INTERIOR DESIGN & DECORATION

NSQF LEVEL - 3

TRADE PRACTICAL

SECTOR : CONSTRUCTION

(As per revised syllabus July 2022 - 1200 hrs)

Directorate General of Training

DIRECTORATE GENERAL OF TRAINING
MINISTRY OF SKILL DEVELOPMENT & ENTREPRENEURSHIP
GOVERNMENT OF INDIA

NATIONAL INSTRUCTIONAL MEDIA INSTITUTE, CHENNAI

Post Box No. 3142, CTI Campus, Guindy, Chennai - 600 032

Sector : Construction

Duration : 1 Year

Trade : Interior Design & Decoration - Trade Practical - NSQF Level - 3 (Revised 2022)

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FOREWORD

The Government of India has set an ambitious target of imparting skills to 30 crores people, one out of every four Indians, by 2020 to help them secure jobs as part of the National Skills Development Policy. Industrial Training Institutes (ITIs) play a vital role in this process especially in terms of providing skilled manpower. Keeping this in mind, and for providing the current industry relevant skill training to Trainees, ITI syllabus has been recently updated with the help of Mentor Councils comprising various stakeholder's viz. Industries, Entrepreneurs, Academicians and representatives from ITIs.

The National Instructional Media Institute (NIMI), Chennai has now come up with instructional material to suit the revised curriculum for **Interior Design & Decoration Trade Practical NSQF Level - 3 (Revised 2022) in Construction Sector.** The NSQF Level - 3 (Revised 2022) Trade Practical will help the trainees to get an international equivalency standard where their skill proficiency and competency will be duly recognized across the globe and this will also increase the scope of recognition of prior learning. NSQF Level - 3 (Revised 2022) trainees will also get the opportunities to promote life long learning and skill development. I have no doubt that with NSQF Level - 3 (Revised 2022) the trainers and trainees of ITIs, and all stakeholders will derive maximum benefits from these IMPs and that NIMI's effort will go a long way in improving the quality of Vocational training in the country.

The Executive Director & Staff of NIMI and members of Media Development Committee deserve appreciation for their contribution in bringing out this publication.

Jai Hind

Addl. Secretary/Director General (Training)
Ministry of Skill Development & Entrepreneurship,
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New Delhi - 110 001

PREFACE

The National Instructional Media Institute (NIMI) was established in 1986 at Chennai by then Directorate General of Employment and Training (D.G.E & T), Ministry of Labour and Employment, (now under Ministry of Skill Development and Entrepreneurship) Government of India, with technical assistance from the Govt. of the Federal Republic of Germany. The prime objective of this institute is to develop and provide instructional materials for various trades as per the prescribed syllabi (NSQF LEVEL - 4) under the Craftsman and Apprenticeship Training Schemes.

The instructional materials are created keeping in mind, the main objective of Vocational Training under NCVT/NAC in India, which is to help an individual to master skills to do a job. The instructional materials are generated in the form of Instructional Media Packages (IMPs). An IMP consists of Theory book, Practical book, Test and Assignment book, Instructor Guide, Audio Visual Aid (Wall charts and Transparencies) and other support materials.

The trade practical book consists of series of exercises to be completed by the trainees in the workshop. These exercises are designed to ensure that all the skills in the prescribed syllabus are covered. The trade theory book provides related theoretical knowledge required to enable the trainee to do a job. The test and assignments will enable the instructor to give assignments for the evaluation of the performance of a trainee. The wall charts and transparencies are unique, as they not only help the instructor to effectively present a topic but also help him to assess the trainee's understanding. The instructor guide enables the instructor to plan his schedule of instruction, plan the raw material requirements, day to day lessons and demonstrations.

In order to perform the skills in a productive manner instructional videos are embedded in QR code of the exercise in this instructional material so as to integrate the skill learning with the procedural practical steps given in the exercise. The instructional videos will improve the quality of standard on practical training and will motivate the trainees to focus and perform the skill seamlessly.

IMPs also deals with the complex skills required to be developed for effective team work. Necessary care has also been taken to include important skill areas of allied trades as prescribed in the syllabus.

The availability of a complete Instructional Media Package in an institute helps both the trainer and management to impart effective training.

The IMPs are the outcome of collective efforts of the staff members of NIMI and the members of the Media Development Committees specially drawn from Public and Private sector industries, various training institutes under the Directorate General of Training (DGT), Government and Private ITIs.

NIMI would like to take this opportunity to convey sincere thanks to the Directors of Employment & Training of various State Governments, Training Departments of Industries both in the Public and Private sectors, Officers of DGT and DGT field institutes, proof readers, individual media developers and coordinators, but for whose active support NIMI would not have been able to bring out this materials.

Chennai - 600 032 **EXECUTIVE DIRECTOR**

ACKNOWLEDGEMENT

National Instructional Media Institute (NIMI) sincerely acknowledges with thanks for the co-operation and contribution extended by the following Media Developers and their sponsoring organisations to bring out this Instructional Material **(Trade Practical)** for the trade of **Interior Design & Decoration** (NSQF LEVEL - 3) (Revised 2022) under **Construction** Sector for ITIs.

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NIMI records its appreciation for the Data Entry, CAD, DTP operators for their excellent and devoted services in the process of development of this Instructional Material.

NIMI also acknowledges with thanks the invaluable efforts rendered by all other NIMI staff who have contributed towards the development of this Instructional Material.

NIMI is also grateful to everyone who has directly or indirectly helped in developing this Instructional Material.

INTRODUCTION

TRADE PRACTICAL

The trade practical manual is intented to be used in workshop . It consists of a series of practical exercises to be completed by the trainees during the course of the **Interior Design & Decoration** Trade supplemented and supported by instructions/ informations to assist in performing the exercises. These exercises are designed to ensure that all the skills in compliance with NSQF LEVEL - 3

Module 1 - Basics of Interior Design and Functional Aspects

Module 2 - Furniture Design and Details

Module 3 - Planning of Residential Interior Spaces

Module 4 - Civil Components

Module 5 - Perspective Drawing and Basics of Computer

Module 6 - Basic of Auto CAD software and Preliminary Auto CAD Software

Module 7 - Civil Components (Ceiling & Flooring)

Module 8 - Joinery Details and Paints

Modfule 9 - Civil Components (Partition)

Module 10 - Plumbing and Sanitation, Lighting, Electrical & Air Conditioning

Module 11 - Commercial Interior Guidelines and Design

The skill training in the shop floor is planned through a series of practical exercises centred around some practical project. However, there are few instances where the individual exercise does not form a part of project.

While developing the practical manual a sincere effort was made to prepare each exercise which will be easy to understand and carry out even by below average trainee. However the development team accept that there is a scope for further improvement. NIMI, looks forward to the suggestions from the experienced training faculty for improving the manual.

TRADE THEORY

The manual of trade theory consists of theoretical information for the course of the **Interior Design & Decoration** Trade. The contents are sequenced according to the practical exercise contained in the manual on Trade practical. Attempt has been made to relate the theortical aspects with the skill covered in each exercise to the extent possible. This co-relation is maintained to help the trainees to develop the perceptional capabilities for performing the skills.

The Trade theory has to be taught and learnt along with the corresponding exercise contained in the manual on trade practical. The indicating about the corresponding practical exercise are given in every sheet of this manual.

It will be preferable to teach/learn the trade theory connected to each exercise atleast one class before performing the related skills in the shop floor. The trade theory is to be treated as an integrated part of each exercise.

The material is not the purpose of self learning and should be considered as supplementary to class room instruction.

CONTENTS

LEARNING / ASSESSABLE OUTCOME

On completion of this book you shall be able to

S.No.	Learning Outcome	Ref. Ex.No.
1	Appraise the importance of interior designing & drawing instruments, drawing sheets, Lettering following safety precautions. (Map Nos:IES/N9454)	1.1.01 - 1.1.06
2	Draft the Geometrical shapes and projection with the help of engineering scale and free hand sketches. (Map Nos:IES/N9455)	1.1.07 - 1.1.12
3	Draft the design with the help of color scheme and apply with rules and calculations. Analysis and uses of building materials. (Map Nos:IES/N9456)	1.1.13 - 1.1.16
4	Draw furniture designing & detailing. (Map Nos:IES/N9457)	1.2.17 - 1.2.19
5	Draw residential plan with necessary working drawing. (Map Nos:IES/N9458)	1.3.20 - 1.3.24
6	Draw different types of staircase. (Map Nos:IES/N9459)	1.4.25 - 1.4.27
7	Apply basic knowledge of structural part of building. (Map Nos:IES/N9460)	1.4.28 - 1.4.29
8	Draw doors and windows & details. (Map Nos:IES/N9461)	1.4.30 - 1.4.33
9	Draw one and two points perspective view. (Map Nos:IES/N9462)	1.5.34 - 1.5.35
10	Prepare power point presentation with animation. (Map Nos:IES/N9463)	1.5.36 - 1.5.37
11	Create object on 2D using tool bars, commands. (Map Nos:IES/N9464)	1.6.38 - 1.6.40
12	Draw different types of false ceiling by using CAD. (Map Nos:IES/N9465)	1.7.41 - 1.7.42
13	Draw different types of flooring by using CAD. (Map Nos:IES/N9466)	1.7.43 - 1.7.44
14	Draw different types of carpentry joints by using CAD. (Map Nos:IES/N9467)	1.8.45 - 1.8.47
15	Analyse and uses of paints polish and varnish. (Map Nos:IES/N9468)	1.8.48 - 1.8.50
16	Draw different types of partition wall by using CAD. (Map Nos:IES/N9469)	1.9.51 - 1.9.52
17	Draw plumbing and drainage details and sanitary fittings by using CAD. (Map Nos:IES/N9470)	1.10.53 - 1.10.55
18	Draw lighting and electrical layout plan by using CAD. (Map Nos:IES/N9471)	1.10.56 - 1.10.58
19	Draw air conditioning layout by using CAD./other software. (Map Nos:IES/N9472)	1.10.59
20	Draw commercial interiors by using CAD. other software. (Map Nos:IES/N9473)	1.11.60 - 1.11.63

SYLLABUS

Duration	Reference Learning Outcome	Professional Skills (Trade Practical) with Indicative hours	Professional Knowledge (Trade Theory)
Professional Skill 10 Hrs; Professional Knowledge 06 Hrs	Appraise the importance of interior designing & drawing instruments, drawing sheets, Lettering following safety precautions. (Map Nos:IES/N9454)	1. Familiarization with the trade & institute. (01 hrs) 2. Importance of trade training. (01 hrs) 3. Uses of tools, equipments & instruments. (01 hrs) 4. Free hand sketches of objects. (02 hrs) 5. Recognize & Layout of drawing sheet including title card as an example portrait & landscape. (03 hrs) 6. Importance of Lettering with the help of single stroke Gothic Letter. (02 hrs)	Importance OF TRADE & necessity of interior designing. In industry Interior design as a profession Modern interior design feature Introduction of tools and equipments, and raw material their used. like drafting board, T scale mini drafter (M.D.), Set Square etc. pencill etc(06 hrs.)
Professional Skill 34 Hrs; Professional Knowledge 10 Hrs	Draft the Geometrical shapes and projection with the help of engineering scale and free hand sketches. (Map Nos:IES/N9455)	7. Draw different types of lines by Free hand. (04 hrs) 8. Introduce the scale MKS and FPS for making the drawing. (06 hrs) 9. Draw the simple composition of geometrical object with help of scale. (06 hrs) 10. Draw the simple exercise using lines in different angles. (04 hrs) 11. Draft the plan, elevation & sectional elevation & isometric view of geometrical solids. Regular, Irregular shapes. (10 hrs) i. Cube ii. Cuboids iii. Triangular prism iv. Cylinder v. Pyramid vi. Hexagonal prism vii. Hexagonal Pyramid viii. Cone 12. Free hand sketches of graphic symbols. (04 hrs)	Introduction to Indian Standards Institution Code of practice for general interior drawing. Introduction & Importance of lines i. Continuous thick & thin line ii. Dashed thin line iii. Cutting plan line iv. Long & short break line thick line Basic knowledge of geometrical shapes & lines. Definition of projection Types of projection Parallel projection i. Oblique ii. Orthographic iii. Axonometric iv. Isometric Definition: - i. Layout of plan ii. Elevation (Front & side elevation) (10 hrs.)
Professional Skill 50 Hrs; Professional Knowledge 12 Hrs	Draft the design with the help of color scheme and apply with rules and calculations. Analysis and uses of building materials. (Map Nos:IES/N9456)	**Functional designing of interiors:** 13. How to make design: - (12 hrs) i. Flow of circulation chart (Bubble diagram) ii. Concept of design, pattern, colour iii. Designing of space with furniture layout 14. Design knowledge of interior in residential & commercial. (20 hrs)	**Principle of elements and interior design:** Introduction of basic interior design. i. Elements- example: line, etc. ii. Principle of design example: balance, emphasis etc. Colors: Types of color schemes based on the color wheel. i. triad colour scheme: a) Primary.

		i. Basic layout plan. ii. Elevation. 15. Free hand sketches of Graphic symbols for landscape and building materials. (12 hrs) 16. Rendering with pencil and pencil colour. (06 hrs)	b) Secondary. c) Tertiary. ii. related colour scheme: a) Analogues. b) Monochromatic. c) Achromatic. d) Neutral. iii. contrasting: a) Complementary. b) Split complementary. c) Double split d) Complementary. e) Cool colour, warm colour. Understand the psychological affects by different colours on different person and places. Introduction of Graphic symbols in interior. Understand impartance of building materials (12 hrs.)
Professional Skill 48Hrs; Professional Knowledge 10 Hrs	Draw furniture designing & detailing. (Map Nos:IES/ N9457)	**Furniture design and detail:** 17. Residential furniture. Table, chair, sofa, cabinet, bed, wardrobe, dining table,wall unit. (20 hrs) 18. Commercial furniture. Executive table/ office table, Reception table, cabinet storage, Display unit. (23 hrs): Note: Necessary practical training will be carried out on site. 19. Free hand sketches of graphic symbol of furniture (5hrs)	**Furniture design:** Furniture styles: i. Traditional/classic style. ii. Ethnic style. iii. Contemporary style. Types of furniture: i. Daily uses furniture ii. Loose carpentry furniture. iii. Fixed carpentry furniture. iv. Multi-utility storage v. Open & closed storage Importance of anthropometric and ergonomics. (10 hrs.)
Professional Skill 100Hrs; Professional Knowledge 23Hrs	Draw residential plan with necessary working drawing. (Map Nos:IES/ N9458)	**Drafting of Residential Plan (Any Room):** 20. Concept plan with circulation flow (Bubble Diagram). (10 hrs) 21. Basic furniture layout plan with working drawing. (20 hrs) 22. Wall elevation with dimension and specification. (20 hrs) 23. Necessary details. (30 hrs) 24. Rendering the plan & elevations. (20 hrs)	**Planning of Interiors:** Space selection for circulation and furniture. Selection of furniture according to functional space. Uses of furniture templates. (22 hrs.)
Professional Skill 28 Hrs; Professional Knowledge 06 Hrs	Draw different types of staircase. (Map Nos:IES/N9459)	25. Prepare drawing with technical details of the R.C.C. Stair case. (14 hrs) i. Straight Staircase. ii. Open newel Staircase. iii. Dog legged Staircase. iv. Bifurcated Staircase. 26. Calculation of Staircase (tread and riser). (10 hrs) 27. Model of staircase (4hrs)	**Stair case:** Requirement and placement of good Staircase. Basic terminology of R.C.C. Staircase. Types of Staircase. i. Straight. ii. Quarter turn iii. Half turn (Dog legged) iv. Three quarter turn v. Bifurcated vi. Open newel.

			vii. Geometrical viii. Circular ix. Spiral. Model of Staircase: - Demonstration of R.C.C. Staircase with the help of respective models. (06 hrs.)
Professional Skill 36 Hrs; Professional Knowledge 06 Hrs	Apply basic knowledge of structural part of building. (Map Nos:IES/N9460)	**Preparing drawing:** 28. Basic concept of section of a building through toilet & balcony introducing the beam & column. (20 hrs) and kitchen 29. Preparing of drawings i)types of brick bond ii) English and Flemish bond iii) lintals & arches iv) foundation drawing (16hrs)	Basic knowledge & importance in PPT/ video presentation i. Mezzanine floor a) Temporary b) Semi permanent ii. Stone masonry & types iii. Brick masonry & bonds • Stretcher bond • Header bond • English bond • Flemish bond • Raking bond • Zigzag bond iv. Lintels & types v. Arches & types and terminology vi. foundation (06 hrs.)
Professional Skill 48 Hrs; Professional Knowledge 12 Hrs	Draw doors and windows & details. (Map Nos:IES/N9461)	30. Model of Door window: - Demonstrate doors and windows with the help of respective models. (04 hrs) 31. Preparing of plan, elevation & section of door (16 hrs) i. Panelled door ii. Glazed or sash iii. Flush door 32. Preparing of plan, elevation & section of window. (16 hrs) i. Casement window with ventilator (wooden) ii. Sash window (wooden) iii. Sliding window (aluminium) 33. Free hand sketches of graphic & symbols for doors and windows (12hrs)	**Wooden Doors & Windows** Introduction of hardware fitting in door & windows with dimension Types of Doors i. Batten and ledged door ii. Framed and panelled door iii. Glazed or sash door iv. Flush door v. Louvered door vi. Wire gauged door vii. Revolving viii. Sliding (Aluminium) ix. Swing door/ floor spring door Placement of door & windows regarding circulation of space Definition of technical terms of doors & window Size of doors & windows, ventilators Types of windows • Fixed window • Casement window • Sliding window • Sash window • Louvered window • Metal window • Bay window • Corner window • Dormer window • Gable window • Sky light window Fixture and fastening a) hinges, b) bolts, c) handles d) locks (12 hrs.)

Professional Skill 30 Hrs; Professional Knowledge 10Hrs	Draw one and two points perspective view. (Map Nos:IES/ N9462)	**Preparation of drawing** 34. Draft one-point perspective view with approximate method (any room). (20hrs) 35. Render the perspective view with any medium. (10 hrs) Computer & drawing software 36. Installation and use of software i.e. Coral Draw, Photoshop and Sketch up,3D's Max with V-ray and Luminous Prepare the power point still presentation. (26 hrs) 37. Prepare the power point animated presentation. (20 hrs)	**Projection** Perspective projection definition i. 1 point ii. 2 point iii. 3 point (Describe the one-point perspective with approximate method) Definition i. Ground plane ii. Station point iii. Picture plane iv. Horizontal plane v. Ground line vi. Horizontal line or eye level Vanishing point (10 hrs.)
Professional Skill 46 Hrs; Professional Knowledge 12 Hrs	Prepare power point presentation with animation. (Map Nos:IES/N9463)	**Computer & drawing software** 36. Installation and use of software i.e. Coral Draw, Photoshop and Sketch up,3D's Max with V-ray and Luminous Prepare the power point still presentation. (26 hrs) 37. Prepare the power point animated presentation. (20 hrs)	Knowledge of Computer and software Microsoft Power point, commands and their uses. Basic introduction of 3 DMax (12 hrs.)
Professional Skill 110Hrs; Professional Knowledge 23 Hrs	Create object on 2D using tool bars, commands. (Map Nos:IES/N9464)	**2D Software training-** 38. Installation of AUTOCAD software. (10 hrs) 39. Elementary commands and menus of AUTOCAD software. (45 hrs) 40. Drawing practice on AUTOCAD software.Drawing practice on AUTO CAD or other software (55 hrs)	**Preliminary Drawing in AUTO CAD** i) 2D commands and use of different menus. ii) Concept of 2D drawing. iii) Concept of rendering. (23 hrs.)
Professional Skill 40 Hrs; Professional Knowledge 10 Hrs	Draw different types of false ceiling by using CAD. (Map Nos:IES/ N9465)	Preparing of drawing with AUTOCAD and user software Installation and uses of software i.e. coral drawing, photoshop and sketches up 30 s mac with v.rag anf lumion 40. drawing practice on AUTOCAD and other software 41. Design a false ceiling in a room. (20 hrs) 42. Specify the level and section and finishing material (laminate, veneer, paints). (20 hrs)	**Ceiling** Definition of false ceiling to understand the job fabrication installation process of false ceiling with Gyp board / POP board / Ply / Wood Types of ceiling i. Grid ii. Coffered iii. Cove iv. Plain Finishing materials used for false ceiling. Laminate, veneer, stone, glass, acrylic sheet, MDF, paints, wall paper, fabric, stainless steel, wood. (10 hrs.)
Professional Skill 40 Hrs; Professional Knowledge 10 Hrs	Draw different types of flooring by using CAD. (Map Nos:IES/N9466)	**Preparing of drawing with AUTOCAD and user software** 43. Design a flooring pattern with finishing material (Marble, Vitrified tile, PVC. Laminated). (30 hrs) 44. Specify the starting point of flooring and Specify the dimension & sizes. (10 hrs)	**Types of floor finishing** i. Stone ii. Marble iii. Mosaic iv. Vinyl v. Vitrified tiles vi. Ceramic tiles vii. PVC viii. Carpet ix. Laminated x. Glass (10 hrs.)

Professional Skill 36 Hrs; Professional Knowledge 10 Hrs	Draw different types of carpentry joints by using CAD. (Map Nos:IES/ N9467)	**Drafting simple joints used in furniture** 45. Drafting details drawing of different types of joints. (20 hrs) 46. Draft a sheet of door/ window/ chair/ table/ bed (any one) (14 hrs) 47. Model of carpentry joints.Demonstration of Stair Case with the help of respective models (2hrs)	**Carpentry joints** Types of joints i. Butt joint ii. Mitre joint iii. Lap joint iv. Mortise and Tenon joint v. Tounge and groove joint vi. Housed joint vii. Cross joint Joints used in furniture Joints used in doors/ windows/ ventilators.
Professional Skill 20 Hrs; Professional Knowledge 06 Hrs	Analyse and uses of paints polish and varnish. (Map Nos:IES/N9468)	**Generate Power Point Presentation for Paint, Polish and Varnish -** 48. Practicing processes & techniques of paints, polishing & varnishing on surfaces. (12 hrs) 49. Recognize the tool & equipment and their uses. (02 hrs) 50. Estimate quantity of materials used on surface and labour cost. (06 hrs) **NOTE: - necessary practical training will be carried out on site.**	**Paints and polishing/varnishing:** What is paint Types of paints i. Synthetic enamel ii. Acrylic Emulsion iii. distemper iv. Epoxy v. Nitro Cellulose vi. Metallic vii. Texture viii. Lime wash ix. Exterior paint Painting techniques i. By Brush ii. By Roller iii. By spray gun Paintings defeats and remedies. Introduction of polish and varnish: Method of preparation and types of polish on wood. Types of varnishes: i. Oil ii. Spirit iii. Turpentine iv. Melamine v. PU (polyurethane) (06 hrs.)
Professional Skill 36 Hrs; Professional Knowledge 10 Hrs	Draw different types of partition wall by using CAD. (Map Nos:IES/N9469)	51. Design the full height and low height partition wall with different construction and finishing materials. (18 hrs) 52. Draft Plan, sectional plan, front elevation and section with specification and dimension. (18 hrs)	**Partition wall:** Introduction of partition wall Property of a good partition wall Types of partition wall i. Brick partition ii. Glass partition iii. Timber or wooden partition iv. Aluminium partition (10 hrs.)
Professional Skill 28 Hrs; Professional Knowledge 06 Hrs	Draw plumbing and drainage details and sanitary fittings by using CAD. (Map Nos:IES/N9470)	53. Layout the plumbing / drainage /Sanitary plan and sectional elevation. (10 hrs) 54. Make Top plan, side elevation, and front elevation of all sanitary plumbing fittings with dimension. (12 hrs) 55. Free hand sketches of graphic symbols for plumbing and sanitary (06hrs)	**Plumbing:** Purpose and principle of house drainage. Types of Drainage plumbing system i. One pipe system ii. Single stack system iii. Single stack (partially ventilated system) iv. Two pipe system Sanitation: Traps i. Gully trap ii. Intercepting trap iii. Grease trap iv. Floor trap or Nahni trap Waste water disposal: i. Inspection chamber ii. Septic tank Pipes: i. Soil pipe

			ii. Waste water pipe iii. Rain water pipe Sanitation fitting: i. Wash basin ii. Sink iii. Bath tub iv. Water closet v. Urinals vi. Flushing cisterns (06 hrs.)
Professional Skill 36 Hrs; Professional Knowledge 10 Hrs	Draw lighting and electrical layout plan by using CAD. (Map Nos:IES/N9471)	56. Layout plan of false ceiling with lighting position, dimensions and specifications. (16 hrs) 57. Layout of electrical plan & elevation along with switch board, electrical fittings & light fittings on wall with dimension. (15 hrs) 58. Free hand sketches of graphic symbols for electrical (05hrs)	**Lighting:** Introduction of natural and artificial light. Differenttypes of lighting arrangements i. Direct lighting • Angular lighting • Down lighting • Eyeball fitting • Track lighting • Shade lighting ii. Indirect lighting iii. Diffused lighting iv. Concealed lighting Varity of lampsi. Incandescent ii. Tungsten halogen iii. Florescent iv. Mercury v. Sodium vapour vi. LED Electrical accessories i. Switches & sockets with box ii. DB (distribution board) & MCB iii. Lamp holders iv. Ceiling roses v. Introduction of LAN/ CCTV/ Biometric/ Speaker/ Smoke Detector (10 hrs.)
Professional Skill 28 Hrs; Professional Knowledge 06 Hrs	Draw air conditioning layout by using CAD./other software. (Map Nos:IES/N9472)	59 Layout plan of window and Split air Conditioning with specification. (28 hrs)	**Air conditioning**: Introduction of Air Conditioning Principle of Air Conditioning Types of Air Conditioning i. Window Air Conditioning ii. Split Air Conditioning iii. Centralised Air Conditioning iv. Cassette Air Conditioning (06 hrs.)
Professional Skill 36 Hrs; Professional Knowledge 10 Hrs	Draw commercial interiors by using CAD. other software. (Map Nos:IES/N9473)	**Office design project: -** 60. Layout plan and Elevations. (06 hrs) 61. Necessary working details to execute the project smoothly. (10 hrs) 62. Free hand sketch for necessary details. (10 hrs) 63. Rendering with gradient & hatches. (10 hrs)	**Planning of commercial interiors: -** Introduction of office building. Offices- i. Interior designer/Architect ii. Lawyer office iii. Administration Room iv. Hotel waiting lounge Follow design guidelines and office space standard. (10 hrs.)

		Workshop Calculation & Science: 32 Hrs.
Professional Knowledge WCS- 32 Hrs.	Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study. (Map Nos:IES/N9402)	**WORKSHOP CALCULATION & SCIENCE:** **Unit, Fractions** Classification of unit system Fundamental and Derived units F.P.S, C.G.S, M.K.S and SI units Measurement units and conversion Factors, HCF, LCM and problems Fractions - Addition, substraction, multiplication & division Decimal fractions - Addition, subtraction, multilipication & division Solving problems by using calculator **Square root, Ratio and Proportions, Percentage** Square and suare root Simple problems using calculator Applications of pythagoras theorem and related problems Ratio and proportion Ratio and proportion - Direct and indirect proportions Percentage Precentage - Changing percentage to decimal and fraction **Material Science** Types metals, types of ferrous and non ferrous metals Physical and mechanical properties of metals Properties and uses of rubber, timber and insulating materials **Basic Electricity** Introduction and uses of electricity, electric current AC,DC their comparison, voltage, resistance and their units Conductor, insulator, types of connections - series and parallel **Mensuration** Area and perimeter of square, rectangle and parallelogram Area and perimeter of Triangles Area and perimeter of circle, semi-circle, circular ring, sector of circle, hexagon and ellipse Surface area and volume of solids - cube, cuboid, Finding the lateral surface area, total surface area **Levers and Simple machines** Lever & Simple machines - Lever and its types
Project Work: - One room estimation of interiors works. **Industrial Visit [Visit to different places for interior work and to different sites where interiors works are in progress & Necessary practical training to be carried out on site.]**		

Interior Design & Decoration - Basics of Interior Design and Functional Aspects

Familarization with trade and institute

Objective: At the end of this exercise you shall be able to
- **identify the trade based on functionality and aestuetics.**

PROCEDURE

TASK 1: **Observe various class rooms around your institute in terms of Interior (Spatial, circulation etc.,) and note down the positive and negative aspects of the design (Fig 1)**

1 Identify interior spaces in the institute.

2 Determine the design aspects of spaces within an architectural environment.

3 Attension to scale and functional aspects.

4 Prepare drawing and documents to the design of interior spaces.

5 Process of involving selection and coordination of interior materials.

6 Arrange the space for furniture and other elements which leads to optimum use of space avaliablity.

7 Plan and use the materials economically.

8 Ensure the project to be completed in time.

9 Identify desire atmosphere and color themes.

10 Make note of positive and negative aspects in written.

11 Carry out discussions in the class room and share your ideas with the instructors.

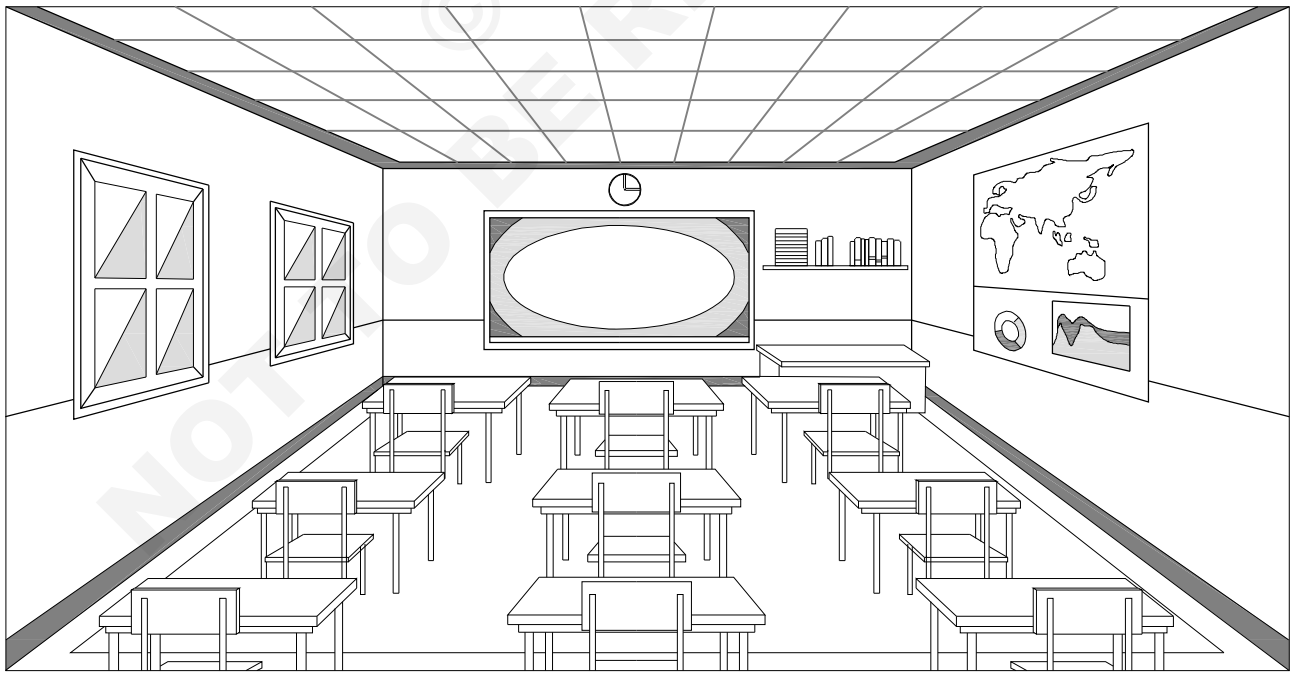
12 Provide finish boards or books to illustrate the color scheme.

13 Check the completed design must clearly convey the design intent.

14 Ensure individual space and requirements.

15 Life safety and fire codes and regulations must be followed in all designs.

Fig 1



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Importance of trade training

Objective: At the end of this exercise you shall be able to
• analyse the interior in terms of spatial planning, material knowledge like texture.

PROCEDURE

TASK 1: **Carryout observation of classrooms in terms of interior (with senses such as sight, smell, taste and touch)**

1 Determine the given interior space (classroom/studio).

2 Inspect the interiors firstly in term of :

a **visual (sight) aspect** (furniture, walls, ceiling etc.,) and make sketches roughly as required.

- Check the materials around the space and take help of the instructor to indentify it.
- Identify forms that had impacted the style and overall impression of the room interms of shapes regular / irregular.

b **Audio aspect -** Identify voices (sound) around the space that promotes noise or quieter elements such as acoustic elements has noise proof wall smell aspect (audio aspect)

c **Smell aspect** - Identify aromas (smell) around the space, since certain odors given comfort and happiness such as presence of fresh flowers.

d **Taste aspect** - Identify color schemes around walls, since color affects the appetite (taste) and will enable you to associate with such colors.

e **Tactile aspect** - Check the textures available in interior space, grains present in furniture (hard/soft), textile fell (touch) in window certains since we are drawn to richness of texture.

Note : During the exercise you can understand that interior designing as a trade is substantial part of our daily life.

— — — — — — — —

TASK 2: **Carryout the professional practice interms of interior**

1 Determine the given interior space (Classroom/ Studio).

2 Arrange eminent and distinguished interior designer to impart specialised education.

3 Laydown general condition of contract and prepare standard forms of agreement.

4 Organise various competitions like Interior of the Year.

5 A code of professional conduct to be established by the practitioners they should understand and adhere to it.

6 Inspect the quality interior design programs in various countries there by develop educational standards.

7 IIID (Indian Institute of Interior Designers) organise seminor and exhibition in india.

— — — — — — — —

Uses of tools, equipments and instruments

Objectives: At the end of this exercise you shall be able to
- **identify drawing tools used in interior design decoration**
- **use drawing tools, equipments and instruments in interior decoration.**

PROCEDURE

TASK 1: **Identifying the tools and equipments (Fig 1 to 24)**

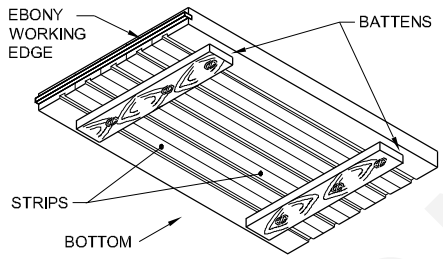
Instructors will explain drawing tools, equipments and instruments name and uses in interior design decorations trade.

1 Trainees will note down name and uses in table 1.

2 Get it checked by your Instructor.

Drawing board (Fig 1)

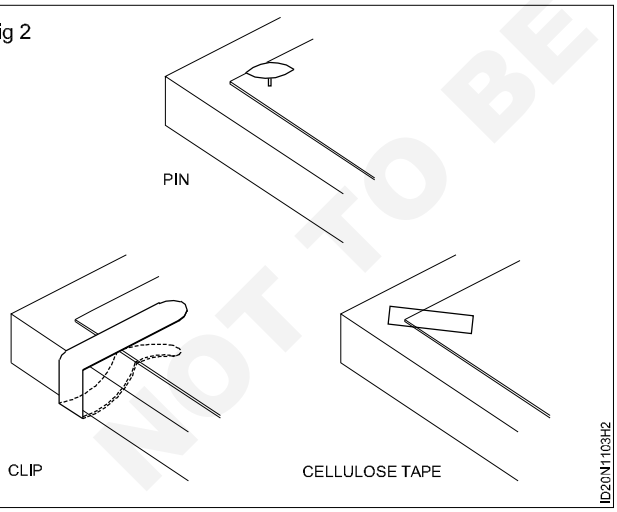
Fig 1



DRAWING BOARD

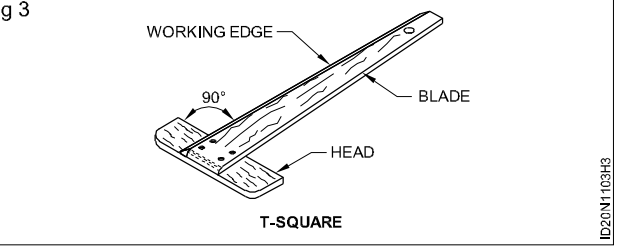
Cellulose tape (Fig 2)

Fig 2



T-Square (Fig 3)

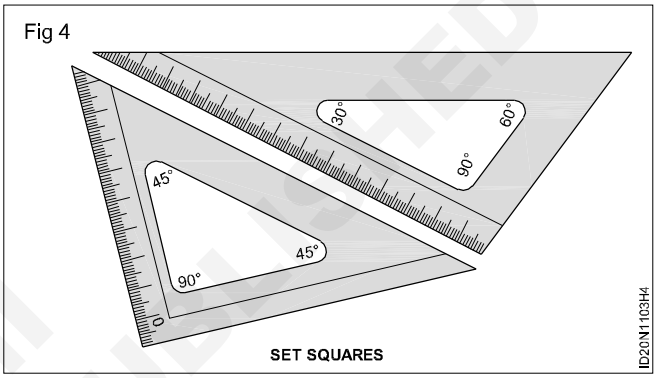
Fig 3



T-SQUARE

Set square (Fig 4)

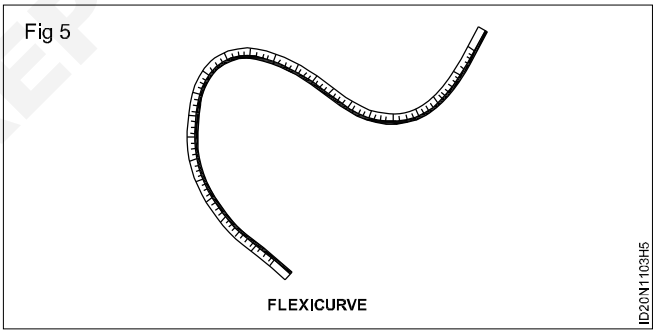
Fig 4



SET SQUARES

Flexicurve (Fig 5)

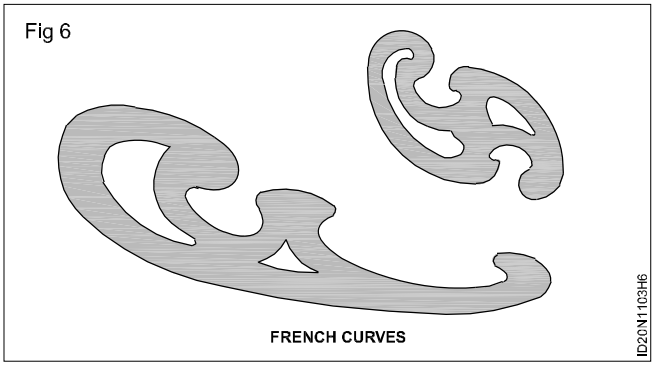
Fig 5



FLEXICURVE

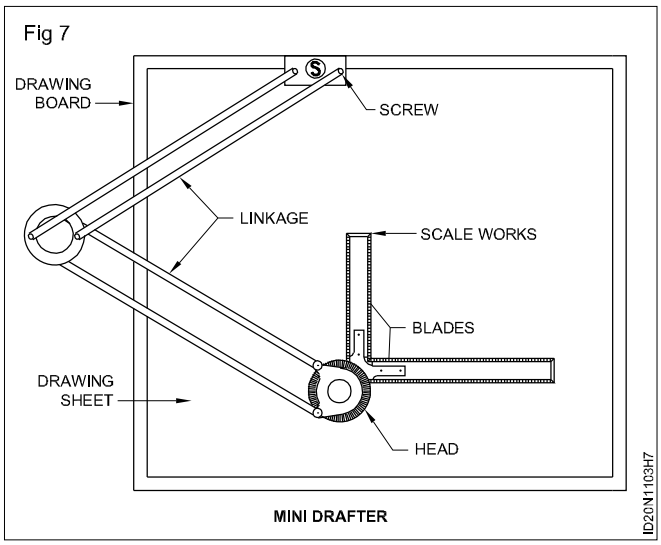
French curves (Fig 6)

Fig 6

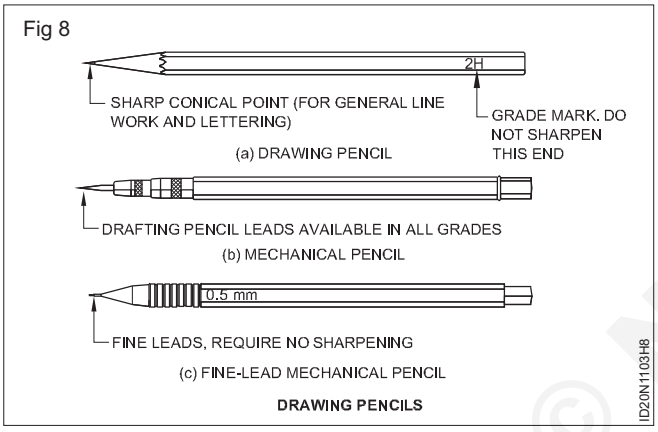


FRENCH CURVES

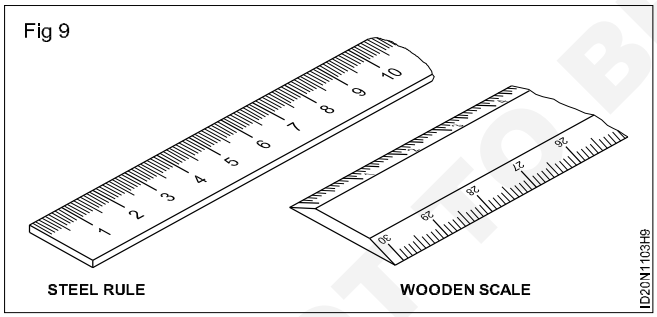
Mini drafter (Fig 7)



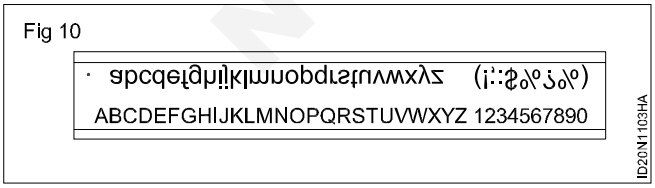
Drawing pencils (Fig 8)



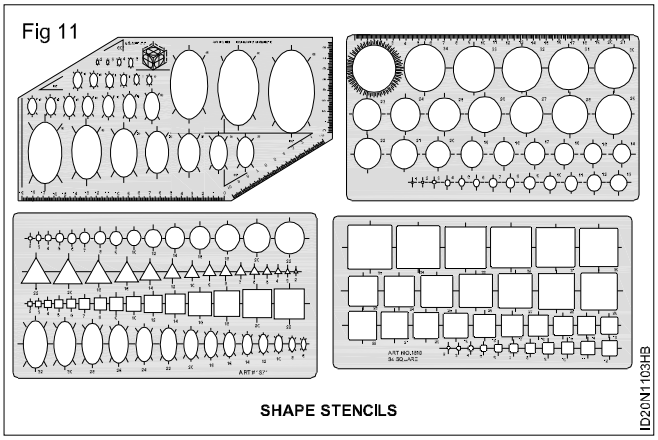
Steel rule and Wooden scale (Fig 9)



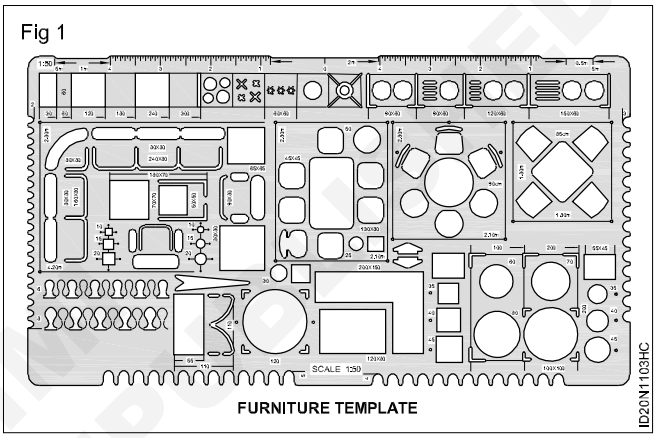
Stencils (Fig 10)



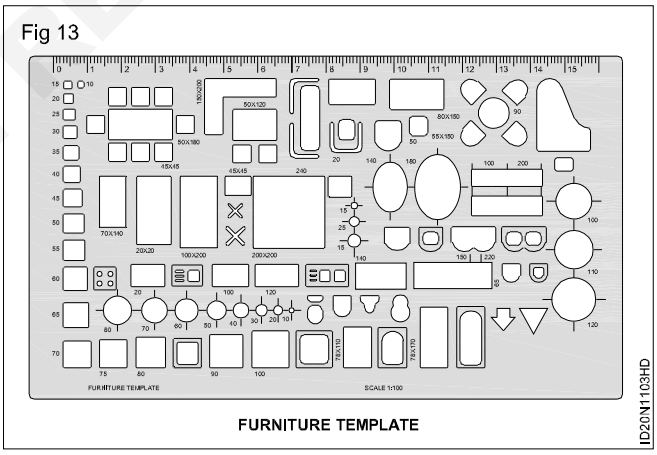
Shape stencils (Fig 11)



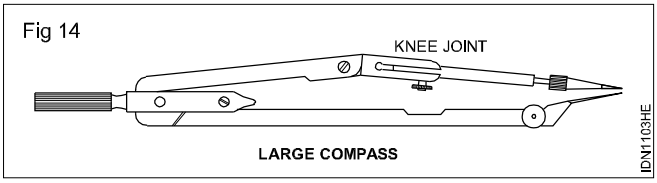
Furniture template - 1:50 (Fig 12)



Furniture template - 1:100 (Fig 13)

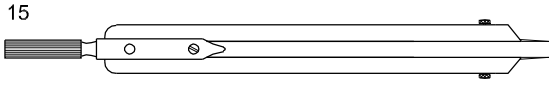


Large compass (Fig 14)



Large divider (Fig 15)

Fig 15

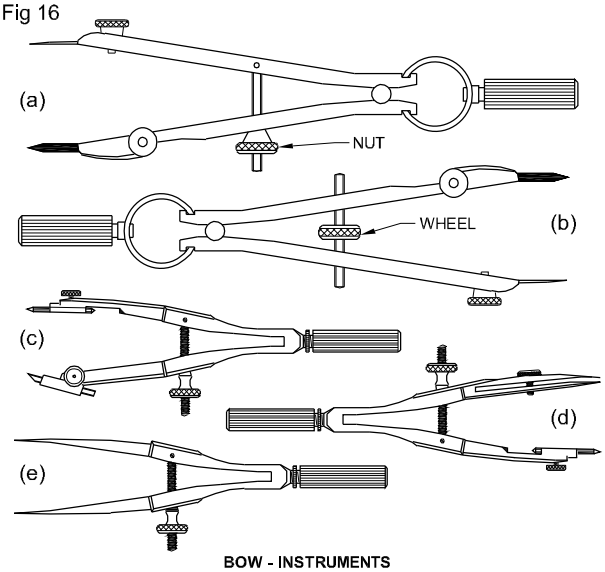


DIVIDER

ID20N1103HF

Bow - instruments (Fig 16)

Fig 16

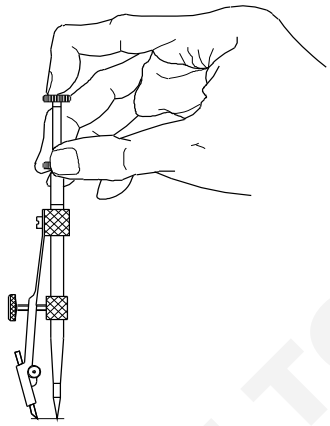


BOW - INSTRUMENTS

ID20N1103HG

Drop spring bow instruments (Fig 17)

Fig 17



DROP SPRING BOW PENCIL

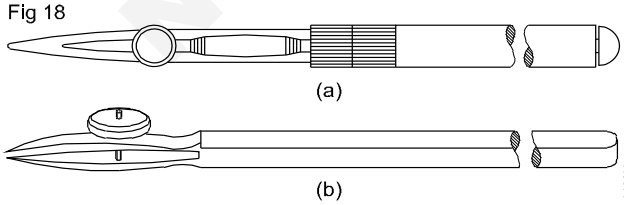
DROP SPRING BOW PEN

DROP SPRING BOW INSTRUMENT

ID20N1103HH

Ruling pens (Fig 18)

Fig 18

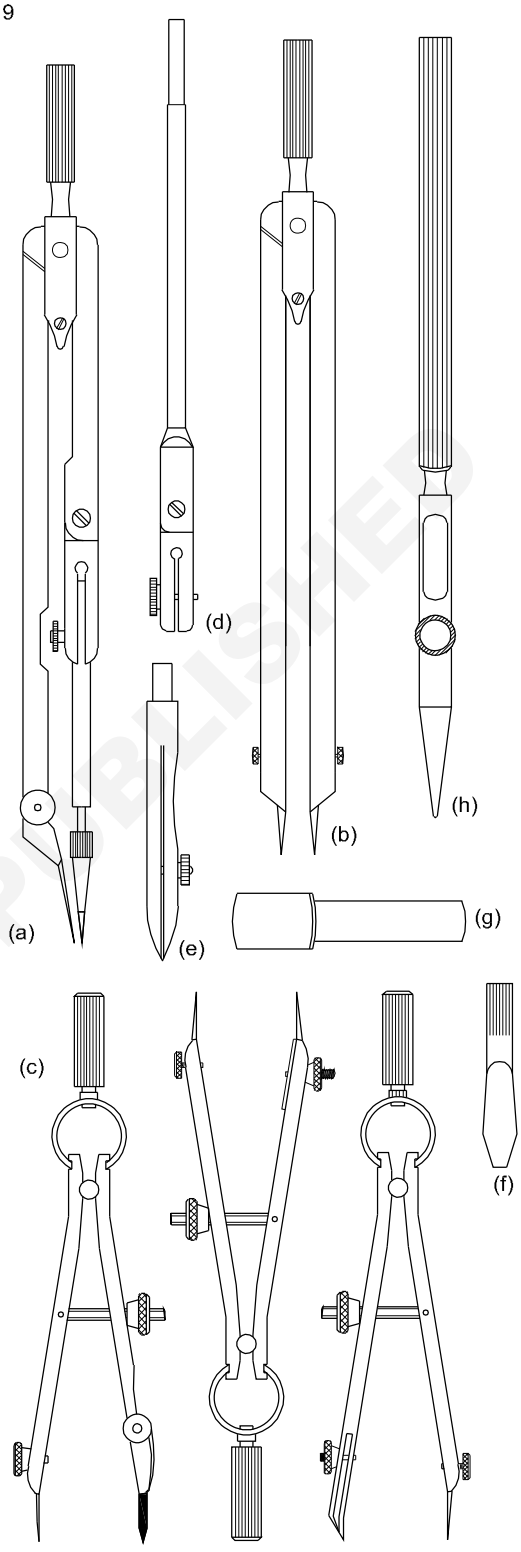


INKING PENS

ID20N1103HI

Drawing instrumens (Fig 19)

Fig 19

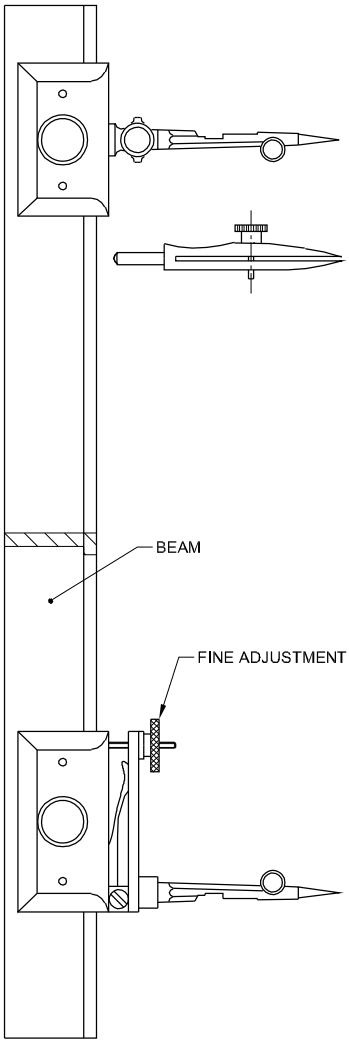


DRAWING INSTRUMENTS

IDN1103HJ

Beam compass (Fig 20)

Fig 20

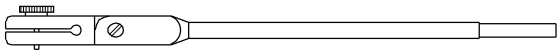


BEAM COMPASS

ID20N1103HK

Lengthening bar (Fig 21)

Fig 21



LENGTHENING BAR

ID20N1103HL

Screw driver (Fig 22)

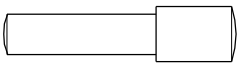
Fig 22

SCREW DRIVER

ID20N1103HM

Lead case (Fig 23)

Fig 23

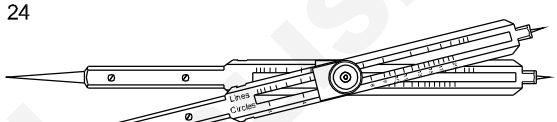


LEAD CASE

ID20N1103HN

Proportional divider (Fig 24)

Fig 24



PROPORTIONAL DIVIDERS

ID20N1103HO

Table 1

Identify the tools and equipment and instrument and its uses

Fig No.	Name	Uses
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
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23		
24		

— — — — — — — —

Free hand sketches of objects

Objective: At the end of this exercise you shall be able to
- **Draw the furniture objects.**

PROCEDURE

TASK 1: **Draw interior related objects as given in Fig 1a to 1d and Fig 2e to 2k.**

1 Set the drawing paper on the board.

2 Draw the free hand sketches of objects.

Fig 1

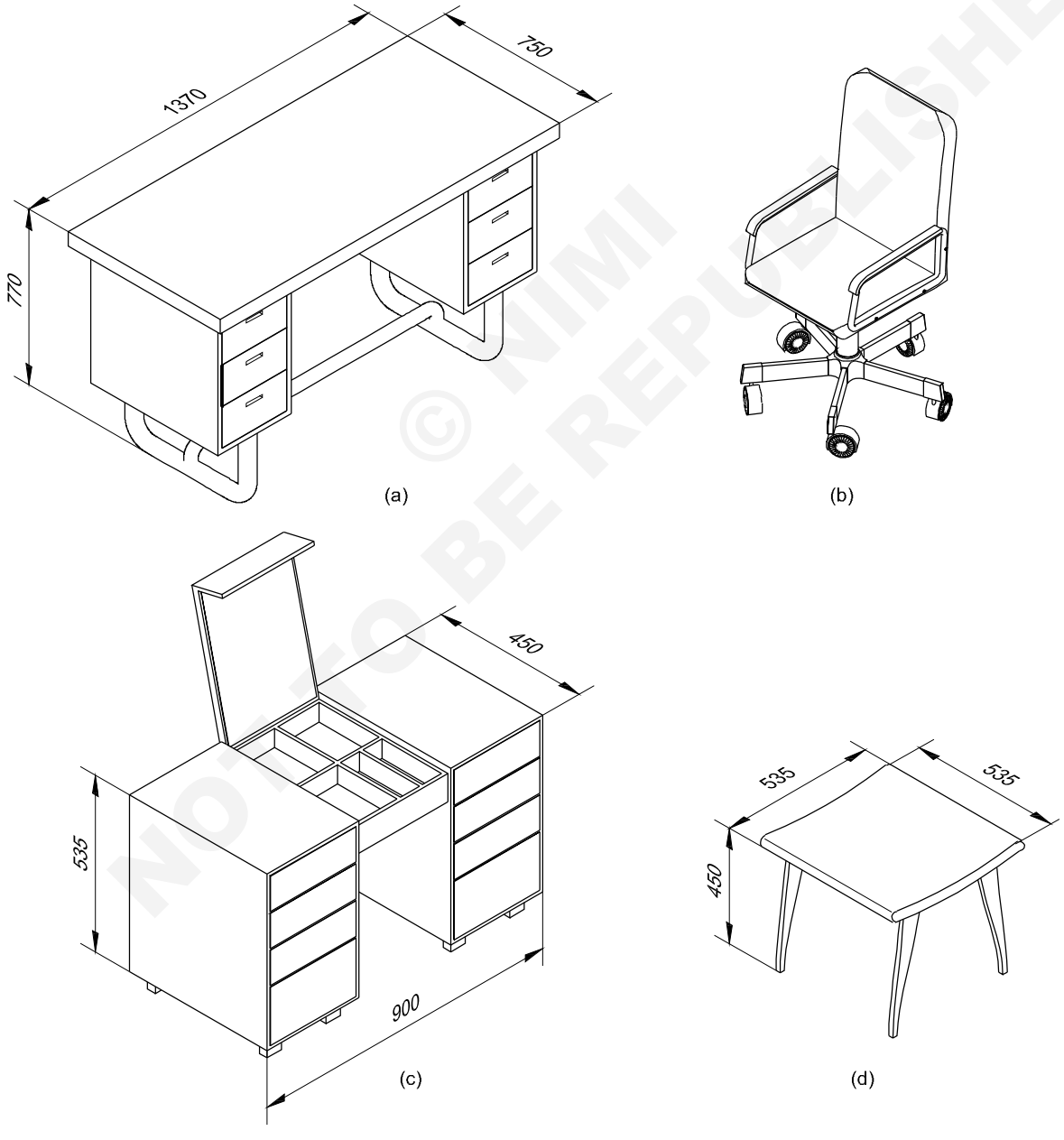
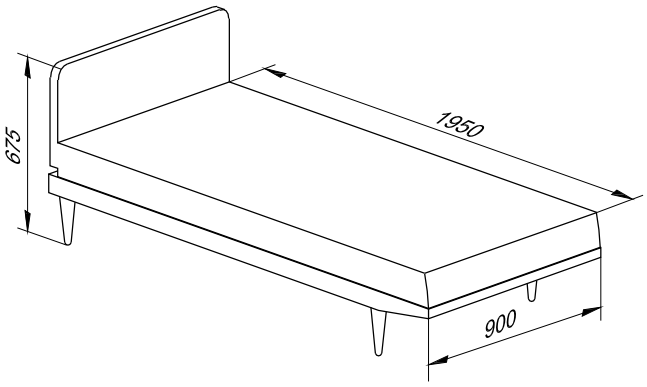
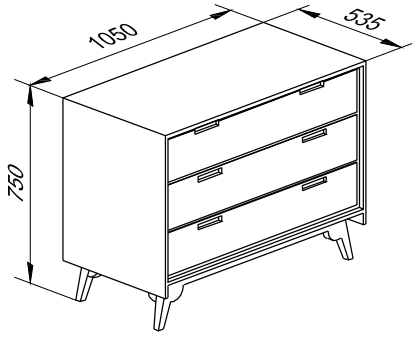


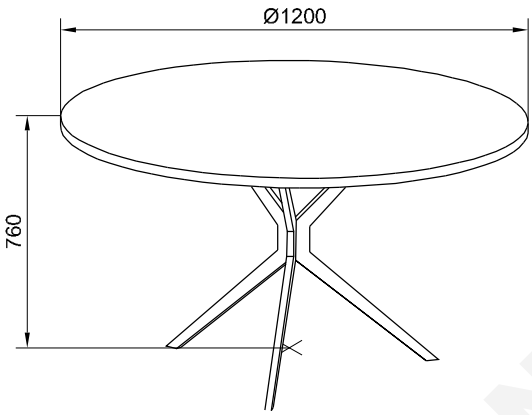
Fig 2



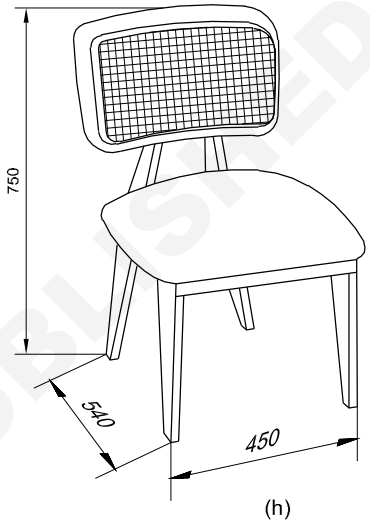
(e)



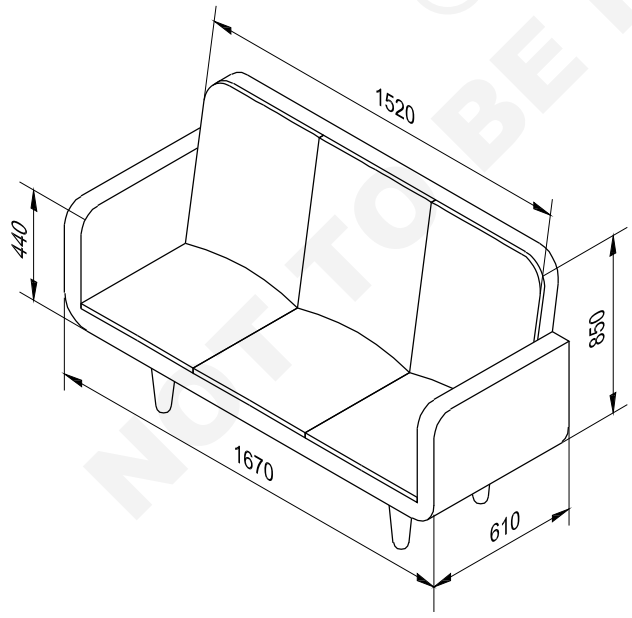
(f)



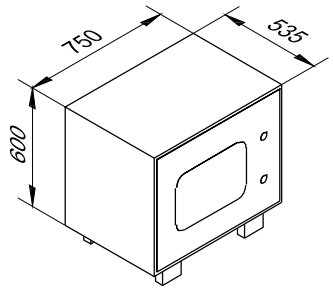
(g)



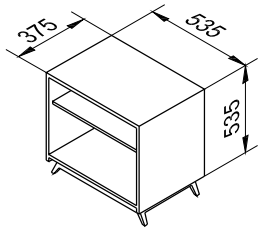
(h)



(i)



(j)



(k)

IDN1105H2

Recognise layout of drawing sheet including title block

Objectives: At the end of this exercise you shall be able to
- **set and fix drawing paper on the drawing board**
- **draw margins and title block frame**
- **layout the drawing sheet**
- **draw the title block as per I.S.**

PROCEDURE

TASK 1: **Prepare the layout as shown below on A2 size paper (Fig 1)**

1 Place the drawing paper centrally on the drawing board.

2 Set the drawing board and align the top edge of the drawing sheet.

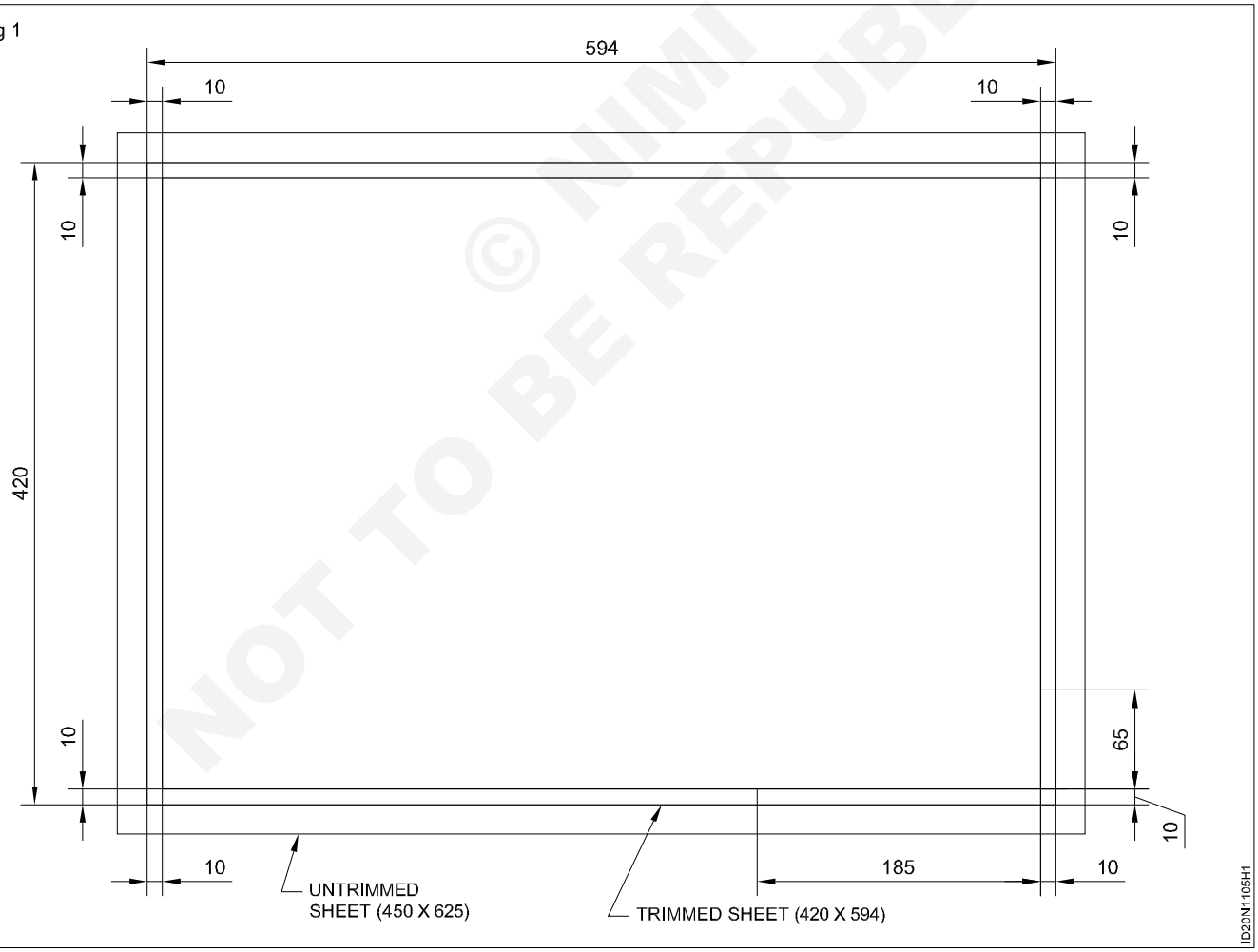
3 Hold the drawing sheet by hand in the same position and fix the sheet in this position with drawing cellolose tape. (Fig 1)

4 Set off the margin distance using scale..

5 Draw four border lines as shown above

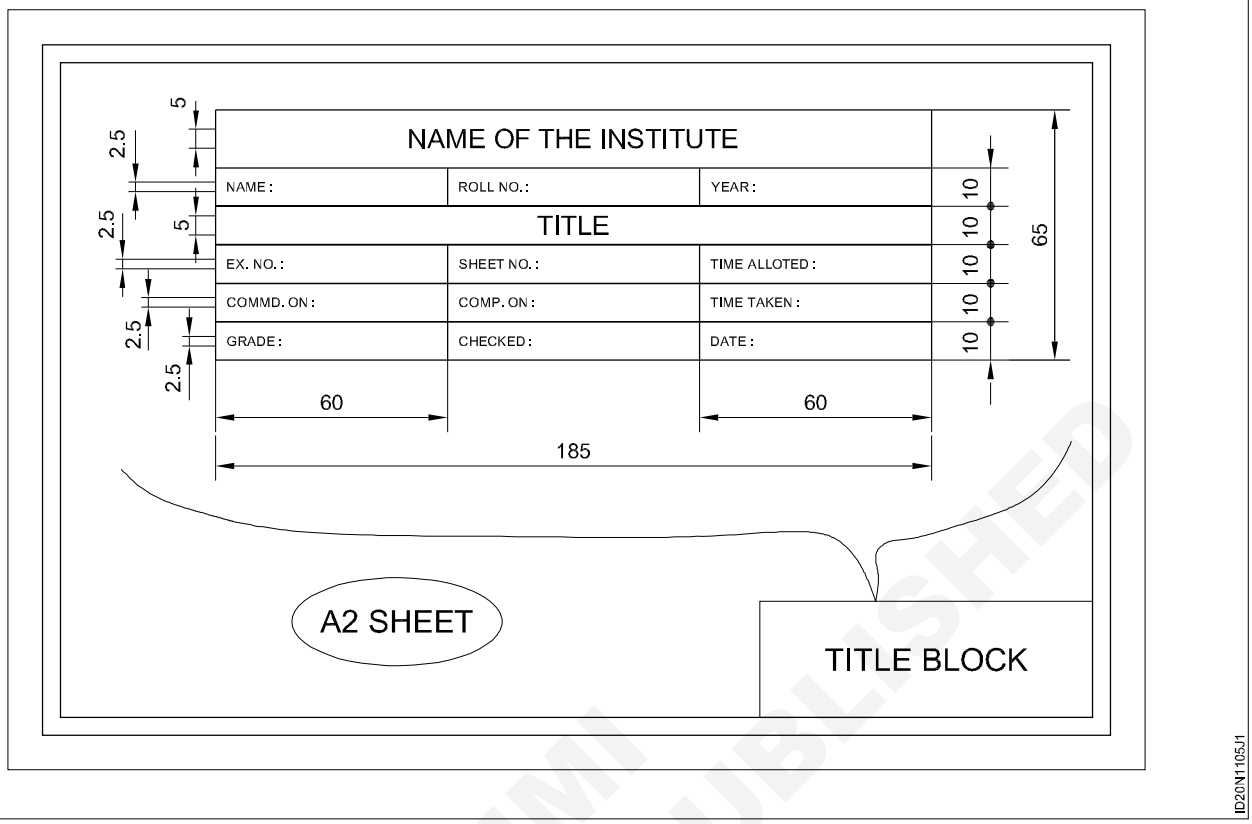
6 Mark and draw the title block.

Fig 1



TASK 2: **Draw this title block in position. In the remaining area of paper print the following (Fig 1)**

Fig 1



1 All dimensions are in mm.

2 Ask if any doubt.

3 Six holes diameter 8 mm equally spaced 60 mm pitch circle diameter.

4 This drawing confirms to IS:9609-1983.

5 Bureau of Indian Standards (BIS) is our national standard.

6 General deviations as per IS:2012;(medium)

7 All thick lines-0.5 mm.

8 Chamfer to bottom of thread.

9 Rough will be the surface marked 'X'.

10 Punch roll number and part number.

- Calculate the width of the each letter.
- Draw the guidelines for the required size:
- Mark the width and spacing for each letter.
- Draw vertical guidelines.
- Print the letter free hand, using HB pencil.
- Draw the subsequent squares with the same.

Importance of lettering with single stroke gothic letter

Objectives: At the end of this exercise you shall be able to
- **importance of lettering in drawing**
- **select and calculate the size of letters**
- **print single stroke letters and numerals by free hand.**

PROCEDURE

TASK 1: **Importance of lettering vertical gothic and gothic letters**

Production

Lettering, in engineering drawing, is an important part of drawing. Lettering enhances the clarity of drawing.

Lettering

The method of writing letters A, B, C, D and numerals 1, 2, 3, 4 etc., titles, notes, scale etc. on drawing is called Lettering.

Types of lettering

1 Gothic Lettering

2 Free Hand Lettering

3 Roman Lettering

1. Gothic Lettering — Single stroke letters of equal thickness and width are called Gothic letters. Gothic letters may be single stroke and double stroke letters. These letters can be written on a scale of 7:4 or 5:4. Letters inclined at 15° to vertical axis are italic gothic letters. All these types of letters are shown in figure below.

— — — — — — — —

TASK 2: **Reproduce single stroke different gothic letters (Fig 1)**

1 Select the size of letters and calculate the height & width of each letter.

2 Arrange and draw the guidelines for the required size.

3 Prepare the layout for printing of letters.

4 Mark the width and spacing for each letters.

5 Draw vertcial guide lines.

6 Print the letter by freeahand, using H or HB pencil.

SIZE	STYLE	SIZE	STYLE
14mm	Vertical capital	10mm	Numerals
14mm	Inclined Capital	14mm	Lower case Vertical
10mm	Vertical Capital	14mm	Lower case inclined
10mm	Inclined Capital	10mm	Lower case vertical
14mm	Numerals	10mm	Lower case inclined

Fig 1

LETTERING PRACTICE

ID20N1106H1

Draw different types of lines by free hand

Objectives: At the end of this exercise you shall be able to
- **sketch horizontal, vertical and inclined lines by free hand**
- **draw circles and arcs by free hand.**

PROCEDURE

TASK 1: **To draw horizontal thick and thin lines by freehand (Fig 1)**

Lengthy lines can be drawn with the forearm motion and short lines are drawn with the wrist motion.

Keep uniform pressure while sketching.

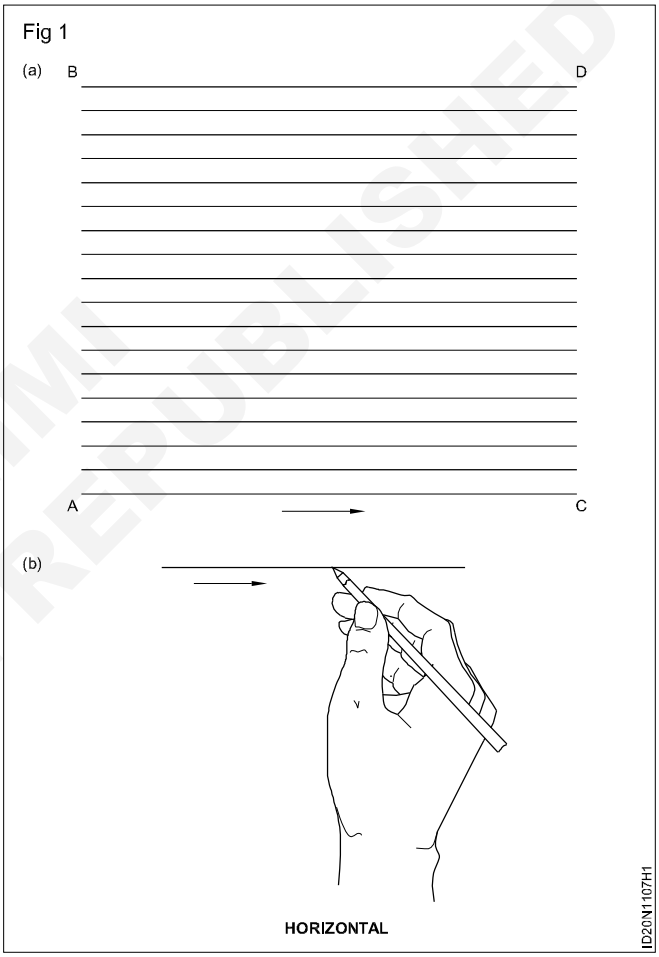
Horizontal lines are drawn from left to right. (Fig 1B)

While sketching straight lines between two points keep your eyes on the point to which the line is to go rather than the point of pencil.

Avoid of drawing whole length of line in one single stroke.

Prevent using eraser often.

Fig 1



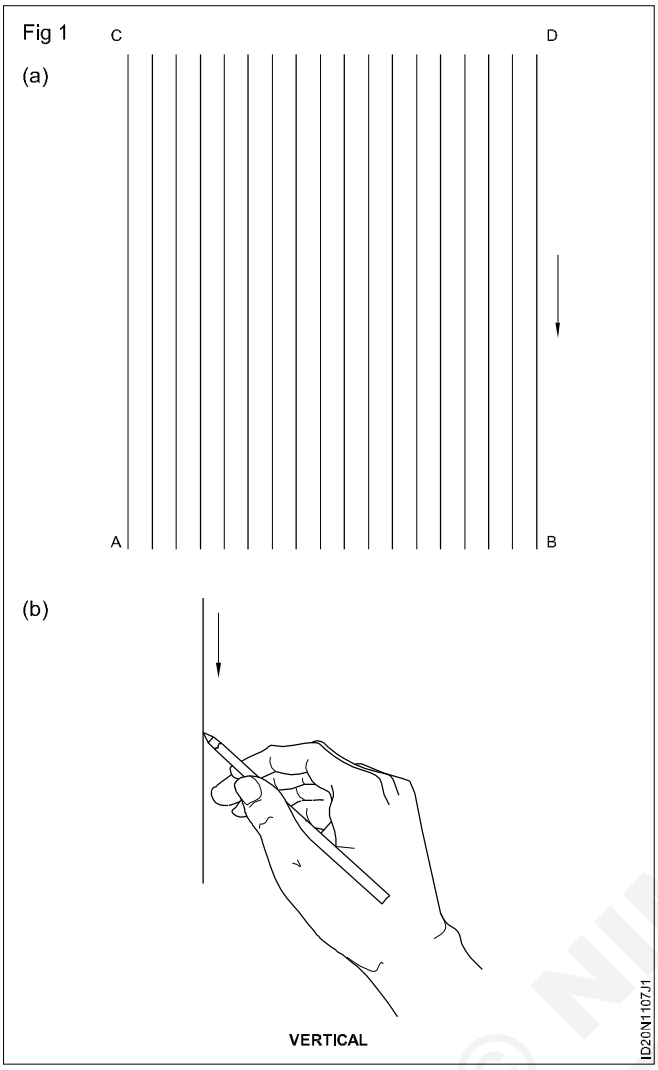
TASK 2: **To draw vertical lines in thick and thin by freehand (Fig 1)**

1 Sketch two horizontal thin guide lines AB & CD.

2 Mark points on the horizontal lines AB & CD, 5 mm intervals.

3 Sketch the line in free hand between the two points with thick and thin alternatively.

Vertical lines are drawn from top to bottom. (Fig 1B)



TASK 3: **Sketch the inclined lines as shown in figure with thick and thin lines by freehand (Fig 1)**

1 Sketch two axis AB & CD.

2 On the horizontal and vertical axis AB and CD, mark points with 5 mm intervals.

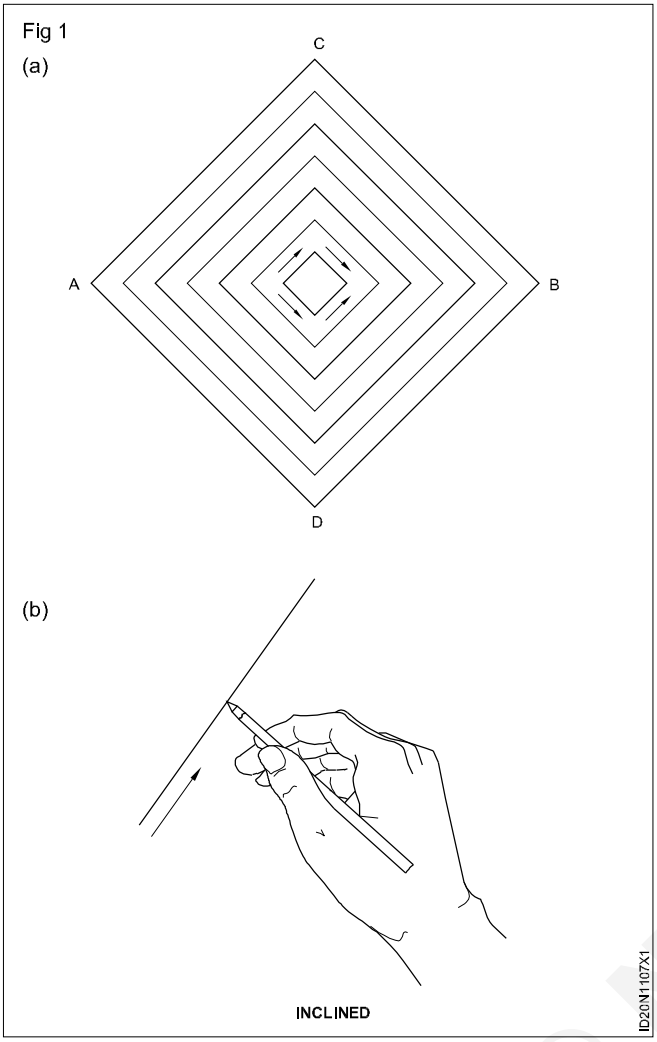
3 Draw thick and thin lines in the direction as shown in the figure alternatively.

Inclined lines running upward are drawn left to right i.e bottom to top. (Fig 1B)

The pencil point need not to be too sharp.

Hold the pencil freely and not close to the point.

It is better that the pencil can be hold 30 mm away from the tip of the pencil lead.



TASK 4: **Draw by free hand circles square method** (Fig 1)

1 Draw a square ABCD of size 60mm x 60mm, if the circle to be drawn is of dia 60mm.

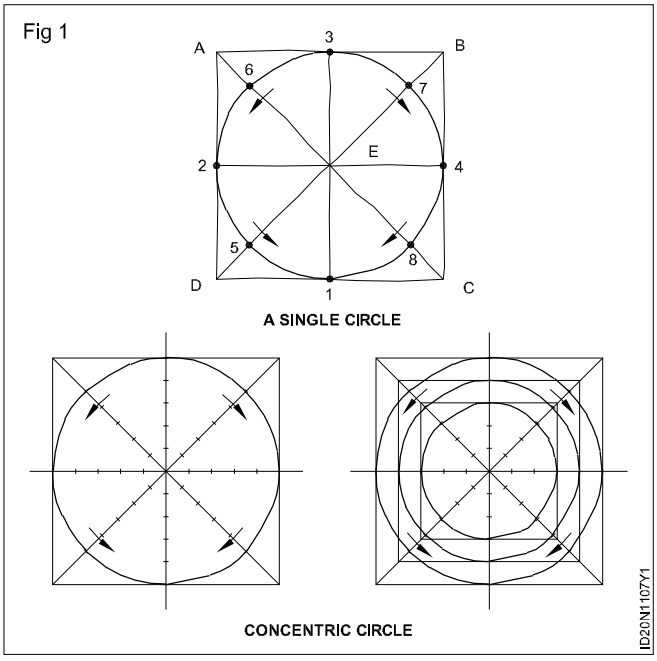
2 Mark the centre of the sides (1,2,3,4).

3 Draw diagonal AC and BD to identify the centre point 'E' of square.

4 Mark half the diversion of one side of square on the AE.

5 Draw small arc joining the three points of one position of square.

6 Similarly draw arcs to form a circle.



TASK 5: **Draw by free hand circles by radial lines method** (Fig 1)

1 Draw the horizontal and vertical centre lines forming a centre.

2 Draw a number of radial lines passing through the centre.

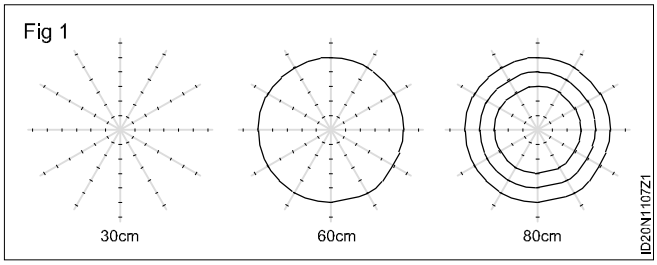
3 Mark uniform divisions approximately 5 mm from the centre on the radial lines.

4 Draw small arcs on the 15 mm marks on each line (30 mm diameter).

5 See that it forms a thin circle, if necessary align and draw the firm line to form a thick circle.

6 Repeat the same method for dia 60 mm and 80 mm circles.

Fig 1



Introduce the scale MKS and FPS for making the drawing

Objectives: At the end of this exercise you shall be able to
• prepare scale of MKS and FPS in drawings.

PROCEDURE

TASK 1: **Draw the given figure using MKS system**

1 Prepare the drawing A2 sheets (border, title, title block frame)

2 Using HB pencil do the drawing illustrated in the figure.

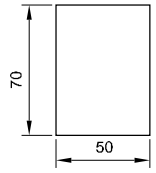
3 Draw the rectangle from (fig 1) using scale 1:1 of MKS scale (metric scale). (50cm x 10 cm)

4 Render (color) it as per your creativity.

5 Draw (fig 2) using scale 1:10/1:20 into proper dimensions (each side - 40 cm). (40cm x 40 cm)

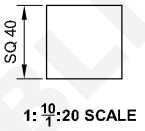
6 All dimensions are measured in cm.

Fig 1



ID20N1108H1

Fig 2



ID20N1108H2

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TASK 2 : **Draw the given figure using MKS system as well as FPS system**

1 Prepare the drawing A2 sheets (border, tittle, tittle block frame)

2 Draw the given Fig 3 of dimension 15'x12' into scale of 1:16 (FPS scale) and 1:50 (MKS scale) while converting 15'x12' in form of metric form (5m x 4m) using HB pencil.

3 Label the windows and door properly.

4 All dimensions need to be precise while doing the drawing.

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Draw the simple composition of geometrical object

Objectives: At the end of this exercise you shall be able to
- **construct an Isometric scale to a given length**
- **draw the isometric projection of regular solids**
- **draw the isometric views of components with horizontal, vertical, slant and curved surfaces**
- **draw the isometric views for the given multi-views.**

PROCEDURE

TASK 1: **Construct an Isometric scale to measure upto 100 mm with minimum reading of 10 mm.**

1 Draw a horizontal line OA.

2 Draw a line OC at 45° to OA and mark 10 mm, 20 mm.....100 mm.

3 Draw another line OB at 30° to OA.

4 Draw vertical projectors from divisions on OC on to OB and mark the divisions as on OC.

The scale on OC is the true scale and the scale on OB is the Isometric scale. (Fig 1a)

Another way of constructing isometric scale.

5 Draw a horizontal OA to a known length.(say 50mm)

6 Draw another line OE at 15° to OA.

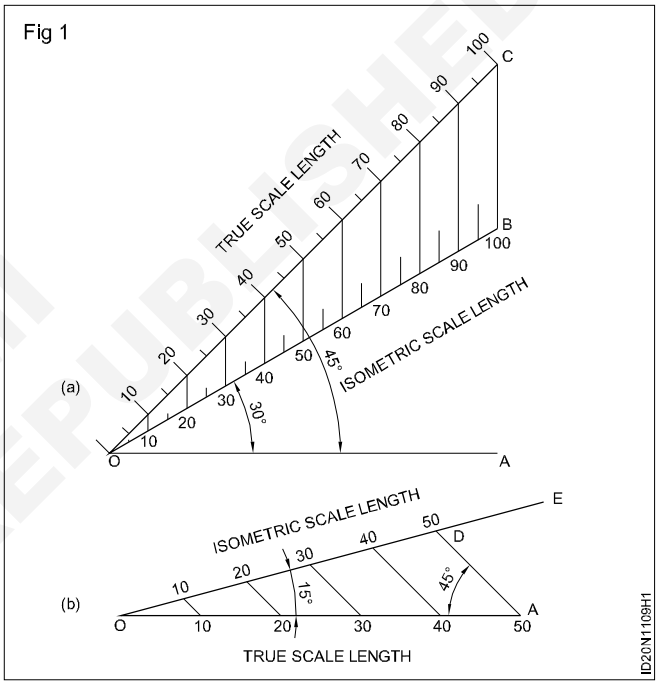
7 Draw another line from point A making 45° and meet the line OE at D.

8 Divide the line OA into number of equal divisions (say 5) and mark 10,20,30,40 and 50 mm.

9 From the points on the line OA, draw lines parallel to AD and mark off 10,20,30,40 and 50 on line OE.

Now the scale on OA is the true scale and the scale on OD is the isometric scale. (Fig 1b)

Fig 1



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TASK 2: **Draw the isometric drawing of a cube of side 25 mm (Fig 1)**

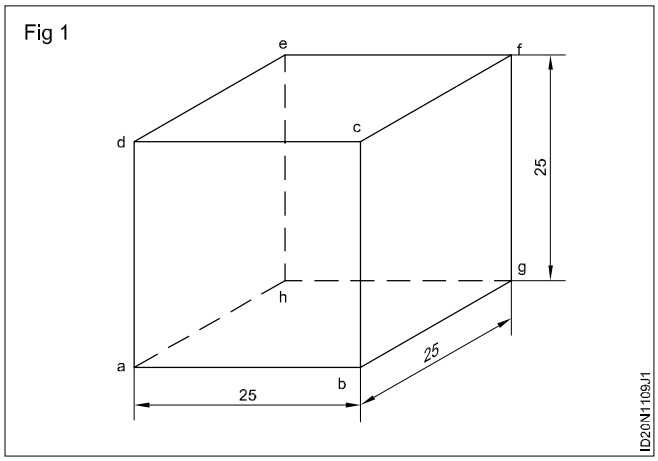
1 Draw square of a, b, c and d.

2 Draw 30° lines from point b, cand d for the length of 25 mm.

3 Mark point g from b, f from c and e from s as shown in figure.

4 Join all points.

Fig 1



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TASK 3: **Draw the isometric drawing of a cuboid of base 30 mm x 40 mm and the height 20 mm (Fig 1)**

1 Draw the three isometric axes through point 'A'.

2 Mark AB = 40 mm, AE = 30 mm and AD = 20 mm representing the three sides of cuboid.

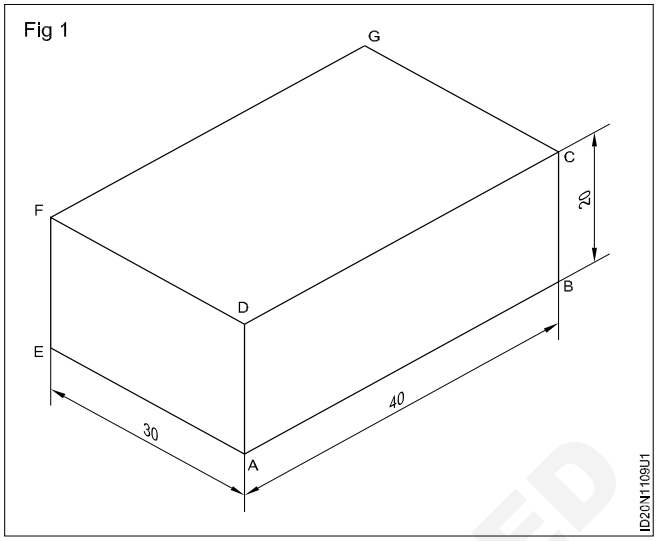
3 Draw two vertical lines parallel to the line EF and BC from point E and B respectively.

4 Similarly draw two more lines parallel to AB and AE mark G intersecting point from F and G.

5 Draw lines parallel to DC and FG, draw lines parallel to DF and GC.

6 Join all the points.

Fig 1



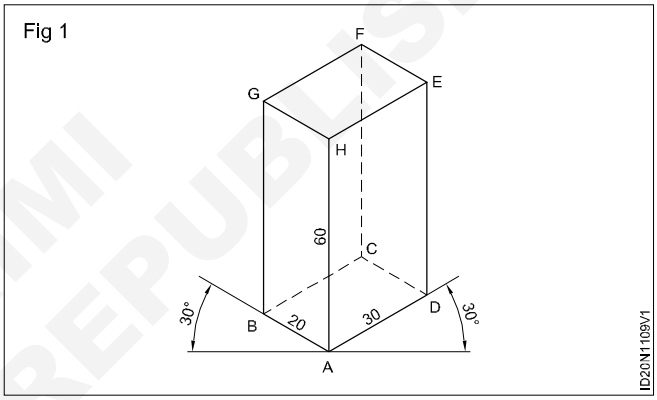
TASK 4: **Draw the isometric projection of a rectangular prism of base 30 mm x 20 mm and height 60 mm (Fig 1)**

1 Use isometric scale for all measurements.

2 Draw the lines AB, AD, AH to 20,30 & 60 representing the isometric axes.

3 Draw lines parallel to isometric axes as shown and complete the isometric projection required.

Fig 1



TASK 5: **Draw the Isometric projection of the hexagonal prism of 2.5 cm side of base and 60 mm height (Fig 1)**

1 Draw a hexagon of side 25 mm of its edge is horizontal.

2 Draw a rectangular prism of base pqrs and height 60 mm.

3 Draw the isometric view of the hexagonal base abcdef of the prism using offset method.

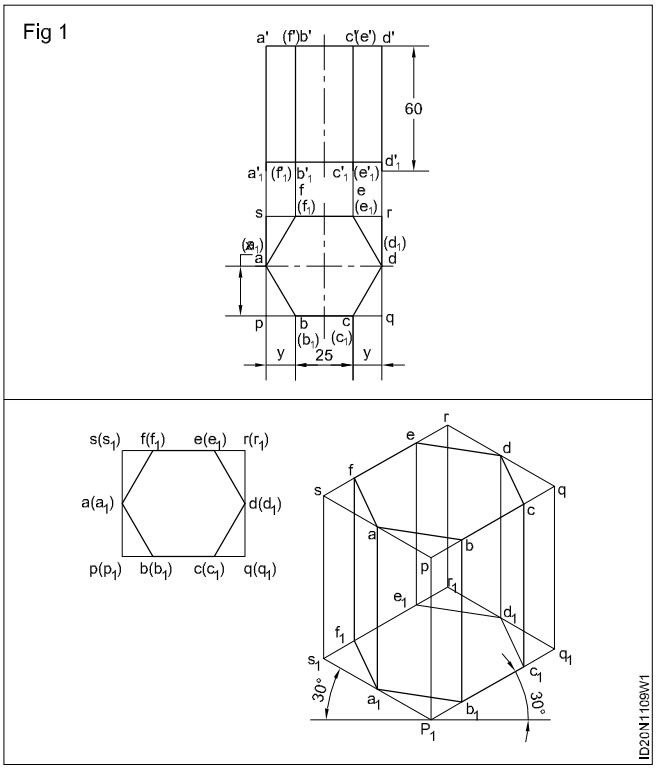
4 Draw the top hexagonal face by drawing projection from the corners of the base.

5 Make the visible edges by drawing thick lines and draw the invisible edges in hidden line.

6 Rub off the unwanted lines and complete the isometric projection.

Use isometric scale for all measurements. (Fig 1)

Fig 1

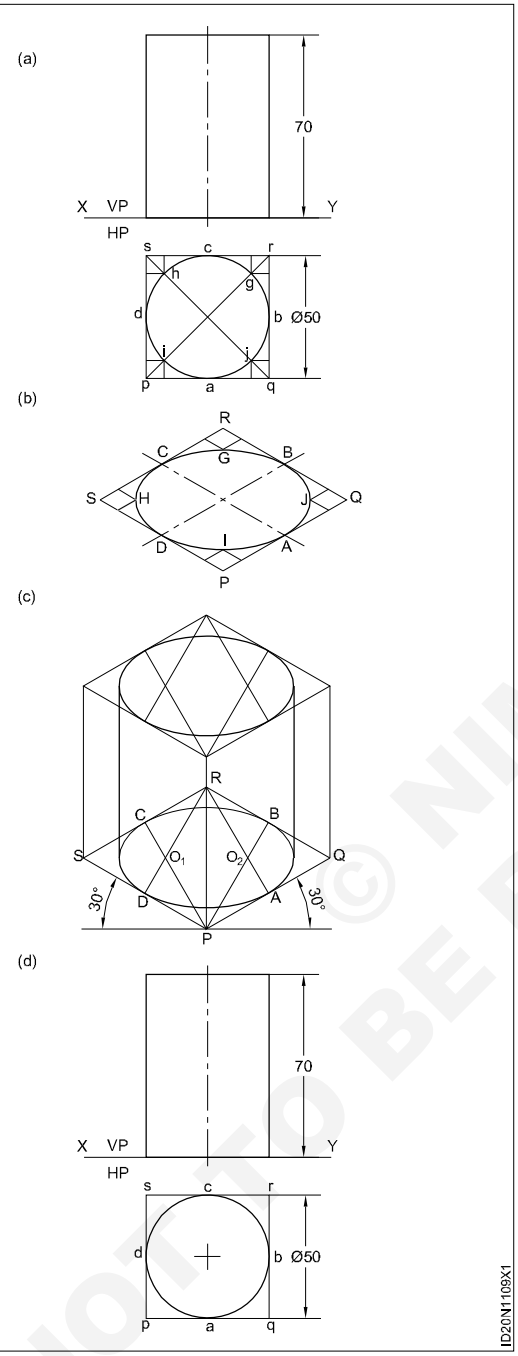


TASK 6: **Draw the Isometric projection of a cylinder of base 50 mm and height/length of 70 mm with its base resting on HP by offset method and four centre arc method.**

Off-set method

1 Draw the elevation and plan of the cylinder. (Fig 1)

Fig 1



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2 Draw the isometric projection of a square of side equals to the dia of cylinder. (Fig 1a)

3 Draw the isometric projection of a square prism of height 70 mm on the square drawn.

4 The mid points of the sides of the square given four points ABCD and four more points HIJG by intersection of the diagonals with circles (located by offset method) join the points to form isometric circle.

5 Draw the isometric circles for the bottom and top face of the cylinder inside the square prism using offset method.

6 Draw common tangents to top and bottom isometric circles.

7 Complete projection by drawing visible lines thick and invisible lines thin. (Fig 1b)

Four Centre arc method

1 Draw the elevation and plan of cylinder. (Fig 1c)

2 Draw the isometric projection of a square of side equals to the dia of cylinder.

3 Draw the isometric projection of a square prism of height 70 mm on the square drawn.

4 Draw the bisectors RD and RA from R and PC and PB from P.

5 Draw arcs with O_1 and O_2 as centres and radius O_1D and O_2A

6 Draw arcs with P and R as centres and radius PC and RD.

7 Draw vertical lines from the end of the ellipse.

8 Draw the base as half of the ellipse.

9 Complete the isometric view of the prism. (Fig 2)

10 Fig 3 shows the cylinder in horizontal position.

11 Follow the procedure of the cylinder in vertical position and complete the prism.

Fig 2

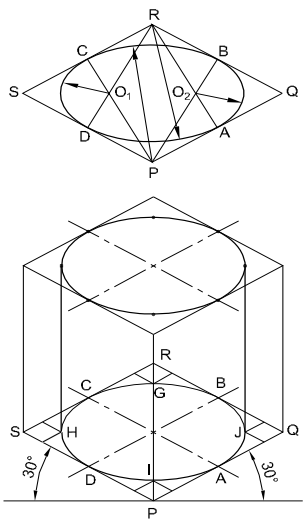

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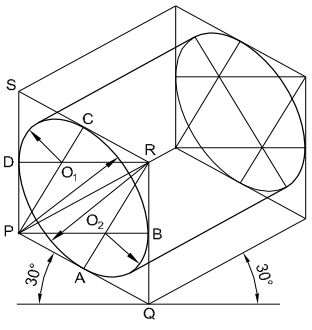
Fig 3



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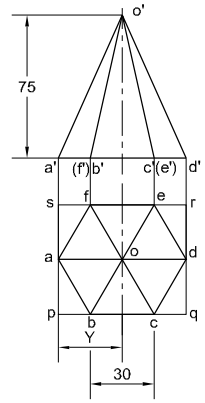
TASK 7: **Draw the Isometric projection of a hexagonal pyramid of side base 30 mm and height 65 mm given its position as under**

1 Its base resting on HP and the edge of the base parallel to VP. (Fig 1)

Fig 1



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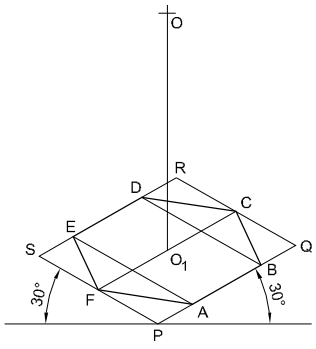
2 Draw the plan and elevation of the pyramid (true scale) and enclose the plan in the rectangle PQRS.

3 Draw the parallelogram with two of its adjacent edges at 30° to the horizontal. (Fig 2) PQ = Isometric length of pq and PS = Isometric length of PS.

4 Draw an isometric hexagon ABCDEF in the parallelogram PQRS.

5 Mark the centre O and draw a vertical line from point O of height to 75 mm in isometric scale.

Fig 2



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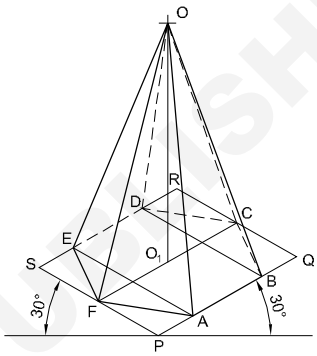
6 Join O, with ABCDE&F to complete the required Isometric projection of the hexagonal pyramid. (Fig 3)

Fig 3



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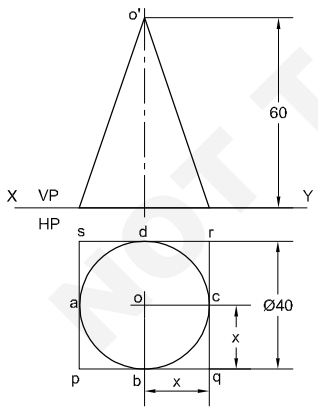
TASK 8: **Draw the Isometric projection of a cone whose base diameter 40 mm and height 60 mm when its base rest on HP (Fig 1)**

1 Draw the plan and elevation of the cone in the true scale as shown in the Fig 1.

Fig 1



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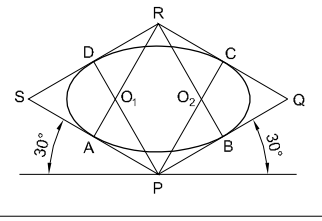
2 Draw the Isometric projection of the base circle. (by four centre method) (Fig 2)

3 Mark the centre and draw a vertical line 0.0_1 such that 0.0_1 equals to 60 mm in isometric scale.

Fig 2



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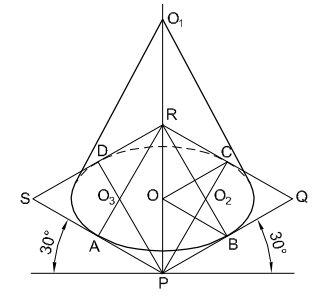
4 From `0' draw tangents to the isometric circle of the base and complete the required isometric projection of the cone. (Fig 3)

Fig 3



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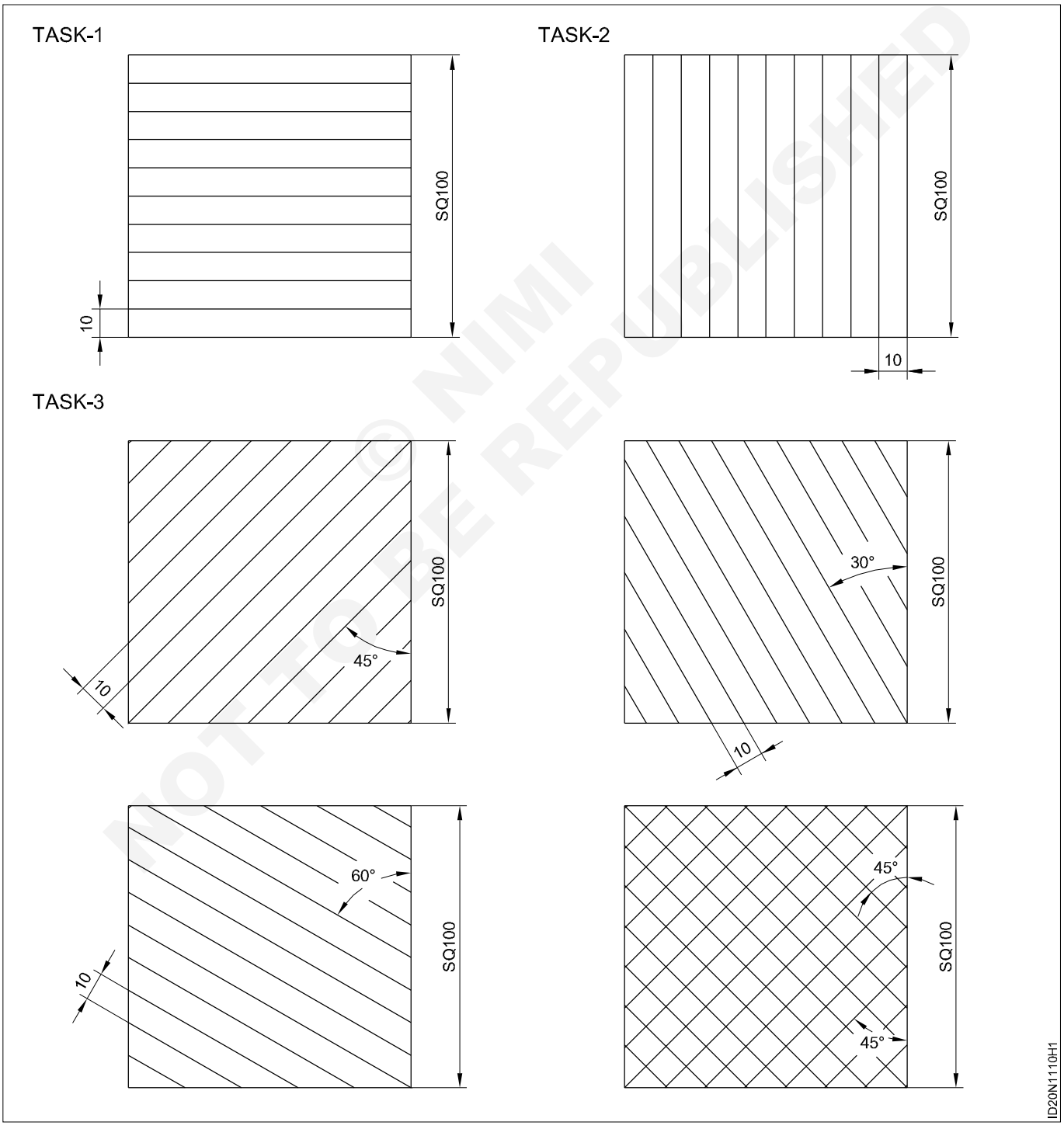
Draw the simple exercise using lines in different angles

Objectives: At the end of this exercise you shall be able to
- **draw figures involving horizontal, vertical and inclined lines**
- **use 'T' square, set square, scale, divider and protractor.**

PROCEDURE

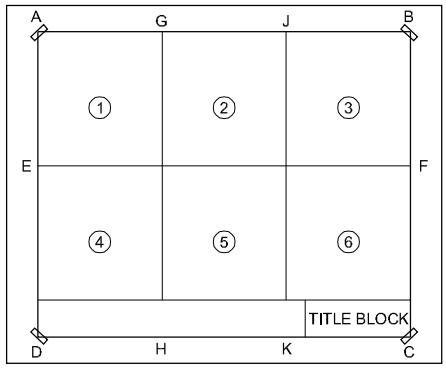
Draw the following patterns and components using stright lines



TASK 1: **Horizontal line**

1 Layout lines as shown in Fig 1 on an A2 drawing sheet.

Fig 1

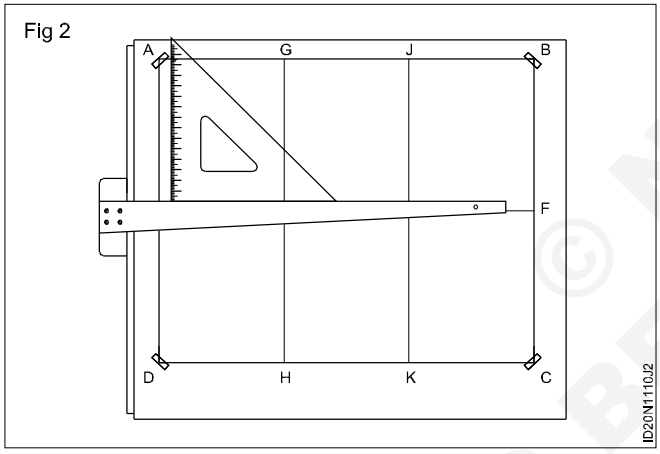


2 Butt the 'T' square approximately 5 mm above the line EF.

3 Draw a horizontal line 100 mm long left to right. (15 mm from AE)

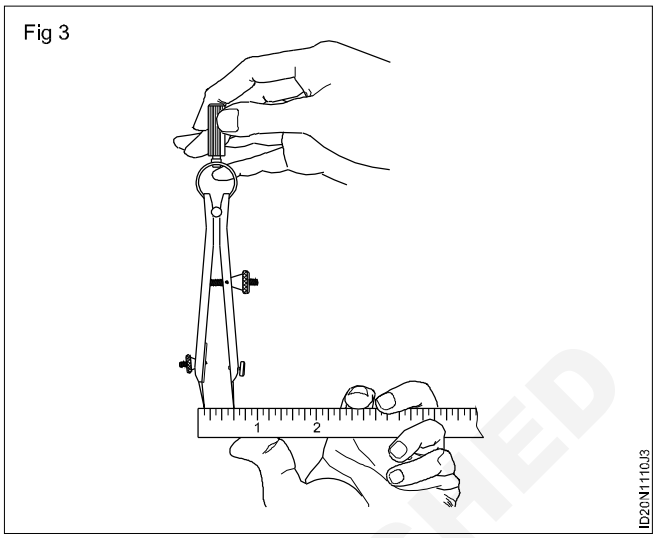
4 Draw a vertical line 100 mm long from the left end of the drawing paper as shown in Fig 2.

Fig 2



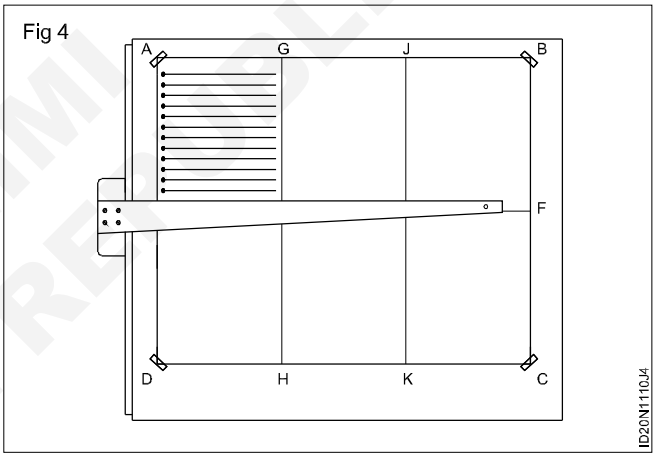
5 Mark of points on the vertical line at 10 mm intervals using divider. (Fig 3)

Fig 3



6 Draw horizontal lines through the points using 'T' square. (Fig 4)

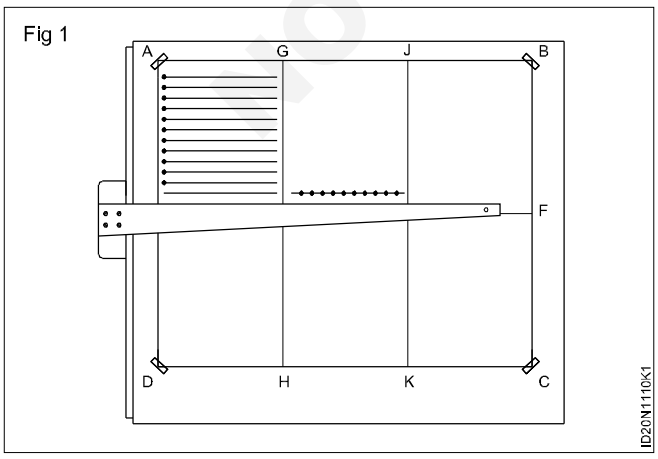
Fig 4



TASK 2: **Vertical line**

1 Draw the thin horizontal line and mark 10 mm spaces as in (Fig 1).

Fig 1



2 Place the 30°/60° setsquare on the 'T' square in such a way that its vertical edge is towards the left side of the board, approximately 15 mm from the line GH. (Fig 2)

3 Move your left hand onto the 'T' square blade and hold the setsquare firmly in position.

4 Hold the pencil approximately at 60° with the paper. (Fig 2)

5 Draw a line upwards approximately to a height of 100 mm twisting your body as shown in Fig 3.

6 Continue to draw the remaining vertical lines.

Fig 2

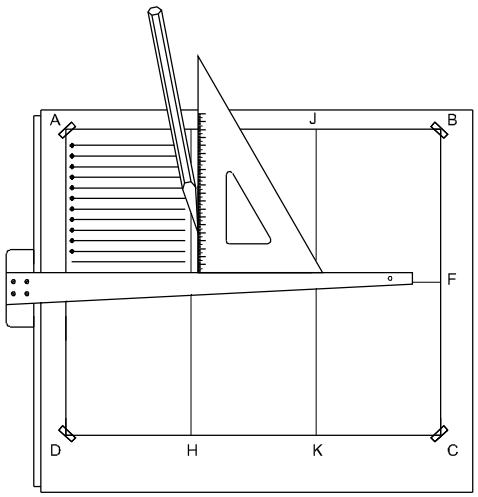


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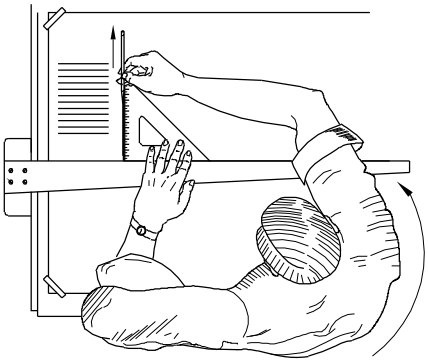
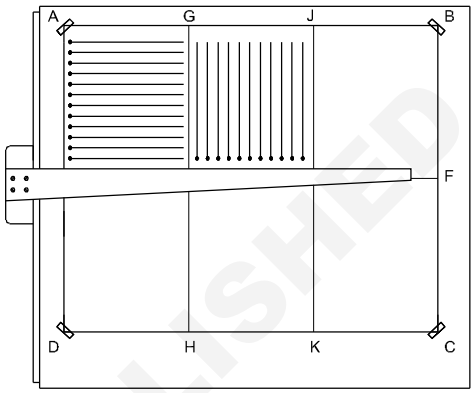
Fig 3





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TASK 3: **Inclined lines**

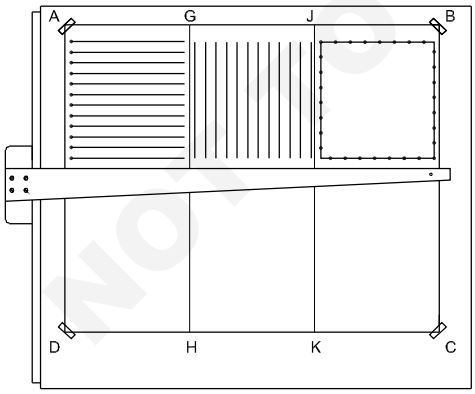
1 For drawing 45° lines.

2 Place the working edge of the 'T' square 15 mm above the line EF and draw horizontal lines in block (3) as shown.

3 Draw vertical lines parallel to JK as shown in the block.

4 Using divider, mark points from top corner at 10 mm intervals on horizontal and vertical line. (Fig 1)

Fig 1



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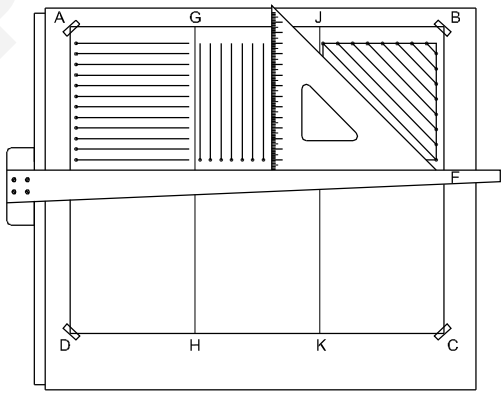
5 Butt, slide and take the working edge of 'T' square to line EF.

6 Place the 45° setsquare and draw the 45° inclined lines from the corner, top to downwards. (Fig 2)

7 Hold the blade of the 'T' square and setsquare intact while drawing lines.

Fig 2



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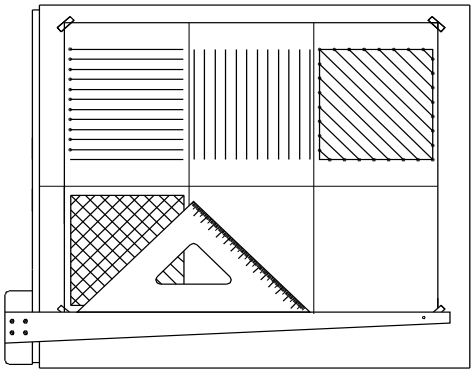
8 Following the same procedure complete block 4, 5 & 6.

9 Draw 45° inclined line in the opposite direction in block 4. (Fig 3)

Fig 3



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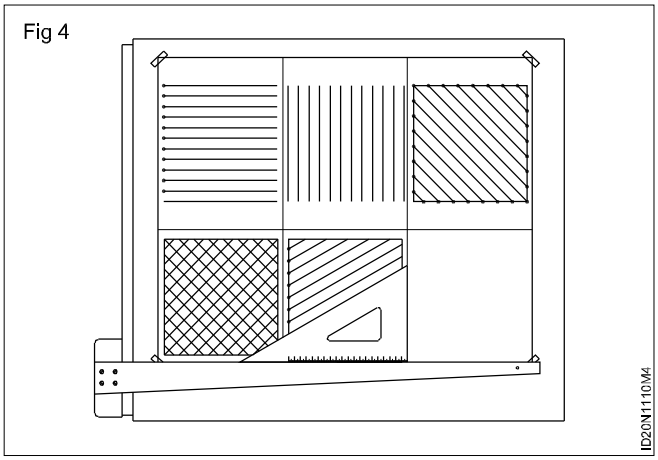
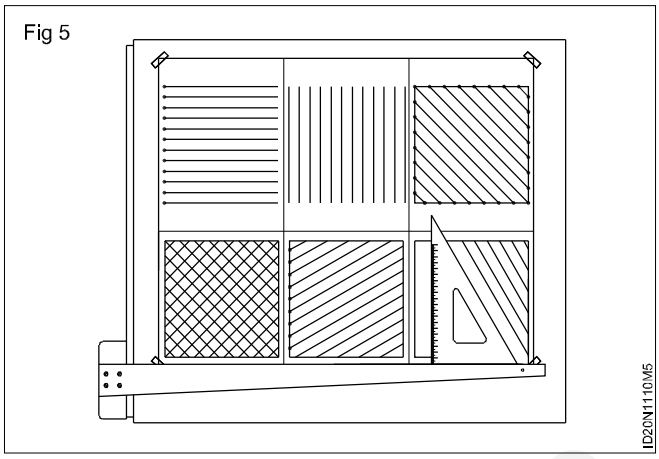
10 30° or/and 60° inclined lines can be drawn with the help of 30° /60° setsquare and 'T' square.

11 Draw 30° inclined lines in block 5. (Fig 4)



In the block 6, draw 60° inclined lines. (Fig 5)

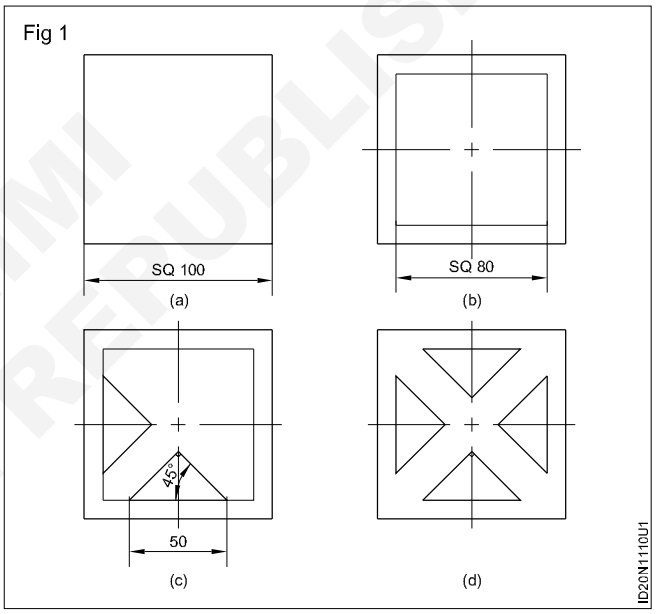


TASK 4: **Triangles in a square**

1 Draw a square of side 100 mm long. (Fig 1a)

2 Draw another square of side 80 mm as shown in Fig 1b.

3 Draw four triangles using 45° setsquare and 'T' square. (Fig 1c & 1d)

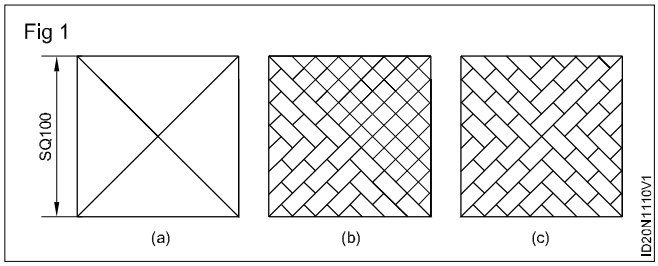


TASK 5: **Tile pattern**

1 Draw a square of side 100 mm and its diagonals. (Fig 1a)

2 Draw lines parallel to both the diagonals at a distance of 10 mm. (Fig 1b)

3 Complete the tile pattern by forming 20 mm x 10 mm rectangles as shown in Fig 1c.

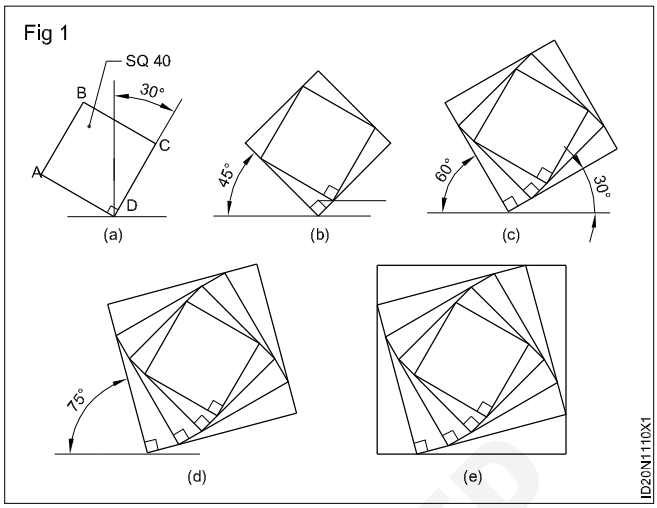


TASK 6: **Square pattern**

1 Draw a square ABCD of side 100 mm with side CD marking 30° to the vertical line. (Fig 1a)

2 Draw the next square by drawing straight lines through points A, B, C & D using 'T' square and 45° setsquare. (Fig 1b)

3 Draw the subsequent squares with the same procedure but with the inclination of 60°, 75° & 90°. (Fig 1c, d, e)



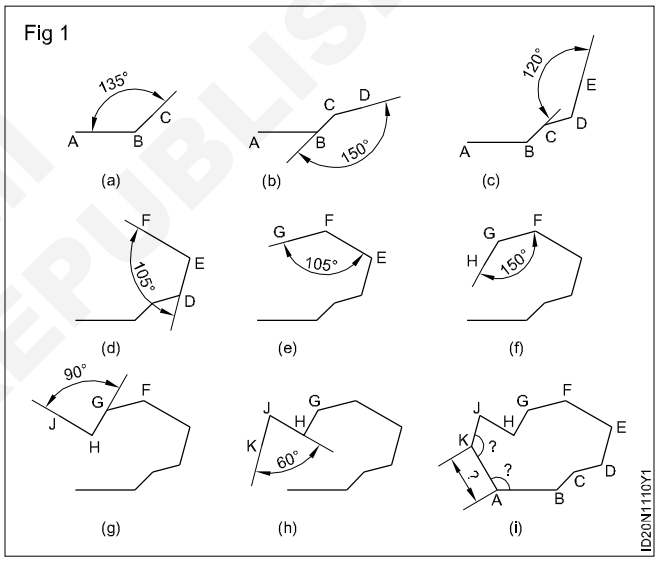
TASK 7: **Irregular pattern (Fig 1)**

1 Draw a horizontal line AB to a length of 90 mm.

2 Draw the remaining lines BC, CD, DE, EF, FG, GH, HJ, JK to the suitable length and angle as in Fig 1.

3 Join the points KA and measure the length of KA.

4 Measure the angles JKA and KAB.



Draw the plan elevation, sectional elevation & isometric view of geometrical solids

Objectives: At the end of this exercise you shall be able to
- **draw the plan, elevation and side view of a cube, rectanglar prism, triangular prism and hexagonal prism**
- **draw the plan, elevation and side view of a cylinder, cone and regular hexagonal pyramid**
- **draw the sectional views of a square prism and cylinder.**

PROCEDURE

TASK 1: **Draw the plan, elevation and side view of a cube**

Draw the orthographic projection (elevation, plan and side view) of the square sheet (40 mm side) kept perpendicular to HP and parallel to VP. (I angle) (Fig 1)

1 Draw the xy line.

2 Draw the square with its centre 40 mm above the xy line and one edge parallel to xy line.

3 Mark the corners of the figure a', b', c' & d'. This will be the elevation of the square.

4 Draw the vertical projectors from a'b' downward beyond the xy line.

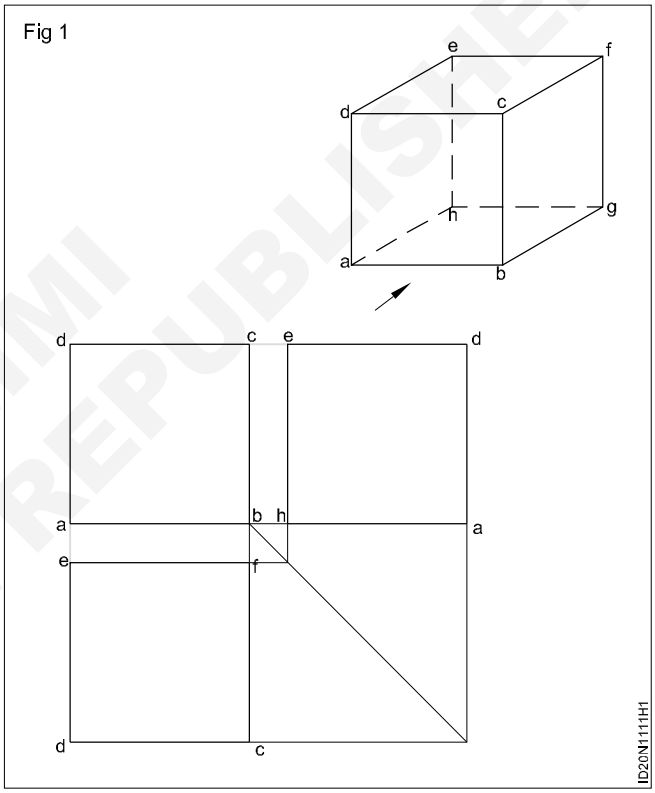
5 Draw a horizontal line dc at a distance of 20 mm below the xy line. Line dc will be the plan.

6 Draw a X'Y' line at a convenient distance from b'c', intersecting the xy line at `0'.

7 Project the plan to the X Y line meeting at e.

8 By arc method transfer Oe to xy and mark the point `f' at a" and d" respectively. Now the line a"d" is the side view.

Fig 1



TASK 2: **Draw the plan, elevation and side view of a Rectagular prism**

Draw the Top, Front and side views of the rectangular prism of base 30 x 20 mm and height 40 mm. (Fig 1a)

In this exercise the faces of prism are parallel to the planes of projection. Therefore all the lines orthographic projection are vertical and horizontal lines only.

Visualise the shape of the object and imagine the shape description of views. Surface ABCD (Fig 2b) only visible from the elevation. At the same time all the four sides of ABCD are isometric lines. Therefore in the elevation a rectangle of 40 x 30 mm is seen.

1 Draw xy line of convenient length. (Fig 1b)

2 Draw a rectangle a'b'c'd' on the xy line. This will be the elevation of the prism.

3 Project the vertical sides of the elevation (a'd' and b'c') downwards beyond xy line.

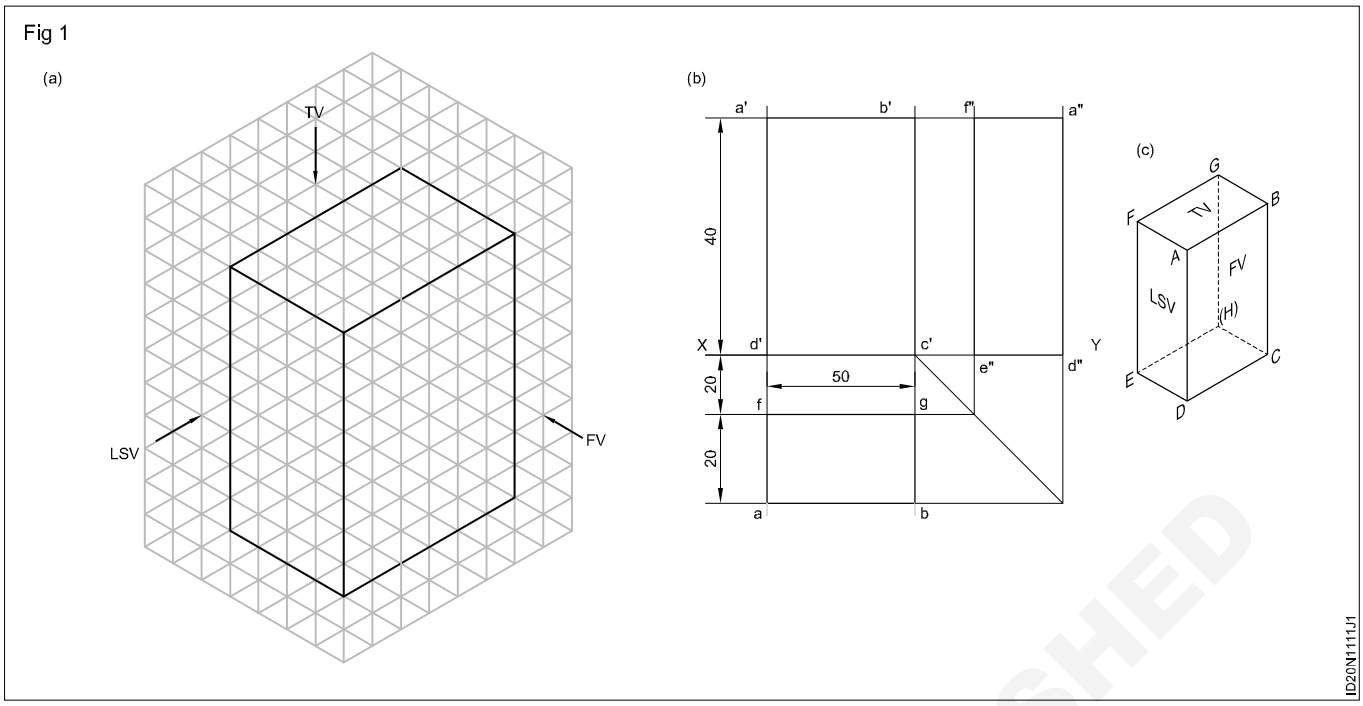
4 Draw a horizontal line fg approximately 20 mm below xy line.

5 Draw a rectangle fgba of 30 x 20 mm size. This will be the plan of the prism.

6 Project points b' and c' horizontally a convenient length to the right side of the elevation.

7 Transfer the width of plan gb by arc and locate points e"d" on the xy line.

8 Project e"d" vertically up and locate points f"a"d"e" is the left side view of the prism.



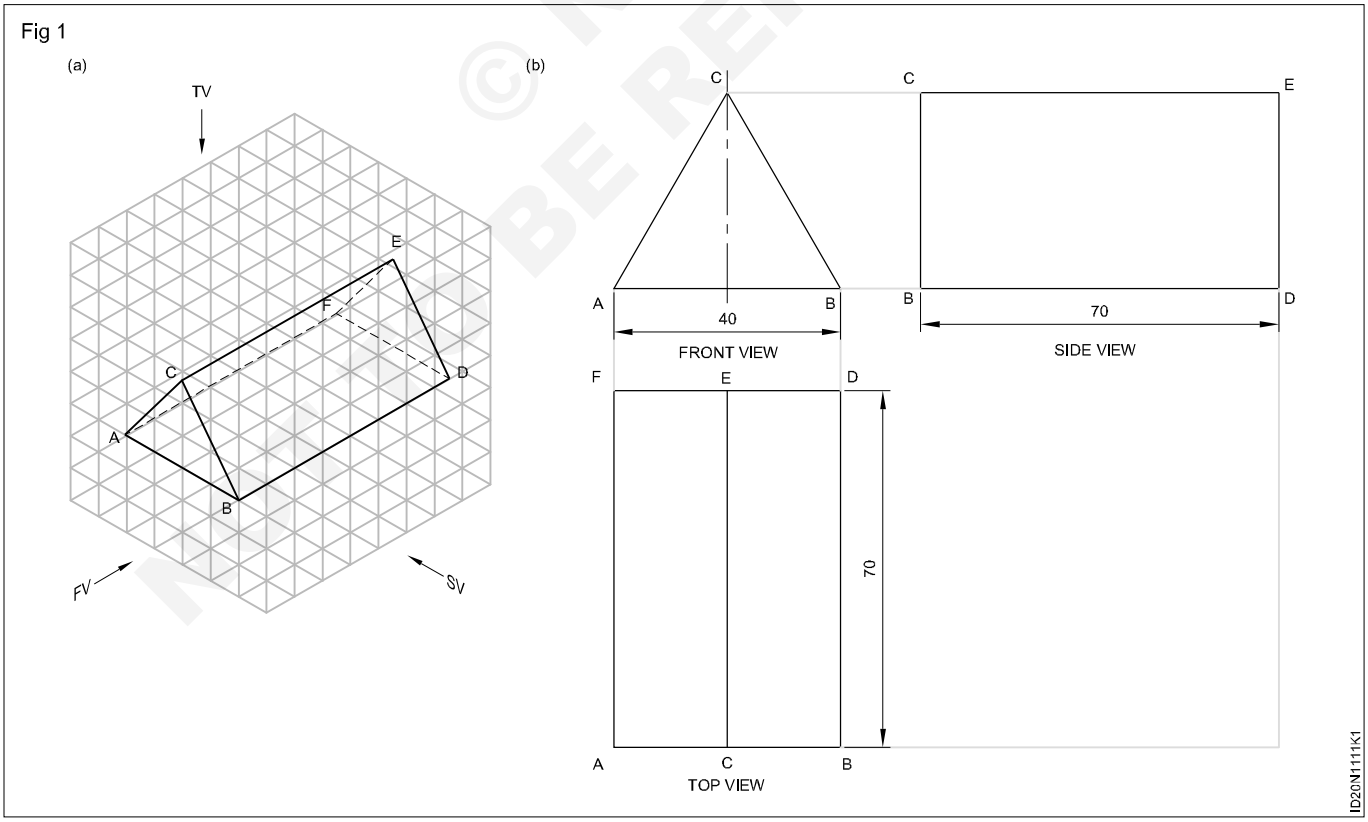
TASK 3: **Draw the plan, elevation and side view of a Triangular prism**

Draw in first angle projection of front view, side view and top views of triangular prism sides are 40 mm and 70mm length. (Fig 1a)

1 Draw equlateral triangle ABC sides are 40mm of front view as shown in Fig.

2 Draw rectangle side view of BDEC 70mm length and 40 mm height as shown in Fig.

3 Draw top view of ACBDEF 40 mm width and 70 mm height as shown in Fig.



TASK 4: **Draw the plan, elevation and side view of a Cylinder**

Draw the top, front and side view of a cylinder of diameter 20 mm and length 30 mm. (Fig 1a)

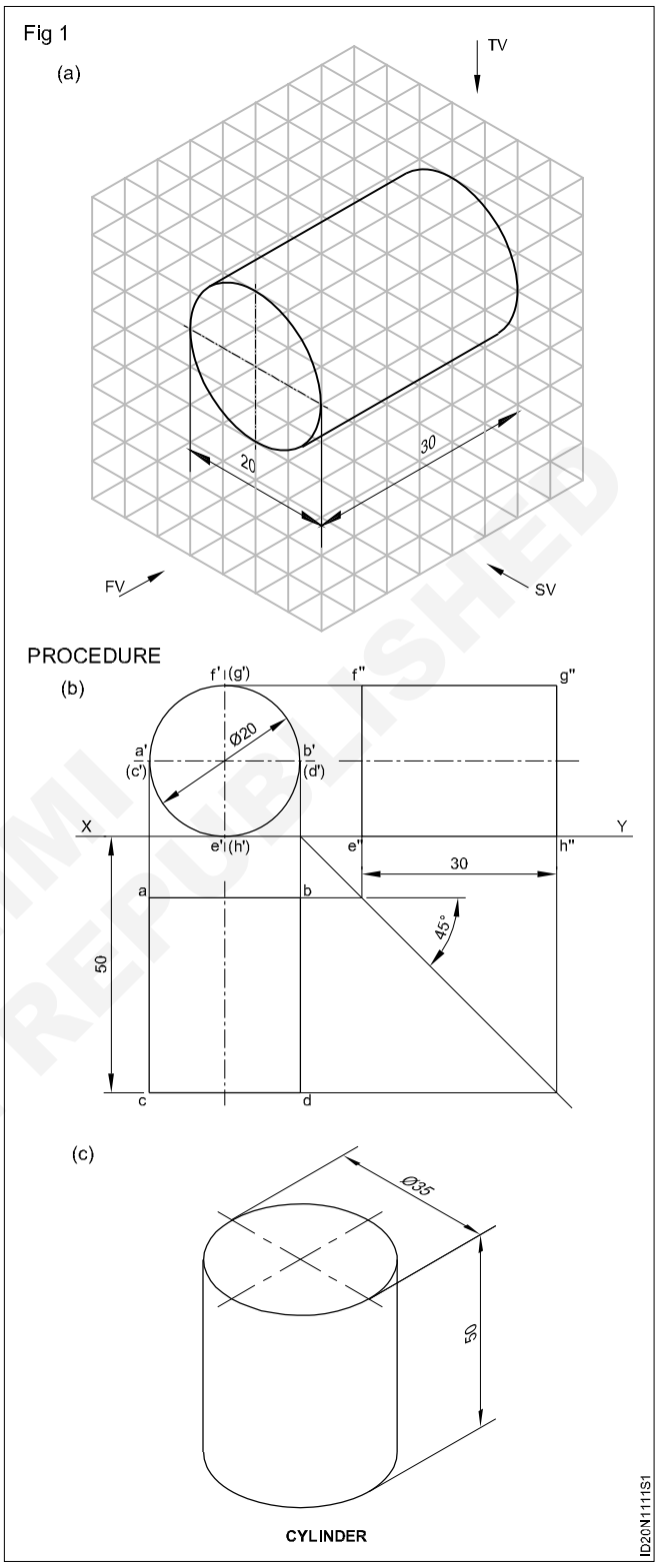
In this problem the circular faces are parallel to VP. Therefore the elevation is a circle resting on XY line. Plan and end views are rectangles of size 30 mm x 20 mm.

1 Draw the circle of diameter 20 mm touching XY line. (Fig 1b)

2 Draw the plan projecting it from the elevation.

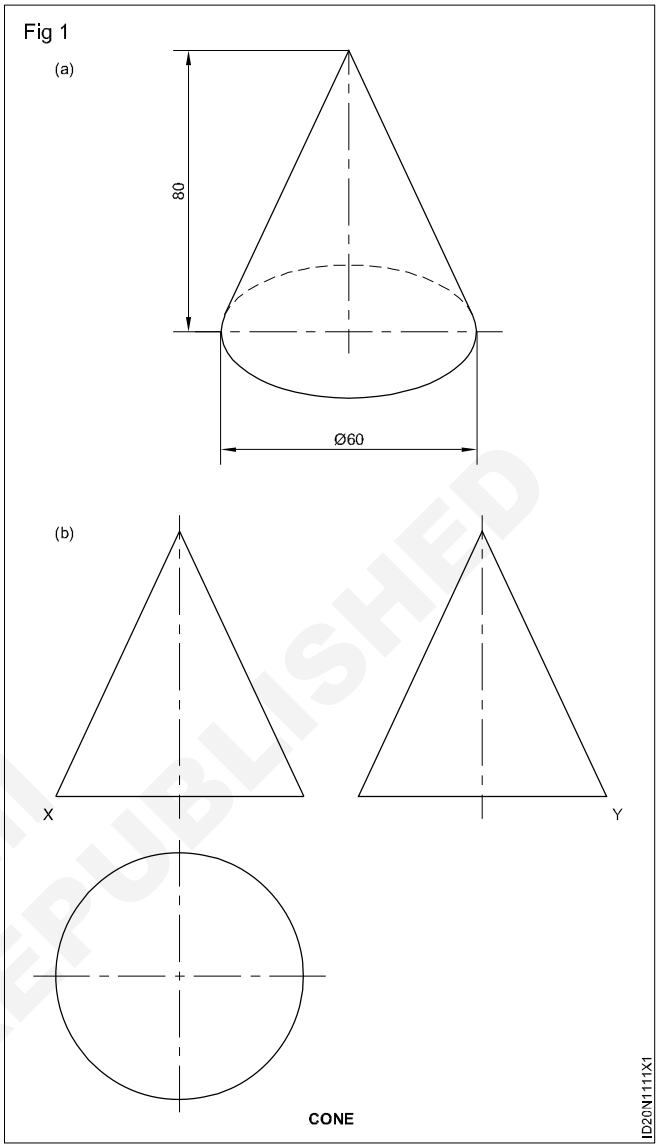
3 Draw the end view by drawing projection on it, from the plan and elevation.

4 Draw the plan, elevation and side view of a cylinder whose base diameter 30 mm and height 50 mm when its position is as shown in Fig 1c.



TASK 5: **Draw the plan, elevation and side view of a Cone**

1 Draw the multi-views of the cone shown in the Fig 1a. Follow the procedures of the earlier exercises and draw the multi-views. (Fig 1b)



TASK 6: **Draw the plan, elevation and side view of a Regular hexagonal pyramid**

Draw the Orthographic views of a regular hexagonal pyramid of side 20 mm and height 40 mm given its position as below. (Fig 1a)

1 Standing vertically with its base on HP and one side of the hexagonal base parallel to VP.

2 The pyramid has 6 triangular faces and one hexagonal base. The plan will show the true shape of the base and other six triangular faces are fore-shortened.

In this elevation, three triangular faces are seen and all of them are fore-shortened.

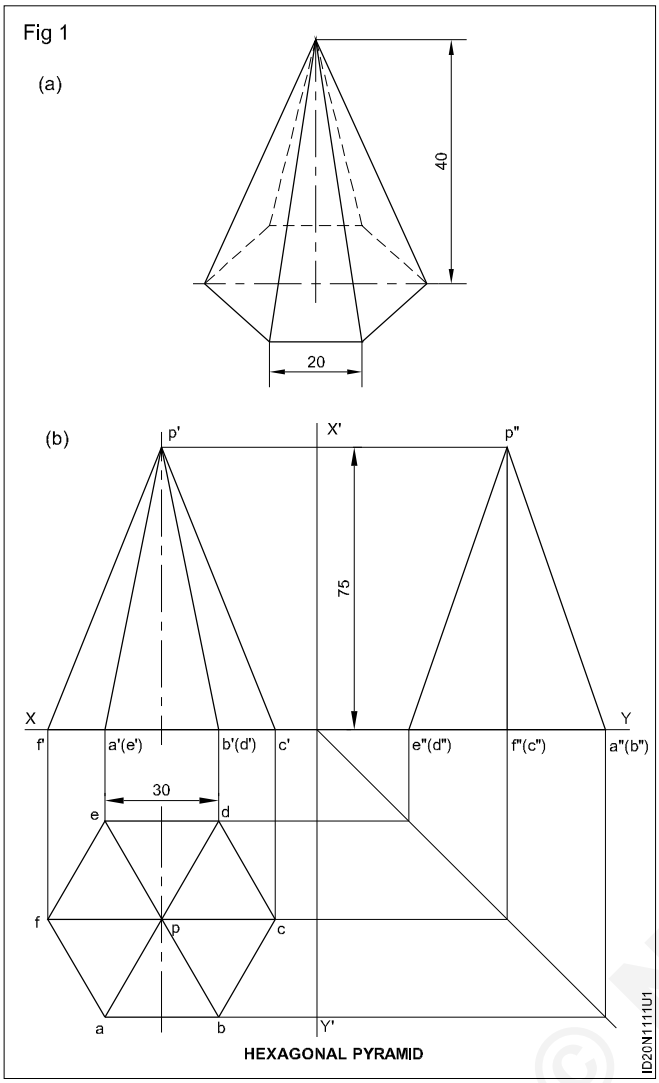
1 Mark the centre of hexagon (Point P) and draw lines from P to the six corners of the hexagon. Now this is the required plan. (Fig 1b)

2 Project this P from plan upwards and mark P' at a distance of 75 mm from XY line.

3 Mark the points f', a'b'c' etc... on XY line by projecting the corresponding points from plan.

4 Join the P' with f', a',b',c' etc and complete the required elevation.

5 Draw projectors from elevation and plan to complete the required side view.



TASK 7: **Draw the plan, elevation and side view of a Hexgonal prism**

Draw the three views of the hexagonal prism shown in Fig 1a.

From the position described above, it is clear that the hexagonal face of the prism is parallel to AVP. Therefore the end view is a true hexagon and hence this view should be drawn first.

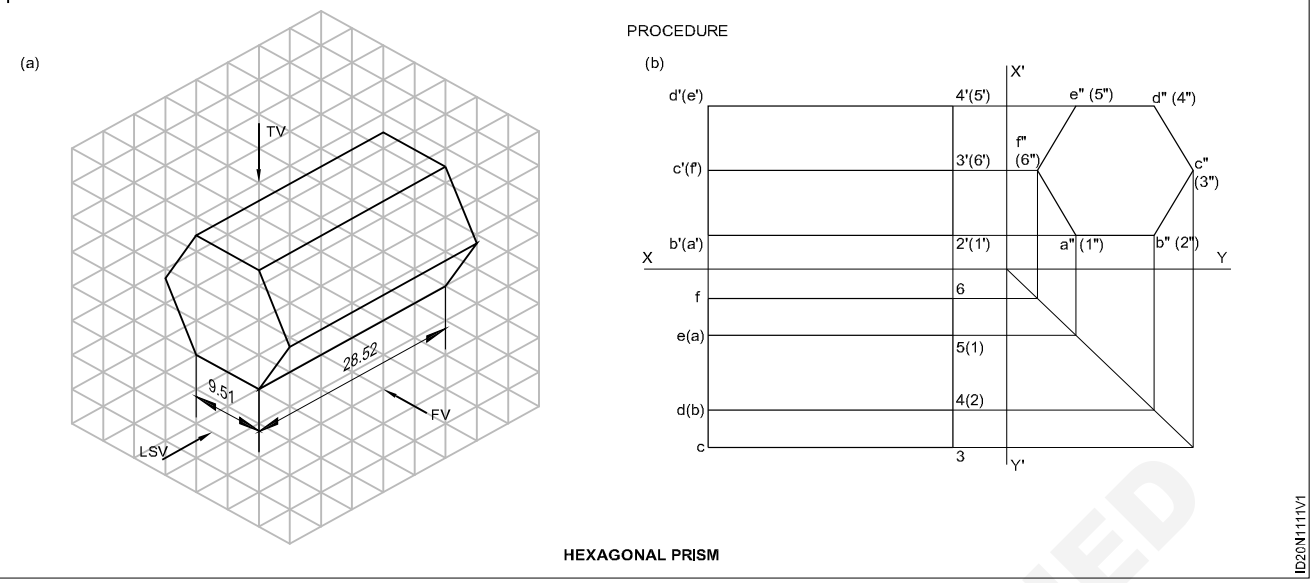
1 Draw the side view (hexagonal of side 25 mm) with one side on HP line. (Fig 1b)

2 Draw horizontal projectors from side view and complete the front view. (in the front view two lateral faces are visible, but they are fore shortened)

3 Draw projectors from elevation and side view and complete the plan.

(Three lateral faces are visible of which one is of true shape and the other two are fore shortened)

Fig 1



HEXAGONAL PRISM

TASK 8: **Draw the sectional views of a Square prism sectional plan**

Draw elevation, sectional plan and the true shape of the section of a square prism.

1 Length of side of square prism standing vertically.

2 One diagonal of the base is perpendicular to VP and anotehr diagonal parallel to VP.

3 Cutting plane makes 45° to the axis and intersects the axis 40 mm above the base.

Draw the plan and elevation of the prism. (Fig 1)

4 Draw the cutting plane in the elevation of the drawing.

5 From the point m' draw projector to meet the plan at mn.

6 Hatch the portion of the plan and complete the required sectional plan.

To get the true shape

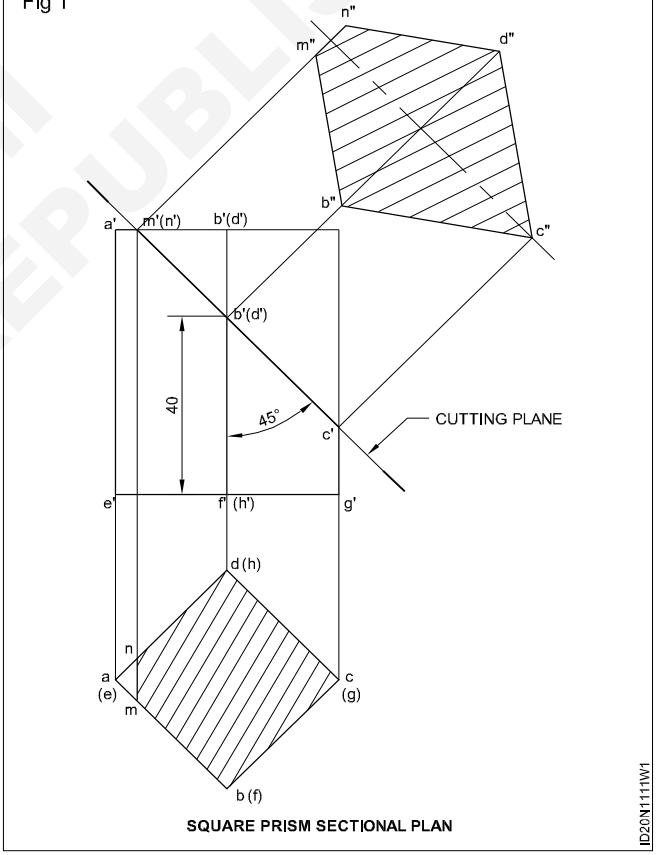
1 Draw a line parallel to the cutting plane.

2 Draw projectors perpendicular to the cutting plane from points m', b' & c' and extend beyond the line, drawn parallel to the cutting plane.

3 Transfer the distances mn and db symmetrically about the line and also mark c''.

4 Join m''-n'', n''-d'', d''-c'', c''-b'' & b''-m'' and hatch the area to complete the required true shape. (auxilliary view)

Fig 1



SQUARE PRISM SECTIONAL PLAN

TASK 9: **Draw the sectional views of a Cylinder sectional plan**

Draw the sectional plan, elevation and true shape of the cut surface of a cylinder given the details as under.

1 Cylinder is of diameter 50 mm and height 60 mm stands on HP with its axis vertical.

2 Cutting plane makes 40° to the horizontal and intersecting the axis at the mid-point of the vertical axis.

Draw the plan and elevation of the cylinder. (Fig 1)

3 Indicate the cutting plane in the elevation.

4 Divide the plan into any number of equal parts, (say 12) and mark the points a, b, c... l.

5 Project the points a to l vertically to intersect the cutting plane line at a' b' c' etc.

6 Project horizontally the points a, b, ... l in the plan by transfer method for the side view.

7 Mark the intersection points of the corresponding projection in the previous two steps and complete the end view.

To draw the true shape of the section

1 Draw a line AB parallel to the cutting plane line.

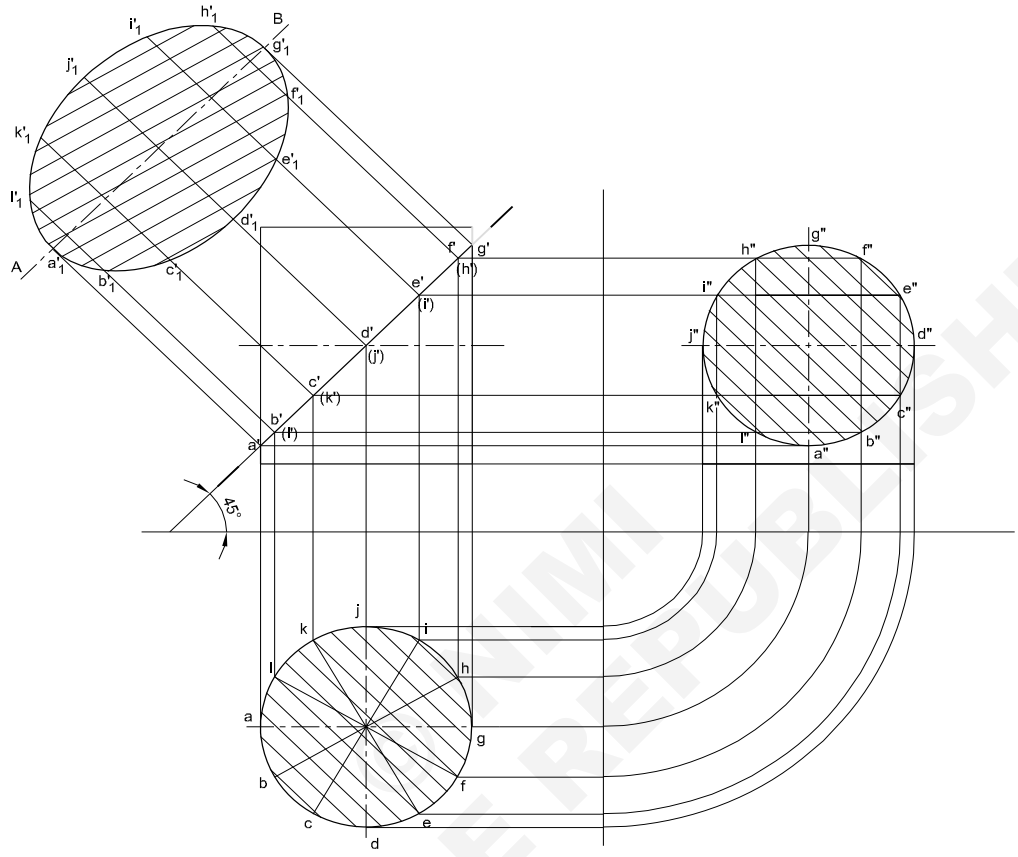
2 Draw perpendicular projectors perpendicular to the cutting plane line.

3 From points a', b', c' extend beyond the line AB.

4 Mark the points a'_1, b'_1, c'_1 etc such that the distance l'' b'' k'' c'' at in the end view are equal to lb, kc etc in the plan.

Join the points a'_1 b'_1, c'_1 and complete the true shape.

Fig 1



CYLINDER SECTIONAL PLAN

ID20N1111Y1

Skill Sequence

Practice on types of dimension

Objectives: This shall help you to
- **draw different systems of dimensioning**
- **dimension the drawings by aligned system and unidirectional system**
- **follow the standard of system of dimensioning with different arrangements of dimensional values.**

To show aligned system of dimensioning

1 Draw the figures as shown (Figs 1&2).

2 Show the dimension lines in the figures.

3 Place the dimension value above the dimension line centrally as direction.

Fig 1

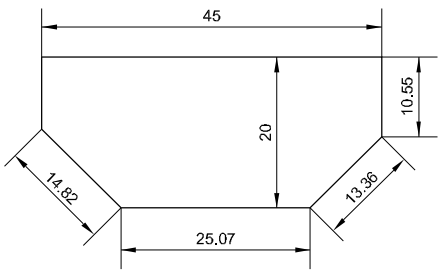


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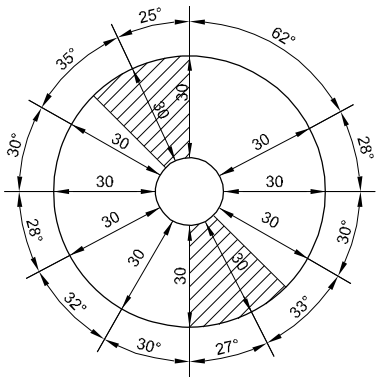
Fig 2



ANGULAR DIMENSIONING

ID20N1111Z2

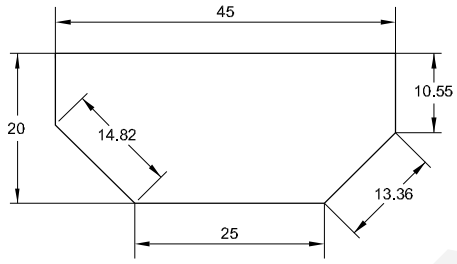
To show unidirectional system of dimensioning

1 Draw the figures as shown (Figs 3&4).

2 Show the dimension lines in the figures.

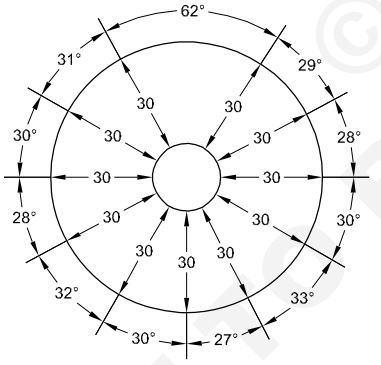
3 Cut the dimension line at center to place the dimen sion value horizontally.

Fig 3



ID20N1111Z3

Fig 4

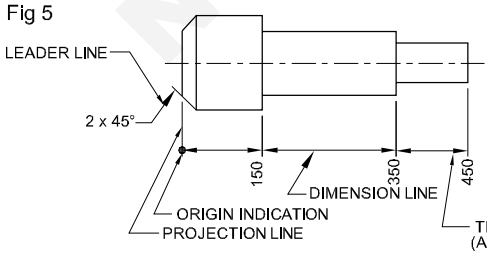


ANGULAR DIMENSIONING - METHOD 2

ID20N1111Z4

To show various notations used in dimensioning (Figs 5 to 11)

Fig 5



ELEMENTS OF DIMENSIONING

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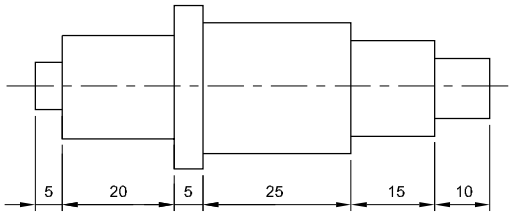
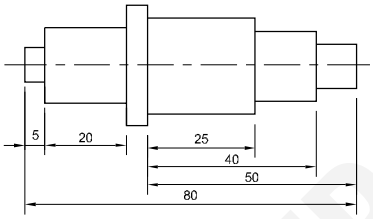
Fig 6



CHAIN DIMENSION

ID20N1111Z6

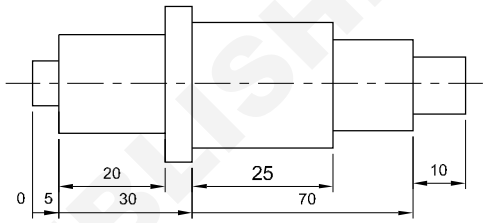
Fig 7



COMBINED DIMENSIONING (CHAIN AND PARALLEL)

ID20N1111Z7

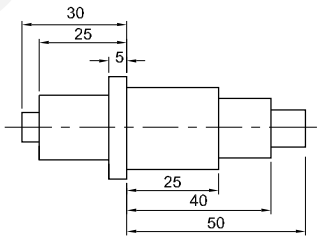
Fig 8



COMBINED DIMENSIONING (CHAIN AND SUPERIMPOSED RUNNING)

ID20N1111Z8

Fig 9



PARALLEL DIMENSIONING

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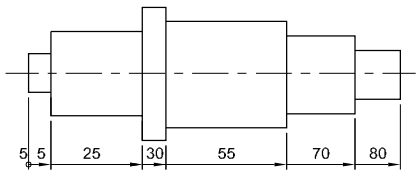
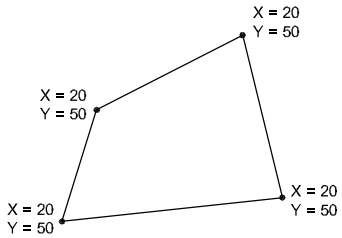
Fig 10



SUPERIMPOSING RUNNING DIMENSIONING IN ONE DIRECTION

ID20N1111ZA

Fig 11



DIMENSIONING BY CO-ORDINATES

ID20N1111ZB

Free hand sketches of graphic symbol

Objective: At the end of this exercise you shall be able to
• draw graphic and conventional symbols used in interior spaces.

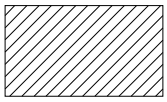
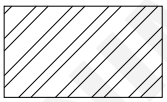
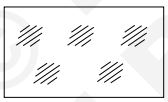
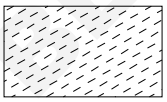
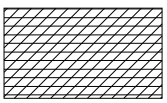
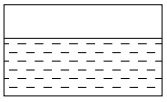
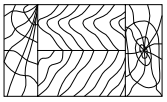
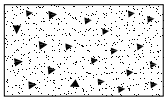
PROCEDURE

TASK 1 : **Draw the conventional symbols using different hatchings as given in (Fig 1)**

1 Draw the conventional symbol as given in the (Fig 1) using HB pencil.

Note: All symbols are standards, as per IS.

Fig 1

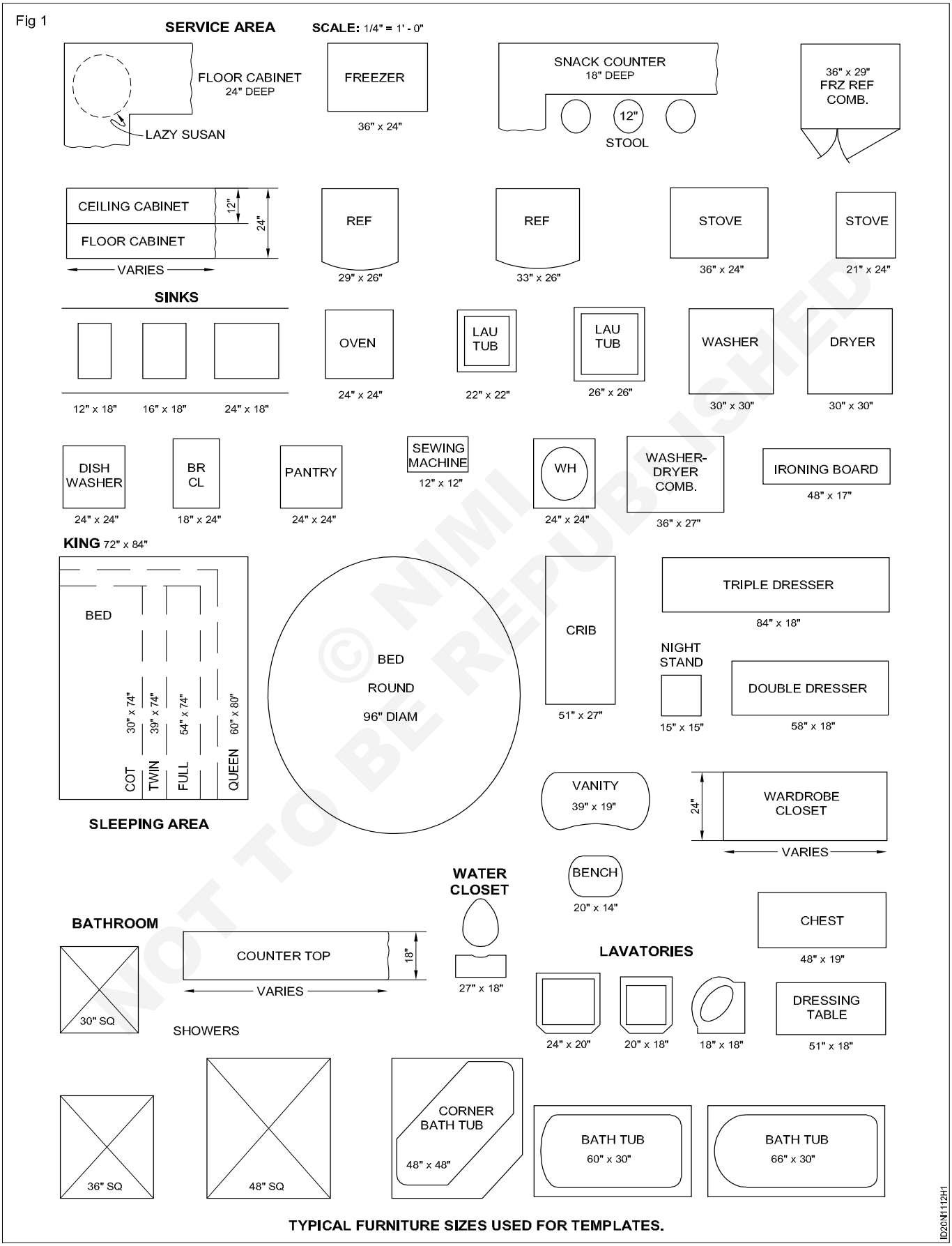
TYPE	CONVENTION	MATERIALS
Metals		Steel, Cast Iron, Copper and its Alloys, Aluminium and its alloy,etc
		Lead,Zinc Tin White-metal,etc.
Glass		Glass
Packing and Insulating materials		Porcelain, Stoneware, Marble,Slate etc
		Asbestos, Fibre, Felt, Syntehtic resin, Products, Paper, Cork, Linoleum, Rubber, Leather, Wax, insulating & Filling Materials etc
Liquid		Water, Oil, Petrol, Kerosen etc
Wood		Wood, Plywood etc
Concrete		Concrete

TASK 2: **Draw the graphic symbols to indicate various furniture interior spaces (Fig 1)**

1 Draw the graphic symbols proportionately (free hand) using the given measurements.

Note: All dimensions are infeet and inches.

Fig 1



TYPICAL FURNITURE SIZES USED FOR TEMPLATES.

ID20NT112H1

How to make design

Objectives: At the end of this exercise you shall be able to
- **prepare circulation of space (spatial arragement) (bubble diagram, proximity chart)**
- **prepare concepts, theme and colour usage in interiors**
- **drawing furniture layout with proper scale.**

PROCEDURE

TASK 1: **Prepare spatial planning in form of bubble diagram and furniture layout given below**

1 Concept (theme also needs to be incorporated).

2 Furniture layout needs to be draw to proper scale and dimension.

Data (Requirement for given bubble layout):

A Index

a Verandah
b Living
c Dining
d Kitchen
e Master bed room
f Attached toilet
g Common toilet
h Childrens bed room

B Built - up area excluding verandah 91.04 sq.m

C Door and Window sizes:

1 Doors	**Height x Width**
a Entrance door	200 x 120 cms
b Toilet door	200 x 80 cms
c All other doors	200 x 100 cms

2 Window & Ventilators	**Height & Width**
Window (W1)	120 x 120 cms
Window (W2)	120 x 120 cms
Window (W3)	120 x 120 cms
Window (W4)	120 x 60 cms
Window (W5)	50 x 100 cms

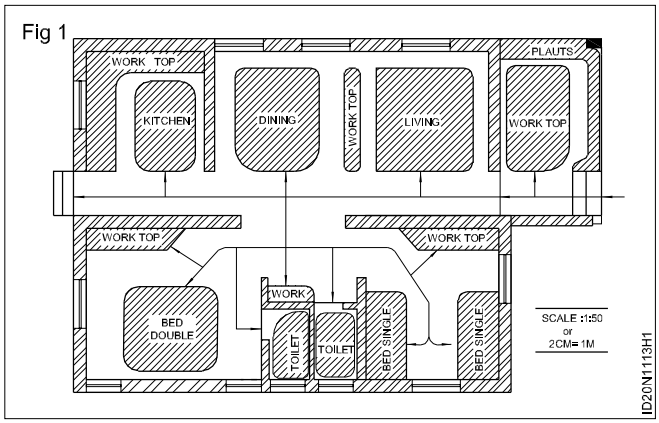
D Arrange the following furniture:

1 Verandah
   a Arrange outdoor plants
2 Living room
   a L-shaped sofa
   b Circular table 80 cm diameter
   c Plant tuff 50 cm diameter
   d Partition wall between living and dining upto door level
3 Dining
   a Dining table (length x breath) = 150 x 80 cm
   b Six chairs (length x breath) = 50 x 40 cm
   c Suitable wash basin near the toilets
4 Kitchen
   a Sink & drain board
   b Stove
   c Fridge
   d Cupboard 30 cm, wide
5 Master bed room
   a Single bed (length x breath x height) = 200 x 200 x 40 cm
   b Built - in wardorbe (length x breath x height) = 150 x 60 x 300 cm
   c Corner shelf
6 Attached toilet
   a Wash basin
   b Western WC
   c Bath space
7 Common toilet
   a Wash basin
   b Western WC
   c Bath space
8 Children bed room
   a Two bed each (length x breath x height) = 100 x 200 x 40 cm
   b Built - in wardrobe (length x breath x height) = 150 x 60 x 300 cm
   c Corner shelf

TASK 2: **Bubble diagram of residential layout (Fig 1)**

Concept design, pattern and colours

Fig 1



Prepare the bubble diagram for given data of residential layout using the following steps.

1 Draw the bubble diagram connecting spaces based on functionality.

2 Concept should be creativity aligned to the space and even theme has to be followed systematically.

3 Colour scheme has to be employed while doing furniture layout as per the concept.

Drawing Method

Steps

1 Draw to scale : 1:50 (or) 2cm = 1 meter as show, otherwise choosen any convenient scale.

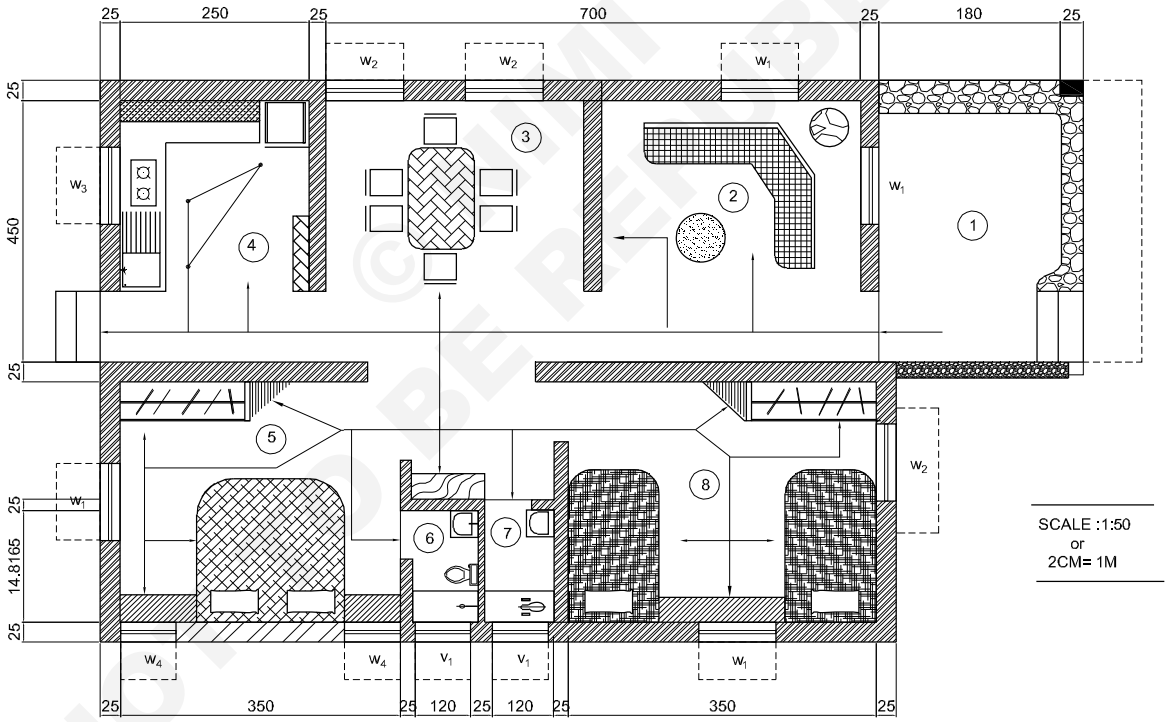
2 Draw the ground floor plan as per the given measurement.

3 Arrange the indoor furniture as shown in fig 2 leaving sufficient area.

4 While drawing the indoor furniture observe the circulation area marked with arrows. Minimum circulation are without obstructions shows efficient interior design layout.

5 In designing any interior space this aspect of efficient utilisation of space should be given due care.

Fig 2



Design knowledge of interior in residential and commercial space (i) Basic layout plan, (ii) Elevation

Objectives: At the end of this exercise you shall be able to
- **prepare drawing plan and elevation**
- **prepare residential plan**
- **prepare commercial layout plan.**

PROCEDURE

TASK 1: **Residential (Figs 1 & 2)**

The retail chain 'K.S.Ramyaagayathri dealing in fashion jewellery is opening a showroom in one of the biggest shopping mall in your city.

The room height is 11' from the floor to ceiling. There is a 12' wide corridor in front of the shop.

Fig 2

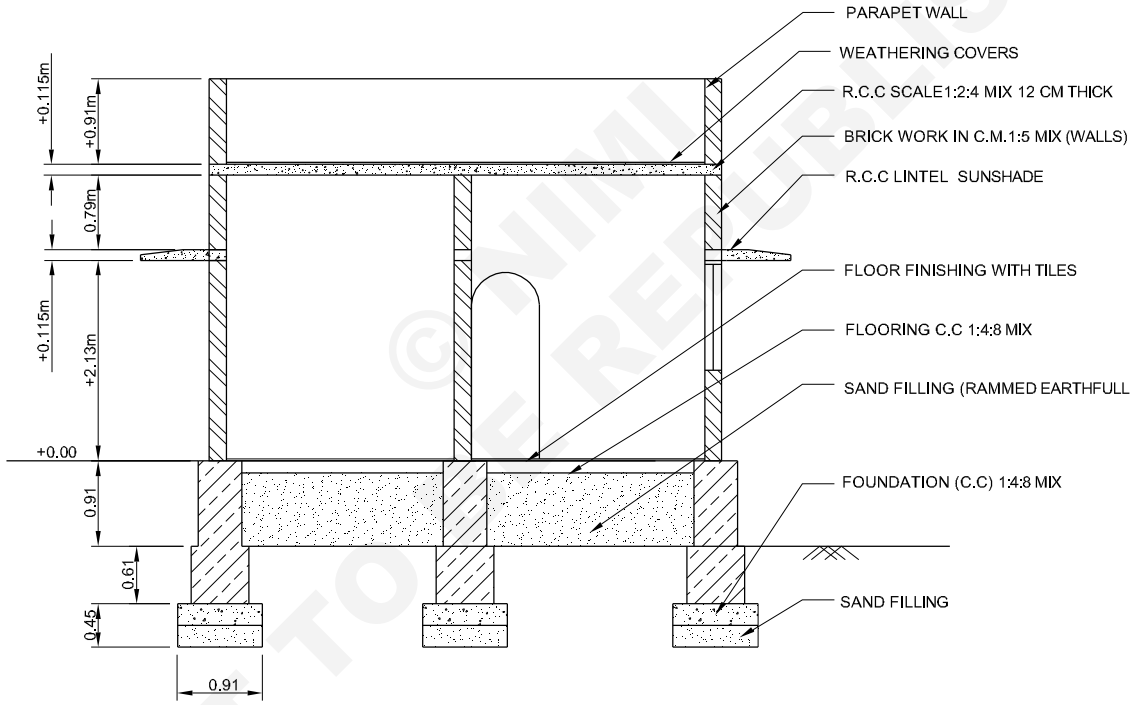
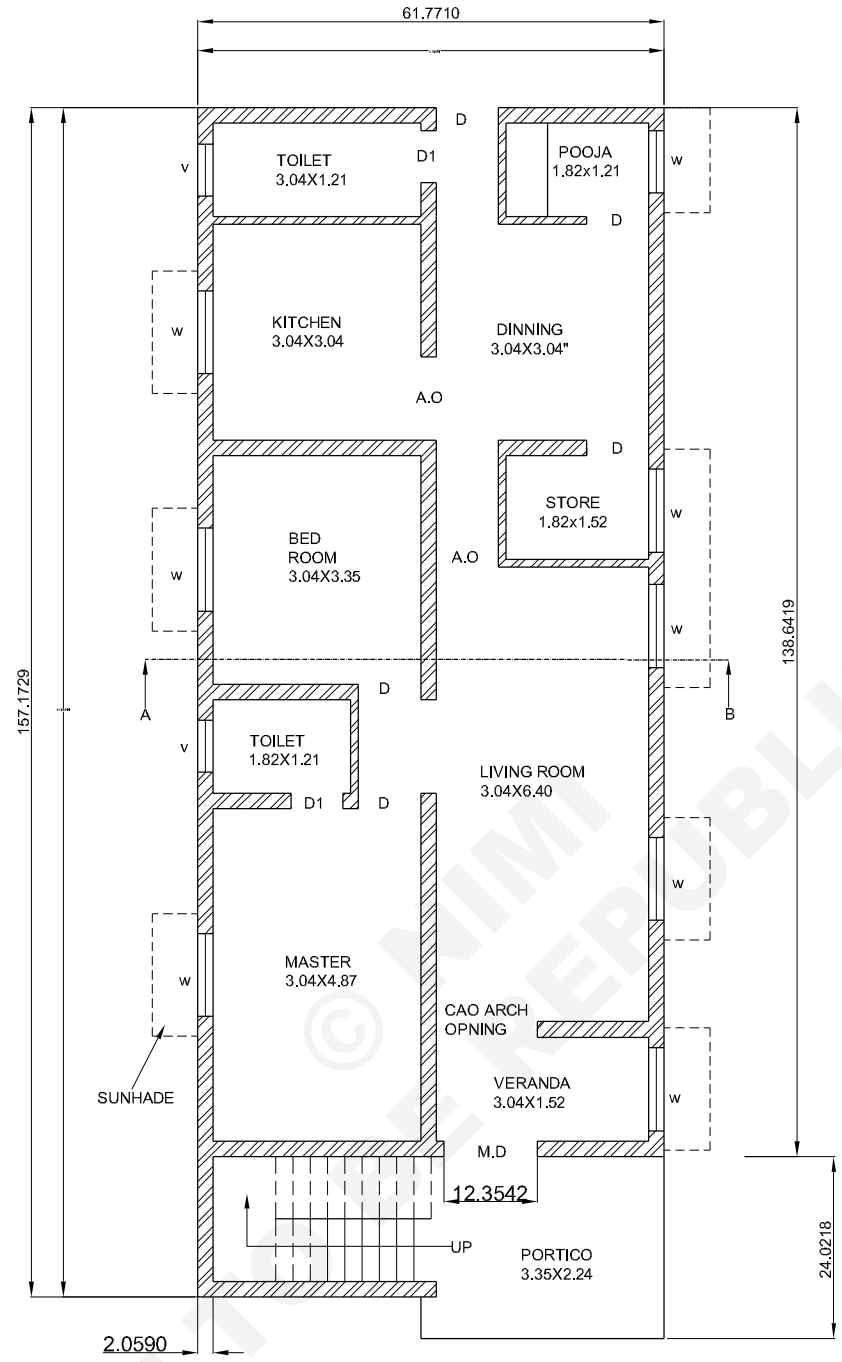


Fig 1



TASK 2 : **Design the interior a restaurant named (Fig 1)**

"SAMPANN" which is set up at your locality for 75'10.5" x 30' using the given requirements.

1 Reception area and waiting Lounge.

2 Kitchen for cooking with clay, storage units and different food counters.

3 Staff retiring room with changing room and toilet.

4 Toilet.

5 Having musical orchestra (Piano) as the focal point.

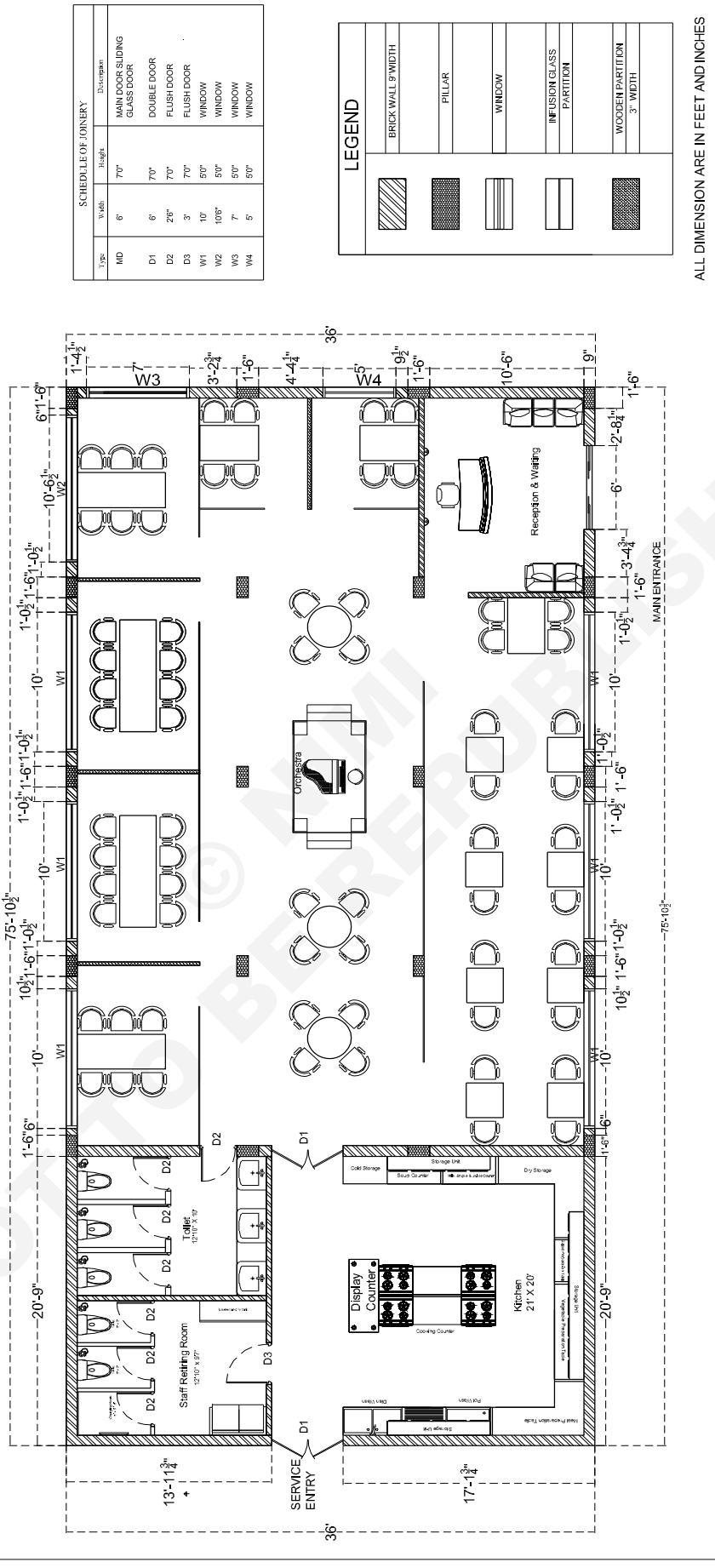
6 Private and public dining spaces with wooden portitions.

7 Seperate main and service entry.

8 From the given layout, design the spaces as per requirement.

9 Proportionaly draw the furniture and place it as per Fig 1.

Fig 1



PLAN OF THE RESTAURANT

ID20N1114J1

Free hand sketches of graphic symbols for carpentry, plumbing and electrical landscape

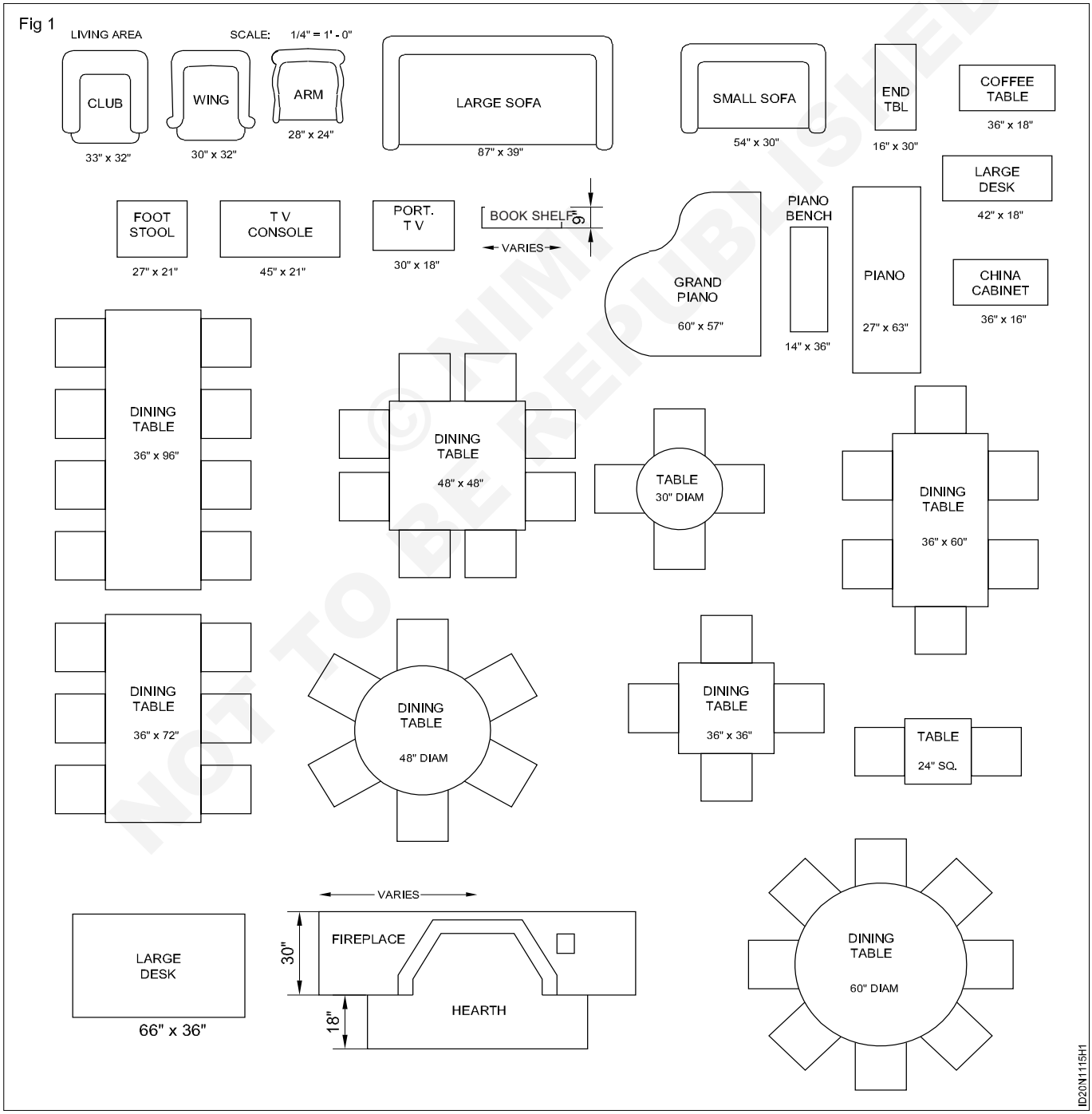
Objective: At the end of this exercise you shall be able to
- **draw free hand sketches graphic symbols for carpentry, plumbing and electrial landscape.**

PROCEDURE

TASK 1: **Draw the graphical symbols for door, windows and furniture (Fig 1 to 3)**

Graphic symbols for furniture in living and dining room. (Fig 1)

Fig 1



Graphic symbols for doors. (Fig 2)

Fig 2

SL.NO	OBJECT	SYMBOLS
01	VERTICAL CENTRE HUGE	
02	VERTICAL SLIDING	
03	HORIZONTAL CENTRE HUGE	
04	TOP HUGE	
05	BOTTOM HUGE	
06	SIDE HUGE RIGHT HAND	
07	SIDE HUGE LEFT HAND	
08	SIDE HUGE RIGHT HAND	
09	SIDE HUGE RIGHT HAND	
10	SIDE HUGE RIGHT HAND	

ID20N1115H2

Graphic symbols for windows. (Fig 3)

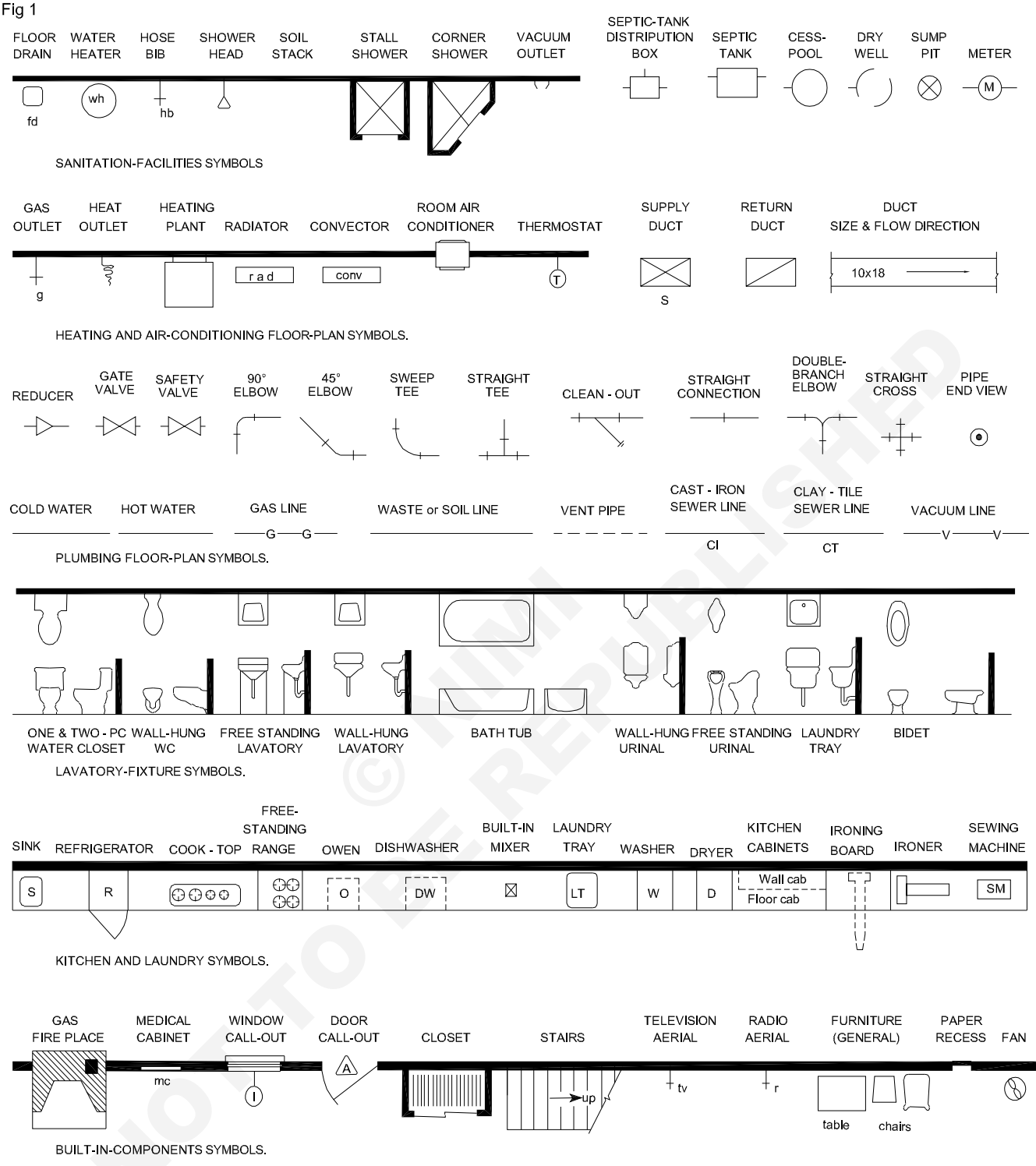
Fig 3

SL.NO	OBJECT	SYMBOLS
01	VERTICAL CENTRE HUGE	
02	VERTICAL SLIDING	
03	HORIZONTAL CENTRE HUGE	
04	TOP HUGE	
05	BOTTOM HUGE	
06	SIDE HUGE RIGHT HAND	
07	SIDE HUGE LEFT HAND	

ID20N1115H3

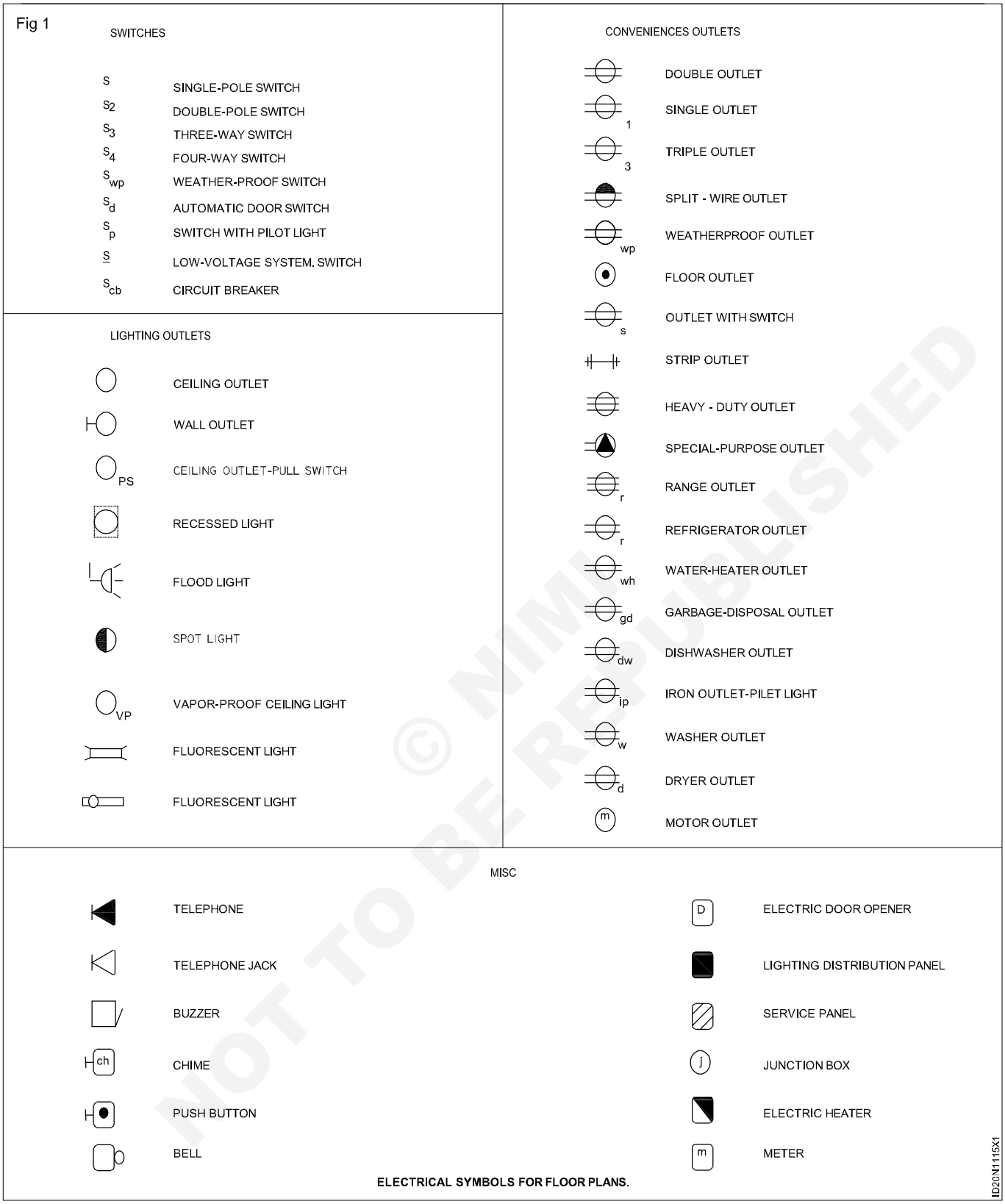
TASK 2: **Draw free hand sketches of plumbing and sanitary fittings (Fig 1)**

Fig 1



TASK 3: **Draw the free hand skectches of electrical and landscape (Fig 1)**

Fig 1



Rendering with pencil and pencil colour

Objectives: At the end of this exercise you shall be able to
- **draw color wheel and understand its importance**
- **draw color scheme and get the knowledge of using it interiors.**

PROCEDURE

TASK 1: **Draw color wheel and understand its importance**

1 Draw concentric circles of three valied sizes.

2 The innermost divide it into three pacts, first using red, blue, yellow which are the primary colors.

3 The middle circle which is formed by mixing two primary colors eg:when red is mixed with yellow we get orange, hence secondary colors are orange, green, violet.

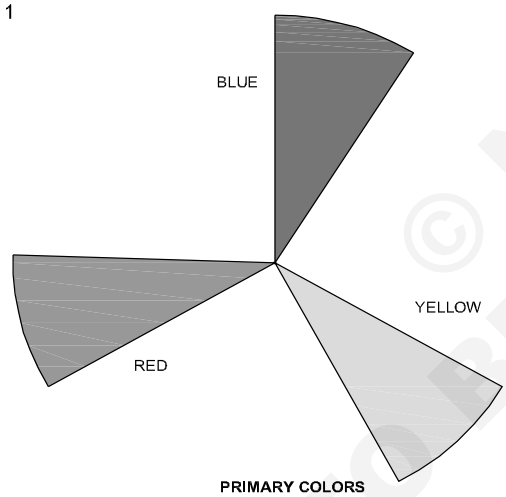
4 Similarly outermost circle should be formed by mixing two secondary colors.

— — — — — — —

TASK 2: **Draw color scheme and get the knowledge of using it interiors**

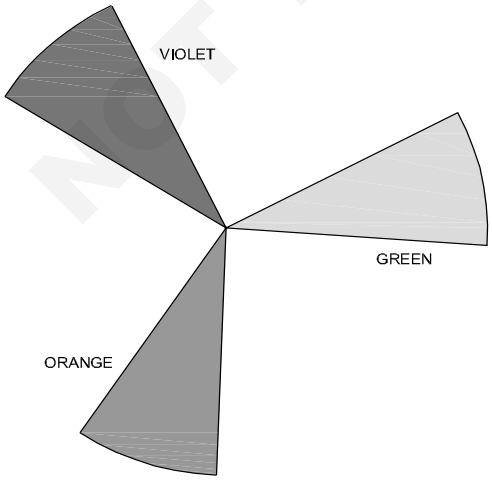
1 Draw a color wheel showing primary, secondary and testiary colors. (Fig 1,2 &3)

Fig 1



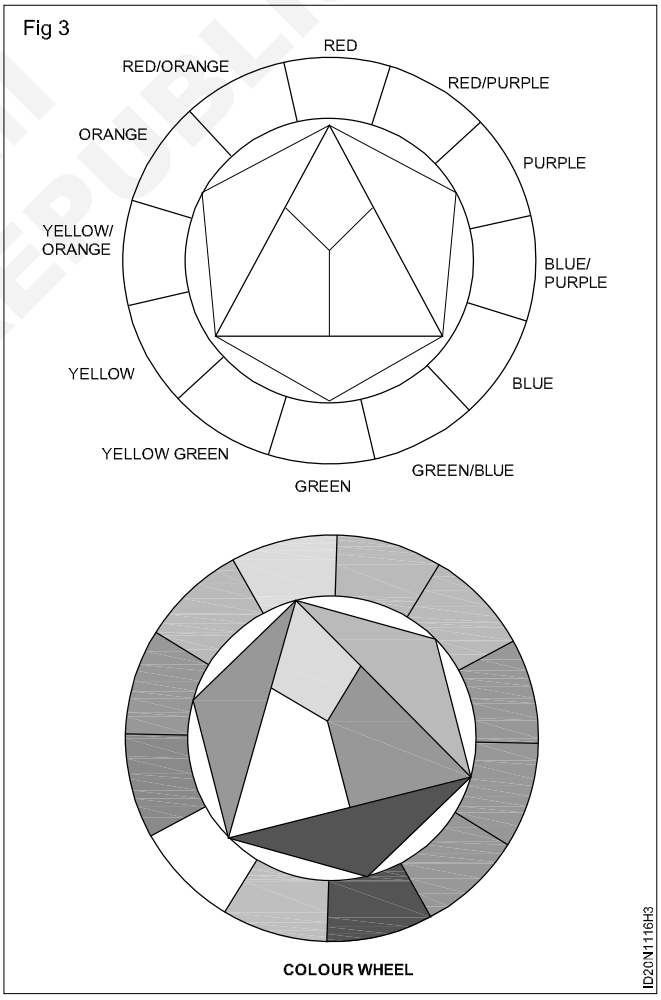
PRIMARY COLORS

Fig 2



SECONDARY COLORS

Fig 3



COLOUR WHEEL

— — — — — — — —

TASK 3: **Creatively uses color schemes in showing interior spaces which should satisfy the following criteria.**

1 Analogous color scheme.
2 Complimentary color scheme.
3 Double complementary color scheme.
4 split complementary color scheme.
5 Monochromatic color scheme.
6 Triad color scheme.
7 Draw the color wheel using the above data as given in(Fig1)

Note: The scheme followed should be precise and the image selected for drawing should be interior based.

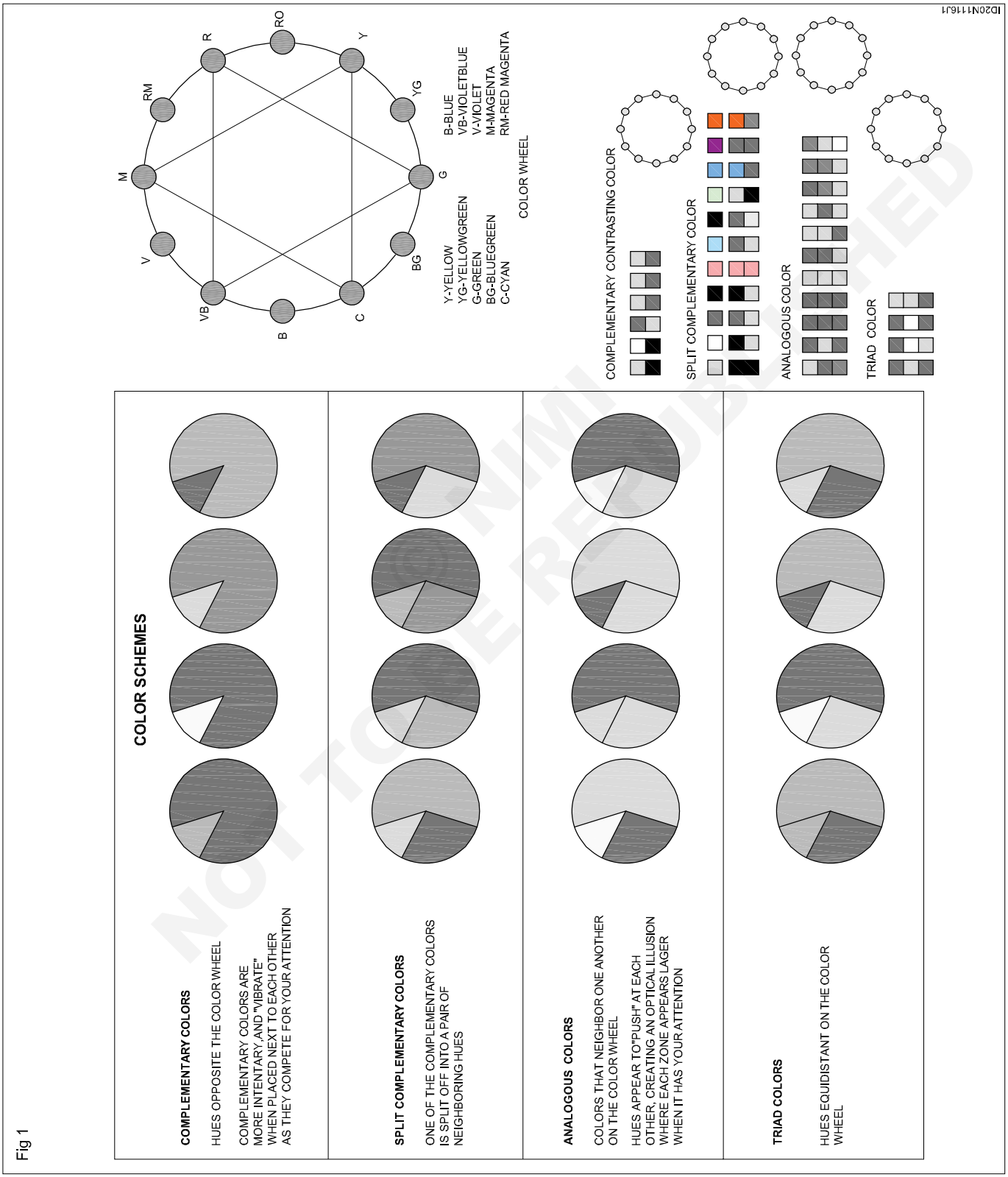


Fig 1

Skill Sequence

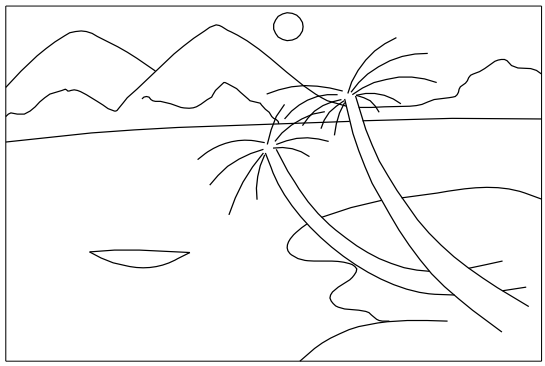
Sketch the landscape or monuments

Objective: This shall help you to
- **sketch landscape or mounments.**

Landscape

- Draw the out line as shown in Fig 1 use HB pencil to draw the outline.

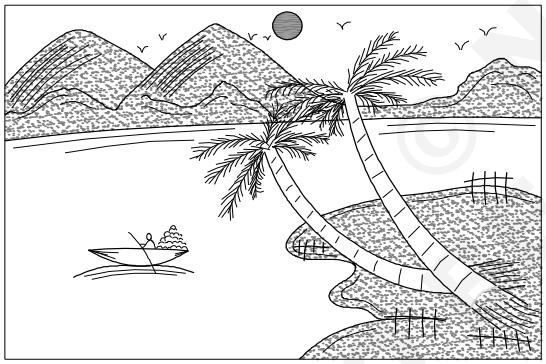
Fig 1



ID20N1116X1

- Render the landscape using 2B, 4B, 6B, pencils for various shades as shown in Fig 2.

Fig 2



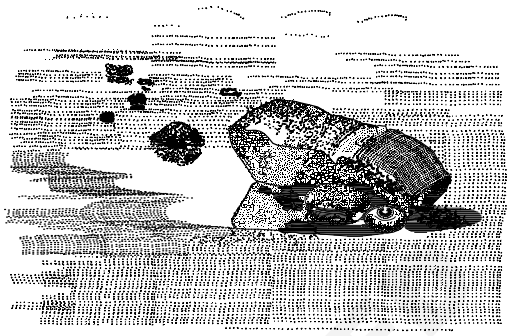
ID20N1116X2

- The landscape can also be rendered using water colours or colour pencils.
- Practice few more sketches as shown in Fig 3,4,5,6,7,8.

Fig 3

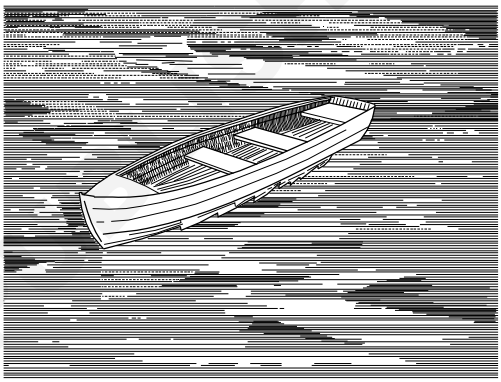
ID20N1116X3

Fig 4



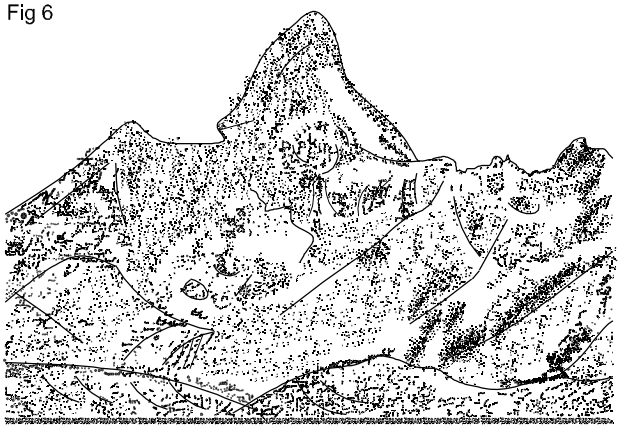
ID20N1116X4

Fig 5



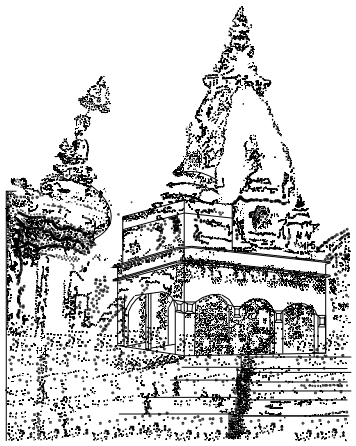
ID20N1116X5

Fig 6



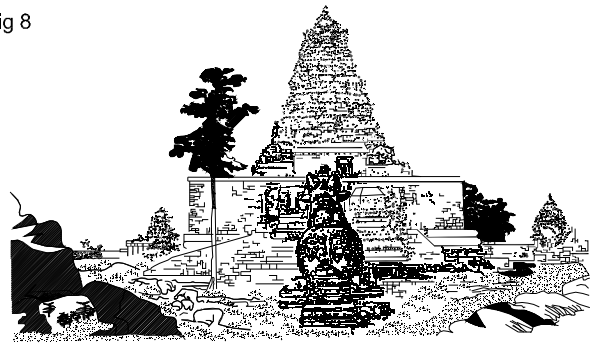
ID20N1116X6

Fig 7



ID20N1116X7

Fig 8



ID20N1116X8

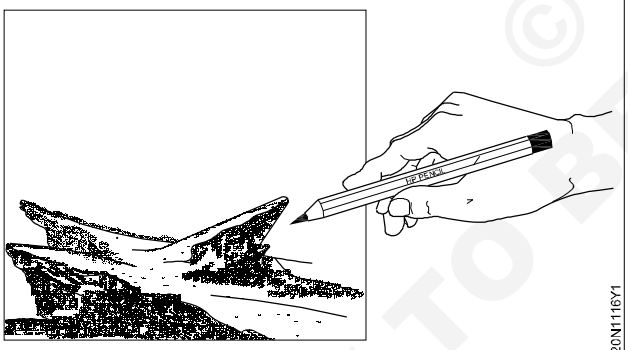
Sketch the drawing using tripod grip, extended grip, overhand grip and hand grip

Objectives: This shall help you to
- **sketch the drawing using tripod grip**
- **sketch the drawing using extended grip**
- **sketch the drawing using overhand grip**
- **sketch the drawing using hand grip.**

Tripod Grip

- Position the pencil applying equal pressure between the side of the middle finger, the tip of the index finger and the thumb as shown in Fig 1.

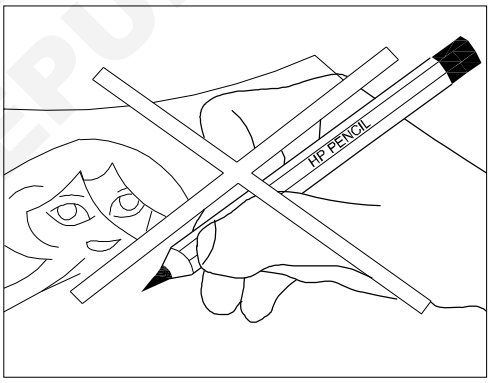
Fig 1



ID20N1116Y1

- Do not grip the pencil too firmly. Holding a pencil too tightly or too lightly will limit your flexibility in drawing.
- Do not hold the pencil vertically as shown in Fig 2. check if the thumb and the underside of the forearm are in straight line.

Fig 2

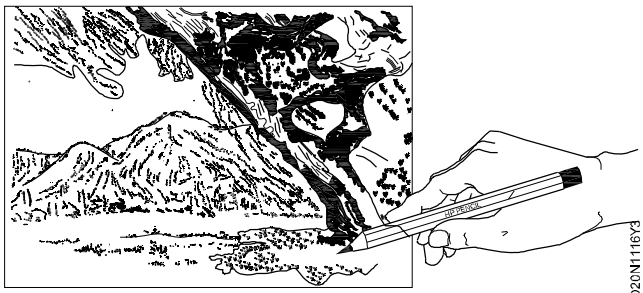


ID20N1116Y2

Extended Grip

- The tripod grip is still used, but you will hold the pencil a bit further at the end on near the tip that has the eraser. as shown in Fig 3.
- Small movements of your hand make larger effects on the other end.

Fig 3

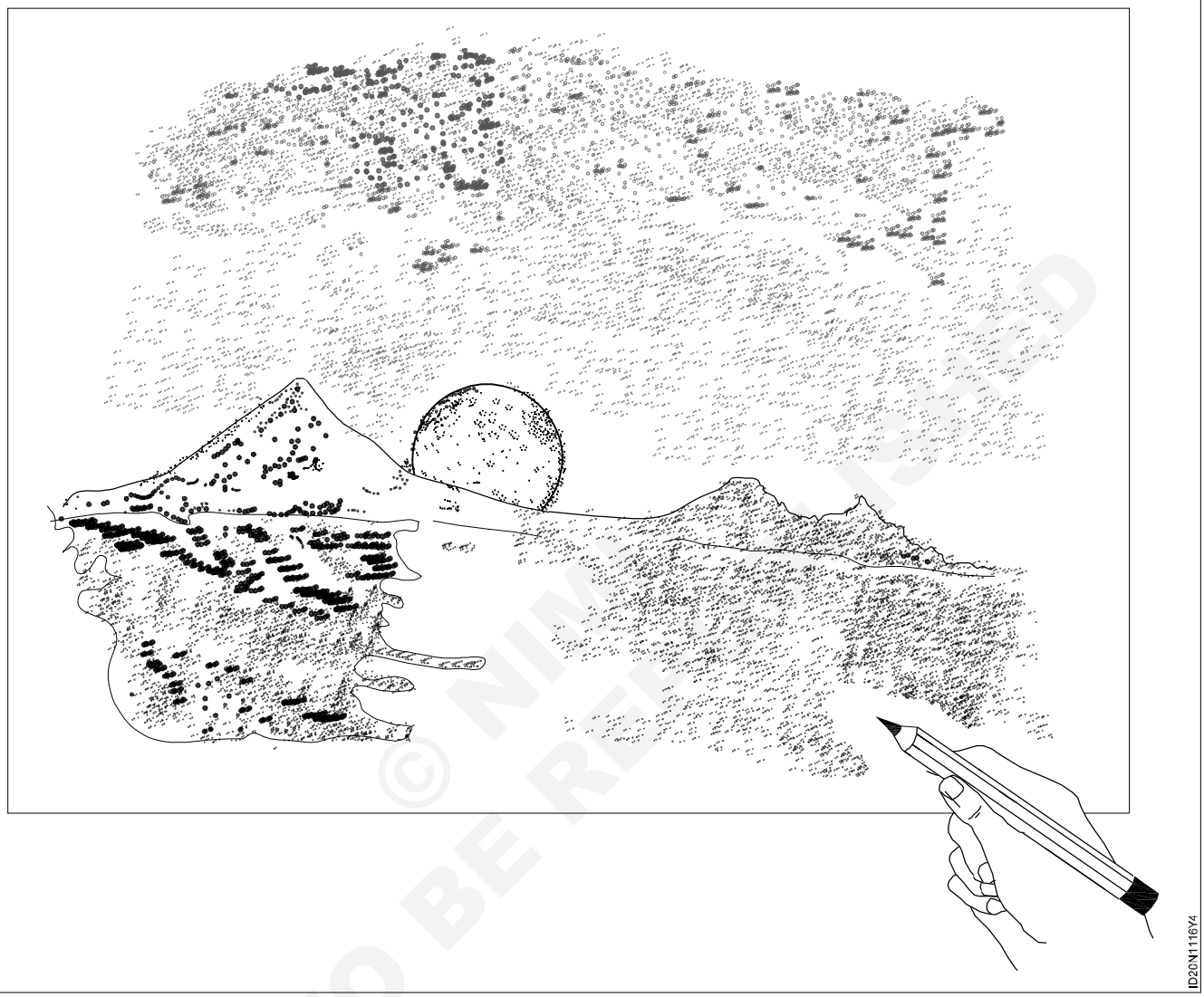


ID20N1116Y3

Overhand Grip

- Hold the pencil horizontally as shown in Fig 4.
- The overhand grip have a relaxed grip on the pencil but not too relaxed that the grip would not be secure.
- You can draw sitting or standing, make sure that your arm has full range movement.

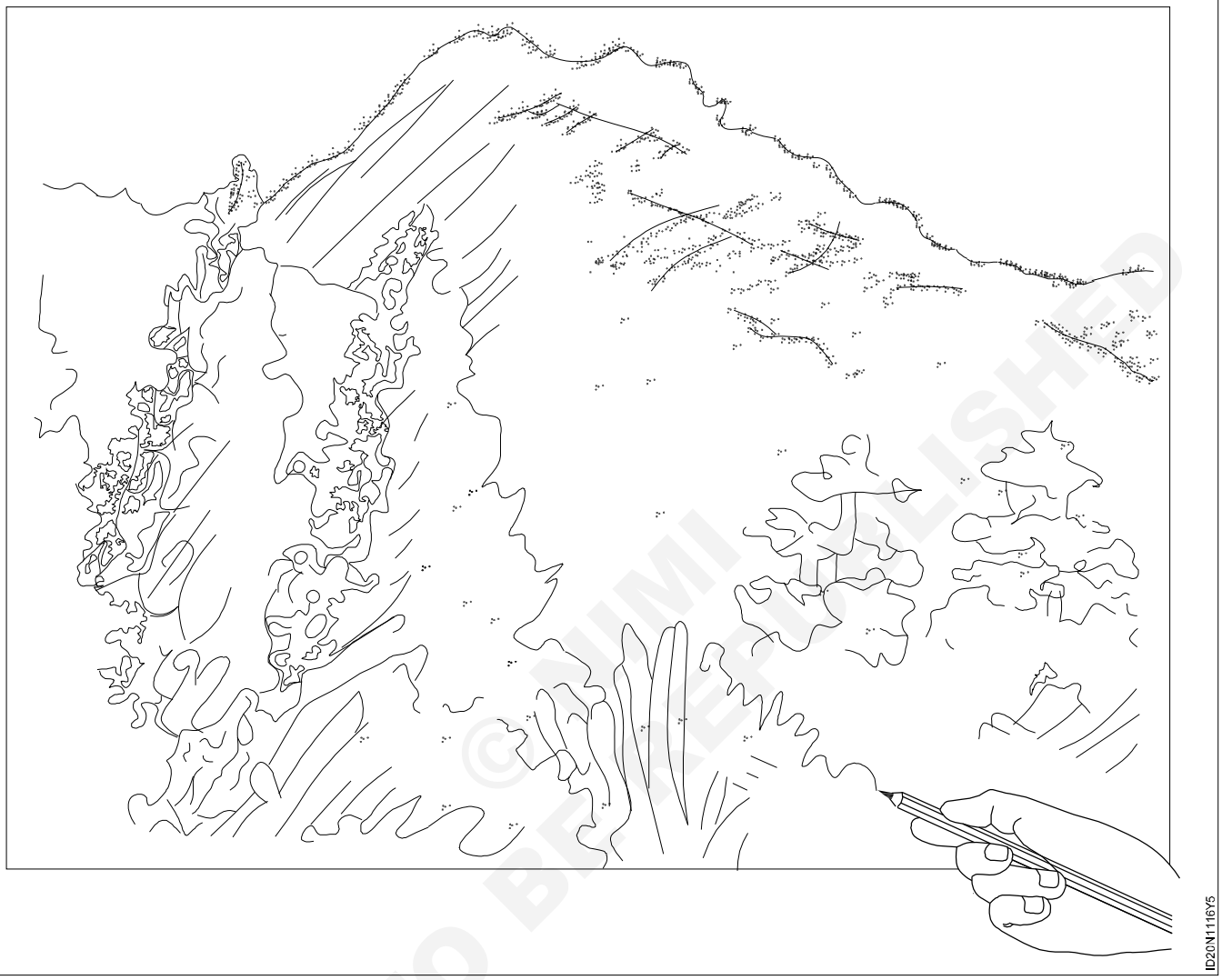
Fig 4



Under hand Grip

- Hold the pencil in a relaxed way.
- This grip is best suited for broad sketching.
- The pencil is positioned in a ‘v’ with the middle and index finger controlling the movement as shown in Fig 5.
- Using this type of grip will help you make from lines and small linear details.

Fig 5



Residential furniture design and detail

Objective: At the end of this exercise you shall be able to
- **draw residential furniture design as per the dimensions.**

PROCEDURE

TASK 1: **Draw the residential table as per dimension (Fig 1)**

Data:

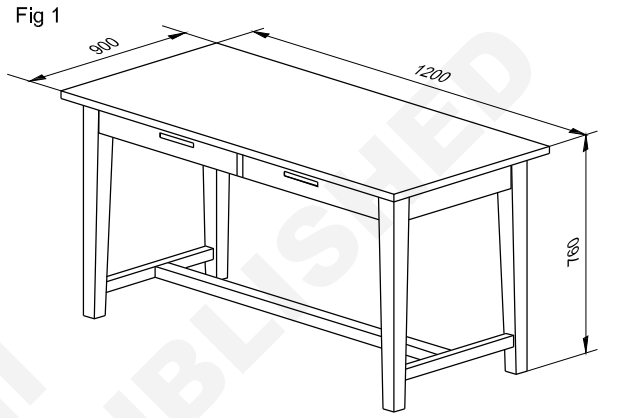
Table size = 1200 x 900 x 760 mm

Top plauge = 1200 x 900 mm

Bottom rails = 45 x 20 mm

Leg size = 45 x 45 mm

Fig 1

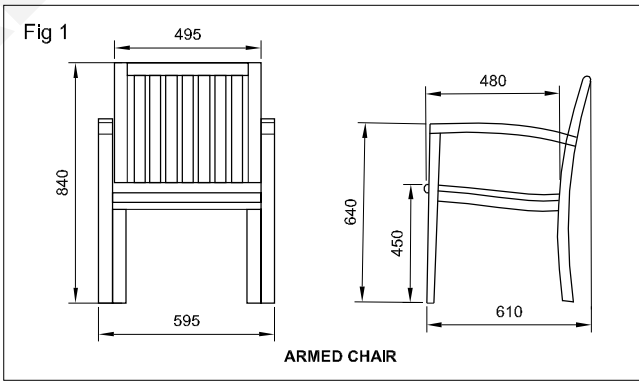


TASK 2: **Draw residential chair as per dimension (Fig 1)**

Data:

Armed chair size = 840 x 595 x 610 mm

Fig 1

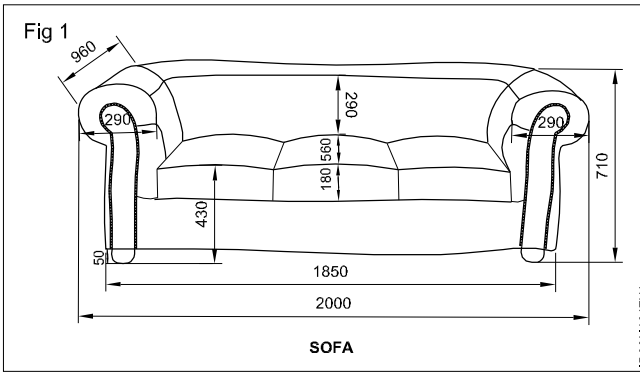


TASK 3: **Draw a residential sofa as per dimensions (Fig 1)**

Data:

Sofa size = 2000 x 710 x 960 mm

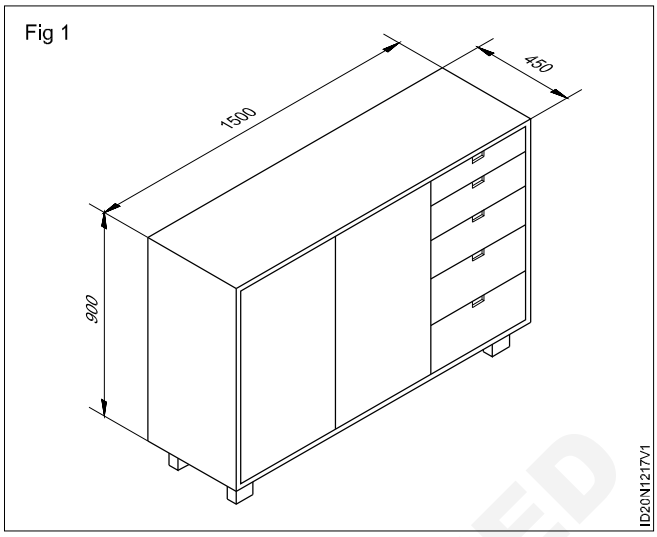
Fig 1



TASK 4: **Draw the cabinet as per dimension (Fig 1)**

Data:

Cabniet size = 1500 x 900 x 45 mm



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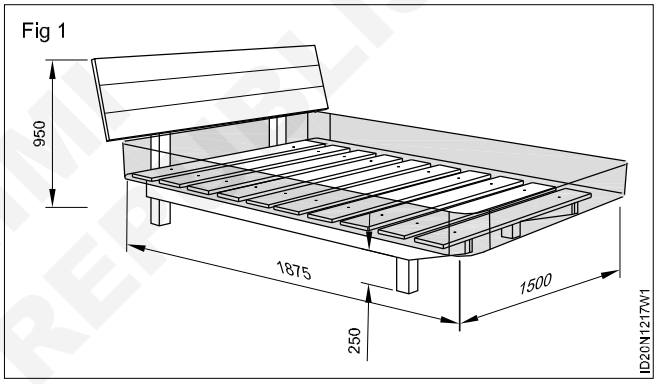
TASK 5: **Draw the bed as per dimension (Fig 1)**

Data:

Bed size = 1875 x 1500 x 950 mm



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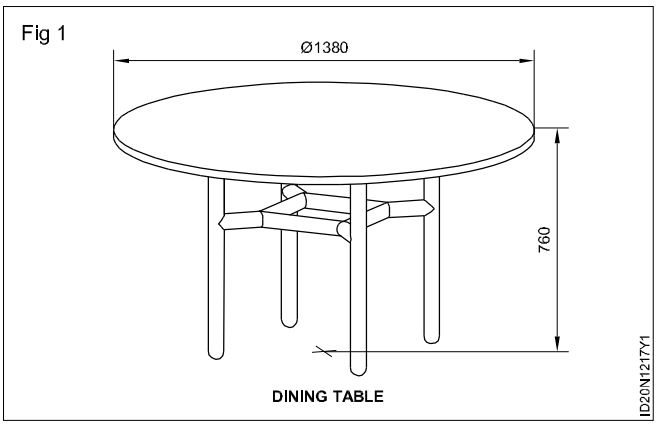
TASK 6: **Draw the dining table as per dimension (Fig 1)**

Data:

Dining table size = 1380 x 760 mm



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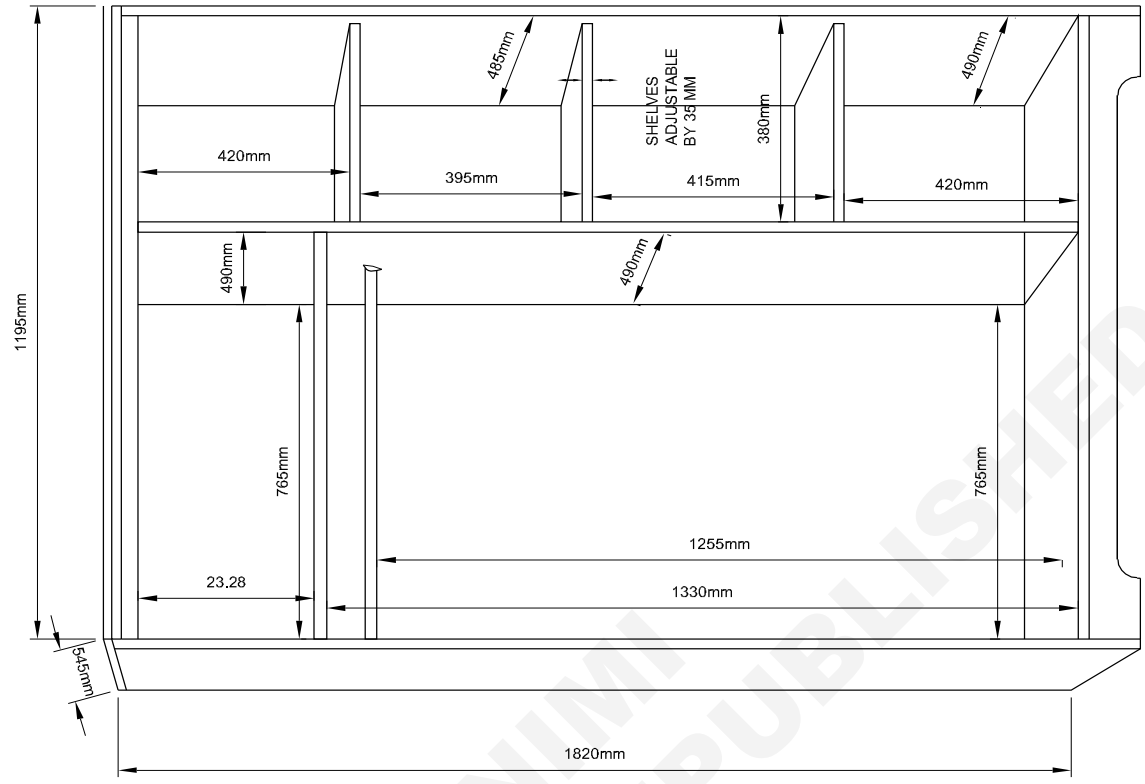
TASK 7: **Draw the wardrobe as per dimension (Fig 1)**

Data:

Wardrobe size = 1820 x 1195 x 545 mm

Fig 1

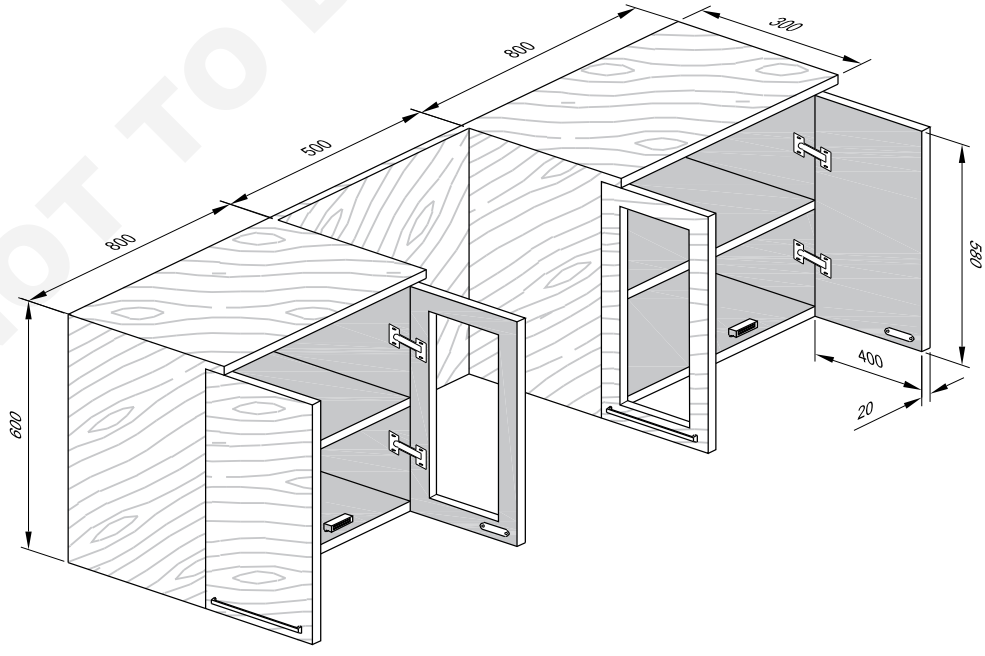


TASK 8: **Draw the modular kitchen wall unit cabinet (Fig 1)**

Data: Door size = 400 x 20 x 580 mm

Wall unit cabinet size: 300 x 600 x 2100 mm

Fig 1



Commercial furnitures design and detail

Objective: At the end of this exercise you shall be able to
- **draw the commercial furniture design as per the dimensions.**

PROCEDURE

TASK 1: **Draw the Executive table (Fig 1)**

1 Draw executive table as per dimension.

2 Draw well of proper height and detail all parts properly.

3 Use line weight accordingly.

Data:

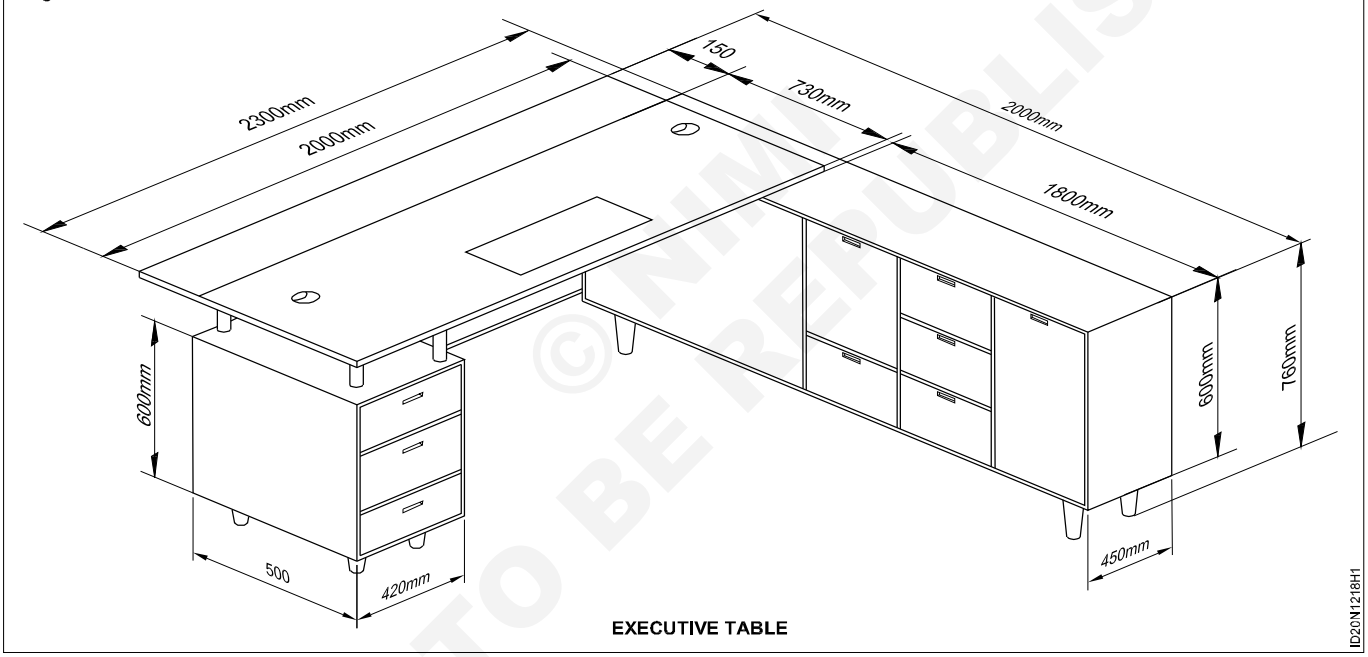
Table top = 2200 x 880 x 19 mm (Thick plywood)

Table top sum mica = 2200 x 880 x 1 mm (Thick)

Left side cupboard = 1800 x 450 x 600 mm

Right side drawer = 600 x 500x 420 mm (with three drawers)

Fig 1



EXECUTIVE TABLE

TASK 2: **Draw the Office table (Fig 1)**

1 Draw office table as per dimension.

2 Draw well of proper height and detail all parts properly.

3 Use line weight accordingly.

Data:

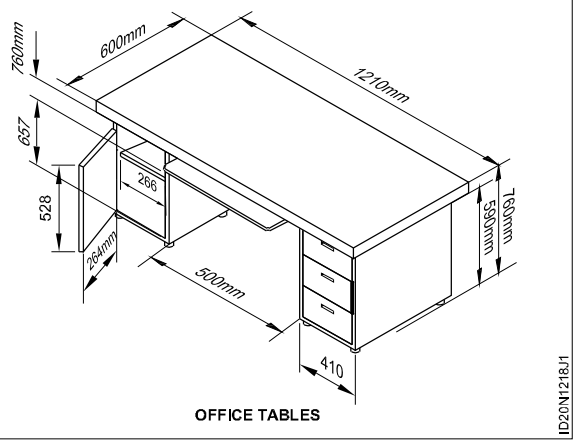
Table size = 1210 x 600 x 760 mm

Top plank size = 1210 x 600 x 20 mm (Thick)

Left side cupboard = 657 x 300 mm

Right side drawer = 590 x 410 mm

Fig 1



OFFICE TABLES

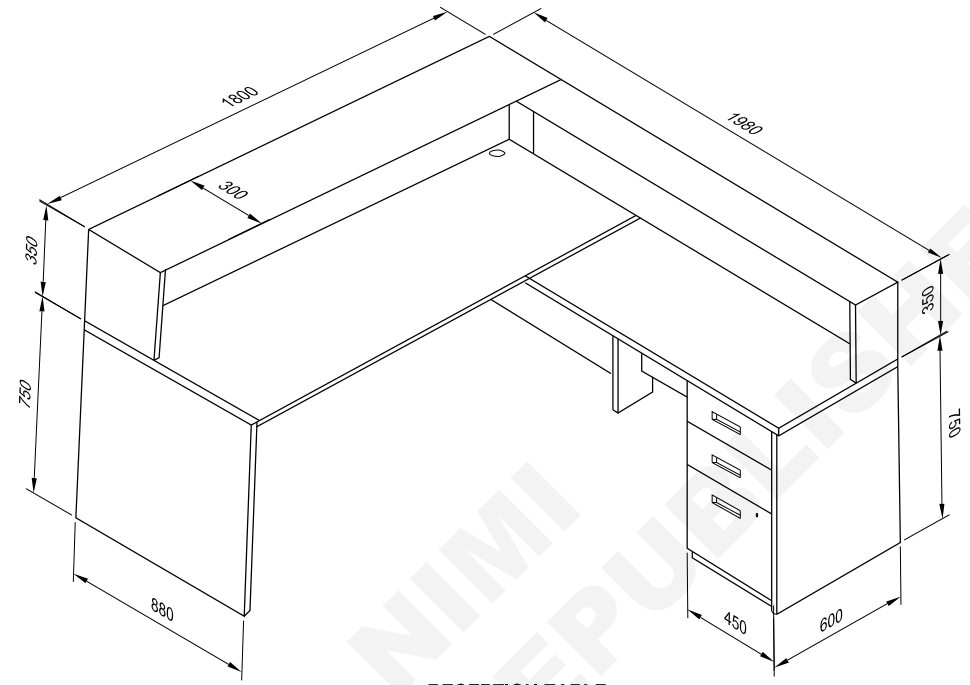
TASK 3: **Draw the Reception table (Fig 1)**

1 Draw the reception table as per dimension.
2 Draw well of proper height and detail all parts properly.
3 Use line weight accordingly.

Data:

Table top front = 1800 x 880 mm
Table top side = 1080 x 600 mm
Counter top front = 1800 x 300 x 350 mm
Counter top side = 1660 x 200 x 350 mm

Fig 1



RECEPTION TABLE

ID20N1218X1

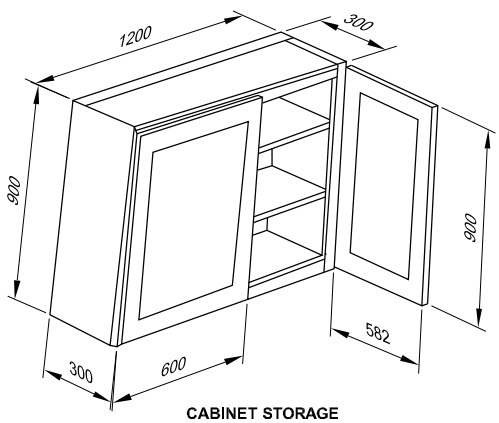
TASK 4: **Draw the cabinet storage table (Fig 1)**

1 Draw cabinet storage as per dimension.
2 Draw well of proper height and detail all parts properly.
3 Use line weight accordingly.

Data:

Cabinet size = 1200 x 300 x 900 mm
Door size = 900 x 582 mm

Fig 1



CABINET STORAGE

ID20N1218Y1

TASK 5: **Draw the display unit (Fig 1)**

1 Draw display unit as per the dimension.

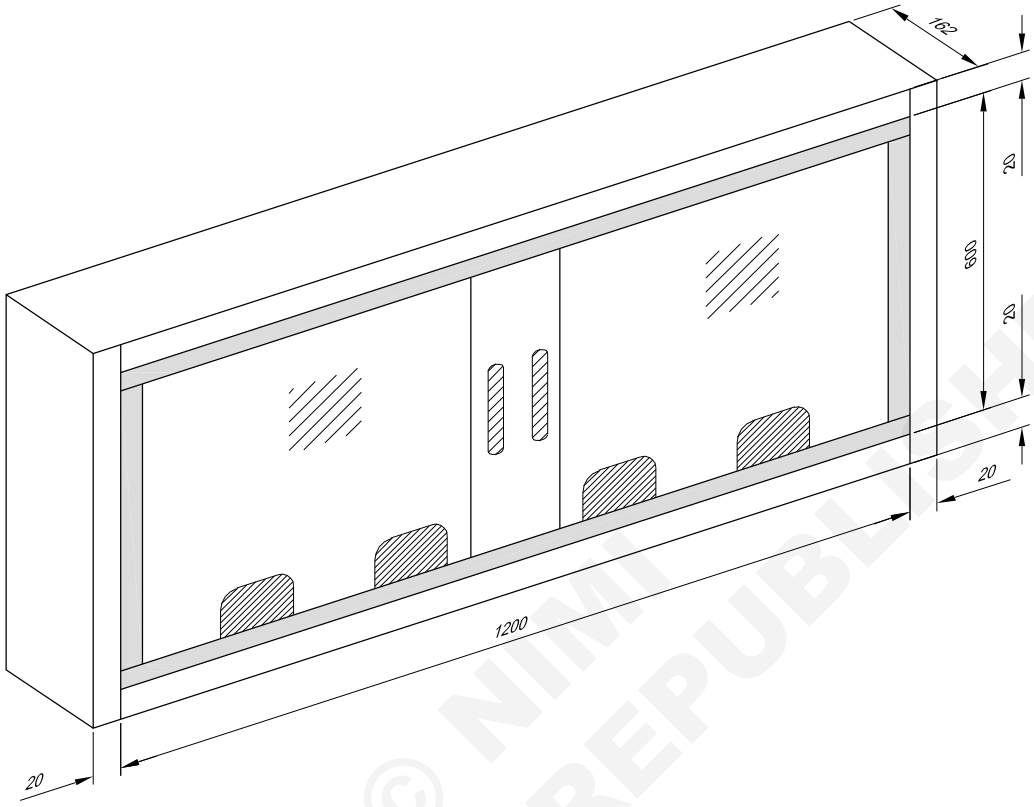
2 Draw well of proper height and details all parts.

3 Use line weight accordingly.

Data:

Display unit size 1240 x 640 x 162 mm.

Fig 1



Free hand sketches of graphic symbols of furniture

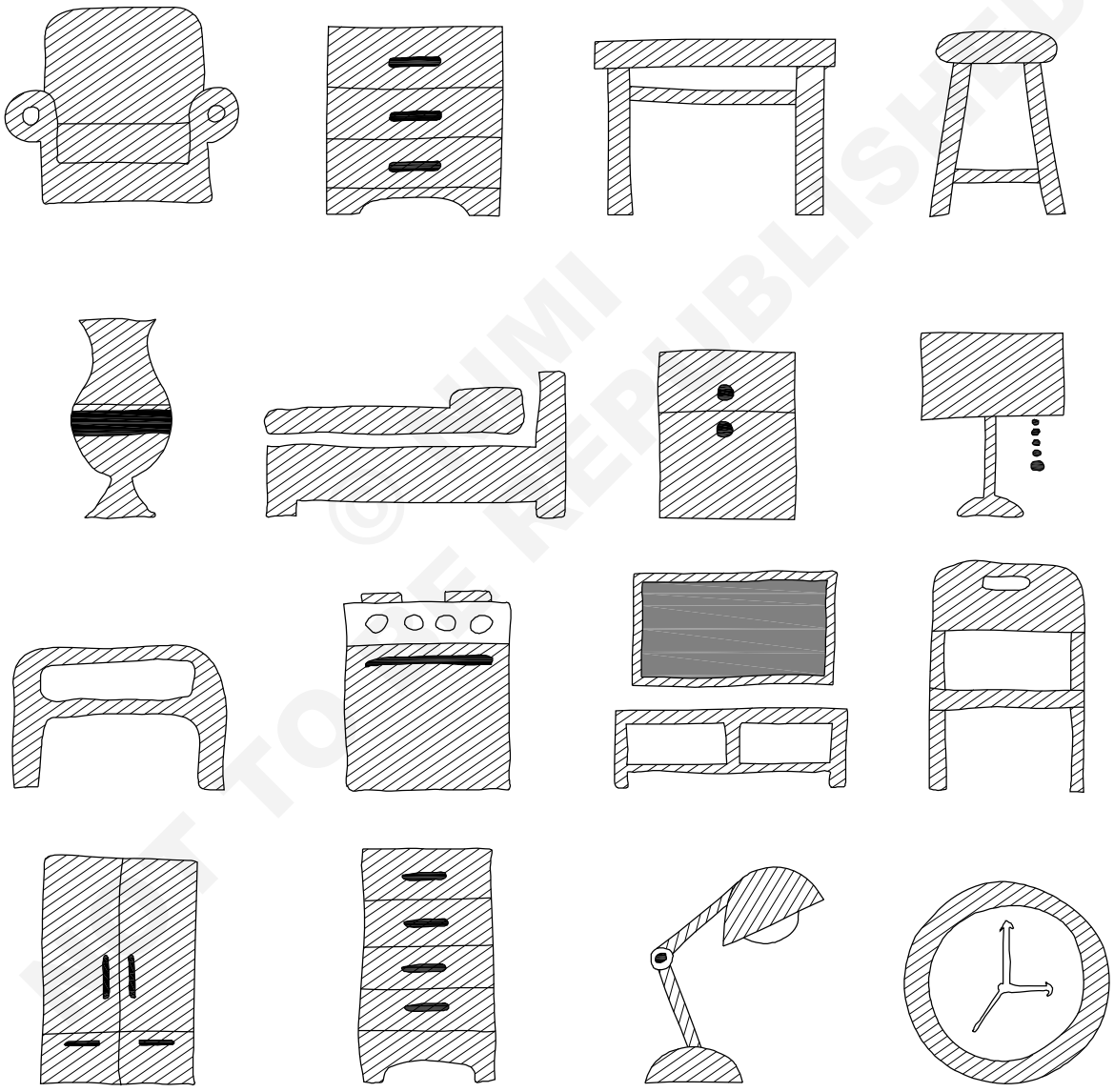
Objective: At the end of this exercise you shall be able to
- **draw the free hand sketches of graphic symbol of furniture.**

PROCEDURE

TASK 1:

1 Draw the graphic symbol of furniture design in floor as per the dimensions free hand approximate. (Fig 1)

Fig 1

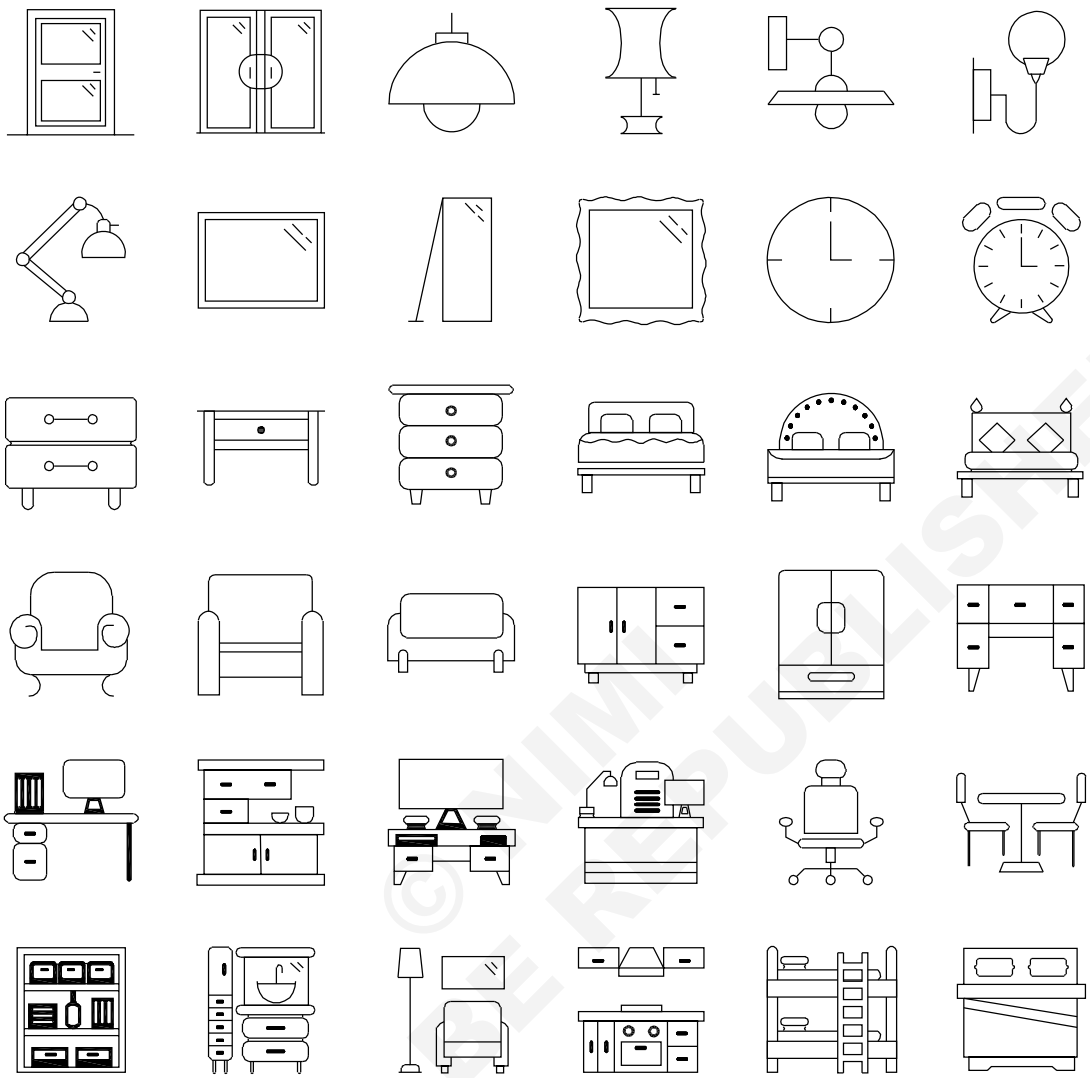


ID20N1219H1

TASK 2:

1 Draw the graphical symbol of furniture living room as per the dimensions approximate. (Fig 2)

Fig 2



ID20N1219H2

Concept plan with circulation flow (Bubble diagram)

Objectives: At the end of this exercise you shall be able to
• draw bubble diagram
• draw plan sectional elevation to suitable scale.

PROCEDURE

TASK 1: **Draw the bubble diagram and residential layout**

Draw bubble diagram along with circulation flow with given requirements of client who is an interior designer having family of four (2 kids). (Even a concept note has to be made.)

Data/Requirements to be incorporated

a One studio (Interior designer) for working

b Home theater

c Living room

d Dining room

e Guest room

f Kitchen

g Master bedroom with attached toilet

h Kids bedroom with attached toilet

i Common toilet

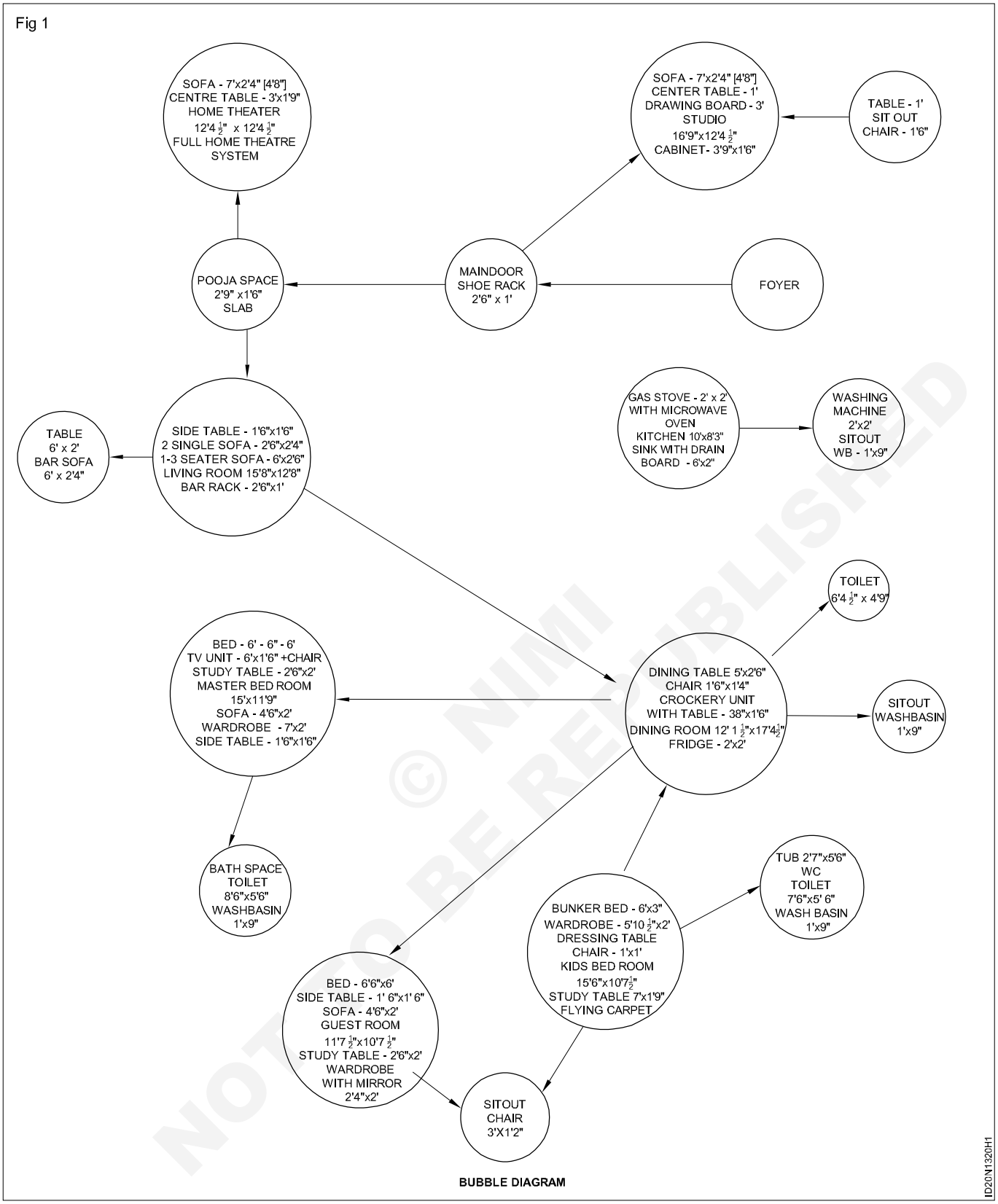
j Prayer (Pooja) spaces

1 Draw the bubble diagram using the required data is the given Fig 1 below gives clear detail of it.

2 Circulation of spaces needs to be understood while doing bubble diagram Fig 2 by drawing proximity chart.

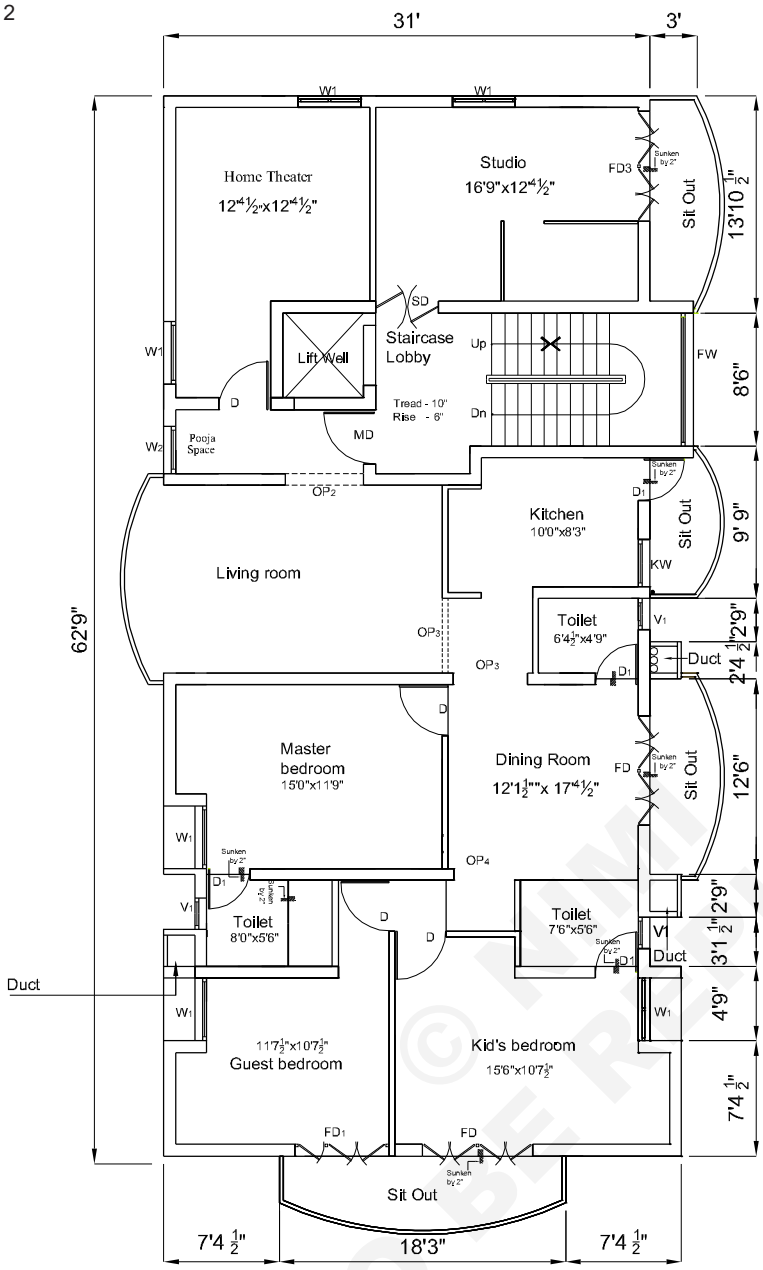
Note: Proximity charge enables placing of spaces next to each other.

Fig 1



BUBBLE DIAGRAM

Fig 2



RESIDENTIAL LAYOUT

CARPET AREA : 1961 SFT

SCHEDULE OF JOINERY			
Type	Width	Height	Description
MD	3' 6"	7' 0"	MAIN DOOR
D	3' 3"	7' 0"	DOOR
D_1	2' 9"	7' 0"	DOOR
SD	4' 0"	7' 0"	SWING DOOR
FD	7' 0"	7' 0"	FULL GLAZED DOOR
FD_1	6' 0"	7' 0"	---- DO ----
FD_2	5' 0"	7' 0"	---- DO ----
W_1	4'	5'	---- DO ----
W_2	3'	5'	---- DO ----
KW	3' 0"	3' 6"	KITCHEN WINDOW
FW	8' 6"	7' 0"	FRENCH WINDOW
FW_1	8' 6"	7' 0"	FRENCH WINDOW
V	3' 0"	2' 6"	VENTILATOR
V_1	2' 0"	2' 6"	--- DO ---
V_2	1' 9"	2' 6"	--- DO ---
RS	4' 0"	7' 0"	ROLLING SHUTTER
OP_1	5' 3"	7' 0"	OPENING
OP_3	4' 3"	7' 0"	--- DO ---
OP_4	3' 6"	7' 0"	--- DO ---
OP_5	2' 9"	7' 0"	--- DO ---

ID20N1321H1

Basic furniture layout

Objective: At the end of this exercise you shall be able to
• draw the basic furniture layout plan.

PROCEDURE

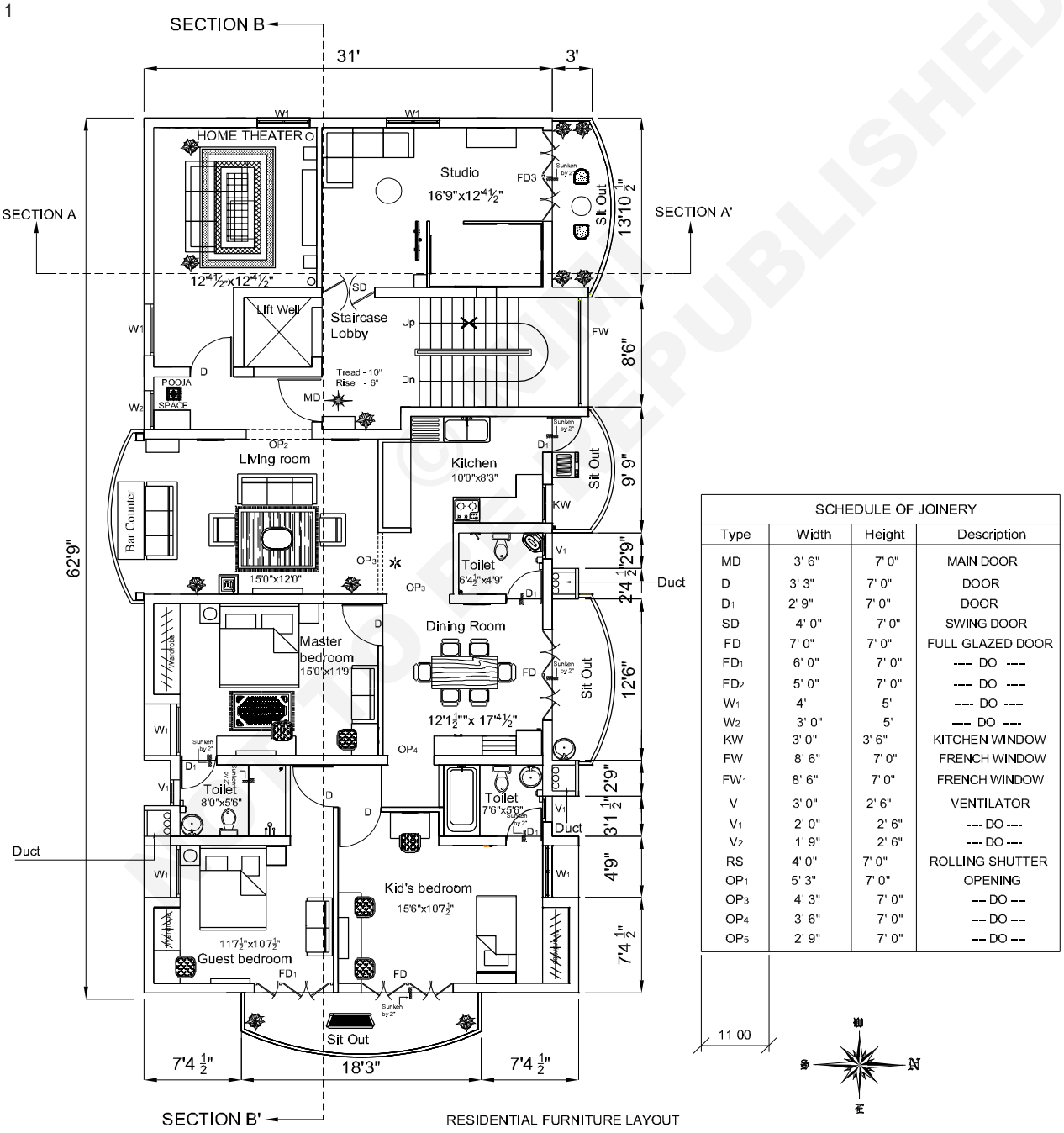
TASK 1: **Furniture layout**

1 Draw furniture layout for (Fig 1) resistance and render it using different, medium pencils, dry pastels etc,.

2 From the given bubble diagram of task 1 draw proper furniture based on standard size.

3 Refer Fig 1 a bubble understanding.

Fig 1



SCHEDULE OF JOINERY

Type	Width	Height	Description
MD	3' 6"	7' 0"	MAIN DOOR
D	3' 3"	7' 0"	DOOR
D_1	2' 9"	7' 0"	DOOR
SD	4' 0"	7' 0"	SWING DOOR
FD	7' 0"	7' 0"	FULL GLAZED DOOR
FD_1	6' 0"	7' 0"	---- DO ----
FD_2	5' 0"	7' 0"	---- DO ----
W_1	4'	5'	---- DO ----
W_2	3' 0"	5'	---- DO ----
KW	3' 0"	3' 6"	KITCHEN WINDOW
FW	8' 6"	7' 0"	FRENCH WINDOW
FW_1	8' 6"	7' 0"	FRENCH WINDOW
V	3' 0"	2' 6"	VENTILATOR
V_1	2' 0"	2' 6"	---- DO ----
V_2	1' 9"	2' 6"	---- DO ----
RS	4' 0"	7' 0"	ROLLING SHUTTER
OP_1	5' 3"	7' 0"	OPENING
OP_3	4' 3"	7' 0"	--- DO ---
OP_4	3' 6"	7' 0"	--- DO ---
OP_5	2' 9"	7' 0"	--- DO ---

ID20N1320H2

Wall elevation and details, rendering plan and elevation

Objectives: At the end of this exercise you shall be able to
- **draw the wall elevation with dimension**
- **necessary details**
- **render the plan ans elevation.**

PROCEDURE

TASK 1: **Wall section elevation**

1 Draw wall sectional elevation with dimension and specification.

2 Render the elevation.

a Draw sectional lines A - A'C - C'.

b Draw wall of proper height and detail all parts property.

c Use line weight accordingly.

d Refer Fig 1 & 2 for reference.

Fig 1

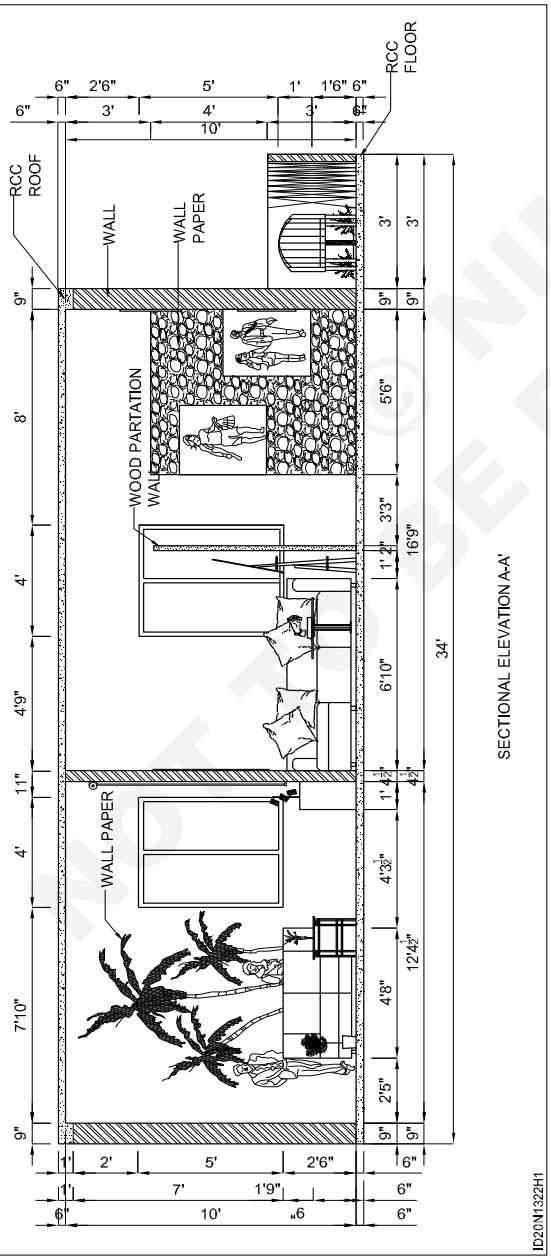
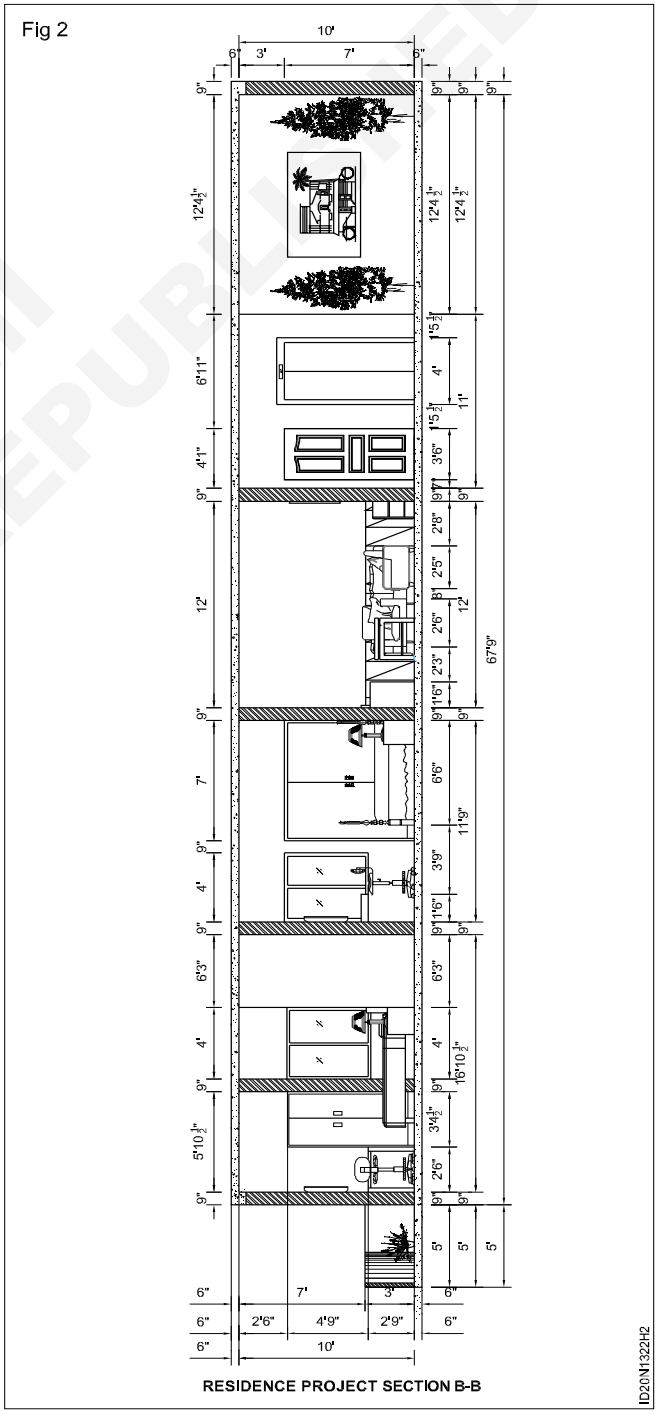


Fig 2



TASK 2: **Spread footing for walls (Brick/Stone)**

Data:

Wall thickness = 230 mm

D = Depth of foundation from grounf level = 1200 mm

a = offset of concrete = 150 mm

b = offset of brickwork = 75 mm

c = thickness of footing = 200 mm

d = depth of concrete = 150 mm

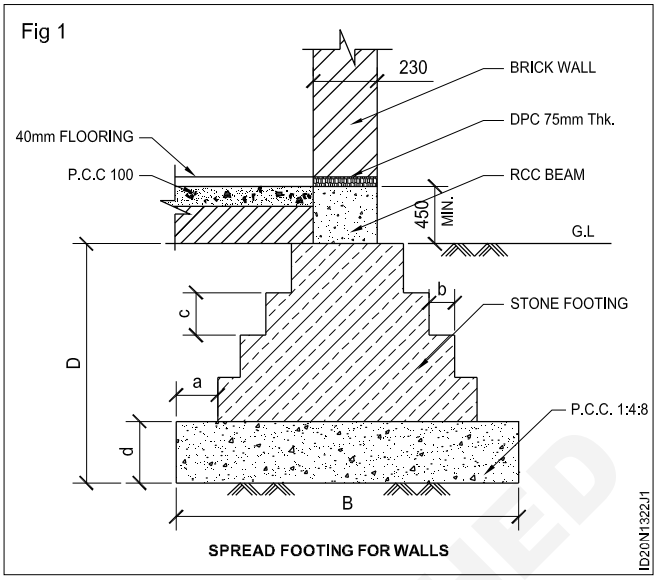
B = Breadth of concrete = 900 mm

1 Draw the section of stone footing.

2 Mark the dimension as shown in Fig 1.

3 Hatch and complete the section.

Fig 1



SPREAD FOOTING FOR WALLS

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TASK 3: **Necessary details for residential plan with working drawing**

1 Draw a size of plot.

2 Set backs.

3 Location & width of the the road.

4 North direction.

5 Climatic information

6 Do R & D for sample floor plan.

7 Divide plot in grids.

8 Make bubble diagram (2/3 times)

9 The following included in a plan set.

10 Foundation plan.

11 Floor plan

12 Building sections

13 Roof plan

14 Beam calcs pack

— — — — — — — —

TASK 4: **Rendering the plan and elevation**

1 Render a floor plan is a 2D or 3D view of home layout.

2 Present the floor plan to home buyers to help them to understand every aspect of it.

3 Introduce the example model.

4 Adjust the focal length.

5 Adjust the depth of field.

6 Adjust your shadows and sum settings.

7 Copy and paste effects to duplicate.

8 Quick over view of the example model.

9 Adjusting sun and heading for floor plan view.

10 Make a front view.

11 Adjust your shadow range.

— — — — — — — —

TASK 5: **Rendering in elevation**

1 Each side of house elevation drawings should be shown.

2 Show each wall length and its height.

3 Show roof width and height.

4 Draw the visible portion of the foundation.

5 Show any exterior features (such as decks porches and stairs).

6 Window and door trim.

— — — — — — — —

Prepare drawing with technical details of R.C.C stair case

Objectives: At the end of this exercise you shall be able to
- **draw the plan and section of straight staircase and technical details**
- **draw the plan and section of open well staircase and technical details**
- **draw the plan and section of dog legged straight staircase and technical details**
- **draw the plan and section of bifurcated staircase and technical details.**

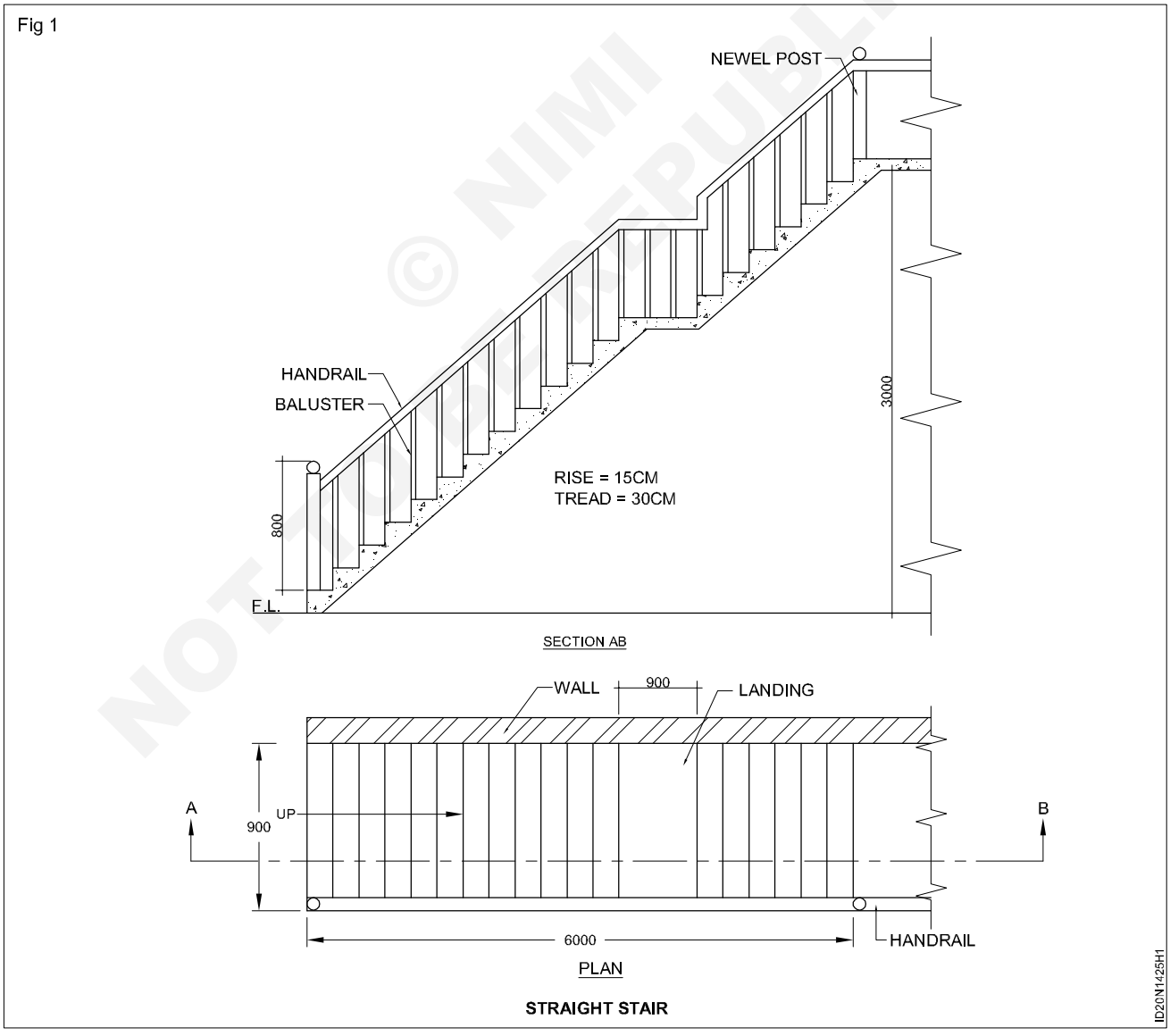
PROCEDURE

TASK 1: **Draw the plan and section of straight staircase (Fig 1)**

DATA

Height of upper floor	= 3 m
The total runs of straight stair	= 6 m
R.C.C waist	= 10 cm thick
The Tread	= 30 cm
No.of Steps in the flight	= 20 Nos.
Width of stair	= 0.90 m
The handrail G.I pipe	= 50 mm dia.
Newel post G.I pipe	= 75mm 80cm height

Fig 1



The baluster 25mmG.I pipe nd missing data may be assumed.

I Plan

1 Select scale 1:50.

2 Draw plan of the straight stair with proper number of treads.

3 Draw the landing after twelve risers.

4 Draw the threads (6 Nos) after the landing.

5 Dimension the drawing properly.

II Sectional Elevation

1 Draw upward projector lines to mark the risers from each tread and complete the section as indication in figures.

2 Draw hand rail details.

3 Fully dimension the drawing.

— — — — — — — —

TASK 2: **Draw the plan and section of RCC open newell staircase as per the data given below:**

DATA

Room size	= 6 x 2.50 m
Wall	= 30 cm
Height of floor	= 2.975 m
Tread	= 25 m
Rise	= 17.5 cm
Width of stair	= 1.00 m
Width of landing	= 1.00 m
Open well rectangle	= 50 cm width
RCC waist	= 12.5 cm
RCC beam	= 20 x 25 cm
Nosing	= 2.5 cm
Hand rail	= 50 mm
Baluster	= 25 mm

1 Draw the plan of room with size 6 x 2.5m

2 Draw the width of stair as 1m

3 Draw the treads 25cm wide and complete the plan as shown in Fig 1.

4 To develop the section, draw projectors upwards from each tread.

5 Complete the section as indicated in the figure.

6 Draw the details at (A) in 1:10 scale as shown Fig 2.

Fig 1

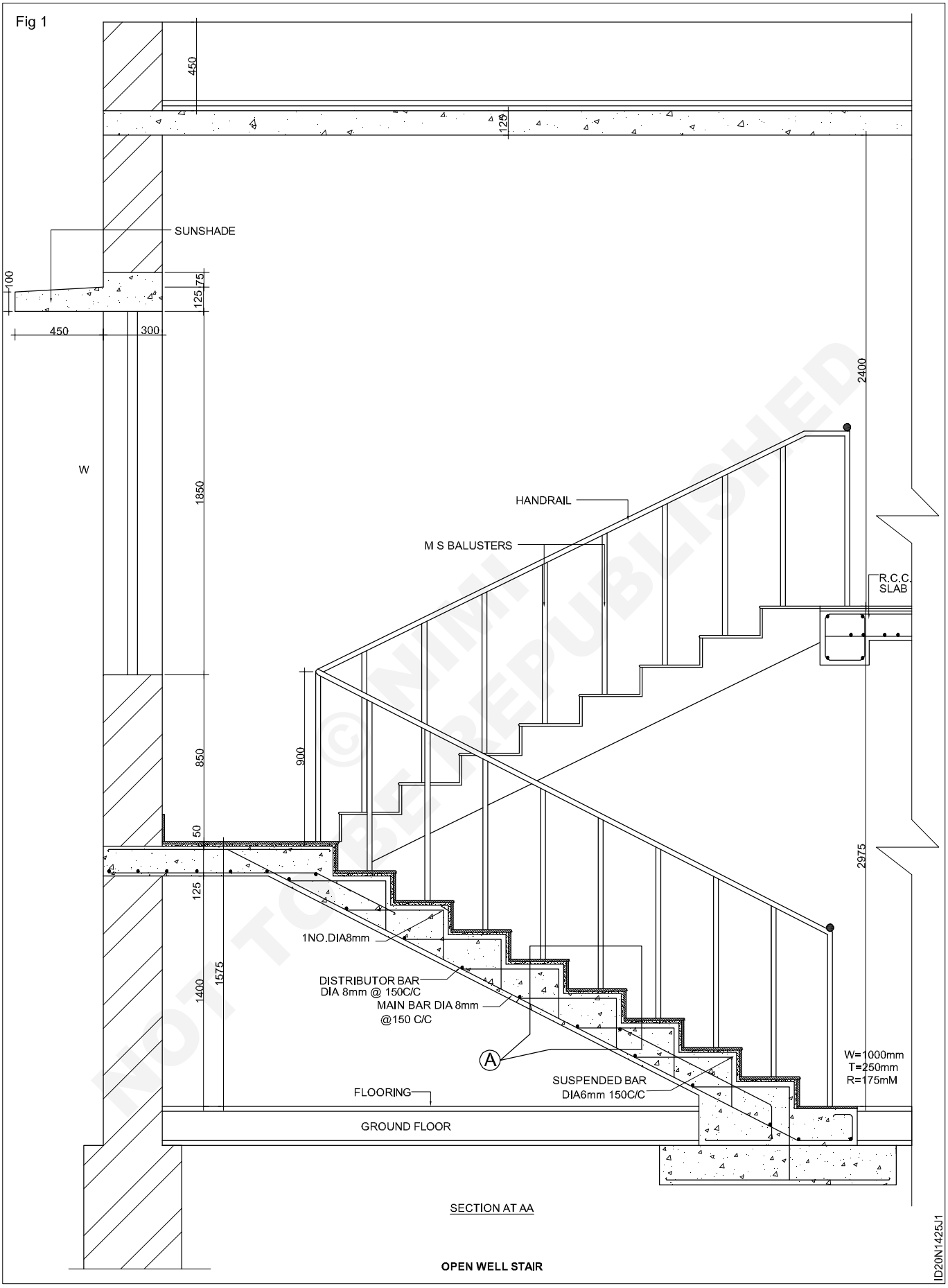
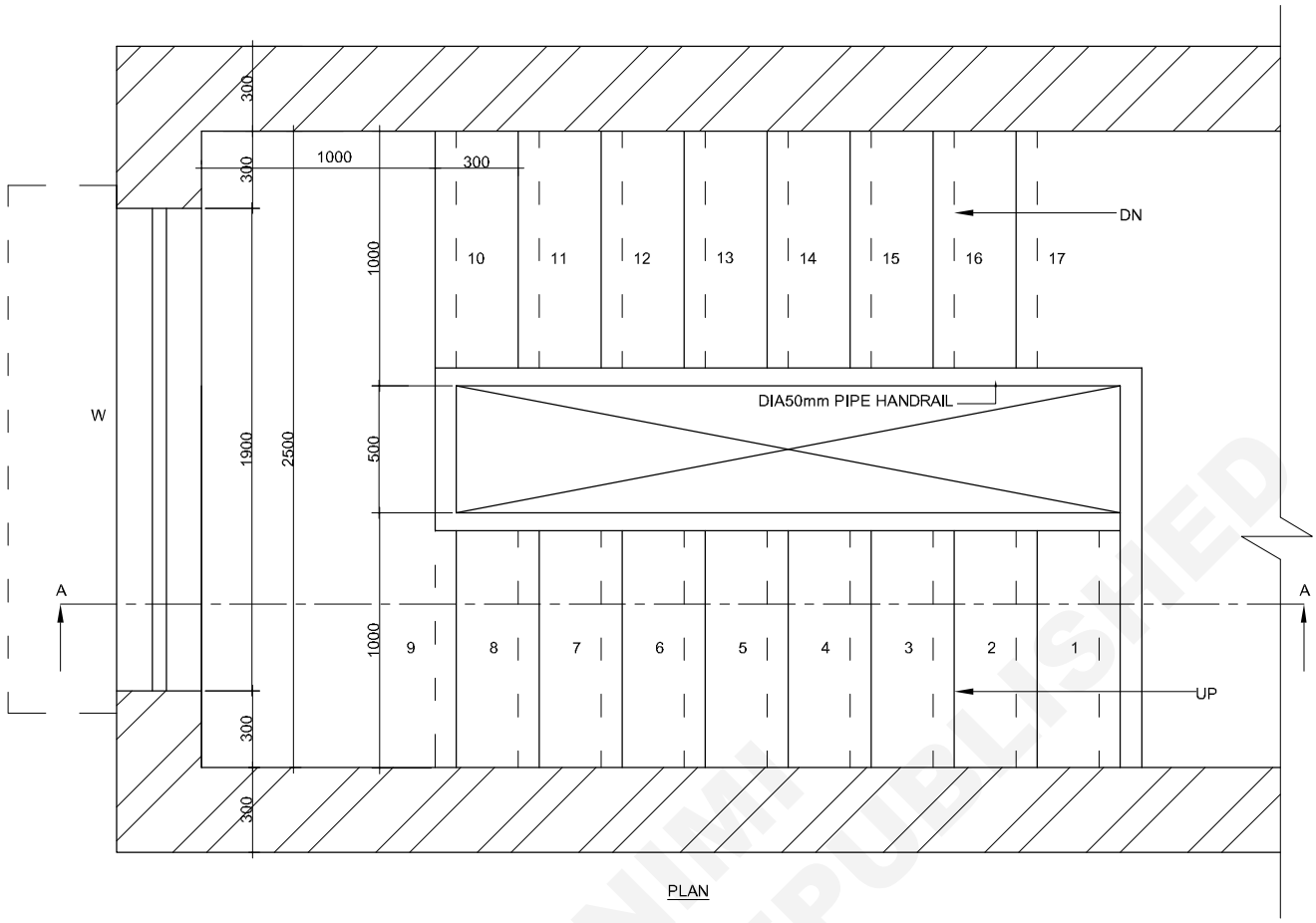
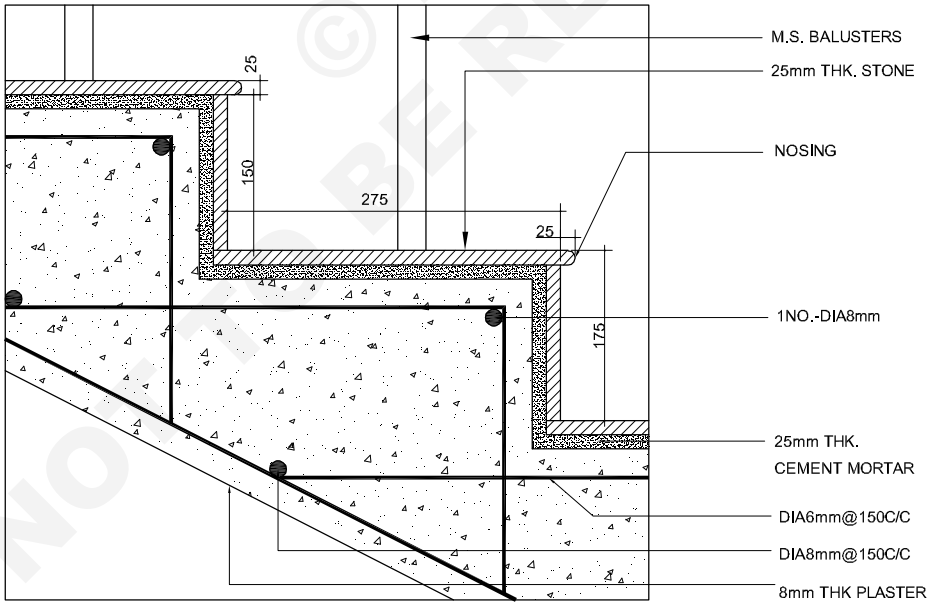


Fig 2



PLAN

Fig 2a



DETAIL A

OPEN WELL STAIRCASE

ID20N1425J2

TASK 3: **Draw the plan and section of RCC dog legged staircase as per the data given below:**

DATA

Room size	= 6 x 2.50 m
Wall	= 30 cm
Height of floor	= 2.975 m
Tread	= 25 m
Rise	= 17.5 cm
Width of stair	= 1.00 m
Width of landing	= 1.00 m
Open well rectangle	= 50 cm width
RCC waist	= 12.5 cm
RCC beam	= 20 x 25 cm
Nosing	= 2.5 cm
Hand rail	= 50 mm
Baluster	= 25 mm

Plan

1 Draw the plan of half turn RCC dog legged stair room as per data given with proper number of treads as shown figure with appropriate scale.

2 Draw the landing after nine risers.

3 Draw the window in plan.

4 Dimension the drawing property.

Sectional Elevation

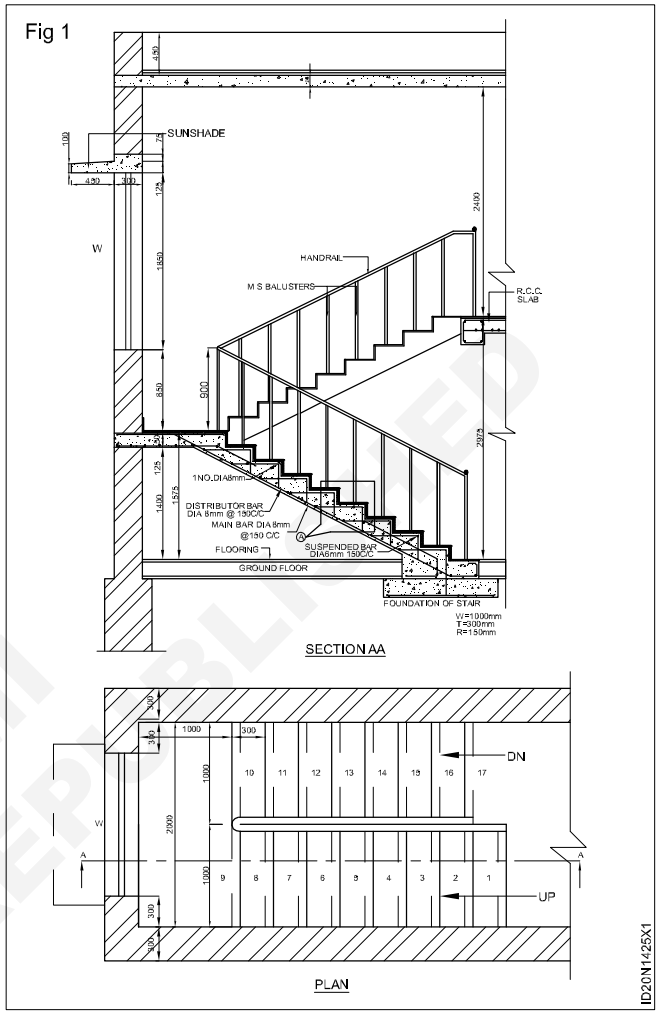
1 Draw the sectional elevation of the stair by drawing projectors upward from each treads.

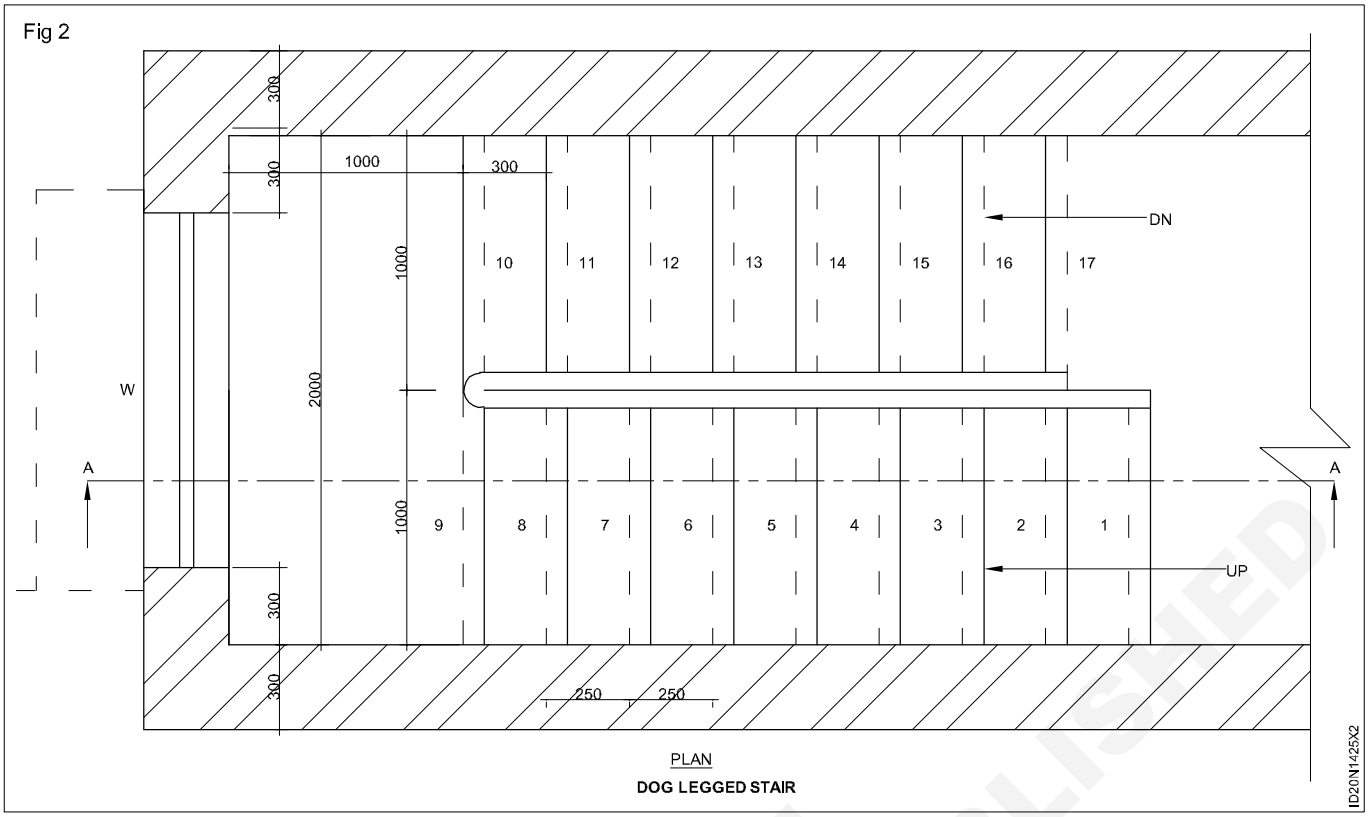
2 Draw the handrail details as per given datas.

3 Draw the elevation of the window.

4 Dimension the drawing property.

Fig 1





TASK 4: **Draw the plan and section of bifurcated stair (Fig 1)**

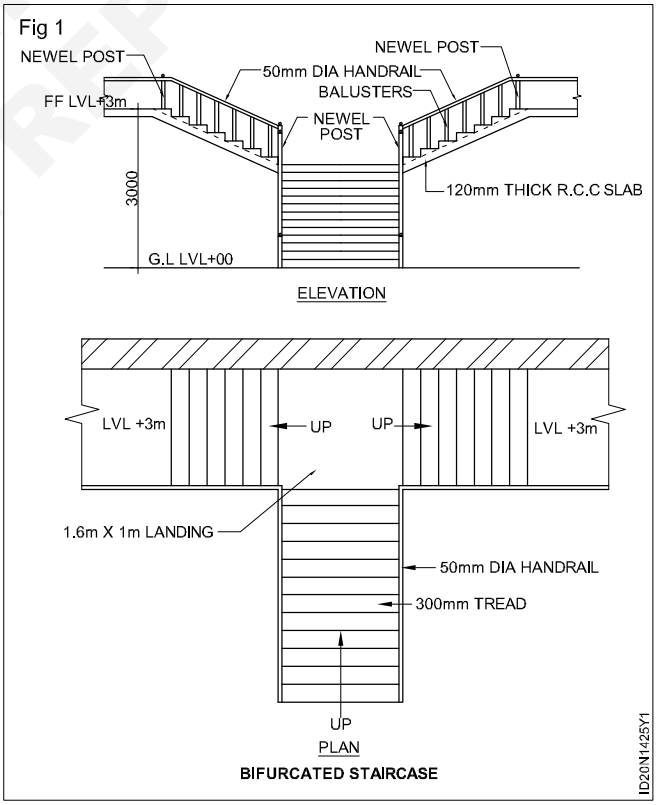
DATA

Height between floors	= 3m
Tread	= 30 cm
Rise	= 15 cm
Middle landing	= 1m (Width)
Width of stair	= 1m
Wall thickness	= 20 cm
R.C.C slab thickness	= 12 cm
No.of risers in 1st flight	= 12 Nos.
No. of risers in 2nd flight	= 8 Nos.
Hand rail, newel post, baluster	= 25 mm

1 Draw the plan of differential stair in 1:50 sclae as per given data.

2 To develop the elements, draw projections upwards form each tread.

3 Complete the elevation as indicated in Fig 1.



Calculation of staircase (trade and riser)

Objective: At the end of this exercise you shall be able to
• calculate tread and risers for a given staircase.

PROCEDURE

TASK 1 : **Design of layout**

i Design of layout The height of floor is generally known procedure for determining the no. of treads and risers is as follows.

a The position of 1st and last risers are determined with regard to the position of doors, windows, verandas etc.

b A convenient height of riser is assumed.

c No. of risers equal to total height of floor divided by height of risers.

$$\text{i.e no.of risers} = \frac{\text{Total height of floor}}{\text{Height of riser}}$$

d No. of treads = no. of riser -1

This is due to the fact that the surface of the upper floor forms the tread for the top step.

E.g:- For instance let us assume that height of floor is 3.8m assume the rise of 14 cm.

$$\text{No.of risers} = \frac{3.50}{0.14} = 25 \text{ Nos.}$$

No. of treads in single flight = 25 - 1 = 24 Nos.

No. of treads in double flight = 25 - 2 = 23 Nos

Depending upon the space available for staircase the type of stair is selected.

Tread and Riser

In - order to make the ascend and descend easy the tread and risers of a stair should be proportional following rules of thumb are commonly used for obtaining a satisfactory proportion of the tread and riser of a step.

i Rise in cm x going in cm = 40 to 45

ii Rise in cm x going in cm = 426 (approximately)

iii 2 rise in cm x going in cm = 60 (approximately) Take rise equal to 14 cm and going would be 30 cm as standard.

Take rise equal to 14 cm and going would be 30 cm as standard.

Other combination of rise and going would be 15 x 28cm, 16 x 26cm, 17 x 24cm.

Problem (Fig 1&2)

1 The inside dimension of a stair case in a residential building are 2m X 4.6m. The height of floor is 3.3 m and the roof consist of R.C.0 slab of 12 cm thick-ness. Design a proper layout of R.C.0 slab stair for this building.

Section

Adopt a dog - legged stair

Assume a convenient height of riser say = 18 cm

$$\text{Then the no.of risers} = \frac{\text{Total height of floor}}{\text{Height of riser}}$$

Total height = 3.30 + 0.12 = 3.42 m

Height of riser = 18 cm

Fig 1

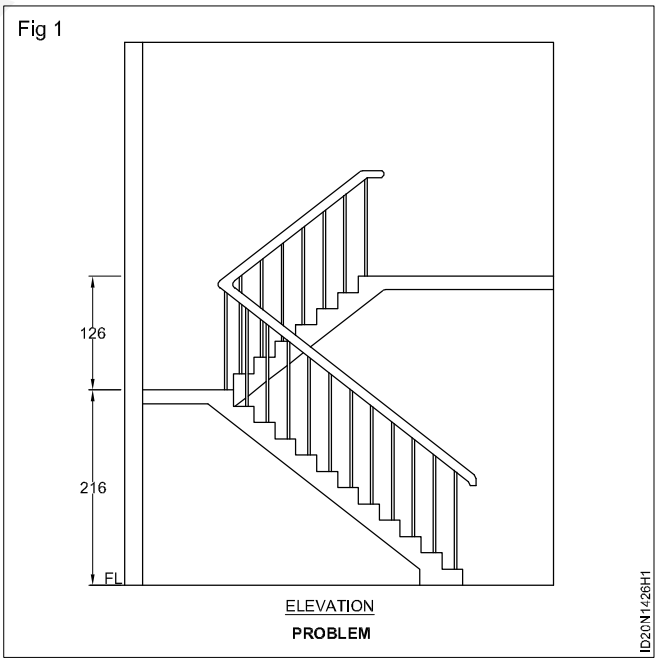
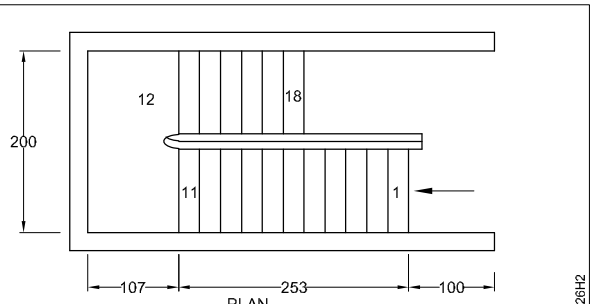


Fig 2



$$\text{Number of risers} = \frac{3.42}{0.18}$$

Split the number of risers into two flights conveniently say 12 nos in first flight and 7 nos in second flight.

No of steps in 1st flight = 12-1 = 11 nos

No. of steps in 2nd flight = 7-1 = 6 nos

Draw the plan and sectional elevation of the dog legged stair case according the designed values.

— — — — — — — —

TASK 2 : **Design a dog legged staircase for a building in which the vertical distance between the floors is 3.6m: (Fig 1)**

The stair hall measures 2.5m x 5m.

Let the rise be 15cm and tread the 25cm.

It us keep width of each flight = 1.2m

Width of landing width of stairs = 1.2m

Height of each flight = 3.6/2

No of risers required = 180/15

= 12" (each flight)

No of treads in each flight 12-1 = 11

Space (Area) occupied by treads

= 11 x 25

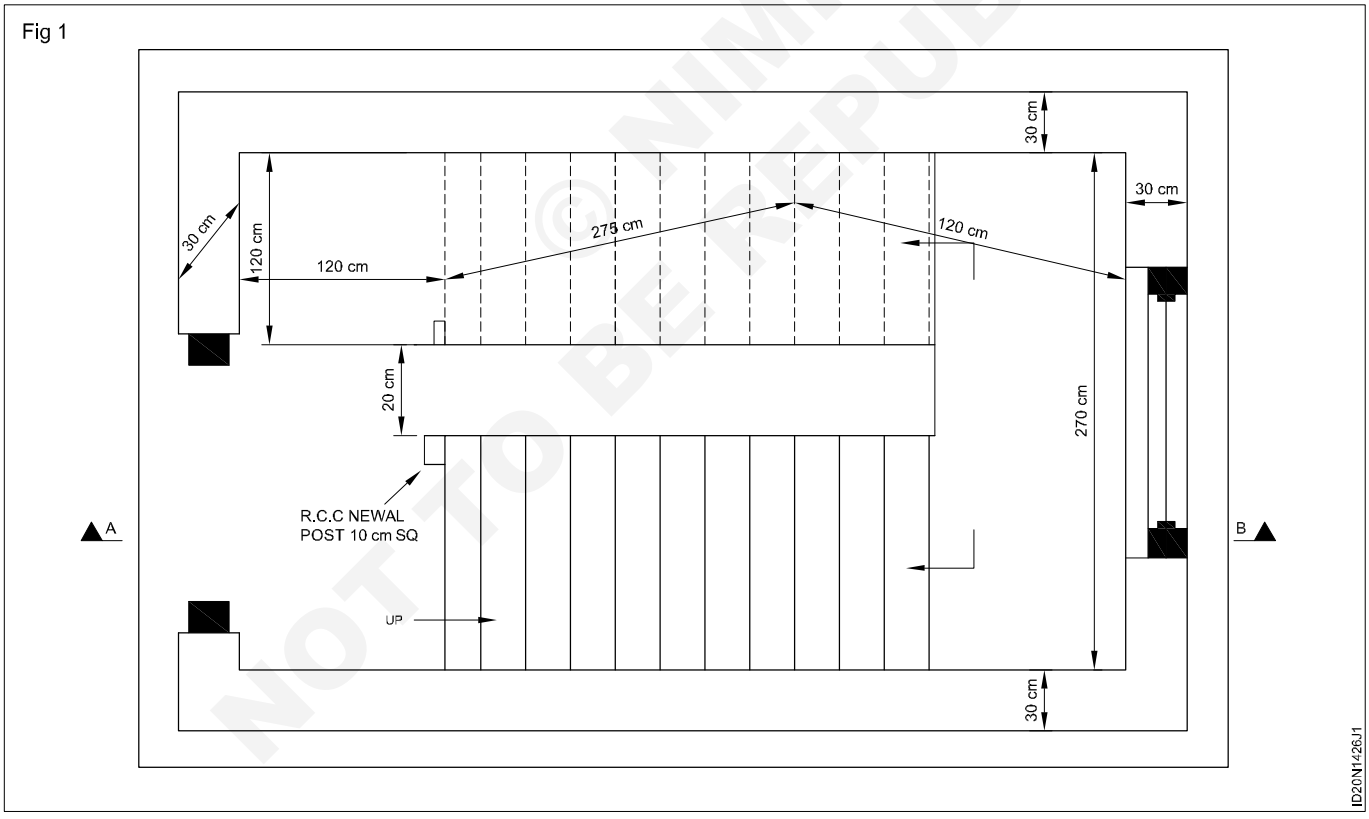
= 275 cm.

Space (Area) left for passage

= 5- 12- 2.75

= 1.05 meters

Fig 1



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Model of staircase

Objectives: At the end of this exercise you shall be able to
- **draw the plan and section of three quarter turn stairs**
- **draw the plan and section of spiral stairs.**

PROCEDURE

TASK 1: **Draw the plan and section of three quarter turn stairs. (Fig 1)**

DATA

Room size	= 3.50 x 2.90m.
Wall	= 30cm.
Height between floor	= 3.00m.
Tread	= 30 cm.
Rise	= 15 cm.
Width of stair	= 1.00m.
Width of stair	= 1.00m.
Open well rectangle	= 150 x 90 cm.
R.C.C. waist	= 12.5 cm.
R.C.C. Beam	= 20 x 25cm.
Nosing	= 2.5 cm.
Hand rail	= 50 mm.
Baluster	= 25mm, 80cm height.
Balustrade	= with glass and wooden combination.

Same as previous exercise considering given data.

TASK 2**: Draw the plan and section of spiral stairs (Fig 1)**

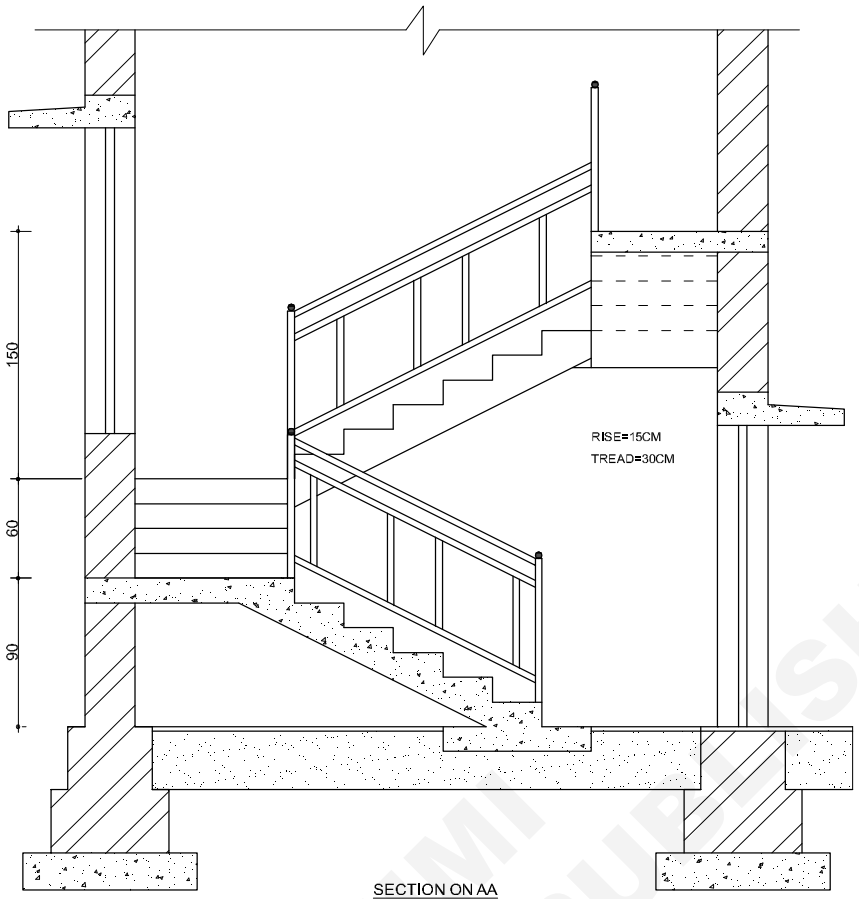
DATA

Height of floor	= 3m.
Wall	= 30cm.
Tread	= 19cm inner circle and 56cm outer circle.
Rise	= 21.80cm.
Width of stair	= 0.80cm.
R.C.C Waist	= 12.5cm.
R.C.C Pilar	= 20cm.
Hand rail	= 50mm.
Baluster	= 25mm.

- Draw the column dia 20cm.
- Draw the outer circle of 0.9m radius.
- Divide the circle in to 10 Equal parts.
- Draw the 10 Winders.
- Draw the outer circumference of handrail of 50mm.
- Draw the complete plan.
- Develop the elevation by projecting each and very points form plan as shown.
- Draw the balusters and handrail and complete the elevation.
- Complete the plan and elevation of spiral stair.

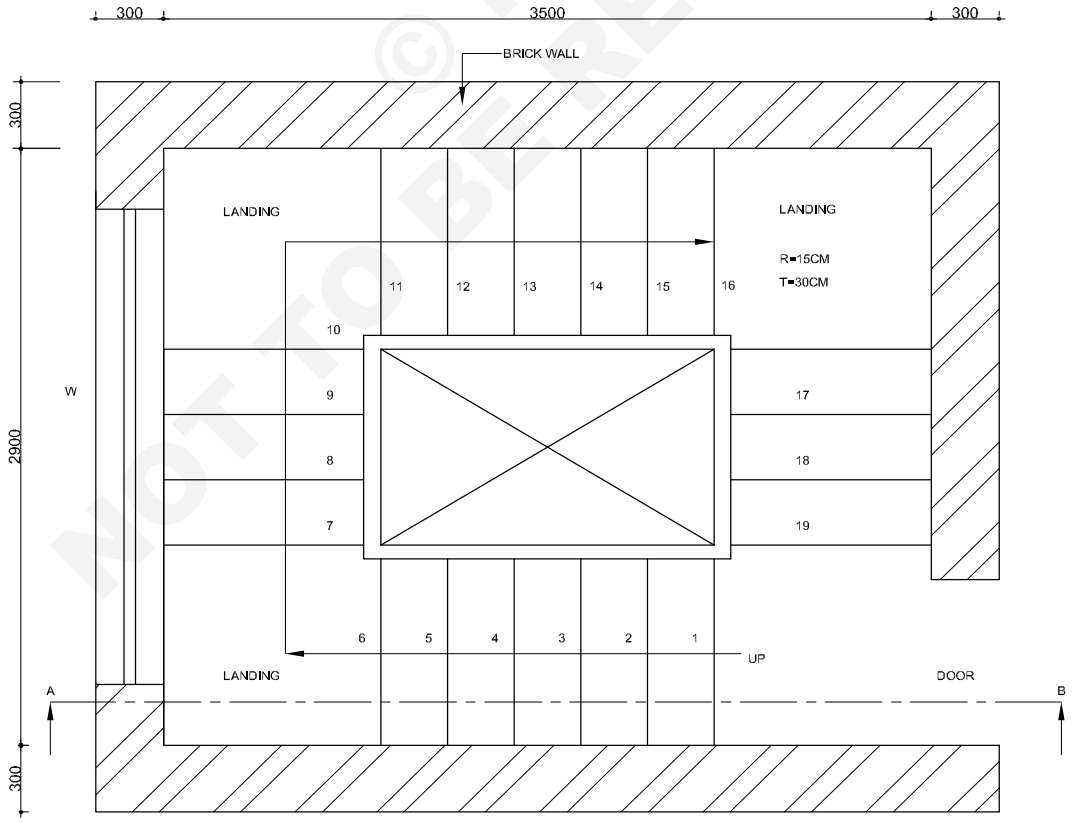
Fig 1

TASK 1



SECTION ON AA

THREE QUARTER TURN OR "WIDE U"



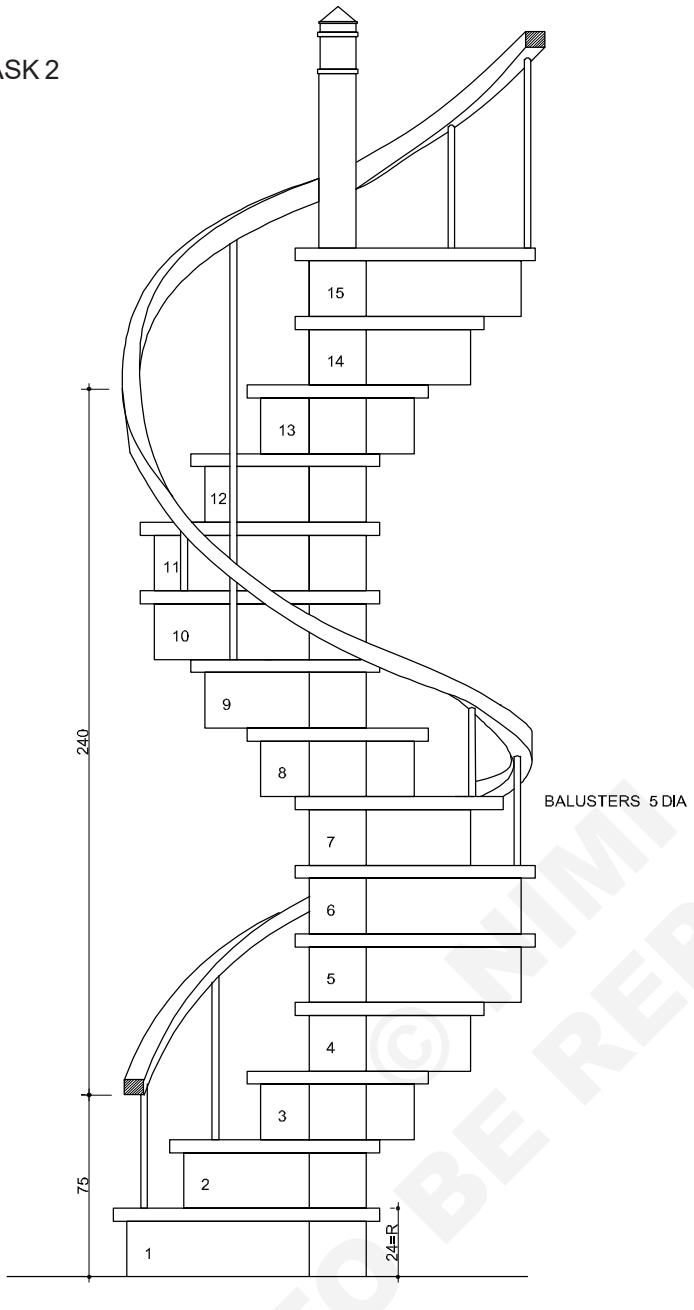
PLAN

THREE QUARTER TURN OR "WIDE U"

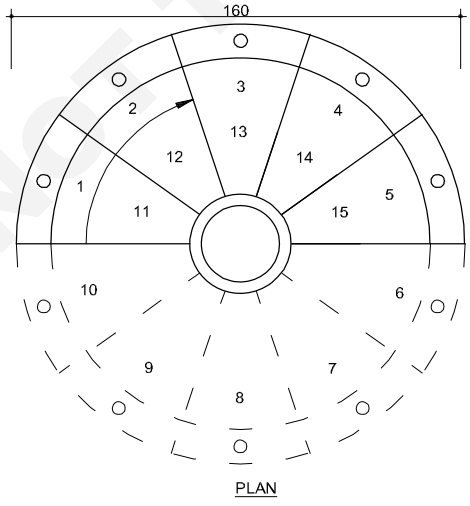
ID20N1427H1

Fig 1

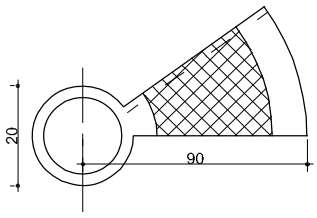
TASK 2



ELEVATION



PLAN



STEPS DETAIL

STEEL SPIRAL STAIR

ID20N1427J1

Basic concept of section of a building through toilet & balcony, deam, column and kitchen

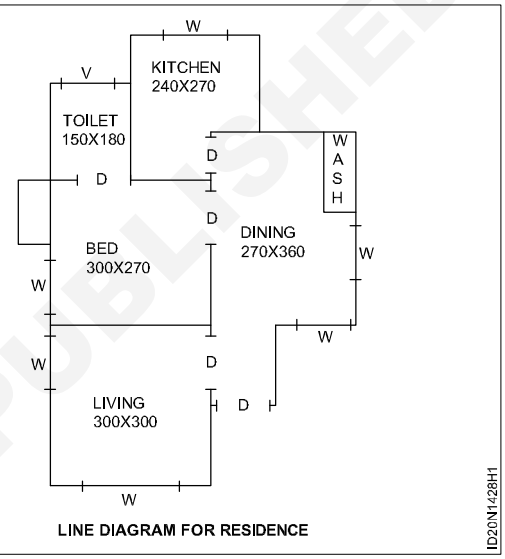
Objectives: At the end of this exercise you shall be able to
- **identify the thickness wall**
- **draw the plan of building**
- **draw the section of the building**
- **draw the elevation of residence.**

PROCEDURE

TASK 1: **Draw the plan, elevation and sectional elevation of the building as per the line diagram (Fig 1)**

1 Select a scale of 1:50.
2 Layout the drawing sheet for plan, section and elevation.
3 Prepare the plan starting from the corner of Living room.
4 Draw wall thickness as per the scale.
5 Create the rooms as per the figure 1.
6 Erase the unnecessary construction lines.
7 Mark the position of door, windows etc.
8 Furnish the dimensions and notes where ever needed.
9 Complete the plan.

Fig 1



LINE DIAGRAM FOR RESIDENCE

— — — — — — —

TASK 2: **Draw the section (Fig 1)**

1 Draw a horizontal line shows the ground level.
2 Identify the position of cutting plane.
3 Create projection lines for walls, as per the room size.
4 Draw the basement line, roof line, parapet line etc.
5 Furnish the foundation details as shown.
6 Hatch the section as per the materials used.
7 Furnish the dimensions.
8 Complete the section.

— — — — — — — —

TASK 3: **Draw the plan and Elevation (Fig 1)**

1 Draw projection lines from plan and section.
2 Remove the unwanted projection lines and develop. The elevation.
3 Furnish the door, window, sunshade details etc.
4 Finish the required plan and elevation by outlines.
5 Complete the working drawing with specification schedule of joinery and other details.

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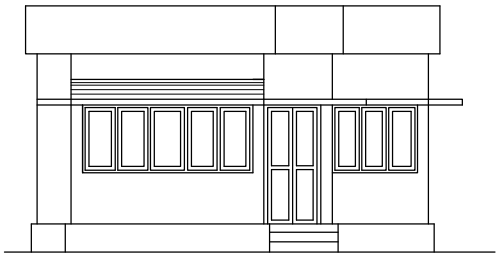
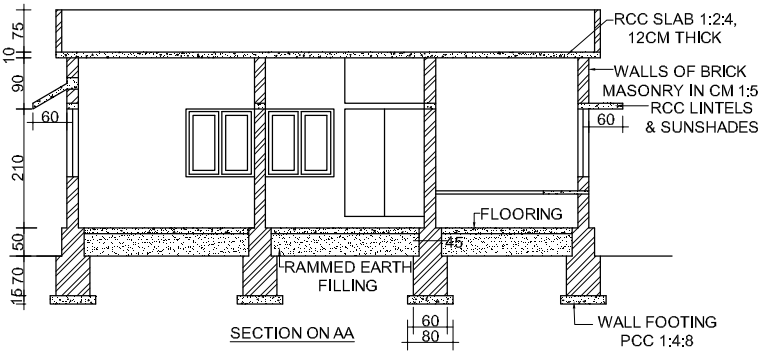
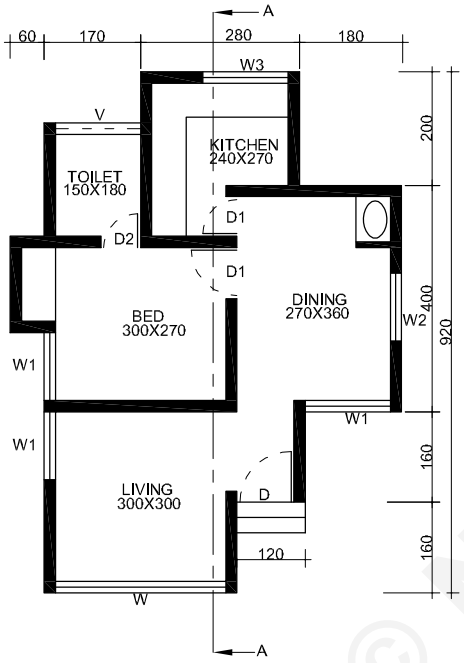
Fig 1



ELEVATION



SECTION ON AA



PLAN

SCHEDULE OF JOINERY

MARK	ITEM	SIZE	TYPE	NOS.
D	DOOR	110X210	PANELLED	1
D1	DOOR	100X200	PANELLED	2
D2	DOOR	90X200	PANELLED	1
W1	WINDOW	300X150	GLAZED	1
W2	WINDOW	120X150	GLAZED	1
W3	WINDOW	150X120	GLAZED	1
V	VENTILATOR	150X60	GLAZED	1

SPECIFICATIONS

1) FOUNDATION:-
2) WALLS:-
3) LINTELS:-
4) ROOF SLAB:-
5) PLASTERING:-
6) FLOORING:-
7) PAINTING:-

Note:- Provide Foundation according to the condition of soil

ID20N1428J1

PLAN AND SECTION OF A BUILDING

Drawing of english bond and flemish band, lintals & arches, foundation

Objectives: At the end of this exercise you shall be able to

- **draw the plans of english bond of 1 brick and 1½ brick thick wall**
- **project elevation view of english bond of 1 brick thick wall**
- **develop the Isometric view of english bond of 1½ brick thick wall**
- **draw the plan of 1 brick and 1½ brick wall**
- **develop the isometric view of flemish bond**
- **draw the elevation and section of wooden lintel**
- **draw the elevation of brick lintel**
- **draw the elevation and section of stone lintel**
- **draw the section of R.C.C lintel and details of bars**
- **Draw the elevation of**
  - **flat Arch**
  - **semi circular Arch**
  - **semi Elliptical Arch (with five centres) and**
  - **venetian Arch**
- **draw the top view and draw cross section of grillage foundation**
- **draw the isometric view of grillage foundation.**
- **draw the details of precast piles.**

PROCEDURE

TASK 1: **English bond 1 brick thick**

Data:

Size of brick = 230 mm x 115 mm x 75 mm

Size of queen closer = 230 mm x 57.5 mm x 75 mm

Height of each course = 75 mm

1 Draw horizontal and vertical lines to form 'L' Shape to a required length.

2 Draw parallel line to 'L' shape at an offset of 230mm.

3 Draw quoin stretcher and queen closer as shown in Figure 1A for courses.

4 Draw headers side by side between the vertical lines.

5 Draw stretchers between the horizonl lines at an offset of 230mm.

6 Follow the same proceducers for even course as shown in Fig 1B.

7 Draw projections from plans of odd and even courses and develop the elevation. (Fig 2).

8 Develop the isometric view for the plans shown in Fig 1a & 1b as show in Fig 3.

TASK 2: **English bond 1½ brick wall (Fig 2)**

1 Draw the 'L' shape, 345mm wide

2 Complete the plan views as per the Fig 4a and 4b.

3 Draw projections from plans of odd and even courses and develop the elevation (Fig 5)

4 Develop the isometric view for the plans shown in Fig 4A to 4B

5 Arrange odd course and even course alternately and complete the drawings as shown in Fig 6.

Fig 1

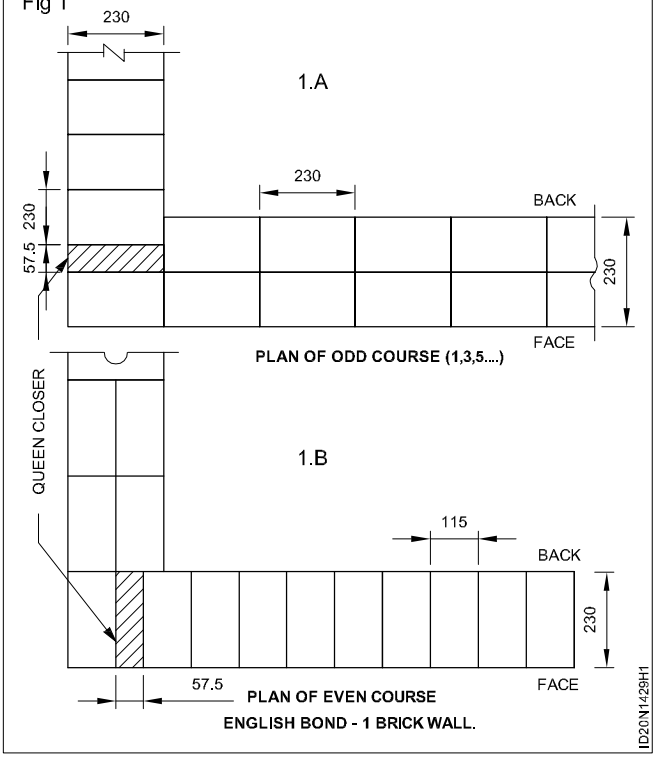


Fig 2

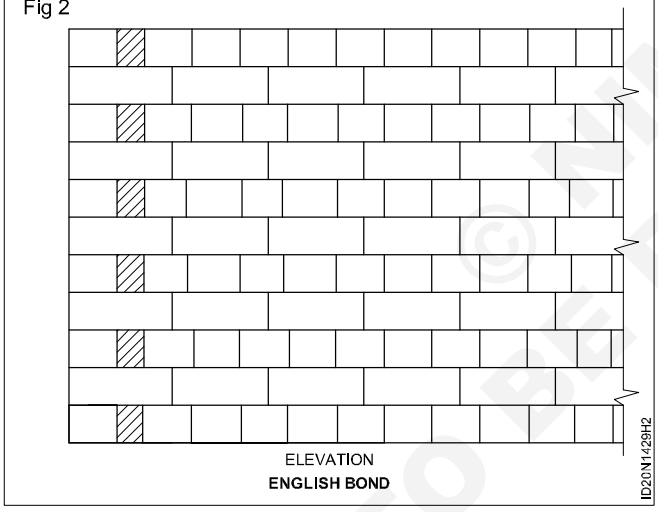


Fig 3

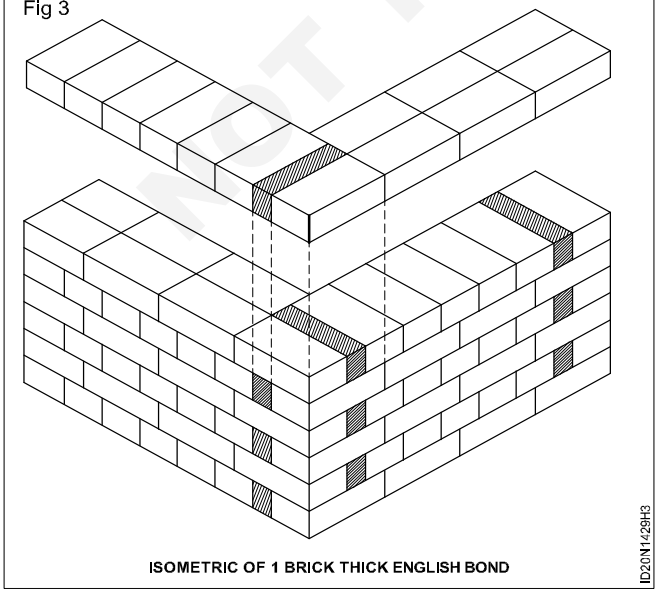


Fig 4

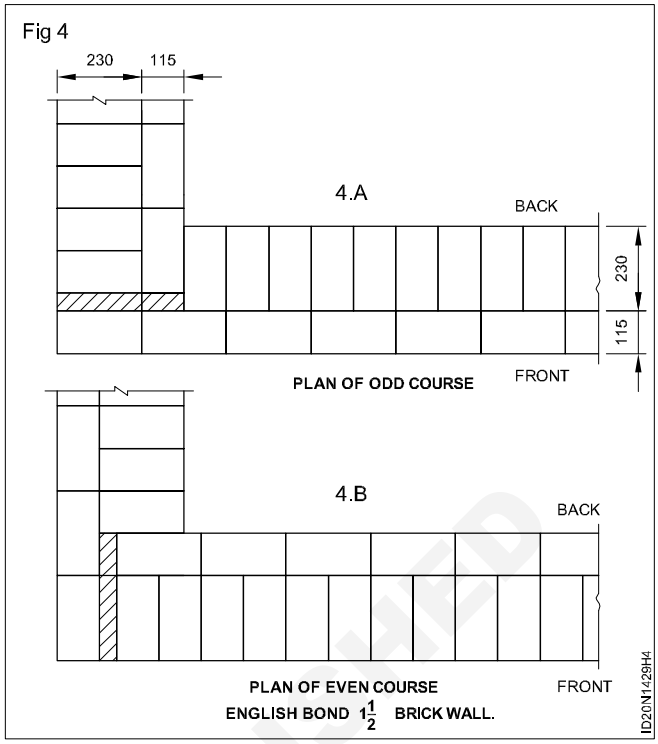


Fig 5

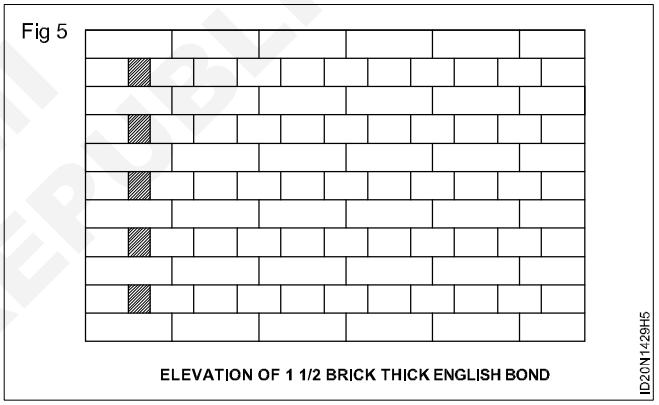
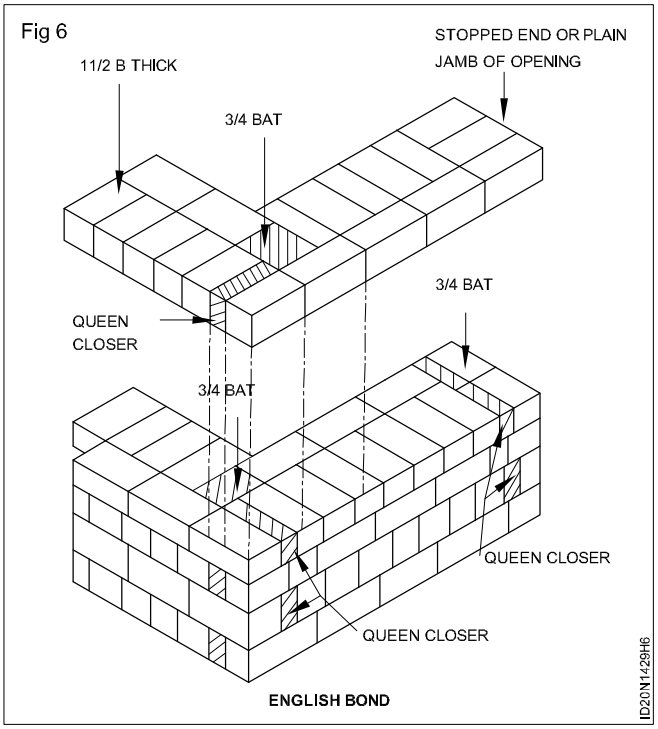


Fig 6



TASK 3: **Draw the plan of 1 brick and 1½ brick wall**

Flemish bend in walls

Data:

Size of brick =230 mm x 115mm x 75 mm

Size of queen closer = 230mm x 57.5mm x 75

Height of each course = 75 mm

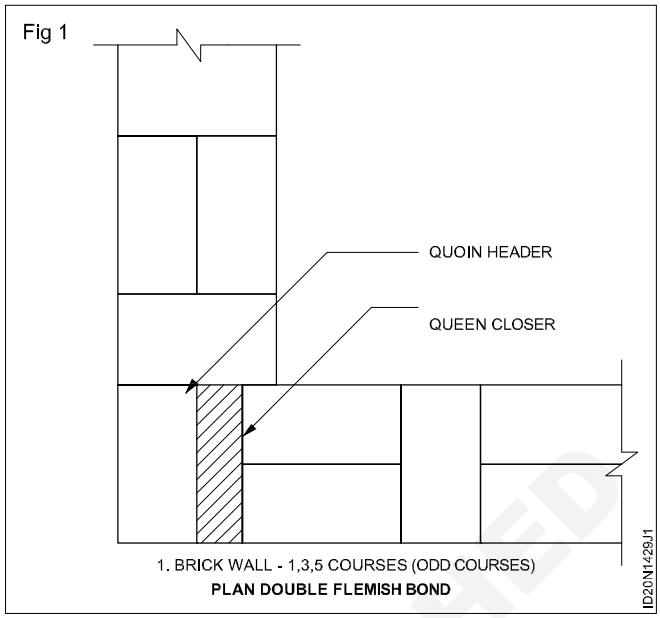
1 Draw plan view of odd course of one brick wall in Double flemish bond (Fig 1)

2 Draw 230mm thick corner wall as per exercise English Bond.

3 Similarly draw quoin header and queen closer.

3 Draw headers and stretchers alternately in both directions (Fig 1) and complete the drawing.

Fig 1



TASK 4:**Draw plan view of even course of one brick wall in Double Flemish bond (Fig 1)**

1 Draw the corner wall for even course as mentioned in Task 1 & 2.

2 Complete the drawing as per Fig 1

3 Develop the isometric view of double flemish bond for 1 brick thick as shown in Fig 2.

Fig 1

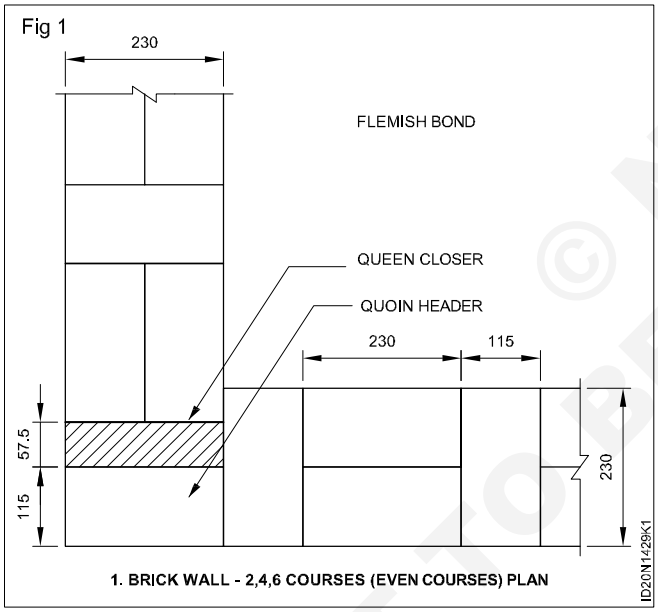
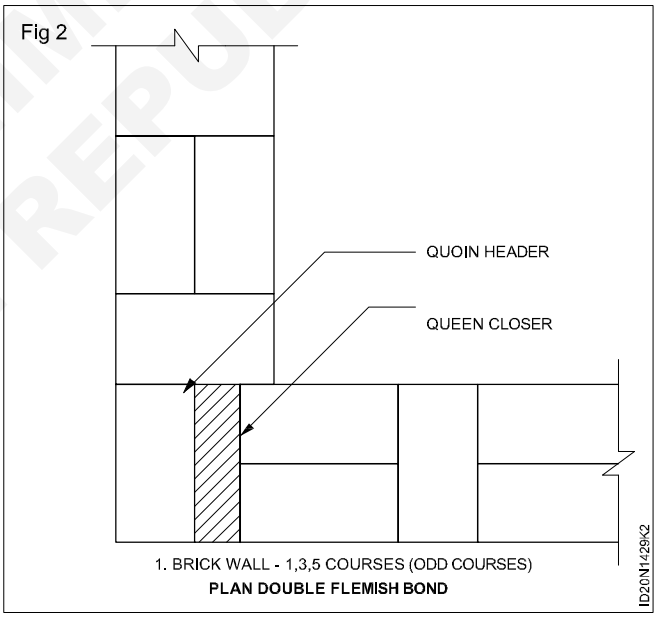


Fig 2



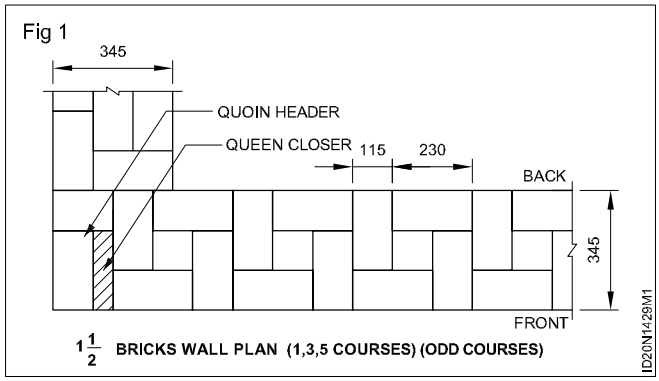
TASK 5 : **Draw plan views of double flemish bond for one and half brick thick wall at right angled corner**

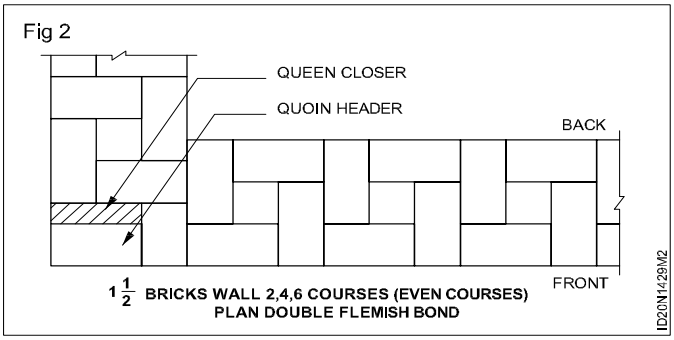
1 Draw the 'L' shape, 345mm wide

2 Follow the procedures mentioned in TASK 3 and TASK 4.

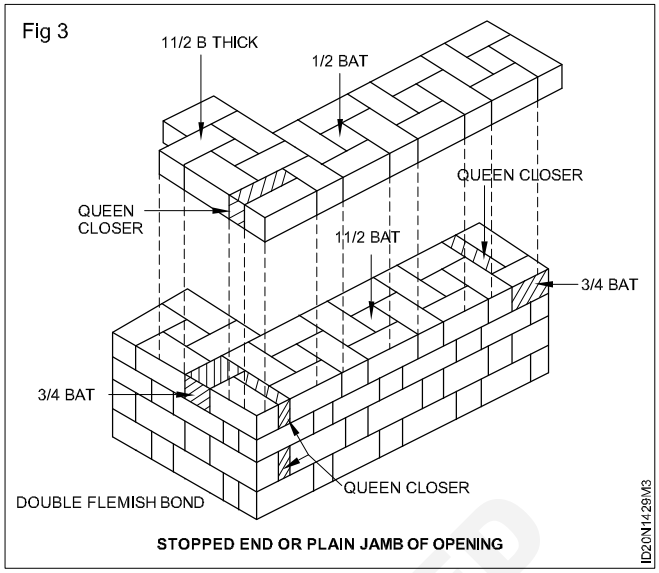
3 Complete the plan views as per Fig 1 and Fig 2.

Fig 1





4 Develop the isometric view of double flemish bond for one and half brick thick wall at right angled corner. (Fig 3)

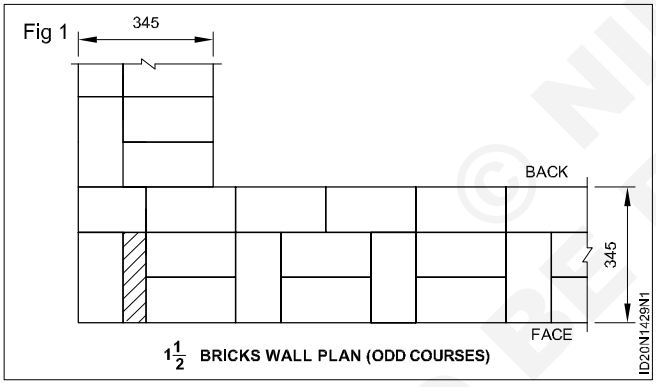


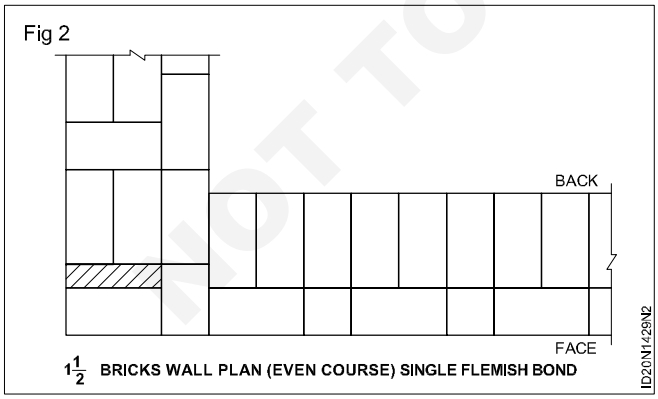
TASK 6 : **Draw plan view of odd (Fig 1) and even (2) courses of single Flemish bond for one and half brick wall at right angled corner**

1 Draw the 'L' shape, 345mm wide

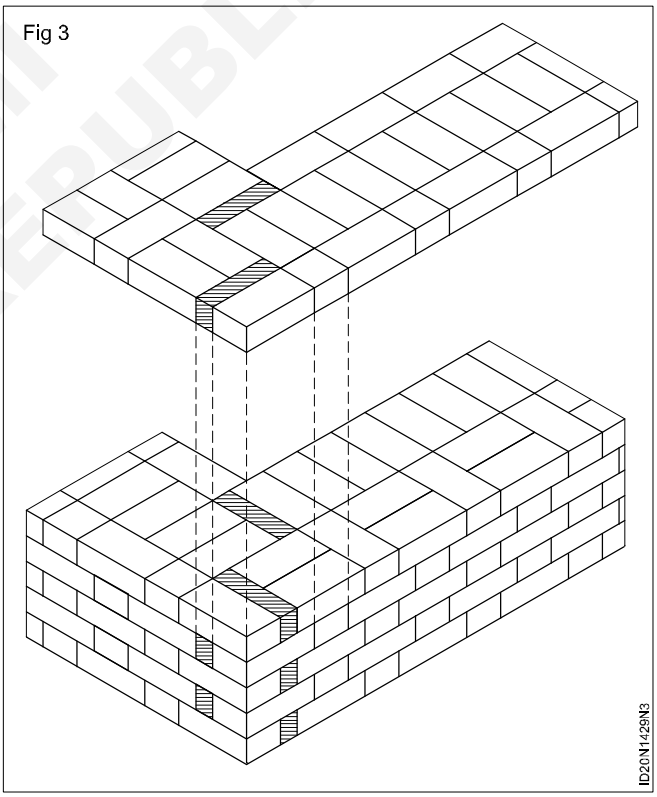
2 Draw the arrangement of bricks as flemish bond in face and as English bond in back.

3 Complete the plan as per Fig 1 and 2.





4 Develop the isometric view of single flemish bond for 1 1 1/2 brick thick wall as shown in Fig 3.

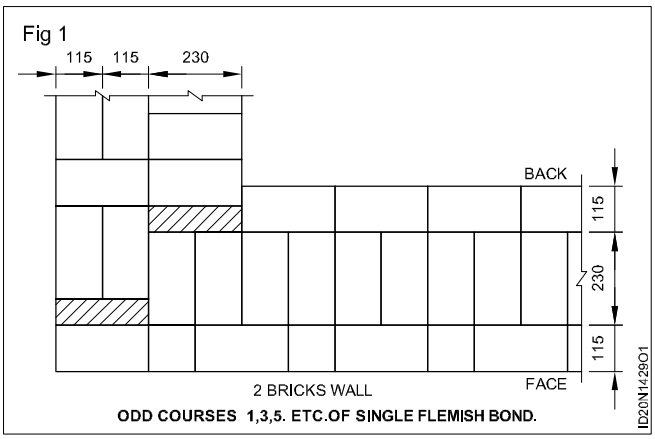


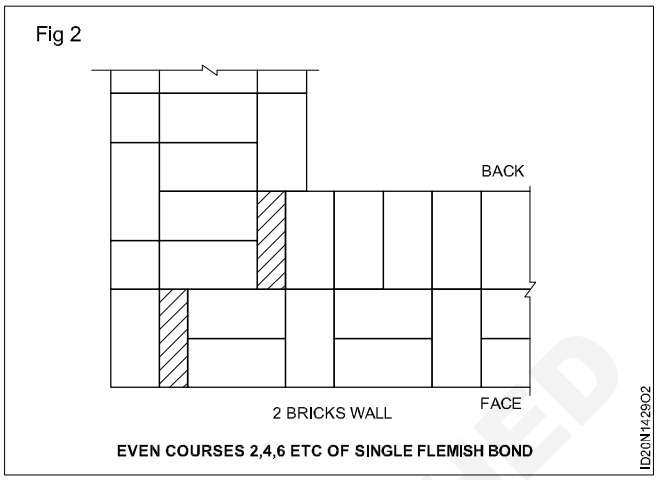
TASK 7: **Draw plans of odd and even courses of single flemish bond for two brick wall at right angled corner**

1 Draw the 'L' shape, 460mm wide.

2 Draw odd and even courses as shown in Fig 1 & 2

3 Develop the isometric view of 2 brick thick single flemish bond.

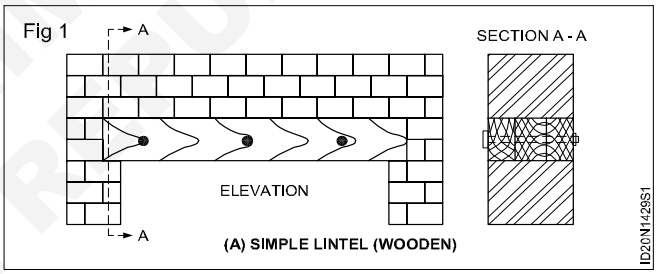




TASK 8: **Draw the elevation and section of wooden lintel**

Draw various views of wooden, stone, brick, steel and R.C.C. lintel

- Draw a span of 1000mm
- Draw 100 mm thick wooden Lintel
- Draw bearing of Lintel 100 mm
- Draw three bolt and nuts in elevation
- Draw three courses of Brick masonry on the top of the wooden Lintel
- Draw a section at AA
- Draw a section of wall 300 mm
- Draw and develop the section at AA
- Draw convensional symbols
- Complete the drawing as shown in Fig 1.

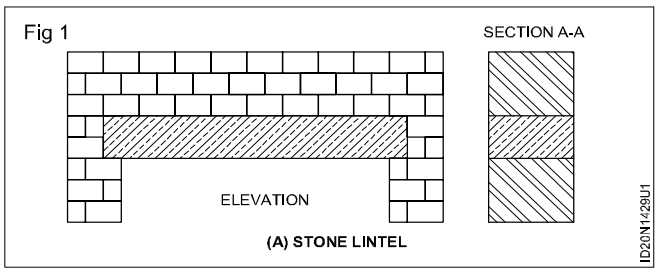


TASK 9: **Draw the elevation of stone lintel**

The size of stone Lintel 220 mm

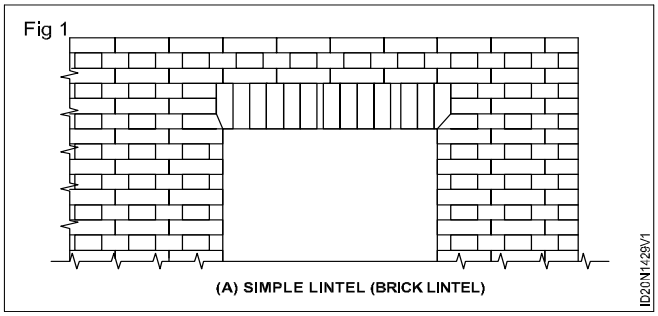
Draw the elevation of stone Lintel similar to wooden Lintel

Draw bearing of Lintel 250 mm (Fig 1)

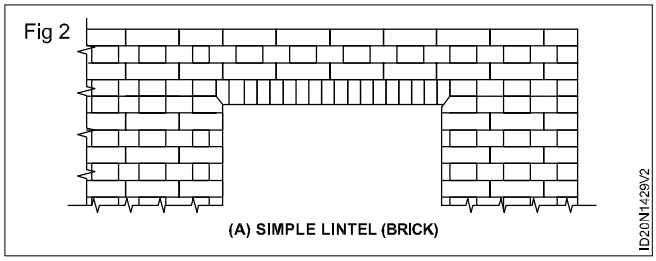


TASK 10: **Draw the elevation and section of brick lintel**

- Draw the elevation of brick Lintel
- Draw a span of 1000 mm
- Draw the elevation of wall
- Draw brick Lintel width of brick 100 mm and depth of brick 300 mm
- Draw and develop the brick Lintel as shown in Fig 1.



- Similarly Draw another form of brick Lintel as shown in Fig 2
- width of brick 100 mm and
- depth of brick 150 mm.



TASK 11: **Draw the section of steel lintel and details of bars**

Steel Lintel : (Fig 1,2,3)

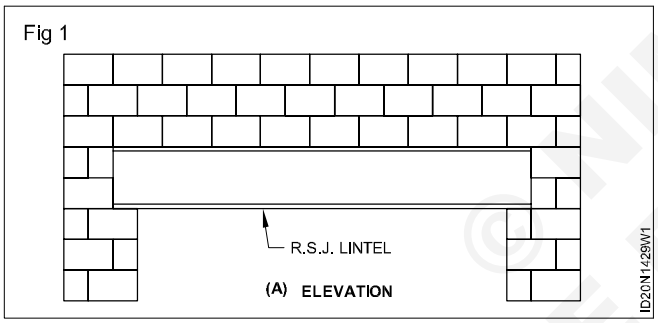
Size of Rolled steel Joist

Indian standard medium Weight beam (ISMB) 150 x 80 - 14.9 Kg - 1 No.

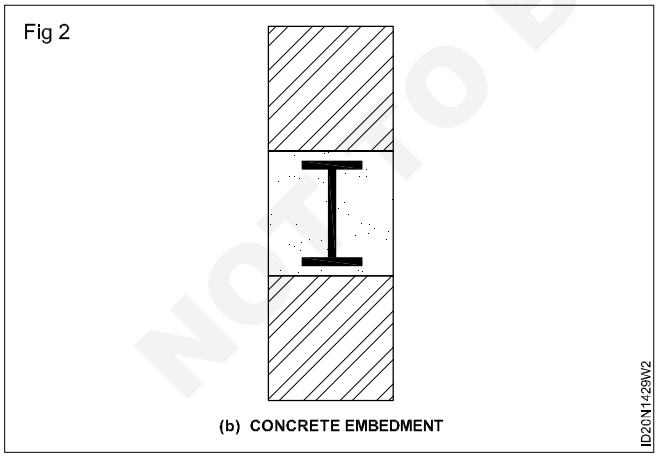
Indian standard Junior beam (ISJB)

175 x 50 - 8.1Kg.

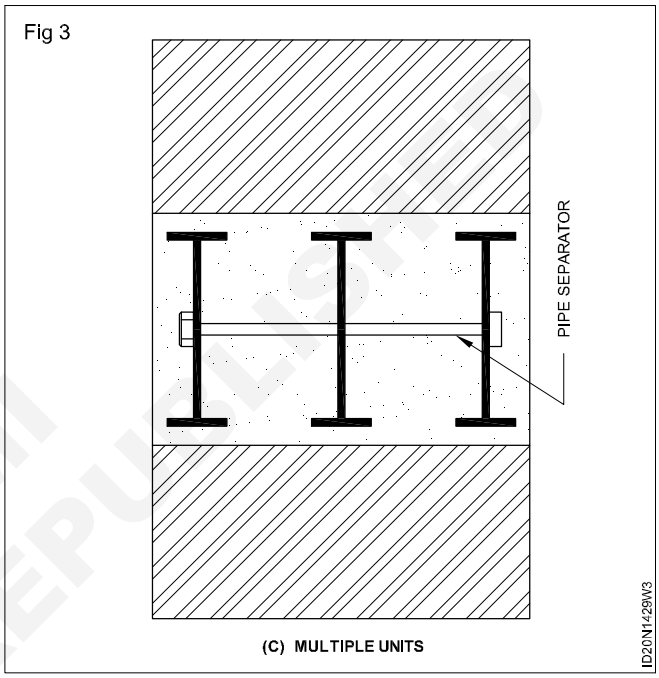
- Draw a span of 2500 mm
- Draw ISMB 150 x 80 - 1No. at the middle of the wall.
- Draw Bearing 150 mm on both sides.
- Draw three courses of brick masonry on the top of the lintel (Fig 1)



- Draw a section view of steel beam. (Fig 2)



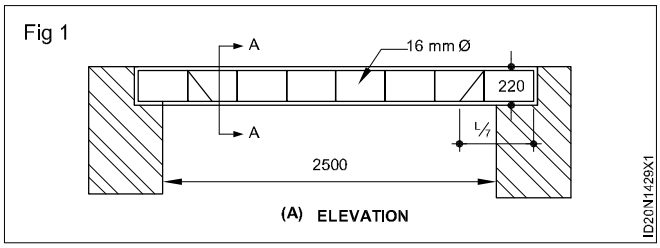
- Draw and develop multiple units of I - section connected with pipe separator. (Fig 3)



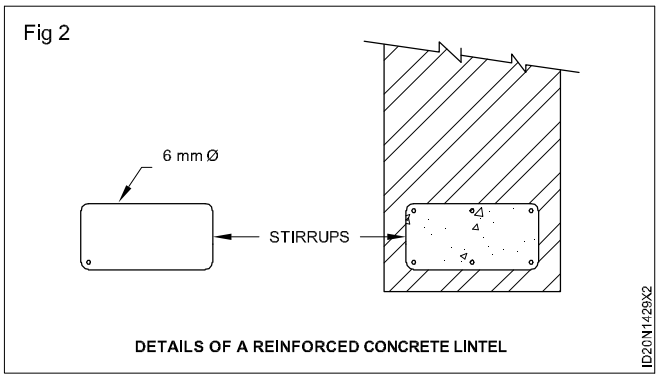
TASK 12: **Draw the R.C.C. Lintel**

- Draw a span of 2500 mm
- Draw a depth of beam 220 mm
- Draw a bearing of Lintel 200 mm
- Draw a bent up bar 300mm from L/7 both supports - 1 No.
- Draw straight bar at bottom of Lintel 16mm f - 2 Nos.
- Draw anchor bar at Top of Lintel 16mm f - 2 Nos.

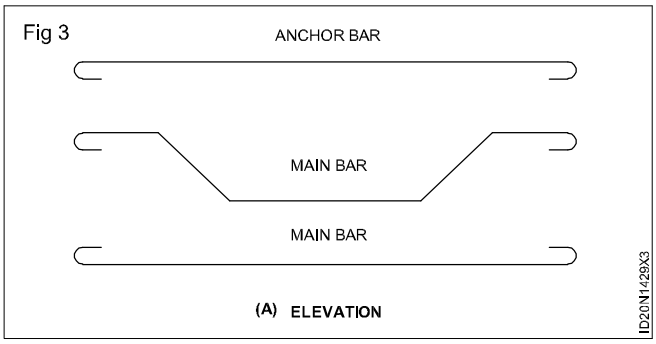
- Draw stirrup 6 mm f uniformly spaced 360 mm c/c Fig 1



- Draw a section at AA (Fig 2)



- Draw the details bar bending. (Fig 3)
- Complete the drawing.



TASK 13: **Draw the Flat Arch**

Draw the elevations of Flat arch

Draw the elevation of Flat arch (gauged type)

Width of opening = 1200 mm

The depth or height of arch = 300 mm

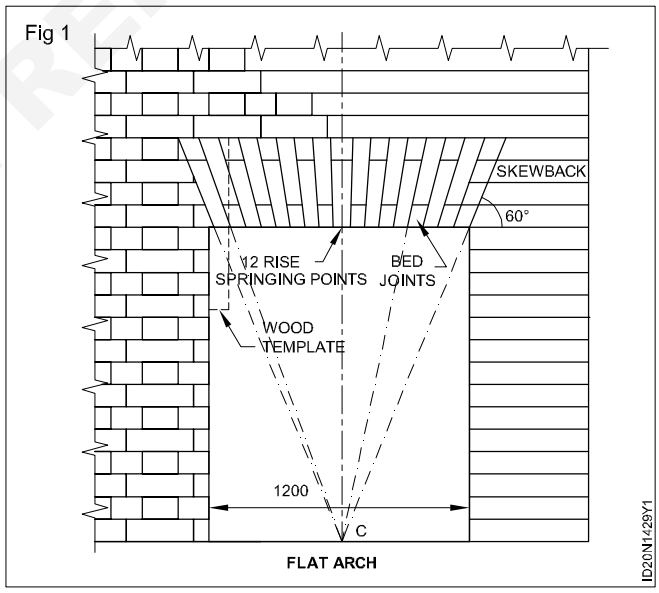
Angle of the skewback = 60^0

Rise of the arch at the middle = 12 mm

Width of each voussoir at extrados = 100 mm

Thickness of mortar joints = 10 mm

- Draw the opening to a width 1200 mm and to a convenient height by indicating the break line.
- Draw the skewback at an angle of 60^0 on both sides of opening.
- Draw a line parallel to the top of opening at a distance of 300mm for fixing the height of the arch.
- Project the skewback lines backwards to findout the centre ‘c’ of the arch.
- Mark the width of voussoirs on top of extrados. Join these points with the arch centre to draw voussoirs.
- Draw the brick layers in elevation on both sides of the opening and top of the arch.
- Complete the elevation of flat gauged arch as shown in Fig 1.



TASK 14: **Draw the Semi circular arch**

Draw the elevation of semi circular arch

Width of opening = 1200 mm

The depth or height of arch = 2 rings. = 200 mm

Angle of skewback = 0^0 (i.e horizontal)

Rise of the arch at the middle = 1/2 span of opening
= 600 mm

Width of each voussoir at extrados = 100mm

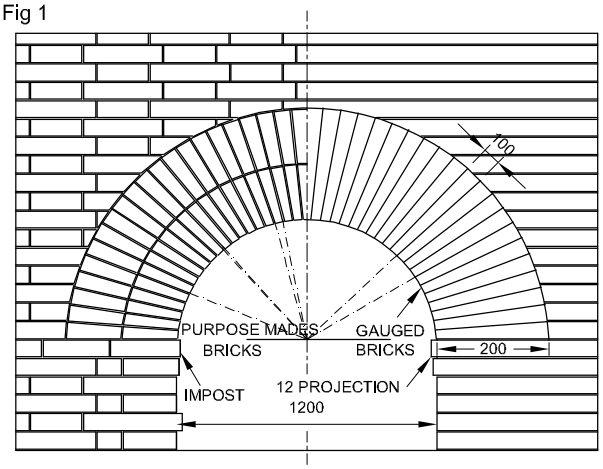
Thickness of mortar joints = 10mm

Procedure

- Draw the opening to a width of 1200 mm
- Draw the springing line and mark the centre of arch

- Draw the intrados with a radius of 600 mm and extrados with a radius of 800 mm from the arch centre.
- Draw the voussoirs as detailed in Fig 1 (Left side half elevation is made with purpose made bricks with 2 rings and the right half elevation is made with gauged bricks).The arch may be constructed with two rings of purpose made bricks of single ring of structure.
- Draw the elevation of remaining wall and complete the drawing as shown in Fig 1

Fig 1



SEMI CIRCULAR ARCH

TASK 15: **Semi Elliptical arch with five centres**

Draw the elevation of semi Elliptical arch with five centres

Width of opening = 1800 mm

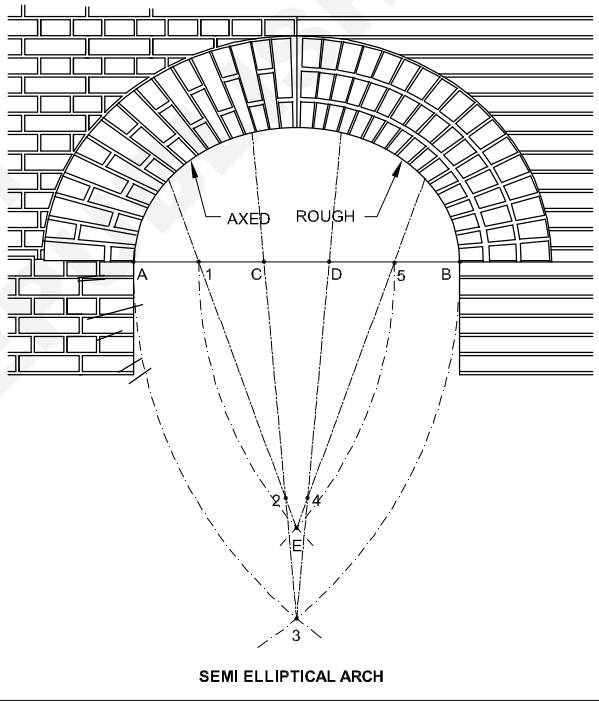
The depth or height of arch = 300 mm

Angle of the skew back = 0^0 (ie horizontal)

- Draw the opening to a width of 1800 mm
- Draw the springing line AB and divide it into 5 equal parts A1 = 1 C = CD = D5 = 5B

  From the Centre A and B draw arc of radius equal to the span, to intersect at 3. Join the point 3 with C and D.
- From the centres 1 and 5, draw arcs of radius equal to 3/5th of span, meeting each other at point E.
- Join points 1 and E. The point of intersection of lines 3C and E1 is 2. Similarly join 5 and E. The point of intersection of lines 3D and E5 is 4
- The points 1,2,3,4 and 5 represent five centres of the arch.
- Draw the left half elevation as axed arch and the right half elevation as rough arch.
- Draw the arrangement of voussoirs and the remaining elevation of wall as shown in Fig 1.

Fig 1



SEMI ELLIPTICAL ARCH

Draw the Venetian arch

Draw the elevation of venetian arch

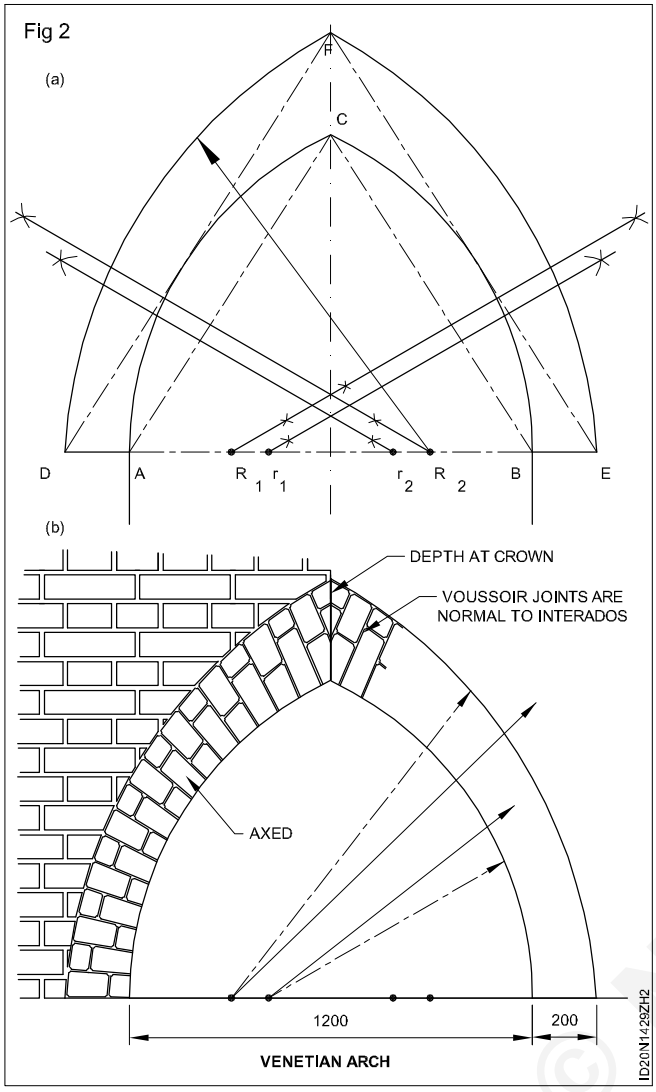
Width of opening = 1200 mm

Rise = 900 mm

The depth or height or arch at skewback = 200 mm

- Draw the springing line AB to 1200mm length.
- From the midpoint of AB, mark the rise at C.
- Join AC and BC to complete the triangle ABC
- Draw the skewback AD and BE on eitherside to a length 200 mm
- Draw DF parallel to AC and EF parallel to BC to Complete the triangle DEF.
- Draw perpendicular bisectors for AC and BC. They meet the springing line at r1 and r2 which are centre points to draw intrados.
- Similarly draw perpendicular bisectors for DF and EF. Let them meet the springing line at R1 and R2 which are centre points to draw extrados.
- Draw intrados with centres r1 and r2 and extrados with centres R1 and R2 as shown in the figure.
- Draw the voussoirs

Complete the remaining elevation as shown in Fig 2.



TASK 16 : **Draw the isometric view to show the arrangement of (Rolled steel joist) R.S.Js in a grillage foundation to support a steel stancheon.**

First layer of RSJ

No. of R.S.J in first tier(layer) = 11 Nos.

C.S size of R.S.J = 100 mm x 125 mm

c/c distance between each RSJ = 200 mm

Dia of bolt = 16mm.

No of bolts = 3.

Second layer of RSJ

No. of R.S.J in the second layer = 4 Nos.

C.S size of R.S.J = 125mm x 300mm

c/c distance between each R.S.J = 200 mm

Bolt details similar to 1st layer

Steel Stancheon

R.S.J Column = 200 x 350 mm

Angle cleat size = 100 x 130 x 12 mm thick

Thickness of gusset plate = 16mm

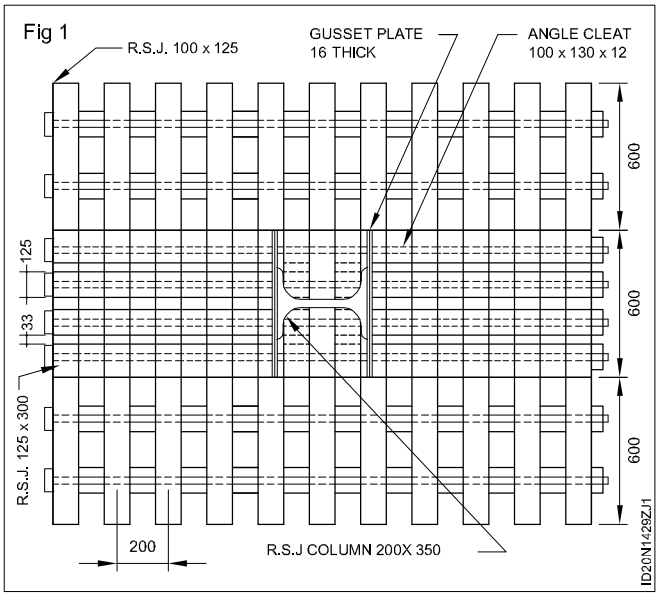
1 Calculate the size of 1st layer based on the size of R.SJand c/c distance between each RSJ.

2 Draw the isometric planes and arrange the first tier of R.S.Js as shown in Fig 1 and Task 17 - Fig 2.

3 Similarly calculate the size of second layer and draw as detailed in Fig(1).

4 Draw the RSJ column angle cleat and gusset plate as shown in Fig 1.

5 Draw the bolt and nut arrangement and complete the drawing as shown in Fig 1.

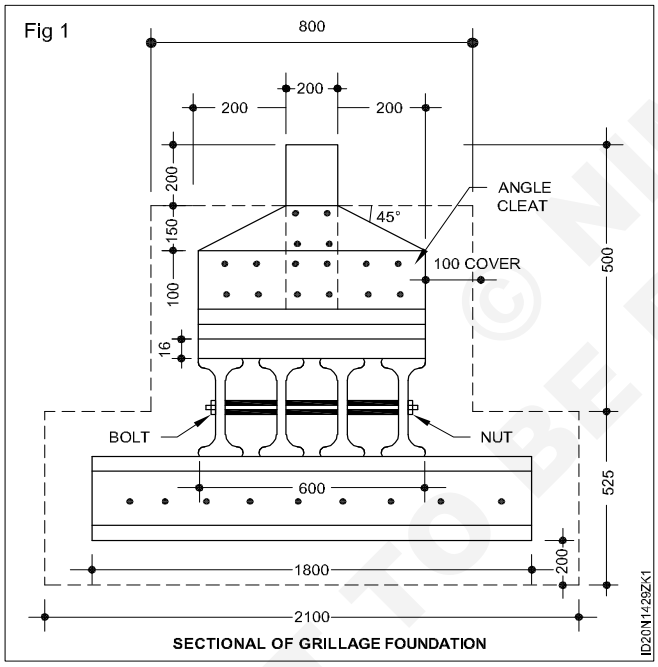


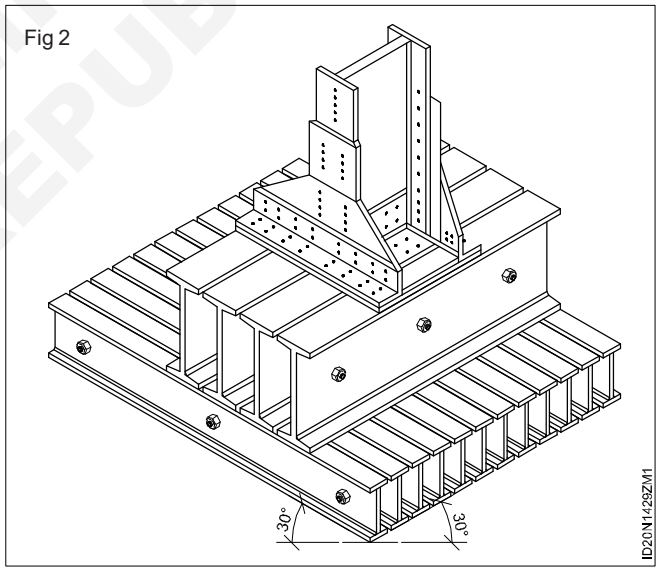
TASK 17: **Draw the section of grillage foundation**

1 Draw the R.S.Js in I[st] layer and second layer, and the gusset plate as shown in Fig 1.

2 Draw the outline of concrete embedding as hidden line and complete the drawing as shown in Fig 1.

3 Develop the isometric view of the grillage foundation as shown in Fig 2.





TASK 19 : **Draw the cross section of raft foundation with slab only**

Thickness of pier = 300 mm

Span between piers = 3000 mm

Thickness of bedding concrete = 150mm

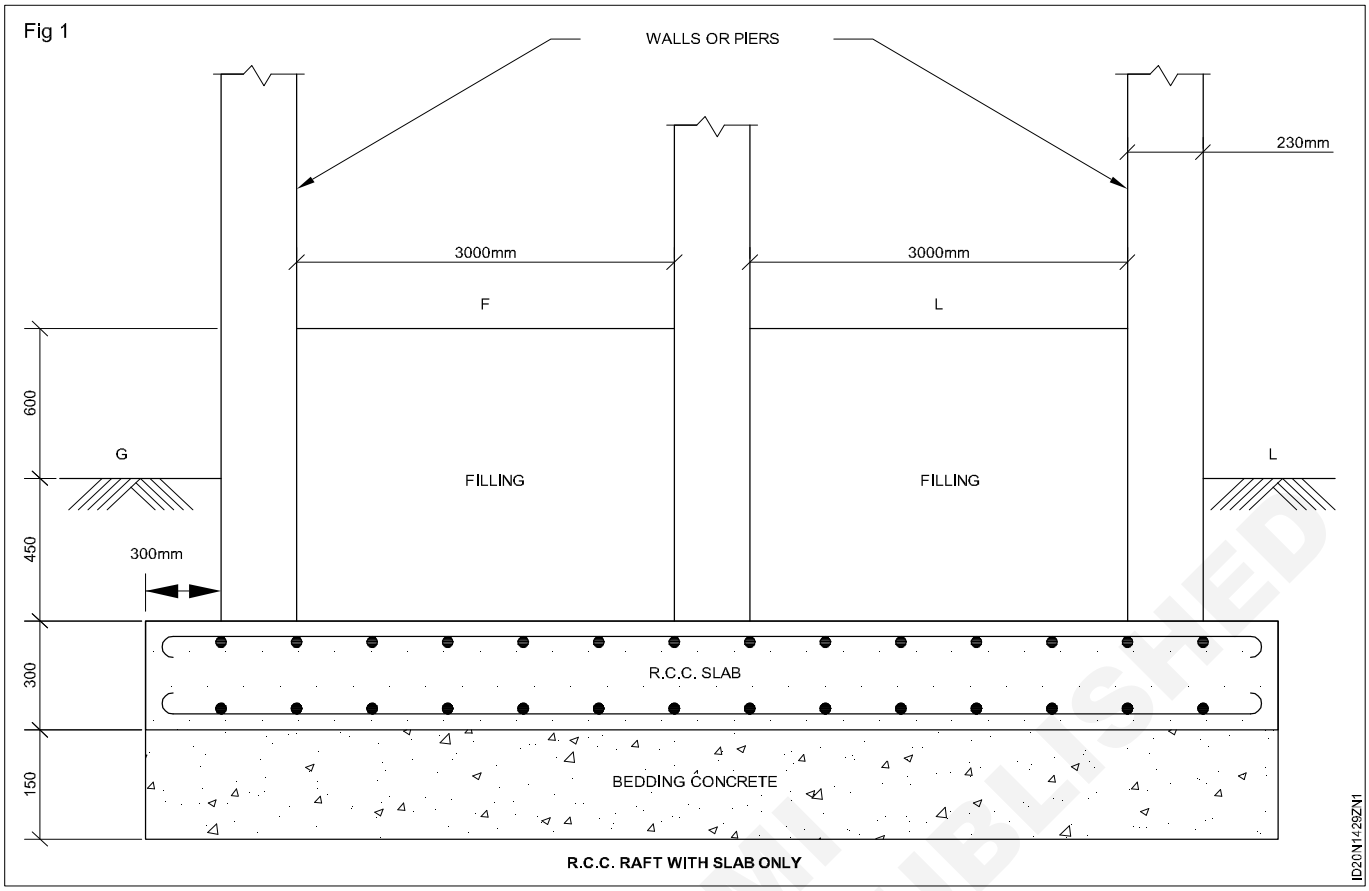
Thickness of R.C.C slab = 300 mm

Pillar offset = 300mm.

Depth of sand filling =1350mm.

1 Draw the rectangles for Bedding concrete and R.C.C slab as shown in Fig 1.

2 Draw the supports as per the span and bearings and complete the cross section as detailed in Fig 1.



TASK 20 : **Draw the cross and vertical section of precast piles and well foundation**

The size of the pile 300mm x 300mm

Length of the pile 8000 mm

Clear cover = 40mm

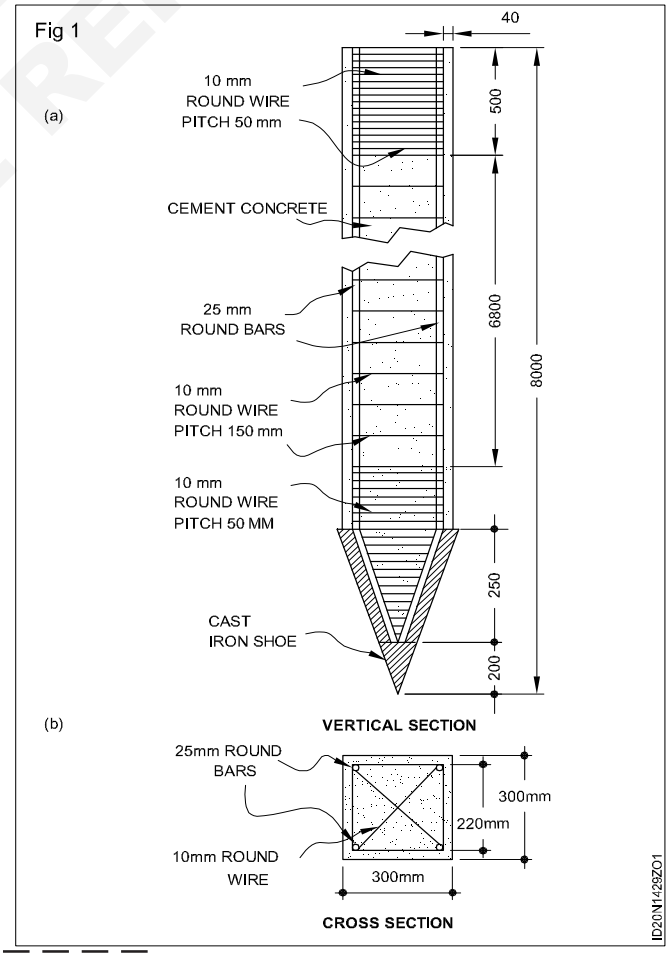
Depth of cast iron shoe = 200mm.

Main bars 25mm ϕ 4Nos. stirrups 10 mm dia spacing as shown in Fig 1a

1 Draw cross section of pile as shown in Fig 1a.

2 Project the vertical section of pile.

3 Draw the bars as per Fig shown 1b and complete the drawing.



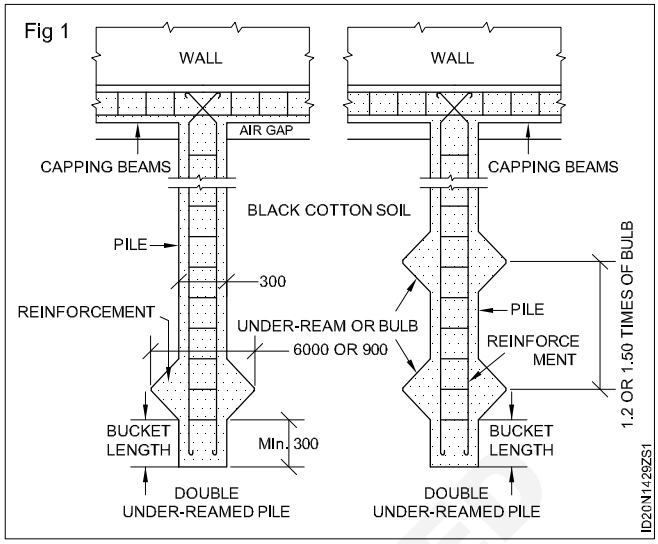
TASK 21 : **Draw the vertical section of precast piles (Fig 1)**

From the bottom of the pile bucket length is minimum 300 mm.

Diameter of under reamed or bulb 2 to 3 times of dia of pile.

The vertical spacing between two bulbs varies from 1.25 to 1.50 times dia of bulb.

Draw the bars and complete the same as shown in Fig.



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Skill Sequence

Drawing damp proofing in basement, floors and walls

Objectives: This shall help you to
- **draw damp proofing in basement**
- **draw damp proofing in floors**
- **draw damp proofing in walls.**

Damp proofing in basement in ordinary soil (Fig 1)

Thickness of mainwalls	= 300 mm
Thickness of Horizontal DPC	= 30 mm
Thickness of Vertical DPC	= 20 mm
Thickness of foundation conc.	= 150 mm
Thickness of Brick layer	= 100 mm
Thickness of floor conc.	= 100 mm
Flooring thick	= 40 mm
Outer protective wall	= ½ brick thick

SCALE 1:20

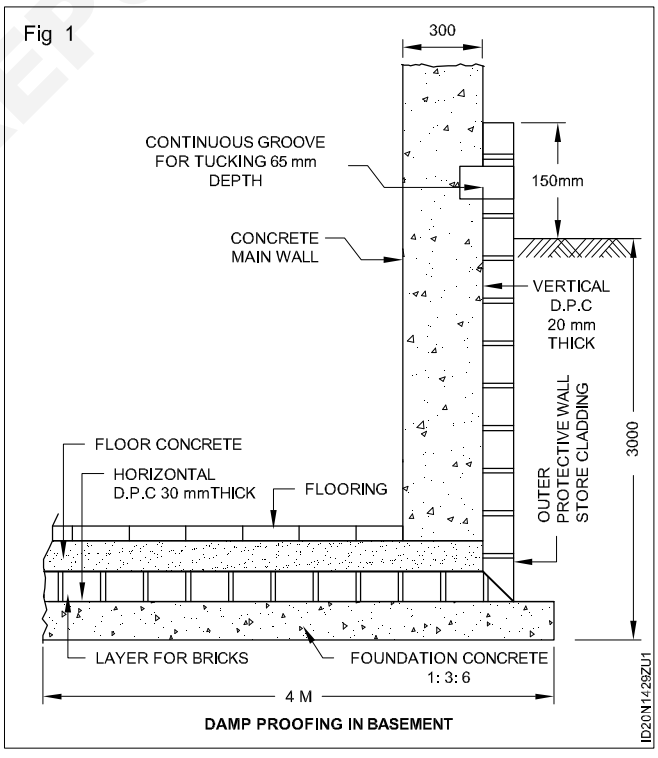
1 Draw the section of foundation concrete of thick 200 mm.

2 Draw horizontal DPC of thick 30 mm.

3 Draw vertical outer protective wall of $\frac{1}{2}$ brick thick from the right side of foundation concrete with an offset of 150mm.

4 Draw vertical DPC of thick 20 mm upto 150 mm above ground level.

5 Draw vertical main wall of 30 cm thick.



6 Draw flooring above the floor concrete.

7 Hatch the proper conventional symbols.

Damp proofing in basement in damp soil using foundation drains

Thickness of mainwalls = 300 mm

Thickness of Horizontal DPC = 30 mm

Thickness of Vertical DPC = 20 mm

Thickness of foundation conc. = 400 mm

Thickness of Brick layer = 100 mm

Thickness of flat brick course = 75 mm

Thickness of drain pipe = 150 mm dia.

SCALE 1:20

1 Draw the section of foundation concrete of thick 400 mm.

2 Draw horizontal DPC of thick 30 mm.

3 Draw flat brick course of thick 75 mm.

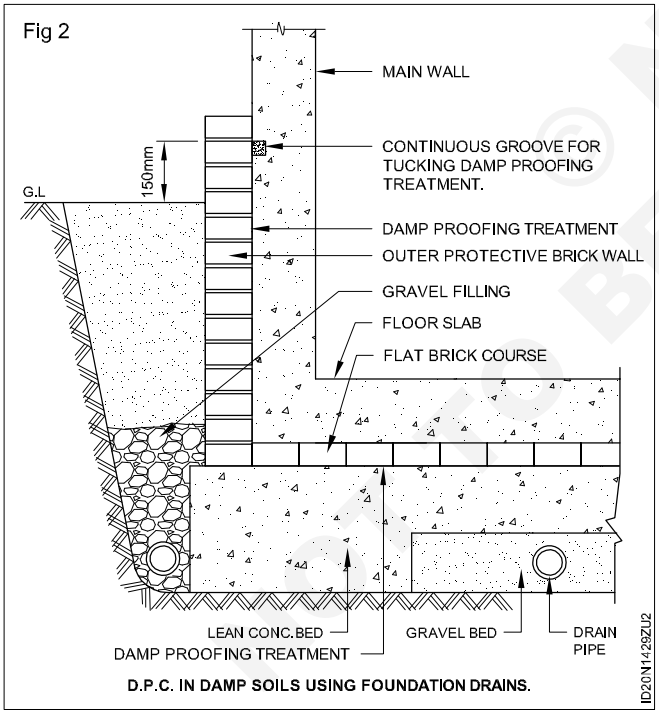
4 Draw the flooring concrete of 200 mm.

5 Draw the vertical outer protective wall of 1/2 brick thick from the left side of foundation concrete with an offset of 150 mm.

6 Draw vertical DPC of the 20mm upto 150mm above ground level.

7 Draw the drain pipe of 150 mm dia as shown in Fig 2.

Fig 2



D.P.C. IN DAMP SOILS USING FOUNDATION DRAINS.

8 Draw the gravel filling in the sides of the foundation.

9 Hatch the proper conventional symbols and complete the drawing with dimension and text.

Draw the details of Damp proofing in Floors.

Data:

Wall thickness = 300 mm

Depth of lean conc = 75 mm

Thickness of flat bricks = 75 mm

Thickness of DPC = 30 mm

(mastic asphalt)

Thickness of floor concrete = 100 mm

Thickness of flooring = 25 mm

SCALE 1:10

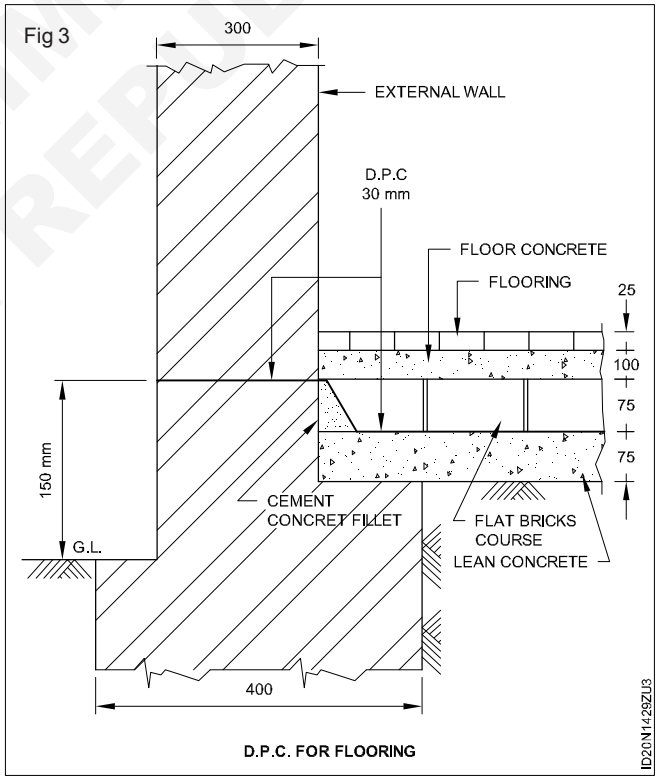
Draw the section of wall and basement

1 Draw the floor and flooring as shown in Fig 3

2 Draw the DPC of 30 mm thick mastic asphalt in wall, floor and in the junction of wall and floor.

3 Draw the proper conventional symbols and complete the section.

Fig 3



D.P.C. FOR FLOORING

Demonstrate doors and windows with the help of respective models

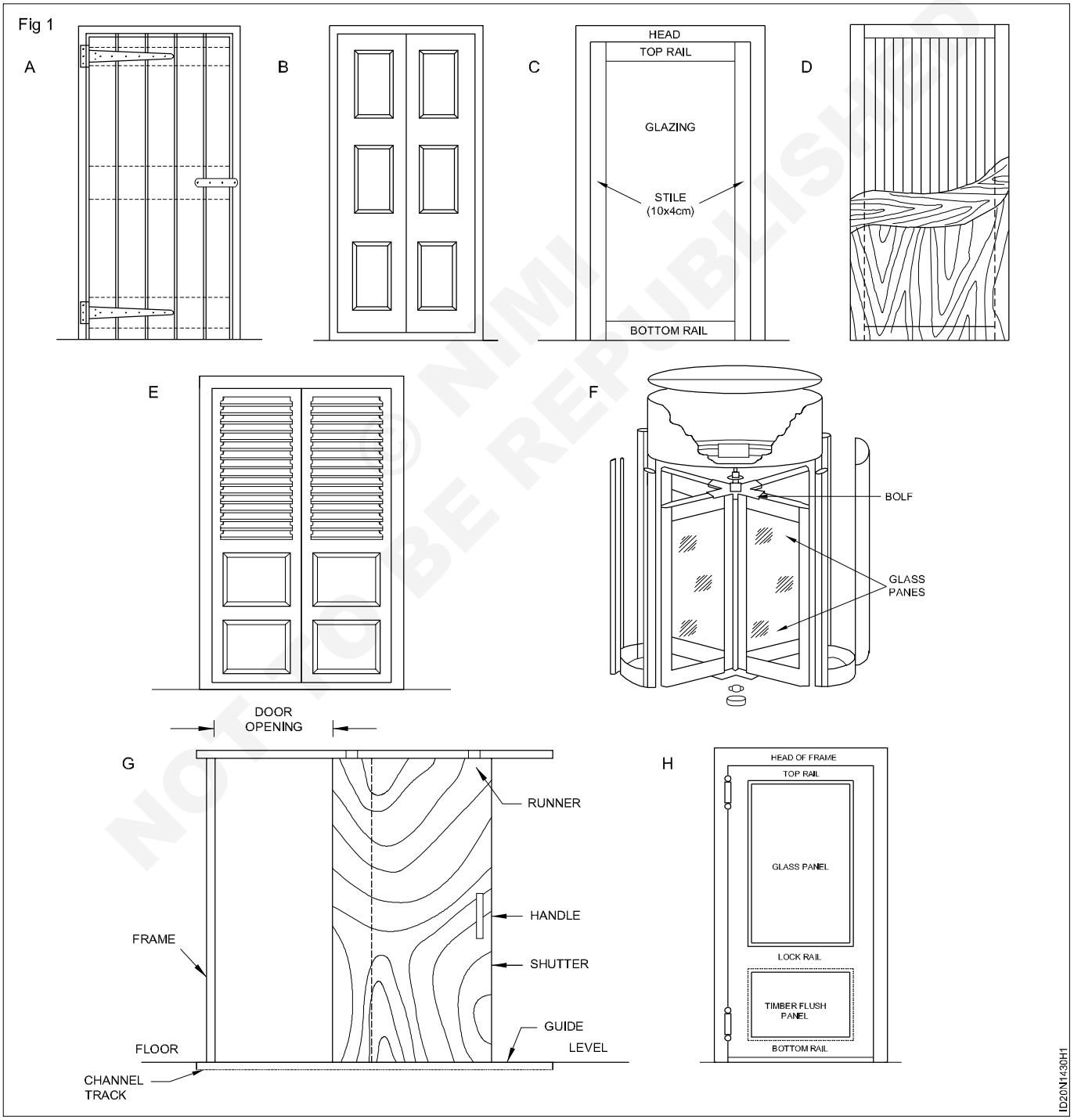
Objective: At the end of this exercise you shall be able to
- **demonstrate different type of doors and windows.**

PROCEDURE

TASK 1: **Identify the doors name (Fig 1)**

Instructor will display the respective models in the section and demonstrate to the students regarding the different types of doors names and uses.

Fig 1



1 Trainees will note down all the displayed respective model doors names and uses.

2 Record them in table 1.

Table 1

Fig no.1	Name	Uses
A		
B		
C		
D		
E		
F		
G		
H		

3 Get it checked by the instructor.

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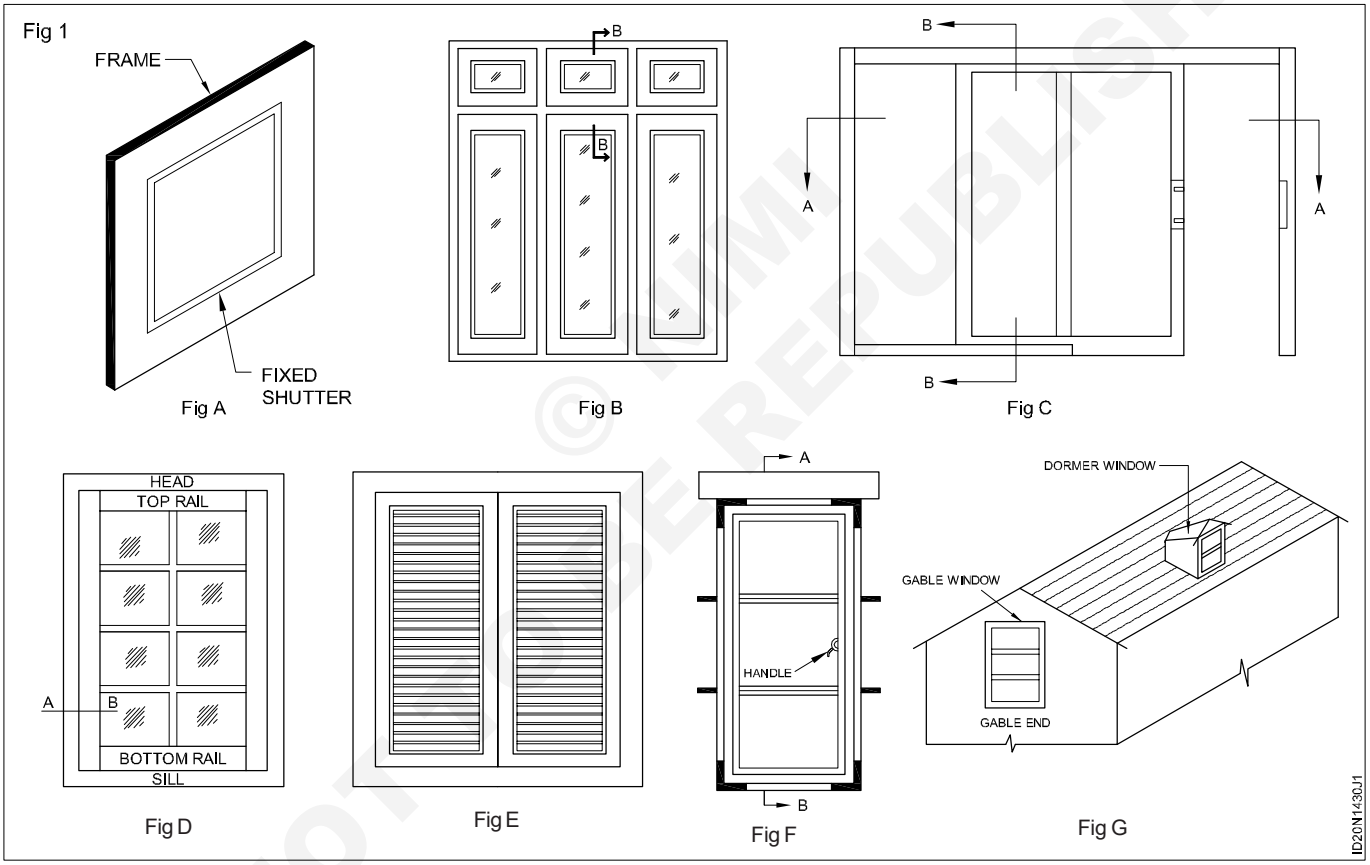
TASK 2: **Identify the windows name (Fig 1)**

Instructor will display the respective models in the section and demonstrate to the students regarding the different types of windows names and uses.



1 Trainees will note down all the displayed respective model windows names and uses.

2 Record them in table 2.

Table 1

Fig no.1	Name	Uses
A		
B		
C		
D		
E		
F		
G		

3 Get it checked by the instructor.

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Prepare plan, elevation and section of door

Objectives: At the end of this exercise you shall be able to
- **draw the plan, elevation and section of panelled door**
- **draw the plan, elevation and section of panelled and glazed door**
- **draw the plan, elevation and section of flush doors.**

PROCEDURE

TASK 1: **Draw the vertical section, elevation of paneled door with the given data below (Fig 1)**

DATA

Width of wall	= 300 mm
Height of lintel	= 150 mm
Size of door	= 1000 x 2000 mm
Frame size	
Head frame	= 90 x 70 mm
Post	= 90 x 70 mm
Vertical styles	= 95 x 35 mm - 4 Nos
Top rail	= 95 x 35 mm
Lock rail	= 150 x 35 mm
Mid rail	= 95 x 35 mm
Butt hinges	= 100 - 4 Nos
Pannel	= 6 nos of equal size, 20 mm thick.

1 Draw door opening, size 1000 x 2000 mm with appropriate scale.

2 Draw two post 70 mm thick, height 1930 mm at a distance of 860 mm apart.

3 Draw door head 70 mm thick 1300 mm length inclined the horn.

4 Draw style of size 95 x 35 mm near the two post

5 Draw top rail 95 x 35 mm

6 Draw panel size 20 mm thick

7 Draw widrail 95 x 35mm

8 Draw lock rail 150 x 35 mm

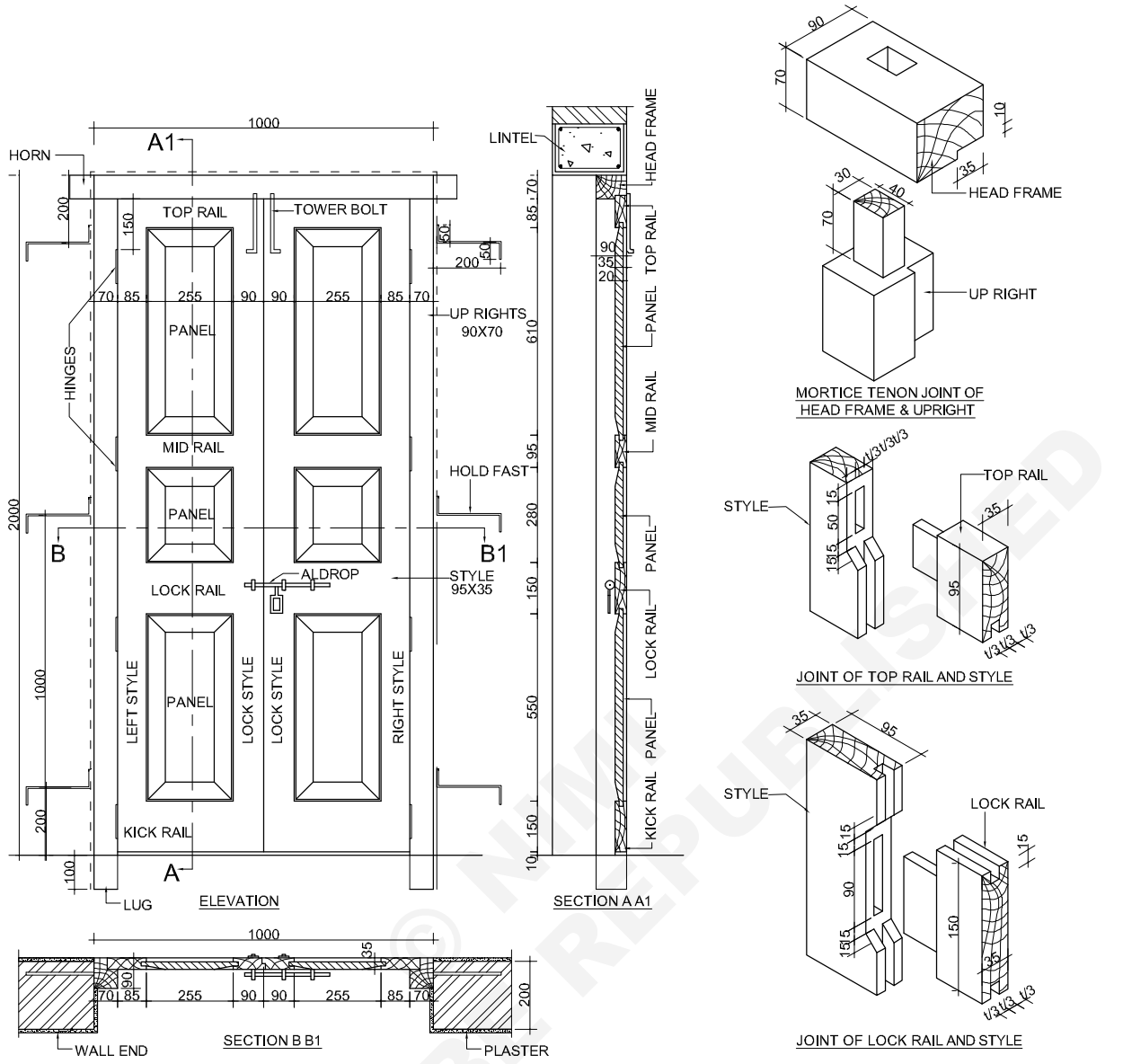
9 Draw the bottom rail 150 x 35 mm

10 Draw panels and butt hinges as shown in Fig 1.

11 Mark the aldrop in lock rail and complete the drawing.

12 Draw the vertical section and mark the symbols and complete the drawing.

Fig 1



PANELLED DOOR

TASK 2: **Draw the elevation and vertical section of panelled and glazed door with the given data below (Fig 1)**

DATA

Width of wall	= 300 mm
Height of lintel	= 150 mm
Size of door	= 1000 x 2000 mm
Frame size	
Head frame	= 90 x 70 mm
Post	= 90 x 70 mm
Vertical style	= 95 x 35 mm, 4 Nos
Top rail	= 95 x 35 mm
Lock rail	= 195 x 35 mm
Bottom rail	= 195 x 35 mm
Butt hinges	= 100 mm, 4 Nos
Pannel	= 6 Nos of equal size, 20 mm thick
Glass	= 3 mm thick 8 Nos
Sash	= 35 x 35 mm

1 Draw door opening, size 1000 x 2000 mm with appropriate scale.

2 Draw two post 70 mm thick, height 1930 mm at a distance of 860 mm apart.

3 Draw door head 70 mm thick

4 Draw style of size 95 x 35 mm near the two post.

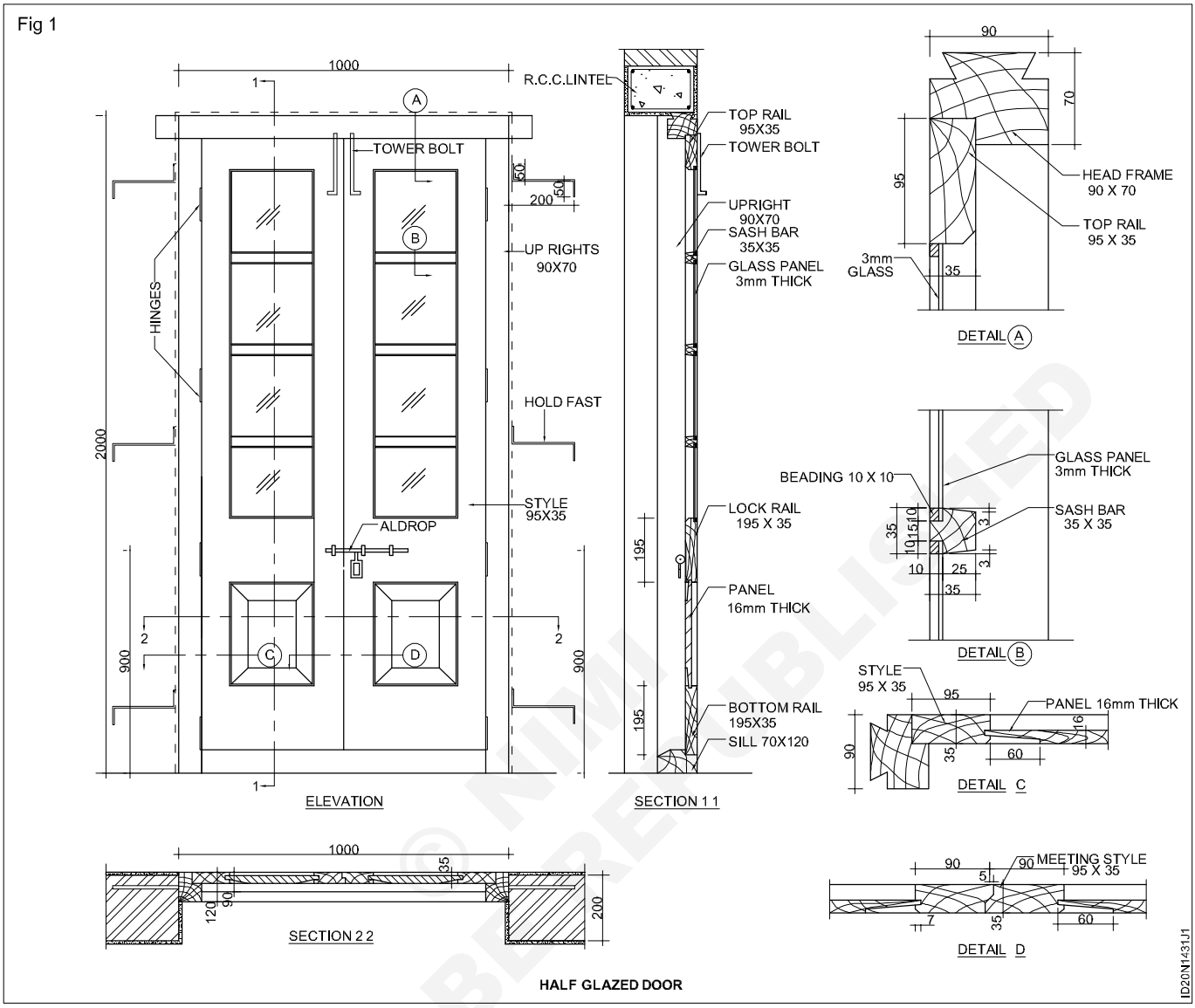
5 Draw top rail 95 x 35 mm

6 Draw sash bar and glass panel as shown in Fig 1.

7 Draw the lock and mark the aldrop.

8 Develop the vertical section mark the symbols and complete the drawing.

Fig 1



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TASK 3: **Draw the elevation and section of solid or laminated flush door (Fig 1a)**

DATA

Size of door = 1000 x 2000.

Post = 80 x 120 mm 2 Nos.

Head = 80 x 120 mm.

3 ply = 6 mm thick.

Thickness of shutter 44 mm.

1 Draw the door opening, size of 1000 x 2100 mm.

2 Draw two posts of thickness 80 mm, and height 1920 mm at a distance of 840 mm apart.

3 Draw a head 80 mm thickness over the post.

4 Draw parallel strips 16 mm each as shown in Fig 1a.

5 Draw the details of section as shown in Fig 1a.

6 Complete the drawing.

— — — — — — — —

TASK 4: **Draw the elevation and section of framed flush door (Fig 1b)**

DATA

Horizontal	= 20 mm wide.
Vertical ribs	= 10 mm
Ventilaling hole	= 10 mm
Bottom rail	= 40 x 25.

1 Draw the door opening, 1000 x 2100 mm.

2 Draw two points of thickness 80 mm, and height 1920 mm at a distance of 840 mm apart.

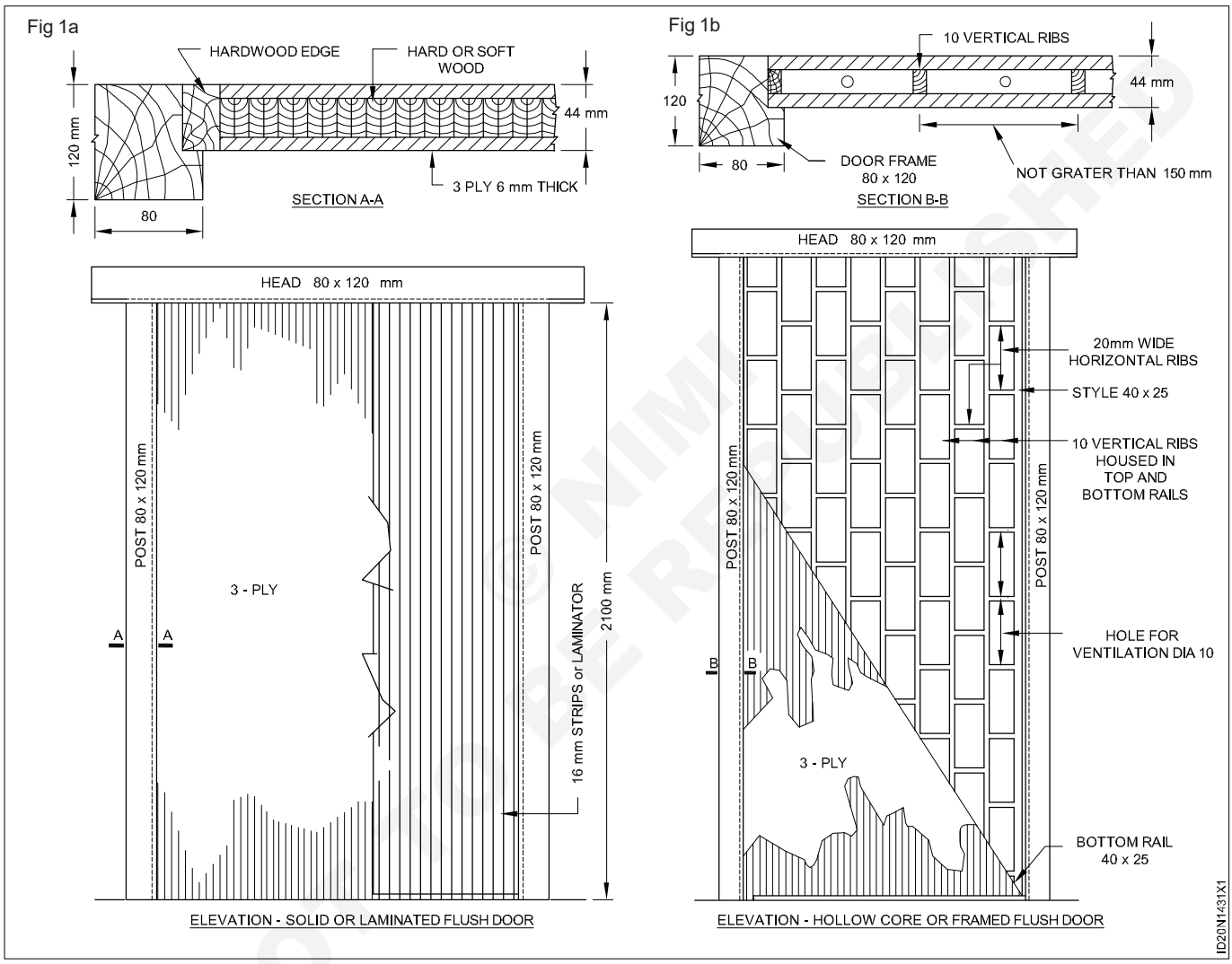
3 Draw a head 80 mm thickness over the post.

4 Draw horizontal & vertical ribs of 20 mm width as shown in Fig 1b.

5 Draw bottom rail of size 40 x 25 mm.

6 Draw the details of section as shown in Fig 1b.

7 Complete the drawing.



Preparation of plan elevation & section of window

Objective: At the end of this exercise you shall be able to
- **draw the plan of elevation & section of window.**

PROCEDURE

TASK 1: **Draw the elevation & section of casement window with ventilator**

DATA

Size of windows	= 1800 x 1670 mm
No. of glazed pavel	= 6
Frame	= 100 x 60 mm
Ventilator rail	= 35 x 75 mm
Transome	= 100 x 60 mm
Sill size	= 100 x 60 mm
Head	= 100 x 60 mm
Post	= 100 x 60 mm, 4 Nos
Hanging style	= 35 x 75 mm, 3 Nos.
Meeting style	= 35 x 75 mm, 3 Nos.
Top rail	= 35 x 75 mm, 3 Nos.
Bottom rail	= 35 x 75 mm, 3 Nos.

1 Draw the post of size 100 x 60 x 1670 mm as shown in the Fig 1.

2 Draw sill and head of size 100 x 60 x 1800 mm as shown in the Fig 1.

3 Draw the transome of size 100 x 60 x 1800 mm as shown in the Fig 1.

4 Draw the hanging style 75 x 35 mm as shown in the Fig 1.

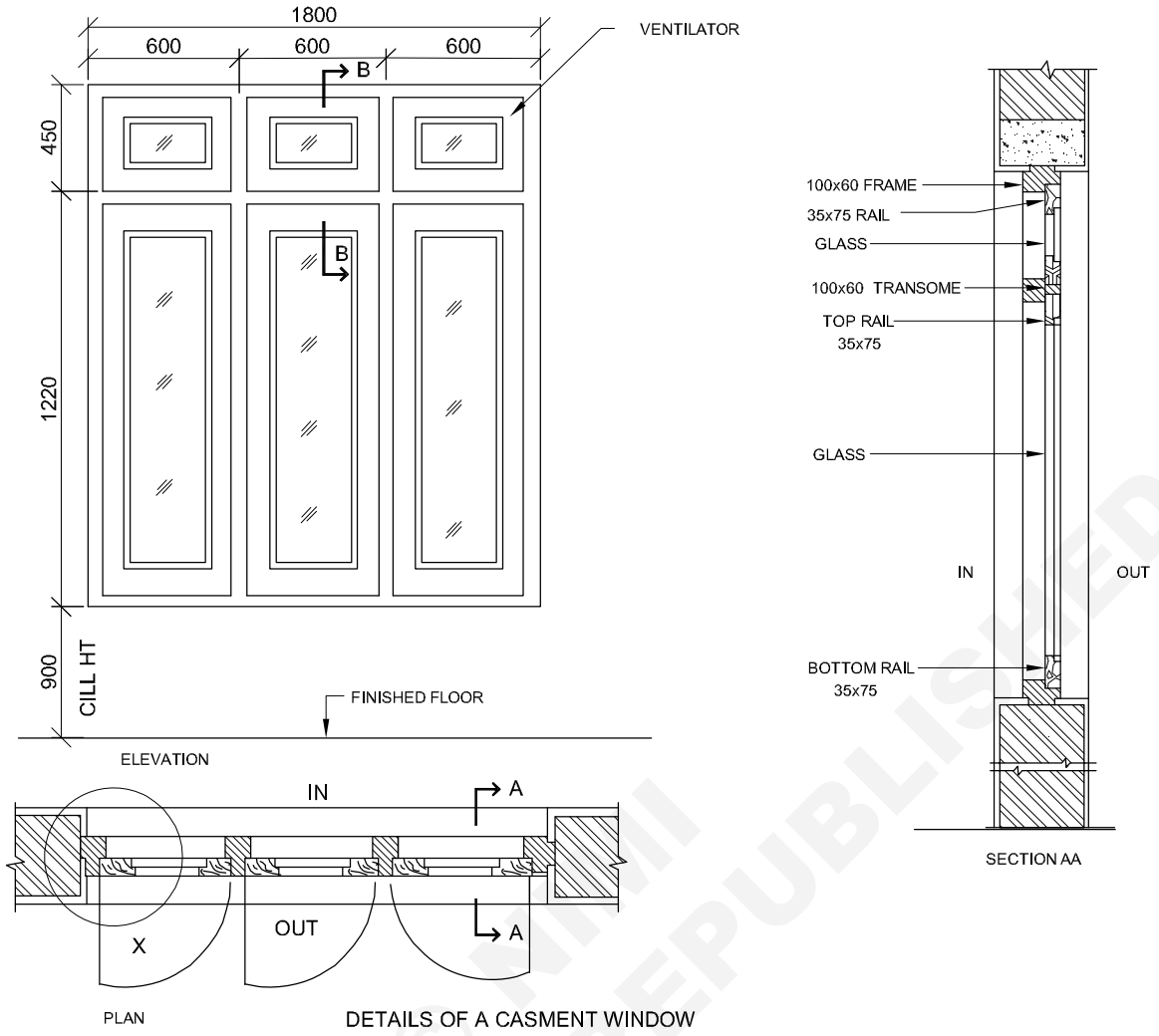
5 Draw the meeting style 35 x 75 mm.

6 Draw top and bottom rail 35 x 75 mm between the styles.

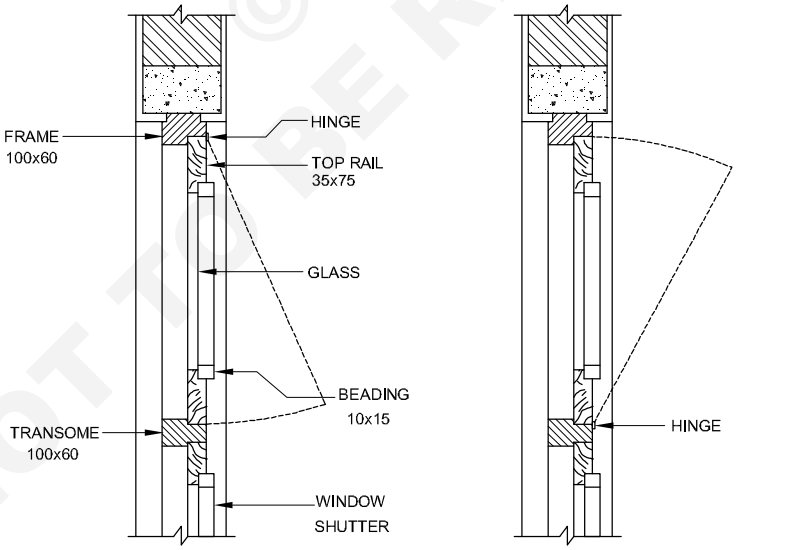
7 Draw the three glass panels between the top and bottom rails.

8 Draw the vertical section in the Fig 1.

Fig 1



DETAILS OF A CASMENT WINDOW



ENLARGED SECTION THROUGH`B-B' SHOWING ALTERNATIVE METHODS OF FIXING VENTILATOR SHUTTER

ID20N1432H1

TASK 2: **Draw the elevation and details of sash window (Fig 1)**

DATA

Head	= 75 x 110 mm
Post	= 75 x 110 mm, 2 Nos.
Hanging style	= 75 x 32 mm, 2 Nos.
Meeting style	= 75 x 32 mm, 2 Nos.
Top rail	= 75 x 32 mm, 2 Nos.
Frieze rail	= 75 x 32 mm
Bottom rail	= 75 x 32 mm
Sill	= 75 x 110 mm

1 Draw two post of 75 mm thick and 1050 mm height at distance of 600 mm apart.

2 Draw a sill of 75 mm thick and 900 mm length below the post.

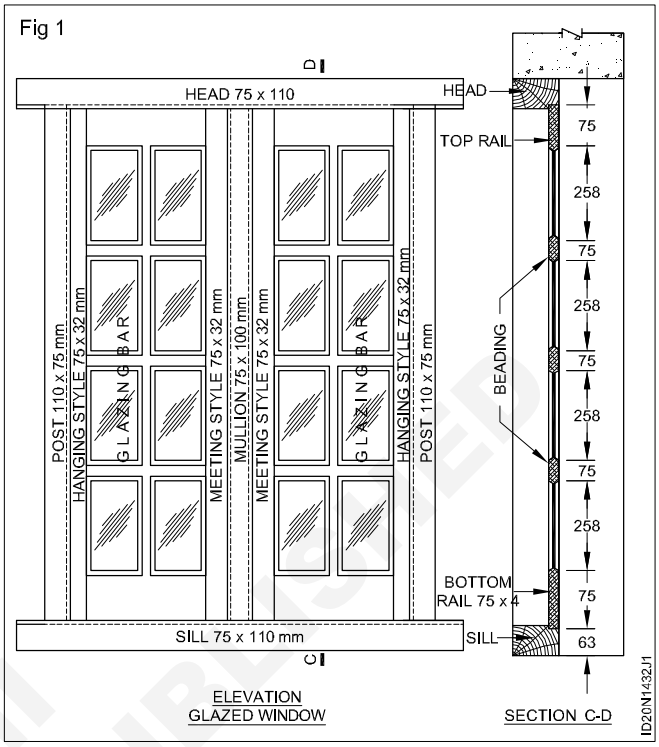
3 Draw the head of 75 mm thich 900 mm length over the post.

4 Draw the hanging style of width 75 mm near the posts.

5 Draw the two meeting styles of width 75 mm in the middle.

6 Draw top rail and bottom rail of height 75 mm between the styles draw the vertical section as shown in Fig 1.

Fig 1



TASK 3: **Draw the elevation and section of aluminium sliding window**

DATA

Aluminium 2 track, E channel	= 62 x 32 x 1040 mm, 2 Nos.
Aluminium 2 track, E channel top & bottom	= 62 x 32 x 860 mm, 2 Nos.
Side shutter section	= 40 x 18 x 1010 mm, 2 Nos.
Top and bottom Shutter section	= 40 x 18 x 380 mm, 8 Nos.
Inter lock shutter	= 40 x 18 x 1010 mm, 2 Nos.
Plain glass	= 937 x 363 x 5 mm, 2 Nos.

1 Draw the U channel outer frame size 1040 x 860 mm.

2 Draw the sliding window side shutter and inter lock shutter height 1001 mm.

3 Draw the top and bottom shutter size 405 mm.

4 Complete the drawing as per the shown Fig 1&2.

Fig 1

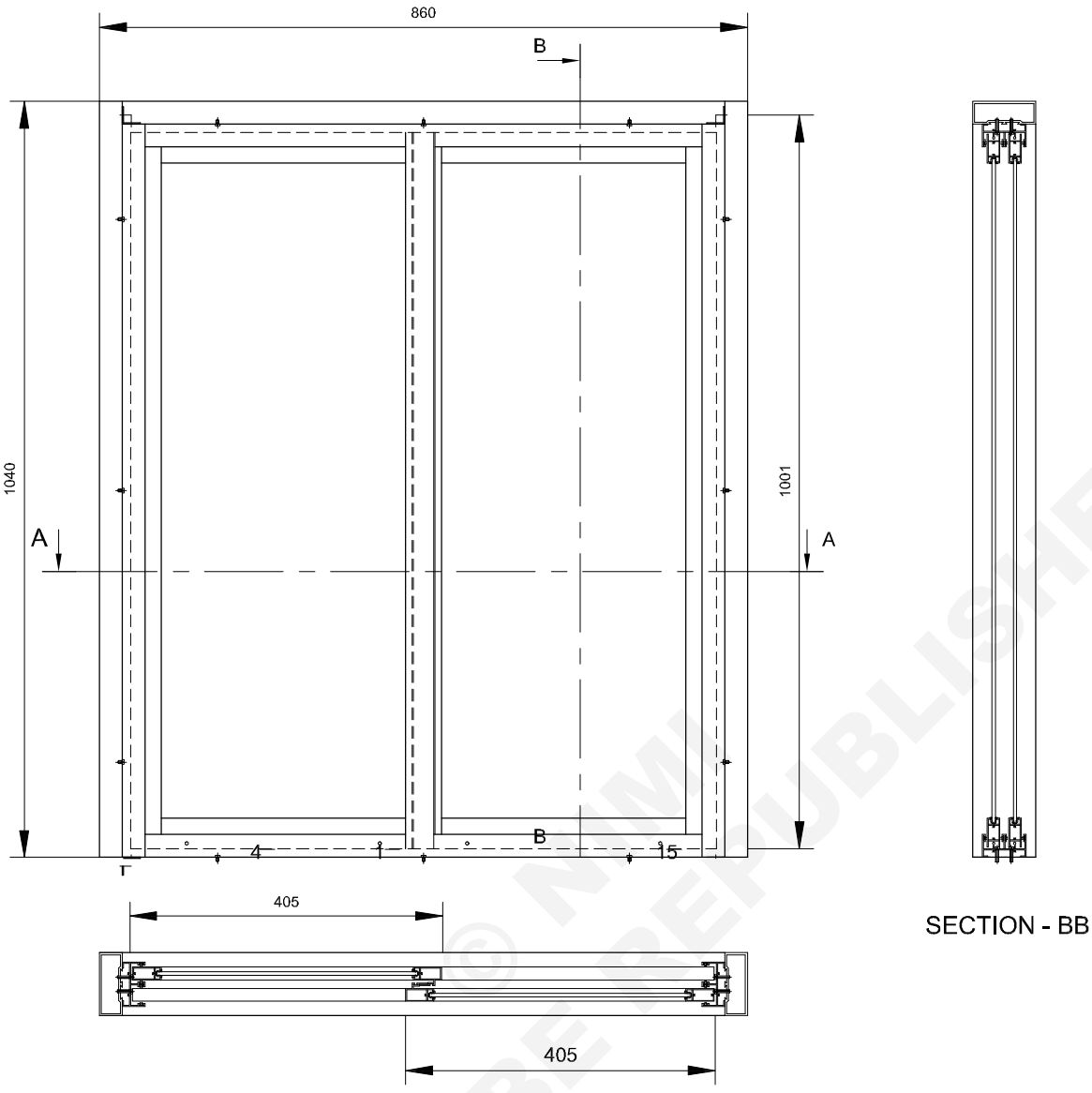
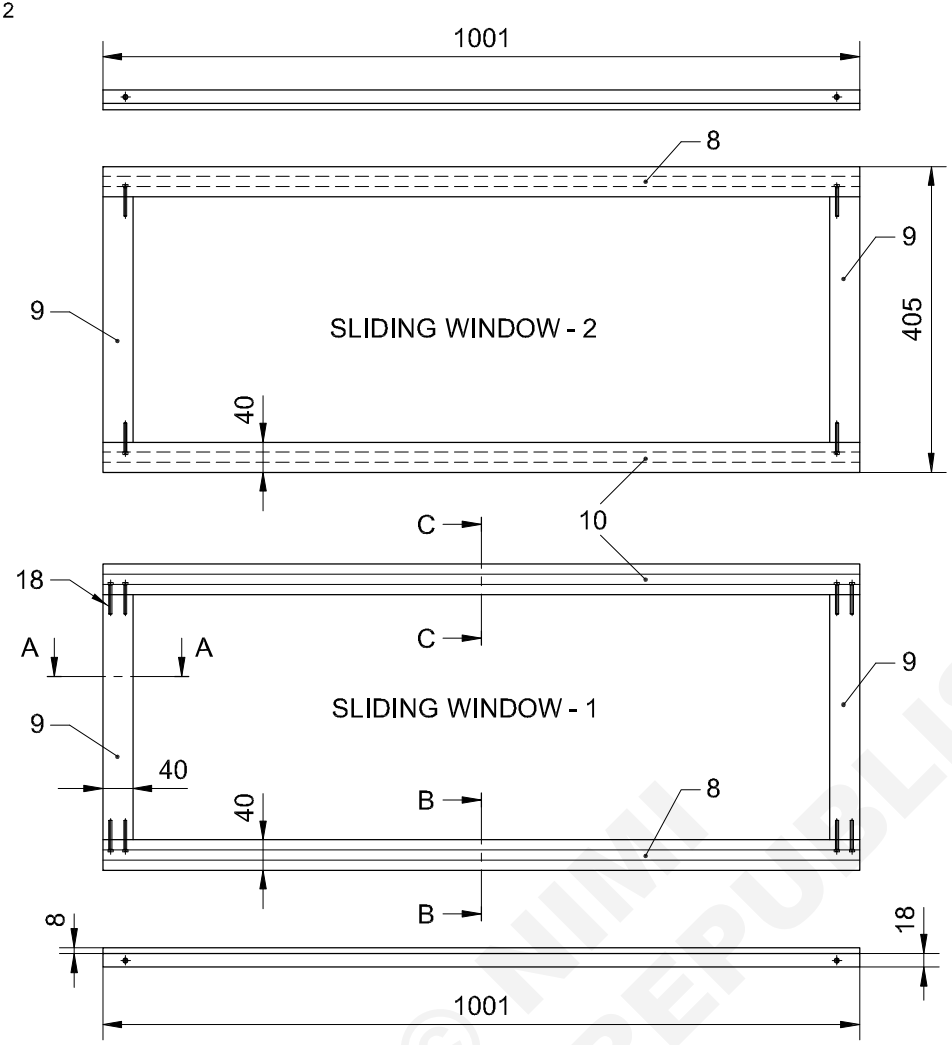
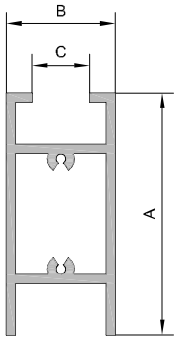
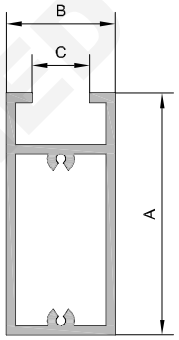


Fig 2

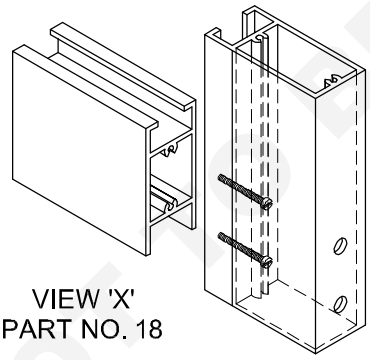




TOP AND BOTTOM SHUTTER
SECTION - AA
A = 40, B = 18, C = 9.5,
PART NO. 9

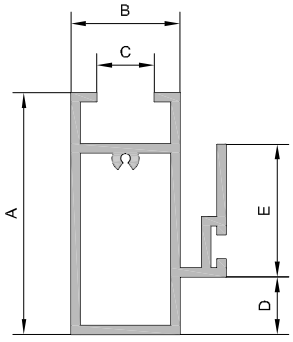


SIDE SHUTTER
SECTION - BB
A = 40, B = 18, C = 9.5,
PART NO. 8



VIEW 'X'
PART NO. 18

CHEESE HEAD SCREW M4x40



INTERLOCK SHUTTER
SECTION - CC
A = 40, B = 18, C = 9.5, D = 9.5, E = 19,
PART NO. 10

ID20N1432X2

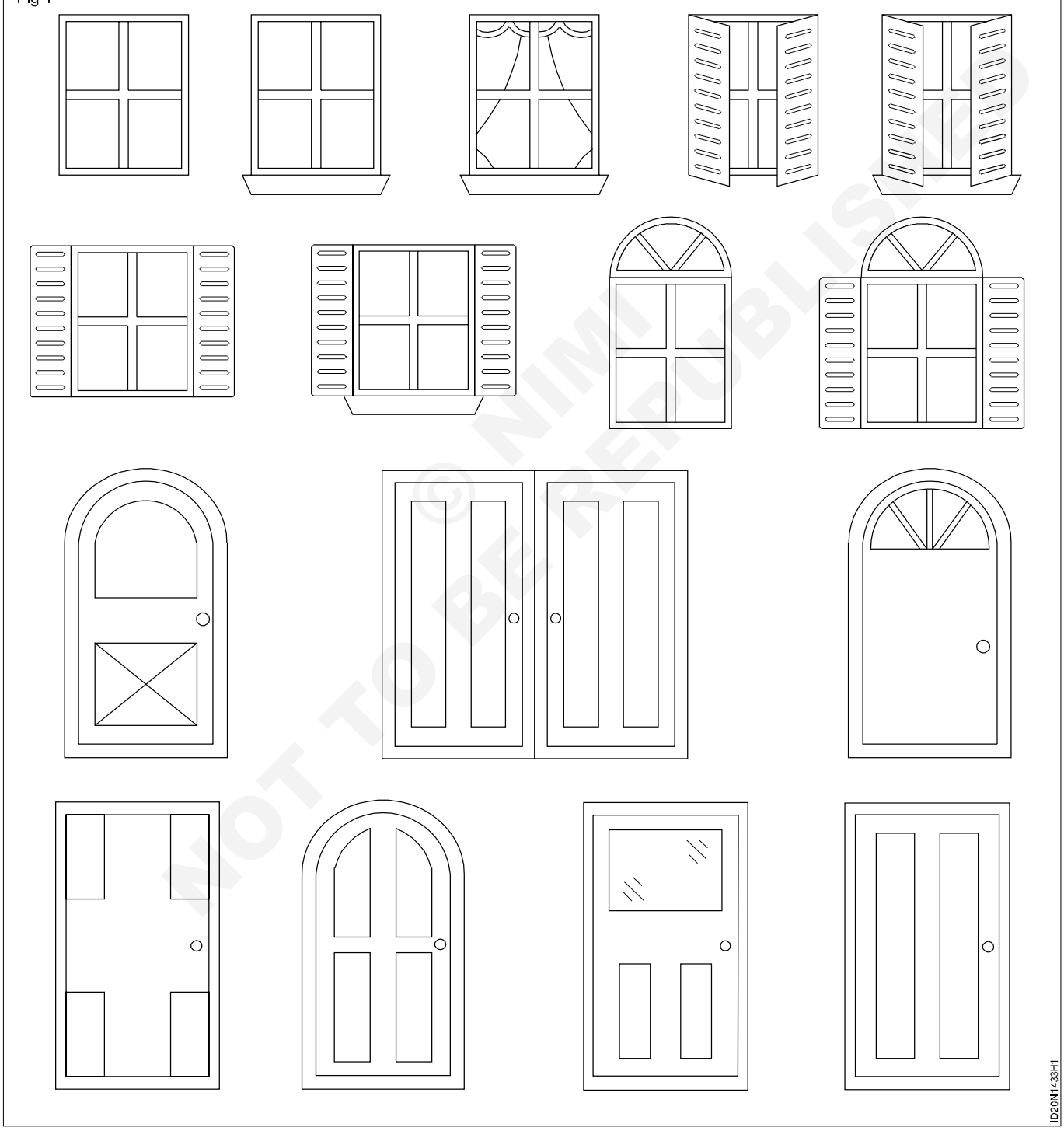
Free hand sketches of graphic symbols for door and windows

Objective: At the end of this exercise you shall be able to
- **draw free hand sketches of doors and windows.**

PROCEDURE

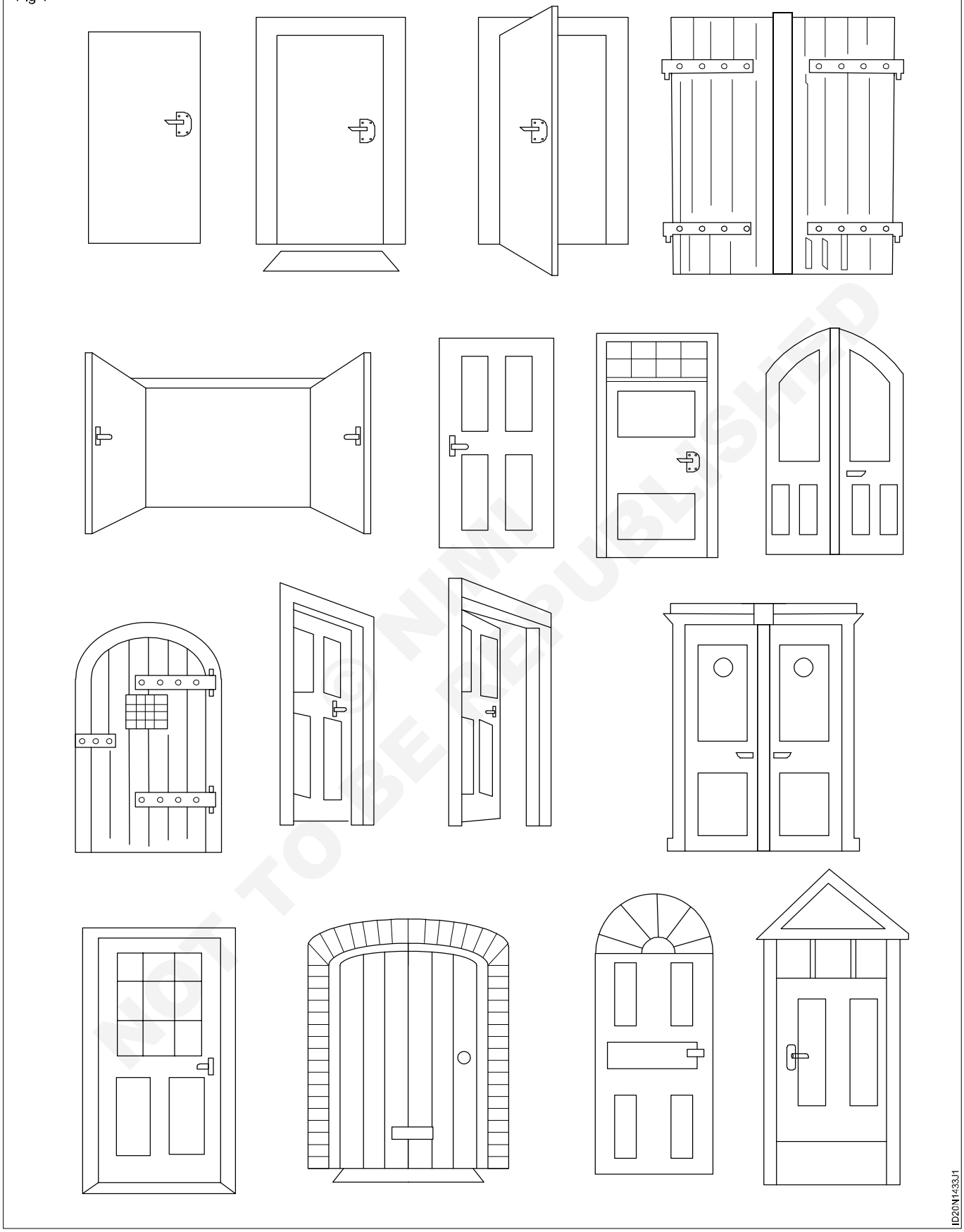
TASK 1: **Draw the free hand sketches of graphic & symbols for windows**

Fig 1



TASK 2: **Draw the free hand sketches of graphic & symbols for doors**

Fig 1



ID20N1433J1

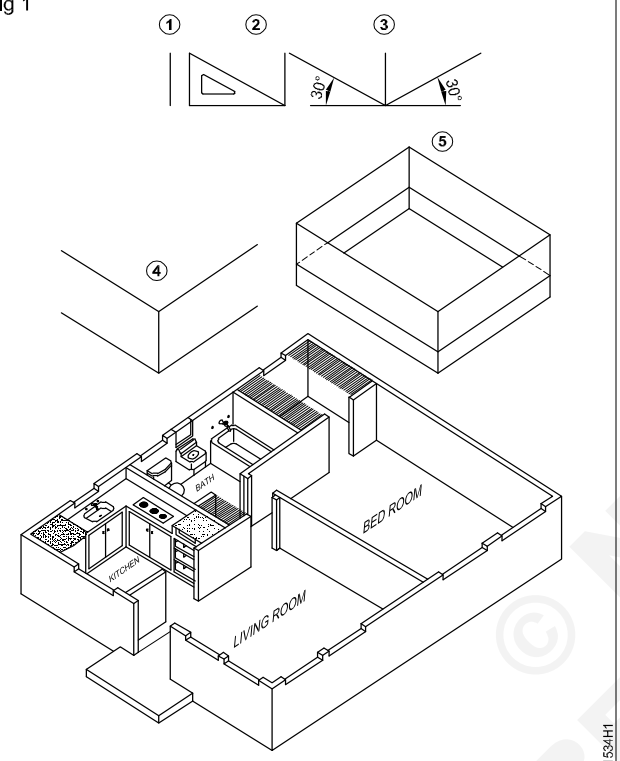
Interiors one point perspective

Objective: At the end of this exercise you shall able to
- **draw one point perspective.**

PROCEDURE

TASK 1: **Draw a one point perspective with high central vanishing point (Fig 1)**

Fig 1



AN ISOMETRIC DRAWING OF A FLOOR PLAN

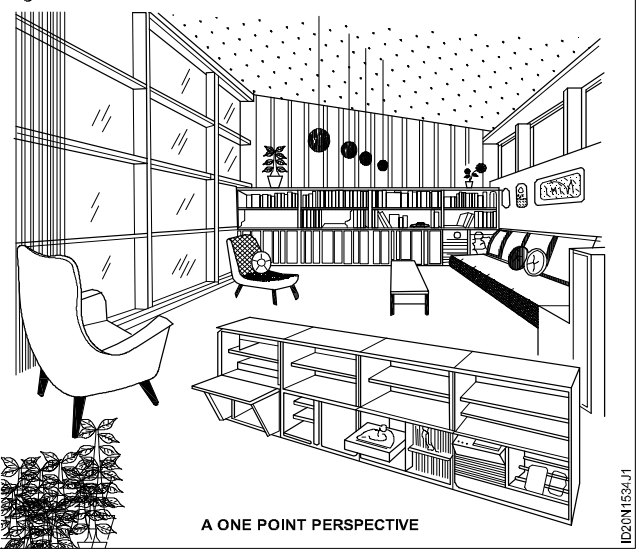
TASK 2: **Draw a one point perspective with low central vanishing point.**

1 Draw the one point perspective by drawing a focus point.

2 Then draw walls and windows respectively.

3 Then draw the furnitures and fixtures accordingly. (Fig 1)

Fig 1

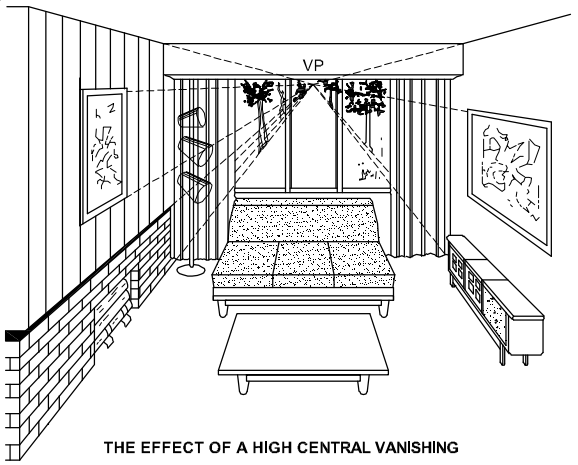


A ONE POINT PERSPECTIVE

TASK 3: **Draw one point perspectives at different vanishing point**

1 Draw a one point perspective with high central located vanishing point. (Fig 1)

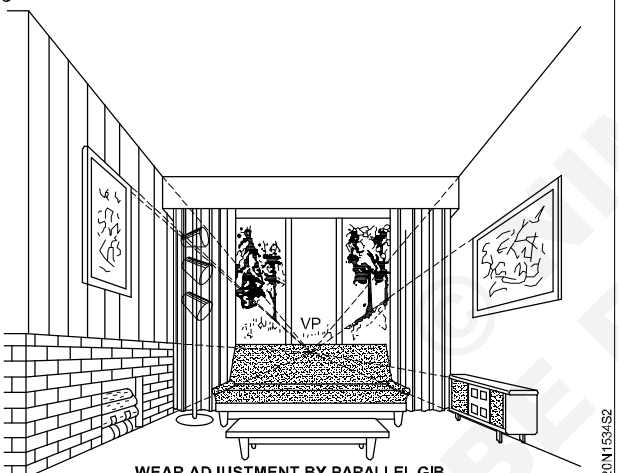
Fig 1



THE EFFECT OF A HIGH CENTRAL VANISHING

2 The effect of low central vanishing point. (Fig 2)

Fig 2



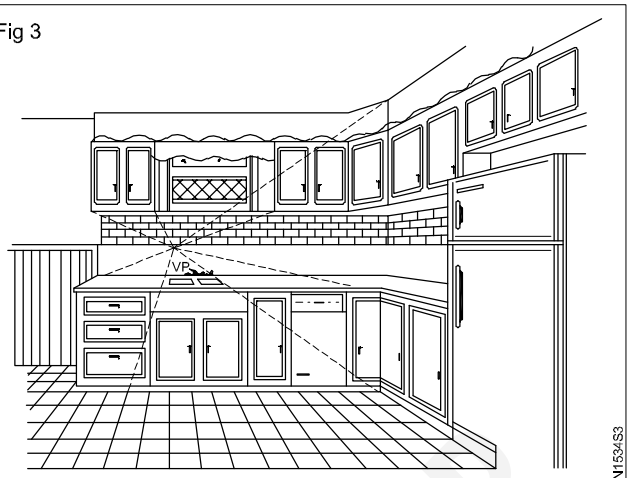
WEAR ADJUSTMENT BY PARALLEL GIB

3 The efffect of the horizontal placement of the vanishing point. (Fig 3)

4 The effect of a centrally located vanishing point. (Fig 4)

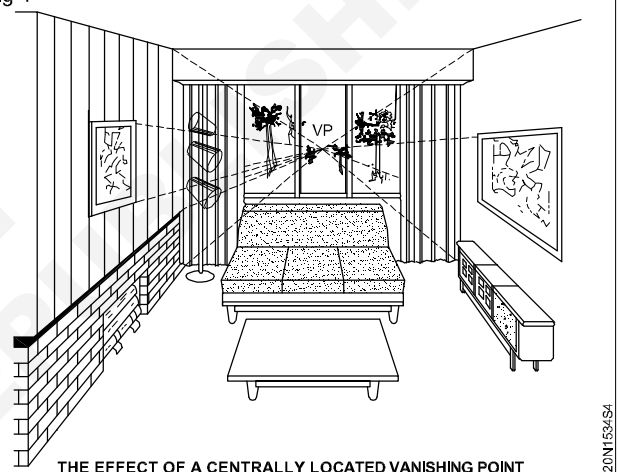
5 Left-wall emphasis is obtained by placing the vanishing point to the extreme right. (Fig 5)

Fig 3



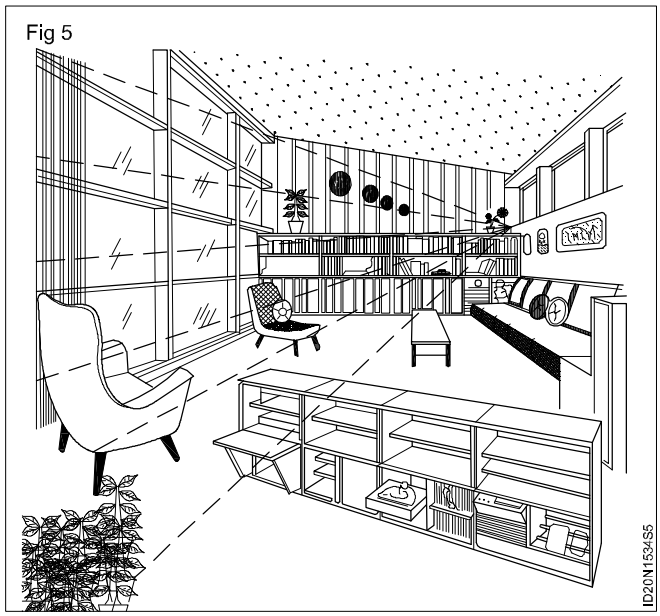
THE EFFECT OF THE HORIZONTAL PLACEMENT OF THE ..... POINT

Fig 4



THE EFFECT OF A CENTRALLY LOCATED VANISHING POINT

Fig 5



Skill Sequence

Drawing of interior perspective view

Objectives: This shall help you to
- **draw the plan**
- **draw the interior perspective view.**

Draw the Interior Perspective Views from the data given (Figs 1&2).

DATA

1 Size of room = 4000 x 3000mm

2 Size of door D = 1000 x 2100 mm

3 Size of door D1= 900 x 2100 mm

4 Window size = 1100 x 2100 mm

5 Size of box = 800 x 2000 mm

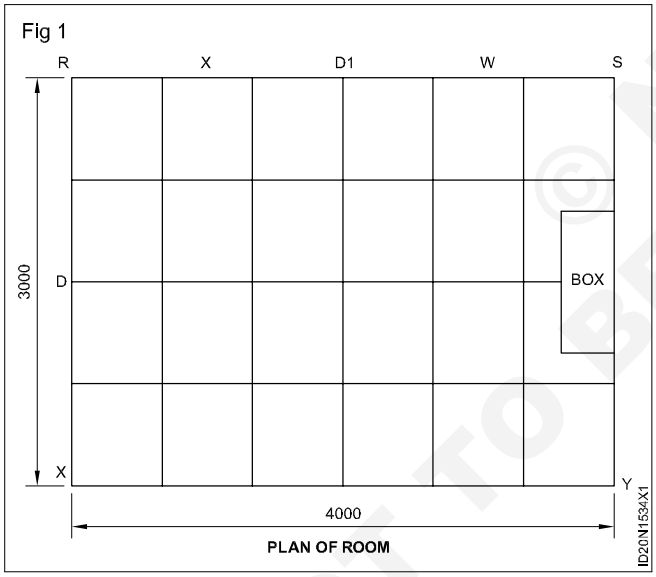
6 Height of ceiling = 3000 mm

7 Draw plan of room = 4000 x 3000 mm

8 Draw the plan at the bottom of your drawing sheet so as to generate the interior perspective above the plan.

9 Mark the position of doors and windows as shown in (Fig 1)

Fig 1



10 Draw the box 800 x 2000 mm as shown in (Fig 1).

11 Draw square floor tiles in plan.

12 Complete the plan of room as shown in fig 1.

13 Draw a horizontal line AB. Parallel to R.S. (fig 2).

14 Draw perpendicular line from A and B.

15 Mark C and D as ceiling height 3000 mm.

16 Complete the rectangle ABCD.

17 Draw the diagonals CB and AD.

18 Find the centre of vision (CV).

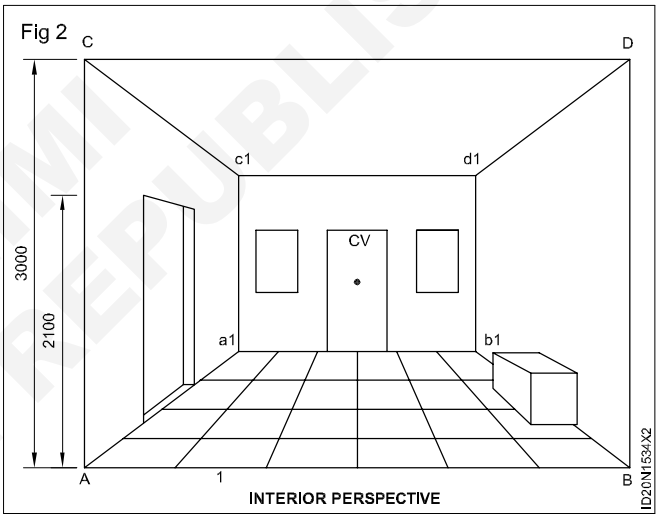
19 Coincide R and CV and mark at AB as

20 From the point 1, draw perpendicular, to cut the diagonal AD at a 1.

21 Complete the rectangle a1, c1, d1, b1.

22 Mark the height of door 2100mm as shown in (fig 2).

Fig 2



23 Coinside the height of door and cv.

24 Coinside side door towards cv and marks at AB.

25 Draw perpendicular up to height of door.

26 Draw similarly door and windows.

27 Project floor tiles from plan up to AB.

28 All projected lines join towards cv.

29 Similarly draw horizontal line of tiles.

30 Draw box shape in the interior perspective.

31 Complete the interior perspective drawing.

Perspective projection

Objectives: This shall help you to
- **describe perspective projection**
- **describe uses of perspective drawings**
- **describe four elements of perspective**
- **describe the types of perspective.**

Describe perspective projection (Ref. Fig 1)

The most realistic form of pictorial drawing is the perspective. This is because it allows for the reduction in size of an object as it recedes from the viewer.

Perspective drawing should three dimensional objects in a single plane as they appear to the eye.

Uses of Perspective Drawing

Perspective drawings are used in architectural design to portray the finished structure in a realistic manner.

The perspective to illustrate proposed product, designs and illustrate advertising copy.

A perspective has four elements (Fig 1)

Types of Perspective

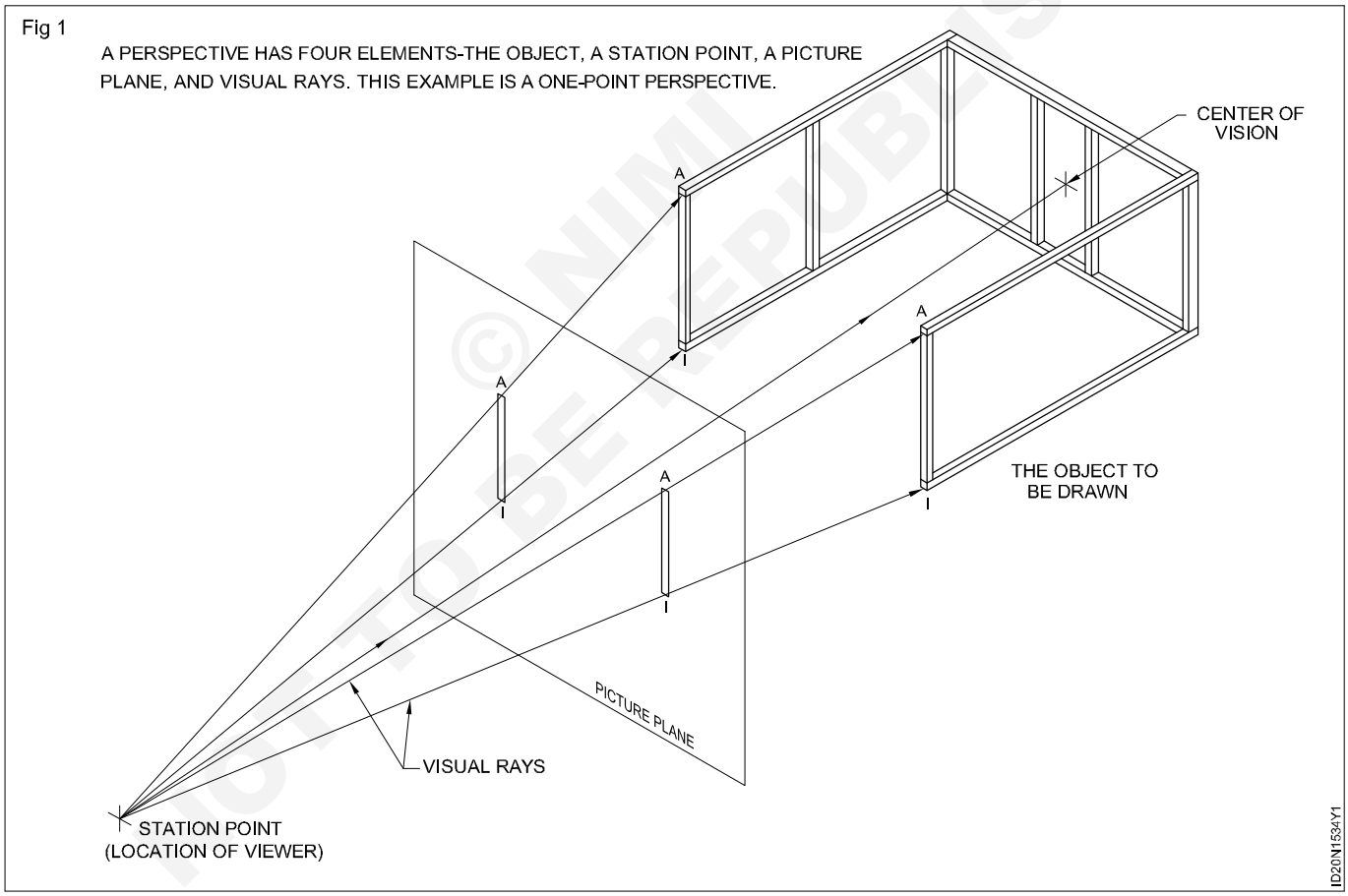
There are three types, according to the number of vanishing point.

1 One point or parallel perspective.

2 Two Point perspective

- i Object
- ii A station point
- iii A picture plane
- iv Visual rays

Fig 1



i Object: The product is viewed.

ii Station Point: The point from which the product is viewed called the station point.

iii Picture plane: The plane upon which the product is projected, called the plane of projection or picture plane.

iv Visual rays: The projectors called visual rays which run from the station point to the product.

v Centre of Vision: The centre of vision is located at the centre of the area on the product.

One point or Parallel perspective

If the object is placed so that the face or front view is parallel with the picture placed.

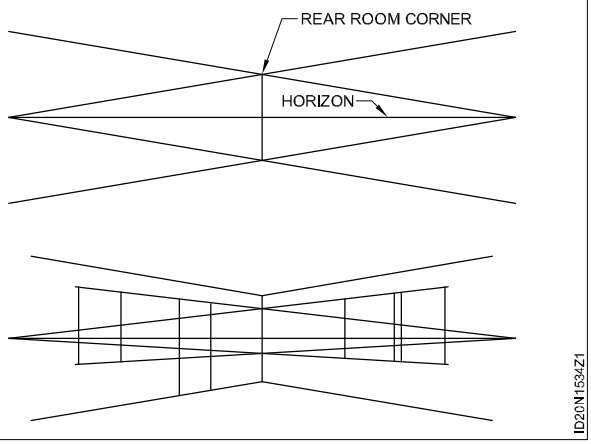
Draw two point perspective

Objectives: This shall help you to
- **draw two point perspective.**

Draw two point perspective as given below in Figs 1&2.

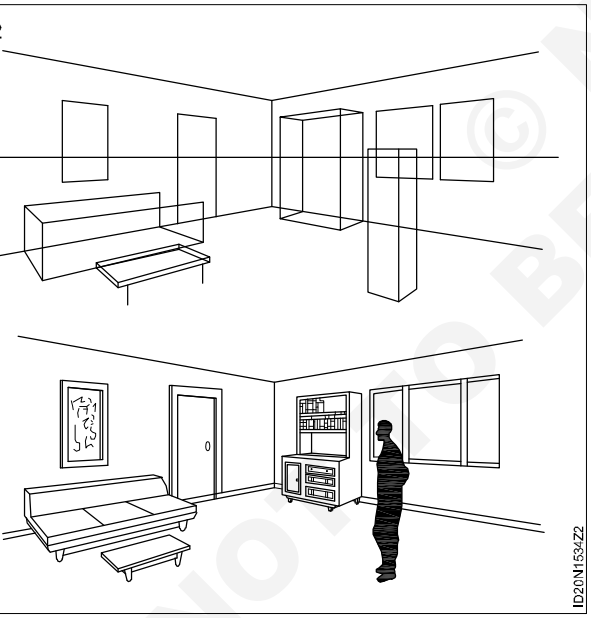
1 Place two points V1, V2, which is achived by drawing two points from central line and during it into two points respectively as in (Fig 1)

Fig 1



2 Then taking consideration from the two varnishing points and draw the window, wall and furnitures respectively as in (Fig 2).

Fig 2



3 Then from (Fig 3) start plaing furnitures and human figures (Fig 4) and accessories.

Fig 3

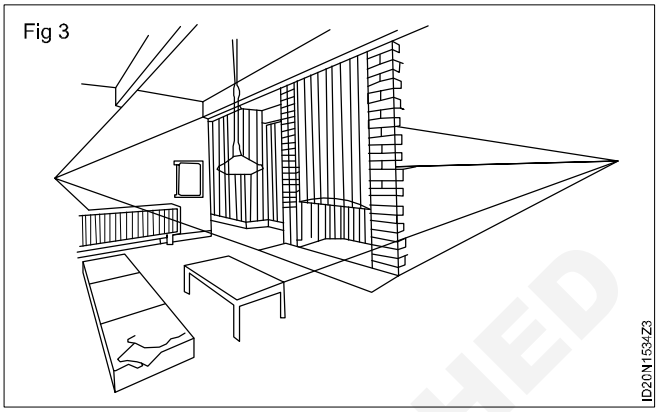
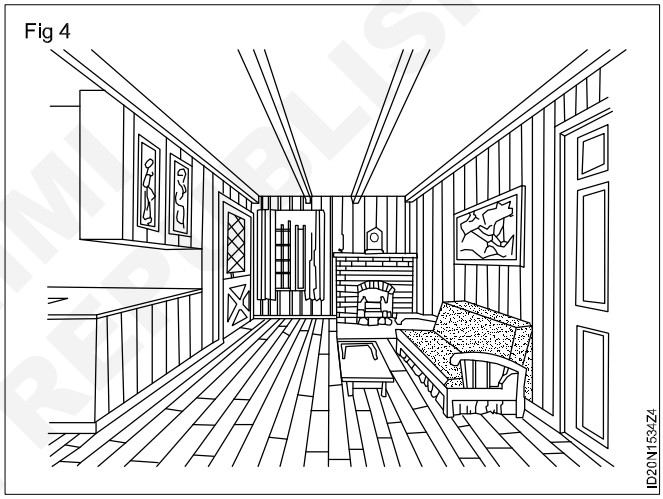


Fig 4



Render the perspective view with any medium

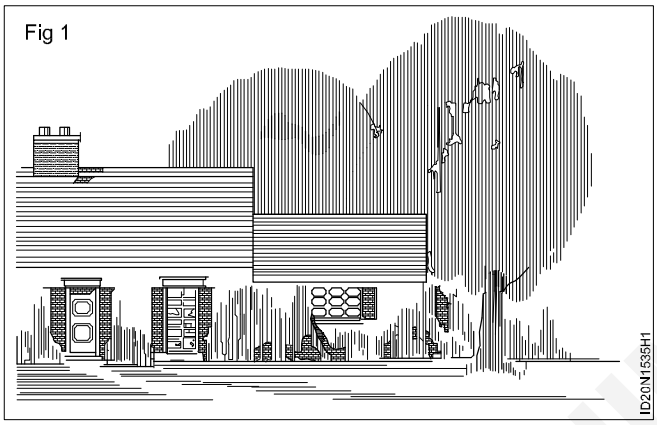
Objectives: At the end of this exercise you shall be able to
- **draw types of renderings**
- **use of renderings.**

PROCEDURE

TASK 1: **Draw the two style of Rendering (a) from soft pencil (b) from pen & ink rendering in the drawing sheet. (Fig 1 & Fig 2)**

a From soft pencil (Fig 1)

Fig 1

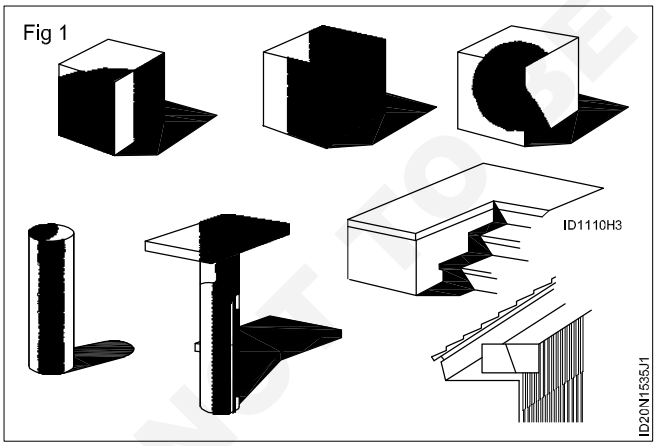


b From pen & ink (Fig 2)

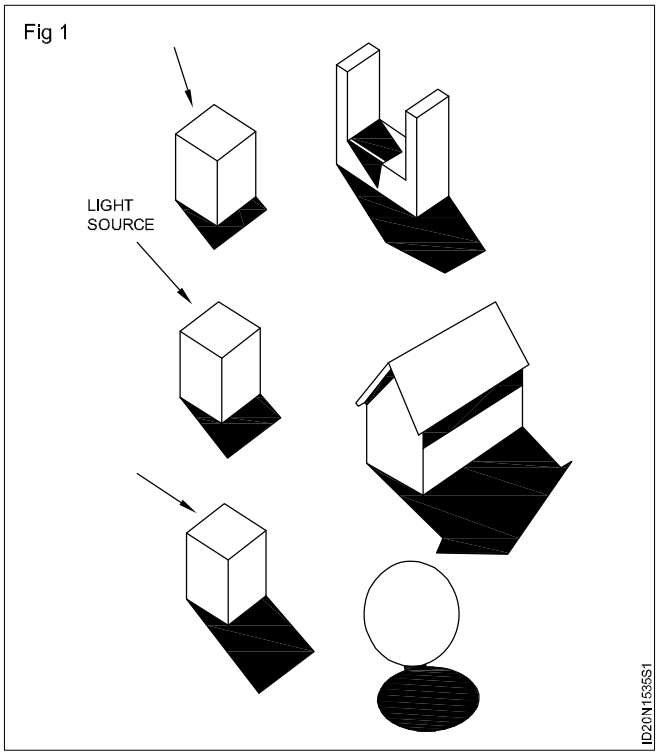
Fig 2

TASK 2: **Draw the method of shading to show sunlight of high areas and shadow the area opposite the light source in the drawing sheet (Fig 1)**

Fig 1



TASK 3: **Draw the shadow using reflection method (Fig 1)**



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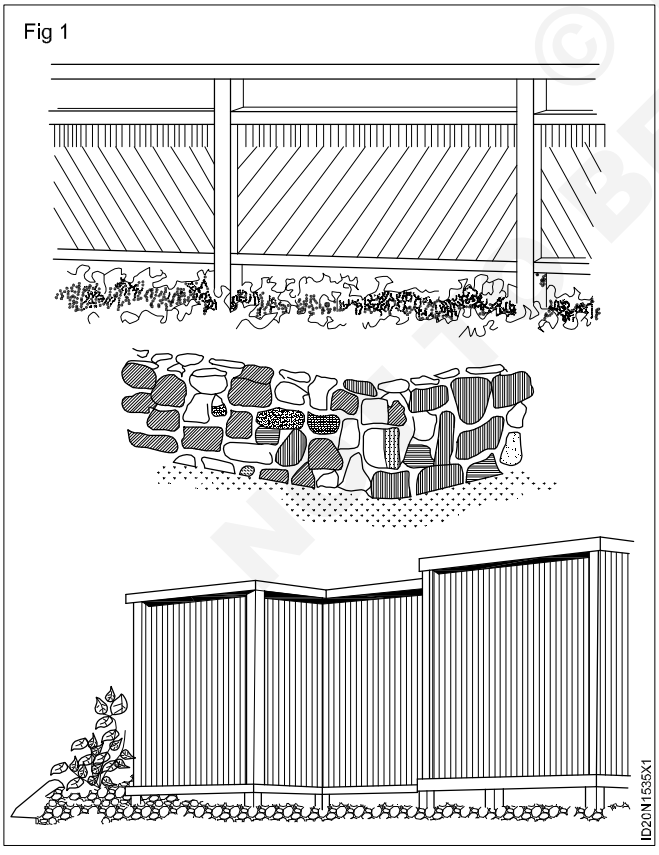
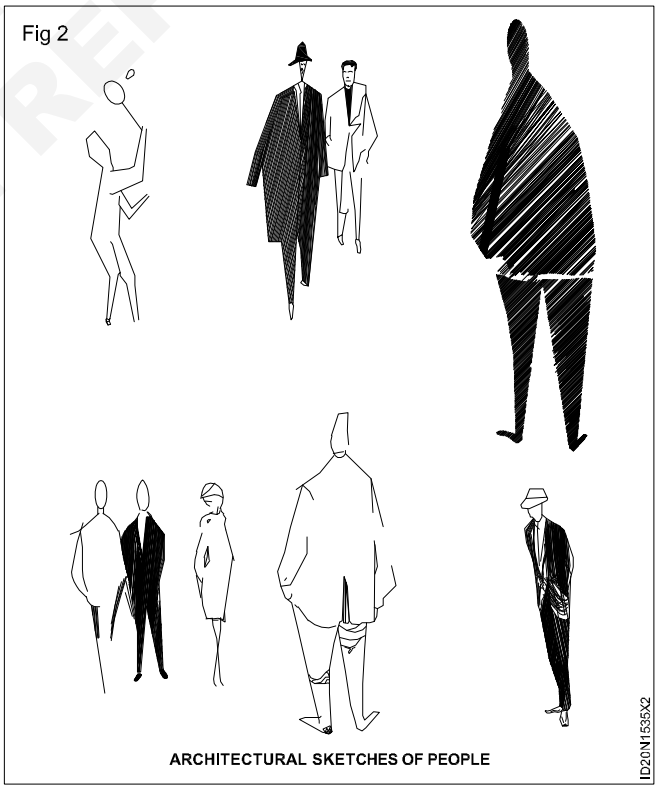
TASK 4: **Draw the method of rendering of types of (Fig 1) fenees and walls (Fig 2) and architectural sketchers of people (Fig 3) landscaping in the drawing sheet.**

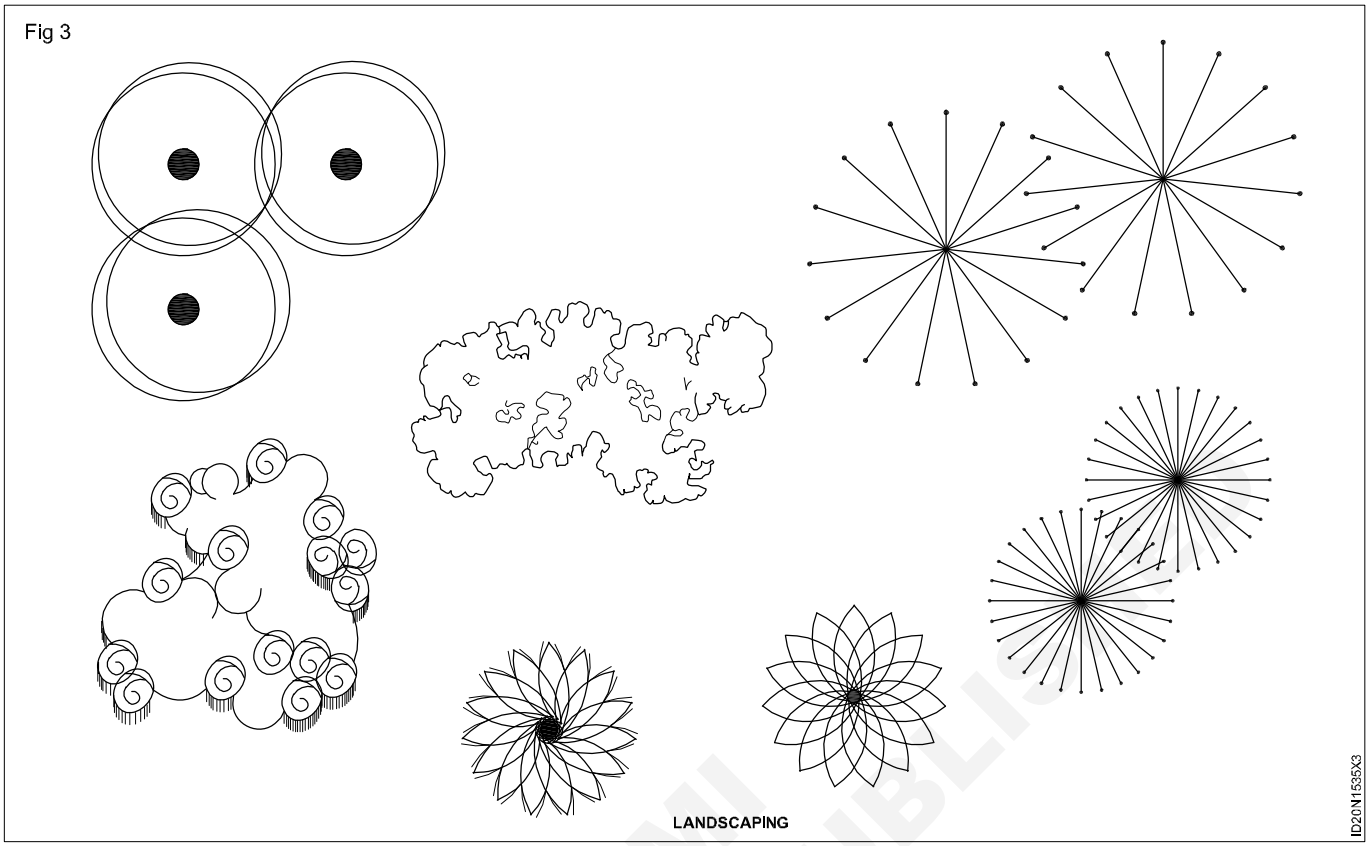
Trees and shelbs (Figs 1&2)





Architectural sketchers of people (Fig 3)

Fig 3



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TASK 5: **Render the image (Fig 1) with any one rendering media and technique**

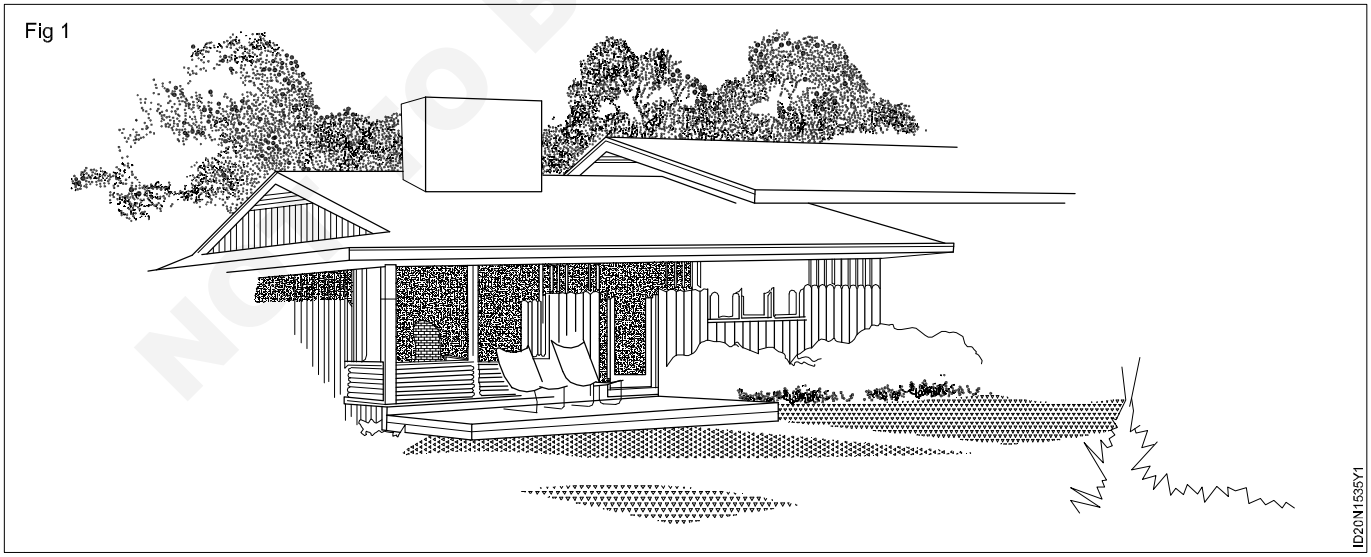
a Color pencils

b Poster color

c Dry partels

d Crayon

Fig 1



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Installation of coral draw, photoshop and sketch up 3D's max with V-ray and Luminous software and prepare the power point skill presentation

Objectives: At the end of this exercise you shall be able to
- **open a CorelDraw X5 Software**
- **create a New Drawing in CorelDRAW**
- **draw a given line drawing by using the Freehand Tool**
- **do the lab assignment.**

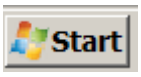
Requirements

Tools/Equipments/Instruments

- Personal Computer with Windows XP Professional Operating system (Latest Configuration) Suitable for the CorelDraw Graphics Suite Software
- CorelDraw Graphics Suite X5 Software (Latest version)

PROCEDURE

TASK 1: **Basic of CorelDraw open a corelDraw X5 Software**

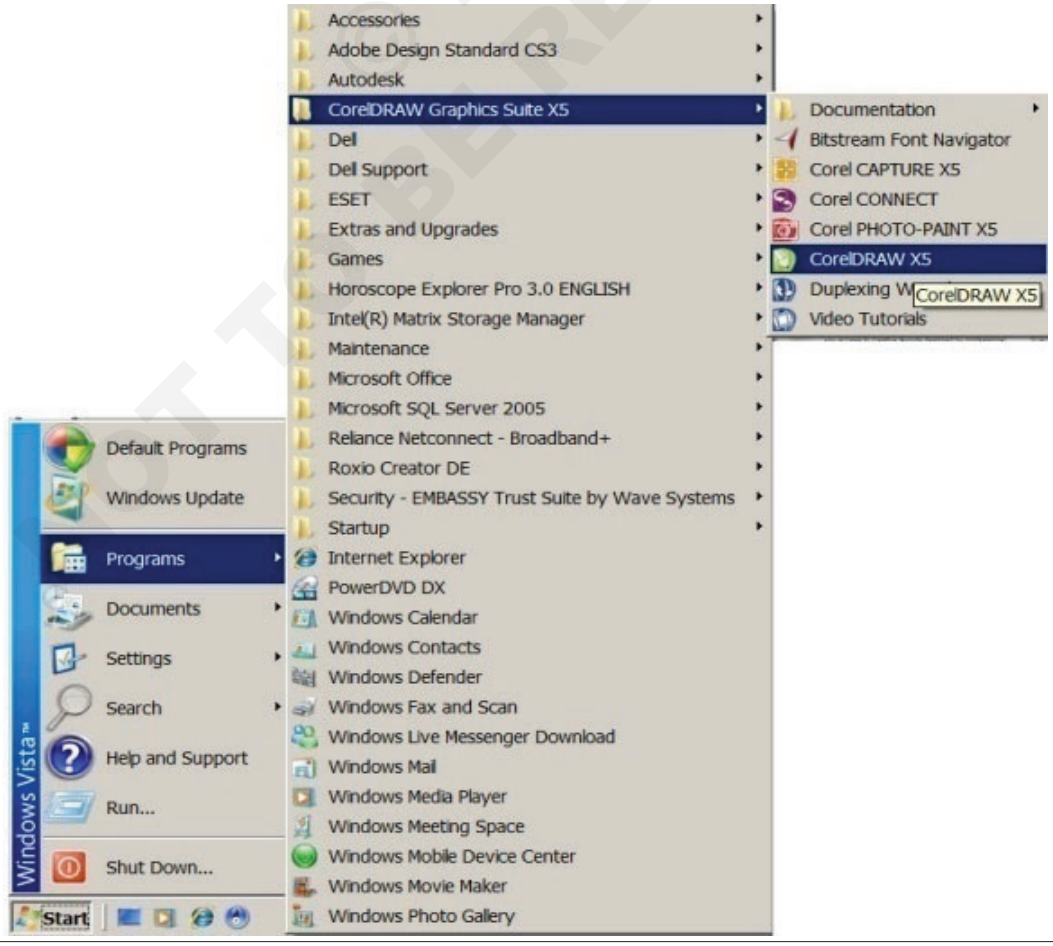
1 Click 'Start' Button  from the Task Bar

2 Select 'Programs' in the Popup Menu

3 Click the 'CorelDRAW Graphics Suite X5' in the Programs Menu.

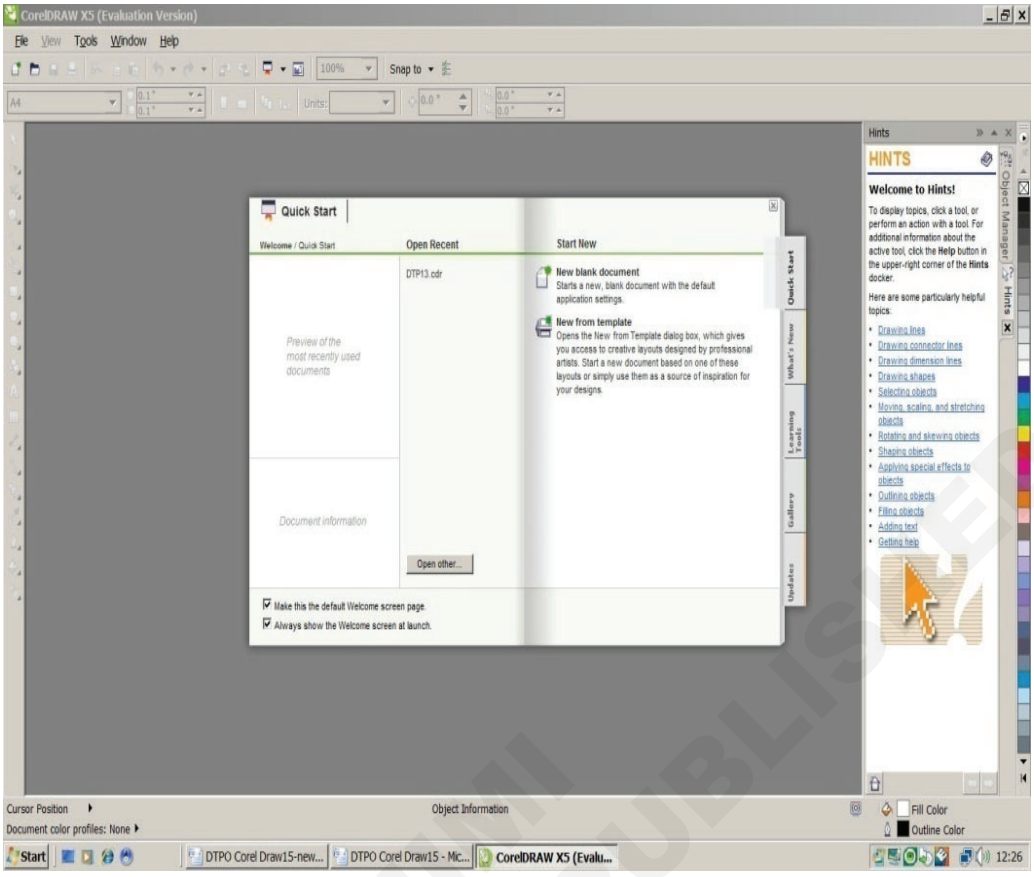
4 Click 'CorelDRAW X5'. The window will appear as shown in Fig.

Fig 1



5 A CorelDRAW X5 window will appear as shown in Fig.2

Fig 2



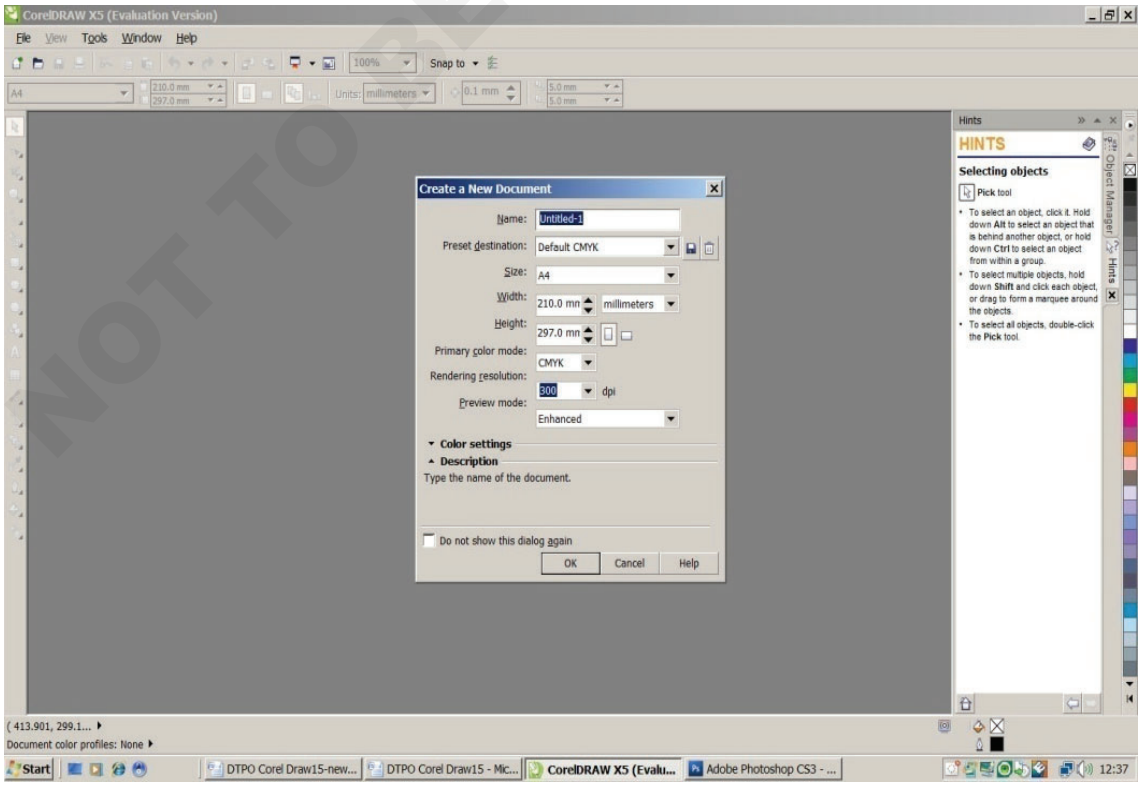
TASK 2 : **Create a New Drawing in CorelDRAW**

Method 1

1 Click on the Welcome Page, click Quick Start

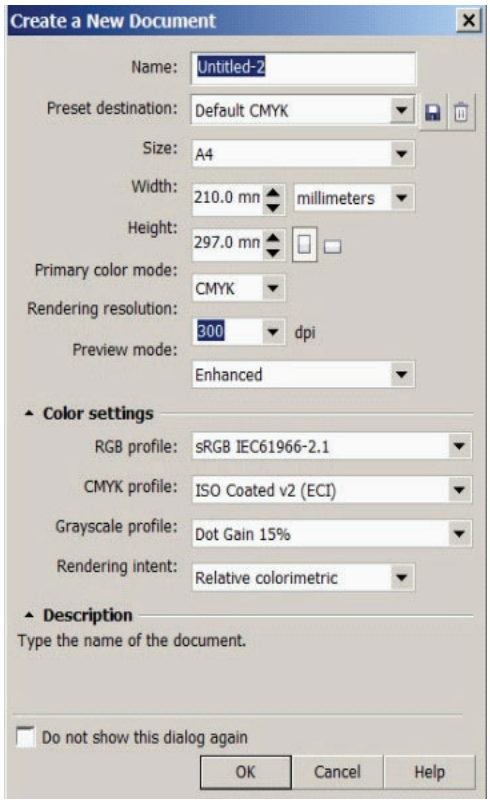
2 Click New blank document. The Window will appear as shown in Fig 3.

Fig 3



3 Type a filename in the Name text box. Will appear as shown in Fig 4.

Fig 4



4 Place the curser Preset destination list box,

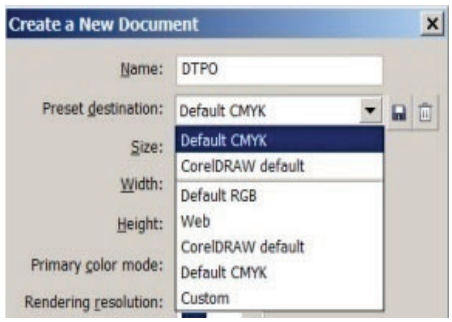
5 Click Pull down Menu, choose Default CMYK

This command applies settings for creating graphics that are destined for commercial printing). Will appear as shown in Fig 5.

6 Choose a unit of measurement in Centimeter from the Unit of measurement list box

You can also choose British and American Metric System such as Inches, Millimeters, Pica, Point, Pixels etc.

Fig 5



7 Place the curser in the Size tab box

8 Click Pull down Menu and Select A4 paper size

Create custom Page size type values in the width and height boxes.

9 Select Portrait button in the page orientation buttons (Portrait or Landscape)

10 Choose a color mode in CMYK at the primary color mode list box

11 Select a rendering resolution from the Rendering resolution list box

The rendering resolution for effects that will likely be rasterized, such as transparency, drop shadow, and bevel effects

12 Choose the Enhanced preview mode from the Preview mode list box

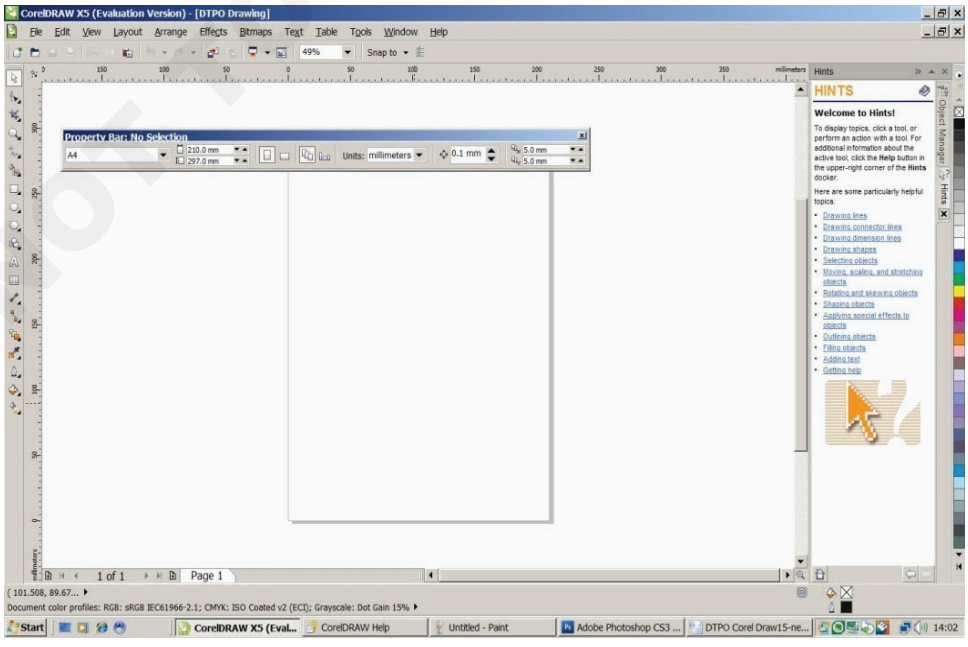
13 Select a default RGB profile from the RGB profile list box

14 Choose a default CMYK profile from the CMYK profile list box

15 Select a default Grayscale profile from the Grayscale profile list box

16 Click OK. The New Document will appear shown in Fig 6.

Fig 6



Method 2

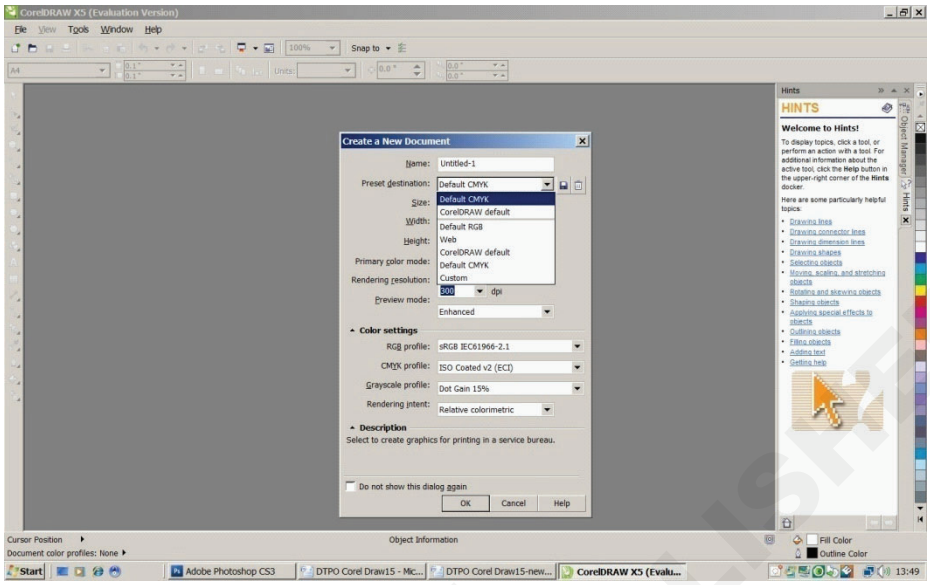
1 Click 'File Menu' in the Menu Bar

2 Select 'New' Menu (Press Ctrl +N from the Keyboard shortcut key). Will appear as shown in Fig 7.

3 Repeat the Step 3 to 16 in Task 2 of method 1

You can add and delete a destination preset by choosing the preset name from the Preset destination list box, and clicking the Remove preset button.

Fig 7

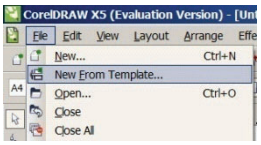


Method 3

1 Click 'File Menu' in the Menu bar

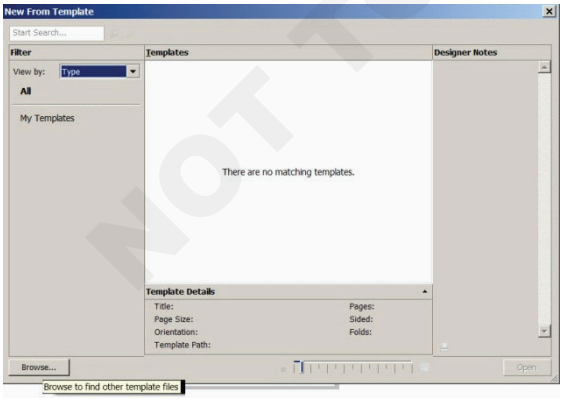
2 Select 'New from template' Menu. Will appear as shown in Fig 8.

Fig 8



3 Choose a template from the Templates list will appear as shown in Fig 9 (if the file is not appear in the Templates list go to the next step)

Fig 9

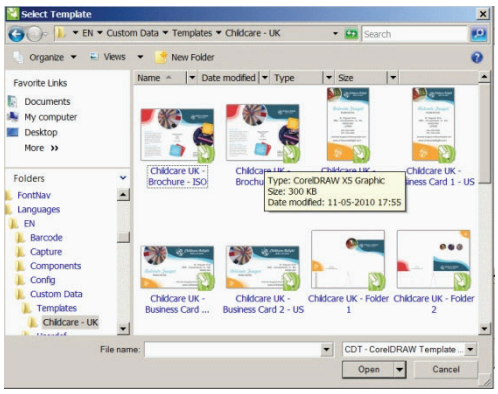


4 Click Brows to select specific Template file. Will appear as shown in Fig 10.

you can choose different Template files in the 'Browse' button (the Browse button will appear in Left bottom corner of the 'New from Template' dialog box)

5 Click Open.

Fig 10



TASK 3 : **Draw a given line drawing by using the Freehand Tool**

A line is a path between two points. Lines can consist of multiple segments, and the line segments can be curved or straight. The line segments are connected by nodes, which are depicted as small squares. CorelDRAW provides various drawing tools that let you draw curved and straight lines, and lines containing both curved and straight segments.

1 Select the 'Freehand Tool' in the Toolbox.

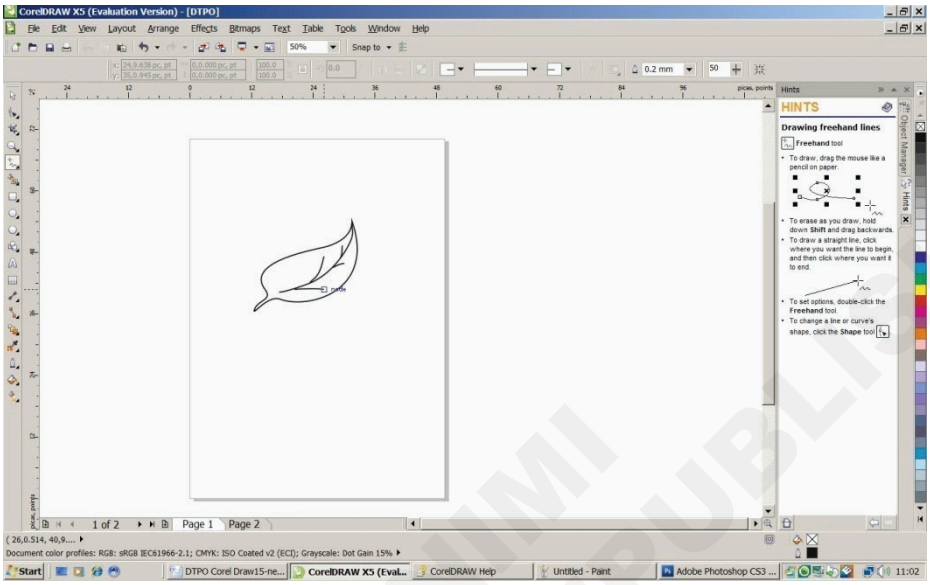
2 Click Centre of the Page to Draw drag the mouse like a pencil on paper

You can constrain a line created with the Freehand tool to a predefined angle, called a constrain angle, by holding down Ctrl while you drag. This feature is useful for drawing straight vertical and horizontal lines

3 Draw the Leaf in correct shape as shown in the Fig 11.

4 Release the mouse button

Fig 11

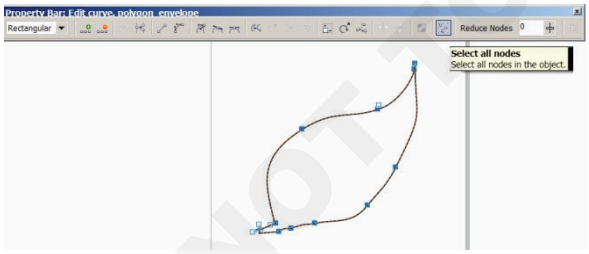


If the Shape is not correct you can erase as you draw hold down the Shift button on the keyboard and drag backwards.

5 Select 'Shape Tool' in the Toolbox

6 Choose 'All nodes button' in the Property bar, the object look like as shown in Fig 12.

Fig 12

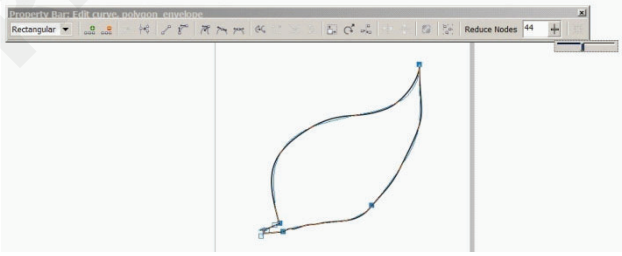


To reduce the number of nodes in the entire object, click the Select all nodes button on the property bar

To reduce the number of nodes in a part of a curve object, marquee select the part you want to change.

7 Click and Move the Curve smoothness slider. (Now the object look like as shown in Fig 13.

Fig 13



The number of nodes that are removed. Removing many nodes can reshape the curve object.

If the Shape is not in correct you can Add and delete a node by using the Shape Tool and Property bar.

8 Draw the Midrib and vein lines.

9 Correct shape of the Midrib and vein lines by using the Shape Tool

10 Click File Menu and Choose 'Save' the Document. The dialog box will appear in shown in figure.

Drawings are saved to the CorelDRAW file format (CDR) and are compatible with the latest version of the application. You can also save a drawing that is compatible with an earlier version of CorelDRAW Graphics Suite

11 Place the curser in the 'Save in' button and click pull down menu.

12 Choose the d: (d drive) and open 'DTPO' folder by double clicking the cursor in the DTPO folder.

13 Type file "DTPO Drawing" in the file name button.

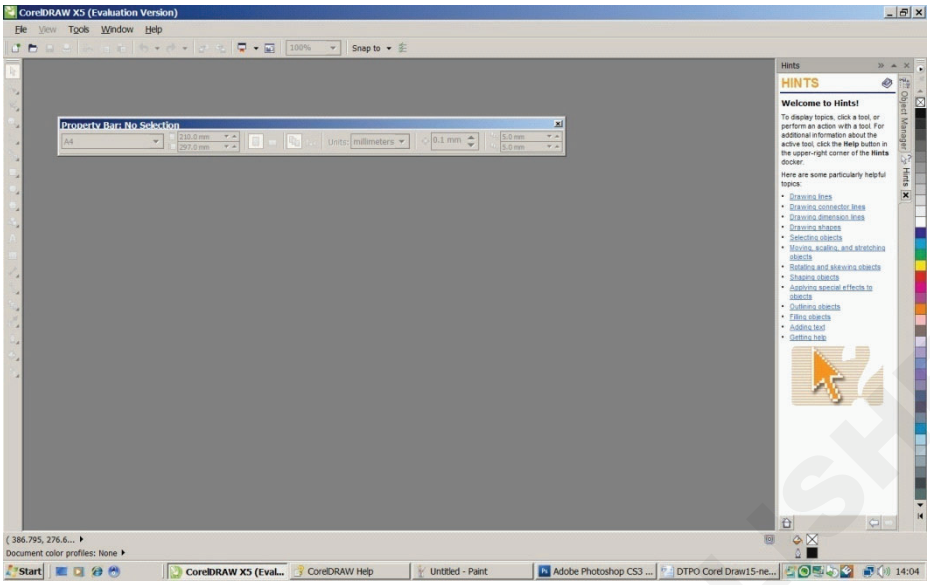
14 Click 'Save'. The file will appear shown in figure.

15 Close the "DTPO Drawing.cdr" by clicking the file menu and choose to 'close' will appear as shown as Fig 14.

16 Click File menu and choose 'Exit.

17 Check with the instructor.

Fig 14



TASK 4 : **Do the lab assignment**

1 Create a "New Document"

2 Repeat the Step 3 to 16 in Task 2 of method 1

3 Draw the own object by using Freehand Tool

4 Check with the instructor.

Create new photoshop document

Objectives: At the end of this exercise you shall be able to

- **install a Creative Suite 6 suite or stand-alone product from disc**
- **create, Open, and import images in Adobe Photoshop**
- **open a file with Adobe Bridge**
- **import images from a digital camera and scanner.**

TASK 1: **Create new photoshop document install a Creative Suite 6 suite or stand-alone product from disc**

1 Insert the Adobe Creative Suite 6 suite or stand-alone product Application DVD into your DVD drive.

2. Double-click Set-up.exe (Windows) or Install.app (Mac OS) to begin the installation.

Depending on your Autoplay settings in Windows, the Set-up.exe file can launch automatically.

3. Follow the onscreen instructions to complete the installation.

4. When prompted to enter a serial number, enter your Adobe Creative Suite 6 suite or stand-alone product serial number and complete the installation.

You must accept the license agreement and warranty terms to use this product. This product doesn't function without mandatory activation and registration via the Internet.

Adobe's single user license allows installation of a single product license on two machines (such as one work machine and one home machine) provided the same individual uses the software, and not concurrently on both machines.

If you want to install the product on a third computer, first deactivate the software on one computer. To deactivate, choose Help > Deactivate.

If your product is on multiple discs, wait for first disc to complete. Once completed, remove the first disc and insert the second disc in same DVD drive.

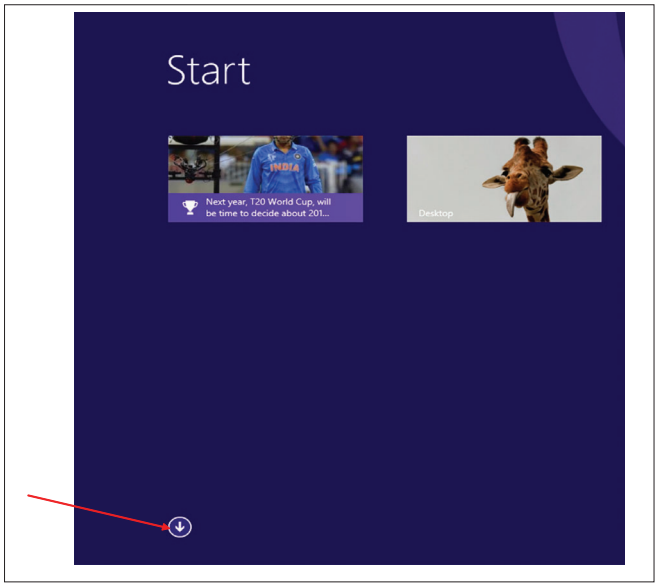
Requirements

- **Personal Computer with Windows 7 Professional Operating system (Latest Configuration) Suitable for the Adobe Photoshop CS6 Software**
- **Adobe Photoshop CS6 software (Latest version)**

TASK 2: **Create, Open, and import images in Adobe Photoshop**

Open a Adobe Photoshop CS6

1. Click 'Start' Button from the left corner of the Task Bar of the windows 8.1 version OS the down arrow will appear on the left bottom of the screen see the figure



2 Click the Down arrow and select the Adobe Photoshop CS6. See the figure and follow.

3 The Adobe Photoshop will appear as shown in the following figure

Create an image

1 Choose File > New.

2 In the New dialog box, type a name for the image.

3 (Optional) Choose document size from the Preset menu.

> **To create a document with the pixel dimensions set for a specific device, click the Device Central button.**

4 Set the width and height by choosing a preset from the Size menu or entering values in the Width and Height text boxes.

To match the width, height, resolution, color mode, and bit depth of the new image to that of any open image, choose a filename from the bottom section of the Preset menu.

5 Set the Resolution, Color Mode, and bit depth.

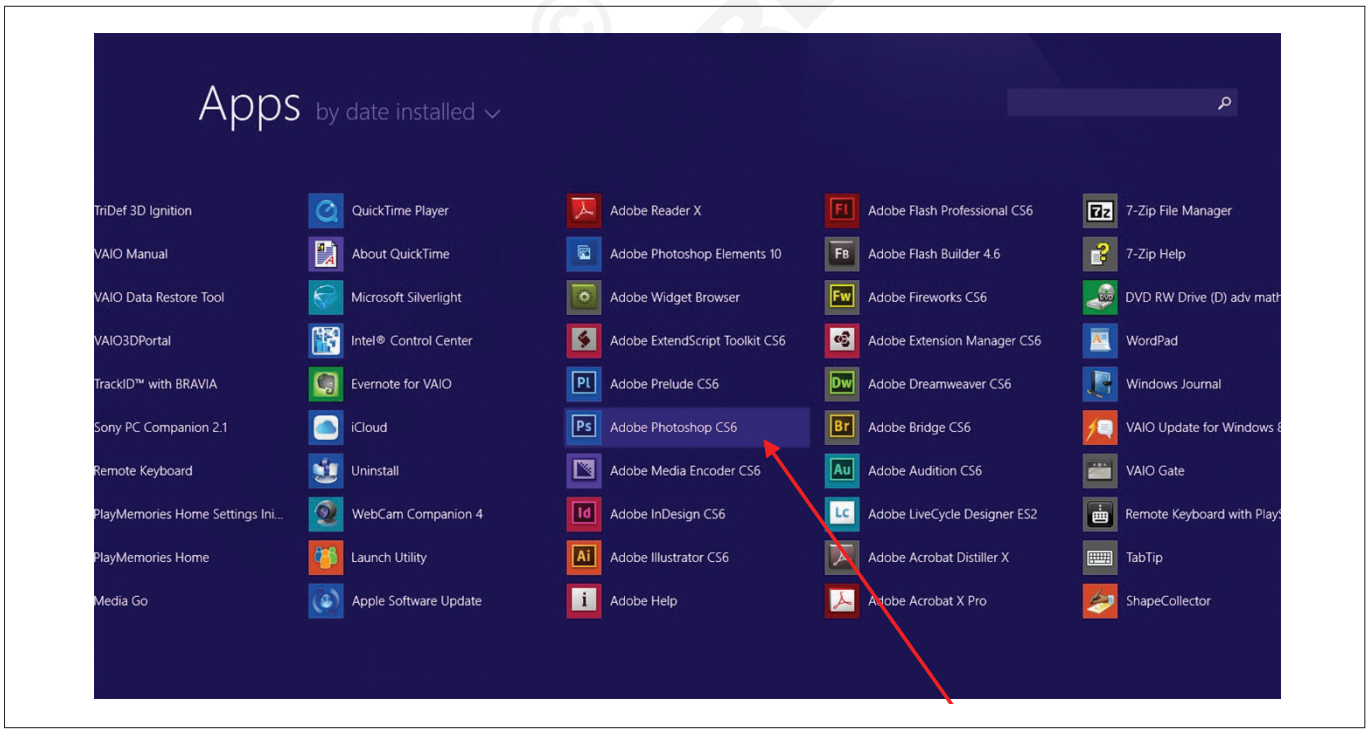
If you've copied a selection to the clipboard, the image dimensions and resolution are automatically based on that image data.

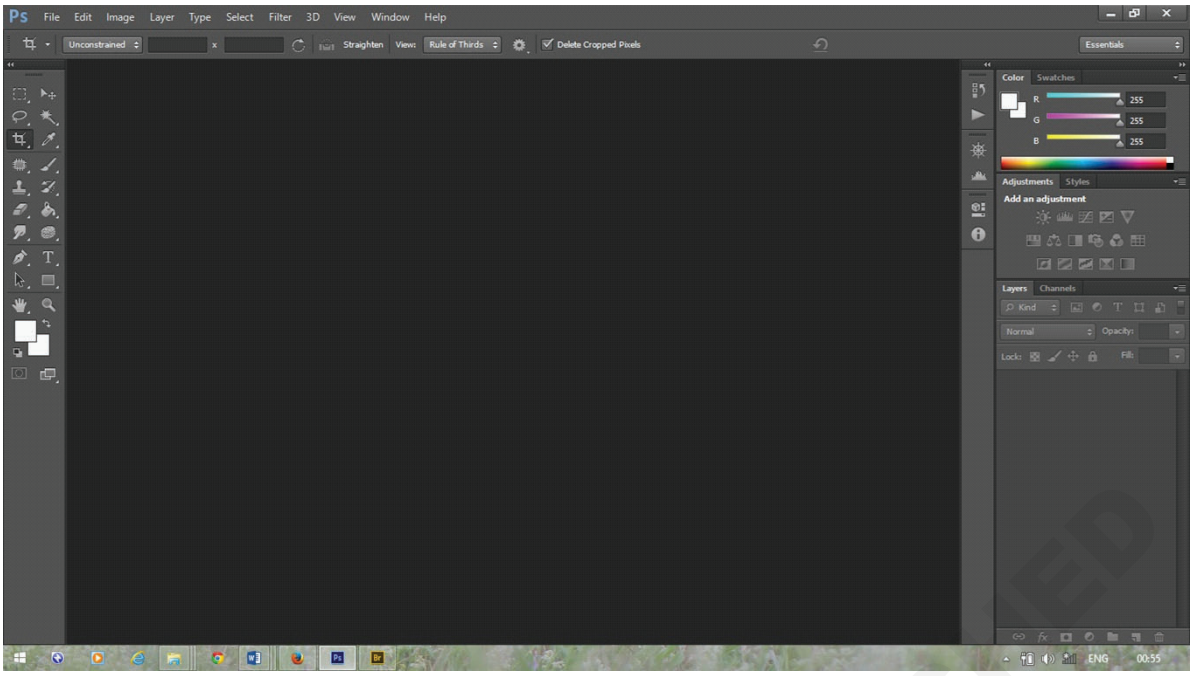
6 Select a canvas color option:

White Fills the background layer with white, the default background color.

Background Color Fills the background layer with the current background color.

Transparent Makes the first layer transparent, with no color values. The resulting document has a single, transparent layer as its contents.



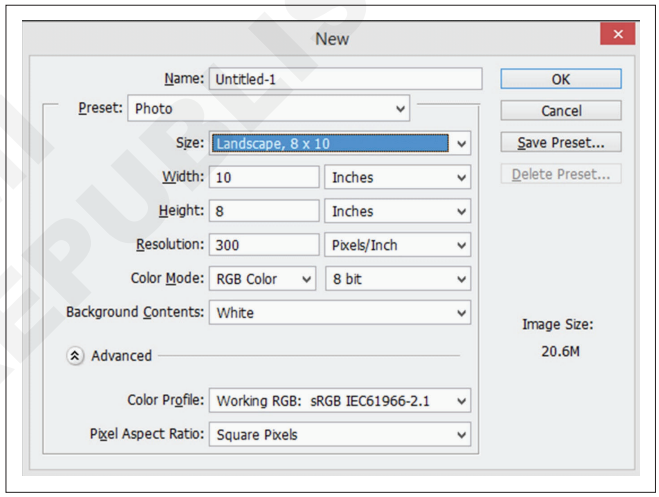


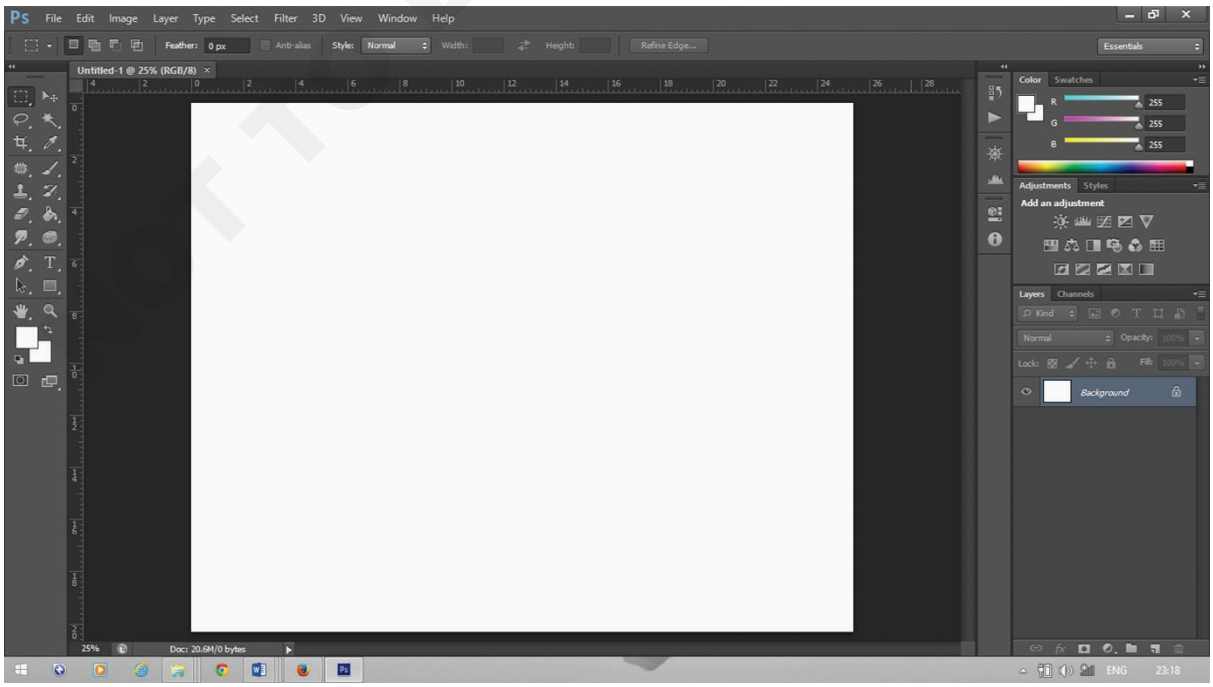
7 (Optional) If necessary, click the Advanced button to display more options.

8 (Optional) Under Advanced, choose a color profile, or choose Don't Color Manage This Document. For Pixel Aspect Ratio, choose Square unless you're using the image for video. In that case, choose another option to use nonsquare pixels.

9 When you finish, you can save the settings as a preset by clicking Save Preset, or you can click OK to open the new file. See the figure and follow the same option in the dialog box

10 The New Document will appear as shown in the following figure

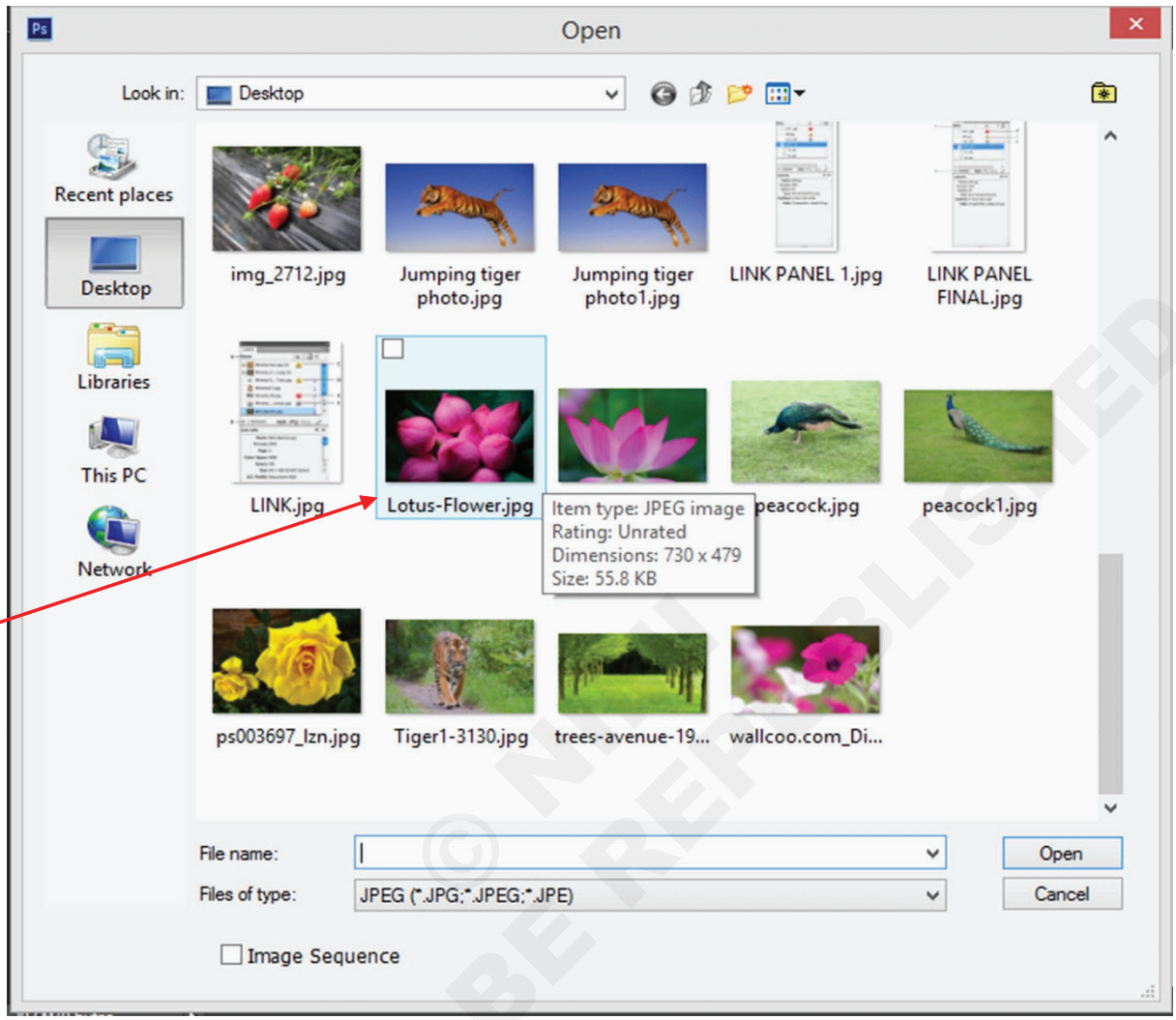




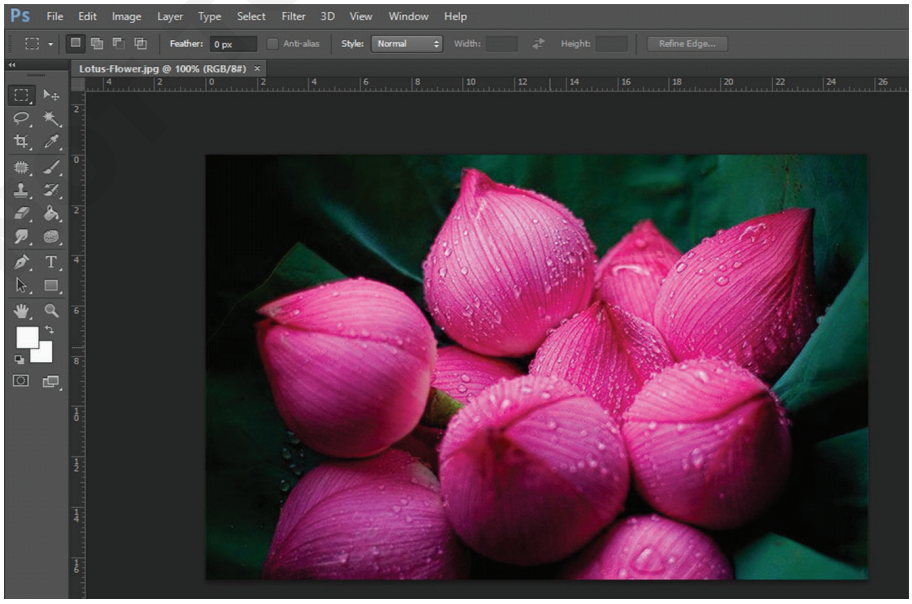
Open a file using the Open command 1 Choose File> Open.

Select the name of the file you want to open. If the file does not appear, select the option for showing all files from the Files of Type pop-up menu.

3 Click Open. In some cases, a dialog box appears, letting you set format-specific options. See the figure and follow the same option in the figure (select the image file from already saved in your computer or download from the web site.)



4 Click Ok button. The new document will appear as shown in the following figure.



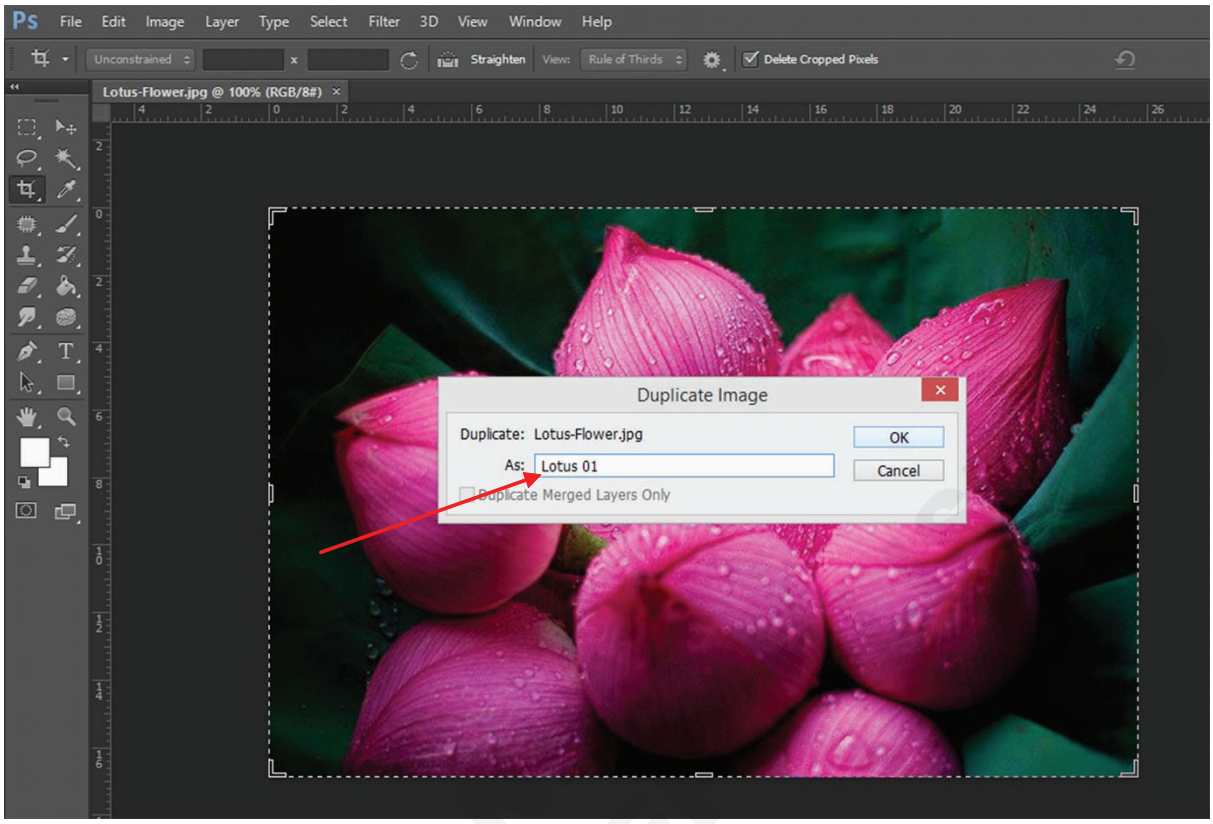
Duplicate an image

You can duplicate an entire image (including all layers, layer masks, and channels) into available memory without saving to disk.

1 Open the image you want to duplicate.

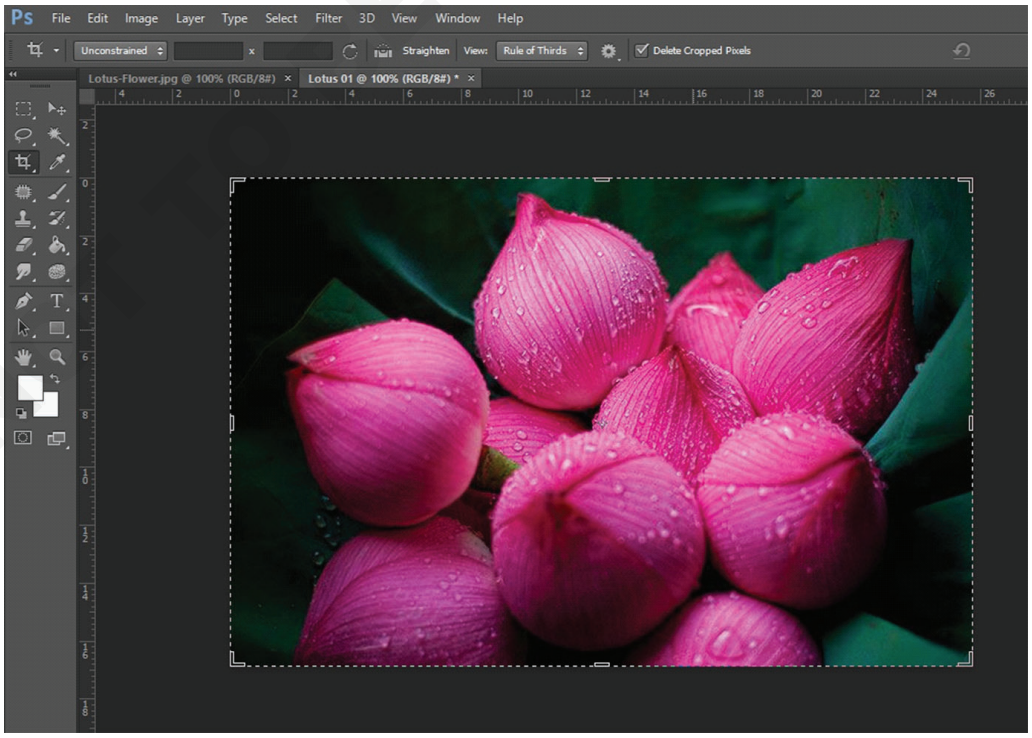
2 Choose Image > Duplicate.

3 Enter a name for the duplicated image. See the figure and follow.



4 If you want to duplicate the image and merge the layers, select Duplicate Merged Layers Only. To preserve the layers, make sure this option is deselected.

5 Click OK. The duplicate image document will appear as shown in the following figure.



Open a recently used file

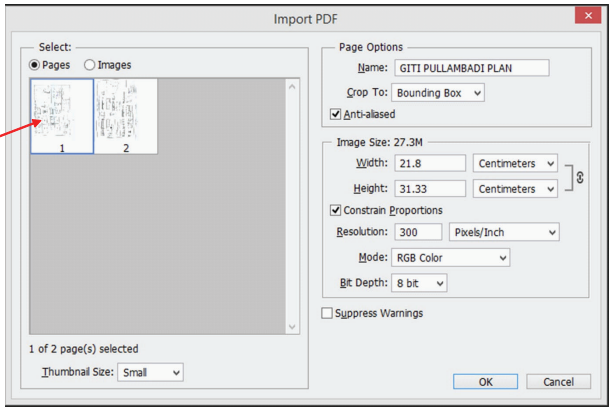
- Choose File > Open Recent, and select a file from the submenu.

Open PDF files

1 (Photoshop) Choose File > Open.

2 In the Open dialog box, select the name of the file, and click Open.

3 Under Select in the Import PDF dialog box, select Pages or Images, depending on what elements of the PDF document you want to import.



4 Click the thumbnails to select the pages or images you want to open. Shift-click to select more than one page or image. The number of selected items appears under the preview window. If you're importing images, skip to step 8.

Use the Thumbnail Size menu to adjust the thumbnail view in the preview window. The Fit Page option fits one thumbnail in the preview window. A scroll bar appears if there are multiple items.

5 To give the new document a name, type it in the Name text box. If you're importing more than one page or image, multiple documents open with the base name followed by a number.

6 Under Page Options, choose from the Crop To menu to specify what part of the PDF document to include:

Bounding Box Crops to the smallest rectangular region that includes all the text and graphics of the page. This option eliminates extraneous white space and any document elements outside the Trim Box.

Bounding Box will not crop white space that is part of a background created by the source application.

Media Box Crops to the original size of the page.

Crop Box Crops to the clipping region (crop margins) of the PDF file.

Bleed Box Crops to the region specified in the PDF file for accommodating limitations inherent in production processes such as cutting, folding, and trimming.

Trim Box Crops to the region specified for the intended finished size of the page.

Art Box Crops to the region specified in the PDF file for placing the PDF data into another application.

7 Under Image Size, enter values (if necessary) for Width and Height:

- To preserve the aspect ratio of the pages as they're scaled to fit within the rectangle defined by the Width and Height values, select Constrain Proportions.
- To scale the pages exactly to the Width and Height values, deselect Constrain Proportions. Some distortion might occur when the pages are scaled.

When more than one page is selected, the Width and Height text boxes display the maximum width and height values of the selected pages. All pages are rendered at their original size if Constrain Proportions is selected and you don't change the Width and Height values. Changing the values will scale all pages proportionately as they're rasterized.

8 Specify the following options under Image Size:

Resolution Sets the resolution for the new document.

Mode Sets the color mode for the new document.

Bit Depth Sets the bit depth for the new document.

The Width and Height values plus the Resolution determine the final pixel dimension of resulting document.

9 To suppress color profile warnings, select Suppress Warning.

10 Click OK. The image file will appear.

Open an EPS file

You can also bring PostScript artwork into Photoshop using the Place command, the Paste command, and the dragand-drop feature.

1 Choose File > Open.

Select the file you want to open, and click Open.

2 Indicate the desired dimensions, resolution, and mode. To maintain the same height-to-width ratio, select Constrain Proportions.

3 To minimize jagged lines at the edges of artwork, select Anti-aliased.

Change the screen mode

You can use the screen mode options to view images on your entire screen. You can show or hide the menu bar, title bar, and scroll bars.

To display the default mode (menu bar at the top and scroll bars on the side), choose View > Screen Mode > Standard Screen Mode. Or, click the Screen Mode button  in the Application bar, and select Standard Screen Mode from the pop-up menu.

or

To display a full-screen window with a menu bar and a 50% gray background, but no title bar or scroll bars, choose

View > Screen Mode > Full Screen Mode With Menu Bar. Or, click the Screen Mode button in the Application bar, and select Full Screen Mode With Menu Bar from the pop-up menu.

or

To display a full-screen window with only a black background (no title bar, menu bar, or scroll bars), choose View > Screen Mode > Full Screen Mode. Or, click the Screen Mode button in the Application bar, and select Full Screen Mode from the pop-up menu.

Use the Navigator panel

You use the Navigator panel to quickly change the view of your artwork using a thumbnail display. The colored box in the Navigator (called the proxy view area) corresponds to the currently viewable area in the window.

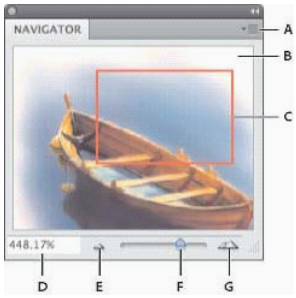
To display the Navigator panel, select Window > Navigator.

or

To change the magnification, type a value in the text box, click the Zoom Out or Zoom In button, or drag the zoom slider.

or

To move the view of an image, drag the proxy view area in the image thumbnail. You can also click the image thumbnail to designate the viewable area.

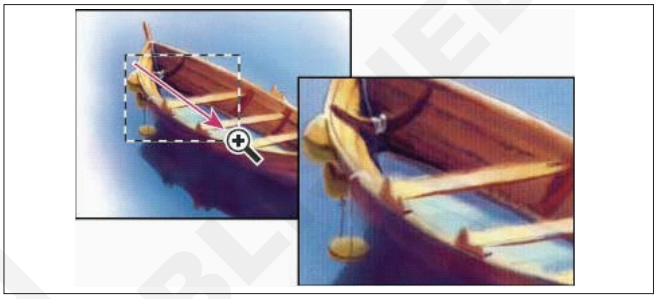


A Panel menu button **B** Thumbnail display of artwork **C** Proxy preview area **D** Zoom text box **E** Zoom Outbutton **F** Zoom slider **G** Zoom Inbutton

Magnify a specific area

1 Select the Zoom tool.

2 Drag over the part of the image that you want to magnify.



The area inside the zoom marquee is displayed at the highest possible magnification. To move the marquee around the artwork in Photoshop, begin dragging a marquee and then hold down the spacebar.

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TASK 3: **Opening a file with Adobe Bridge**

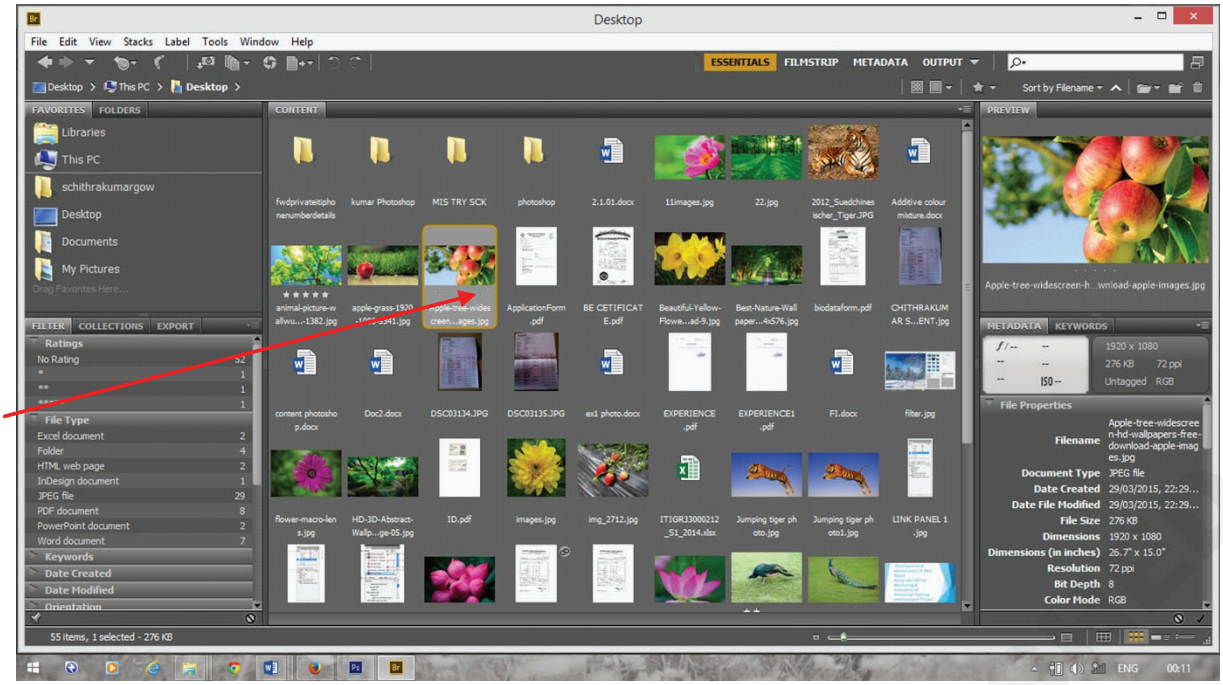
1 Choose File > Browse In Bridge. If you're prompted to enable the Photoshop extension in Bridge, click OK.

2 Select the Folders tab in the upper left corner, and then browse to the particular folder you copied from the DVD onto your hard disk.

3 Select the specify folder, and choose File > Add To Favorites. Adding files, folders, application icons, and other assets that you use often to the Favorites panel lets you access them quickly.

4 Select the Favorites tab to open the panel, and click the particular folder to open it. See the figure and follow.

5 Select and double click image. The image file window will appear in the Adobe Photoshop.



TASK 4: **Import images from a digital camera, and Scanner**

Import images from a digital camera using WIA (Windows only)

Certain digital cameras import images using Windows Image Acquisition (WIA) support. When you use WIA, Photoshop works with Windows and your digital camera or scanner software to import images directly into Photoshop.

1 Choose File > Import > WIA Support.

2 Choose a destination in which to save your image files on your computer.

3 Make sure that Open Acquired Images in Photoshop is selected. If you are importing a large number of images, or if you want to edit the images later, deselect Open Acquired Images.

4 To save the imported images directly into a folder whose name is the current date, select Unique Subfolder.

5 Click Start.

6 Select the digital camera from which to import images.

If the name of your camera does not appear in the submenu, verify that the software and drivers were properly installed and that the camera is connected.

7 Choose the image or images you want to import:

- Click the image from the list of thumbnails to import the image.
- Hold down Shift and click multiple images to import them at the same time.
- Click Select All to import all available images.

8 Click Get Picture to import the image.

Import images using a TWAIN interface

TWAIN is a cross-platform interface for acquiring images captured by certain scanners, digital cameras, and frame grabbers.

1 Install the TWAIN software provided by the device manufacturer.

2 Download the Photoshop TWAIN plug-in for Windows

3 Choose File > Import, and select the device you want to use from the submenu.

Import images using a WIA interface (Windows only)

1 Choose File > Import > WIA Support.

2 Choose a destination on your computer for saving your image files.

3 Click Start.

4 Select Open Acquired Images In Photoshop (unless you have a large number of images to import, or if you want to edit the images at a later time).

5 Select Unique Subfolder if you want to save imported images in a folder named with the current date.

6 Select the scanner that you want to use.

If the name of your scanner does not appear in the submenu, verify that the software and drivers were properly installed and that the scanner is connected.

7 Choose the kind of image you want to scan: Color Picture, Grayscale Picture, or Black And White Picture or Text.

8 To specify custom settings, select Adjust The Quality Of The Scanned Picture.

9 Click Preview. If necessary, drag the handles of the bounding box to adjust the size of the crop.

10 Click Scan.

The scanned image is saved in BMP format.

Sketch up 3D's max

Objectives: At the end of this exercise you shall be able to

- **install a creative sketch up 3D's max software.**

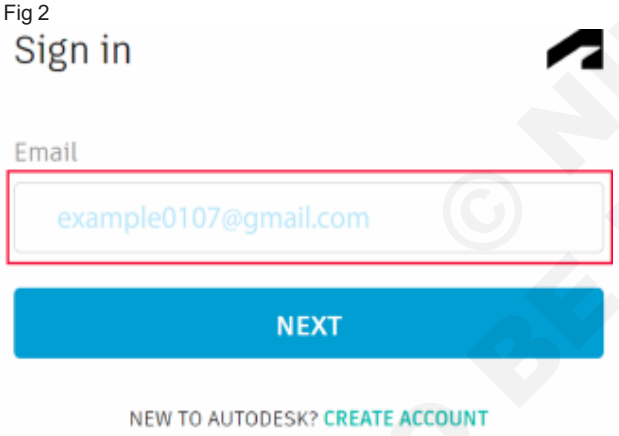
TASK 1: **Sketch up 3D's max install a creative sketch of 3D's max**

Step 1: Go to the Autodesk 3ds Max education page.

Fig 1

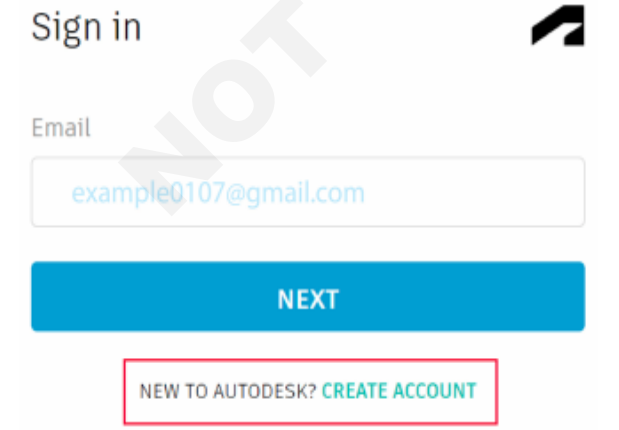
Step 2: Sign in to an existing Autodesk account using your e-mail address and password.

Fig 2



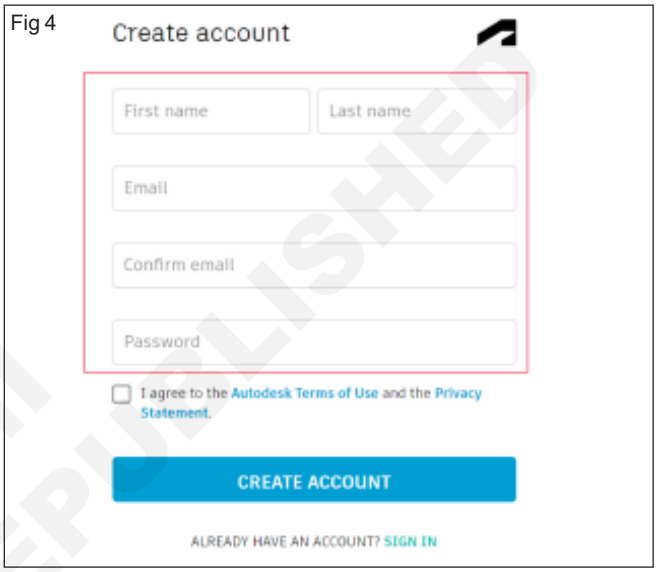
Step 3: If you don't have account then click create.

Fig 3



Step 4: Fill all the details

Fig 4

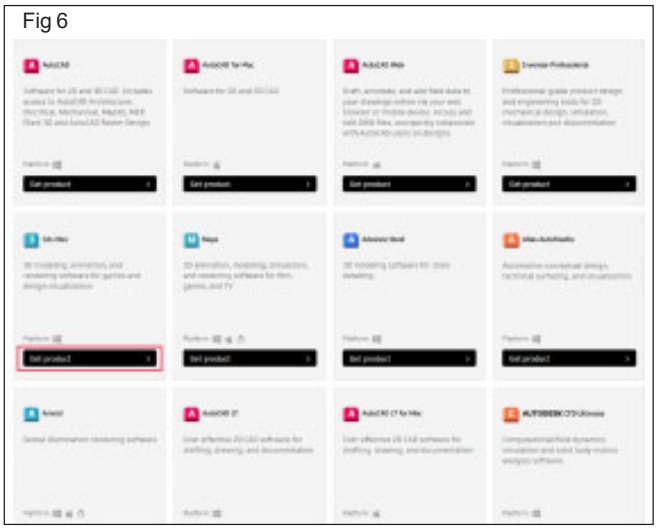


Step 5: Sign in to get the educational access.

Fig 5

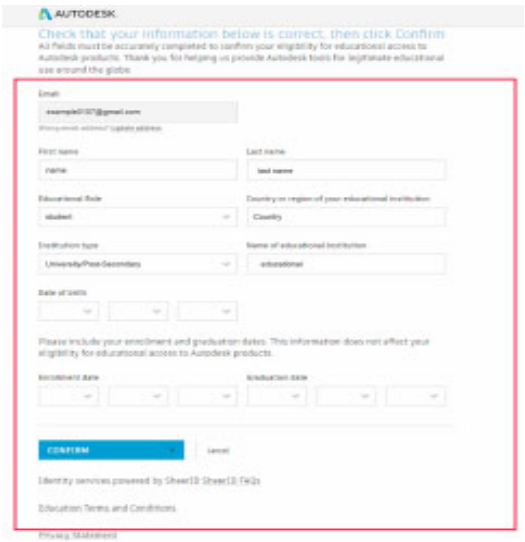
Step 6: Select get started to download the software.

Fig 6



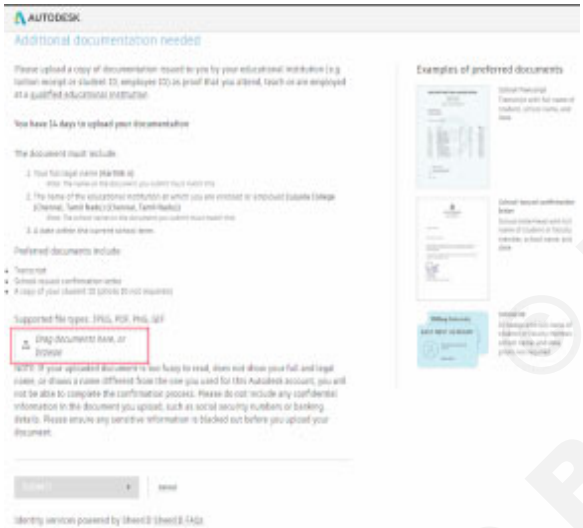
Step 7: Check all the details and click confirm.

Fig 7



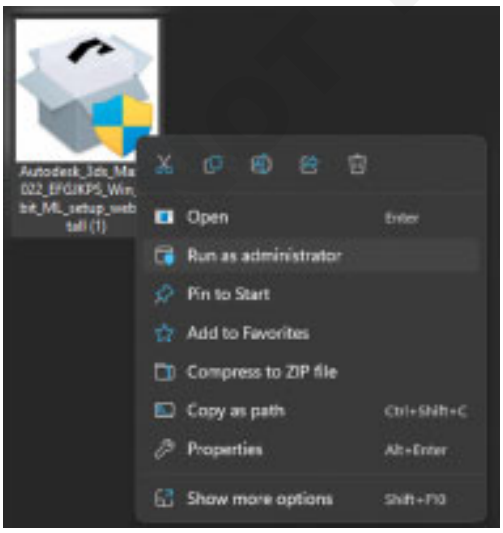
Step 8: Upload your student ID card photo.

Fig 8



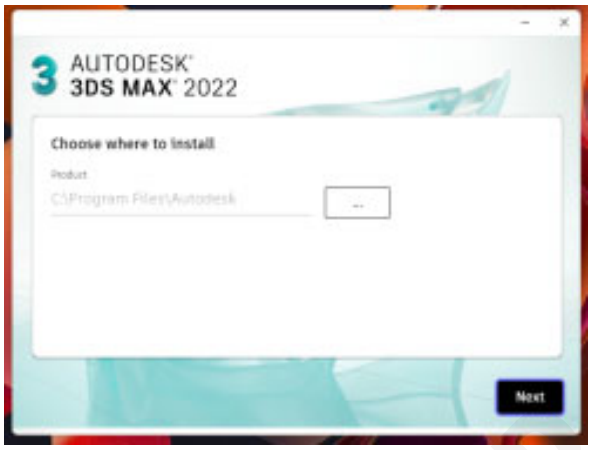
Step 9: Right click on the download setup file and run it in administer.

Fig 9



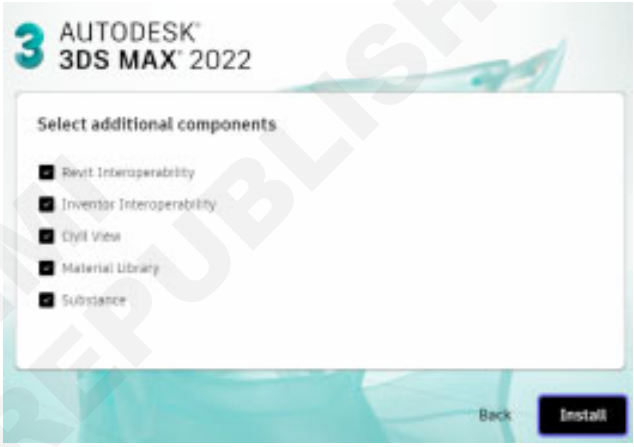
Step 10: Choose where to install.

Fig 10



Step 11: Select necessary components and click install.

Fig 11

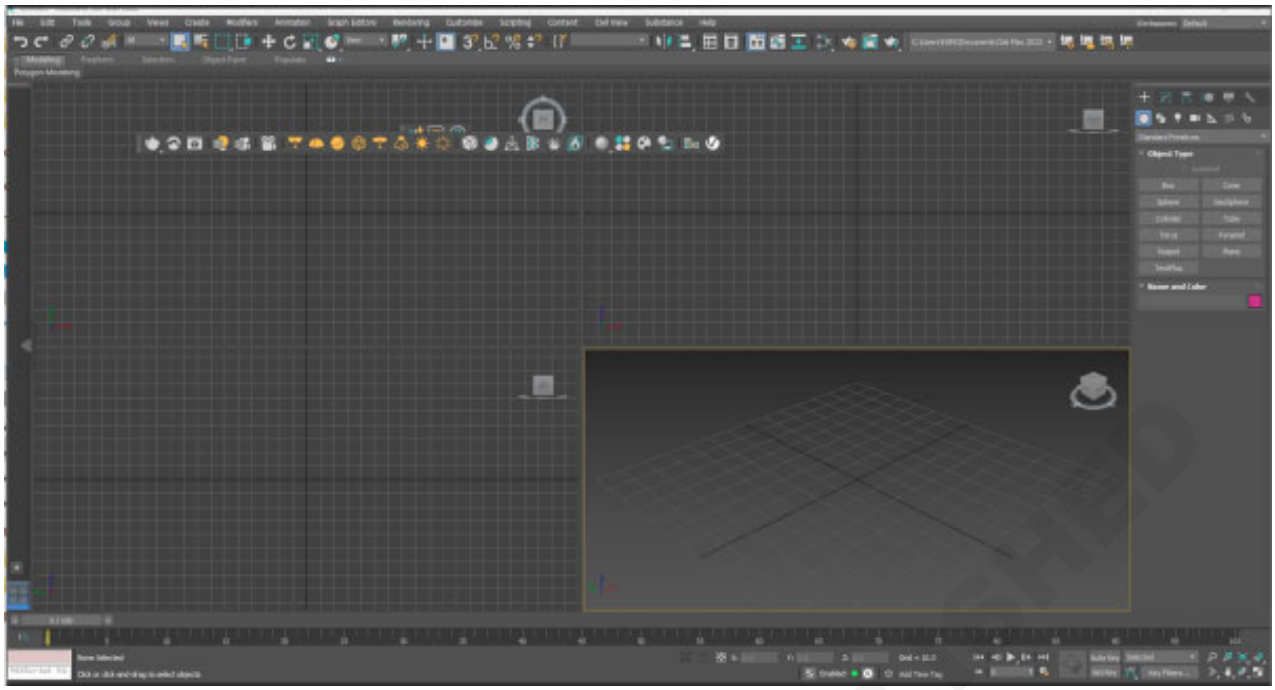


Step 12: Click start to run the software.

Fig 12

Step 13 : Installation completed.

Fig 13



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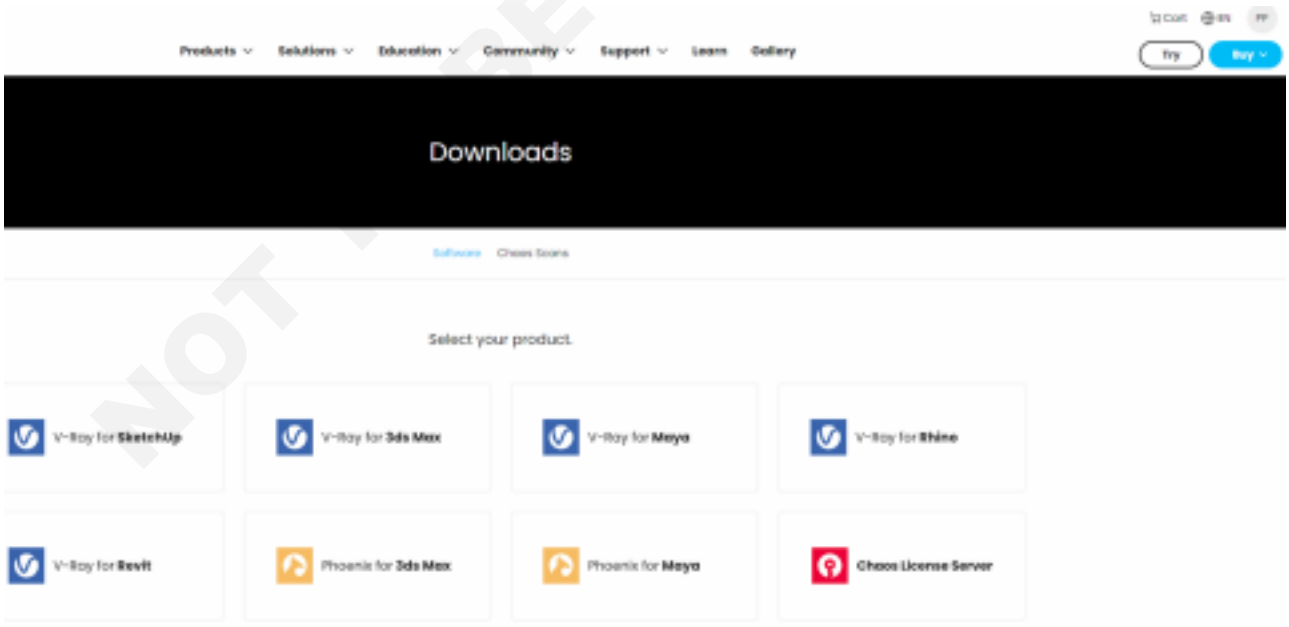
V - ray Software

Objectives: At the end of this exercise you shall be able to
- **install a creative use V-ray software.**

TASK 1: **Install and use V-ray software**

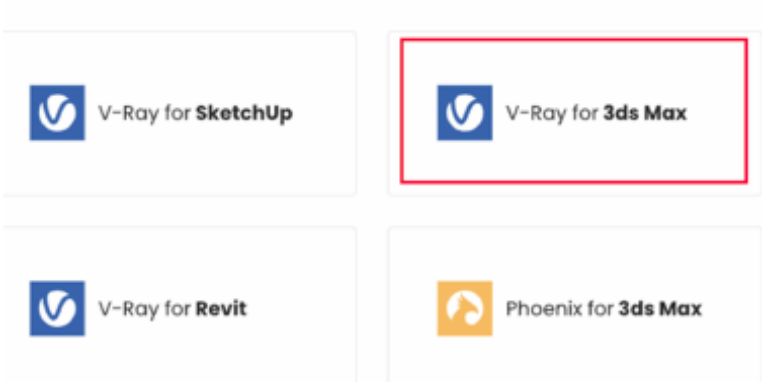
Step 1: Go to http://download.chaos.com/

Fig 1



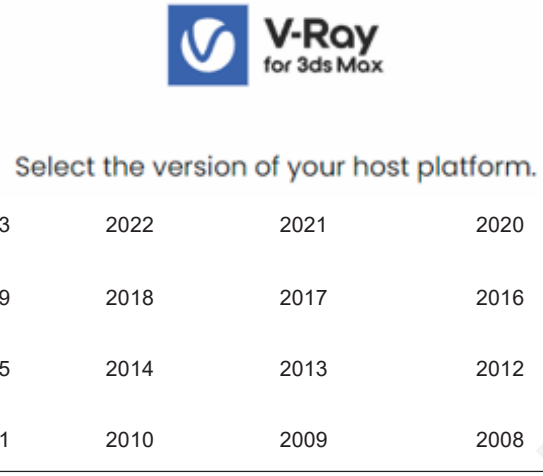
Step 2: Select V-Ray 3D's Max

Fig 2



Step 3: Select the version according to your need.

Fig 3

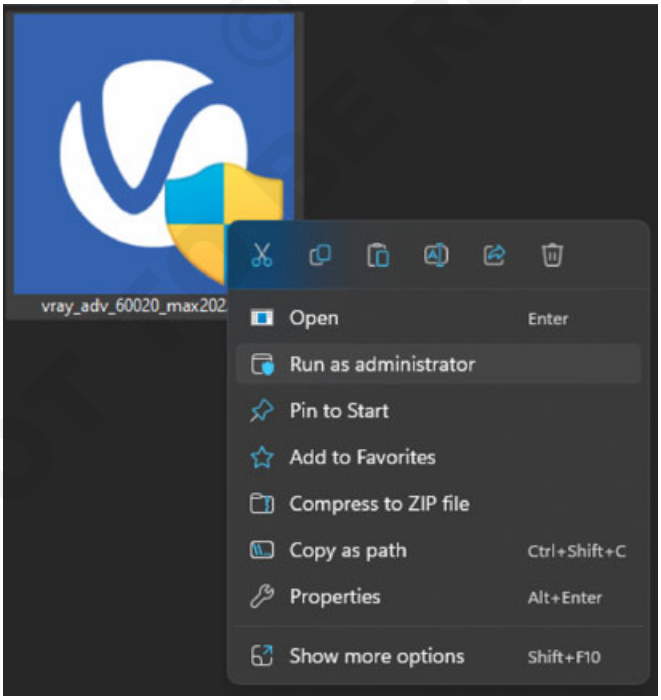


Step 4: Select download

Fig 4

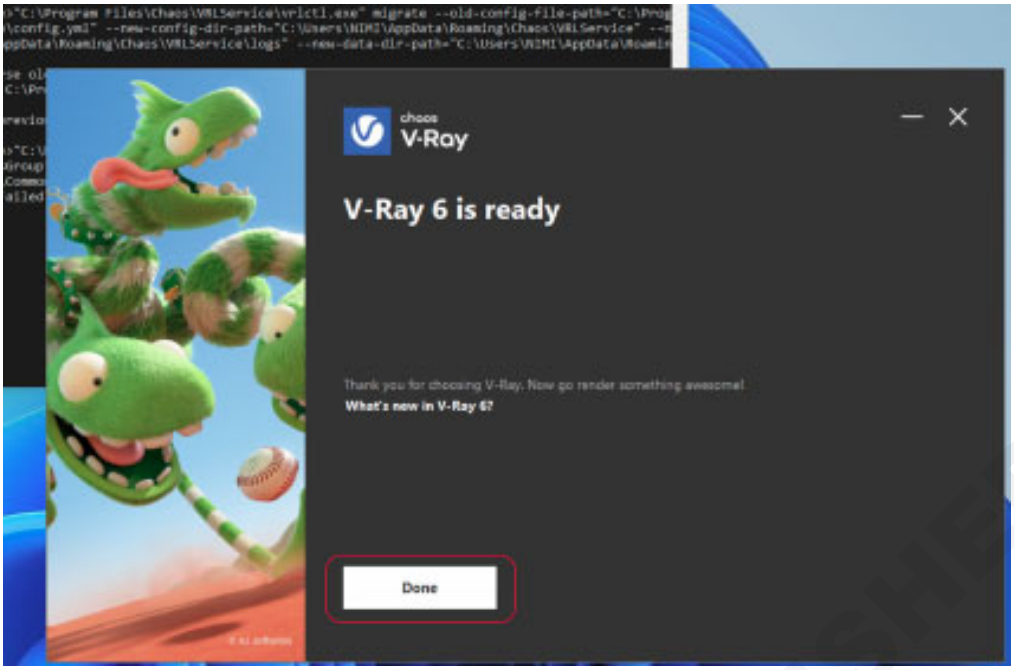
Step: 5: Right click on the download setup file and run it in administrator.

Fig 5



Step 6: Installation completed.

Fig 6

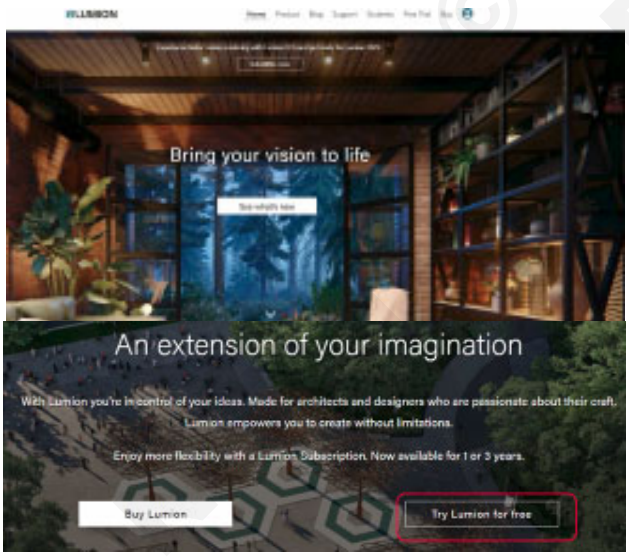


Create new lumion software

Objectives: At the end of this exercise you shall be able to
- **install a creative new lumion software.**

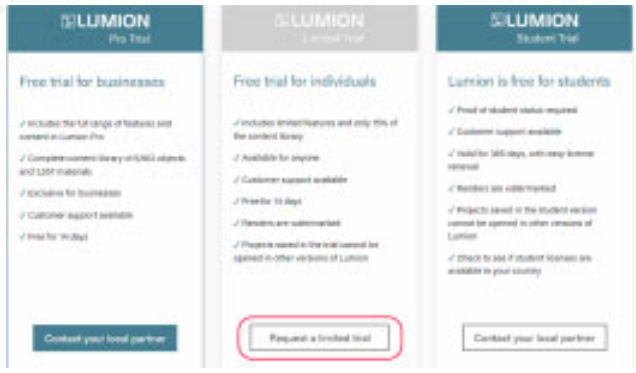
Step 1: Go LUMION official page then select try lumion free

Fig 1



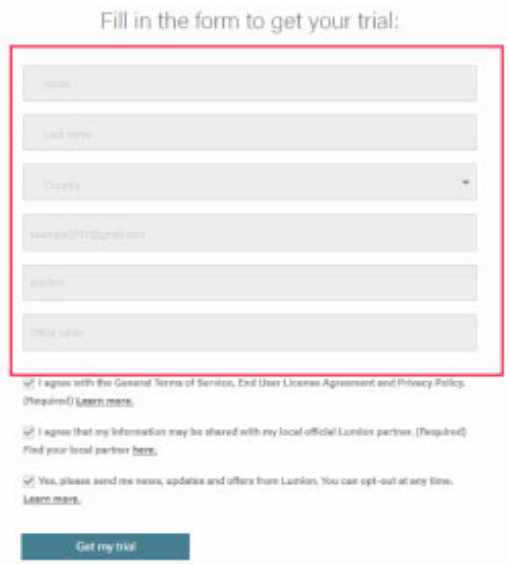
Step 2: Select request a limited trail

Fig 2



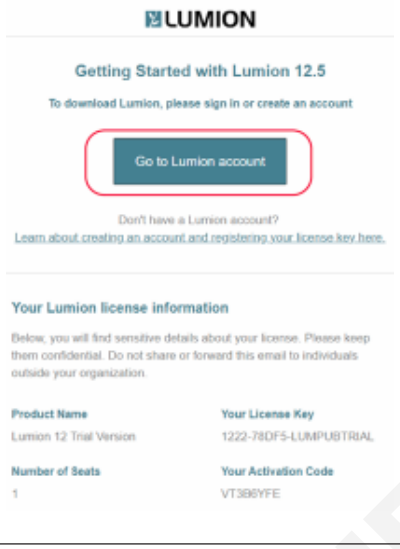
Step 3: Fill all the details

Fig 3



Step 4: Go to Lumion account

Fig 4

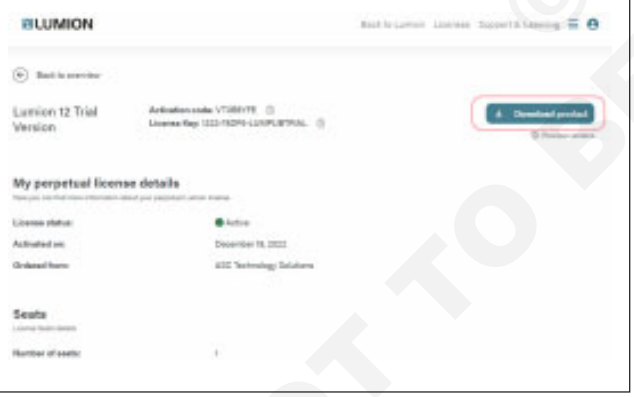


Step 5: Click view more to download the product

Fig 5

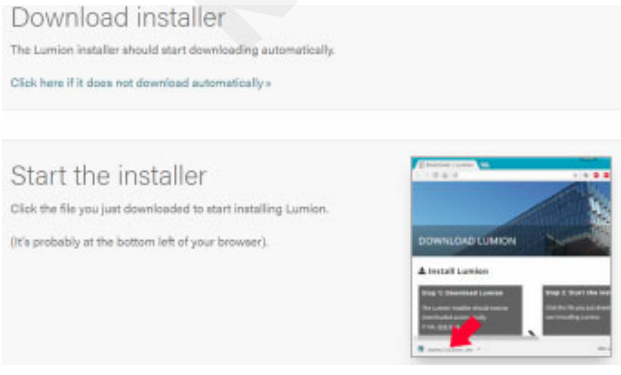
Step 6: Download the product

Fig 6



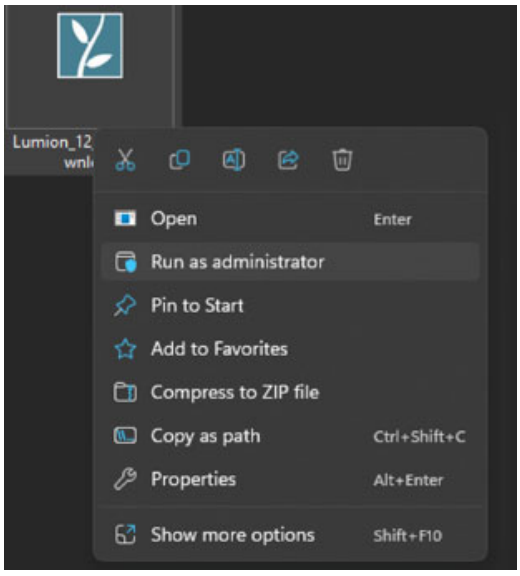
Step 7: Download Lumion installer

Fig 7



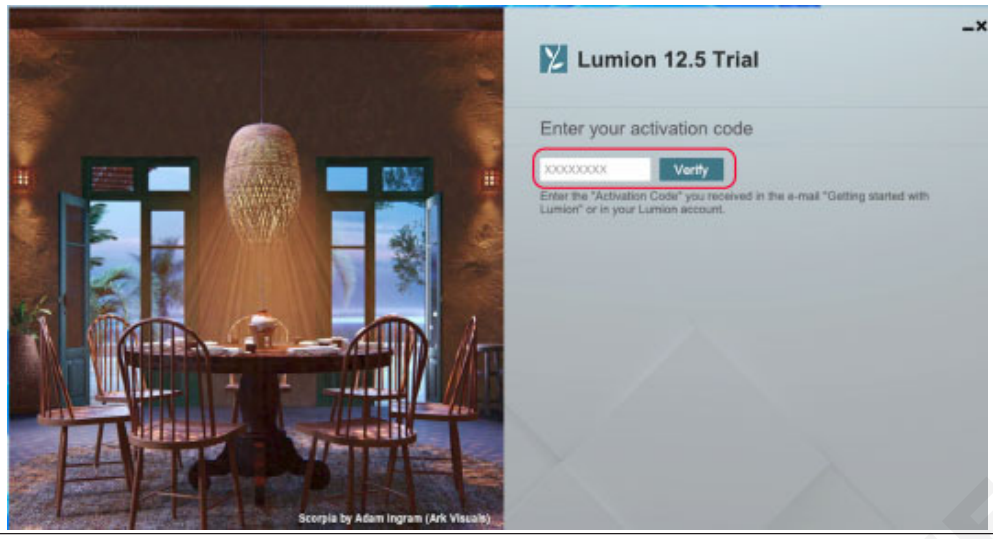
Step 8: Right click on the download setup file and run it in administrator.

Fig 8



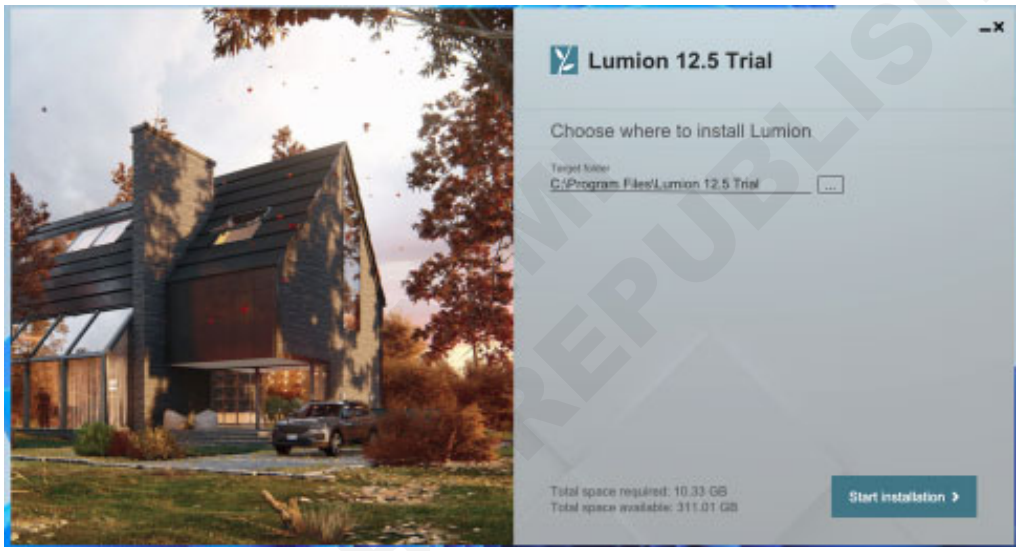
Step 9: Enter the Activation code you received in the e-mail.

Fig 9



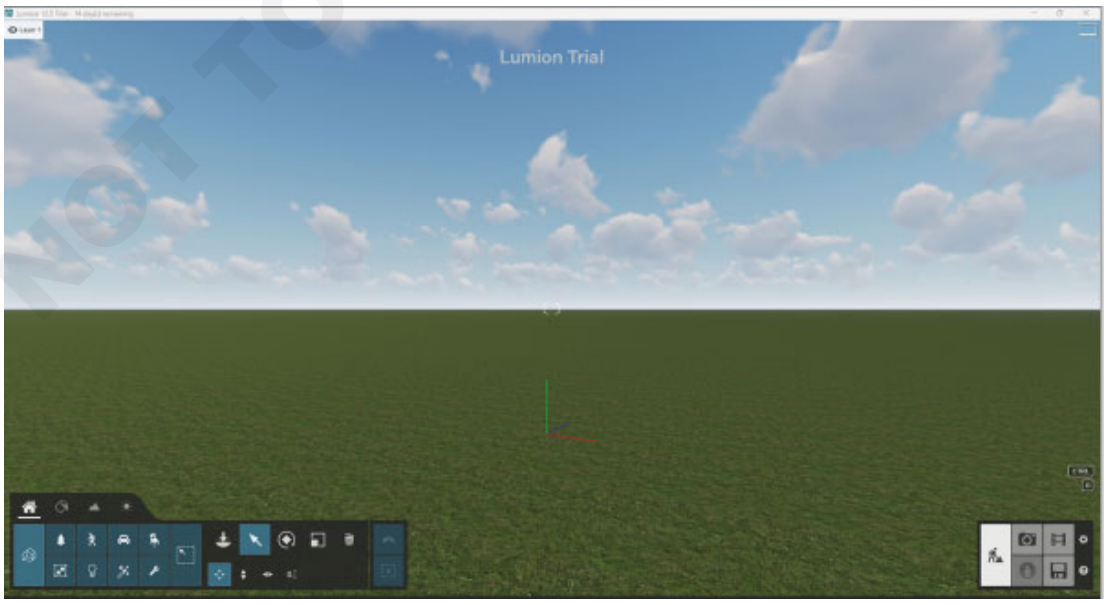
Step 10: Download Lumion installer

Fig 10



Step 11: Software successfully installed

Fig 11



Prepare the power point skill presentation

Objectives: At the end of this exercise you shall be able to
- **open a power point and create a new document**
- **familiarize different power point screen components.**

TASK 1 : **Open a Power point and creat a new document**

1 Boot the system, if not booted

2 Click Start Button

3 Select Programs

4 Click Microsoft Power Point. (Fig 1)

5 PowerPoint window will open (Fig 2)

Requirements

A working PC with MS Office 2007

Fig 1

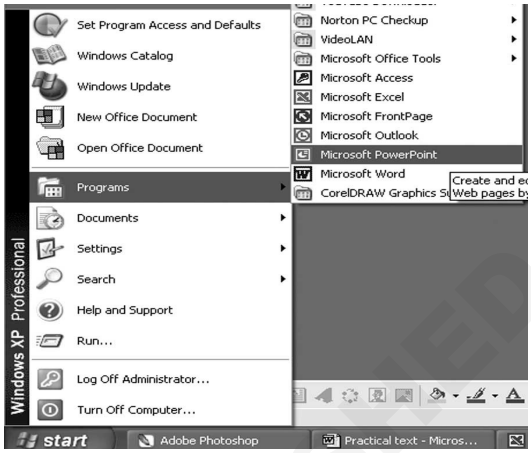
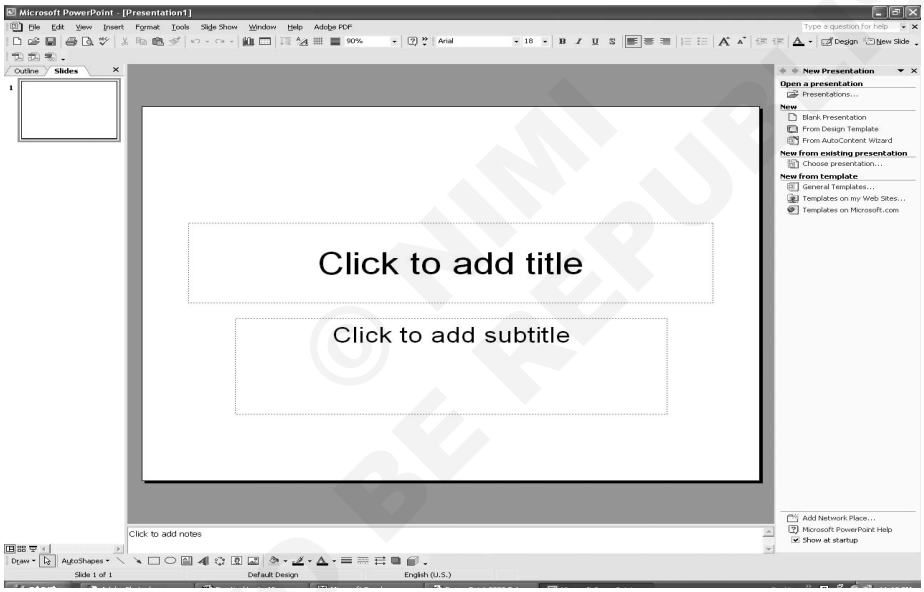


Fig 2



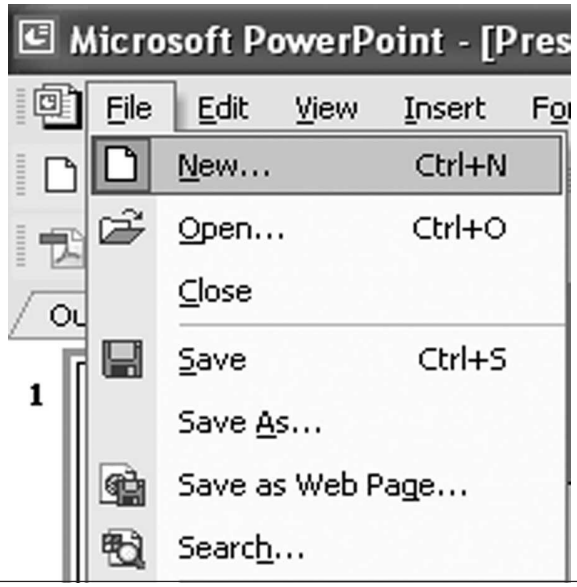
Create a New Presentation (Fig 3)

1 Choose File Menu

2 Click New option (Short cut key : Ctrl + N)

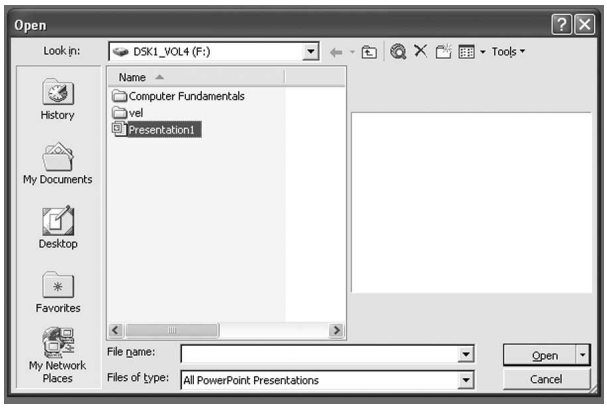
3 Created a New presentation

Fig 3



TASK 2 : **Familiarize different Power point screen components. (Fig 1)**

Fig 1



1 Choose Fie Menu

2 Click Open option which displays,

3 existing presentation.

4 Choose any one presentation " presentation1"

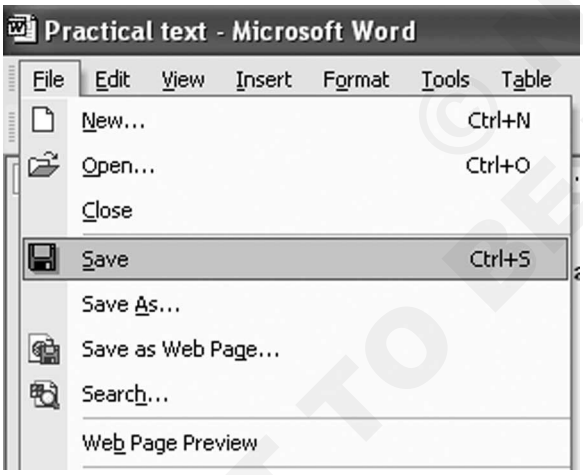
5 Click Open button to open the presentation 1'

Save a current Presentation

1 Choose File menu

2 Click Save option (Fig 2)

Fig 2



3 Displayed Save as window

4 Type the name of the presentation "sample" (Fig 3)

5 Choose saving location

6 Click save button

7 Saved current presentation "sample" (Fig 4)

Close the current presentation:

1 Choose file menu

2 Click Close option

3 Closed current presentation

Fig 3

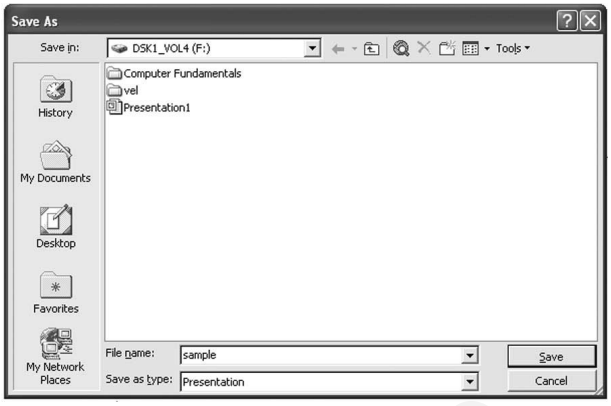
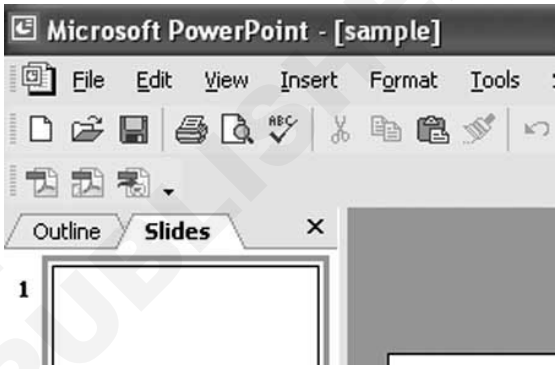


Fig 4

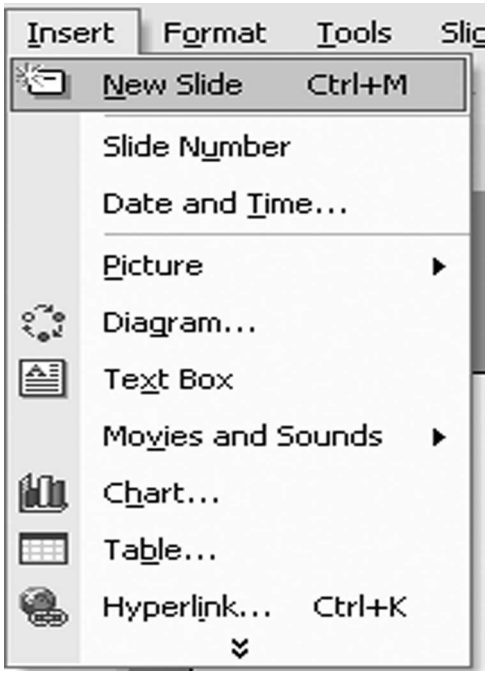


Insert a New Slide

1 Choose Insert Menu

2 Click New Slide (Short cut key : Ctrl + M). (Fig 5)

Fig 5



Prepare the power point animated presentation

Objectives: At the end of this exercise you shall be able to
- **insert a simple animation to text**
- **arrange timing for each animation**
- **set transition between slides.**

Requirements

Tools/Equipments/Instruments

- A working Computer with MS Office 2007 - 1 No.

PROCEDURE

TASK 1: **Insert a simple animation to text**

1 When the Slide 1 Normal View screen appears,

2 click on the first line of text.

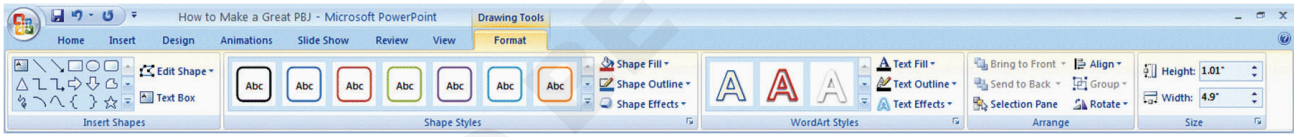
3 The first Text Box will appear as below. (Fig 1)

4 When you see the above Text Box, highlight the text. When you do, you will again see the Drawing Tools Tab appear.

5. Click the Drawing Tools Tab and the Drawing Tools Ribbon will again appear - just like it did for WordArt. (Fig 2)

Fig 1

Fig 2



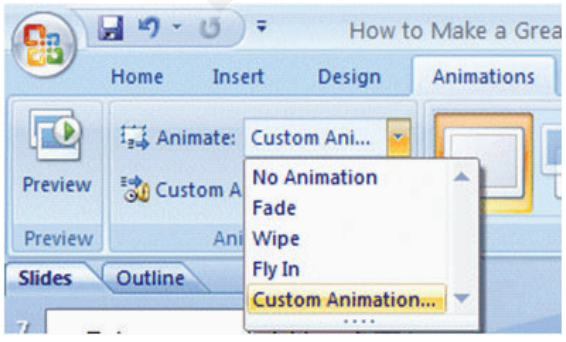
Arrange timings for each animation

1 Click the Animations Tabagain,

2 Thenclick the down triangle to the right of Custom Ani….

3 When the drop down menu appears click Custom Animation… (Fig 3)

Fig 3



4 The following Custom Animation Task Pane will appear on the your screen.When this screen appears, first, click Add Effect,Then click Entrance, and finally click More Effects (because we want ALL of the effects). (Fig 4)

5 The Add Entrance Effect menu screen will appear. (Fig 5)

6 Move your cursor over the blue Add Entrance Effect "bar" at the top of the menu screen. Click and hold down the left mouse button and drag the menu screen to the right of your screen so that you can see the textin the Title text box. After you have moved this box raise your finger from the left mouse button.

7 Choose one of the effects by clicking-on it. You will now be able to see the animation effect in the Text box. You may hear a sound that is "part" of your Slide Transition.

Fig 4

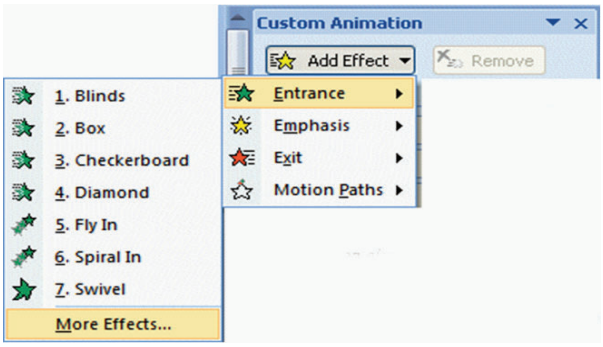
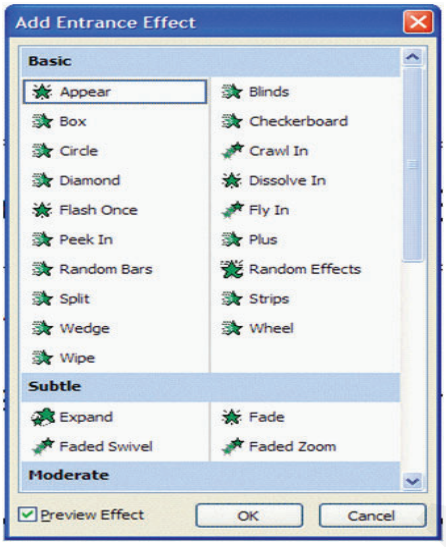


Fig 5



8 Notice - on the right side of the screen - under Custom Animation - that the Titles (on which we added effects) are shown as a part of this screen.

Also notice, on the right side of our second title there is a small, down pointing arrow.

9 Click-on this arrow it will show you each line of text that you animated in the lower sub-title box. (Fig 6)

Now we'll enhance our text some more. (Fig 7)

10 Move your cursor over the first title and click the left mouse button. Next click the small down arrow on the right sideof this box. You will see a menu screen appear that will let you enhance your title. Choose (click)Effect Options and the menu screen below will appear.

Chose magnify for our text effect and then chose laser for our sound.

11 Go ahead and experiment with Entrance effects and sounds for your slide. (Fig 8)

Fig 6

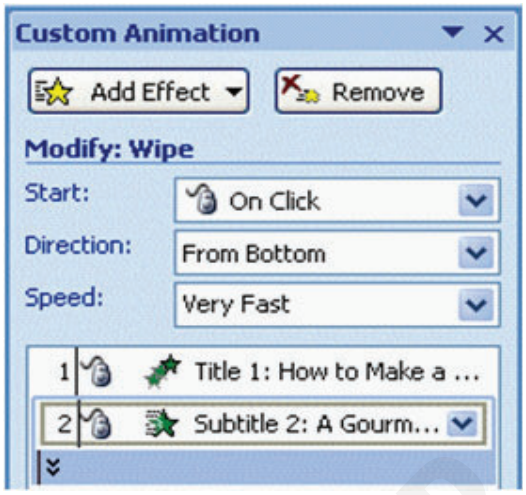


Fig 7

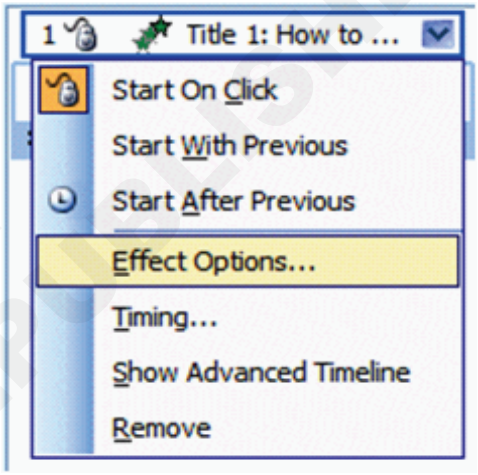
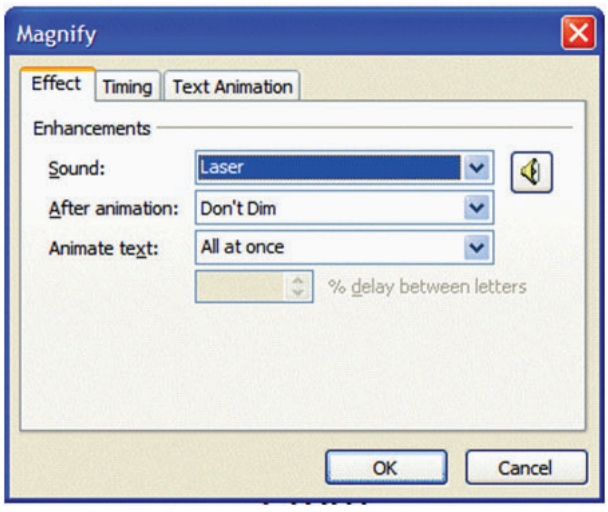


Fig 8



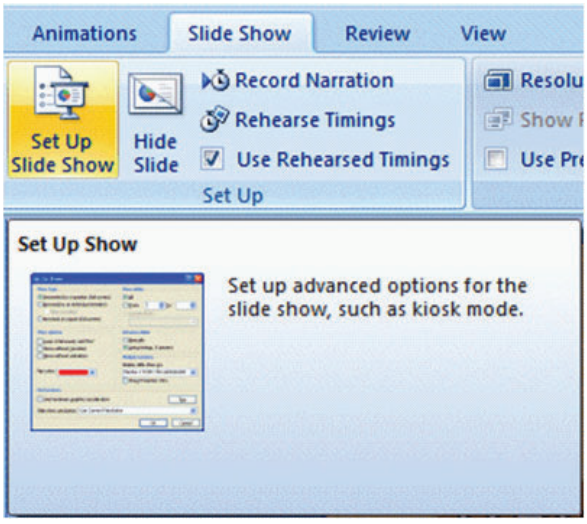
TASK 2: **Arrange Timings for each animations**

Name: Created set times on the Animations Tab for your slides, and desire to have the show

1 Run in "automatic," click theSlideShowTab and then

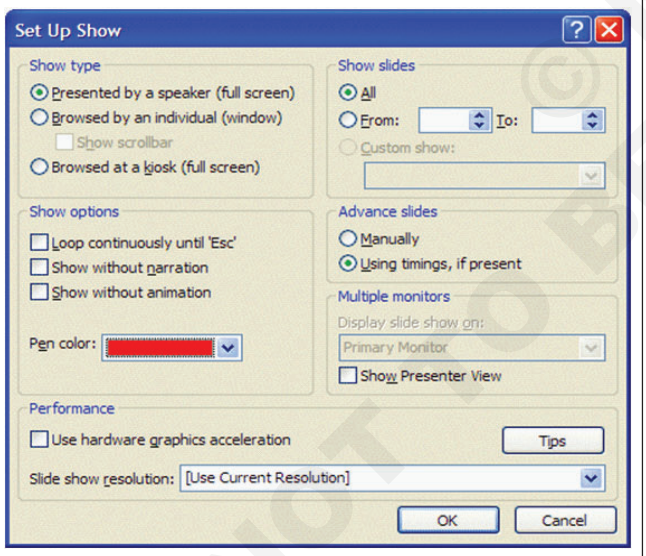
2 Clickthe Set Up Slide Show button. (Fig 1)

Fig 1



The following Set Up Show menu screen will appear. (Fig 2)

Fig 2



In the Advance slides box (Fig 3)

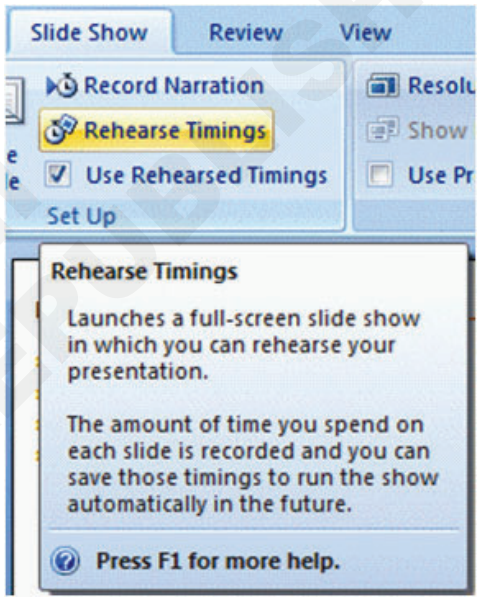
3 click the circular area to the left of Using timings, if present. Look over the other choices in this menu screen. Notice that there are a lot of enhancements in this Set Up Show menu screen. Experiment, as you desire.

Fig 3

4 Click theOKbutton when you have made your changes.

5 if they desire to have the show repeat continuously, is the Loop continuously until 'Esc' selection. This is indicated by an arrow to the Show options area. (Fig 4)

Fig 4



6 Clickon Slide Show Taband then select Rehearse Timings. (Fig 5)

Fig 5

7 A small, rehearse timings "box" will appear (image above). It will "show" a running clock on the right side of the menu - that indicates the time for the entire show.

TASK 3: **Set transition between slides**

1 Now well add some pizzazz to our presentation. When you viewed your slide show, a few moments ago, it was like "flopping down" plastic transparencies on an overhead projector." Now add some motion, animation, sound, and color and really make our presentation something to view. (Fig 1)

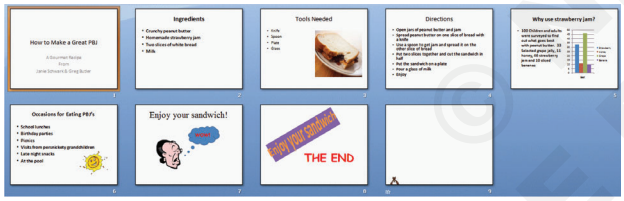
Fig 1

2 Go to the Slide Sorter button at the bottom right area of the screen.

3 Click on the button with four white squares.

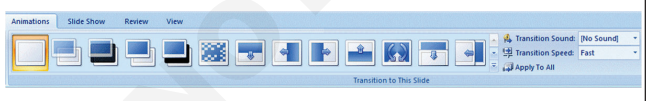
4 You can now seeall nine slides (as shown below). Notice that Slide 9 (the one with the flying bat) does not show the path of the bat. This is because of the motion path - not a big deal. Lightly,click once on the first slide to highlight the slide (an orange border will surround the slide - see arrow below). Now point in the MIDDLE of Slide 1 and click on your RIGHT mouse button. (Fig 2)

Fig 2



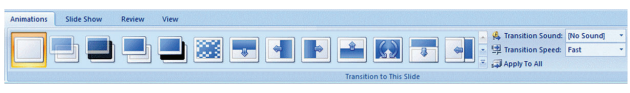
5 If you accidentally quick twice on Slide 1, this will take you to the Slide View, again. If this happens, simply click on the Slide Sorter View button at the bottom of the screen, just like you did on the last page.With Slide 1 "marked," click the Animations Tab. The Animations Ribbon will again open. (Fig 3)

Fig 3



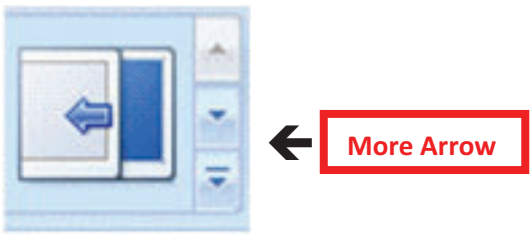
For previous PowerPoint users, this is another "totally new" method. (Fig 4)

Fig 4



Notice in - the Animations Ribbon a Group - Transition to This Slide. (Fig 5)

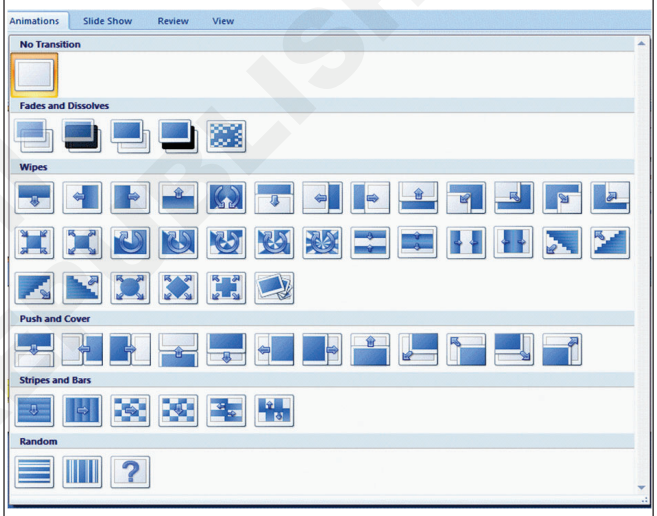
Fig 5



6 Transitions are neat, visual actions, as we move from slide to slide in our show. To get a "feel" for what Transitions do, click the More Arrow in the lower right corner of the Transition to This Slide Group. (Fig 6)

A Transition selection screen similar to the image on the right will appear.

Fig 6



7 So, let's get started in creating some movement (transitions) as we enhance our PowerPoint slide show. Remember that we clicked-on Slide 1 to begin this process.

We have enlarged the Fades and Dissolves and Wipes sections of the Transitions image on the last page. We moved our cursor over Wipe Up and clicked on it. Immediately our Slide 1 Transitioned with a Wipe Up. (Fig 7)

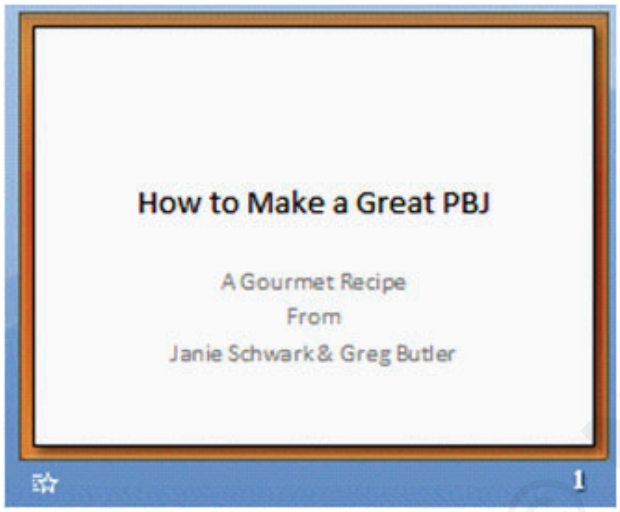
Fig 7

8 AtthebottomoftheTransition to This Slide Group there is a Random area. One of the choices has a Question Mark (?). We chosethis selection and then chose Apply to All Slides. So, when we show our slides, each slide will transition with a different effect. (Fig 8)

Fig 8

9 Go ahead and try as many Slide Transitions as you desire. When you have one you like, look at the lower left corner of Slide 1. You will see a small "shooting" star. This means that a transition has been applied to this slide. If you click the star, you will see the transition you selected will Play again. (Fig 9)

Fig 9



10 You can repeat the above process by clicking on each slide and selecting a different transition for each slide. Or - Notice - on the right side of theTransition to This Slide Group - you can select Apply to All. And the transition you choose will be applied to all of your slides. It's up to you on how you want each slide to transition - or not transition. (Fig 10)

Fig 10

11 Also notice that there is a Transition Speed selection in this same area. You may change your transition from Fast to Medium or Slow. (Fig 11)

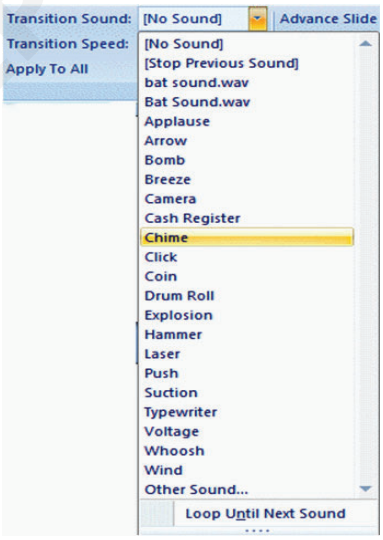
Fig 11

12 You may also add a Sound to your transition. Click the small down arrow to the right of Transition Sound. A drop down list of sounds will appear. We chose Chime for our Slide 1 Transition.

Notice at the bottom of the "list" it indicates Other Sound…. When we found the bat sound on Microsoft Office Online, it placed the sound in our Clip Art Organizer. To use this sound we had to choose Other Sound. When we did, it was added to our list at the top.

As you get more comfortable with sounds, you can find some really neat sounds all over the internet. (Fig 12)

Fig 12



Installation of 2D (AutoCAD) software

Objective : At the end of this exercise you shall be able to
• install the 2D software.

PROCEDURE

Student's version 2020 Download

The AutoCAD student version is available free for up to 3 years. For the student version, we have to sign-in and then select the student version option.

> **Note: We cannot use the objects created in the student's version for commercial use. If we want to use the AutoCAD software for commercial projects and objectives, we need to buy the license for the AutoCAD software.**

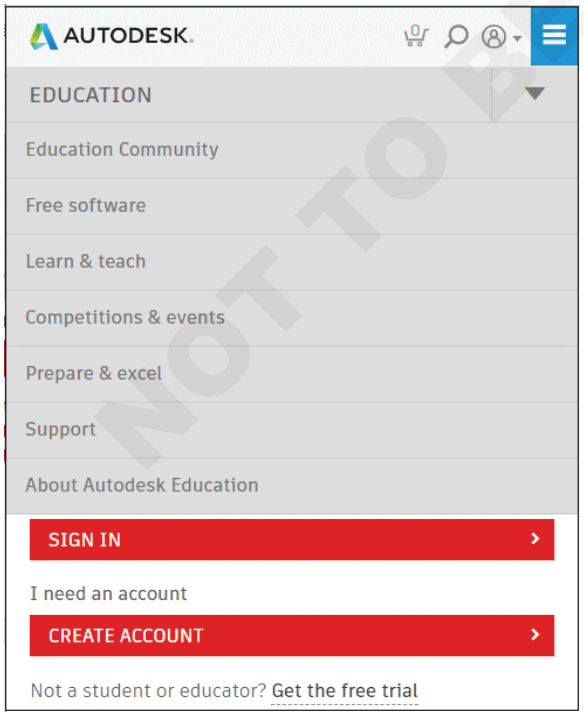
Let's start with the process of installation of Student's version. To download the 2019, 2018! or 2017 version,all the steps will remain the same. We need to select the appropriate version. The steps to download the latest version, i.e., AutoCAD 2020 are listed below:

Step 1 : Open your favorite browser

Step 2 : Type the url: https://www.autodesk.com/education/free-software/autocad

1 The Autodesk page will be opened. as given in (Fig 1).

Fig 1

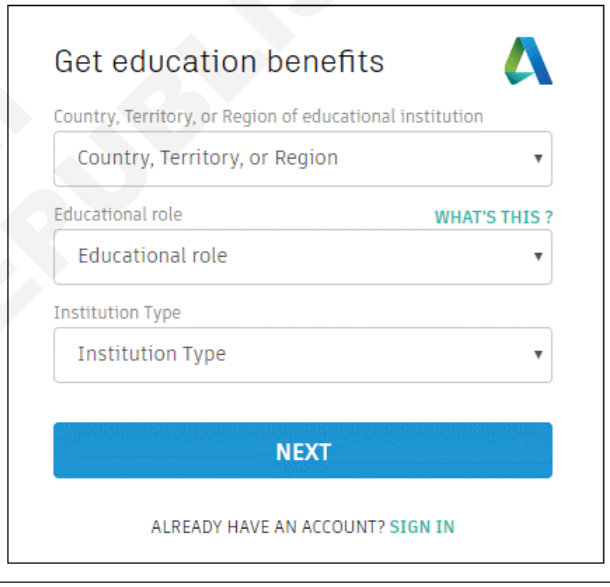


Step 3 : Click on the 'CREATE ACCOUNT' option to create your account for the student version.

Step 4 : We can also click on the option below the CREATE ACCOUNT button to download the version for a 30 days free trial. as shown in (Fig 2)

Not a student or educator? Get the free trial

Fig 2



Step 5 : When we click on the CREATE ACCOUNT button, the screen willlook like the given image (Fig 2).

Step 6 : We need to enter the details to create an account. The drop-down list of the educational role will appear as the given image (Fig 3) & institution type will appear as shown in given fig 4.

Fig 3

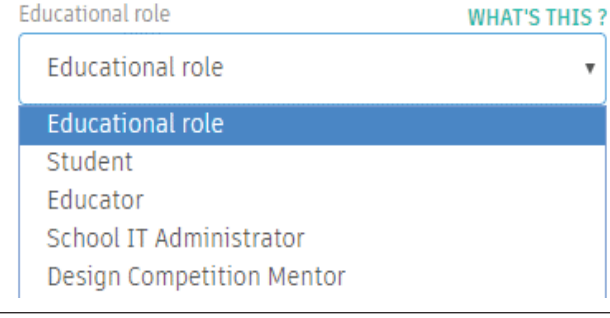
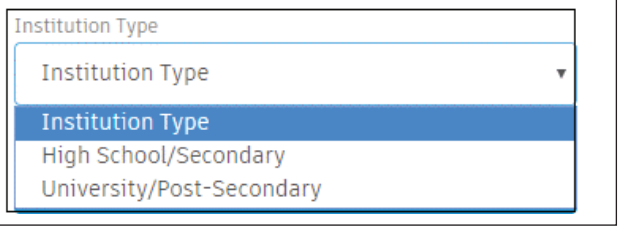


Fig 4

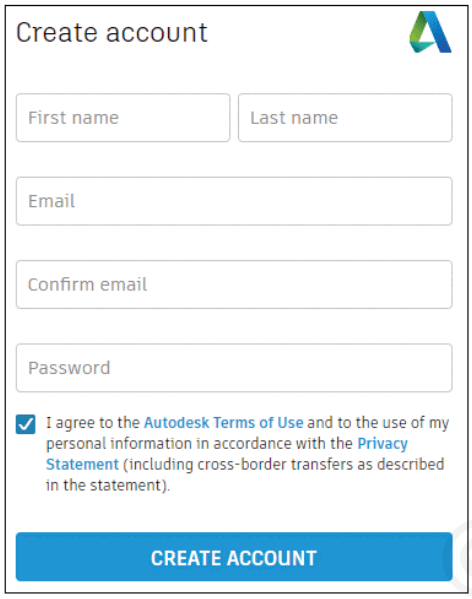


You can select the option according to the requirements.

Step 7 : After these details, click on the 'NEXT' button given at the bottom.

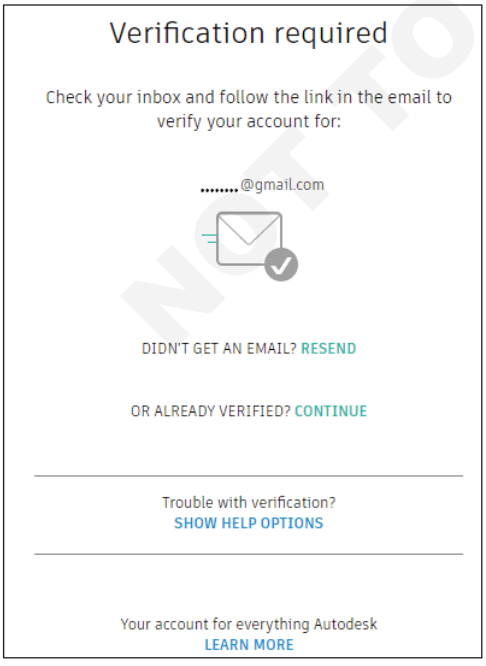
Step 8 : The window with details such as name, email-id, etc. will appear as the below image (Fig 5).

Fig 5



Step 9 : The final step is the verification of your email-id. The window will now look like the given image (Fig 6).

Fig 6

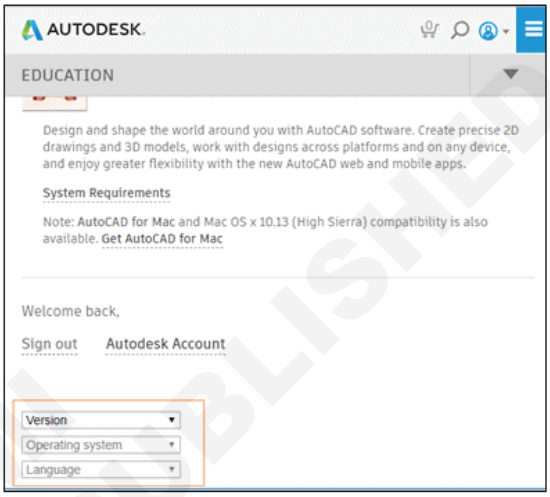


The registration process is now complete, and we can now sign-in with this email-id and password on the link mentioned in step 2.

Step 10 : After the sign-up, the Autodesk will ask for a 6-digit passcode verification. We need to download the Duo Mobile app, scan the QR code, and enter the passcode or we can also follow the same instructions as mentioned by Autodesk .

Step 11 : The screen will now appear as the given image (Fig 7).

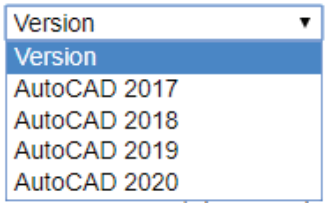
Fig 7



Step 12 : We need to select the version, operating system, and the Language from the drop-down list. After this step, the download will begin.

1 The drop-down list of the Version will appear as the given image (Fig 8).

Fig 8



2 Here, we will select the latest version, i.e., 2020.

3 Note: We can select the particular version from the drop-down list according to the requirements. The system requirements for that version will be displayed accordingly.

4 According to the selected version, the drop-down list of the operating system will be listed. For the 2020 version, only windows 64-bit is listed.

5 You can set the Language according to the requirements.

6 The drop-down list of the Language will appear as the below image (Fig 9).

7 After selecting the above categories, the window will now look like the below image (Fig 10).

Fig 9

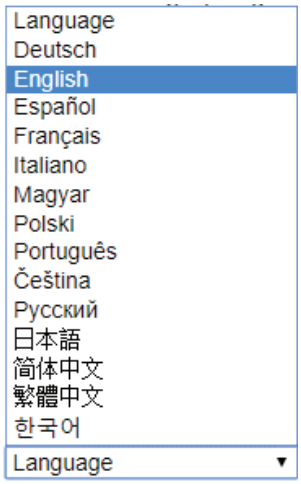
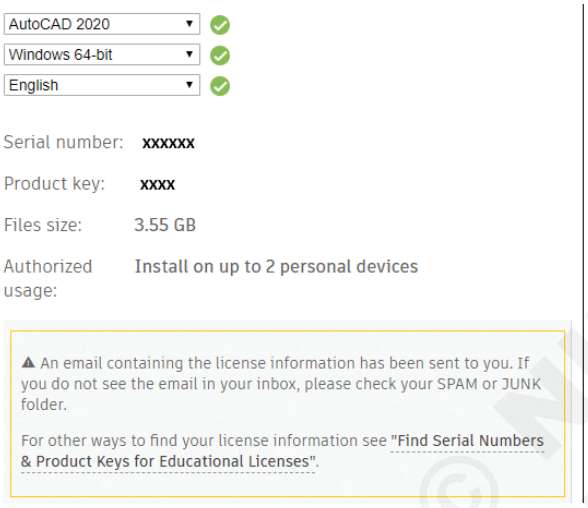


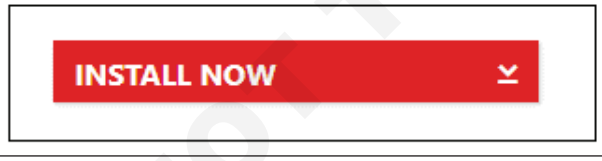
Fig 10



Step 13 : The serial number and the product key will be required further during the installation of the AutoCAD.

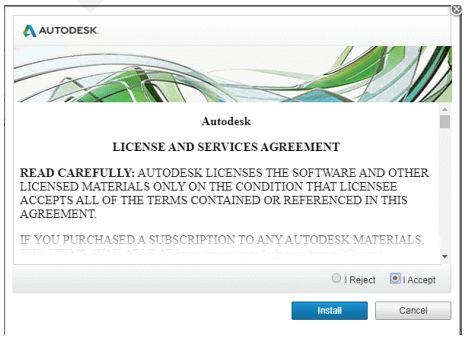
Step14 : Click on the **'INSTALL NOW'** option given at the bottom of the page. It will appear as (Fig 11).

Fig 11



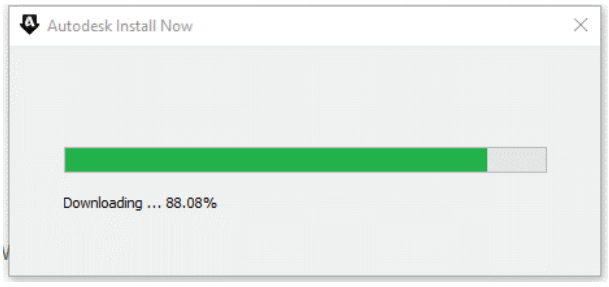
Step 15 : Accept the license and click on **'Install'** as shown in the below image (Fig 12).

Fig 12



Step 16 : Open the downloaded file.It will look like the below image (Fig 13).

Fig 13



Step 17 : The AutoCAD window will appear. Click on the 'Install' option as shown in the below image (Fig 14).

Fig 14

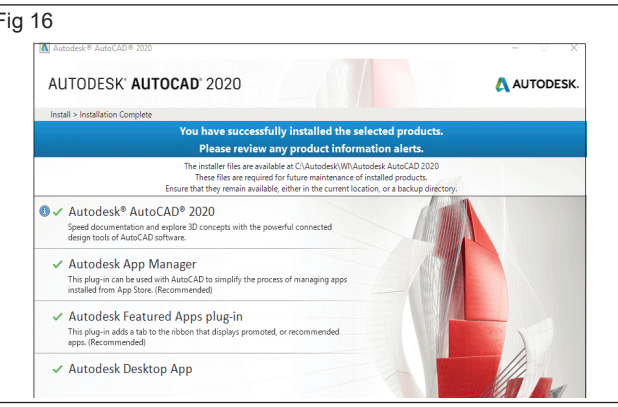
Step 18 : Now, again click on Install as shown in the below image. (Fig 15)

Fig 15

Step 19 : The download will start. We need to wait for a while until the download is completed.

Step 20 : After the download is completed, the window will appear as shown in the below image (Fig 16).

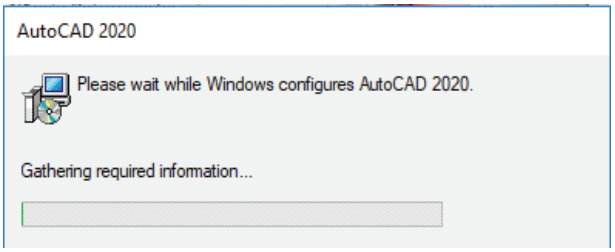
Fig 16



(Click on the 'Launch Now' option at the bottom right corner of the page.

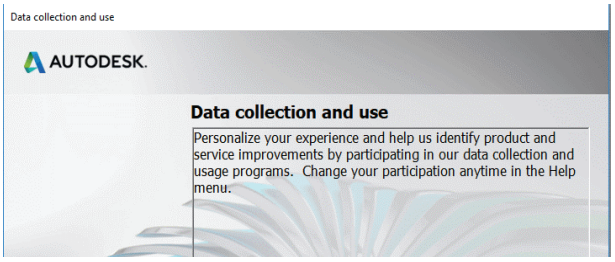
Step 21 : The configuration will start, as shown in the below image (Fig 17)).

Fig 17



Step 22 : After this step, the AutoCAD software will be opened. Click on the OK option as shown in the below image (Fig 18).

Fig 18

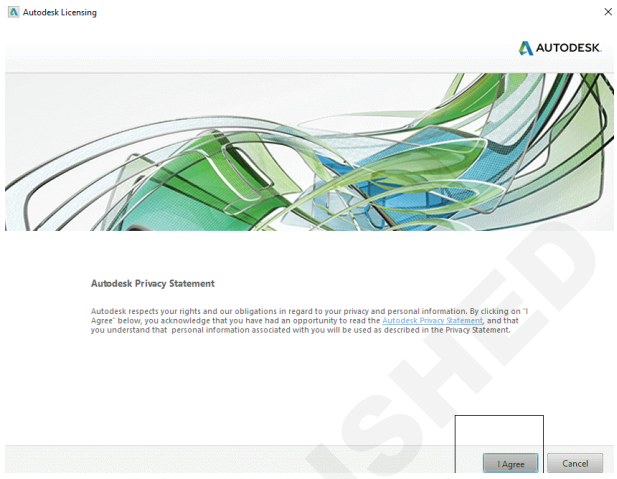


The AutoCAD software will appear.

Step 23 : Now, at last, comes the Autodesk license part. After this, you can start your drawings.

As soon the window appears, click on the **'I Agree'** option for acceptance of license terms and conditions as shown in the below image (Fig 19).

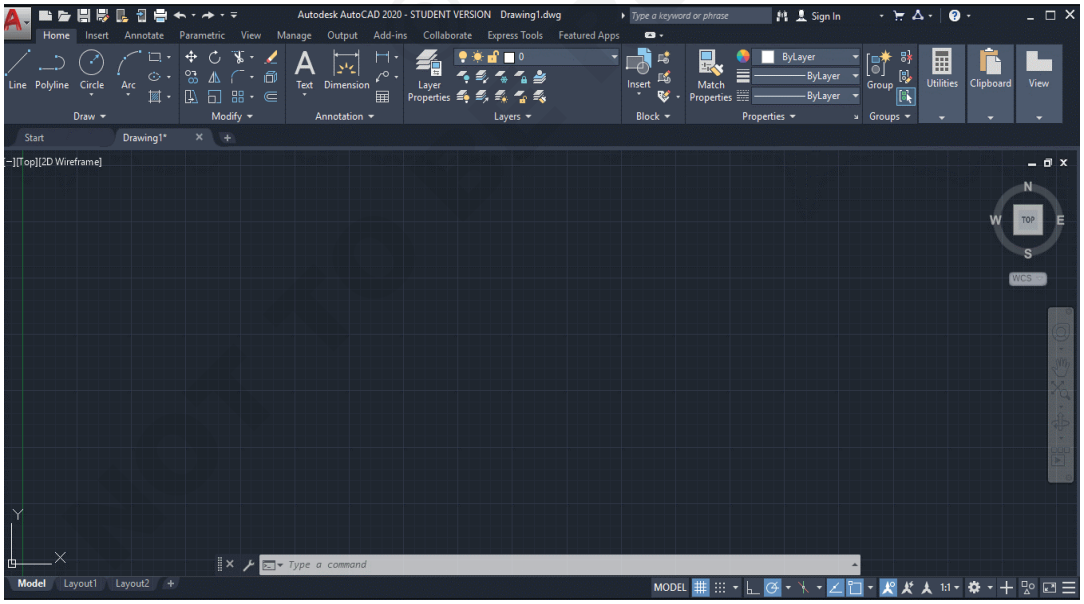
Fig 19



Step 24: The AutoCAD software is now ready for use.

The screen of the AutoCAD software will look like the below image (Fig 20).

Fig 20



Elementary commands and menus of 2D (AutoCAD) software

Objectives : At the end of this exercise you shall be able to
- **start a new drawing**
- **open a template**
- **create a template.**

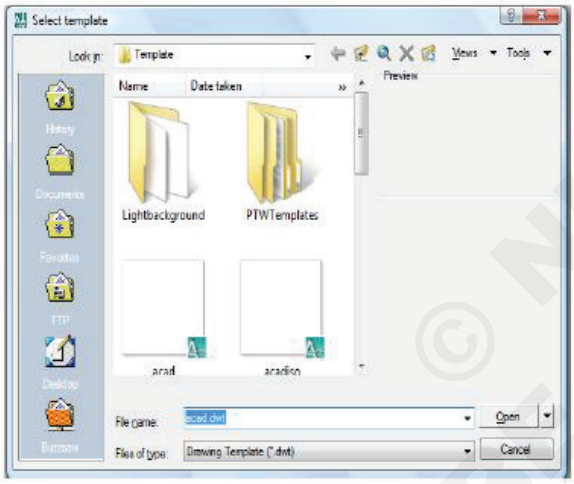
PROCEDURE

Starting a new drawing

Step 1: Pulldown menu: file, new.

Step 2: When you invoke this command Autocad displays the select template dialogue box.(If you selected "show startup dialogue box' from option dialogue box you cannot see the following dialogue box. Instead of this you can see the start up dialogue box itself) (Fig 1).

Fig 1

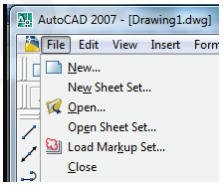


Opening a template

Step 1: The template that you create by using F 8. It will appear as a blank screen, but there are many variables that have been preset. This will allow you to start drawing immediately).

Let's start by opening the "1 Workbook" (Fig 2).

Fig 2



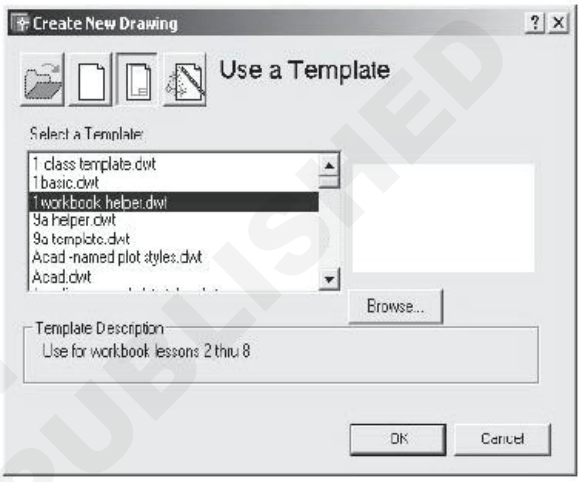
1 Select file/new

2 Select use a template box (third from the left). (Fig 3)

3 Select 1 workbook helper. dwt from the list of templates.

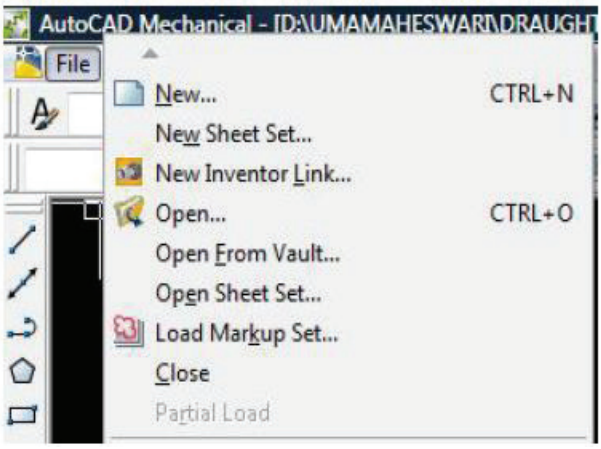
4 Select the ok button.

Fig 3



Create a template. (Fig 4)

Fig 4



Now you can create a template. This will be a very easy task. (Fig 5)

Step 1: Start AutoCAD as follows.

Start button/programs/AutoCAD.

The 3 letter extension for drawing file is drawing If a dialog box appears select the "Cancel" Button.

Step 2: Select **file/open.**

Step 3: Select the **directory** in which the files located. (click on the) (Fig 6).

Fig 5

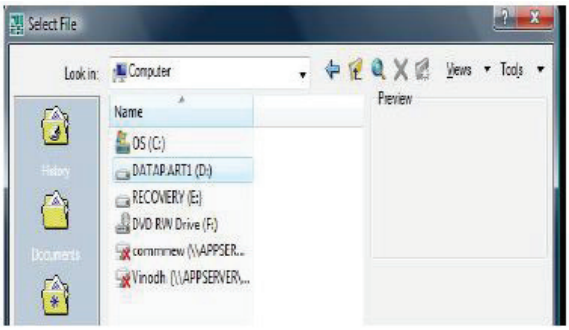
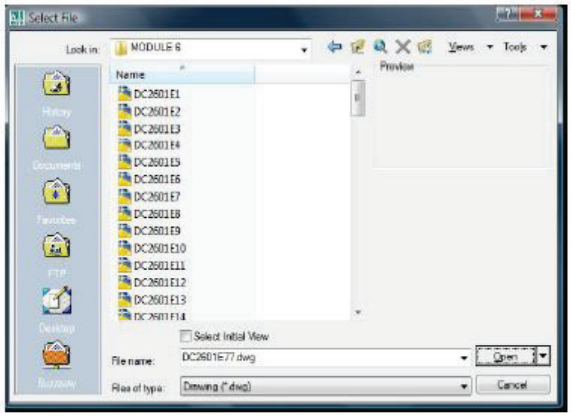


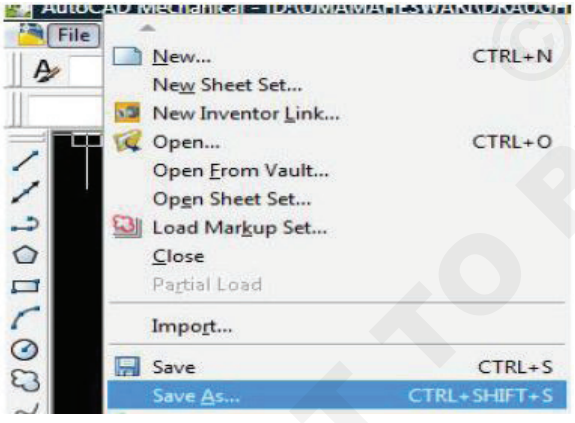
Fig 6



Step 4: Select the file **"Workbook** and then **"Open"** button.

Step 5: Select **"File / save as" (Fig 7)**

Fig 7



Step 6: Select the **"File of type"** down arrow to display different saving formats. Select " Autocad drawing template (*.dwt)". (Fig 8)

The 3 letter extension for template is "dwt".

A list of all the AutoCAD templates will appear. (Your list may be different)

Step 7: Type the new name "1 Workbook" in the file name". box and then select the save button. (Fig 9)

The "1" before the name will place the file at the top of the list.

AutoCAD displays numerical first and then alphabetical.

Fig 8

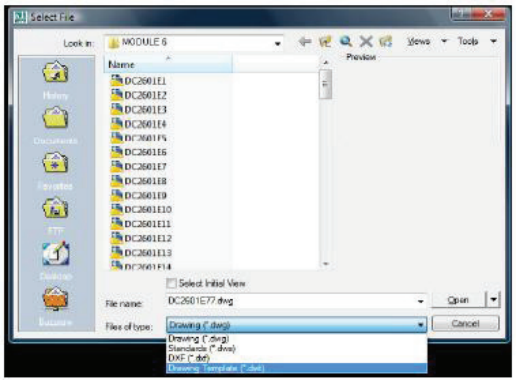
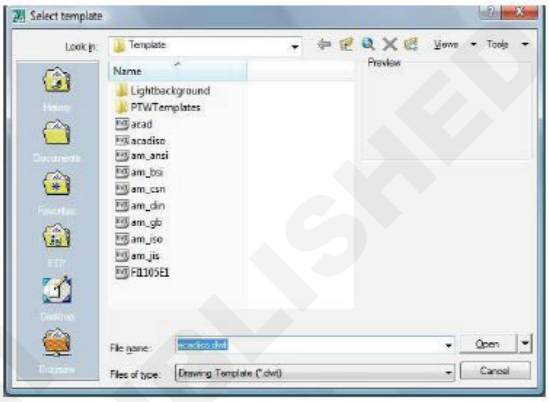


Fig 9

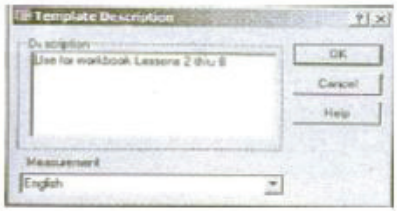


Step 8: Type a description and select the "OK" button.

This template can be used at the beginning of each of the exercises. (Fig 10)

(Using a template as a master setup drawing is good CAD management).

Fig 10



Creating a new drawing

Step 1: New command

Create a new drawing file.

1 Choose → File, → new. or

2 Press → Ctrl + N or

3 Click → The new icon or

4 Type → New at the comand prompt.

Command: new

5 Choose → One of the options for creating a new drawing.

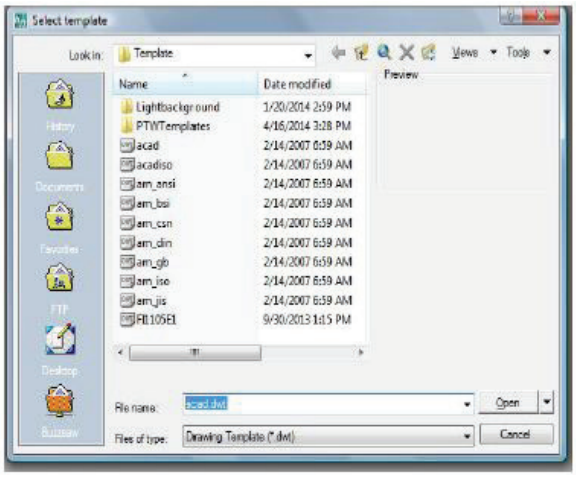
Step 2

1 Click → The ok button.

Step 3: Save the drawing as another name.

Note: New drawings can also be created from template files. (Fig 11)

Fig 11



Open existing drawings (Fig 12)

Step 1

1 Choose → File, open. or

2 Press → Ctrl + O

3 Click → The open icon. or

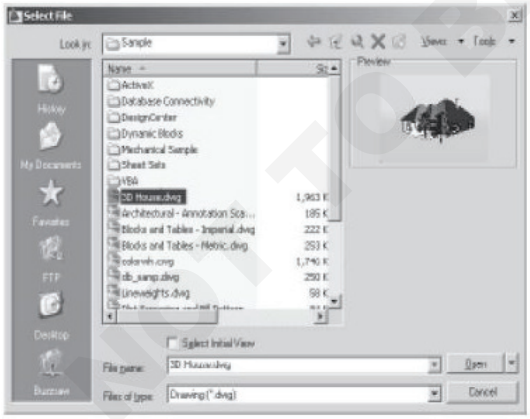
4 Type → Open at the command prompt.command: open

5 Press → Enter

6 Double click The desired directory to find the drawing to open.

7 Click the drawing name to open.

Fig 12



Step 1 Click The ok button.

Preview shows a bitmap image of the drawing selected. This image is the view that was last saved in the drawing.

Saving drawings

Saves the most recent changes to a drawing. The first time an unnamed drawing is saved the "Save As" Dialog box appears. AutoCAD saves its drawings as files with extensions ending in . DWG.

Step 2

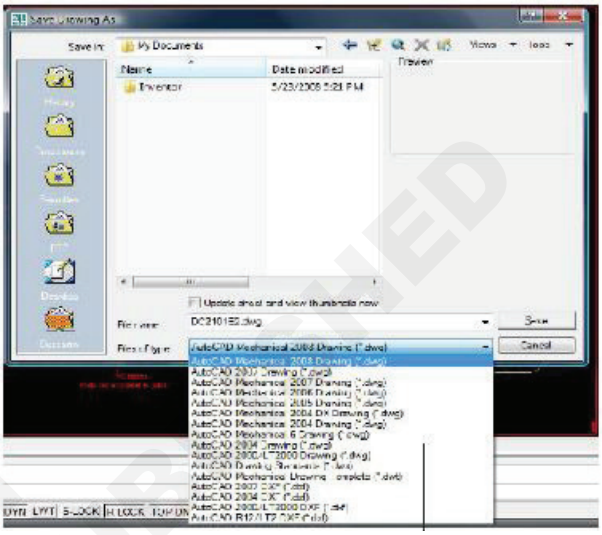
1 Choose → File, save or save as

2 Type → Save or save as at the command prompt command: Save or Save as

3 Press → Enter

4 Type → A new drawing name or keep the existing drawing name.

Fig 13



Step 2

Click → The ok button.

Various file type can be saved as shown in fig 13

Step 3: Clicking the dropdown list for file type changes the format that the drawing can be saved in.

Quick save

The Qsave command is equivalent to clicking Save on the file menu.

If the drawing is named, AutoCAD saves the drawing using the file fromat specified on the open and save tab of the Options dialog box and does not request a file name. If the drawing is unnamed, AutoCAD displays the save drawing. As dialog box **(see save as)** and saves the drawing with the file name and format you specify.

Step 1

1. Press → Ctrl + S.

or

2. Click → The save icon.

or

3. Type → Qsave at the command prompt, Command: Qsave.

Hint: Drawings can be saved as different versions of AutoCAD (e.g. R13, R14, R2000, etc.) (Fig 14)

AutoSave settings under Tools, options...

Existing AutoCAD

Step 1 → Choose File, exit.

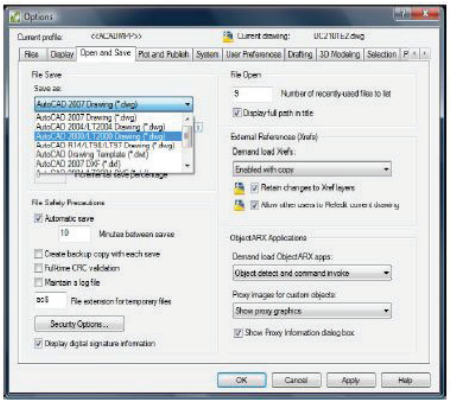
or

Type → Quit at the command prompt.
Command: Quit

Step 2 Press ENTER.

Step 3 Click Yes to save changes or No to discard changes.

Fig 14



Drawing area control

Objectives : At the end of this exercise you shall be able to
- **identify method of entering commands**
- **practice drawing command set up**
- **practice drawing area set up.**

TASK 1: **Methods of entering commands**

AutoCAD has 3 different methods of entering commands. All 3 methods will accomplish the same end result. AutoCAD allows you to use the method you prepare. The following are descriptions of all 3 methods and an example of how each one would be used to start command such as the line command.

Step 1: Pull down Menu (select draw / line).

a Move the cursor to the Menu Bar.

b Click on a Menu header such as “Draw”.

c Slide the cursor down the list of commands and click to select.

or

Step 2: Tool bars (select the line icon from the draw tool bar).

Move the cursor to an icon on a toolbar and press the left mouse button.

or

Step 3: Keyboard (Type L and <enter>).

Type the command on the command line.

What is a shortcut menu?

In addition to the methods listed above, AutoCAD has shortcut menus. Shortcut Menus give you quick access to command options. Shortcut Menus are available when brackets [] enclose the options, on the command line. (Example below) To activate a Shortcut Menu, press the right mouse button.

Example

Step 1: Select: draw /circle / center, radius._circle specify center point for circle or **[3P / 2P/ Ttr (tan tan radius)]:**

Step 2: Press the right mouse button now, the shortcut menu on the left will appear. This allows you to select the options 3P, 2P, or Ttr with the mouse rather than typing your selection.

— — — — —

TASK 2: **Drawing units setup (Fig 1)**

Every object we construct in a CAD system is measured in Units. We should determine the system of units within the CAD system before creating the first geometric entities.

Step 1: In the menu bar select:

(Format) (Units)

The AutoCAD menu bar contains multiple pull down menus, where all of the AutoCAD commands can be accessed. Note that many of the menu items listed in the pull-down menus can also be accessed through the Quick Access toolbar and / or Ribbon panels.

Step 2: Click on the length type option to display the different types of length units available. Confirm the length type is set to decimal. (Fig 2 & 3)

Step 3: On your own, examine the other settings that are available.

Step 4: In the drawing Units dialog box, set the length type to decimal. This will set the measurement to the default english units, inches.

Fig 1

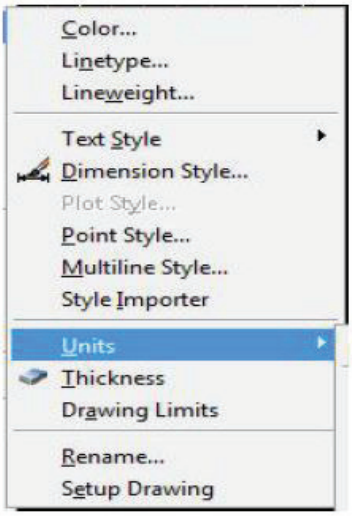


Fig 2

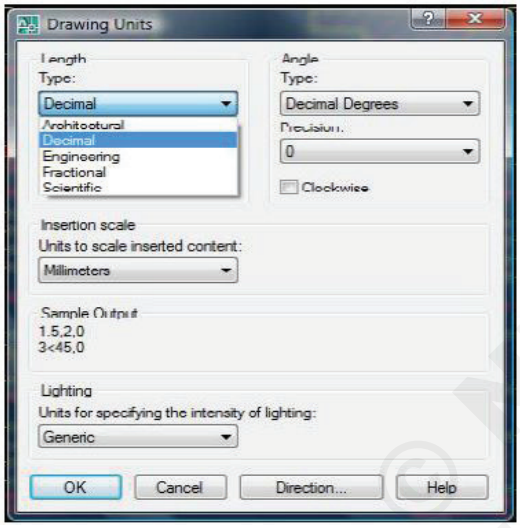
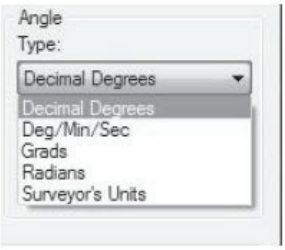
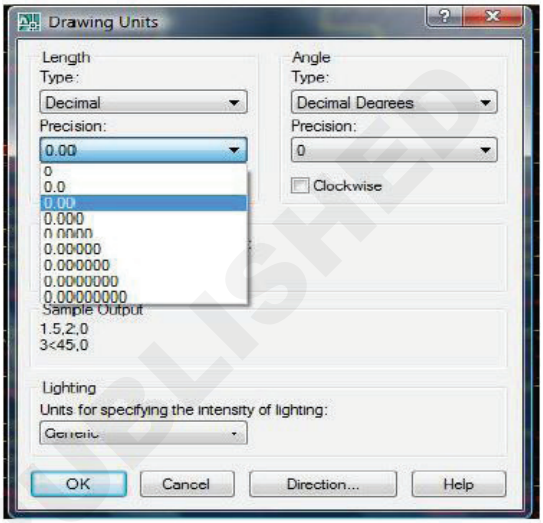


Fig 3



Step 5: Set the precision to two digits after the decimal point as shown in the above Figure. (Fig 4)

Fig 4



Step 6: Pick ok to exit the drawing units dialog box.

TASK 3: **Drawing area setup**

Next, we will set up the **drawing limits** by entering a command in the command prompt area. Setting the Drawing Limits controls the extents of the display of the grid. It also serves as a visual reference that marks the working area. It can also be used to prevent construction outside the grid limits and as a plot option that defines an area to be plotted / printed. Note that this setting does not limit the region for geometry construction.

Step 1: In the menu bar select:

[Format] [Drawing Limits] (Fig 1)

Step 2: In the command prompt area, the message "Reset model space limits: Specify lower left corner or [on/off] <0.00,0.00>." is displayed. Press the **ENTER** key once to accept the default coordinates <**0.00,0.00**>. (Fig 2)

Step 3: In the command prompt area, the messsage "specify upper right corner <12.00,9.00>" is displayed. Press the ENTER key again to accept the default coordinates <12.00,9.00>. (Fig 3)

Fig 1

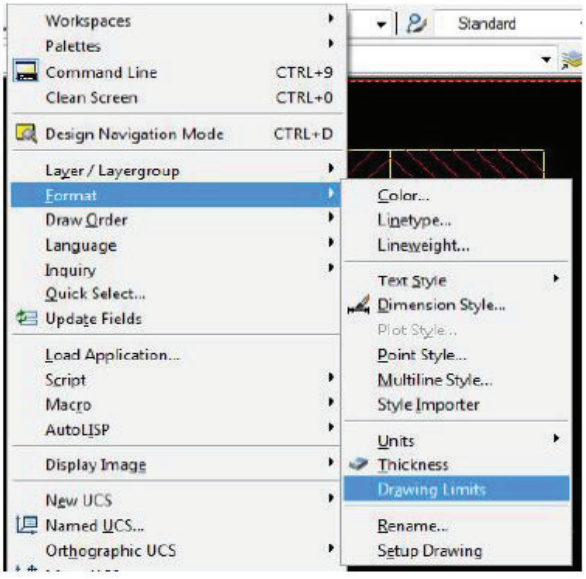


Fig 2

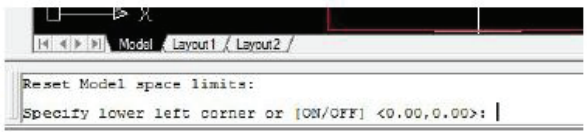
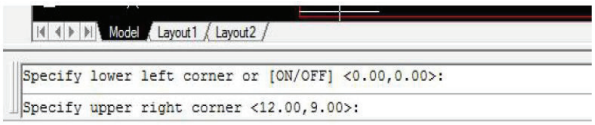


Fig 3



Step 4: Move the graphic cursor near the upper right corner inside the drawing area and note that the drawing area is unchanged. (The drawing limits command is used to set the drawing area, but the display will not be adjusted until a display command is used.)

1 Setting limits of a drawing

In AutoCAD The drawing must be drawn in full scale. So limits are needed to size up a drawing area. The limits are determined by the following factor.

i Size of drawing.

ii Space needed for dimensions, notes and other details.

iii Space between different views.

iv Space for the border and a title block etc.

Limits

Step 1: Pull down: Format, drawing limits.

Step 2: Command: Limits.

The command **LIMITS** allows you to change the upper and lower limits of the drawing.

Example: Set the drawing screen to A4 size (210 x 297)

Command: LIMIT.

Step 3: Specify lower left corner or (ON/OFF) <0.000,0.000>:

Step 4: Specify upper right corner <12.000,9.000>: 210,297

Step 5: Give ZOOM command with ALL option to view all the drawing

area (A4 size)

Step 6: MVSETUP = Multiview Setup

MVSETUP offers two different setup options depending on whether you are in Model Space or in a Layout (Paper Space).

In model space- you set the units type, drawing scale factor, and paper size at the command prompt using MVSETUP. Using the settings you provide, a rectangular border is drawn at the grid limits.

In Paper Space - you can insert one of several predefined title blocks into the drawing and create a set of layout viewports within the title blocks. You can specify a global scale as the ratio between the scale of the title block in the layout and the drawing on the Model tab. The model tab is most useful for plotting multiple views of a drawing within a single border.

MVSETUP commands

No (to not create a new layout tab - we will do this in another lesson)

A (Metric units)

48 (Scale factor - common arch, scale factor is 1:1)

24 Width- see table below for paper size.

(example 210 x 297) Since we are printing in “land scape “ mode, we enter the bigger number of the paper size first.

18 Length - Smaller number from the list below.

Once MVSETUP is finished, it will show a rectangle. This is the area where your grid wil show up if you have the grid on. This box is pretty much useless so just erase it. You will not need it.

From here, set up dimensions styles, text styles. layer.

If these settings will used in other drawings here are two suggestions, the first of which is recommended because it is less error prone.

1 After creating the desired settings, do a save-as and save t as a . dwt. All of the settings that you created will be saved.

2 After using this drawing, open it and erase all objects. The settings will remain but you will have to hunt down the objects that need to be erased in layouts.

2 Setting units of a drawing

UNITS Command is used to set the units of measure, angle measurement, direction and precision.Pull down Menu: Format, UNITS

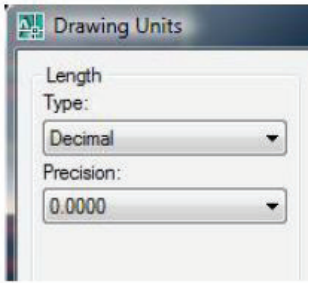
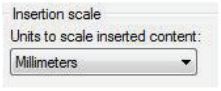
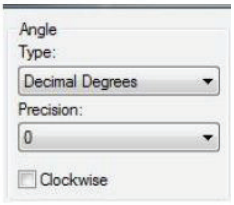
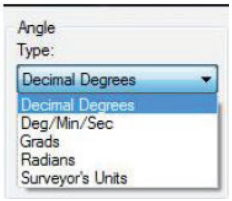
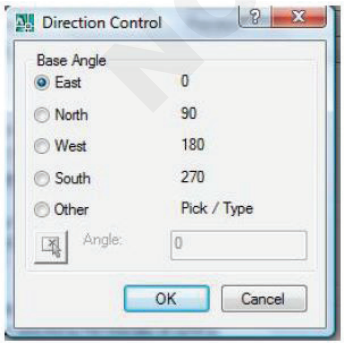
Command: UNITS

If you enter-units at the command prompt, UNITS displays prompts on the command line.There are five fundamental types of units i.e. Decimal, architectural, engineering, fractional & scientific.

The text window displays the following prompt.

There are five fundamental types of units i.e. Decimal, architectural, engineering, fractional & scientific.

There are five fundamental types of units i.e. Decimal, Architectural, Engineering, Fractional & Scientific.

Icon/Button	Description
	Report formats: (Examples) 1 Scientific (1.55E + 01) 2 Decimal (915.50) 3 Engineering 1'-3.50" 4 Architectural 1'-3 1/2" 5 Fractional 15 1/2 Enter choice, 1 to 5 <Current >: Enter a value (1-5) or press ENTER
 	The following prompt for decimal precision is displayed if you specify the scientific, decimal, or engineering format. Enter number of digits to right of decimal point (0 to 8) <Current >: Enter a value (0-8) or press ENTER. The following prompt for the denominator of the smallest fraction is displayed if you specify the architectural or fraction format. Enter denominator of smallest fraction to display. (1,2,4,8,16,32,64,128,or 256) <current>: Enter a value (1,2,4,8,16,32,64,128,or 256) or press ENTER **Inserting scale** Controls the units of measurement for blocks and drawings that are inserted into the current drawing. A block or a drawing that is created with units that are different from the units specified with this option is scaled when inserted. The insertion scale is the ratio of the units used in the source block or drawing and the units used in the target drawing and the units used in the target drawing. Select Unitless to insert the block without scaling it to match the specified units.
 	The next prompts is for angle formats and precision. System of angle measure: (Example) 1 Decimal degree 45.000 2 Degree/minutes/seconds 45d0'0. 3 Grads 50.000g. 4 Radians 0.78454r. 5 Surveyor's units N 45d0'0"E. Enter choice ,1 to 5< Current>:Enter a value (1-5) or press ENTER. Enter number of fractional places for display of angles (0-8) <Current>:Enter a value (0-8) or press ENTER.
	The next prompt is for the direction for angle 0. **Direction for angle 0:** **East 3 o'clock = 0.** **North 12 o'clock = 90.** **West 9 o' clock = 180.** **South 6 o' clock = 270.** Enter direction for angle 0<current>: Enter a value or press ENTER. The default direction for 0 degrees is to the east quadrant, or 3 o' clock. The default direction for positive angular measurement is counterclockwise. Measure angles clockwise? [Yes/No] <current>: Enter y or n or press ENTER. Select the unit you want from the dialogue box. This unit is used for dimensioning of the drawing. Input from the user accepted in this unit only.

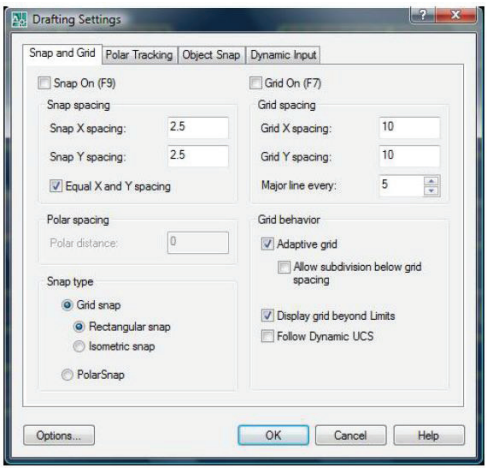
Drafting setting a display commands

Objectives : At the end of this exercise you shall be able to

- **practice the drafting setting**
- **identify the visual reference**
- **identify esc, undo, redo**
- **practice display commands.**

Drafting Settings (Fig 1)

Fig 1



Drafting settings includes the commands for initial setting of a drawing. Some of the drafting settings are **snap, grid, polar tracking, osnap.**

Step 1: Switches the grid on/off

Step 2: Set the size of the grid in the current drawing units

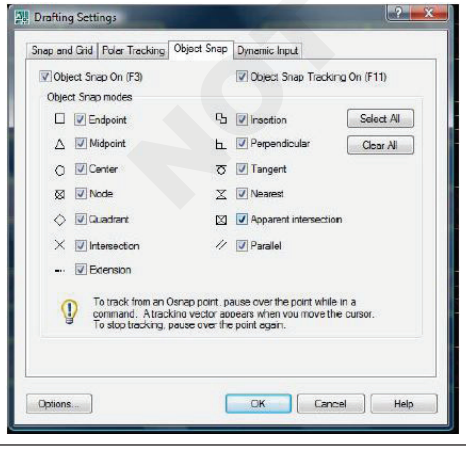
Step 3: Snap: Snap is used to move the cursor at a defined value. This will set a position on the drawing quickly and accurately. The snap mode can be switched ON / OFF by pressing function key **F9**.

Grid: Grid command is used to display dots, which is easy for us to fix the points. But these dots were not

printed. Grid points have default spacing of one unit. We can change the spacing too. This mode can be ON / OFF by using the function key **F7**.

Object snap settings (Fig 2)

Fig 2



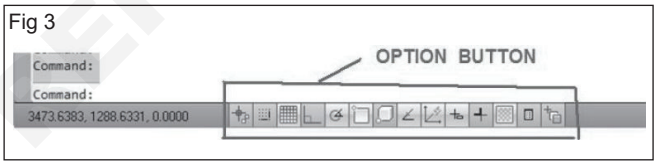
Object snap settings are used to pick a geometric point on an object. Object snap mode can be ON / OFF by using the function key **F3** or by clicking O snap button on the status bar. There are various options for object snap settings such as end point, mid point, centre, quadrent etc.

Ortho: Ortho command forces lines to be drawn exactly perpendicular directions. While using this command we have to turn ortho ON/OFF (otherwise press **F8** according to our need

The grid and snap mode option can be turned ON or OFF through the status bar. The status bar area is located at the bottom left of the AutoCAD drawing screen, next to the cursor coordinates.

The second button in the status bar is the snap mode option and the third button is the grid display option. (Fig 3) Note that the buttons in the status bar area serve two functions: (1) the status of the specific option, and (2) as toggle switches that can be used to turn these special options on and off. When the corresponding button is highlighted, the specific option is turned on. Using the buttons is quick and easy way to make changes to these drawing aid options. Another aspect of the buttons in the Status Bar is these options can be switched on and off in the middle of another command.

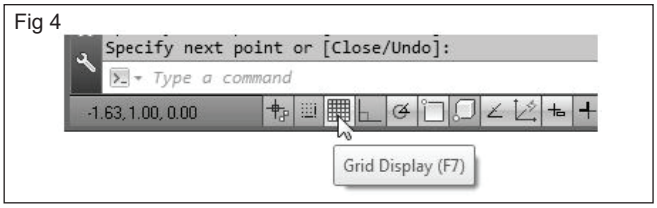
Fig 3



Grid on

1 Left-click the grid button in the status bar to turn on the **grid display** option. (Notice in the command prompt area, on the massage “<Grid on>” is also displayed.) (Fig 4)

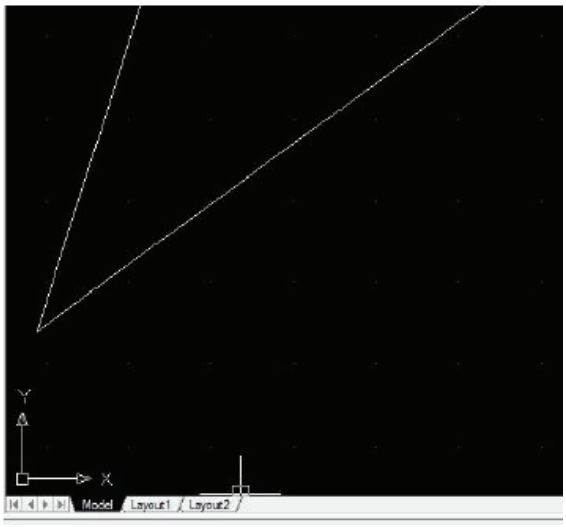
Fig 4



2 Move the cursor inside the graphics window, and estimate the distance in between the grid lines by watching the coordinates display at the bottom of the screen. (Fig 5)

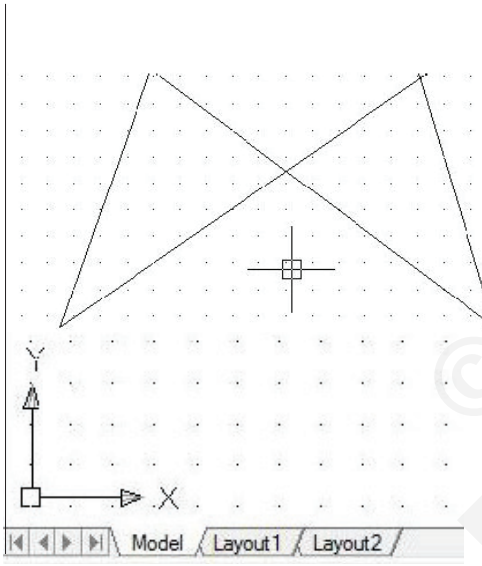
The grid option creates a pattern of lines that extends over an area on the screen. Using the grid is similar to placing a sheet of grid paper under a drawing. The grid helps you align objects and visualize the distance between them. The grid is not displayed in the plotten drawing. The default grid spacing. Which means the distance in between two lines in the screen, is 0.5 inches. We can see that the sketched horizontal line in the sketch is about 4.5 inches long.

Fig 5



Snap mode on (Fig 6)

Fig 6



Step 1: Left- click the snap mode button in the status bar to turn on the snap option.

Step 2: Move the cursor inside the graphics window, and move the cursor diagonally on the screen. Observe the movement of the cursor and watch the coordinates display at the bottom of the screen.

SNAP mode is on, the screen cursor and all input coordinates are snapped to the nearest point on the grid. (Fig 7)

The default snap interval is 0.5 inches, and aligned to the grid points on the screen. (Fig 8)

In case of any mistake

Pressing the ESC key

The Esc key at the top of the key board will get you out of most problems you encounter using AutoCAD. Here are some examples of the times you would press Esc key.

- If a command is not responding the way you expect.

Fig 7

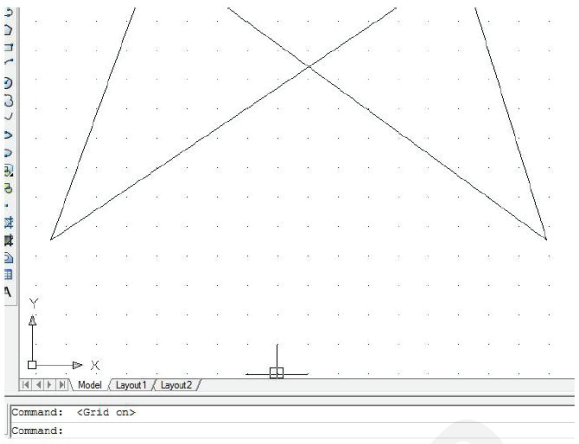
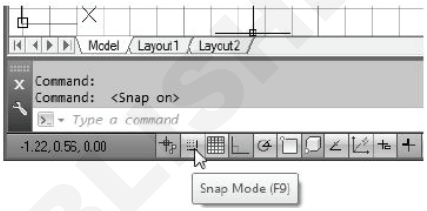


Fig 8



- If you want to cancel a command you started.
- If you clicked a point on the screen unintentionally.
- If a dialogue box appears on the screen accidently.

In all these cases above, pressing Esc once will free the command line.

Example

Issue the line command, click a point on the screen and then press the esc key to cancel the command.

Using undo

Undo the last command by typing U at the command line and pressing the enter key, or by clicking on the Undo icon on the tool bar.

Using redo

The Redo command will reinstate the last command you applied undo to. You may undo as may commands as like you, but you may only redo once.

Display commands

Zoom

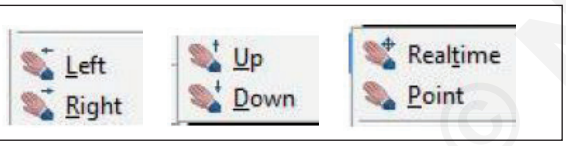
Zoom command enlarges or reduces the view of the drawing. When we are working on a drawing it is always required to bring the area of our interest to focus on to the screen. The zoom tool bar may be accessed from the standard tool bar at the top of the screen or from the dropdown menu > view >Tool bars....> Zoom. The icons are

Icon	Function
Realtime	This allow you to select a window or box around the area you want to magnify.
Dynamic	This is both zoom and pan. When the command is issued a view box will be displayed with the drawing inside. The view box can be resized (Zoom) and moved around pan.
Scale	The drawing is at a scale of 1.A zoom scale of 2 doubles the magnification of the drawing, while 0.5 halves it.
Center	Allows you to pick a point which will be the center of the zoom area.
In	Just click on it zoom in on the drawing. You may preset the amount it zooms in a the command line.
Out	Just click on it zoom out from the drawing. You may preset the amount it zooms out at the command line.
All	This zooms to show the complete electronic page you set up. It zooms out to the electronic sheet limits.
Extents	This will zoom to fit the complete drawing on the screen.
Previous	This displays the last view created by zoom, pan or view command.

Pan: Pull down menu: view, pan.

The cursor changes to a hand cursor. (Fig 9)

Fig 9



By holding down the pick button on the pointing device, you lock the cursor to its current location relative to the view port coordinate system. Graphics within the window are moved in the same direction as the cursor.

when you reach a logical extent (edge of the drawing space), bar is displayed on the hand cursor on the side where the extend has been reached. Also a message is displayed in the status bar as “already bottom most extent”. Depending upon whether the logical extent is at the top, bottom, or side of the drawing, the bar is either horizontal (top or bottom) or vertical (left or right side).

When you release the pick button, panning stops. You can release the pick button move the cursor to another location in the drawing, and the press the pick button again to pan the display from that location.

On your own, move the graphic cursor near the upper-right comer inside the drawing area and note that the drawing area is unchanged. (The Drawing Limits command is used to set the drawing area, but the display will not be adjusted until a display command is used.)

Inside the Menu Bar area

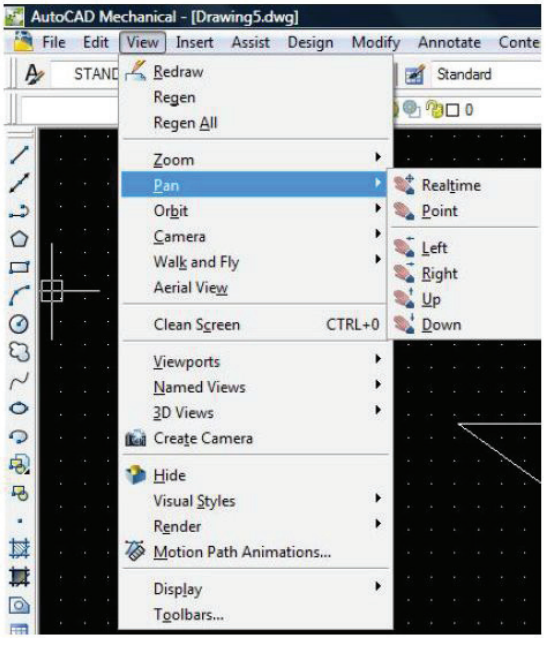
Select: **[View] [Zoom] [All]**

Zoom All command will adjust the display so that all objects in the drawing are displayed to be as large as possible. If no objects are constructed, the Drawing Limits are used to adjust the current viewport.

Move the graphic cursor near the upper - right comer inside the drawing area and note that the display area is updated.

In the menu bar area select: [View] [pan] [Realtime] (Fig 10)

Fig 10



The available pan commands enable us tomove the view to a different position. The pan - realtime function acts as if you are using a video camera.

Move the cursor, which appears as a hand inside the graphics window, near the center of the drawing window, then push down the left - mouse - button and drag the display toward the right and top side until we can see the sketched line. (Notice the scroll bars can also be used to adjust viewing of the display.)

Commands & co-ordinate system

Objectives : At the end of this exercise you shall be able to
- **use draw command line**
- **practice co-ordinate system**
- **use modify command erase.**

Draw commands Line

From tool bar: Line

Draw menu: Line

Command : Line, L

Example:

Command: L - Line

Step 1: Specify first point: Select one point on the screen

Step 2: Specify next point or [Undo]: Select second point on the screen

Step 3: Specify next point or [Undo]:

Continue

Continue a line from the end point of the most recently drawn line

If the most recently drawn line is an arc, its end point defines the starting point of the line, and the line is drawn tangent to the arc.

Close

Ends the last line segment at the beginning of the first line segment, which forms a closed loop of line segments. You can close after you have drawn a serious of two or more segments.

Undo

Erase the most recent segment of a line sequence. Entering “U” more than once back tracks through line segments in the order you created them.

Co-ordinate system in autocad

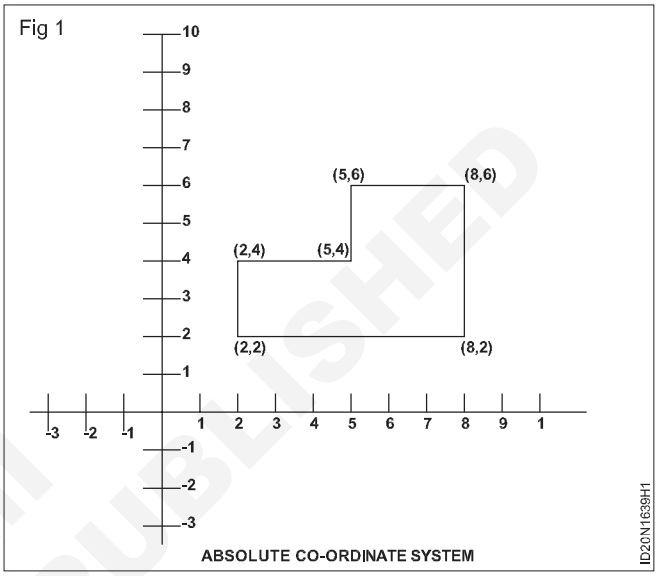
All drawings are superimposed on an invisible grid, or co-ordinate system, with a horizontal X-axis and a verticasl Y-axis.

You can establish grid and snap setting that match the units of the co-ordinate system or some multiple or fraction of it.

1 Absolute co-ordinate system (X, Y): To enter an absolute coordinate, specify a point by entering its X and Y values in the format X,Y. (Fig 1)

Use absolute coordinate when you know the precise X and Y values in the point from the origin. The following sequence of coordinates draw a triangle, as shown below.

Fig 1



Step 1: Command _ Line specify first point: 2,2

Specify next point or [undo]: 8,2

Specify next point or [undo]: 8,6

Specify next point or [undo]: 5,6

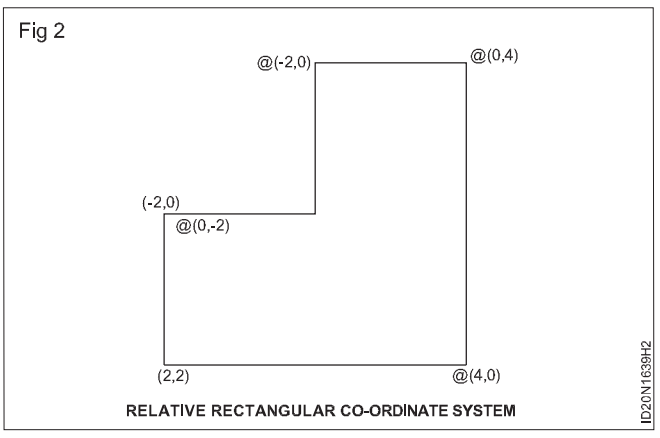
Specify next point or [undo]: 5,4

Specify next point or [undo]: 2,4

Relative rectangular co-ordinate system @ X distance, Y distance (Fig 2)

Use relataive coordinates when you know the position of a point with respect to the previous point, the relative rectangular coordinate is represented in the following format.

Fig 2



Step 2: X displacement, Y-displacement

Command:_ line specify first point:2,2

Specify next point or [undo]: @ 4,0

Specify next point or [undo]: @ 0,4

Specify next point or [Close/ undo]: @ 0,-2

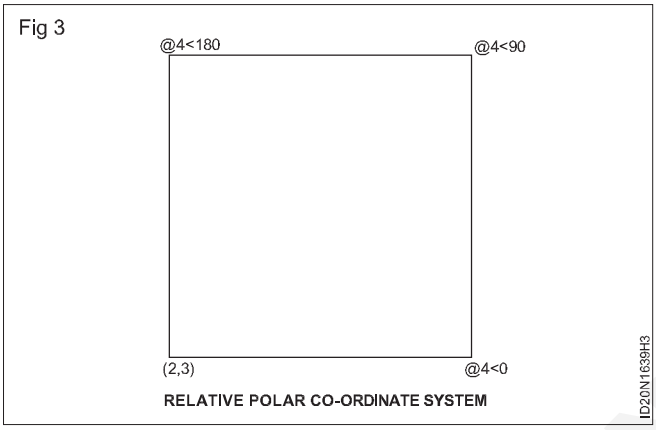
Specify next point or [Close/ undo]: @ -2,0

Specify next point or [Close/ undo]: @ c

Relative polar co-ordinate system @ distance angle (Fig 3)

Polar co-ordinate system uses a distance and an angle with reference to the previous point to locate a point. Angle is measured in anti-clock direction, taking 0° towards right.

Fig 3



RELATIVE POLAR CO-ORDINATE SYSTEM

The relative polar coordiante is representing in the following format. (Fig 4)

@Distance<angle

Command: _ line specify first point:2,3.

Specify next point or [undo]: @ 4<0.

Specify next point or [undo]: @ 4<90.

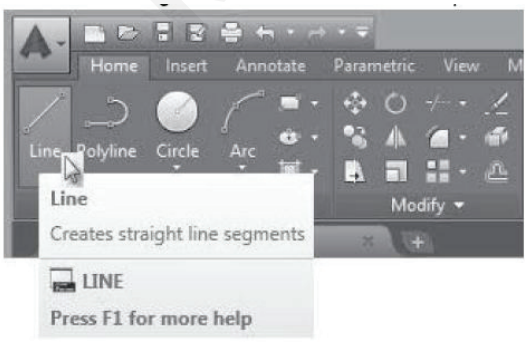
Specify next point or [close / undo]: @ 4<180.

Specify next point or [close / undo]:c.

Drawing lines with the line command

Step 1: Move the graphics cursor to the first icon in the draw panel. This icon is the **line** icon. Note that a brief description of the line command appears next to the cursor.

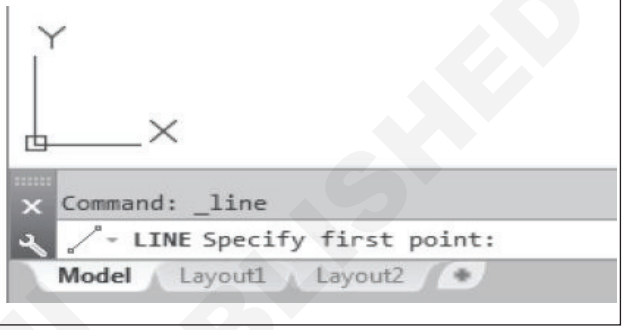
Fig 4



Step 2: Select the icon by clicking once with the **Left - mouse- button,** which will activate the line command. (Fig 4)

Step 3: In the command prompt area, near the bottom of the AutoCAD drawing screen, the message " - line specify point:" is displayed. (Fig 5) AutoCAD expects us to identify the starting location of a straight line. Move the graphics cursor inside the graphics window and watch the display of the coordinates of the graphics cursor at the bottom of the AutoCAD drawing screen. The three numbers represent the location of the cursor in the X,Y, and Z directions. We can treat the graphics window as if it was a piece of paper and we are using the graphics cursor as if it were a pencil with which to draw.

Fig 5



We will create a freehand sketch of a five - point star using the Line command. Do not be overly concerned with the actual size or the accuracy of your freehand sketch.

Step 4: We will start at a location about one - third from the bottom of the graphics window. Left - click once to position the starting point of our first line. This will be point 1 of our sketch. Next move the cursor upward and toward the right side of point 1 (Fig 6). Notice the rubber band line that follows the graphics cursor in the graphics window. Left - click again (point 2) and we have created the first line of our sketch. (Fig 7)

Fig 6

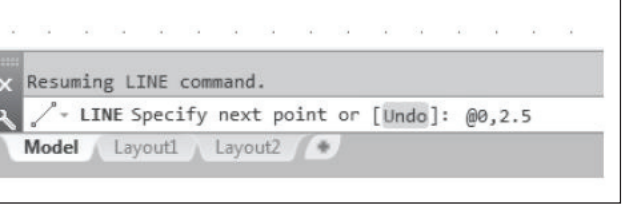
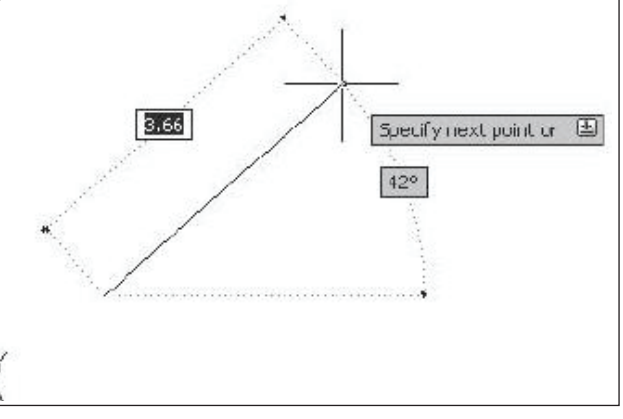


Fig 7

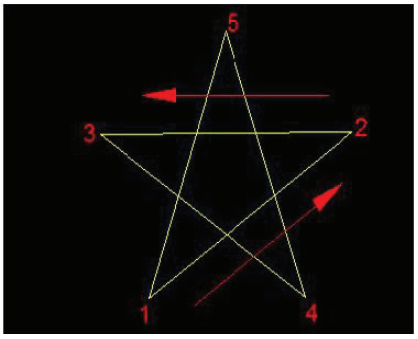


Step 5: Move the cursor to the left of point 2 and create a horizontal line about the same length as the first line on the screen.

Step 6: Repeat the above steps and complete the freehand sketch by adding three more lines (from point 3 to point 4, point 4 to point 5, and then connect to point 5 back to point 1).

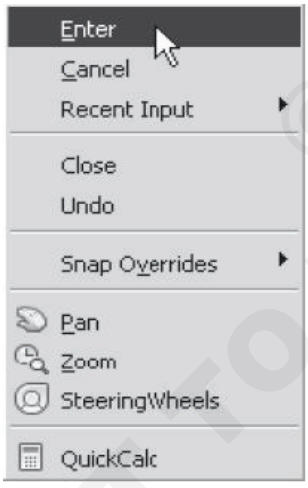
Step 7: Notice that the Line command remains activated even after we connected the last segment of the line to the starting point (point 1) of our sketch. (Fig 8) Inside the graphics window, **Click once** with the **right - mouse-button** and a popup menu appears on the screen.

Fig 8



Step 8: Select enter with the left - mouse - button to end the line command. (This is equivalent to hitting the [ENTER] key on the keyboard.) (Fig 9)

Fig 9



Step 9: Move the cursor near point 2 and point 3, and estimate the length of the horizontal line by watching the displayed coordinates for each point.

ERASE

There are 3 methods to **erase** (delete) objects from the drawing. You decide which one you preper to use. They all work equally well.

METHOD 1

Select the Erase command first and then select the objects

Step 1: Start the Erase command by using one of the following.

TYPING = E <enter>.

PULLDOWN = MODIFY / ERASE

TOOLBAR = MODIFY

Step 2: Select objects: **Pick one or more objects**

Select objects: **Press <enter> and the objects will disappear.**

METHOD 2

Select the objects first and then the Erase command from the shortcut menu

Step 1: Select the object (s) to be erased.

Step 2: Press the right mouse button.

Step 3: Select **"Erase"** from the short - cut mentu.

METHOD 3

Select the objects first and then the delete key

Step 1: Select the object (s) to be erased.

Step 2: Press the delete key.

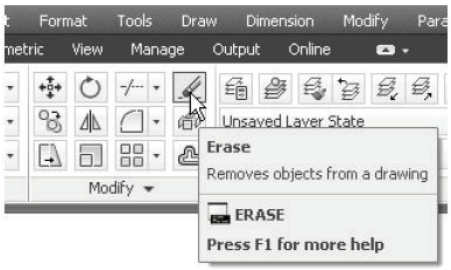
Very important : If you want the erased objects to return, press U <enter> or Ctrl + Z or the Undo arrow icon. This will "Undo" the effects of the last command.

Using the ERASE command

One of the advantages of using a CAD system is the ability to remove entities without leaving any marks. We will erase two of the lines usisnsg the Erase command.

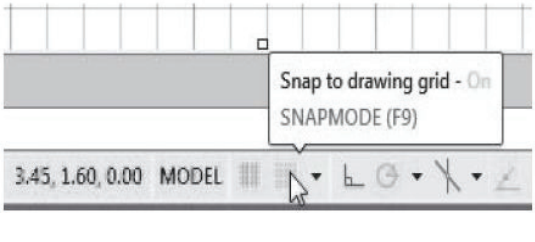
Step 1: Pick Erase in the modify toolbar. (Fig 10) (The icon is a picture of an eraser at the end of a pencil.) The message "Select objects" is displayed in the command prompt arrea and AutoCAD awaits us to select the objects to erase.

Fig 10



Step 2: Left - cllick the SNAP MODE button on the status bar to turn OFF the SNAP MODE option so that we can more easily move the cursor on top of objects. We can toggle the Status Bar options ON or OFF in the middle of another command. (Fig 11)

Fig 11



Step 3: Select any two lines on the screen; the selected lines are displayed as dashed lines as shown in the figure below.

To deselect an object from the selection set, hold down the [SHIFT] keyand select the object again.

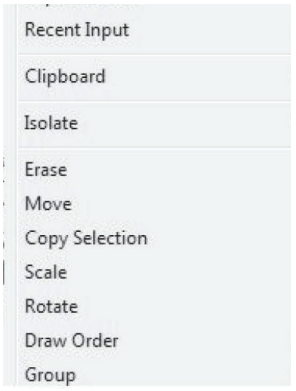
Step 4: Right - mouse - click once to accept the selections. The selected two lines are erased.

The last command

Step 1: Inside the graphics window, click once with the right- mouse-button to bring up the popup option menu.

Step 2: Click repeat erase, with the left - mouse - button, in the popup menu to repeat the last command. Notice the other options available in the popup menu. (Fig 12)

Fig 12



Step 3: Move the cursor to a location that is above and toward the left side of the entities on the screen. Left - mouse - click once to start a corner of a rubber - band window.

Move the cursor toward the right and below the entities, and then left-mouse-click to enclose all the entities inside the selection window. Notice all entities that are inside the window are selected.

Inside the graphics window, right-mouse-click once to proceed with erasing the selected entities. (Fig 13 & 14)

Fig 13

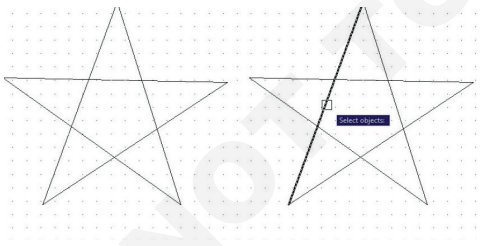
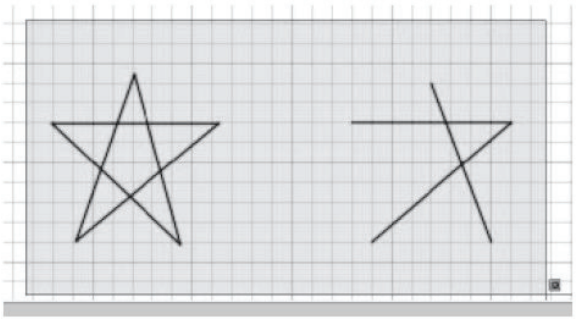


Fig 14



When your own create a free hand sketch of your choice using the line comman. Experiment with using the different commands we have discussed so far, Reset the satus button so that only the GRID DISPLAY option is turned ON as shown. (Fig 15)

Fig 15

Practice - I

Instructions

Step 1: Start a **New file**

Step 2: Draw the objects below using

LINE command.

Ortho (f8) **ON** for **Horizontal** and **Vertical** lines.

Ortho (f8) **OFF** for lines drawn on an **Angle.**

Increment Snap (f9) **ON** Osnap (f3) **OFF.**

Step 3: Save this drawing using:

Practice - II (Fig 16)

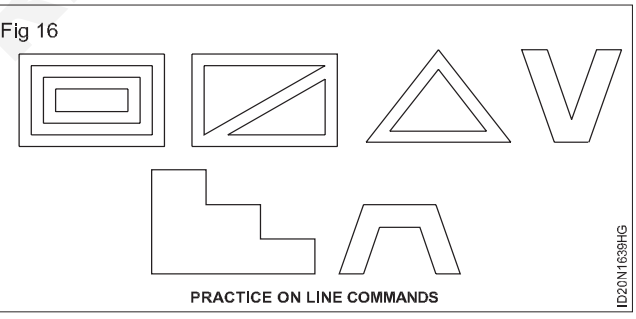
Instructions

Step 1: Using drawing DRG NO **ERASE** the missing lines.

Step 2: Save this drawing using:

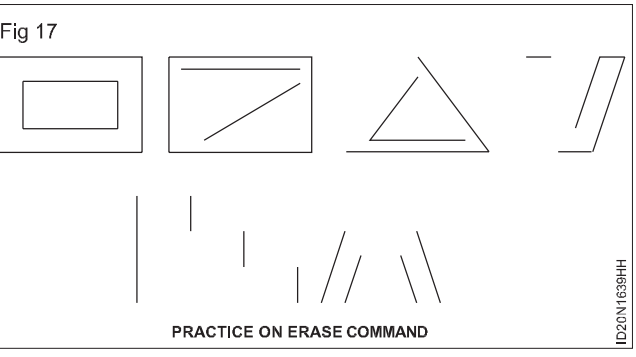
File / Save as / DRG NO.

Fig 16



Practice - III (Fig 17)

Fig 17



Instructions

Step 1: Start a **New** file. **(Fig 18)**

Step 2: Draw the objects below using.

Draw / Line.

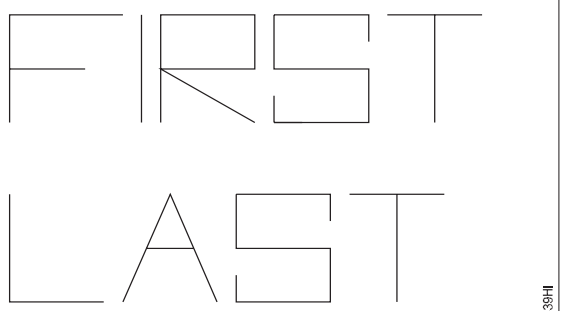
Ortho (f8) **ON** for **Horizontal** and **Vetical** Lines.

Ortho (f8) **OFF** for lines drawn on an **Angle**.

Increment Snap (f9) **ON**

Osnap (f3) **OFF**

Fig 18



Step 3: Save this drawing using.

File / Save as DRG NO.

Practice - IV (Fig 19)

Instructions

Step 1: Start a New file.

Step 2: Draw the objects below using

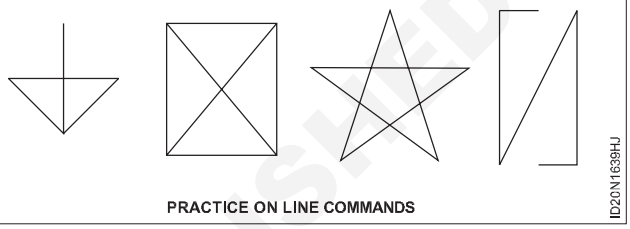
Draw / Line.

Osnap (f3) **OFF.**

Step 3: Save this drawing using.

File / Save as (give file name).

Fig 20



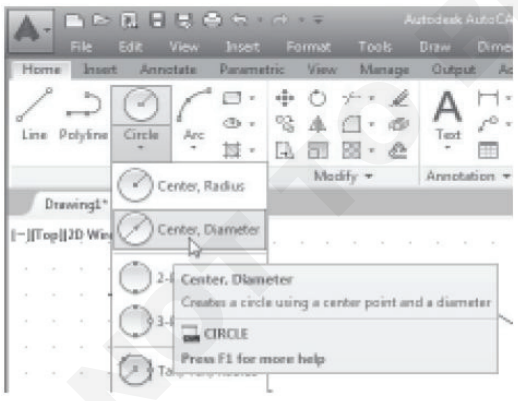
Basic commands - I

Objectives : At the end of this exercise you shall be able to
- **create circle**
- **create arcs**
- **creat polygon.**

Creating circles

The menus and toolbars is **AutoCAD 2013** are designed to allow the CAD operators to quickly activate the desired commands (Fig 1).

Fig 1



Step 1: In the Draw toolbar, click on the little triangle below the circle icon. Note that the little triangle indicates additional options are available.

Step 2: A circle based on two endpoints of the diameter.

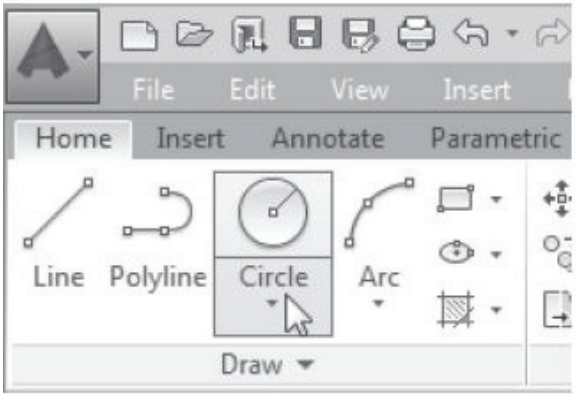
Notice the different options available under the circle submenu.

- **Center, radius:** Draws a circle based on a center point and a radius.
- **Center, diameter:** Draws a circle based on a center point and a diameter.
- **2 points:** Draws a circle based on two.
- **3 Points:** Draws a circle based on three points on the circumference.
- **TTR - Tangent, Tangent, Radius:** Draws a circle with a specified radius tangent to two objects.
- **TTT - Tangent, Tangent, Tangent:** Draws a circle tangent to three objects.

Circle

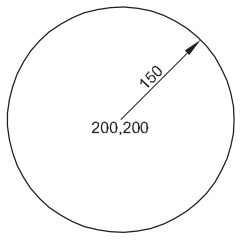
AutoCAD provides the following ways of drawing circles. (Fig 2).

Fig 2



Step 1: Centre and radius (Fig 3)

Fig 3



PRACTICE ON CIRCLE COMMAND

ID20N1639J3

This is the classical method. The first point define the circle's center,

The second one radius

Example

Command. : Circle or C.

3P / 2P / TTR /<Center point>. : 200,200.

Diameter / <Radius>. : 150.

Step 2: Centre and diameter (Fig 4)

After the circle's center has been defined the diameter can be given

Example

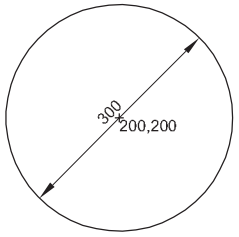
Command : Circle or C

3P/2P/TTR/<Center Point> : 200, 200

Diameter/<Radius> : D

Diameter : 300

Fig 4



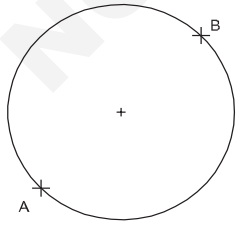
PRACTICE ON CIRCLE COMMAND

ID20N1639J4

Step 3: Points (Fig 5)

With this option, the user can specify two points constituting the end points of the circles diameter.

Fig 5



PRACTICE ON CIRCLE COMMAND

ID20N1639J5

Example

Command : Circle or C

3P/2P/TTT/<Center point> : 2P

First point on Diameter : 200,200

Second point on Diameter : 400,400

Step 4: 3 Points (Fig 6)

With this option the user can specify two points constituting the end points of the circles diameter.

Example

Command : Circle or C

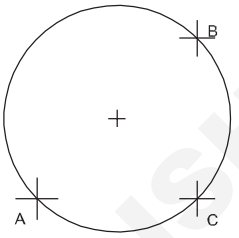
3P/2P/TTR/<Center point> : 3P

First point on Diameter : 200,200

Second point on Diameter : 400,400

Third point on Diameter : 300,350

Fig 6



PRACTICE ON CIRCLE COMMAND

ID20N1639J6

5 Tangent, tangent and radius (Fig 7)

This option allows the user to define two tangential points and then the circle's radius. In order to invoke this option it should have two entities draw. The circle can be drawn between Tangentially to two lines, two circles, or two Arc's or combination of any two.

Example

Command : Circle or C

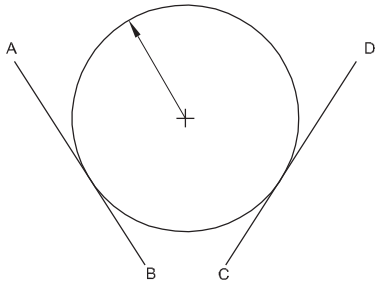
3P/2P/TTR/<Center point> : TTR.

Enter Tangent Space : Pick by using mouse on the entity drawn already.

Radius : 100

AutoCAD procides 11 different ways of drawing Arcs.

Fig 7



PRACTICE ON CIRCLE COMMAND

ID20N1639J7

1 3 Points (Fig 8)

In this method three points define the Arc's Start point, Second point that the Arc passes through, and the arc's end point. (Fig 9)

Fig 8

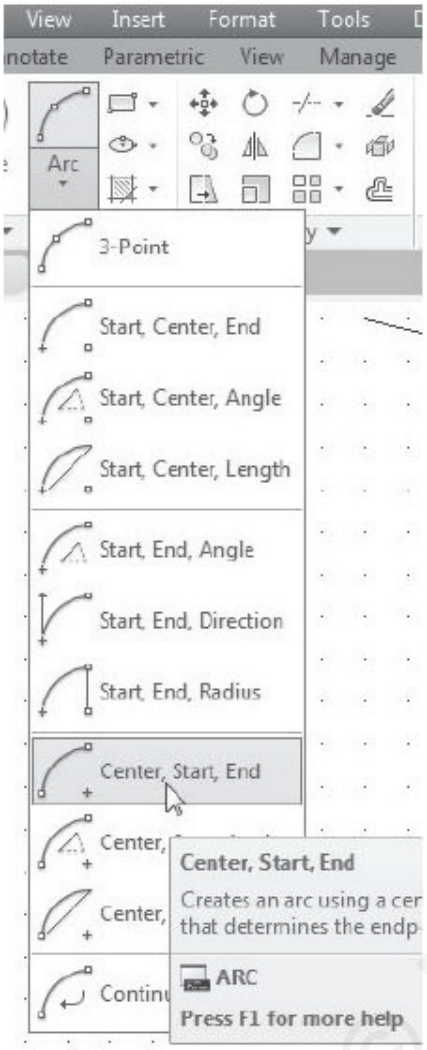
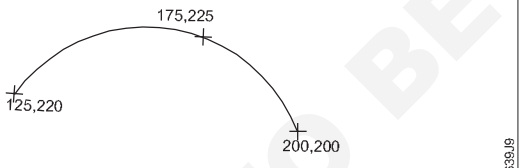


Fig 9



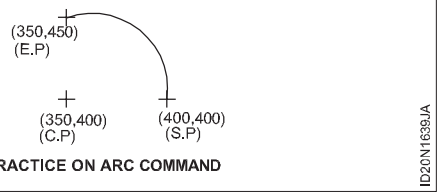
2 Start point, centre, end point (S,C,E) (Fig 10)

Center refers to the center point of the circle of while the arc is a part.

Example

Command	: Arc or A
Center/<Start point>	: 400,400.
Center/End<Second point>	: C.
Center point	: 350,400.
Angle/Length of chord/ <End point>	: 50,450.

Fig 10



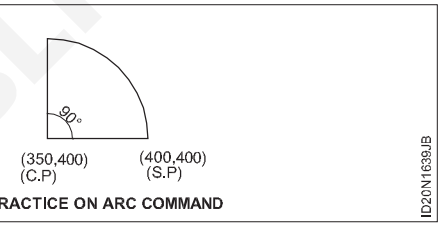
3 Start point, centre, included angle (S,C,A) (Fig 11)

In this method first specify the start point of the arc, then the center point or the arc, and then the include angle between the start point and the end point of the arc.

Example

Command	: Arc or A
Center/<Start point>	: 400,400.
Center/End<Second point>	: C.
Center point	: 350,400.
Angle/Length of Chord/ <End point>	: A.
Included Angle	: 90.

Fig 11



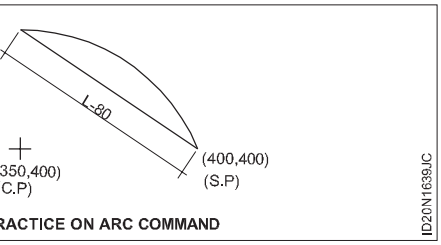
4 Start point centre, length of chord (S,C,L) (Fig 12)

In this method first specify the start point of the arc, then the center point of the arc and then the chord length.

Example

Command	: Arc or A.
Center/<Start point>	: 400,400.
Center/End<Second point>	: C.
Center Point	: 350,400.
Angle/Length of Chord/ <End point>	: L.
Length of Chord	: 80.

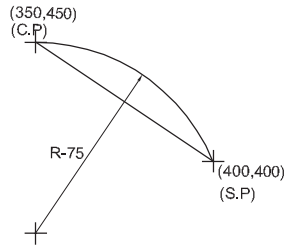
Fig 12



5 Start point, end point, radius (S,E,R) (Fig 13)

In this method first specify the start point of the arc, then the end point and finally the radius of the arc.

Fig 13



PRACTICE ON ARC COMMAND

ID20N1639JD

Example

Command	: Arc or A.
Center/<Start point>	: 400,400.
Center/End<Second point>	: E.
End point	: 350,450.
Angle/Direction/Radius/ <Center point>	: R.
Radius	: 75.

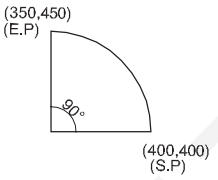
6 Start point, end point, included angle (S,E,A) (Fig 14)

In this method first specify the start point of the arc, then the end point and finally the included angle of the arc.

Example

Command	: Arc or A.
Cener/<Start Point>	: 400,400.
Center/End<Second point>	: E.
End point	: 350,450.
Angle/Direction/Radius/ <Center poinmt>	: A.
Included angle	: 90.

Fig 14



PRACTICE ON ARC COMMAND

ID20N1639JE

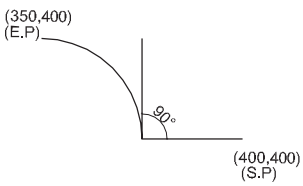
7 Start point, end point, starting direction (S,E,D) (Fig 15)

In this method first specify the start point of the arc, then the end point and finally the starting direction of the arc from the start point.

Example

Command	: Arc or A.
Center/<Start point>	: 400,400.
Center/End<Second point>	: E.
End point	: 350,450.
Angle/Direction/Radius/ <Center point>	: D.
Direction from start point	: 90.

Fig 15



PRACTICE ON LINE COMMANDS

ID20N1639JF

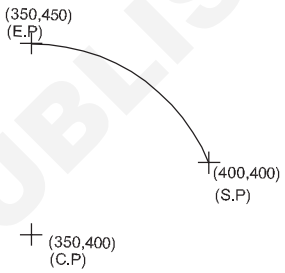
8 Start point, end point, centre point (S,E,C) Fig 16

In this method first specify the start point of the arc, then the end point and finally the center point of the arc.

Example

Command	: Arc or A.
Center/<Start Point>	:400,400.
Cener/End<Second point>	: E.
End point	: 250,450.
Angle/Direction/Radius/ <Center point>	: 350,400.

Fig 16



PRACTICE ON ARC COMMAND

ID20N1639JG

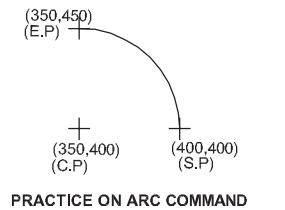
9 Centre point, start point, end point (C,S,E) (Fig 17)

In this method first specify the center point of the arc, then the start point and finally the end point of the arc.

Example

Command	: Arc or A.
Center/<Start point>	: C.
Center point	: 350,400.
Stat point	: 400,400.
Angle/Length of chord/ <End point>	: 350,450.

Fig 17



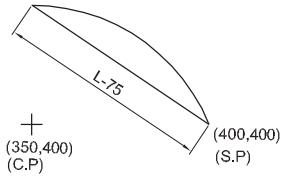
PRACTICE ON ARC COMMAND

ID20N1639JH

10 Centre point, start point, length of the chord (C,S,L) (Fig 18)

In this method first specify the center point of the arc, then the start point and finally the length of chord.

Fig 18



PRACTICE ON ARC COMMAND

ID20N1639JI

Example

Command : Arc or A.

Center/<Start point> : C.

Center point : 350,400.

Stat point : 400,400.

Angle/Length of chord/<End point> : L.

Length of chord : 75.

11 Centre point, start point, included angle (C,S,A) (Fig 19)

In this method first specify the center point of the arc, then the start point and finally the included angle.

Example

Command : Arc or A.

Center/<Start point> : C.

Center point : 350,400.

Stat point : 400,400.

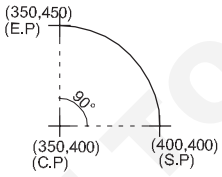
Angle/Length of chord/<End point> : A.

Included angle : 90.

Ellipse

This command approximates an ellipse is to choose the default options:

Fig 19



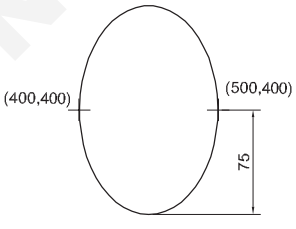
PRACTICE ON ARC COMMAND

ID20N1639JJ

1 Ellipse by axis and eccentricity (Fig 20)

Example

Fig 20



PRACTICE ON ELLIPSE COMMAND

ID20N1639JK

Command : Ellipse or EL.

Axis end point of ellipse or (Arc/Center) : 400,400.

Other end point of axis : 500,400.

Distance to other axis or [Rotation] : 75.

2 Ellipse by axis and rotation (Fig 21)

Example

Command : Ellipse or EL.

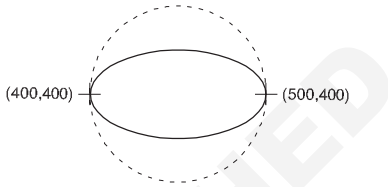
Axis end point of ellipse or (Arc/center) : 400,400.

Other end point of axis : 500,400.

Distance to other axis or [Rotation] : R.

Rotation around major axis : 60.

Fig 21



PRACTICE ON ELLIPSE COMMAND

ID20N1639JL

3 Ellipse by centre and two axes (Fig 22)

Example

Command : Ellipse or EL.

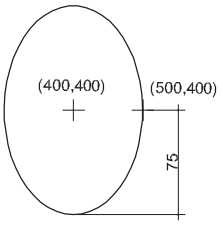
Axis end point of ellipse or (Arc/center) :400,400.

Center of ellipse : 400,400.

Axis end point : 500,400.

Distance to other axis or [Rotation] : 75.

Fig 22



PRACTICE ON ELLIPSE COMMAND

ID20N1639JM

4 Ellipse by centre, one axis, and rotation (Fig 23)

Example

Command : Ellipse or EL.

Axis end point of ellipse or (Arc/center) : C.

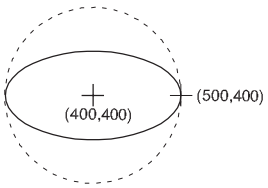
Center of ellipse : 400,400.

Axis end point : 500,400.

Distance to other axis or [Rotation] : R.

Rotation around major axis : 60.

Fig 23



PRACTICE ON ELLIPSE COMMAND

ID20N1639JN

Polygon

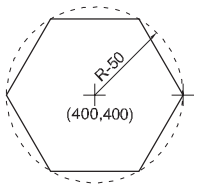
This command allows the user to draw regular 2D polygons.

1 Centre of polygon, inscribed circel, radius (Fig 24)

Example

Command	: POL.
POLYGON Enter number of sides <default>	: 6.
Center of polygon or [Edge]	: 400,400.
[Inscribed in circle/ Circumscribed about circle]<I>	: I.
Specify radius of circle	: 50.

Fig 24



PRACTICE ON POLYGON COMMAND

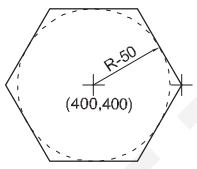
ID20N1639JO

2 Centre of polygon, circumscribed about circle radius of circle (Fig 25)

Example

Command	: Polygon/POL.
POLYGON Enter number of sides<default>	: 6.
Center of polygon or [Edge]	: 400,400.
[Inscribed in circle/ Circumscribed about circle]<I>	: C.
Radius of circle	: 50.

Fig 25



PRACTICE ON POLYGON COMMAND

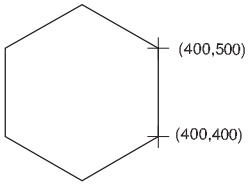
ID20N1639JP

3 Edge option (Fig 26)

Example

Command	: Polygon/POL
POLYGON Enter number of sides <default>	: 6.
Center of polygon or [Edge]	: E.
First end point of edge	: 400,400.
Second end point of edge	: 400,500.

Fig 26



PRACTICE ON POLYGON COMMAND

ID20N1639JQ

Doughnut (Donut) (Fig 27)

This command allows the user to draw filled circles and rings

Example of filled circle option

Command	: Donut.
Inside diameter <default>	: 0.
Out side diameter <default>	: 50.
Center of doughnut	: 100,100.

Fig 27

PRACTICE ON DOUGHNUT COMMAND

ID20N1639JR

Example for rings (Fig 28)

Command	: Donut.
Inside diameter <default>	: 30.
Out side diameter <default>	: 50.
Center of doughnut	: 100,100.

Fig 28

PRACTICE ON DOUGHNUT COMMAND

ID20N1639JS

Basic commands - II

Objectives : At the end of this exercise you shall be able to
- **erase oops move copy offset rotate**
- **scale fillet trim champer extend break**
- **join mirror array strech lengthen explode.**

Modifying commands

Modifying commands are used for modifying the existing drawings. Thus it helps to prepare a final drawing incorporating the necessary changes and a lot of time is saved. Modifying commands are properties, erase, copy, mirror, offset, array,move,rotate, scale, trim, extend, explode etc.

1 Erase (Fig 1)

This command allows the user to specify entities permanently removed from the drawing. The selection can be made with any of the standard SELECT OBJECT method.

Tool bar : Modify, Erase.

Pull down : Modify, Erase.

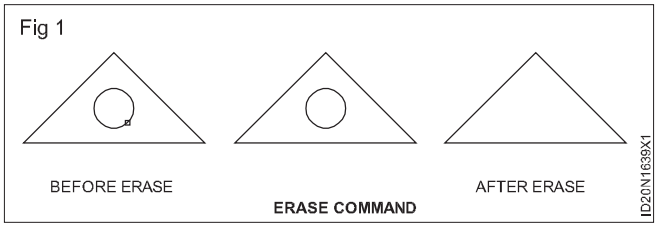
Command : Erase./ E.

Example

Command : Erase or E.

Select objects : Select the objects using mouse.

Select objects :



2 Oops (Fig 2)

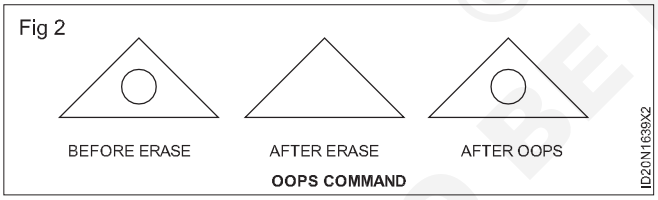
This command restore objects that have been unexpectedly erased by the previous ERASE command

Example

Command : Erase or E

Select objects : Select the objects using mouse

Command : Oops



3 Move (Fig 3)

This command is used to move a single or a set of objects to a new location on a drawing.

Tool bar : Modify, Move.

Pull down : Modify, Move.

Command : Move / M.

Example

Command : Move or M.

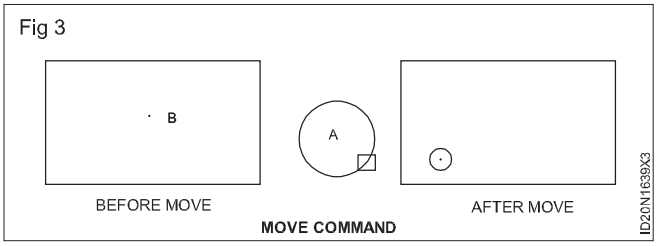
Select objects : Select circle.

Select objects : One found.

Select objects :

Base point or displacement : Click A as basepoint.

Second point of displacement : Select B.



4 Copy (Fig 4)

Tool bar : Modify, Copy.

Pull down : Modify, Copy.

Command : Copy.

This command is used to copy the existing drawing to another place.

Example

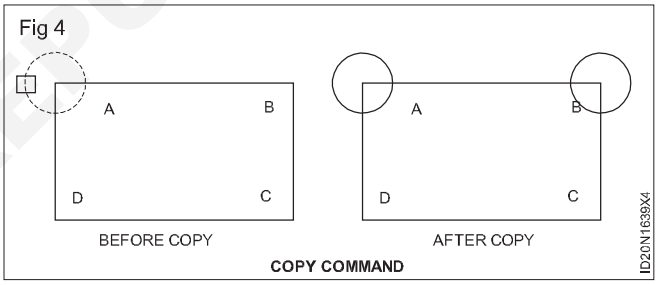
Command : Copy or Co or CP

Select objects : Select object to Copy

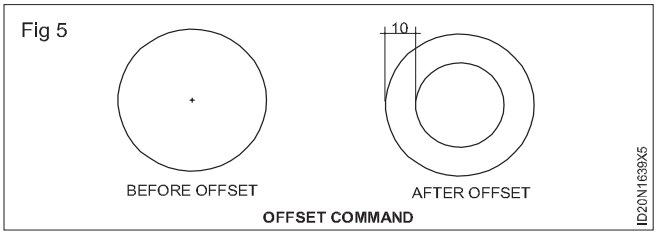
Select objects : One found

Base point or displacement : Select a base point.

Second point of displacement : Drag cursor at desired place and click mouse.



5 Offset (Fig 5)



Tool bar : Modify, Offset.

Pull down : Modify, Offset.

Command : Offset / O.

This command is used to draw parallel lines, concentric circle, arcs etc. When offset is used, it is necessary to specify the offset distance and side of offset.

Command : Offset or O.

Offset distance or through <current> : 10.

Select the object : Select the circle.

Side to offset : Specify the side for offsetting.

6 Rotate (Fig 6)

This command is used to rotate an object or set of objects to a specified angle.

Tool bar : Modify, Rotate.

Pull Down : Modify, Rotate.

Command : Rotate / Ro.

Example

Command : Rotate / Ro.

Select objects : Select the object by window.

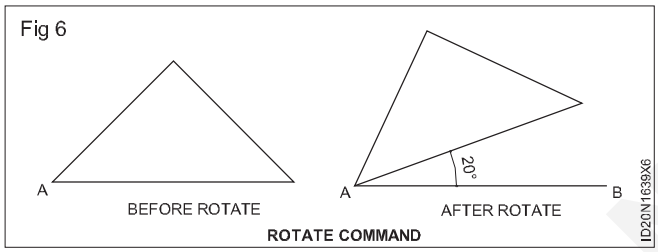
Select objects : Three found.

Select objects :

Specify base point or displacement: Click A as basepoint.

Specify rotation angle or [Copy / Reference] < default>:

Specify rotation angle or [Copy / Reference] < default>: 20.



7 Scale (Fig 7)

This command is used to change the size of an object

Tool bar : Modify, Scale

Pull down : Modify, Scale

Command : Scale / SC

Example

Command : Scale / SC

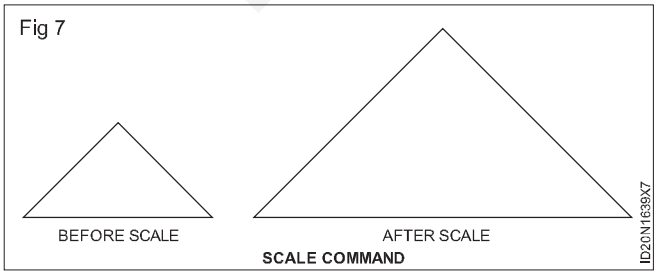
Select objects : Select the object by window.

Select objects : Three found.

Select objects :

Specify scale factor or : 2.

[Copy/Reference]<Default>



8 Fillet (Fig 8)

This command is used to connect two parallel lines, arcs etc., smoothly by a curve of specified radius.

Tool bar : Modify, Fillet.

Pull down : Modify, Fillet.

Command : Fillet or F.

Example

Command : Fillet or F

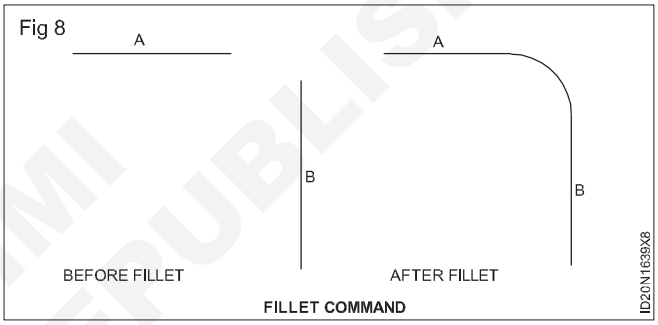
Current settings : TRIM, Radius = 0,0000

Select first object or [Undo/Polyline/Radius/Trim/ Multiple]: R

Specify fillet radius<0.0000>

Select first object or [Undo/Polyline/Radius/Trim/ Multiple]: Select A

Select second object or shift - selected to apply corner: Select B



9 Trim (Fig 9)

This command is used to removed a part of a line, circle or arc based on a cutting edge.

Tool bar. : Modify, Trim.

Pull Down. : Modify, Trim.

Command : Trim or TR

Example

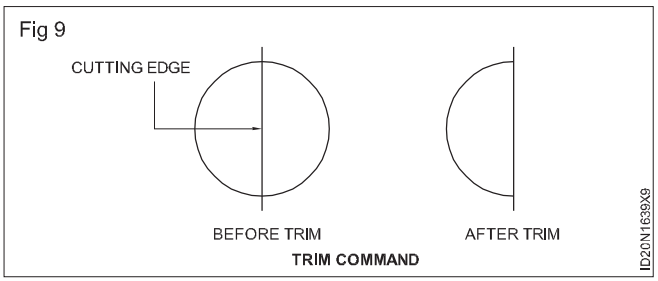
Command : TR TRIM.

Select objects or <Select all>: Select cutting edge, 1 found

Select objects:

Select object to trim of shift - select to extend or

[Fence / Crossing / Project / Edge / eRase / Undo]: Select object to trim.



Select object to trim or shift - select to extend or

[Fence / Crossing / Project / Edge/ Erase/ Undo]:

10 Chamfer (Fig 10)

This command is used to join two non parallel lines with an intermediate line. It produces an inclined surface at the edge of two intersetting lines.

Tool bar : Modify, Chamfer.

Pull down : Modify, Chamfer.

Command : Chamfer or CHA.

Example

Command : Chamfer or CHA.

(TRIM mode) Current chamfer Dist1 <Default>, Dist2 <Default>.

Select first line or [Undo Polyline/Distance/Angle/.

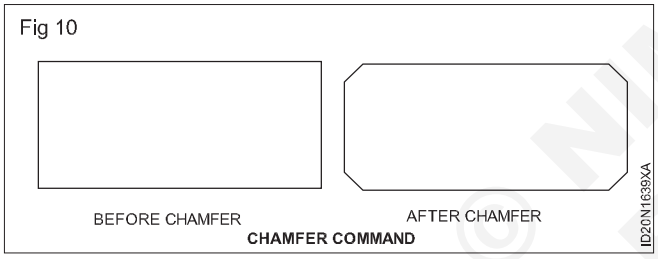
Trim/mEthod/Multiple] : D.

Specify first chamfer distance <0.5000>.

Specify second chamfer distance <3.0000>.

Select first line:

Select second line:



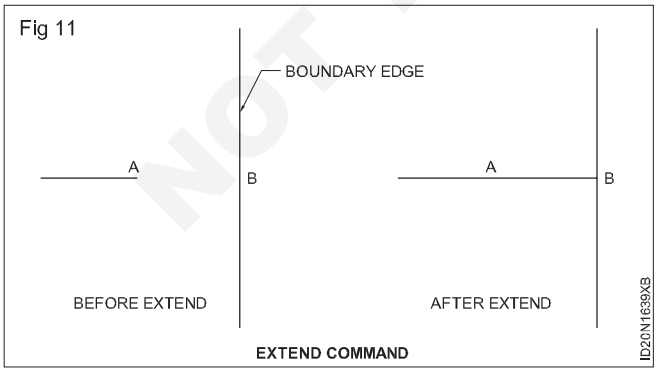
11 Extend (Fig 11)

This command is used to extend the shorter lines to meet another object.

Tool bar : Modify, Extend.

Pull down : Modify, Extend.

Command : Extend or EX.



Example

Command : Extend or EX.

Select boundary

edges.

Select objects

or <Select all> : Select A, 1 found.

Select objects:

Select object to extend or shift - select to trim or [Fence/ Crossing/Project/Edge/Undo]:Select B.

Select object to extend or shift - select to trim or [Fence/ Crossing/Project/Edge/Undo]:

12 Break (Fig 12)

This command is used to erase a part of an object between two points.

Tool bar : Modify, Break.

Pull Down : Modify, Break.

Command : Break or BR.

Example1 : To break a line

Command : Break or BR.

Select objects : Select A.

Specify second

break point : Select B.

13 Join (Fig 13)

This command is used to join two lines.

Tool bar : Modify, Join.

Pull down : Modify, Join.

Command : Join or J.

Example

Command : Join or J. Select source object.

Select lines to

join to source : Select A and B.

14 Mirror (Fig 14)

Tool bar : Modify, Mirror.

Pull down : Modify, Mirror.

Command : Mirror or MI.

This command is used to create a miror image of the select objects. After selecting the objects the beginning point and end point of a mirror line is entered.

Example

Command : Mirror.

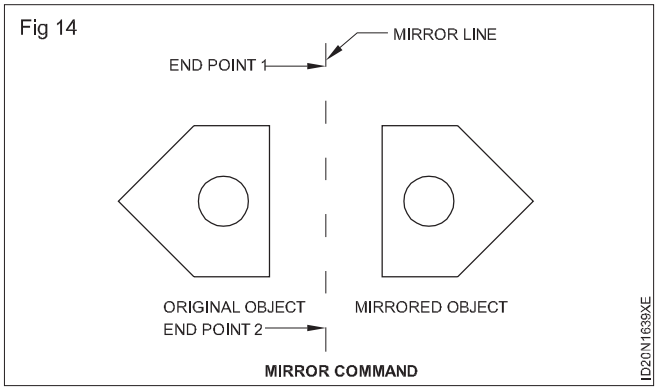
Select object : Select the object.

Select object :

First point of mirror line : Specify the first point.

Second point : Specify the second point.

Delete old object ? retaining <N> : Enter Y for deletion, N for the previous object.



15 Array (Fig 15)

Tool bar : Modify, Array.

Pull down : Modify, Array.

Command : Array or AR.

This command is used to make multiple copies of an object in rectangular or polr (circulr) patterns.

Example : 1

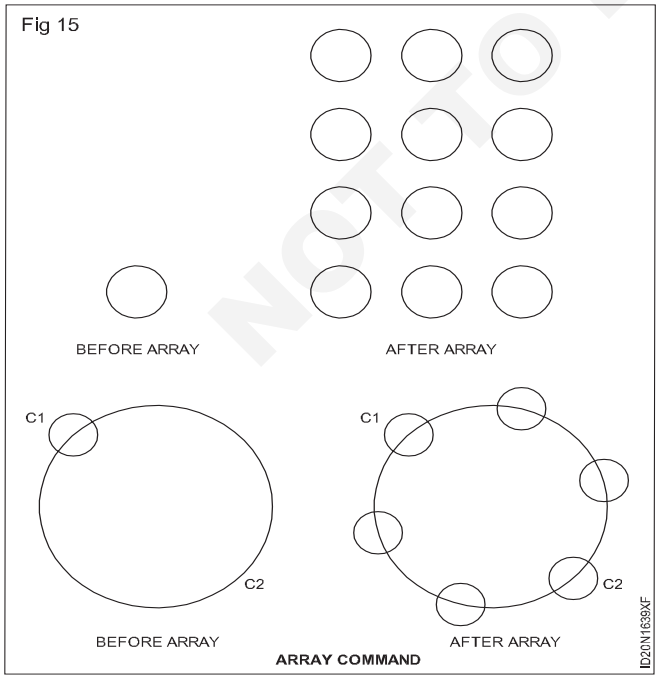
Command : Array.

Select objects : Select circle of radius 5.

Rectangular or polar array (R/P) : R.

Number or rows (----) <1> : 4.

Number of columns (III) <1> : 3.



Unit cell or distance between Rows (----) : 3.

Distance between columns (III) : 3.

Example : 2

Command : Array.

Select objects : Select circle C1.

Rectangular or polar Aarray (R/P) : P.

Base /<Centre point of Array> : Select circle C2.

Number or Items : 4.

Angle to fill <360> : Press to acept 360°.

Rotate objects as they are copied ? <Y> : Enter Y or N.

16 Strech (Fig 16)

Tool bar : Modify, Strech.

Pull down : Modify, Strech.

Command : Strech or S.

This command is used to lenghten or shorten the line or objects.

Example : 1

Command : STRETCH.

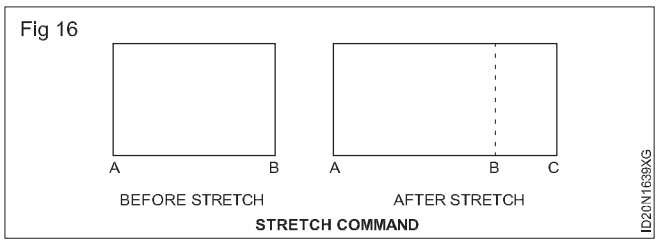
Select objects to stretch by crossing - window

Select objects : Select A and B by crossing - window.

Select objects :

Specify base point or [Displacement] <Displacement>.

Specify second point: Mouse click at C.



17 Lenthen (Fig 17)

Tool bar : Modify, Lengthen.

Pull down : Modify, Lengthen.

Command : Lengthen or LEN.

This command is used to lengthen or shorten a line.

Example : 1

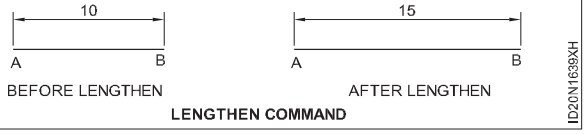
Command : LEN or LENGTHEN.

Select an object or [DElta/Percent/Total/Dynamic]: T

(Current length: 10).

Specify total length of [Angle] <1.0000)>:15.

Fig 17



LENGTHEN COMMAND

Select an object to change or [Undo]: Select line AB

Select an object to change or [Undo]

18 Explode (Fig 18)

Tool bar : Modify, Explode.

Pull down : Modify, Explode.

Command : Explode or X.

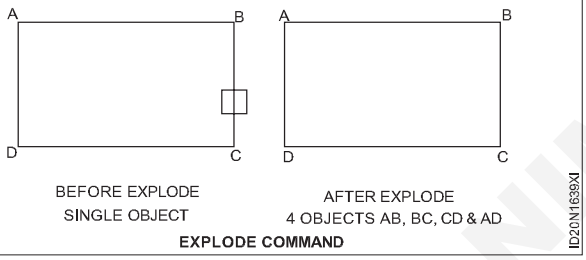
This command will split the component objects such as blocks, polylines, regions etc. If you explode a ploy line the result will be ordinary lines or arcs.

Example : 1

Command : EXPLODE or X.

Select an object : Select the rectangle.

Fig 18



EXPLODE COMMAND

19 SCALE (Fig 19)

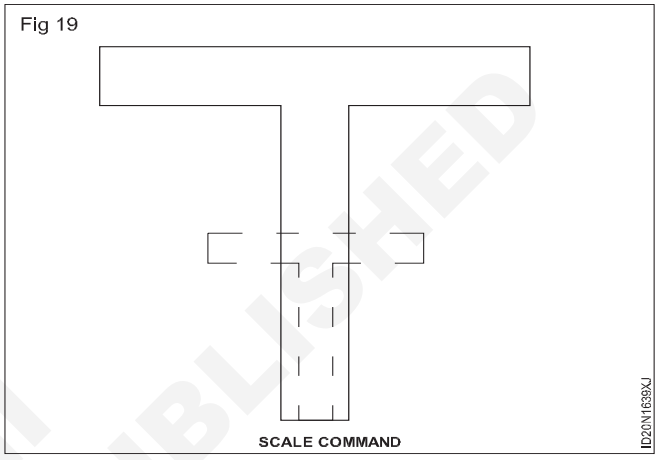
Choose	Modify, Scale.
Click	the Scale icon.
Type	SCALE at the command prompt.
	Command : SCALE.
	Select objects: (Select Objects).
Pick	A pivot point to scale about base point : (point).
Type	A rotation angle <Scale factor> / Reference: (number).
	or
Pick	A scale factor< Scale Factor>/ Reference: (Point).
	Scale factor / Reference: (points).

Scale by specifying length

You can show AutoCAD the reference length (by pointing to the two endpoints of a line to be scaled), and then specify the new length. You can specify the new length by pointing, or by dragging the object.

1	Type	R to define a reference length
		Scale factor / Reference: (R)
2	Choose	A reference scale factor.
		Reference length; (number or points)
3	Choose	A new scale factor.
		New length: (number of points) .

Fig 19

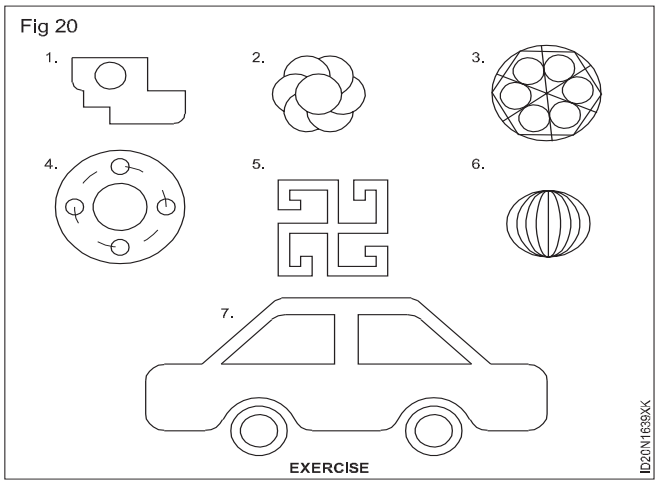


SCALE COMMAND

You can be closed to form enclosed to form enclosed shapes. A closed multiline automatically joins the beginning and end of the shape. When you are drawing a multiline shape, the command option ‘c’ closes the shape otherwise just press enter to finish the command.

Editing multiline (Fig 20)

Fig 20



EXERCISE

Basic commands - III

Objectives : At the end of this exercise you shall be able to
- **point rectangle**
- **revision cloud spline multilines**
- **construction line (xline) ray hatch.**

1 Point

This command is used to display a point on the screen (Drawing area).

Enter

Command : Point.

Point : 5,6.

Changing the point type.

Normally the point appears as a dot on the screen, the style in these dialog box by clicking the pointing device (mouse) then select the OK button.

Enter

Command : PDMODE.

Pull down : Format, point style.

While using the pull - down menu, the point style dialogue box will appear select a point style in this dialog box by clicking the pointing device (mouse) then select the OK button.

Enter

Command : PDMODE.

New value for PDMODE<current>: Enter new value (2) .

Command : Point.

Point : (2.2).

2 Rectangle

This command is used to draw Rectangle.

Example

Command : RECTANGLE / REG.

First comer or (Chamfer / Elevation / Fillet / Thickness / Width) : 2,1

Other corner (Area / Dimension / Rotation): 5,6.

Chamfer : Used for chamfering the edges.

Fillet : Used for filleting the edges.

Width : to change the width.

Thickness: allows to draw rectangle that projects in Z-direction by the specified value of thickness.

Elevation: allows to draw a rectangle at a specified distance from the XY-plane along the Z-axis.

3 Poly line

This command is used to draw poly lines. The PLINE command functions like the LIKE command with additional option like arc, length, width, etc.

Example

Command : P LINE.

Start point : select a point.

Current the width is 0.0000.

Next point or (Arc / Half width / Length / Undo / Width):

Select P1.

Next point or (Arc / Close / Half width / Length / Undo / Width): Select P2.

i **Width:** To change the width of the poly line, enter W atlast prompt. It asks you to enter the starting width and ending width of the poly line.

ii **Undo:** This erase the most recently drawn poly line segment. This can be invoked by entering U at the last prompt.

iii **Length:** This asks you to enter the length of a new poly line segment. This can be invoked by entering U at the last prompt.

iv **Half width:** This is used to specify the starting and ending hald width or a poly line. This can be invoked by entering H at last prompt.

v **Arc:** This is used to draw poly arcs from the previous point. It provides the various option for drawing poly arcs. The Arc option can be invoked by entering a last prompt.

4 Revision cloud (Fig 1)

This command is used to high light your mark-ups.

Example

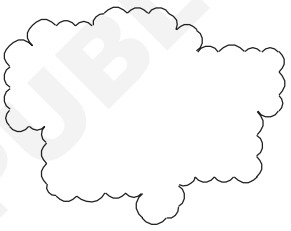
Command : REVCLOUD.

Minimum arc length: 2.0000 Maximum arc length: 3.0000 Style: Normal specify start point or (Arc length / object / Style) <Object>: Specify start point.

Guide crosshairs along cloud path:

Revision cloud finished.

Fig 1



REVISION CLOUD COMMAND

ID20N1639Y1

5 Spline (Fig 2)

Example

Command : SPLINE.

Specify first point or [Object]: Click on the first point.

Specify next point: <Ortho off>.

Specify next point or [Close/Fit tolerance] <start tangent>: Click on the point.

Specify next point or [Close/Fit tolerance] <start tangent>: Click on the point.

Fig 2

SPLINE COMMAND

ID20N1639Y2

Specify next point or [Close/Fit tolerance] <start tangent>: Click on the point.

Specify next point or [Close/Fit tolerance] <start tangent>: Click on the point.

Specify next point or [Close/Fit tolerance] <start tangent>: Enter.

Practice 1: Instructions (Fig 3)

Step 1: Start a New file and select 1 workbook helper. Dwt.

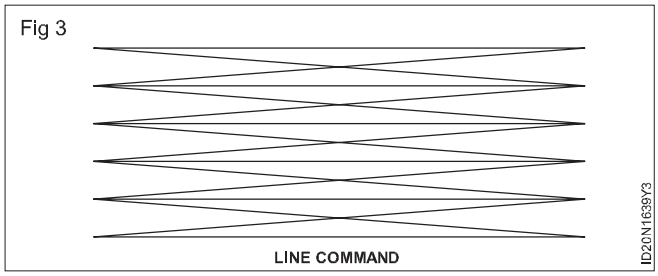
Step 2: Draw the objects below using:

DRAW / LINE.

ORTHO ON for Horizontal lines.

OBJECT SNAP = ENDPOINT.

Step 3: Save this drawing as.



Practice 2: Instructions a (Fig 4)

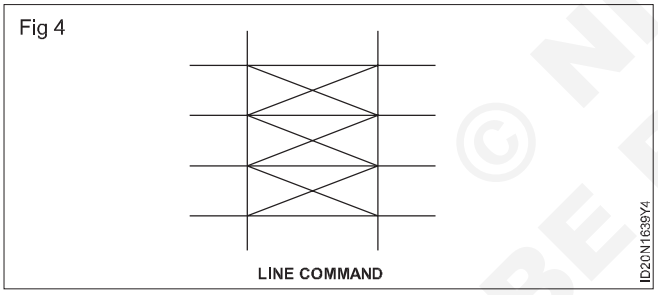
Step 1: Start a New file and select 1 workbook helper. Dwt

Step 2: Draw the 2 vertical and 4 horizontal lines using.

DRAW / LINE.

ORTHO (F8) = ON.

SNAP (F9) = OFF.



Step 3: Then draw the diagonal lines using.

DRAW / LINE.

ORTHO & SNAP = OOF.

OBJECT SNAP = INTERSECTION.

Step 4: Save this drawing as. (Fig 4A)

Practice 3: Instructions

Step 1: Start a New file and select 1 workbook dwt.

Step 2: Using FORMAT / UNITS:

Set the units to DECIMALS.

Set the precision to 0.00.

Step 3: Using FORMAT / DRAWING LIMITS set the drawing limits to :

Lower left corner = 0,0.

Upper right corner = 12,9.

Step 4: Use view/zoom/ all to make the screen adjust to the new limits.

Step 5: Turn OFF the GRIDS (F7) SNAP (F9) and ORTHO (F8)

(Your screen should be blank and your crosshair should move freely).

Step 6: Draw the Lines below using.

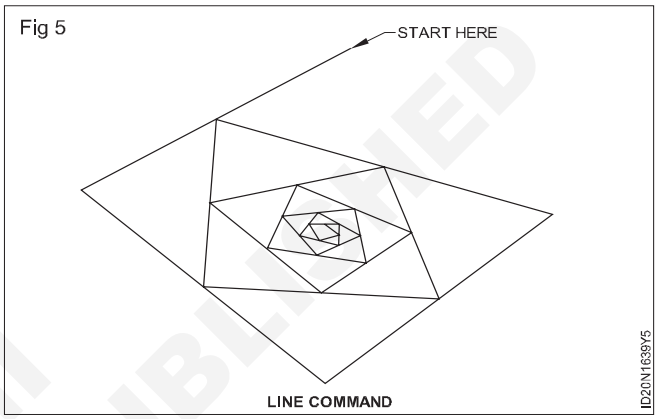
DRAW / LINE.

OBJECT SNAP = MIDPOINT.

Step 7: Save this drawing as.

Practice 4: Instructions (Fig 5)

Step 1: Using a new file and select 1 workbook helper. dwt.



Step 2: Using FORMAT / UNITS

Set the units to ARCHITECTURAL

Set the precision to ½"

A warning may appear asking you if you "are sure you want to change the units"? Select the OK button.

Step 3: Using FORMAT / DRAWING LIMITS set the drawing limits to.

Lower left corner = 0.0

Upper right corner = 25, 20

Step 4: Use VIEW / ZOOM / ALL to make the screen adjust to the new limits.

Step 5: Turn OFF the GRIDS (F7) SNAP (F9) and ORTHO (F8)

(Your screen should be blank and your crosshair should move freely)

Step 6: Draw the Lines below using.

DRAW / LINE

OBJECT SNAP = MIDPOINT.

Step 7: Save this drawing as.

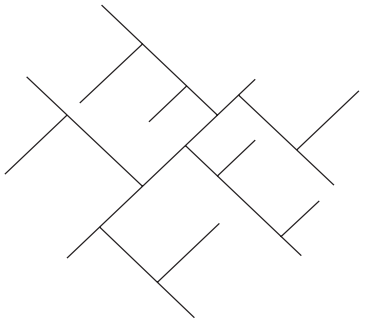
Practice 5: Instructions (Fig 6)

Step 1: Start a New file and select 1 workbook helper. dwt.

Step 2: Draw the house below using at least 4 commands.

Step 3: You can change the GRID and INCREMENT SNAP setting to whatever you like.

Fig 6



LINE COMMAND

ID20N1639Y6

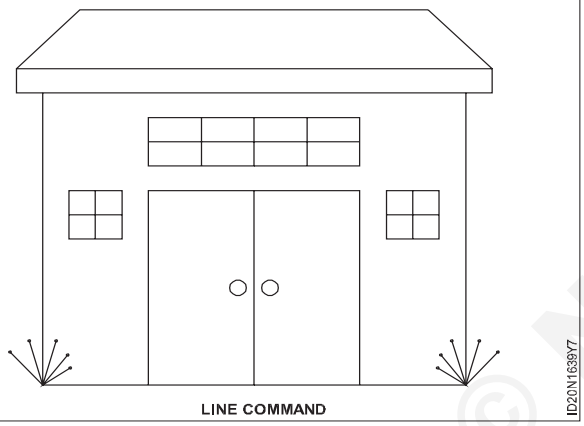
Step 4: You decide when to turn Ortho and Snap On or Off. Have some fun with this one.

Step 5: Save this drawing as.

Practice 6: Instructions (Fig 7)

Step 1: Start a New file and select 1 workbook helper. dwt.

Fig 7



LINE COMMAND

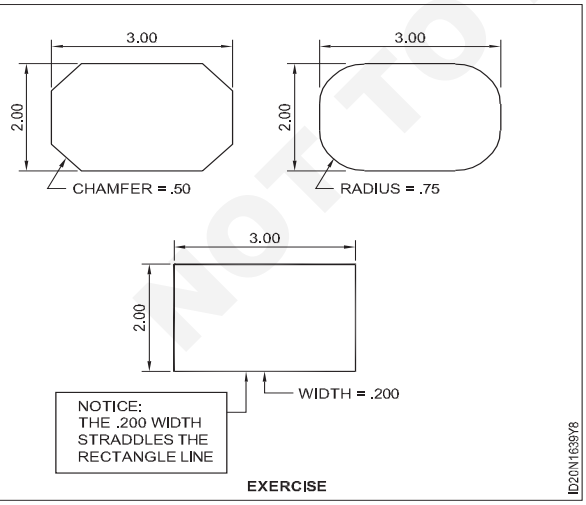
ID20N1639Y7

Step 2: Draw the rectangles below using the options, dimension, chamfer, fillet and width.

Step 3: Save this drawing as.

Practice 7: Instruction (Fig 8)

Fig 8



EXERCISE

ID20N1639Y8

Step 1: Start a New file and select 1 workbook dwt.

Step 2: Using FORMAT / UNITS:

Set the units to FRACTIONAL

Set the precision to ¼".

Step 3: Using FORMAT / DRAWING LIMITS set the drawing limits to:

Lower left corner = 0,0.

Upper right corner = 12,9.

Step 4: Use VIEW / ZOOM / ALL to make the screen adjust to the new limits.

Step 5: Turn OFF the GRIDS (F7) SNAP (F9) and ORTHO (F8).

(Your screen should be blank and your crosshair should move freely).

Step 6: Draw the objects below using:

DRAW / CIRCLE (CENTER, RADIUS) and LINE.

OBJECT SNAP = QUADRANT.

7 Save this drawing as.

Practice 8: Instructions (Fig 9)

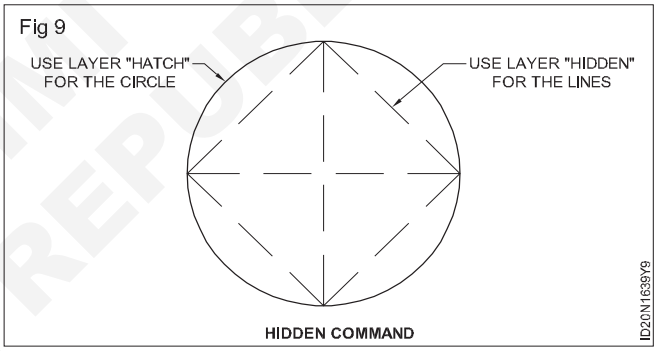
Step 1: Start a New file and select 1 workbook dwt.

Step 2: Using FORMAT / UNITS.

Set the units to FRACTIONAL.

Set the precision to ½".

Fig 9



HIDDEN COMMAND

ID20N1639Y9

Step 3: Using FORMAT / DRAWING LIMITS set the drawing limits to:

Lower left corner = 0,0.

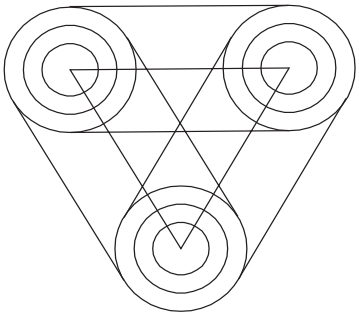
Upper right corner = 20,15.

Step 4: Use view/zoom/all to make the screen adjust to the new limits.

Step 5: Turn OFF the GRIDS (F7) SNAP (F9) and ORTHO (F8).

(Your screen should be blank and your crosshair should move freely).

Fig 10



EXERCISE

ID20N1639YA

Step 6: Draw the objects below using

DRAW / CIRCLE (CENTER, RADIUS) and LINE.

OBJECT SNAP = CENTER and TANGENT.

Very important: Use the Tangent option at each end of the line. AutoCAD needs to be told that you want each end of the line to be tangent to a circle.

Step 7: Save this drawing as. (Fig 10)

6 Multilines (Fig 11)

This command allows you to draw between 1 and 16 lines parallel to each other. You must tell AutoCAD the distance between the parallel lines.

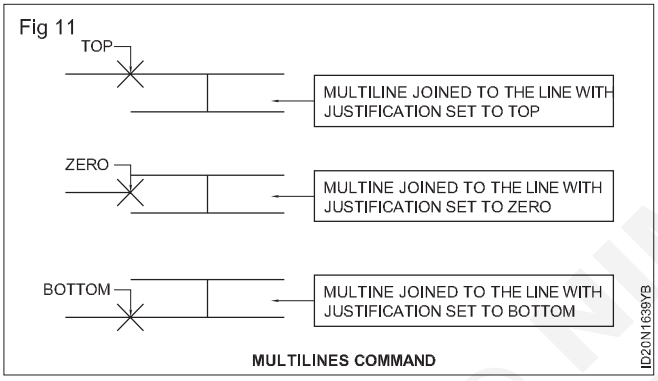
Pull down menu : Draw, Multiline.

Command : Draw multiline, ml.

Once the command is issued, Autocad responds with

Current settings: Justification = Top, Scale = 1.00, Style= STANDARD.

Fig 11



Specify start point or [Justification/Scale/Style]:

Scale is the distance in units between the parallel lines. Justification determines where the start point of a vertex is. Both these settings are illustrated in the diagram below. Top, Zero and Bottom refer the justification.

Multiline can be closed to form enclosed to form enclosed shapes. A closed multiline automatically joins the beginning and end of the shape. When you are drawing a multiline shape, the command option 'c' closes the shape otherwise just press enter to finish the command.

Editing multiline

Command line: mledit

Menu: Modify, object, multiline

When the command is issued, the mulitiline edit tools dialogue box is displayed. The box is divided in to four columns. Each column helps you to edit a different type of intersection.

7 Construction line (X line) (Fig 12)

X line is a linear object, which starts at infinite and ends at infinite, or we can say that it is a line, which has no start or end point but passes through a specified point. These lines are used for projections.

Command : X line.

Specify a point or [hor/ver/ang/bisect/offset]: use one of the point fixing methods or enter.

An option. Eg. H.

Specify through point: Use one of the point fixing methods

8 RAY (Fig 13)

Ray creates semi infinite lines commonly used as construction lines. A ray has a finite starting point and extends to infinity.

Command : Ray.

Menu : Draw, Ray.

Specify start

point : Fix a point on the screen.

Specify through point

AutoCAD draws a ray and continue to prompt for though points so you can create multiple rays. Press to end the command.

Fig 12

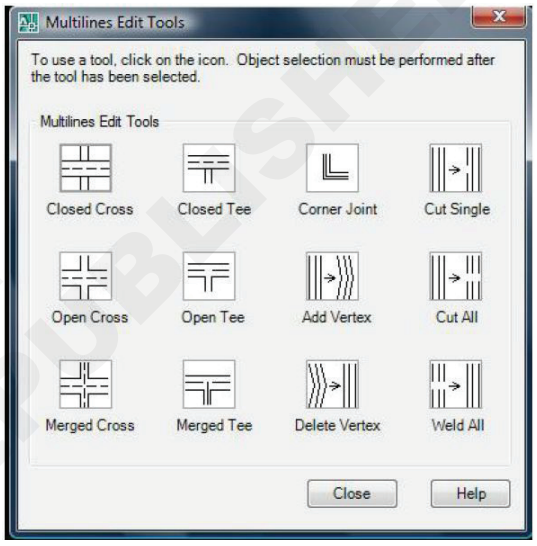
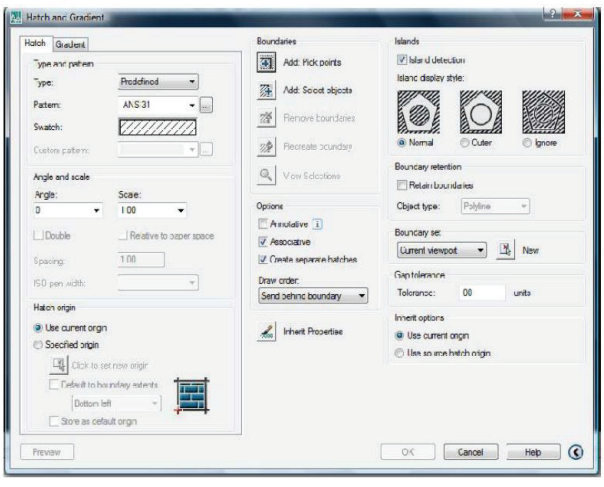


Fig 13



9 Hatch (Fig 14)

Hatch is used to fill an area defined by lines arcs, circles or poly line with either a predefined pattern, a user defined pattern or a simple hatch pattern. It is used to show the section of solids or objects.

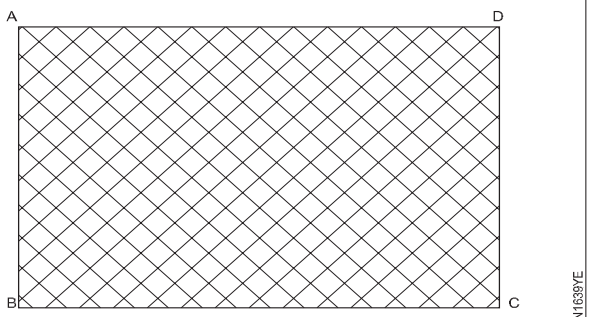
Tool bar: Draw, Hatch.

Pull down menu: Draw hatch B.

Command: Hatch or H.

This allows you to hatch a region enclosed within a boundary by selecting the objects to be hatched. When you invoke the HATCH command. The hatch and gradient dialogue box is displayed. This dialogue box has several options which give various aspects of hatching.

Fig 14



HATCH COMMAND

ID20N1639YE

Command: Hatch or H

Step 1: Select type and pattern from predefined, user defined and customer select colour from gradients.

Step 2: Mouse click on add pick point.

Step 3: Click inside ABCD.

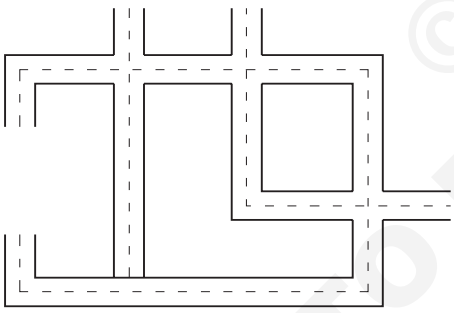
Step 4: Change angle and scale if you want click on preview.

If it is ok then click on in the dialogue.

Example

Command: Hatch, H (Fig 15)

Fig 15



MULTILINES

ID20N1639YF

Step 1: Select type and pattern from predefined user defined cand custom or select colour from gradient

Step 2: Mouse click on add pick point.

Step 3: Mouse inside ABCD.

Step 4: Change angle and scale if you want.

Step 5: Click on preview.

Step 6: If it is ok then click on OK in the dialogue box.

List

AutoCAD lists out the properties and the geometrical parameters of the selected objects.

Pull down menu :- Tools, inquiry, list.

Command: list.

Select objects: use any object selection method select rectangle ABCD.

Select objects: 1 found.

Select objects:

Properties of the rectangle ABCD = LWPOLYLINE layer: "0"

Space: Model space, Handle = d8a, Closed, Constant width 0.0000

Area 16486.7990, perimenter 551.6401.

Distance

Pull down menu: Tools, inquiry, distance.

To measure the distance between two points.

Command: Dist.

Specify first point: Select A.

Specify second point: Select B.

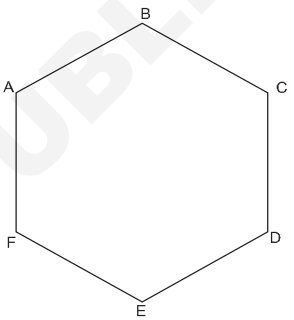
Distance = 118.6843, Angle in XY Plane = 0, Angle from XY Plane = 0.

Delta X = 118.6743, Delta Y = 0.0000, Delta Z = 0.0000.

Area (Fig 16)

Calculate the area and perimater of object or of defined areas.

Fig 16



AREA COMMAND

ID20N1639YG

Step 1: Pull down menu: Tools, inquiry, area.

Step 2: Command Area.

Specify first corner point or [Object / Add / Subtract] first point A.

Step 3: Specify next corner point or press ENTER for total: Select next point B.

Step 4: Specify next corner point or press ENTER for total: Select next point C.

Step 5: Specify next corner point or press ENTER for total: Select next point D.

Step 6: Specify next corner point or press ENTER for total: Select next point E.

Step 7: Specify next corner point or press ENTER for total: Select next point F.

Step 8: Specify next corner point or press ENTER for total.

Area = 8316.3401, Perimeter = 339.4622.

REGEN.

Step 9: Command : Regen.

Step 10: This command makes Auto CAD to regenerate the entire drawing to update it. By using this commands, the circles and arcs can be smoothened.

Drawing practice on AutoCAD (2D software)

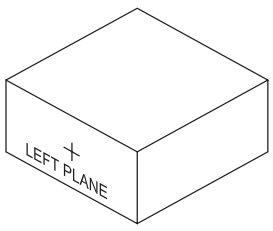
Objectives : At the end of this exercise you shall be able to
- **identify ISO axes**
- **practice ISO drawings on 2D software.**

PROCEDURE

ISO metric drawing (Fig 1)

Isometric drawing have three principal planes. They are isoplane right, isoplane top and the isoplane left.

Fig 1



ISO planes

Step 1: To turn on an isometric plane

1 Click Tools menu>> Drafting Settings.

2 In the Drafting settings dialog box, snap and grid tab, under snap type, select isometric sanp.

3 Click OK.

You can cycle through the three isometric planes by pressing F5.

Step 2: Command: Isoplane (or Isoplane for transparent use)

Enter isometric plane setting [left/top/right] <top>: enter an option or press ENTER.

The isometric plane affects the cursor movement keys only when Snap mode is on and the snap style is isometric. If the snap style is Isometric, Ortho mode uses the appropriate axis pair even if Snap mode is off. The current isometric plane also determines the orientation of isometric circles drawn by ELLIPSE. You can cycle through the isometric planes by pressing CTRL+ E or F5.

Left

Selects the left - hand plane, defined by the 90 - degree and 150-degree axis pair.

Top (Fig 2)

Selects the top face of the cube, called the top plane, defined by the 30- degree and 150 - degree axis pair.

Right (Fig 3)

Selects the right - hand plan, defined by the 90-degree and 30- degree axis pair.

Fig 2

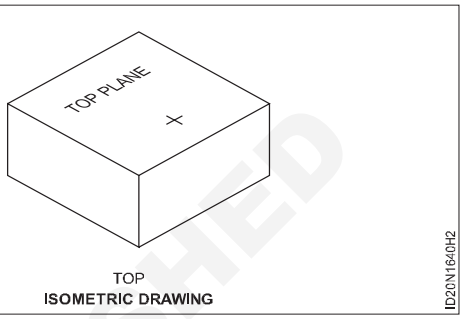
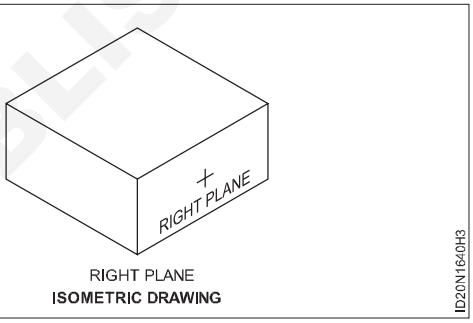


Fig 3

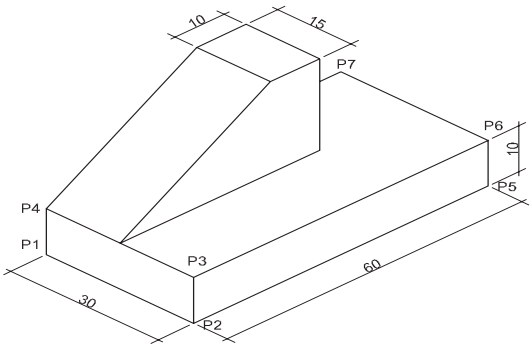


When the snap style has been set to isometric, you will find isocircle. Option under ellipse command. Use this to draw circle and arcs in isometric plane.

Example

1 Create the isometric drawing shown in the Fig 4

Fig 4



Step 1

Change the isometric view by using sanpcommand.

Command: snap

Specify snap spacing or [ON/OFF/Aspect/Style / Type]<0.5000>:s Enter snap grid style [Standard/ Isometric] <S>:i

Specify vertical spacing <0.5000>.

Step 2: Change the isoplane to isoplane left by pressing Ctrl+E or F5. Now draw lines between points P1, P2, P3 and P1.

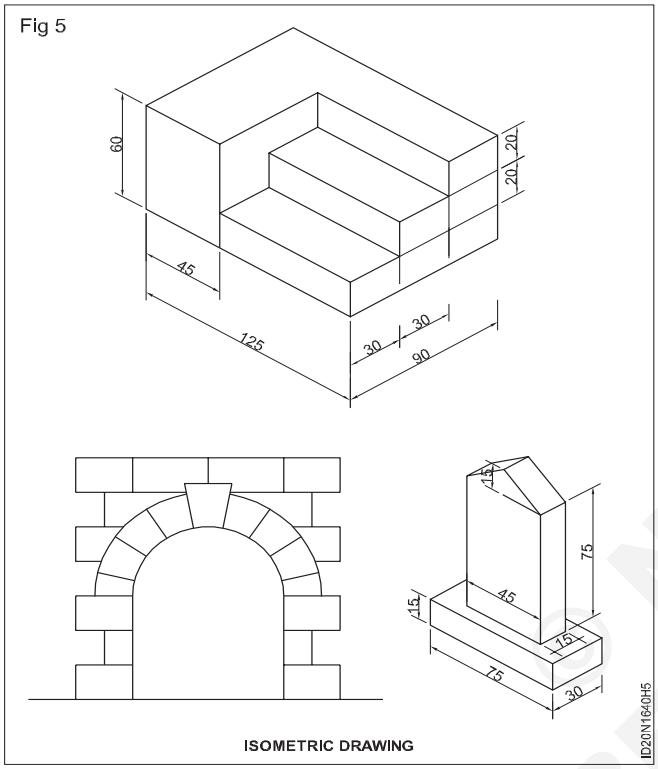
Step 3: Change the isoplane to isoplane right by pressing Ctrl + E or F5. Now draw lines between points P3, P2, P5, and P6.

Step 4: Change the isoplane to isoplane top by pressing Ctrl +E or F5. Now draw lines between points P6, and P7.

Step 5: Change the corresponding plane by pressing Ctrl +E or F5 and continue the procedure.

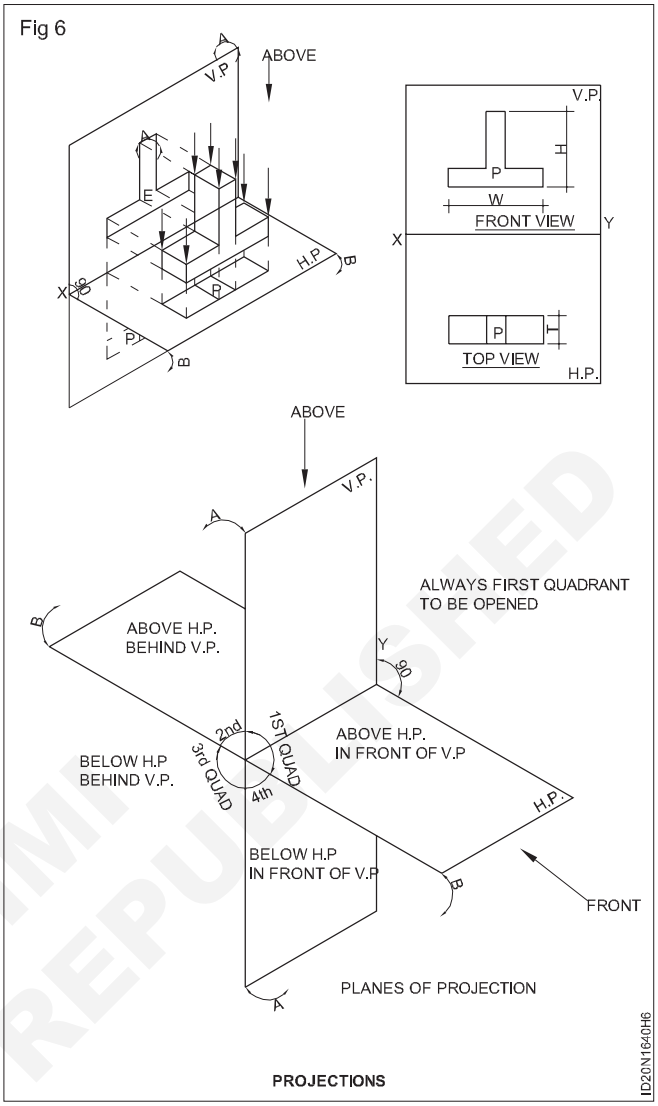
Create the isometric drawing shown Fig 5

Fig 5



Create the orthographic projection drawing shown in Fig 6.

Fig 6



Dimensioning & text

Objectives : At the end of this exercise you shall be able to
- **dimensioning**
- **text & text style.**

Dimensioning commands

While manufacturing an object, the drawing must contain size description such as the length, width, height, angle, radius, diameter and location of the object. These are added to the drawing with the help of dimensioning.

1 Dimension - linear (Fig 1)

This command is used to measure horizontal and vertical dimensions between two points.

Tool bar : Dimension, Linear

Pull Down : Dimension, Linear

Command : DIM LIN /DLI

Example

Command : DIM LIN / DLI

Specify first extension line origin of : Selection point A

Specify second extension line original : Select point B

Specify dimension line location or

[Mtext/Text/Angle/Horizontal/Vertical/Rotated]: Mouse click on the position where the dimension is to be placed

Dimension text = 6.00

2 Dimension - aligned (Fig 2)

This command is used to measure inclined dimension between two points.

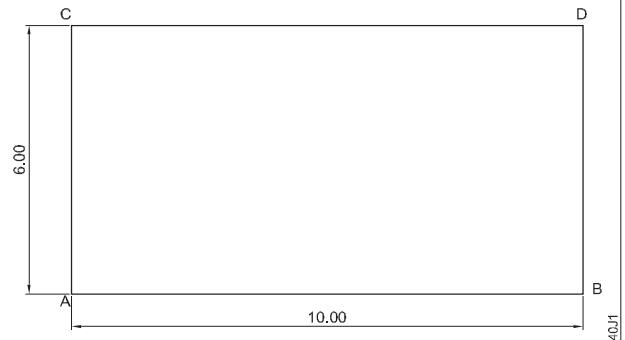
Tool bar : Dimension, Aligned

Pull down : Dimension, Aligned

Command : DIM ALI /DAL

Example

Fig 1

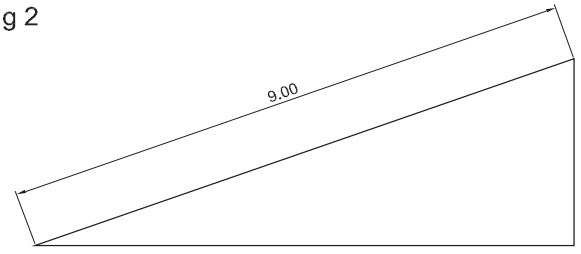


DIMENSION-LINEAR

DIMENSIONING COMMANDS

ID20N1640J1

Fig 2



DIMENSION-ALIGNED

DIMENSIONING COMMANDS

ID20N1640J2

Command : DIM ALI/DAL

Specify first extension line origin or : Select point A

Specify first extension line origin : Select point B

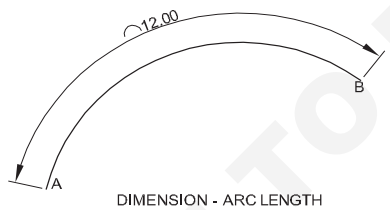
Specify dimension line location or

[Mtext/Text/Angle/Horizontal/Vertical/Rotated]: Mouse click on the position where the dimension is to be placed.

Dimension text = 9.00

3 Dimension - ARC length (Fig 3)

Fig 3



DIMENSION - ARC LENGTH

DIMENSIONING COMMANDS

ID20N1640J3

This command is used to measure the length of an arc.

Tool bar: Dimension, Arc length

Pull Down : Dimension, Arc length

Command :DIMARC/DAR

Example

Command : DIM ARC / DAR

Command : DAR DIMARC

Select arc or polyline arc segment

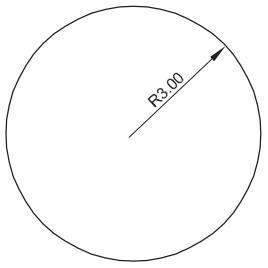
Specify arc length dimension location,

Or [Mtext/Text/Angle/Partial/Leader]: Mouse click on the position where the dimension is to be placed

Dimension text = 12.00

4 Dimension - radius(Fig 4)

Fig 4



DIMENSION - RADIUS

DIMENSIONING COMMANDS

ID20N1640J4

This command is used to measure the radius of an arc or circle.

Tool bar: Dimension, Radius

Pull Down : Dimension, Radius

Command : DIM RA/DRA

Example:

Command : DIM RA / DRA

Select arc or

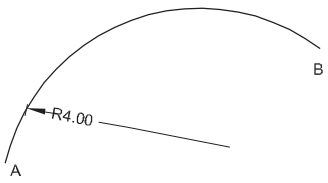
circle : Select the circle

Dimension text = 3.00

Specify dimension line location or [Mtext /Text/Angle]

5 Dimension - jogged (Fig 5)

Fig 5



DIMENSION - JOGGED

DIMENSIONING COMMANDS

ID20N1640J5

Tool bar: Dimension, Jogged

Pull Down : Dimension, Jogged

Command : DIM JO/DJO

Example

Command : DIM JO/DJO

Select arc

or circle : Select the circle

Specify center location override: Select center

Dimension text = 4.00

Specify dimension line location or [Mtext /Text/Angle]

Specify jog location: Mouse click on the position where the dimension is to be placed.

6 Dimension - diameter (Fig 6)

This command is used to measure the Diameter of a circle.

Tool bar : Dimension, Diameter

Pull Down : Dimension, Diameter

Command : DIM DIA/DDI

Example:

Command : DIM DIA/DDI

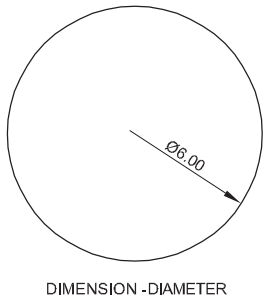
Select arc

or circle : Select the circle

Dimension text = 6.00

Specify dimension line location or [Mtext /Text/Angle] Mouse click on the position where the dimension is to be placed.

Fig 6



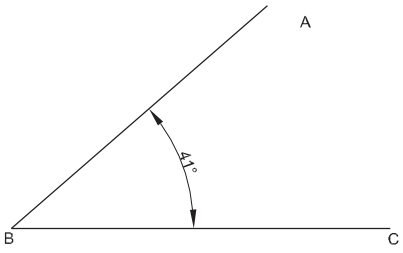
DIMENSION -DIAMETER

DIMENSIONING COMMANDS

ID20N1640J6

7 Dimension - Angular (Fig 7)

Fig 7



DIMENSION - ANGULAR

DIMENSIONING COMMANDS

ID20N1640J7

This command is used to measure the Angle between two non parallel straight lines.

Tool bar : Dimension, Angular

Pull Down : Dimension, Angular

Command : DIM ANG/DAN

Example

Command : DIM ANG/DAN

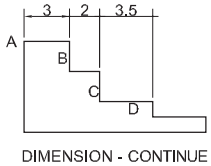
Select arc, circle, line, or <specify vertex>: Select AB

Specify dimension line location or [Mtext /Text/Angle]: Mouse click on the position where the dimension is to be placed.

Dimension text = 41

8 Dimension - continue (Fig 8)

Fig 8



DIMENSION - CONTINUE

DIMENSIONING COMMANDS

ID20N1640J8

This command is used to continue dimensioning after the first dimensioning has been executed.

Tool bar: Dimension, Continue

Pull Down : Dimension, Continue

Command : DIM CON/DCO

Example

Command : DIM CON/DCO

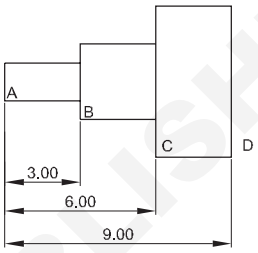
Specify a second extension line origin or [Undo/Select] <Select>: Select C

Specify a second extension line origin or [Undo/Select] <Select>: Select D

Specify a second extension line origin or [Undo/Select] <Select>: Cancel

9 Dimension - base line (Fig 9)

Fig 9



DIMENSION -BASELINE

DIMENSIONING COMMANDS

ID20N1640J9

This command is used to give dimension when number or dimensions of a part have a common datum.

Tool bar : Dimension, Base line

Pull Down : Dimension, Base line

Command : DIM LEA/LE

Example

Command : DIM LEA/LE

Specify first leader point, Select point A

Specify next point: Select point B

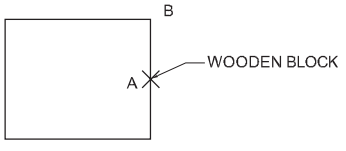
Specify next point:

Specify text width <0.0000>:

Enter first line of annotation text <Mtext>: WOODEN BLOCK

10 Dimension - leader (Fig 10)

Fig 10



DIMENSION - LEADER

DIMENSIONING COMMAND

ID20N1640JA

This command is used to give leader lines i.e. used to describe some features in the drawing.

Tool bar : Dimension Leader

Pull Down : Dimension Leader

Command : DIM LEA/LE

Example

Command : DIM LEA/LE

Specify first leader point, Select point A

Specify next point: Select point B

Specify next point

Specify text width <0.0000>

Enter first line of annotation text <Mitest> WOODEN BLOCK

11 Dimension - style (Fig 11 to 14)

Fig 11

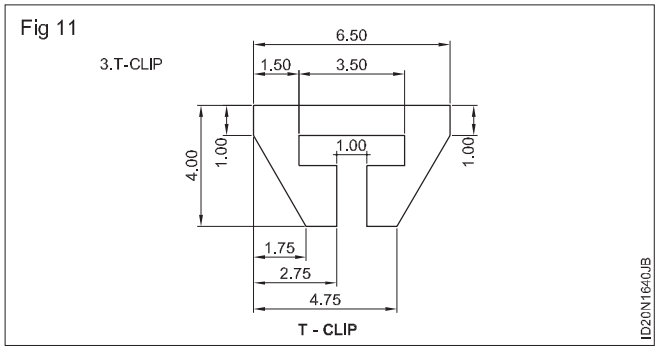


Fig 12

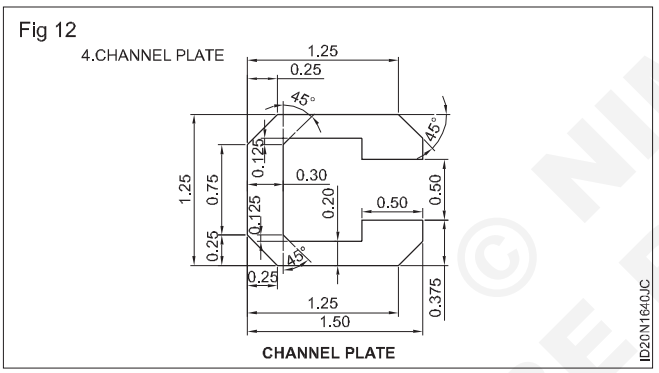


Fig 13

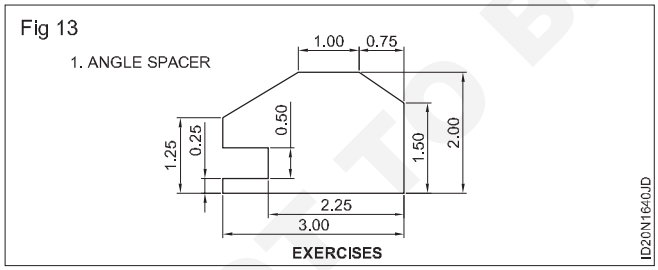
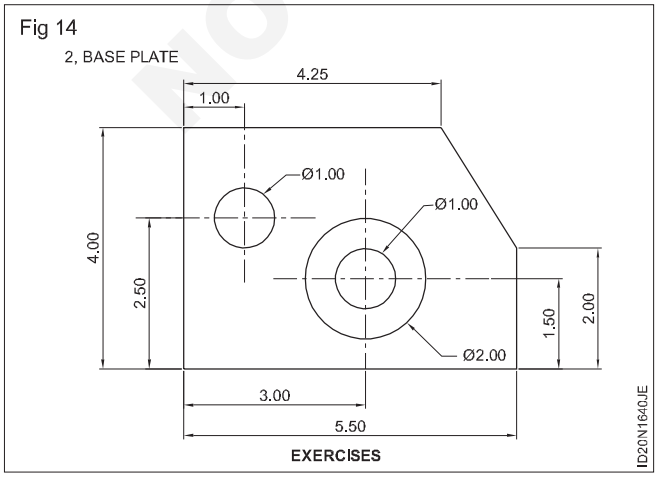


Fig 14



Tool bar : Dimension, Dimension style

Pull Down : Dimension, Dimension style

Command : D

This command is used to select or change the properties of a dimension. When you enter this command the dimension style manager dialogue box will be displayed. This dialogue box provides various options for modifying the dimension. Click on modify and give the new values.

Dimension style (Fig 15 to 18)

Pull down menu: Dimension, Dimension style

When you select this, a dimension style manager dialogue box will appear on the screen.

A dimension style is a saved set of dimension settings defining the appearance and behaviour of the dimensions. By creating dimension styles. You can set all relevant dimension system variables and control the layout and appearance of all dimesions within a drawing.

Fig 15

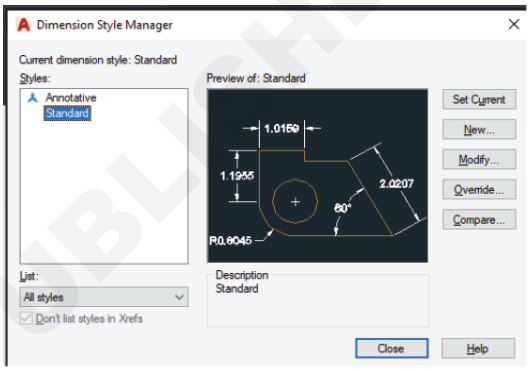


Fig 16

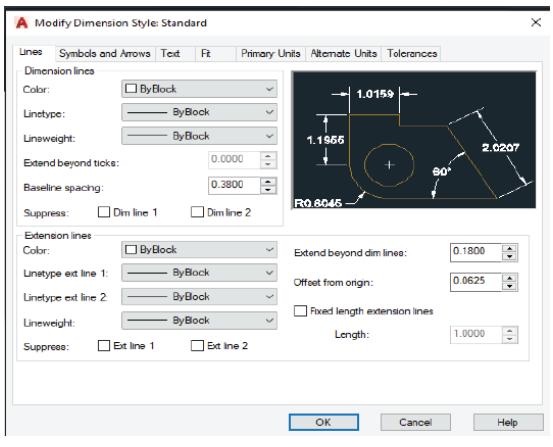


Fig 17

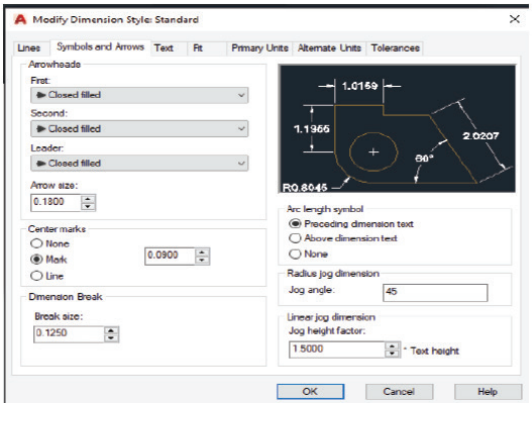
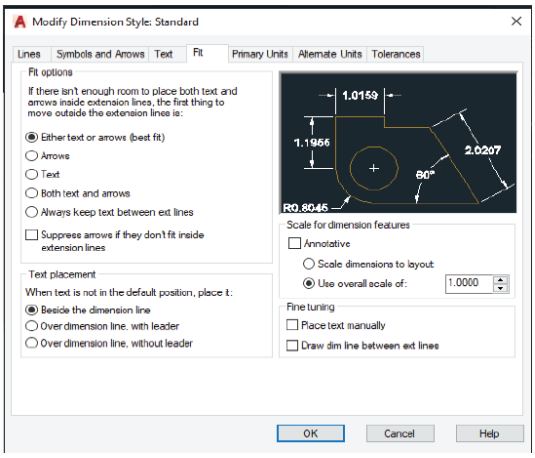


Fig 18



Description

Sets the dimension line properties (Fig 19)

1 Colour displayed and sets the colour for dimension line.

2 Line type sets the type of the dimension line.

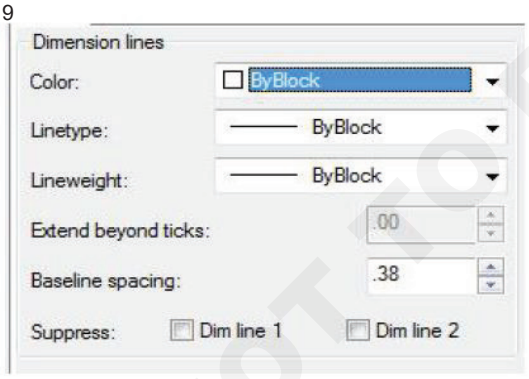
3 Line weight sets the line weight of the dimension line.

4 Extend beyond ticks specifies a distance to extend the dimension line past the extension line when you use oblique, architectural, tick, integral, and no marks for arrow heads.

5 Base line spacing sets the spacing between the dimension lines of a base line dimension. Enter a distance.

6 Suppress suppresses display of dimension line when they are outside.

Fig 19



Description

Set the extension line properties (Fig 20)

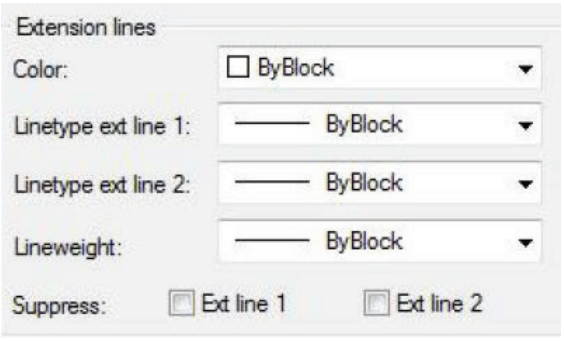
1 Colour displayed and sets the colour for extension line.

2 Line type sets the type of the extension lines.

3 Line weight sets the line weight of the extension lines.

4 Suppress suppresses display of extension lines.

Fig 20



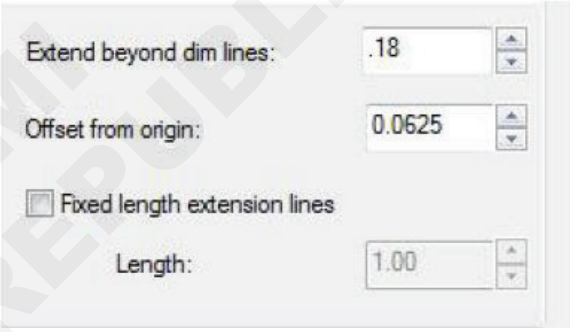
Description

1 External beyond dim lines specifies a distance to extension lines from the origin points that define the dimension.

2 Offset from origin specifies the distance to offset the extension lines from the origin points that define the dimension.

3 Fixed length extension lines, set the length of the extension line. (Fig 21)

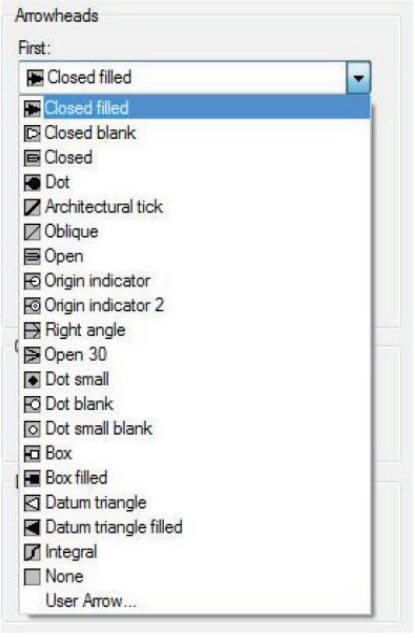
Fig 21



Description

1 Here you can set the types of arrow heads. (Fig 22)

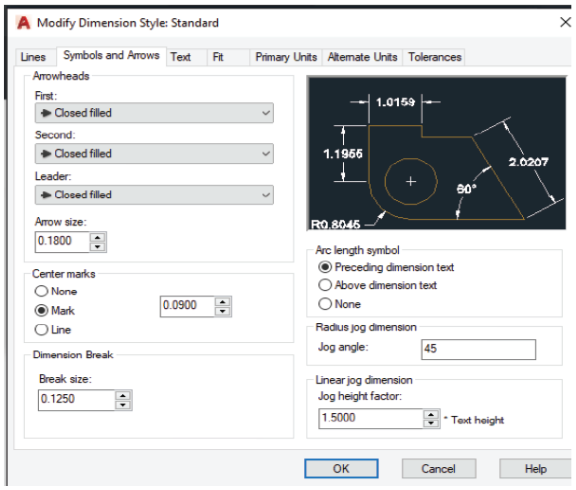
Fig 22



2 Arrow size sets the size of arrow.

Symbols and arrows tab (Fig 23)

Fig 23



Description

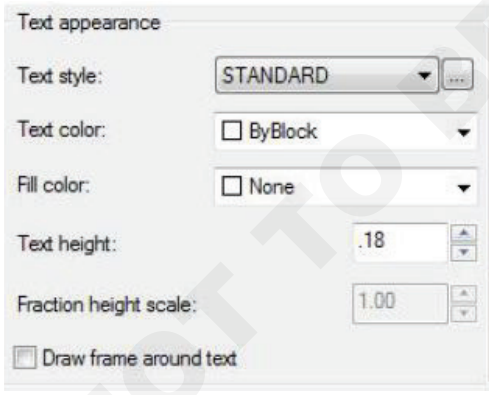
1 Text style button displays the text style dialogue box, which you can use to define or modify text styles. (Fig 24)

2 Text colour displays and sets the colour for the dimension text.

3 Text height displays and sets the current dimension text style.

4 Draw frame around text draws a frame around dimension text.

Fig 24



Tex tab (Fig 25 & 26)

1 Vertical position controls the vertical justification of dimension text along the dimension line.

2 Horizontal position controls the horizontal justification of dimension text along the dimension line and extension line.

3 Offset from dimension line displays and sets the current text gap, which is the distance around the dimension text when the dimension line is broken to accommodate the dimension text.

Fig 25

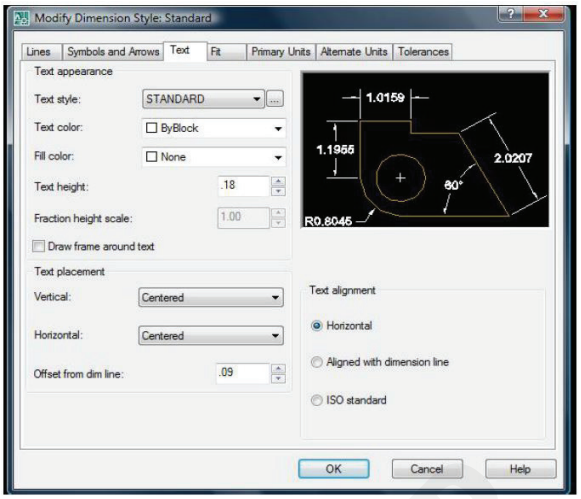
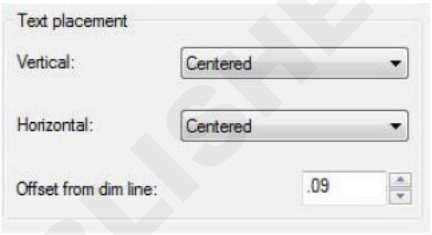
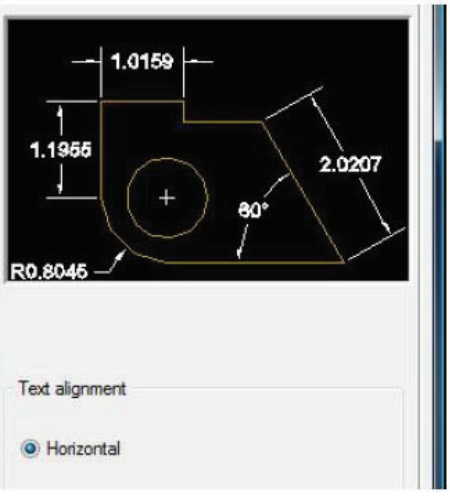


Fig 26



1 Horizontal places text in a horizontal position. (Fig 27)

Fig 27



2 Aligned with dimension line aligns text with the dimension line. (Fig 28)

3 ISO standards aligns text with the dimension line when the text is inside the extension lines, but aligns horizontally when text is outside the extension lines. (Fig 29)

Fig 28

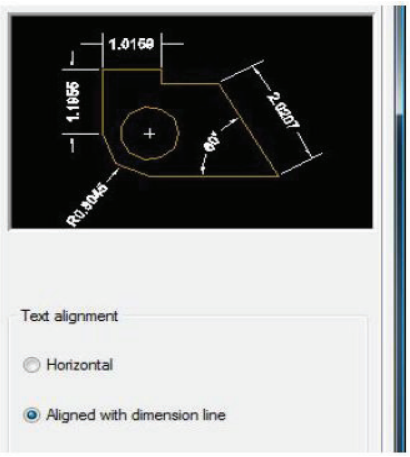
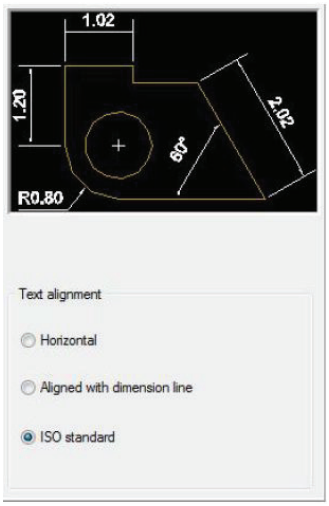
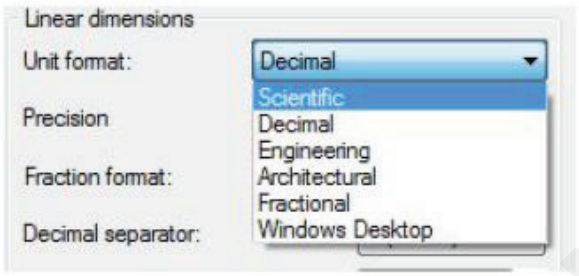


Fig 29



Primary units tab (Fig 30)

Fig 30



Deseription

1 Unit format sets the current for all dimension types accept angular. Options to select from include scientific, decimal, engineering, architectural, fractional etc.

2 Precision displays and sets the number of decimal places in the dimension text.

3 Fractional format sets the format for fractions. Options to select from include diagonal, horizontal, and not stacked.

4 Decimal separator sets the separator for decimal formats. Options to select from include period (.), comma (.), or space.

Fig 31

1 Prefix includes the prefix you enter in the dimension text. You can enter text or use control codes to display special symbols. For example, entering the control code % %c displays the diameter symbol. (Fig 31)

2 Suffix includes the suffix you enter in the dimension text. You can enter text or use control codes to display special symbols.For example,entering the text mm results in the dimension text similar to that shown in the illustration.

3 Measurement scale defines measurements scale options as follows: Linear scale factor sets a scale factor for linear dimension measurements for all dimension types except angular.

Control code % displays the diameter symbol.

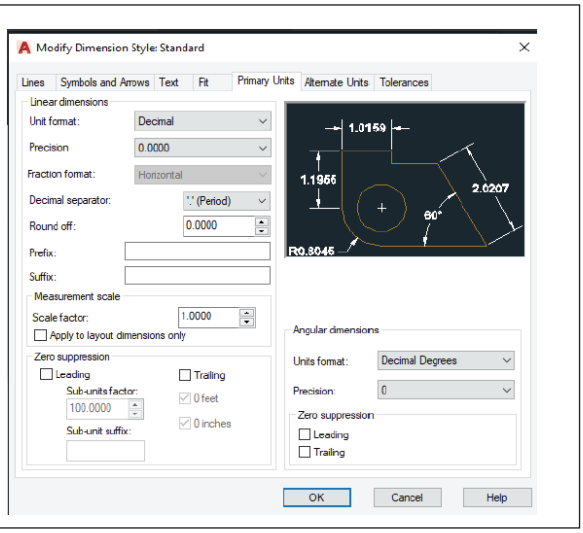
Primary units tab

Dimensioning: Create the following exercise using CAD
commands.

Text (Fig 32)

This command is used for entering the related details on a drawing. Text is used for entering details in the title blocks, for labelling the parts of drawing, For giving specifications and for making annotations etc. There are two types of text used in Auto CAD.

Fig 32



1 Single line text or D text.

2 Multiline text or M text.

1 Single line text or D text

Pull down : Draw, TEXT, single line text

Command : TEXT or DT

Current text style : "Standard"

Text height : 0.2000

Specify start point of text or [Justify/Style]: Select start point

Specify height<0.2000>: 25

Specify rotation angle of text <0>

Type on the screen: TEXT

2 Multiline text or M text

Pull down : Draw, Text, Multi line text

Command : MText or MT

Current text style : " Standard"

Text height : 0.20000

Specify first corner : Click on the first corner

Specify opposite comer or [Height/Justify/

Line spacing /Rotation/Style/Width]: click on the second corner Give text height, type, style, etc.

Enter the text, And press button OK.

Plotting drawings (Fig 33 & 34)

Printing or plotting of a drawing can be done by using a printer or a plotter.

Print or plot command

Various input facilities are available for printing a drawing. Facilities like key board, menu bar or tool bar with mouse are explained below.

Text style (Fig 35)

This command is used to change the text style.

After giving changes click on apply.

Fig 33

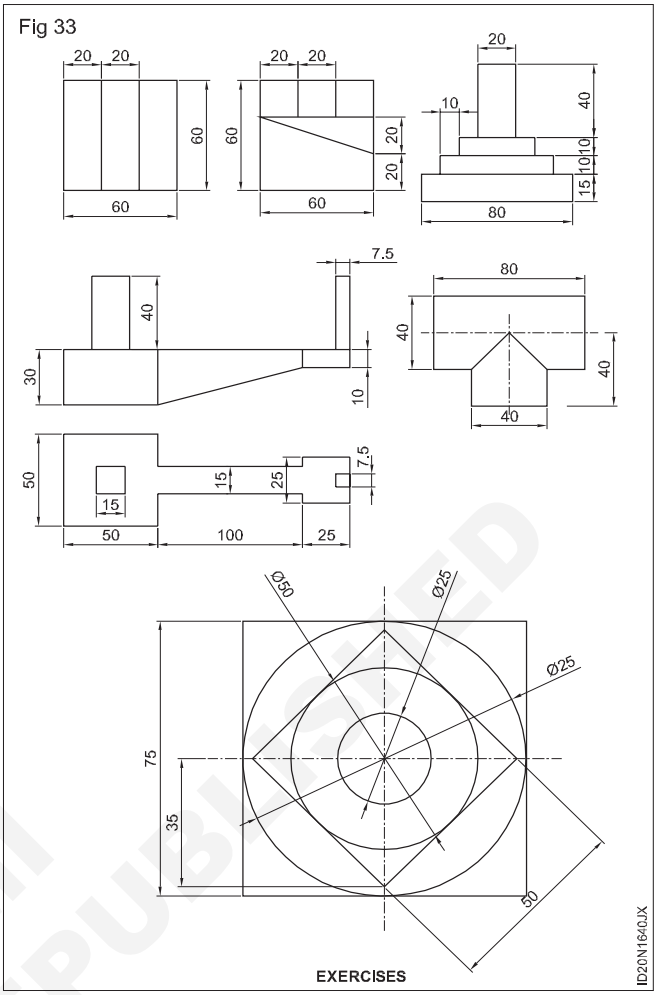


Fig 34

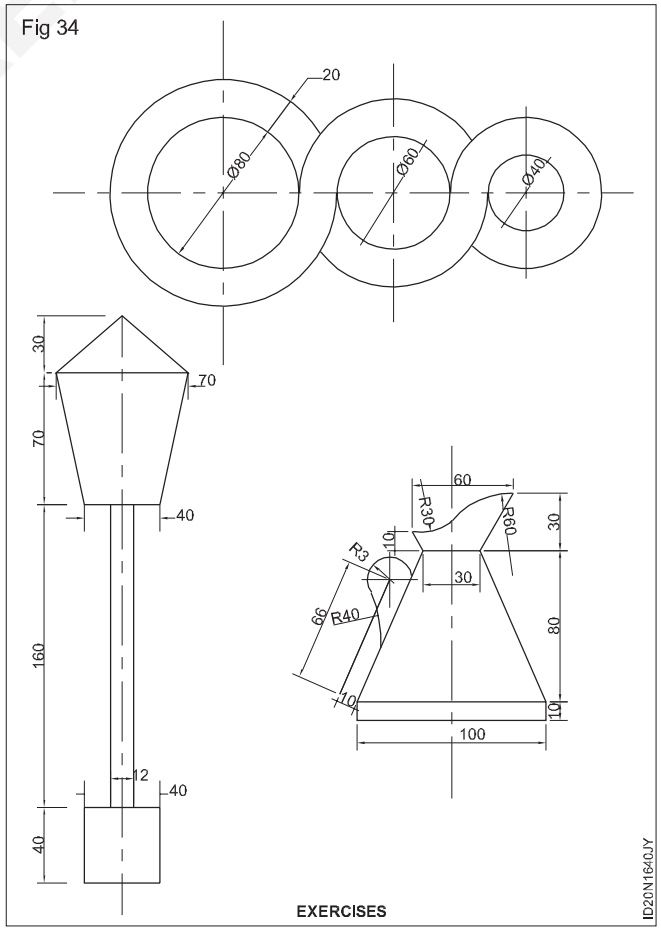
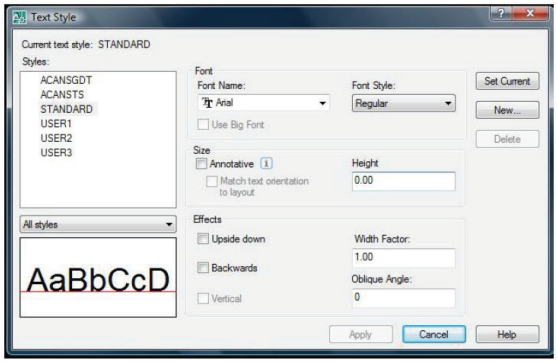


Fig 35



Computer aided drafting exercise 15-16

Plotting

Objectives: At the end of thess lessons, you shall be able to practice

Plotting drawings.

Properties & blocks

Objectives : At the end of this exercise you shall be able to

- **match properties**
- **identify line weight**
- **practice block.**

Match properties

This command is used to copies the properties from one object to one or more objects.

Step 1: Pull down menu: Modify, match properties

Step 2: Command: Match properties, MA

Step 3: Select the source object: Pick the object whose property to be matched.

Step 4: Select destination object(s) or [settings]: Select the object to which properties are to be copied or press

Step 5: Select destination object(s) or [settings]

Change the properties

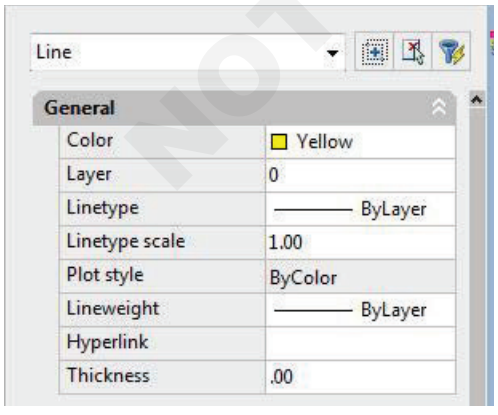
Command: CHPROP

When you select an object in the drawing area, the object properties window displays all the properties they have in common.

The properties that are in grey cannot be modified.

Line type (Fig 1)

Fig 1



Pull down menu : format, line type

Command : L type

After invoke this command a 'Line type manager' dialogue box will appear on the screen.

Click here

Clik ok

Select line type from here

Click Ok in the 'line type manager' dialogue box.

Object snaps (Fig 2 to 5)

Fig 2

ICON	SETTING	ICON	SETTING
/	Endpoint	□	Insertion Point
/	Midpoint	⊥	Perpendicular
.	Center	○	Tangent
.	Node	⊼	Nearest
◇	Quadrant	×	Apparent Intersection
×	Intersection	//	Parallel
--	Extension	M2P	Midpoint between 2 points

OBJECT SNAP COMMAND

ID20N1640X2

Fig 3

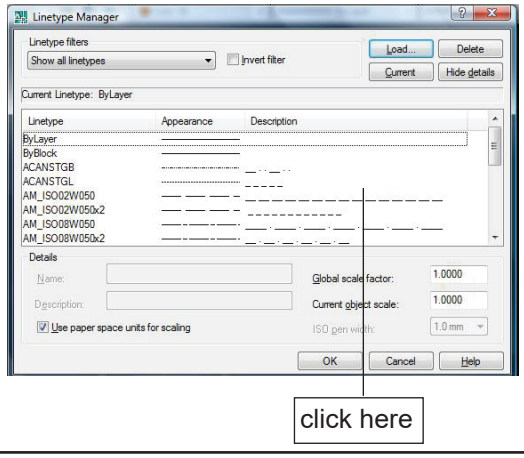


Fig 4

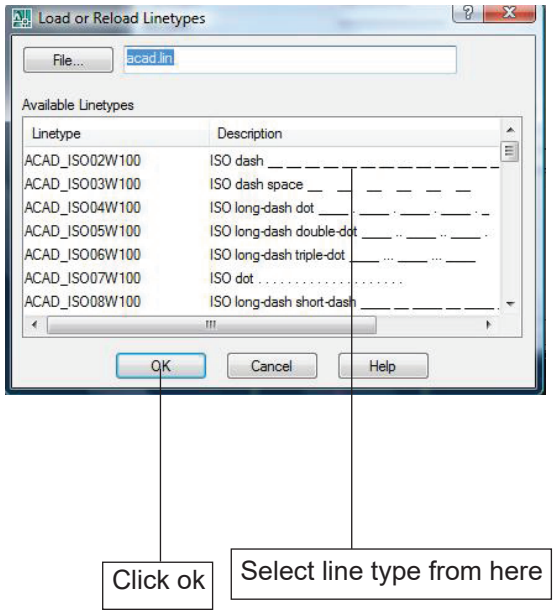
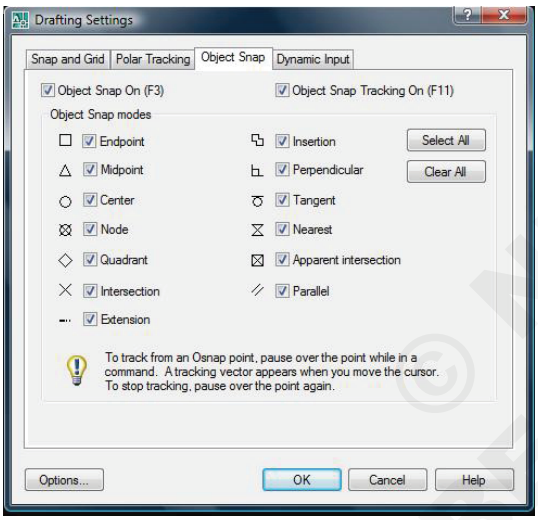


Fig 5



Suppose you want to draw a line from the center of the circle to the middle of the vertical line you extended earlier. AutoCAD has a feature that makes this very easy. These are the object snaps (or Osnaps “Oh-Snaps”). Type os <ENTER>. You will see this dialog box appear.

Block

This is used for storing a part of drawing or entire drawing or symbols that are needed in the same drawing or for other drawing. This is stored with a desired scale factor. All the objects inside a block considered as a single object.

Tool bar : Draw block, make

Pull down menu : Draw, block, make

Command : Block or B

When you invoke the command BLOCK a block definition dialogue box is displayed.

1 Draw a door. (Fig 6)

2 Click on draw pull down menu, click on block, click on make

3 Type the name in this area, door. (Fig 7)

4 Click on select objects. AutoCAD hides the dialogue box. Pull a selection window around the door and press enter. The dialogue box will return.

5 Click here and pick an insertion point, use object snap.

6 Select.

7 Unit offered here are the drawing units.

8 Click on ok

Fig 6

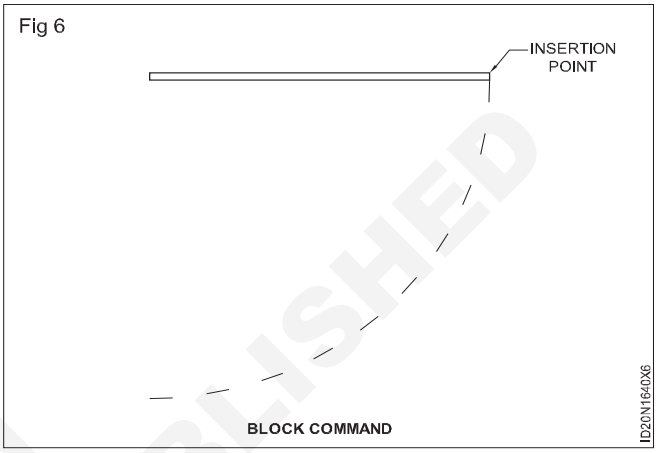
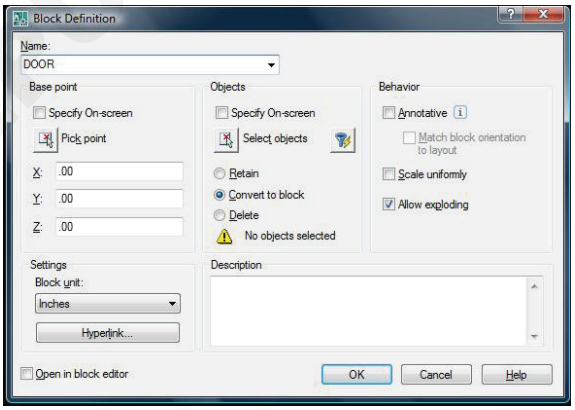


Fig 7

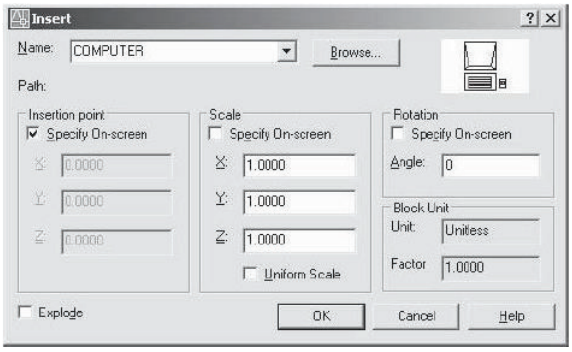


Insert block (Fig 8)

Once the block has been created you may insert it in the drawing.

- Click on the insert menu
- Click on block
- The insert dialogue box will appear
- Click on the down arrow all the blocks created in the current drawing will be listed. Select the block name.
- At this point you are returned to the drawing with the block attached to the cross hairs at the insertion point you defined.
- Move the block in to position on the sreen. The command line asks for the insertion point and lists several options.[Scale, X/Y/Z/Rotate/Pscale/PX/PY/PZ/PRotate]

Fig 8

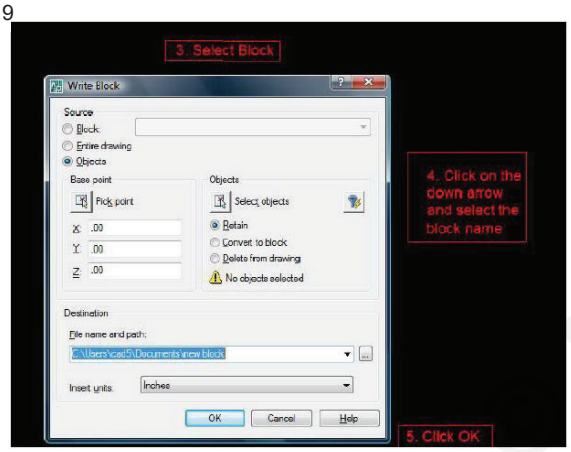


These options refer to the scaling and rotation of the block. If you simply pick a point on the screen the block will be inserted without being scaled(at the size it was drawn)

- The block is now locked in to position in the drawing.

Write block (Fig 9)

Fig 9



If a block is converted in to a drawing file then you can use it in any other drawing.

- Type WBLOCK at the command line and press enter.
- The write block dialogue box appears.
- Select block
- Click on the down arrow and select the block name.

At this stage AutoCAD takes the block and converts it to a drawing. This drawing can be treated like Aito CAD drawing You can open it as a separare drawing, explode it, edit & draw in the usual way

Divide

This command is used to divide a line or arc or circle in to number of parts.

1 Command : Divied, div

2 Select object to divide: Select the line AB

A _____ B

Before divide

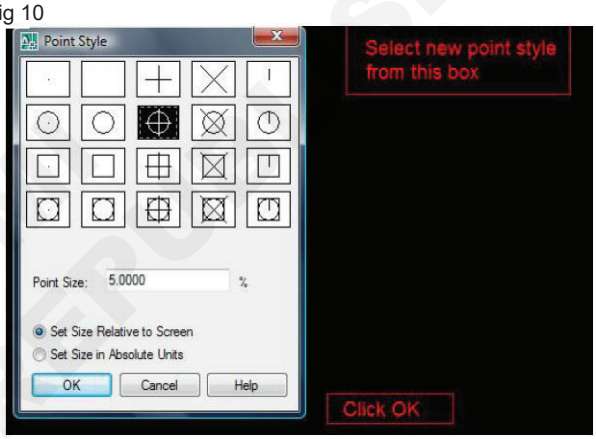
A B

Before divide

If you cannot see the division on the screen, change the point stlyle.

Point style (Fig 10)

Fig 10



1 Pull down menu: Format, point style

2 Select new pointstyle from this box

3 Click OK

Then the points are visible clearly.

Drafting of door elevation

Objectives : This shall help you to

- **draft the door elevation using basic CAD commands.**

Data : Size of the door

Height = 2100

Width = 100

Step 1: Create a new metric file.

Step 2: Draw a rectangle with the following dimensions.

i. Length = 100

ii. Width = 210

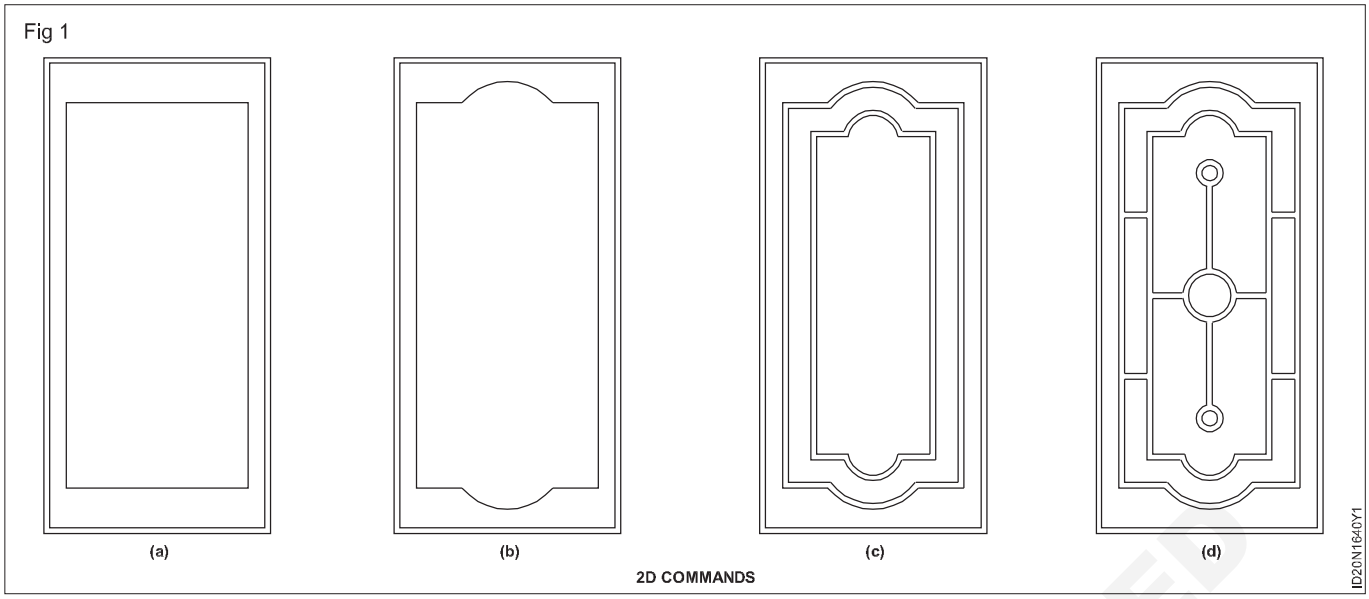
Step 3: Offset the rectangle towards the inside for 2.5 units.

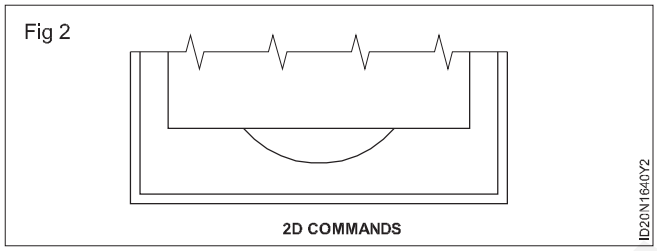
Step 4: Create another rectangle with the dimension of 80, 170 as shown in Fig 1a.

Step 5: Create an ARC as follows with the help of start, End and Direction method. (Fig 2)

i. Chord length = 40 units

ii. Tangent angle = -60 deg





Step 6: Mirror the arc to the opposite side and trim the unwanted portion to get the following result. (Fig b)

Step 7: Convert the inner loop as a single element with the help of PEDIT.

Step 8: Offset the inner loop to 2.5, 10 & 2.5 units. (Fig c)

Step 9: Complete the model as follows with the help of Circle, Line, Offset and Trim. (Fig d)

Drafting of chair plan using 2D software

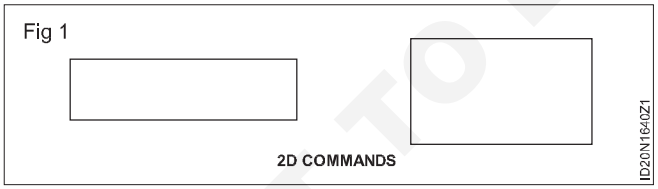
Objective : This shall help you to

- **draft the door elevation using basic CAD commands.**

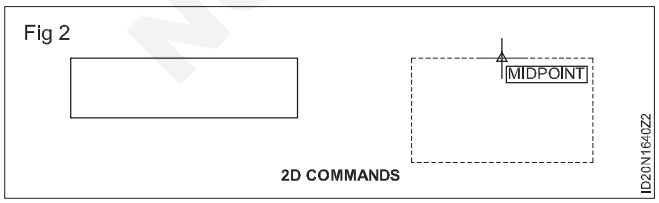
Step 1: Create two tectangles with the following dimensions.

I Length = 15; Width = 4

II Length = 12; Width = 7 (Fig 1)



Step 2: Use the MOVE command to assemble the rectangles as follows. (Fig 2)



Command: Move

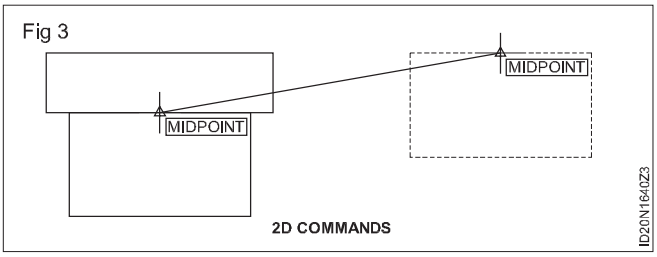
Select object: select the second rectangle

Select object: <Null response>

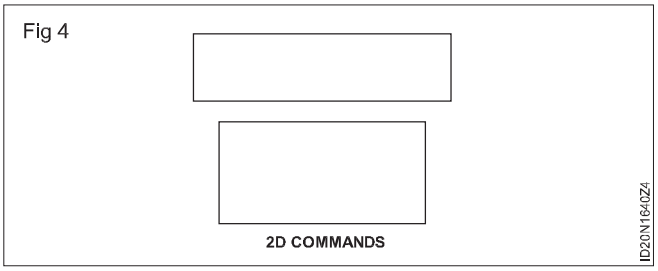
Base point: <Pick the top midpoint>

Second point: from

Base point: <Pick the bottom midpoint of the first rectangle> (Fig 3)



Offset: @2.5<270 (Fig 4)

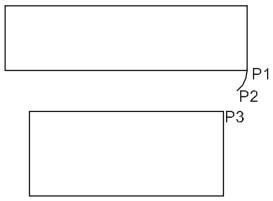


Step 3: Use the ARC and MIRROR commands to connect the rectangles. (Fig 5)

Arc between P2 and P1

Command: ARC

Fig 5



2D COMMANDS

ID20N1640Z5

Start Point: <Pick P2: Use 'Mid between two points' in object snap>

Second point [Centre/End]: E

End Point: <Pick P1>

Centre Point [Angle/Direction/Radius]: R

Radius: 1.5

Create one more ARC as like as above which connects P2 and P3. (Fig 5)

MIRROR both the arcs to the opposite side.

Command: MIRROR

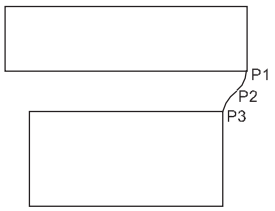
Select objects: <select both the arcs>

Select objects: <Null response>

First point of mirror line: <Pick the top middle point of ottom rectangle>

Second point of mirror line: <Pick the bottom middle point of the top rectangle> (Fig 6)

Fig 6



2D COMMANDS

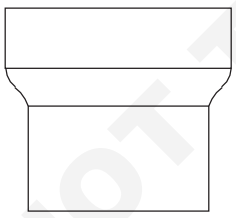
ID20N1640Z6

Step 4: Trim the unwanted edges to get the following output.

Command: TRIM

Select cutting edges: <select all> (Fig 7)

Fig 7



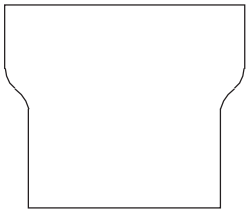
2D COMMANDS

ID20N1640Z7

Select object to trim: <select the unwanted edges>

Step 5: Fillet the corners with radius 2. (Fig 8)

Fig 8

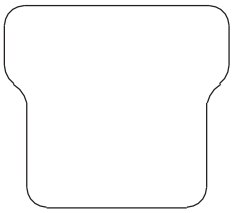


2D COMMANDS

ID20N1640Z8

Step 6: Create the back rest. (Fig 9)

Fig 9



2D COMMANDS

ID20N1640Z9

Command: OFFSET

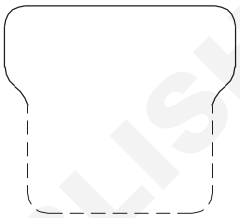
Offset distance: 1

Object to offset " <select teh bottom rectangle of teh created seat >

Side to offset: <pick in the outside of the seat>

Repeat the above two steps to create one more offset. (Fig 10 & 11)

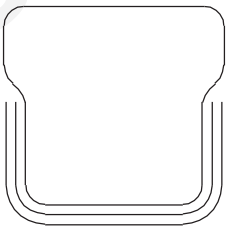
Fig 10



2D COMMANDS

ID20N1640ZA

Fig 11

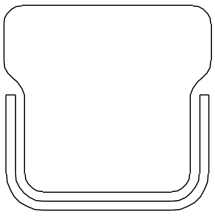


2D COMMANDS

ID20N1640ZB

Connect the open ends with the help of LINE. (Fig 12)

Fig 12

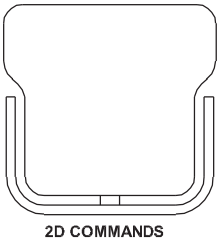


2D COMMANDS

ID20N1640ZC

Create the connection between the seat to the back rest with the help of LINE. (Fig 13)

Fig 13



2D COMMANDS

ID20N1640ZD

Design a false ceiling in a room

Objective: At the end of this exercise you shall be able to

- **draw the different types of false ceiling using Auto CAD.**

PROCEDURE

TASK 1 : **Draw a detail suspended ceiling using Auto CAD (assuming the data as required) (Fig 1)**

1 Room size = 400 x 200cm.

2 Hight of room is = 360cm.

3 Depth of suspended ceiling = 30cm

4 Plaster of Paris (POP) boards panel size = 50 x 50cm

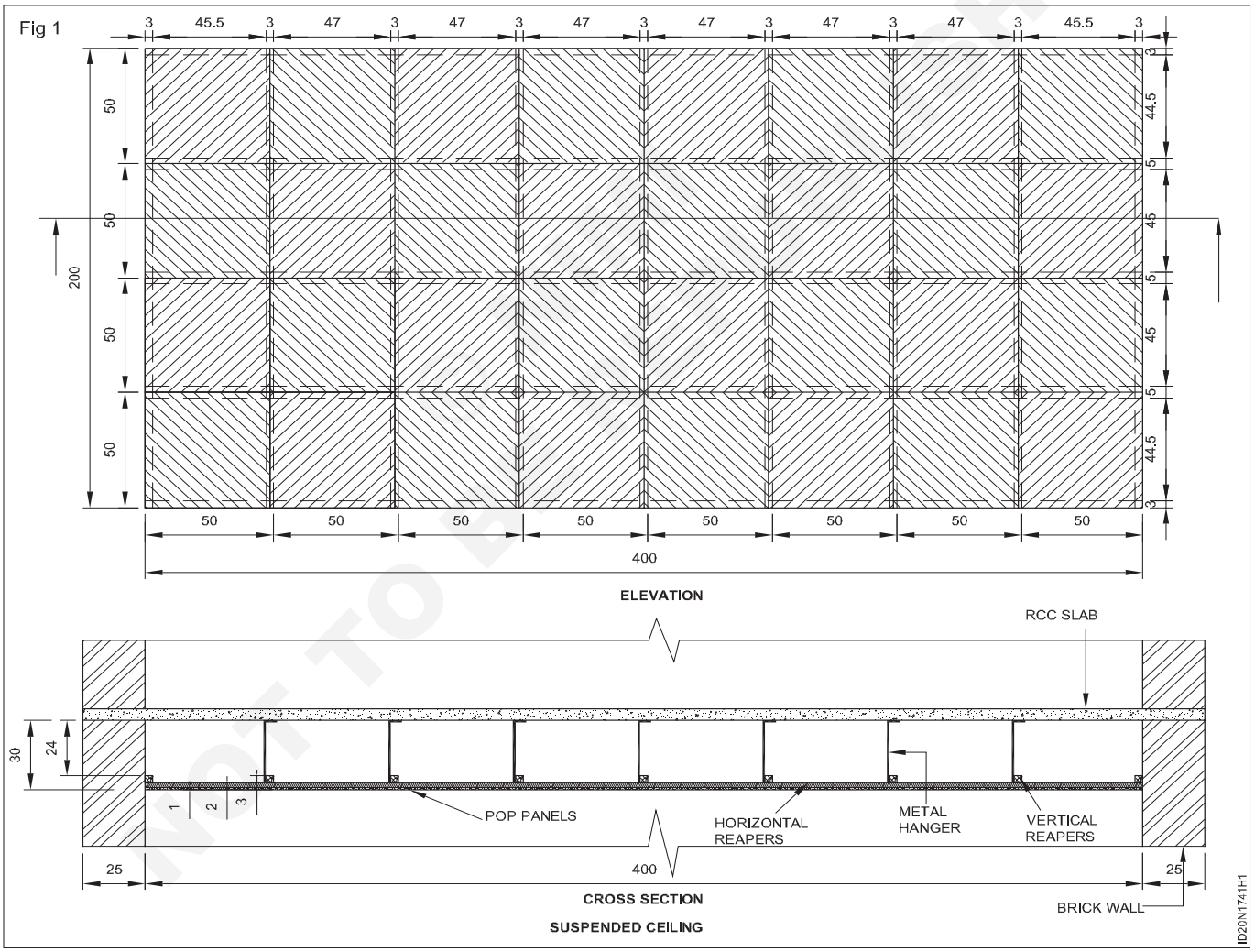
5 'L' shaped metal hangers as per the requirement

6 Length wise wooden reapers size = 400cm

7 Width wise wooden reapers size = 200cm

8 Draw to scale 1:20 (or) 5cm = 1meter as shown other wise choose any convenient scale.

Fig 1



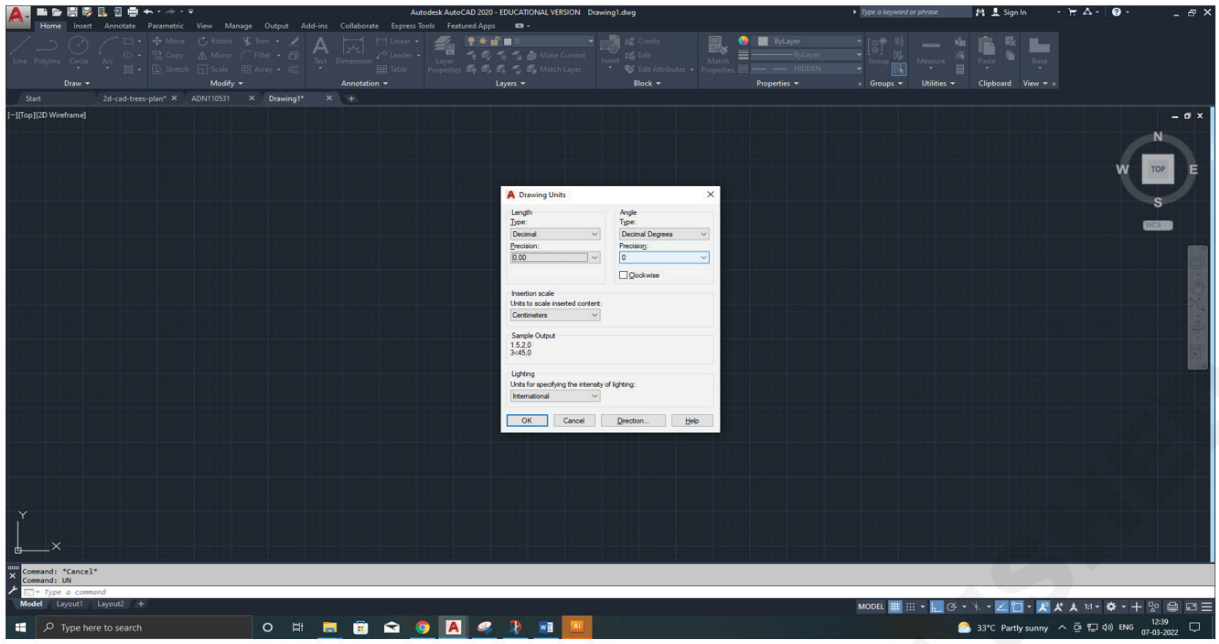
Draw the elevation of the false ceiling

Step1: Open the Autocad Software (Fig 2)

Step 2: Start a New Drawing

Step 3: Type the Command: UNITS in command line

Fig 2



Step 4: Select the paper size (FIg 3)

In command line palette give or Command: LIMITS

Reset Model space limits: for A_3 paper as shown below

Specify lower left corner or [ON/OFF] <0.00,0.00>:

Specify upper right corner <420.00,297.00>:

Step 5: Give Command: ZOOM

Specify corner of window, enter a scale factor (nX or nXP), or

[All/Center/Dynamic/Extents/Previous/Scale/Window/ Object] <real time>: A..... (to zoom all)

Regenerating model.

Step 6: Save the Drawing by selection Ctnl+S

Step 7: Give Command: RECTANG

Specify first corner point or [Chamfer/Elevation/Fillet/ Thickness/Width]: Pick the corner point in the window screen by lift click of the mouse button

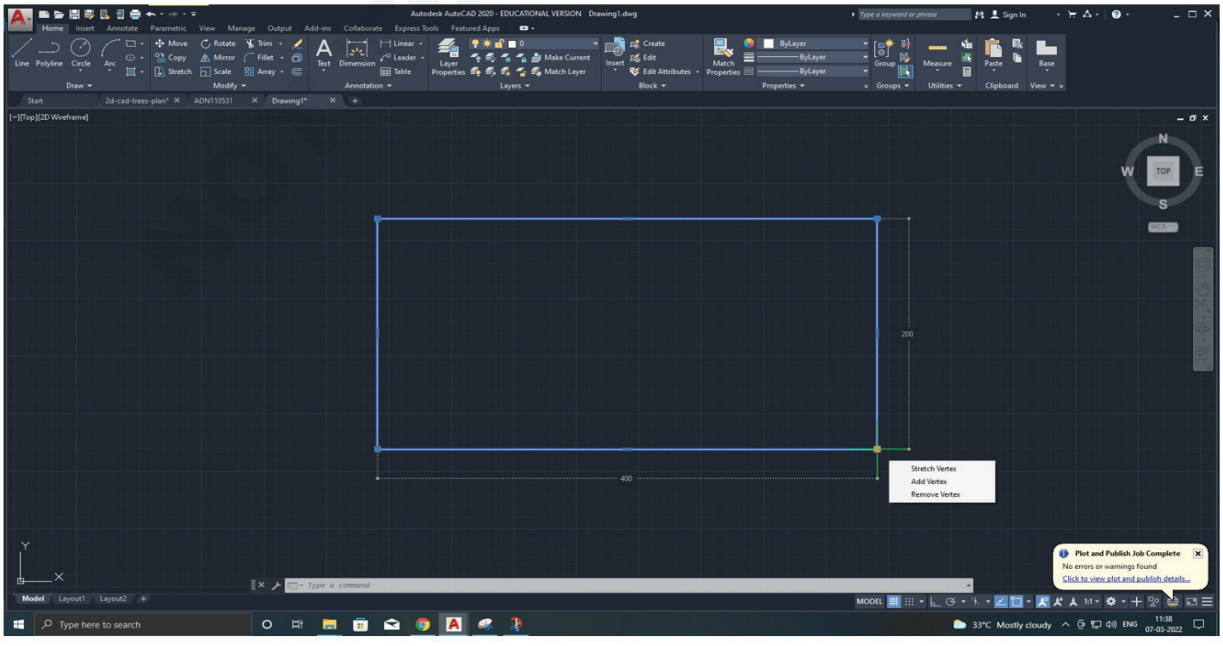
To specification next corner point select - Dimensions

Specify other corner point or [Area/Dimensions/ Rotation]: D

Specify length for rectangles: 400

Specify width for rectangles: 200

Fig 3



For POP-panels

Step 8: Command: RECTANG (Fig 4)

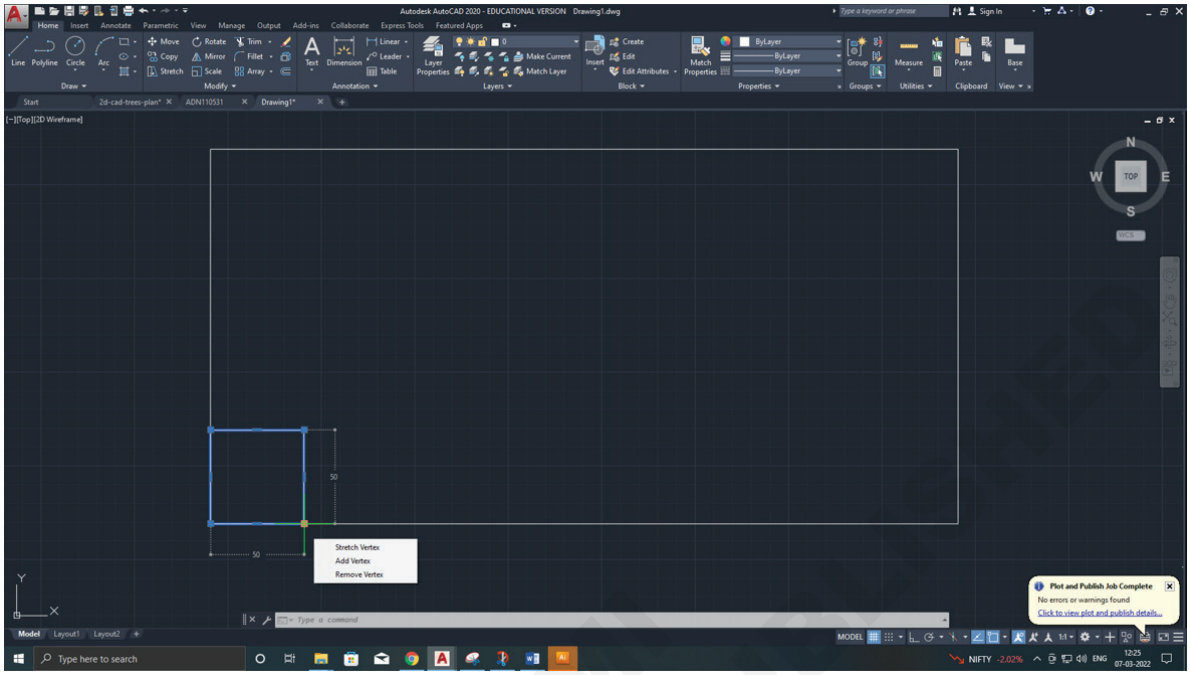
Repeat the above step 7 to create another inside rect

With specify other corner point or [Area/Dimensions/Rotation]: D

Specify length for rectangles at 50

Specify width for rectangles at 50, as shown in fig

Fig 4



Step 9: Type: HATCH command in command line (Fig 5)

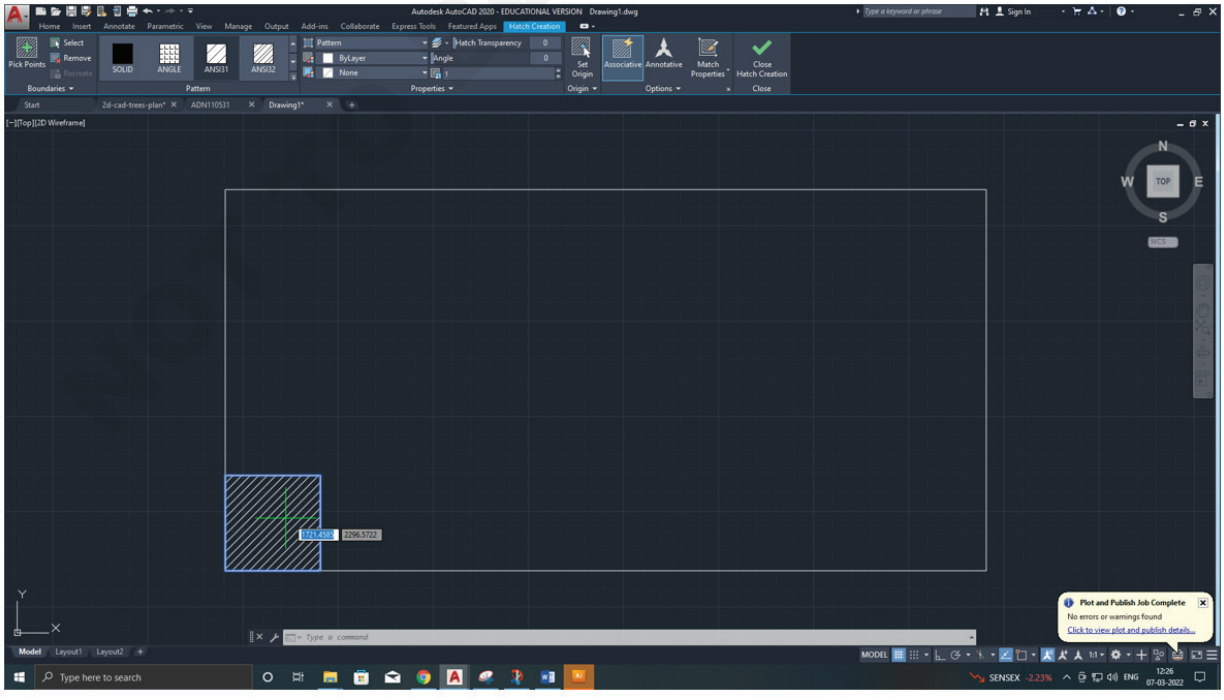
Pick internal point or [Select objects/Undo/seTtings]: Selecting everything...

Selecting everything visible...

Select the following HATCH type

Pick internal point or [Select objects/Undo/seTtings]: '_-hatchedit_pANSI31

Fig 5

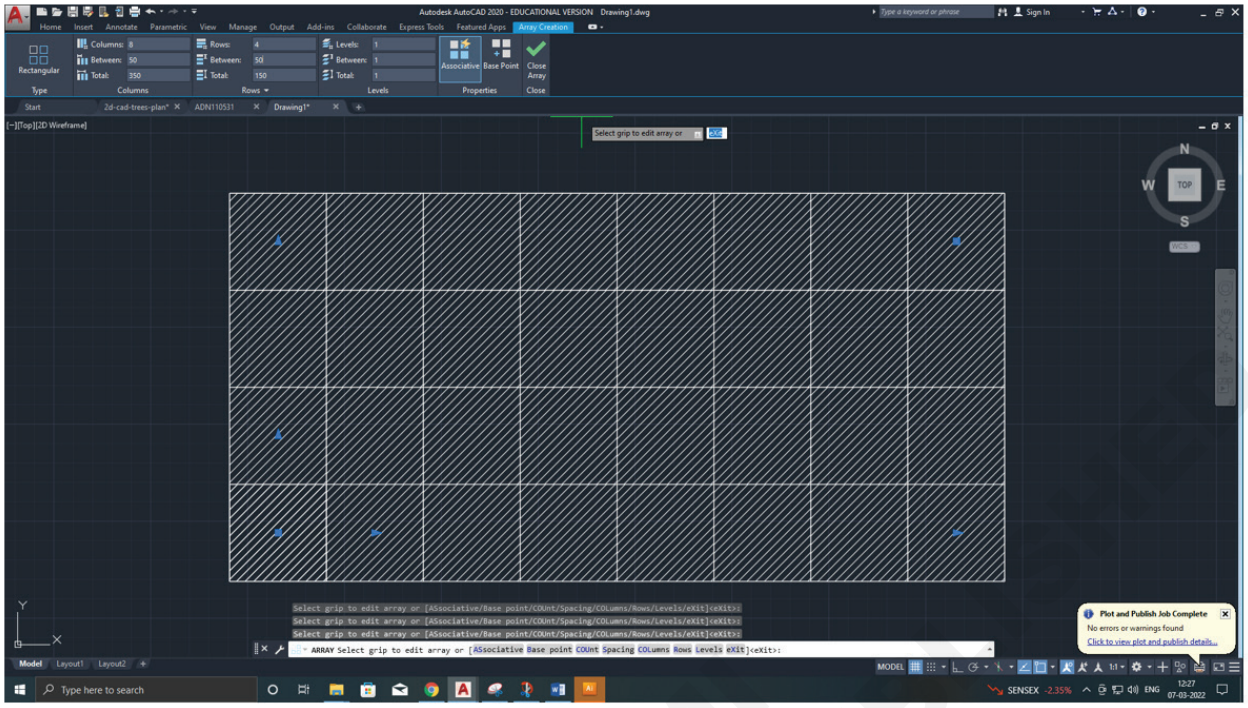


Step 10: Now give Command: ARRAY for drawing multiple rectanguler as shown (Fig 6)

Enter array type [Rectangular/PAth/POlar]: R

Type = Rectangular Associative = Yes

Fig 6



Step 11: To Offset the object as shown in Fig 7

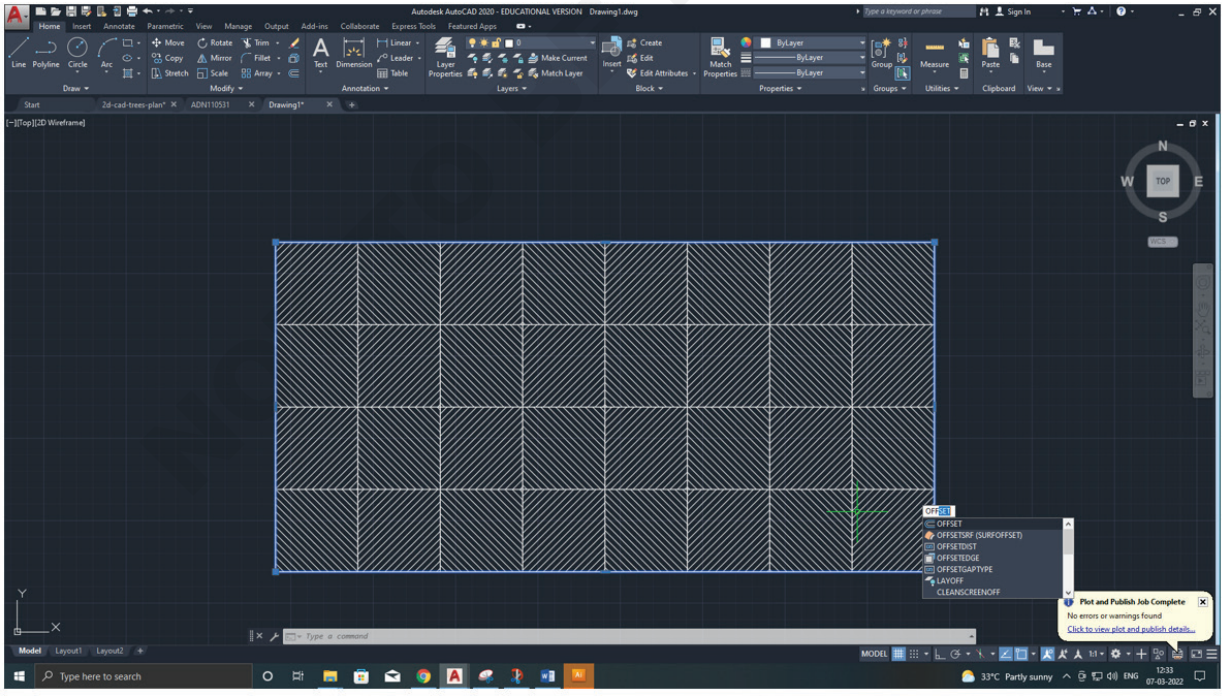
TypeCommand: OFFSET

Current settings: Erase source=No Layer=Source OFFSETGAPTYPE=0

Specify offset distance or [Through/Erase/Layer]: 3

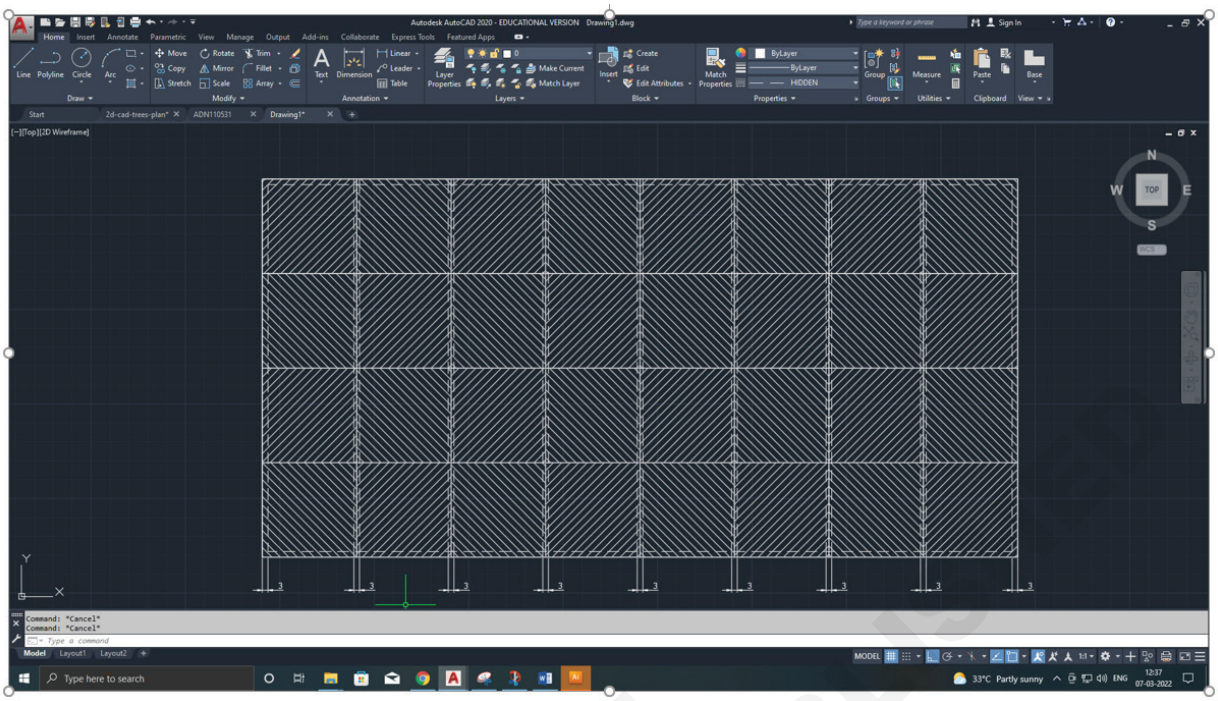
Select object to offset or [Exit/Undo] <Exit>:

Fig 7



Step 12: Select the Line Type (Fig 8) Change the Hidden Line for Aluminium Panel.

Fig 8



Step 13: This elevation is as it appears from below the ceiling.

Step 14: For cross-section, take the orthographic projections from the elevation. It is a horizontal cross-section.

Step 15: Take the total depth of 30 cm. from below the RCC slab; which is supported by brick walls.

Step 16: Then draw the metal hangers, vertical & horizontal reape rs and POP panels fixed to the framework. Metal hangers are 3 mm thickness, vertical wooden reapers (widthwise) are 3x3 cm and horizontal wooden reapers (lengthwise) are 5x2 cm size and POP panels are 1cm. thickness.

Step 17: Assign proper line weights to create the effective appearance of the builiding.

Step 18: Plot the drawing to a printer or to a PDF format. Hit the plot icon to open the plot settings. Choose the layout type, pen settings, and window view that you would like to use.

Step 19: Take a print in A3 size paper.

— — — — —

TASK 2 : **Draw the aluminium section false ceiling (Fig 1)**

Draw the elevation of the false ceiling

1 Room size = 2400 x 1200mm

2 Height of room size = 3600mm

3 Draw elevation the room size 400 x 200 cm.

4 Depth of the suspended ceiling = 300mm

5 Suspended ceiling files size = 300 x 300 x 20mm.

6 'L' wall ceiling angle = 22 x 20mm.

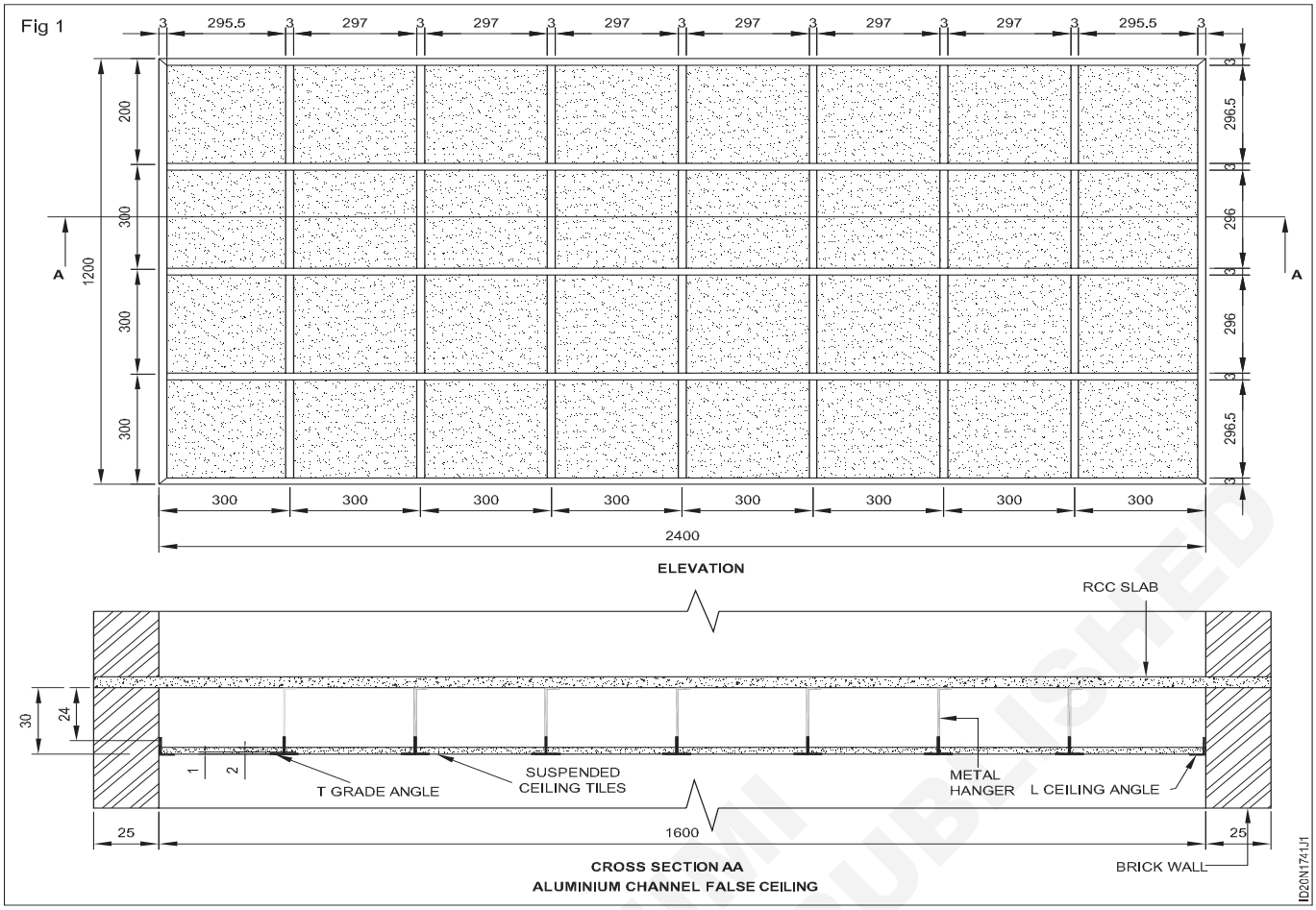
7 'T' grade false ceiling angle = 27 x 25mm

8 Metal hangers as per requirement

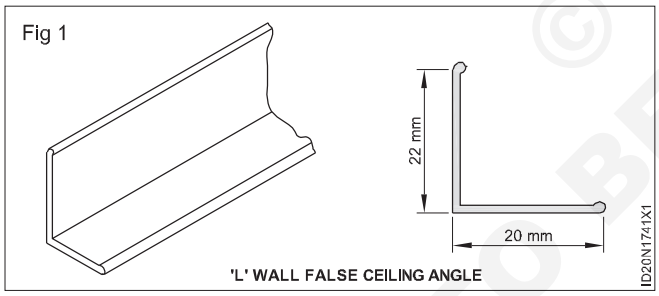
9 Draw to scale 1:20 or choose any convenient scale

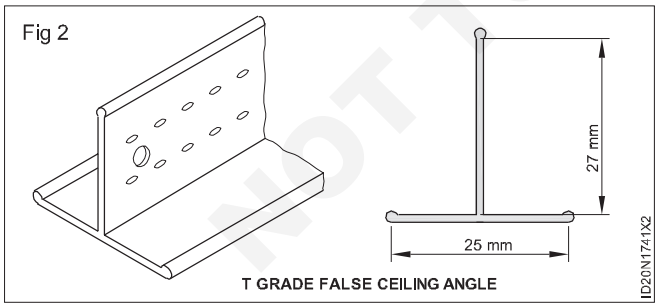
10 Draw the elevation and section of aluminium false ceiling using various commands in auto CAD, refer the TASK 1.

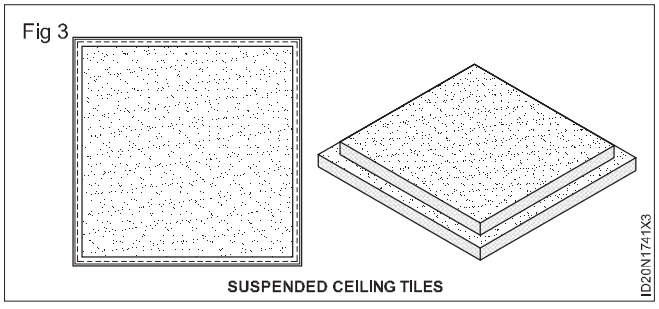
11 Take a print in A3 size paper.

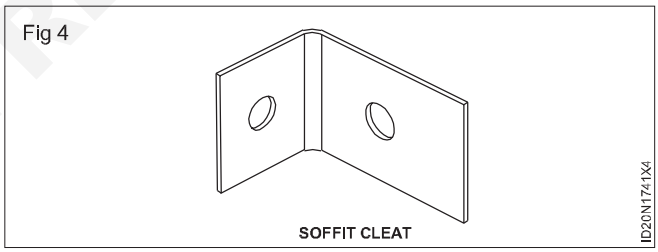


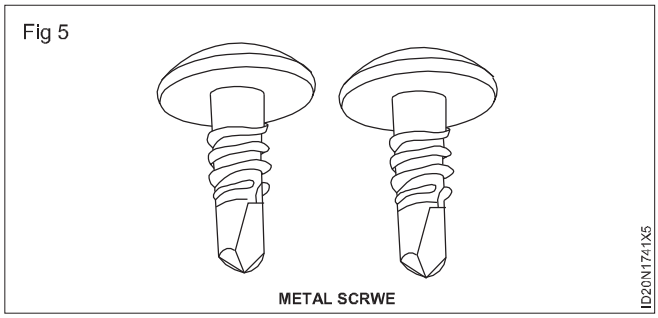
TASK 3 : **Details of aluminium section false ceiling accessories (Fig 1 to 6)**

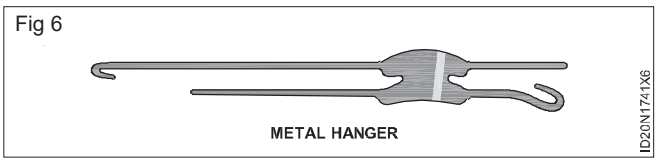












Specify the level of false ceiling and section and finishing material

Objective: At the end of this exercise you shall be able to

- **draw different type of sections of suspended false ceiling with different material with suitable scale.**

PROCEDURE

TASK 1 : **Draw different types of sections of suspended false ceiling with different material with suitable scale using Auto CAD (Fig 1 to 5)**

5 types are need to be drawn with different measurements and suitable scale use autocad software/

1 Acoustic tile (Plain).

2 Aluminium clad acoustic tile.

3 Plaster ceiling.

4 Gypsum board ceiling.

5 Plywood finish.

From the given drag (1-5) draw as given below assuming the length and width as given in the diagram in AutoCad.

Step 1: Open a autocad software draw the base line to draw the section of the ceiling.

Step 2: According to the section line shown in the plan the width of walls, room has to be drawn according to the design using line, offset, trim commands.

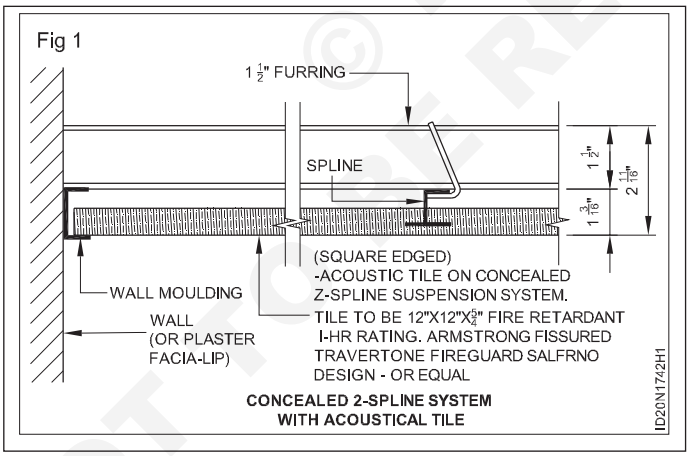
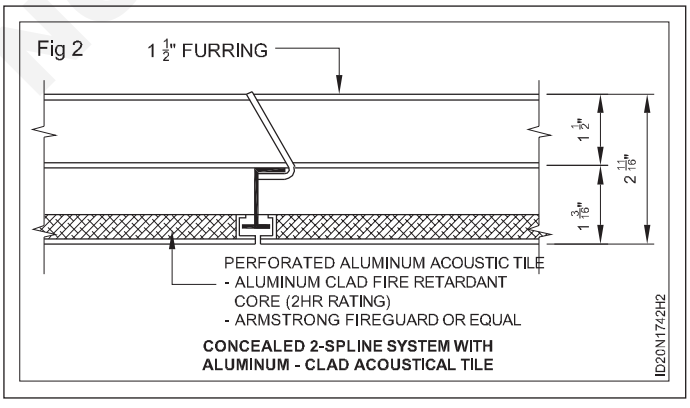
Step 3: Use the hatch commands to show the false ceiling in the section.

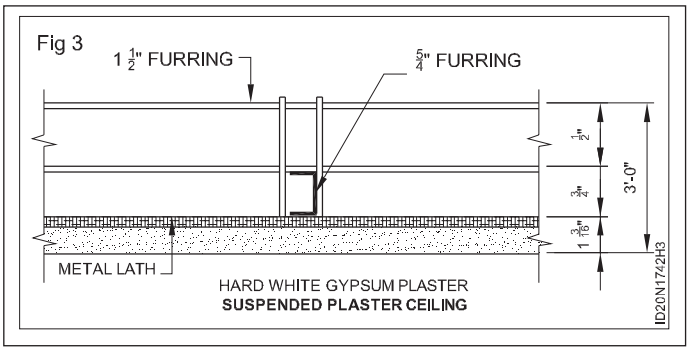
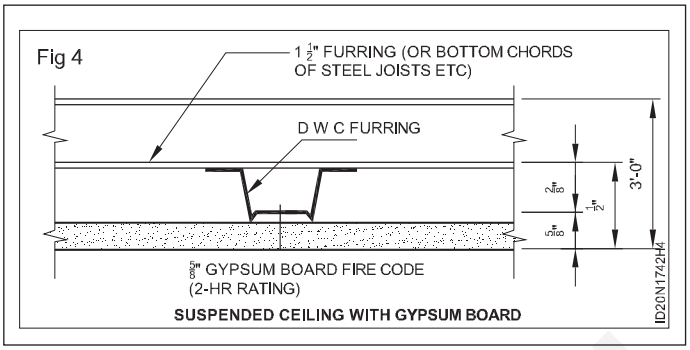
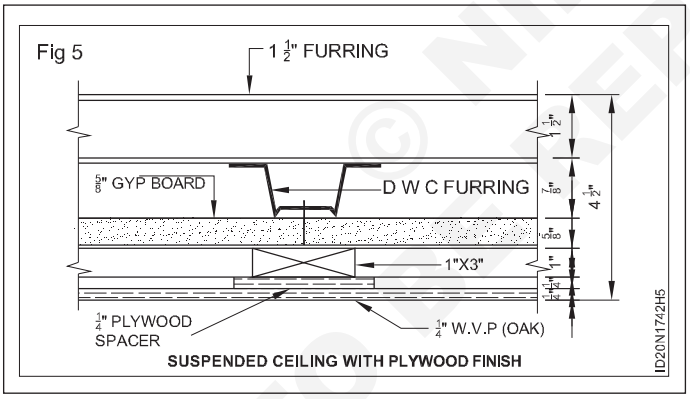
Step 4: Activate the text commands for mentioning the name and size of the ceiling.

Step 5: Using dimension command complete the dimensioning of the section drawing.

Step 6: Plot the drawing to a printer or to a PDF format. Hit the plot icon to open the plot settings. Choose the layout type, pen settings and window view that you would like to use.

Step 7: Take a print A3 size paper.

1		Concealed 2 spline system with acoustic tile (Plain)
2		Concealed 2 spline system with Aluminium clad acoustic tile

3		Suspended plaster ceiling
4		Suspended with Gypsum board
5		Suspended ceiling with plywood finish

Design a flooring pattern with different finishing material

Objective: At the end of this exercise you shall be able to

- **draw different type of floors with different material and functions using Auto CAD.**

PROCEDURE

TASK 1 : **Draw the section of a timber ground floor (Fig 1)**

DATA

Wall	-	200 mm thick.
Base concrete	-	150 mm thick.
Sleeper walls	-	100 mm thicks, at 1500 mmc/c.
Wallplate	-	100 mm thick.
D.P.C	-	25 mm thick.
Bridging joint	-	50 x 180 mm.
Floor boards	-	32 mm thick.

1 Draw the section of wall above and below ground floor.

2 Draw the section of a timber ground floor using various commands in Auto CAD.

3 Draw the base concrete, 150mm depth.

4 Draw the sleeper wall of height 1000mm at 1500mm C/C.

5 Draw the section of wall plate 100mm x 100mm, over 300mm thick D.P.C on end wall and centre of sleeper wall.

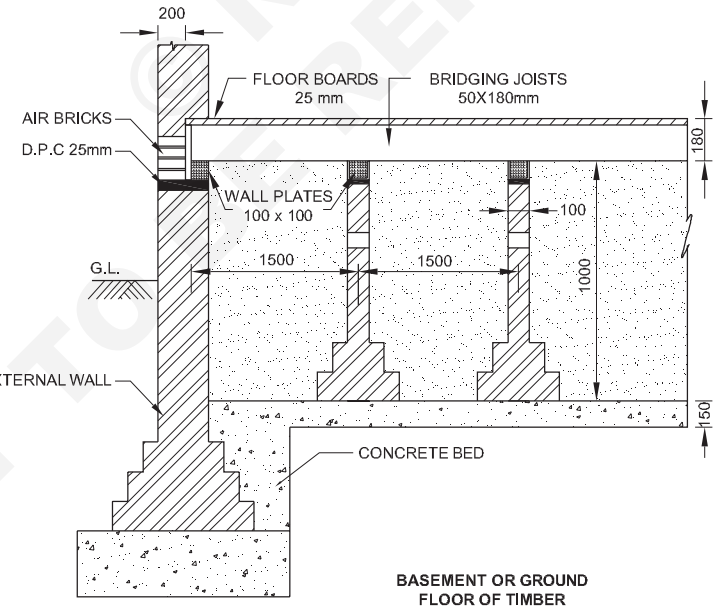
6 Draw the elevation of bridging joint 180mm depth over these wall plates.

7 Draw the section of floor boards, 32mm thick over joint

8 Finish the drawing with proper conventional symbols.

9 Take print out in A3 size sheet.

Fig 1



TASK 2: **Draw the isometric view of brick floors (Fig 1)**

DATA

Concrete sub-grade thick - 100 mm

Lime/cement mortar supgrade thick - 12 mm

1 Draw the isometric view of brick floors using various commands in Auto CAD. (Fig 1)

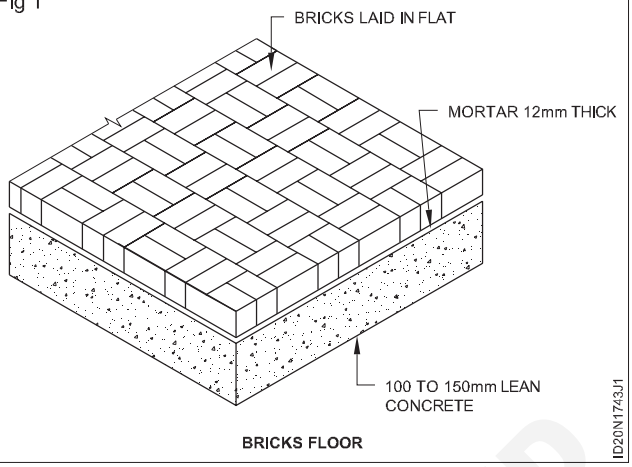
2 Draw the sub-grade with 100mm thick lean concrete as shown in figure.

3 Draw 12mm thick lime/cement mortar over this subgrade.

4 Draw the isometric view of bricks laid on edges as shown in figure.

5 Take print out in A 4 size paper.

Fig 1



BRICKS FLOOR

— — — — —

TASK 3: **Draw the isometric view of flag stone floor (Fig 1)**

DATA

Stone size - 60 x 45 x 20 mm

Depth of concrete for subgrade -100 mm

Mortar bed - 20 mm thick

Concrete subgrade thick - 100 mm

Cement mortar subgrade thick - 20 mm

1 Draw the isometric view of flag store floor using various commands in Auto CAD

2 Draw the sub grade with 100mm thick lean concrete as shown in figure.

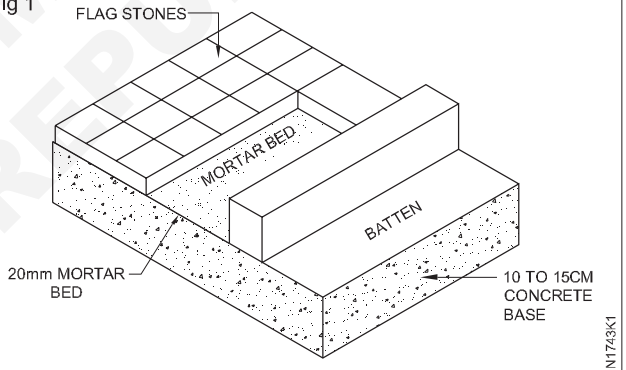
3 Draw 20mm thick lime/cement mortar over this sub grade

4 Draw the stone slabs over this mortar bed as shown in figure.

5 Complete the drawing by printing dimension and other related notes.

6 Take print out in a 4 size sheet.

Fig 1



FLAGSTONES FLOOR

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TASK 4: **Draw the section of cement concrete floor (Dimensions are given in) (Fig 1)**

DATA

Concrete above earth fill thick - 100 mm

Floor finish cement plastering thick - 25 mm

1 Draw the section of cement concrete floor using various comment in Auto CAD

2 Draw section of a wall, with basement

3 Draw a line to mark to ground level

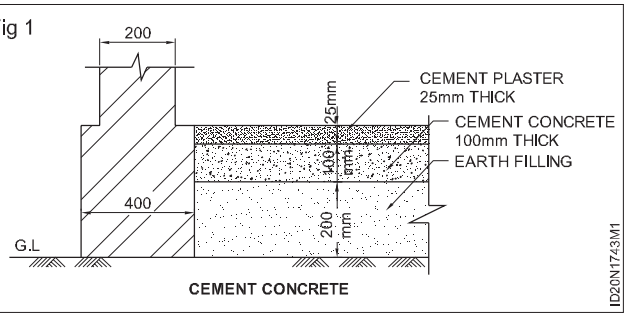
4 Show hard earth filling of suitable (it may varies thickness above ground level.

5 Draw 100mm thick base concrete above earth fill.

6 Draw 25mm thick floor finish with cement plastering.

7 Take printout in A4 size paper.

Fig 1



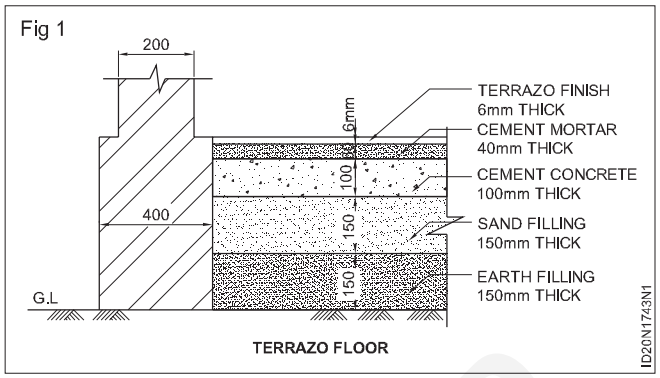
CEMENT CONCRETE

TASK 5: **Draw the section of terrazzon floor (Fig 1)**

DATA

Sand filling above earth fill thick	- 100 mm
Cement concrete over sand filling thick	- 75 mm
Cement mortar thick	- 34 mm
Terrzzo flooring thick	- 6 mm

1 Draw the section of terrzzo floor using various commands in Auto CAD.
2 Draw section of a wall with basement
3 Show well consolidated earth fill above ground level.
4 Draw 150mm thick sand filling above earth fill,
5 Draw 75mm thick cement concrete over sand filling.
6 Draw 34mm thick cement mortar.
7 Draw a line to mark ground level
8 Draw 6mm thick terrzzo flooring.
9 Complete the drawing by printing dimension and other related notes
10 Take print out in a A4 size sheet.



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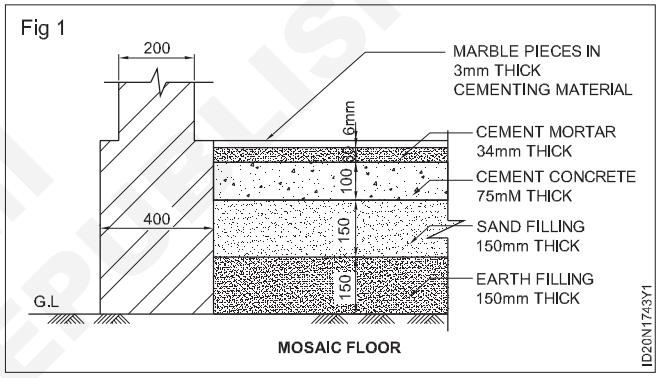
TASK 6: **Draw the section of marble floor (Fig 1)**

DATA

Sand filling above earth fill thick	- 150 mm
Cement concrete over sand filling thick	- 75 mm
Cement mortar thick	- 34 mm
Marble thick	- 6 mm

1 Draw the section of marble floor using various commands in Auto CAD
2 Draw section of a wall with basement
3 Draw a line to mark ground level.
4 Show well consolidated earth fill above ground level.
5 Draw 150mm thick sand filling above earth fill.
6 Draw 75mm thick cement concrete over sand filling.
7 Draw 34mm thick cement mortar.
8 Shown 6mm thick marble chips is cementing materials as mosaic flooring.



9 Complete the drawing by printing dimensioning and other related notes.
10 Take print out in a A4 size paper.

— — — — —

TASK 7: **Draw plan and detailed section of a single joist timber floor (Fig 1)**

DATA

Room size	-	300 x 4900 mm
Wall	-	300 mm thick
Bridging joist	-	50 x 100 mm at 350 mm c/c
Herring bone strutting	-	32 x 50 mm
Floor board	-	32 mm
Wall plate	-	100 x 75 mm
Wedge	-	75 x 100 mm

1 Draw plan and detailed section of single distemper floor using various commands.
2 Draw the plan of the room 3000x1900mm, width wall thickness 300mm.
3 Draw wall plate 100mm wide on longer side, in dashed line.
4 Draw 75mm thick wedges on shorter walls.
5 Draw the bridging joints, 50mmm width at 350mm c/c in shorter span.
6 Draw 32mm wide strut in the middle of shorter span and between the bridging joists.
7 Show the boarding of 32mm thick at one corner and complete the drawing as shown in figure.
8 Complete the drawing and take print in a A3 size paper.

To draw the section along long span (Section AA) (Fig 1)

DATA

Wedge wide	-	75 mm
Wedge height	-	100 mm
Bridging joists wide	-	50 mm
Bridging joists depth	-	100 mm
Other wedges	-	350 mm c/c
Struts	-	32 x 50
Wedge	-	32 mm

1 Draw the section along long span (section AA) using in AutoCAD
2 Draw the section of wall.
3 Draw the wedge 75 mm 100 mm height, attached to the wall
5 Draw bridging joists 50 mm wide, 100 mm depth, first one attached to the wedge and others, 350 mm c/c
6 Draw the struts 32 X 50 mm diagonally between the joists
7 Draw the floor board 32 mm thick on the bridging joist.
8 Draw the ceiling joining the bridging joist at bottom and complete the drawing
9 Complete the drawing and take print out in A4 size sheet

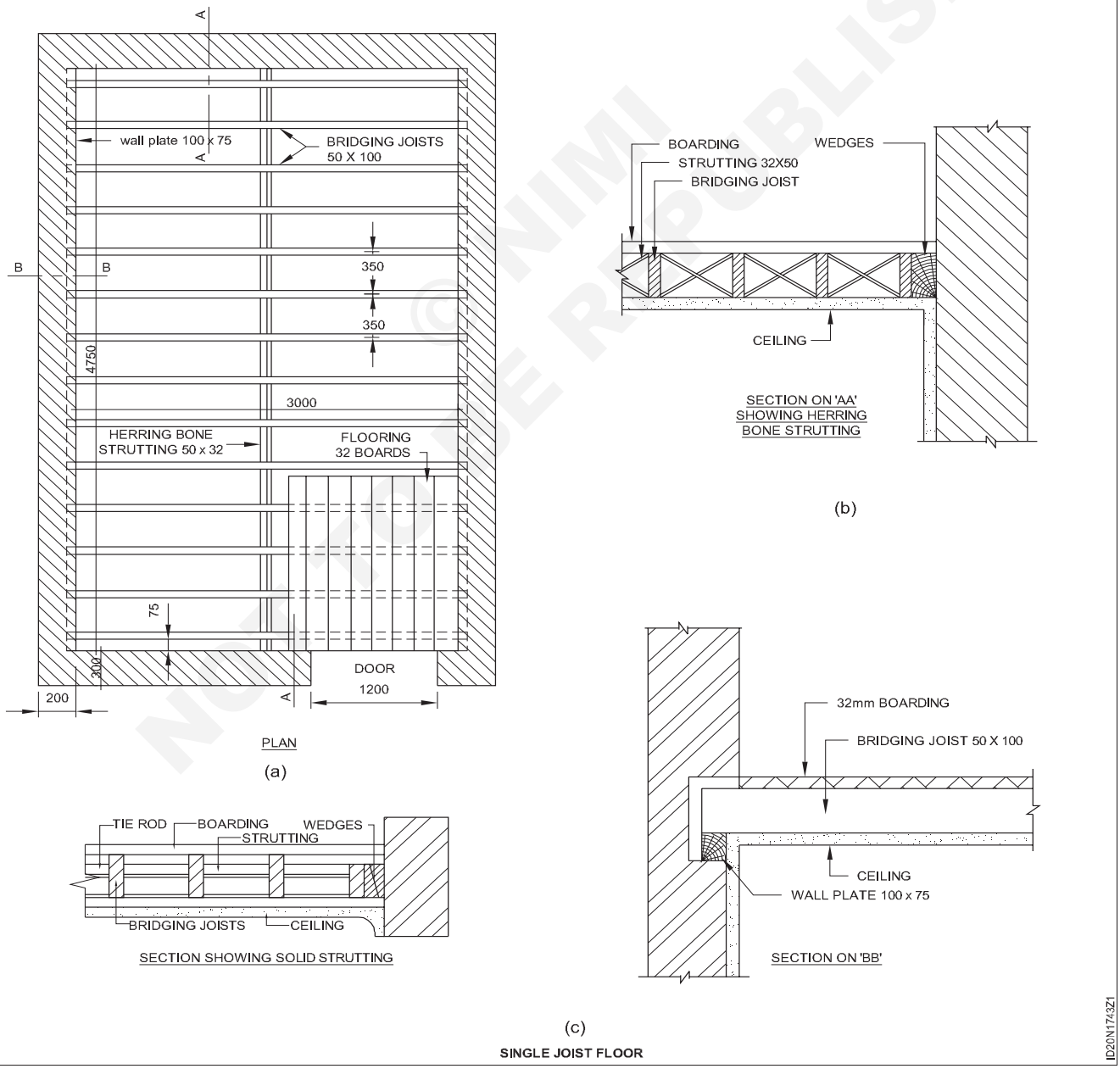
To draw the section along shorter span (Section BB) (Fig 1)

DATA

Wall plate wide	-	75 mm
Wall plate height	-	100 mm
Bridging joists height	-	100 mm
Borad thick	-	32 mm

1 Draw the section of wall.
2 Draw wall plate 75 mm wide, 100 mm height, inside the wall
3 Draw bridging joists 100 mm over this wall plate
4 Draw a 32mm thick borad over the joist, starting from the side of wall.
5 Show air space as shown in figure.
6 Draw ceiling under the bridging joist and complete the drawing.
7 Complete the drawing and take print out in A4 size sheet
8 Use the hatch commands to show the rcc, rubble masonry in the section and take the printout in A4 size paper.

Fig 1



SINGLE JOIST FLOOR

Specify the starting point of flooring

Objective: At the end of this exercise you shall be able to

- **draw detail of starting point of flooring.**

PROCEDURE

Draw a detailed of starting point of floor covering for claying of granite/marble floor using AutoCAD

1 Starting point of floor

2 Draw 230mm with 2.5cm DPC a plinth level along with stone foundation 450 mm thick below.

3 Draw sub floor total depth of 900mm bottom soling is 40 mm aggregate/random ribble of 150mm.

4 Rammed earth filling 600mm thk. Flat brick soling 75mm thk. (When black cotton soil is present)

5 Base of 100 mm thk. Cement concrete in 1:4:8 and smeared with 1:2:4 concrete

6 Draw floor covering or flooring of 20mm thk. Of desired tile granite/marble.

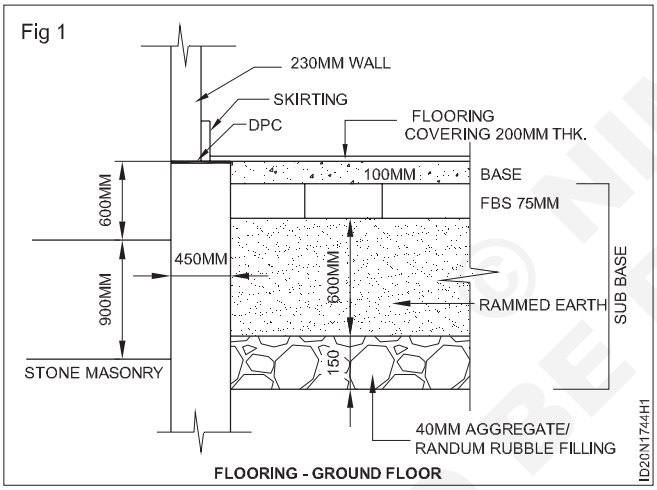
7 Draw the ground floor and upper floor of the flooring using various commands in AutoCAD (Fig 1 and 2)

8 Draw the sectional view

9 Complete the drawing by printing dimension and other related notes.

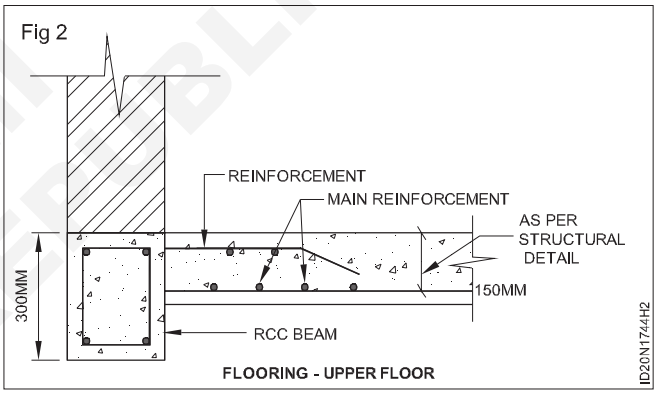
10 Take print in A4 size paper.

Fig 1



FLOORING - GROUND FLOOR

Fig 2



FLOORING - UPPER FLOOR

— — — — —

Specify the dimension & sizes of floor

Objective: At the end of this exercise you shall be able to

- **components of various types of spaces floor**
- **draw the specified dimensions of drawing.**

TASK 1 : **Mention the floor covering for various types of spaces as mentioned below**

1 Reception of office space.

2 Dancing floor.

3 Living room of resistance.

4 Toilets space.

5 Kitchen space(countertop)

6 Industrial space.

7 Auditorium space(Theatre space)

8 Restaurant space.

Space can have varied form of flooring depending on the user and function.

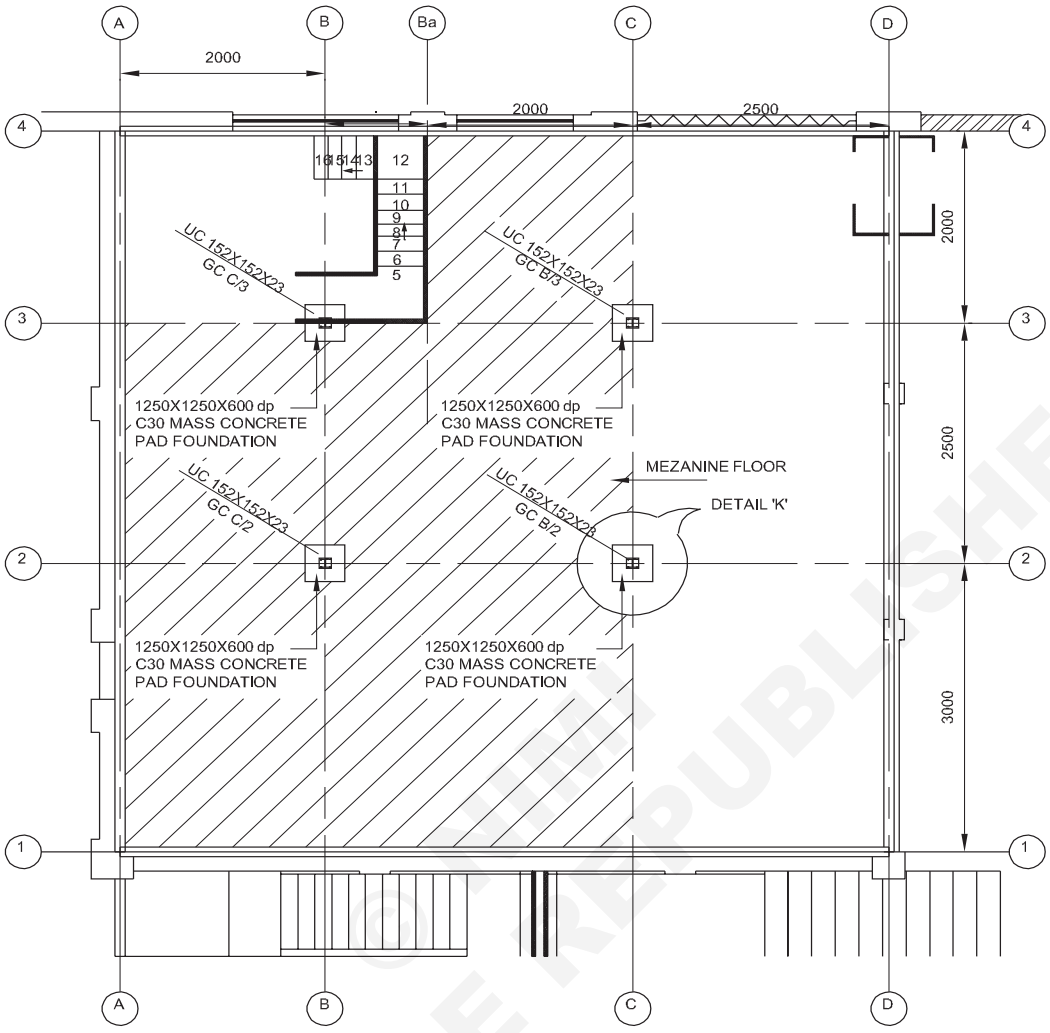
9 Suitable flooring convenient to the space occupied needs to be considered.

— — — — —

TASK 2 : **Draw commercial complex with specified dimensions (see drawing) using Auto CAD**

1 Draw the commercial complex plan (Fig 1)

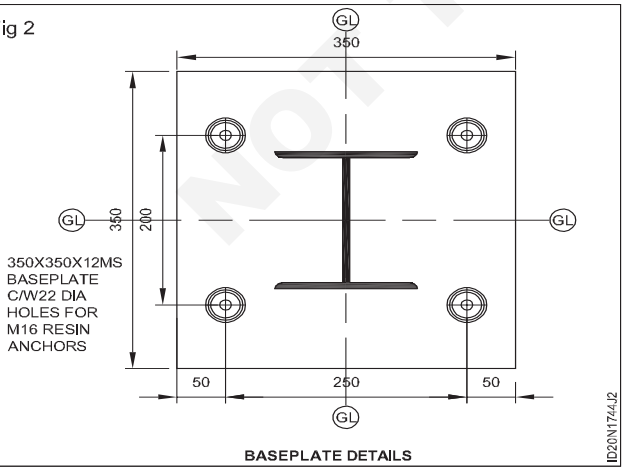
Fig 1



2 Draw the plan of the commercial complex using various commands in AutoCad.

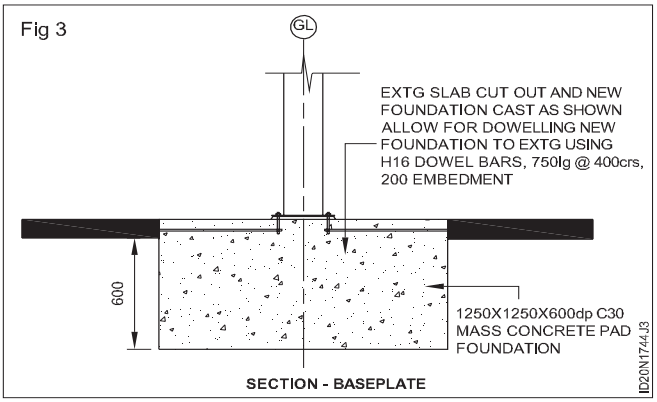
3 Draw magazine floor above used for extension activity (Fig 2 & 3)

Fig 2



BASEPLATE DETAILS

Fig 3



SECTION - BASEPLATE

4 Draw the sectional – B-B view (Fig 4)

5 Draw the sectional – C-C view (Fig 5)

6 Complete the drawing by printing dimension and other related notes

7 Take print out in A3 sheet.

Fig 4

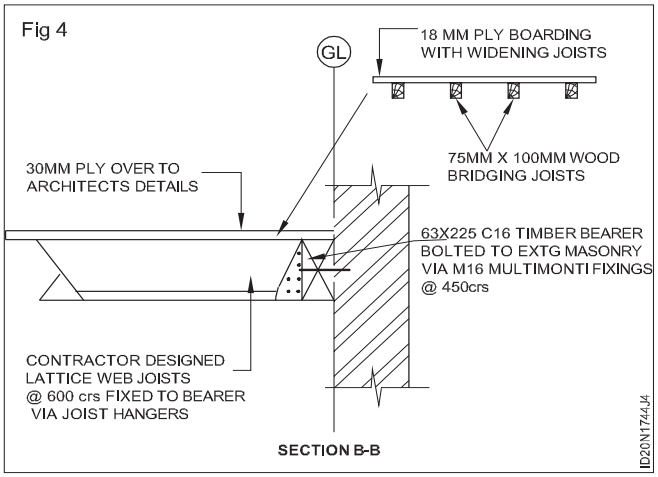
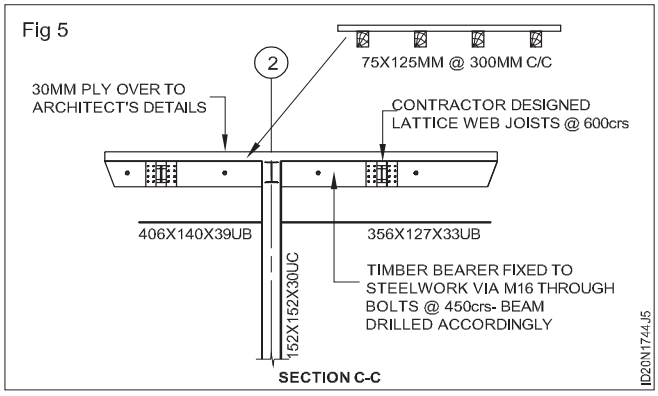


Fig 5



Drafting details drawing of different types of joints

Objectives: At the end of this exercise you shall be able to

- **draw the isometric views of lengthening joints**
- **draw the isometric views of angle and widening joint**
- **draw the isometric views of bearing joints.**

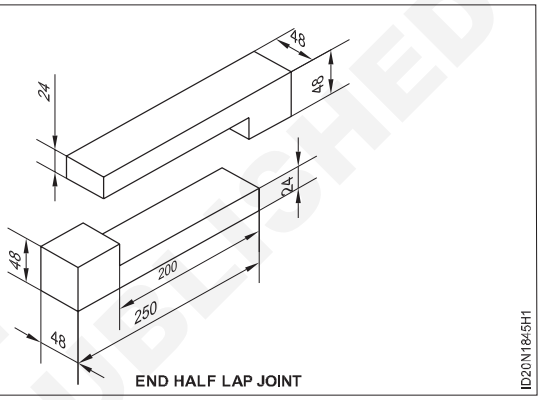
PROCEDURE

Draw the details of the different types of joints as per drawing. TASK 1 to TASK 15 : Using AutoCAD. Take a print in A4 size paper.

TASK 1 : **End Half - Lap Joint**

1 Draw the isometric views end of Half-lap Joint
2 Draw two wooden pieces 48x48x250mm = 2nos
3 Draw a depth of lap 24mm
4 Complete the views of end Half-lap Joint (Fig 1).

Fig 1

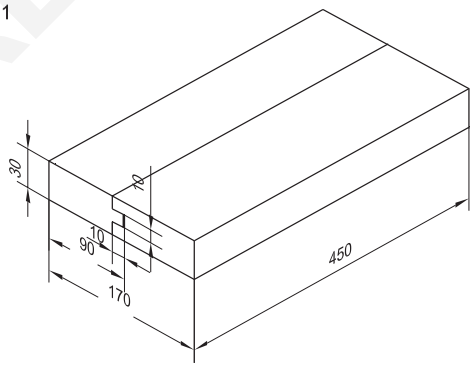


END HALF LAP JOINT

TASK 2 : **Tongue and groove joint**

1 Draw the isometric views of tongue and groove.
2 Draw two wooden pieces 90x30x450mm
3 Draw the tongue and groove 10x10mm
4 Draw the complet tongue and groove Joints (Fig 1)

Fig 1

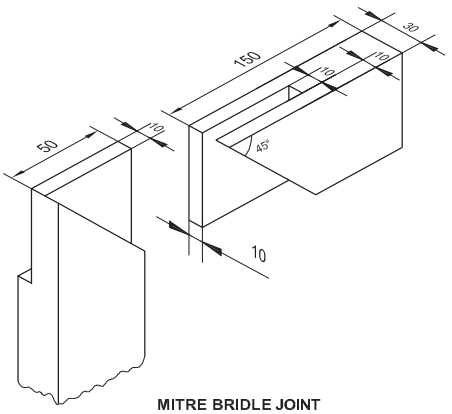


TONGUE AND GROOVE JOINT

TASK 3 : **Mitre bridle joint**

1 Draw the isometric views of mitre bridle joint
2 Draw the two wooden pieces, 50x30x150mm
3 Draw the mitre 45°
4 Draw the bridle 50x10
5 Draw the complete the mitre bridle joint Fig 1

Fig 1

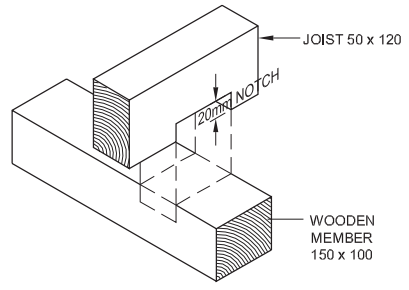


MITRE BRIDLE JOINT

TASK 4 : **Single Notched Joint**

1 Draw the isometric view of single notched joint
2 Draw the lower edge of the joist being cut to fit over the wall plate
3 Draw a isometric view of wall plate of size 150 x 100 mm
4 Draw isometric view of joist of size 50 x 120 mm
5 Draw cutting edge 20mm notch in the joist
6 Complete the views of single notched joint (Fig 1)

Fig 1



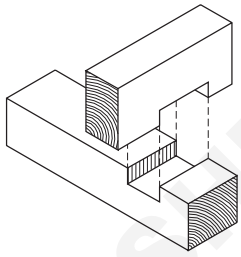
SINGLE NOTCHED JOINT

ID20N1845M1

TASK 5 : **Double notched Joints**

1 Draw isometric view of double notched joint
2 Draw similarly Fig No.1
3 Draw the cutting edge in the wall plate 20mm thick
4 Complete the views of double no tched joint (Fig 1)

Fig 1



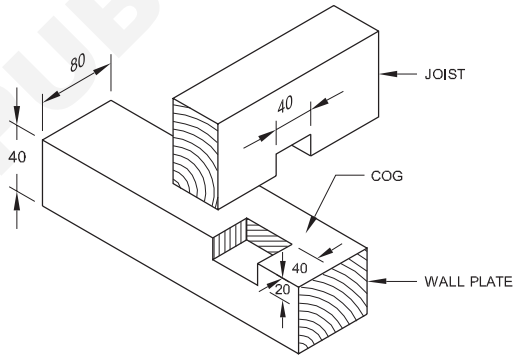
DOUBLE NOTCHED JOINT

ID20N1845N1

TASK 6 : **Single cogged Joint**

1 Size of notch 40 x 50 x 20 mm
2 Draw the isometric view of single cogged joint
3 Draw one notch in lower wall plate
4 Draw similarly notch in joist
5 Complete the Isometric view of single cogged joint (Fig 1).

Fig 1



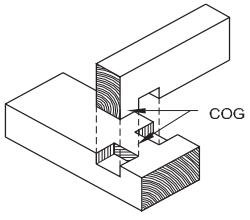
SINGLE COGGED JOINT

ID20N1845O1

TASK 7 : **Double cogged joint**

1 Draw the isometric view of double cogged joint
2 Draw two notches in the lower piece of timber on either side of uncut portion in the middle
3 Draw a notch on upper piece of timber to receive the cog of the lower piece.
4 Complete the view of Double cogged Joint (Fig 1).

Fig 1



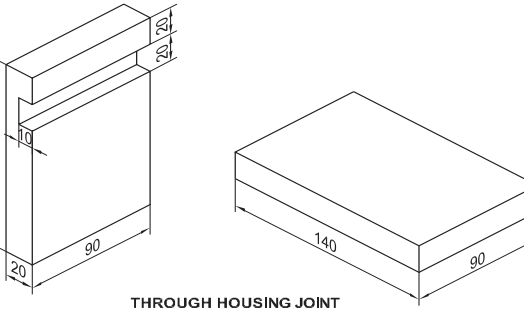
DOUBLE COGGED JOINT

ID20N1845P1

TASK 8 : **Through housing joint**

1 Draw an isometric view of through housing
2 Draw the two wood piece of 90x20x140mm
3 Draw the depth of housing 10mm
4 Complete the isometric view of through housing

Fig 1



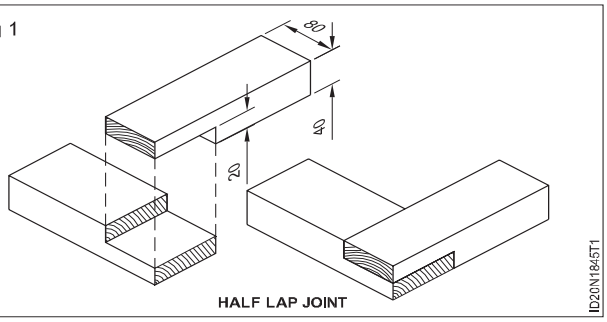
THROUGH HOUSING JOINT

ID20N1845S1

TASK 9 : **Half lap Joint**

1 Draw an isometric view of Half lap joint
2 Draw isometric view of 80 x 40 mm rectangular piece
3 Draw another piece in the same size at right angle to previous piece (80 x 40mm)
4 Draw cut out half of the thickness of each timber piece
5 Complete the Drawing of Half lap joint (Fig 1)
6 Draw the elevation Longitudinal Half lap joint.

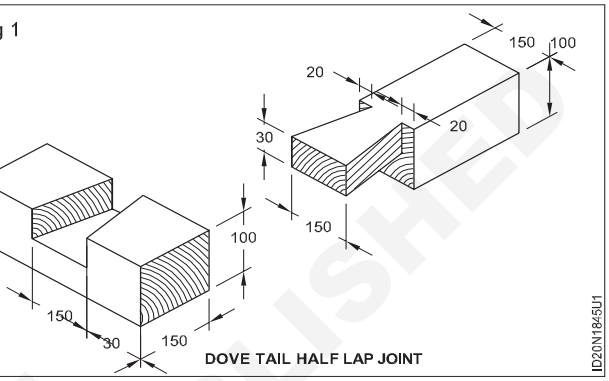
Fig 1



TASK 10 : **Dovetail Half lap Joint**

1 Draw an isometric view of Dovetail halved joint
2 Draw 150 x 100 mm timber piece in isometric view.
3 Draw another piece of timber in same size at right angle to previous timber piece
4 Draw the upper edge being cut 150mm on one side and other side tapered of size 110mm
5 Draw similarly the top piece of lower edge to fit into the lower piece
6 Complete the Drawing of Dovetail Halved Joints (Fig 1).

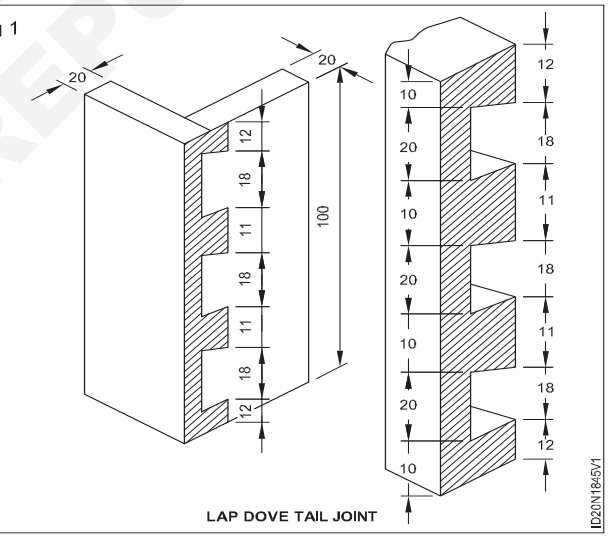
Fig 1



TASK 11 : **Lapped Dovetail Joints**

1 Draw an isometric view of lapped dovtail joint
2 Draw Two pieces joined at corner in isometric view (130 x 100 x 20mm)
3 Draw 10mm and 20mm size alternately on one edge
4 Draw another cutting edge as per given Dimension to fit into corner joint
5 Complete the drawing of lapped Dovetail Joint (Fig 1).

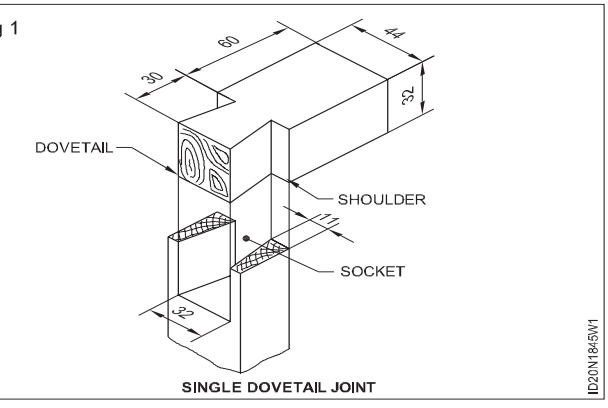
Fig 1



TASK 12 : **Single Dovetail Joint**

1 Draw an isometric view of single dovetail joint.
2 Draw isometric view of timber piece size 90 x 44 x 32mm
3 Draw 1/4th size (11 mm) on both ends.
4 Draw 6mm socket on both ends
5 Complete the Drawing of single Dovetail Joints (Fig 1)

Fig 1



TASK 13 : **Mortice and Tenon Joint**

1 Draw the isometric view of Mortice and Tenon joint.

2 Draw a timber piece of size 90x35x33 mm in isometric view.

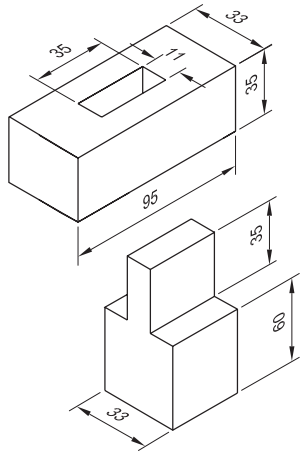
3 Draw a tenon 35x11mm.

4 Similarly draw a timber piece of size 66 x 32mm at top.

5 Draw a 35x11mm size mortice.

6 Complete the drawing of mortice and Tenon joints (Fig 1).

Fig 1



MORTICE AND TENON JOINT

ID20N1845X1

— — — — —

TASK 14 : **Draw Haunched mortise and tenon joint between Top rail and style to a scale 1:10**

Data

Size of vertical style 100 x 50 mm

Size of top rail 100 x 50 mm

1 Draw isometric view of vertical style

2 Draw mortice on top of vertical style

3 Draw Haunch 40mm Deep and 16mm thick

4 Draw an isometric view of top rail 100 x 50 mm

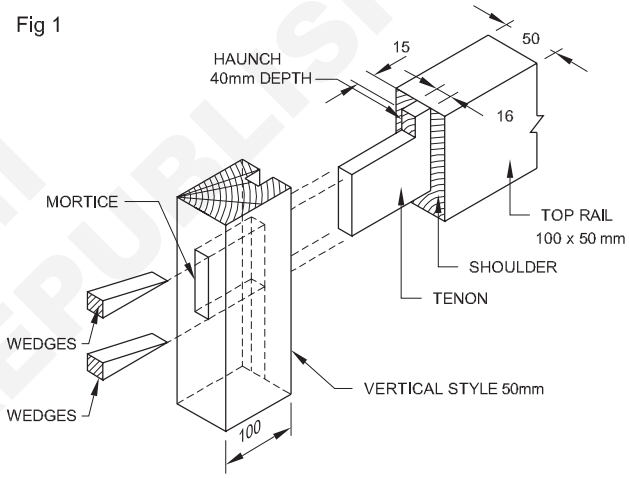
5 Draw shoulder on both side 17mm wide

6 Draw tenon 100 mm length

7 Draw the wedges.

8 Complete the drawing of Havnched mortise and tenon joint between the top rail and style (Fig 1).

Fig 1



HAUNCHED MORTISE AND TENON JOINT

ID20N1845Y1

— — — — —

TASK 15 : **Draw isometric view of Double mortise and tenon joint between middle rail and style**

Data

Size of vertical style as per (Fig 1)

Size of middle rail 200 x 50 mm

1 Draw isometric view of vertical style

2 Draw two mortice in the vertical style

3 Draw the distance between the mortice 40mm deep

4 Draw groove at right side for panel (12mm)

5 Draw an isometric view of middle rail 200 x 50 mm

6 Draw 12mm groove at top for panel fixing.

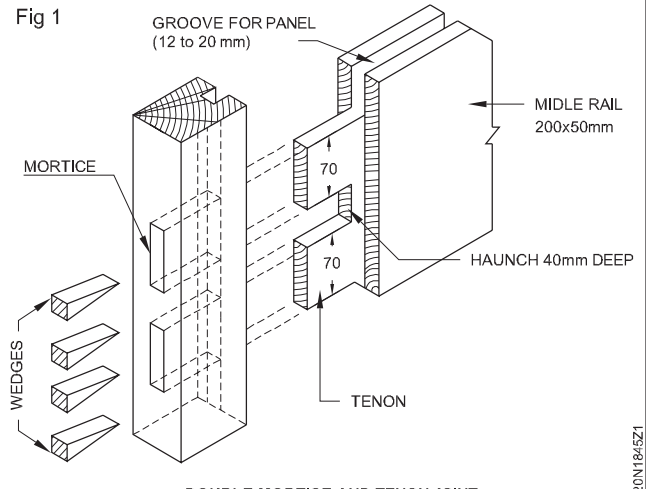
7 Draw each 70mm depth tenon

8 Draw 40 mm depth Haunch

9 Draw wedges to tighten the joints

10 Complete the Drawing of double mortice and tenon joints between middle rail or Lock rail and style. (Fig 1).

Fig 1



DOUBLE MORTISE AND TENON JOINT

ID20N1845Z1

Drafting panelled & glazed door with wire gauge shutter

Objective: At the end of this exercise you shall be able to

- **draw the plan, section and elevational views of panelled, glazed with wire gauged door using AutoCAD**

PROCEDURE

TASK 1 : **Draw the elevation and vertical section of panelled and glazed with wire gauge door**

Data

Door opening 1200 x 2100 mm

Frame size

Head = 120 x 75 mm

Post = 110 x 75 mm

Top Rail = 100 x 40 mm

Lock Rail = 150 x 40 mm

Bottom Rail = 200 x 40 mm

Hanging style and meeting style = 100 x 40 mm

Front shutter = wire gauge

Back shutter = panelled + glazed

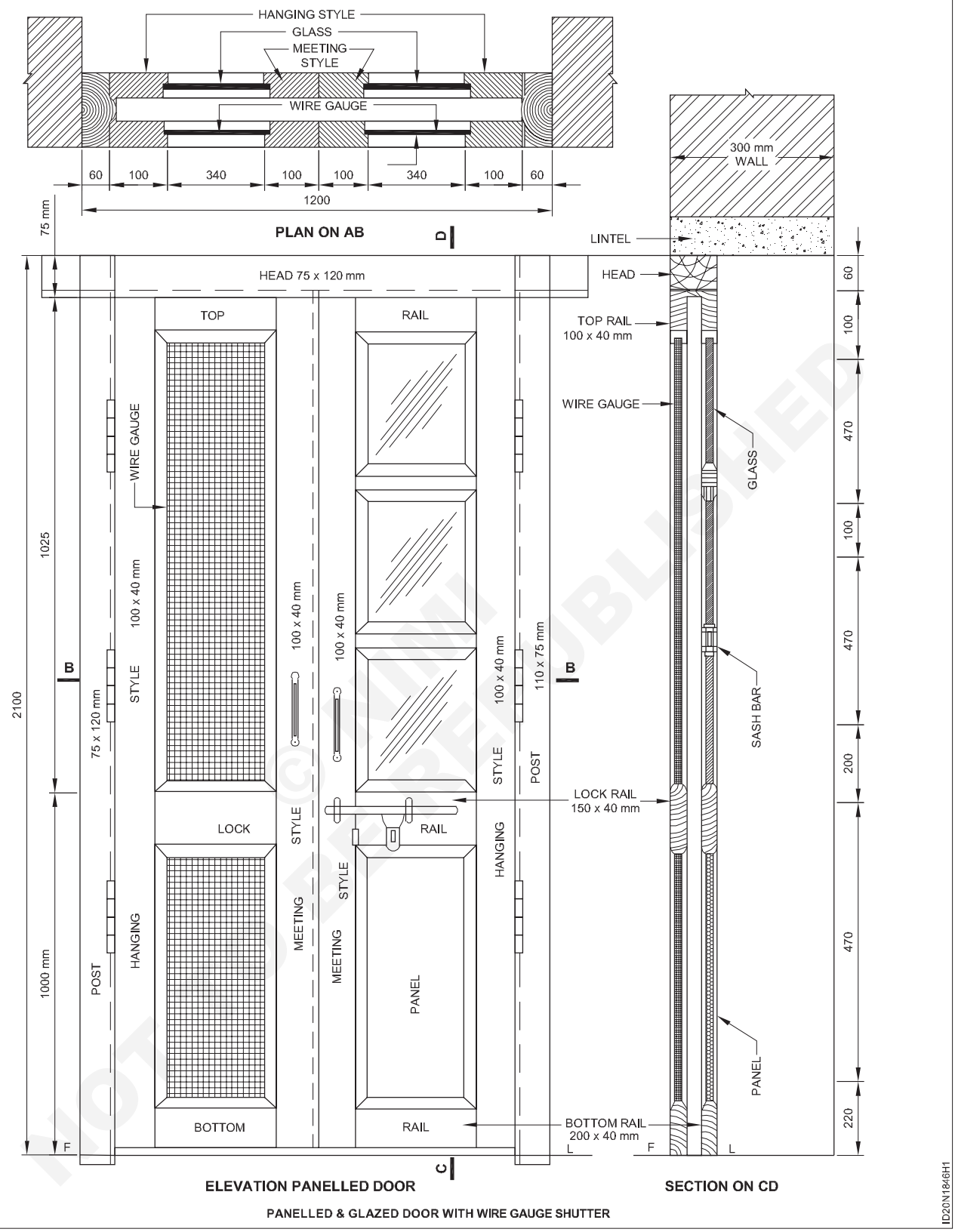
1 Draw the details of the panelled, glazed and wire gauge door as per the drawing Fig 1 using various commands in AutoCAD.

2 Draw half elevation with wire gauge and the balance half with panelled and glazed Fig 1.

3 Develop the vertical section and horizontal section and complete the drawing.

4 Take a print in A3 size paper.

Fig 1



PANELLED & GLAZED DOOR WITH WIRE GAUGE SHUTTER

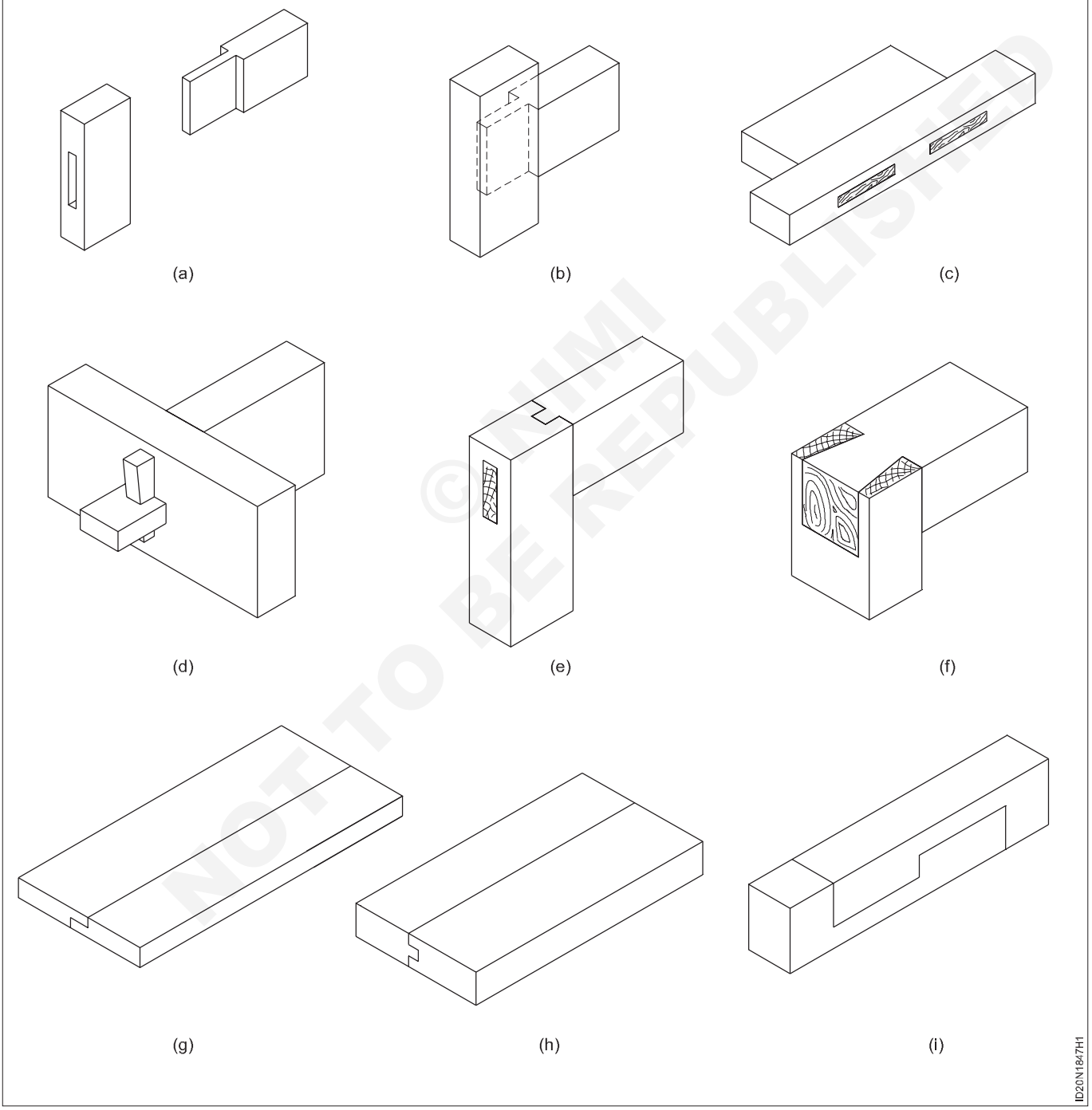
Model of carpentry joints, demonstration of stair case

Objectives: At the end of this exercise you shall be able to

- **identify basic carpentry joints**
- **identify the joints for specific uses**
- **demonstrate the stair case.**

PROCEDURE

Fig 1



TASK 1: **Identify the basic carpentry joints**

Instructor shall display and demonstrate to the students regarding the basic joints related with contruction work.

1 Trainees will note down all the displayed joint name and uses.

2 Get it checked by the instructor

3 Record it table 1

Table 1

Identify the joint

Fig No. 1	Name of the joint	Uses
a		
b		
c		
d		
e		
f		
g		
h		
i		

— — — — —

TASK 2: **Demonstration of stair case**

Instructor shall display and demonstrate to the students regarding the stair case with help of respective models and brief their name and use.

1 Trainees will note down all the displayed stair case parts name and uses.

2 Get it checked by the instructor

3 Record it Table 2

Fig 1

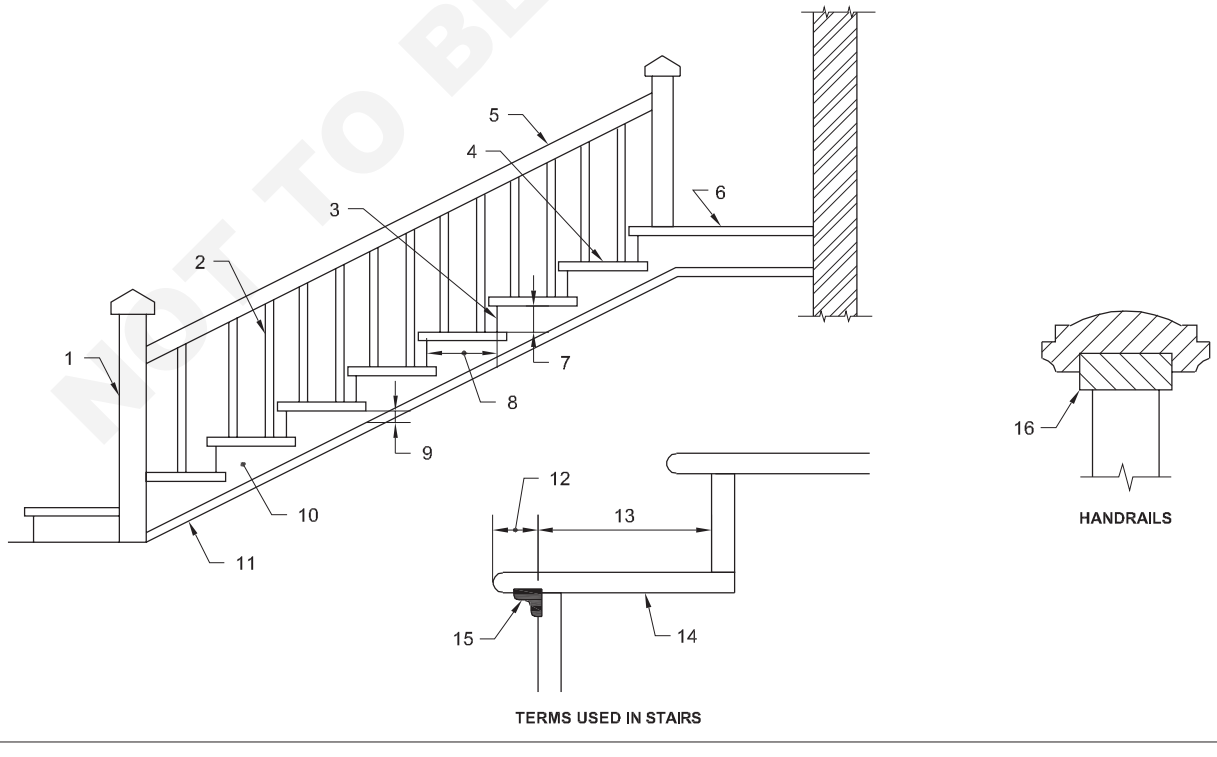


Table 2

Identify the stair case parts name (Fig 1)

Part No.	Name of the part	Uses
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		

Refer the details of stair case in the Exercise. No: (1.4.25 to 1.4.27)

— — — — —

Skill sequence

Specific use of carpentry joints related with construction work

Objective:

- **name and use of joint in building work.**

1 Mortise and tenon joint used in framed doors, frames for cabinets.

2 Stub mortise and tenon joint used in framed lock rail for doors and furniture.

3 Double mortise and tenon joint used in framed bottom rail for doors.

4 Task tenon and mortise joint used in framed by wooden floors and furniture.

5 Hunched mortise and tenon joint used in framed by top rail for doors and table.

6 Dove tail joint used in framed by door frame and table, drawer.

7 Rebated, tongue and groove joint used in framed by ledged doors and table top.

8 Table scraf joint used in hand rail and roof.

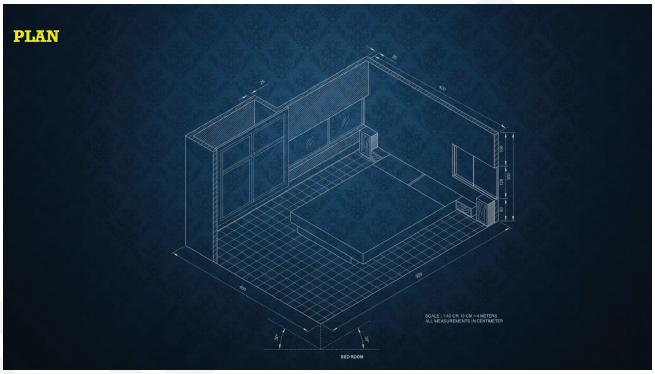
Practicing process & techniques of paints, polishing & varnishing on surfaces use power point skill presentation

Objectives: At the end of this exercise you shall be able to

- **practice the process of painting techniques**
- **practice the process of polishing & varnishing on surfaces**
- **prepare the power point presentatin for paint, polish and varnish.**

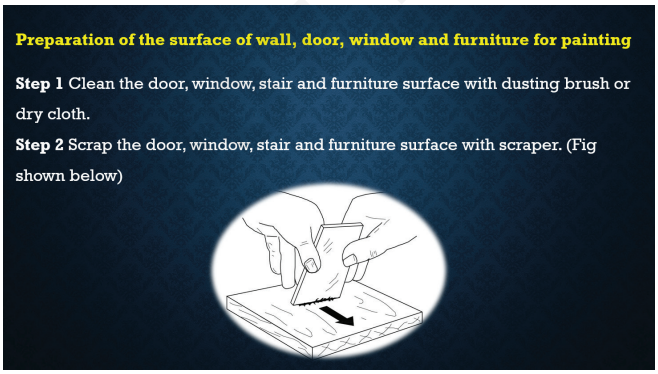
PROCEDURE

Generate power point presentation refer to - Exercise No. 1.5.36 and 1.5.37

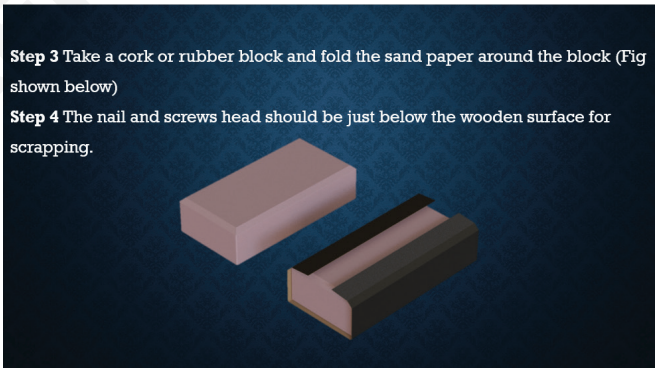


TASK 1: **Slide preparation for painting**

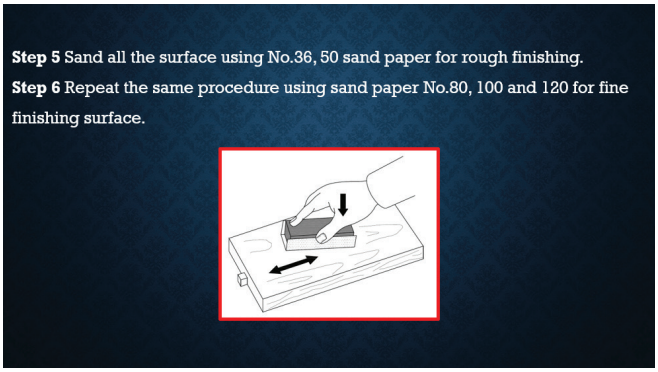
Slide 1



Slide 2



Slide 3



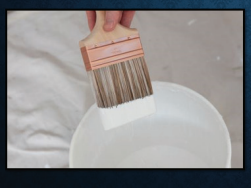
Slide 4

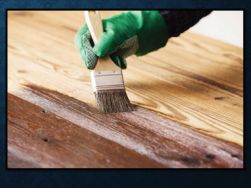
To apply the enamel primer and wall primer (water primer) on the surface of wall, door & window.

- Check the prepared surface for enamel primer and wall primer.
- Clean all the surface of the surface using dusting brush.
- Select the brush for enamel priming.
- Open the enamel primer container with opener.

Slide 5

- Shake the enamel primer with flat stick paddle.
- Dip the brush with enamel primer quenching level for 1/4".
- Apply first coat of enamel primer which acts as a filler and absorption well into the pores of surface.
- Apply first coat in crossing and re crossing motion.





Slide 6

- After enamel priming fill up the nailed holes, cracks etc. with putty made by mixing whiting with linseed oil to a thick past, with matching colour.
- Allow the first coat to dry and finishing coat. Apply the enamel primer along the direction with light quick strokes.

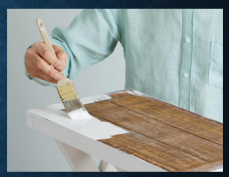
Priming is one of the strong, elastic foundation film before painting.

- Finishing the apply synthetic enamel primer to the new surface.

Slide 7

Steps to apply synthetic enamel paint or oil paint on the primed surface of wall, door, window, furniture as finishing coat.

- Check the priming surface for enamel painting.
- Clean all the surface using dusting brush.
- Select the brush for proper enamel painting.
- Open the enamel paint container with opener.



Slide 8

- Shake the enamel paint with flat stick paddle.
- Give a first coat of enamel paint applied evenly and smoothly in the direction of the grain.
- Apply the enamel paint covering the priming surface area.
- Finally brushing lightly in a direction at right angles to the grains in first coat.

Slide 9

- Allow it to dry for 8 hours.
- Sand again lightly using No.120 sand paper to get the smooth surface.
- Clean the dust with dusting brush.
- Finishing coat is applied straight from the tin it brushed.
- Finish the enamel paint/oil paint even and uniformly get the fine gloser finish and without any brush marks.

Slide 10

- ✓ Add paint with turpentine so that the brush will move smoothly.
- ✓ Apply the painting area should be well ventilated and free from dirt and dust.
- ✓ Enamel painting brush are normally 5-10 cm width be used.
- ✓ Apply the paint for uniformity of thickness.

Slide 11

To Prepare the ceiling and wall for distemper painting

- ✓ Inspects the ceiling and wall condition.
- ✓ Mark the electrical parts and switch board fixed on the ceiling and walls of building.
- ✓ Use the air gun to apply air pressure for clean the dust on ceiling and walls.
- ✓ Use the brush to clean dust on the wall and ceiling.
- ✓ Use the cleaning solvent mix with water.
- ✓ Apply pressure water spray on the ceiling for clean the dirt deposit on the ceiling.
- ✓ Apply pressure water on the wall to remove the dirt deposit on the wall.
- ✓ Ensure the building ceiling and wall is well cleaned.
- ✓ Inspect the ceiling and wall for damage.
- ✓ Mark the damaged part of ceiling and walls.

Slide 12

- ✓ Scrap and remove the damaged commended spot.
- ✓ Select the wall care putty.
- ✓ Prepare the wall care putty and apply on scrapped spot of the wall.
- ✓ Level the putty up to level of ceiling and wall.
- ✓ Check the ceiling and wall level with help of straight edge.
- ✓ If any uneven level apply wall care putty on required space of ceiling and wall.
- ✓ Level the putty with help of putty level.
- ✓ Allow the putty to dry for 8hrs with wall.
- ✓ Sanding the wall and ceiling with sand paper.
- ✓ Clean the level of ceiling and wall.
- ✓ Apply wall care primer on the wall and ceiling.
- ✓ Ensure the ceiling and wall is ready for distemper painting.

Slide 13

To Prepare the ceiling and wall for apply interior emulsion paint

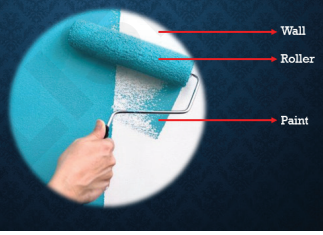
- ✓ Clean the wall or ceiling surface.
- ✓ Remove the loose particles, dust, dirt, grease, waste, marker, dropping by using wire brush or knife.
- ✓ Wipe off the wall/ceiling surface using a dry cloth.
- ✓ If old painted wall, sand the wall with the sand paper to get a smooth surface and off the dust with dry cloth.
- ✓ Apply primer coat before apply putty and allow it to dry.
- ✓ Apply wall putty coat in a vertical bottom to top manner by using a putty blade.
- ✓ Allow it to dry for 6 to 8 hours.
- ✓ After drying the first coat of putty gently rub the surface with sand paper to remove the loose particle and uneven surface.
- ✓ State applying the second coat of wall putty.

Slide 14

- ✓ Leave the surface dry completely for 8 to 12 hours and the rub surface very gentle to remove unevenness by using sand paper.
- ✓ The minimum thickness of the coats should be limited to minimum 1.5 mm, if it is thicker it may peel off or crack later on.
- ✓ Applying the primer coat to ensure a good bond between interior emulsion paint and surface to create a better finish.
- ✓ The primer provides the foundation for the paint job and increase the coverage of the paint.
- ✓ Apply the primer by using brush or roller and leave it dry. After coat of primer apply second coat it dry and let leave for dry 8 to 12 hrs.

Slide 15

- ✓ Dilute the interior emulsion paint as recommended by the manufacture.
- ✓ Apply the first coat of interior paint with help of brush or roller and allow it for dry as per manufacturing instructions.
- ✓ Apply second and top coat paint as you need.



TASK 2: **Slide preparation for Polishing**

Slide 1

POLISHING

Slide 2

To prepare the polishing surface (by hand and by machine)

Step 1: By hand

- Rub the furniture surface with a dry cloth.
- Scrap the surface using scraper. (Fig 1)
- Take a cork or rubber block and fold the sand paper around the block. (Fig 2)
- Sand all the furniture surface using No 36. and 50 sand paper, for rough finish. (Fig 3)

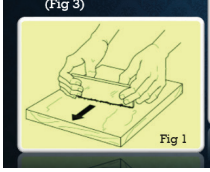


Fig 1

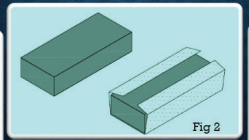


Fig 2

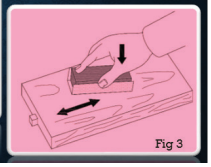
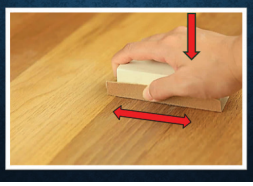


Fig 3

Slide 3

- Repeat the same sanding process using the sand paper No 80 and 100 for fine finishing.
- Apply wooden putty to cover screw, nail heads and all other gaps if any.
- Sand again using No.120 sand paper to get the smooth surface.
- Apply wood filler using cotton waste on the finished surface of the furniture.



Slide 4

Filler should be of the same colour of the wood

- Remove the extra filler dust using fresh fine cotton waste.
- Sand again using the sand paper No: 120
- Finish the furniture surface to fine glossy finish.

Slide 5

Step 2: By machine (Sanding with portable power disk sander machine)

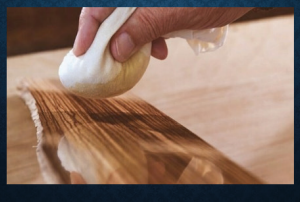
- Select the portable disk sander machine.
- Fix the disk sand paper No.80 in part of the disk on sander machine.
- Start the machine.
- Move the disk sander in the direction of the grain.
- Use little pressure.
- Move the disk sander evenly. (Shown in Fig.)
- Sand the surface for rough finish.
- Sand again using the disk sand paper No.120 to get fine glossy finish surface.
- Finish the wooden surface.

Slide 6

To apply the French polish on the prepared wooden surface

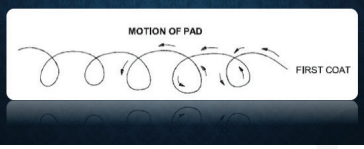
- ❖ Clean all the surface using dry cloth.
- ❖ Prepare the polishing pad by using cotton and cotton clothes.

Do not polish rough surfaces



Slide 7

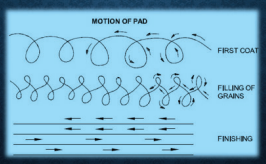
- ❖ Apply a coat of wood filler on the surface with a piece of rag and allow it to dry.
- ❖ Clean the surface with dusting brush to remove the excess filler.
- ❖ Hold the pad in right hand and dip it in polish, apply first coat on all wooden surface.
- ❖ Apply few drops of coconut oil on the surface and rub the surface.



Slide 8

- ❖ When the first coat is dry, apply second coat in circular motion.

Do not apply a new coat of polish when the previous one is wet



Slide 9

- ❖ Repeat the same procedure till surface of the grains are filled.
- ❖ When grains are filled, dip the pad with polish and squeeze the polish with slight pressure.
- ❖ Squeeze all the polish from the pad, and rub the pad all over the surface to obtain fine glossy finish.

Do not use wet pad for finishing

Do not stop the rubbing process in between

TASK 3: Slide preparation for Varnishing

Slide 1

VARNISHING

Slide 2

To prepare the surface for varnish. [Refer to slides of Polishing]

To apply the varnish on the prepared wooden surface

- o Clean all the surface of the job using dusting brush.
- o Rub the surface using wet cloth before varnish.
- o Prepare the brush.

Avoid foarming spume or air bubbles

- o Allow the first and second coat of varnish to dry.
- o Apply the varnish with full brush evenly with short light strokes.

Slide 3

- Apply the varnish vertical should be crossed and recrossed and then loid off lightly.
- It should be completed with upward brushing so that varnish could set flow down and eliminate brush marks.
- Apply the varnish horizontally in every direction with light quick strokes.
- It should be finished in one definite direction so that it could set without showing brush marks.

Slide 4

- Apply the varnish final coat
- The finished surface should present to look like fine glossy surface.

Surface should be rubbed down after each coat with fire sand paper except final coat.

Slide 5

THANK YOU

Here the below link you can download and view the above PPT slideshow

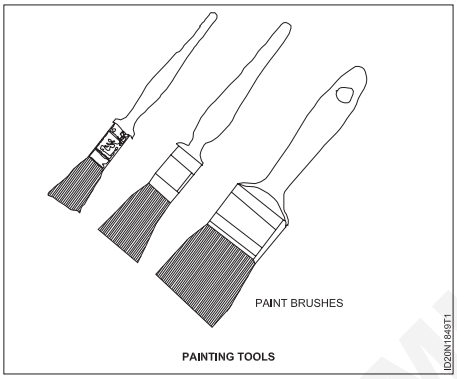
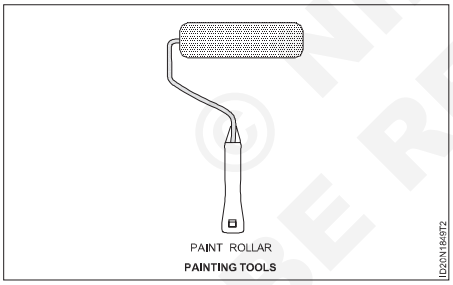
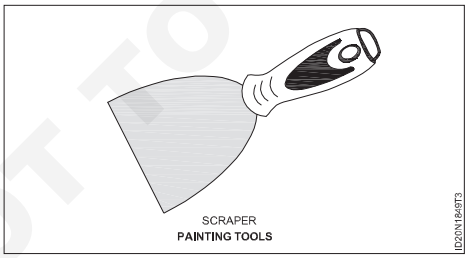
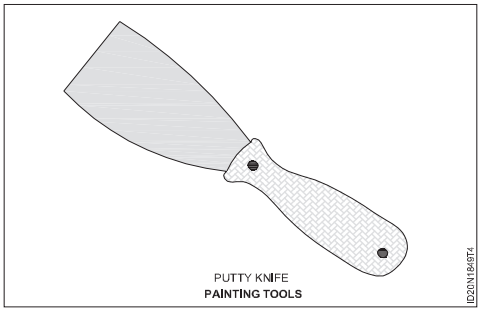
https://www.nimilearningonline.in/ppt/interior_2sem_2.5.46.ppsx

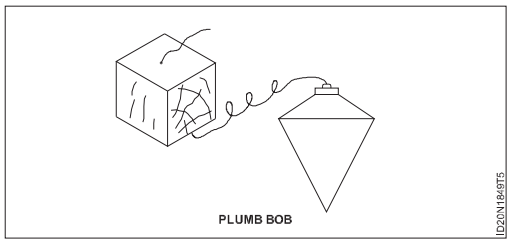
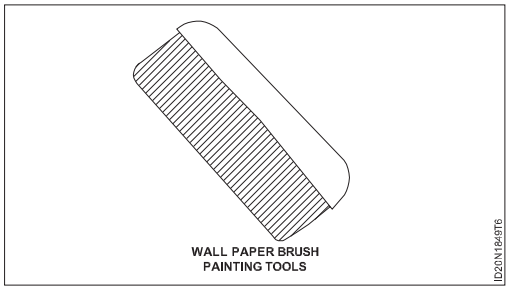
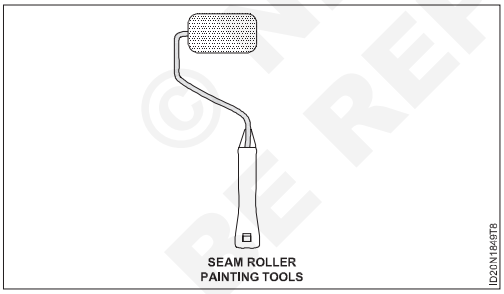
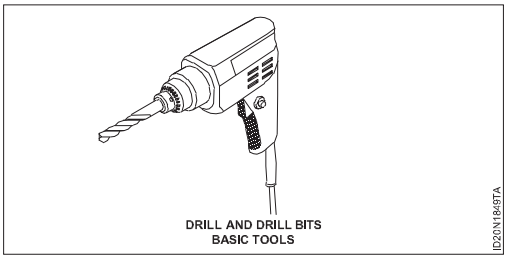
Recognize the tool & equipments uses in paints

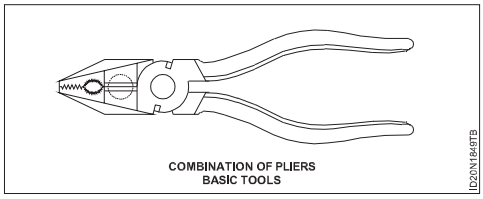
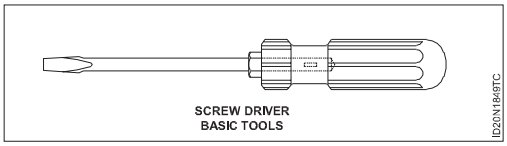
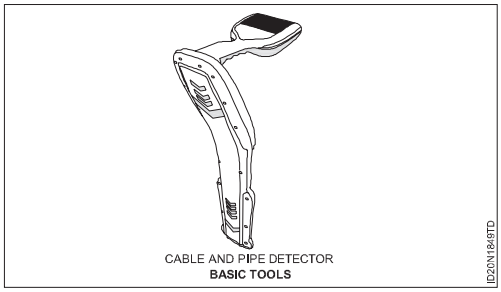
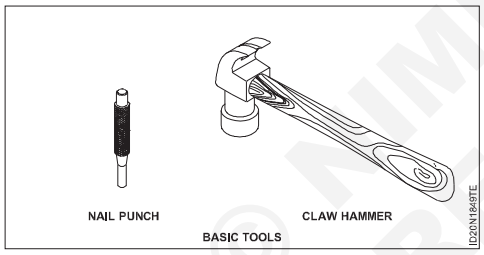
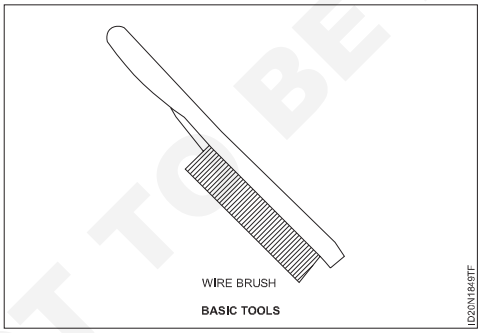
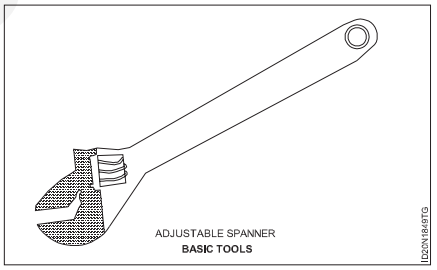
Objective: At the end of this exercise you shall be able to
- **name the basic tools used in painting.**

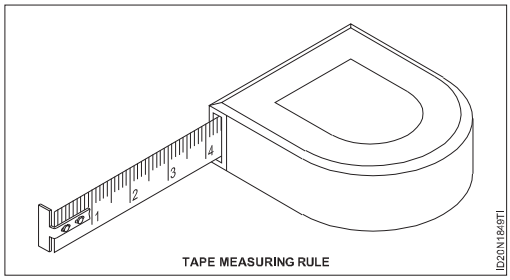
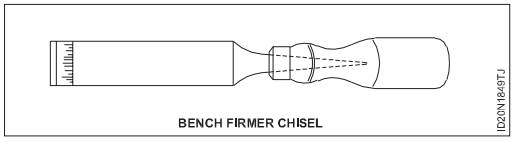
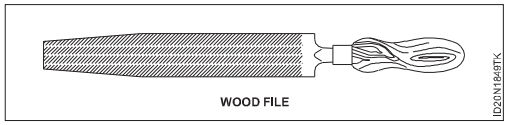
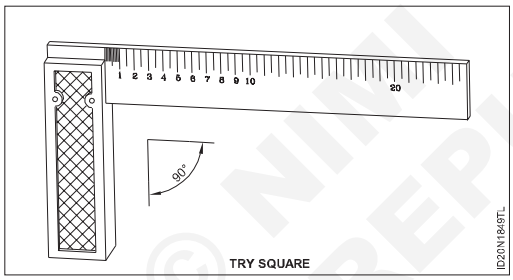
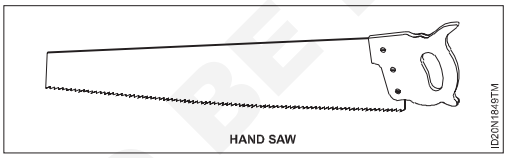
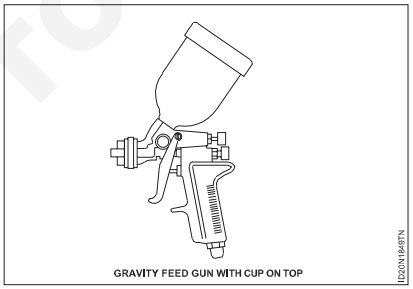
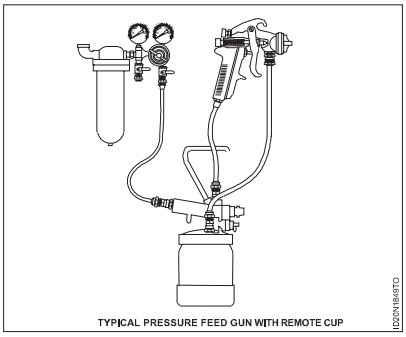
PROCEDURE

Basic painting tools and uses, generate power point presentation refer Exercise 1.8.48

Sl.No.	Tool Name	Figure of tool	Uses
1	Paint brushes		Handle the painting part
2	Paint roller		Used to paint large are quick and evenly
3	Scraper		Used to remove old wall paper and paint from the wood rough surfaces
4	Putty knife		Used for spreading and smoothing filler

5	Plumb line painting tool		Used to mark a vertical guideline for tasks such as hanging wall covering
6	Wall paper brush painting tool		Smooth out pasted wall coverings once in position
7	S c i s s o r painting tool		Making long clean cuts in wall coverings small scissors used for precise cuts
8	Seam roller		It is rolled along the seam between sheets of non textured wall covering to give a smooth finish
9	Paste brush		Used to apply wall paper and evenly
10	Drill and drill bits		Used on wood surfaces masonry bits used for harder surface

11	Combination of plier		Used to grip straighten and bend metal and to cut wire
12	Screw driver		Used on slot head and puillips head screws
13	Cable and pipe detector		Used to check the water pipes, electrical cable in wall and prevent accidents that can be ex-pensive to repair work
14	Claw hammer and nail punch		Used to tackle most decorating tasks quickly and easily nail punch used to drive nail and pin heads below the surface
15	Wire brush		Used to scrap rough surfaces to remove rust loose flakes and other debris
16	Adjustable spanner		Used to tighten and loosen nuts and bolts

17	Sprit level		Used to test perpendicularity of wall and windows
18	Tape measure		Used for longer measurements
19	Bench firmer chisel		Used for general chiseling purpose
20	Wood file		Used for smoothing roughly prepared surfaces
21	Try square		Used to check the trueness and flatness of surface
22	Hand saw		Used for sawing light work on wood
23	Gravity feed gun with cup on top		Provides most uniform film thickness and obtain a smooth finish
24	Typical pressure feed gun with remote cup		Used to atomise paint and apply on a surface

Estimate quantity of materials used on surface and labour cost for painting

Objective: At the end of this exercise you shall be able to
- **estimate quantity of materials and labour cost for painting**
- **estimate quantity of materials and labour cost for polish and varnishing.**

PROCEDURE

TASK 1: **Estimate materials Quantity and Labor cost for surface painting (Fig 1)**

Calculation of painting area = Height x Width = SQ Feet

100 SQ FT = 1 liter (Enamel paint (or Emulsion paint)

For Example wall size = 10' x 20'

Area = 10' x 20' = 200 SQ ft (or)

= 3000x6000= 18,000,000 sq mm

(or) 180,000 sq cm

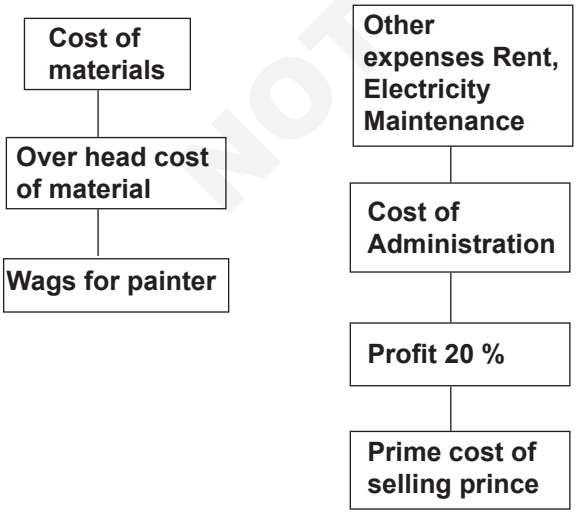
200 SQ ft Emulsion paint (or)

Enamel paint = 2 litres

Raw material for surface

SL NO	Name of material	Quantity	Approximate Rate
1	painting chopping knife	2 Nos	50 x 2 = 100
2	Emery sheet grid No: 80, 120.220	2 Nos each	10 x 6 = 60
3	Wall putty	5 kgs	50 x 5 = 250
4	Putty knife 50 mm 100 mm	2 Nos	50 x 4 = 200
5	Sponge	2 Nos	15 x 2 = 30
6	Wall primer or oil primer	2 litres	375 x 2 = 750
7	Emulsion paint or enamel paint	3 litres	500 x 2 = 100
8	Turpentine oil	1 No each	50 x 2 = 150
9	Brush 2 /4	1 No each	50 x 1 = 50 100 x 1 = 100
10	Banyan Waste	1 Kg	50 x 1 = 50
			Total = 2740/-

Total materials cost = 2740/-

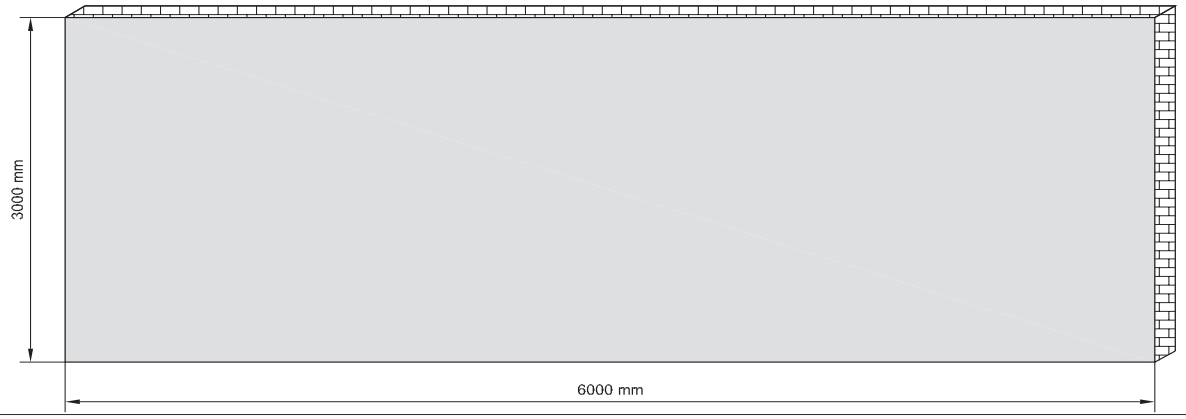


Detail of the estimate

Cost of materials	= 2740.00
Over head 10 %	= 274.00
Wages for painter 2 x 900	= 1800.00
Other cost rent and Electricity	= 150.00
Administrative cost	= 100.00
Profit 20 %	= 1013.00
Total prime cost	= 6077.00
Prime cost of selling	= 6077/-

Estimation of the prime cost approximately

Fig 1



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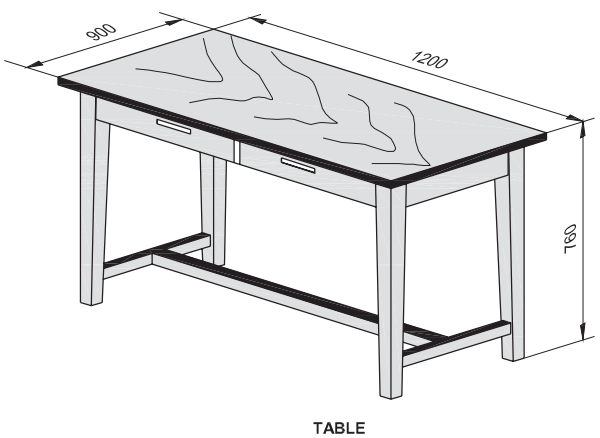
TASK 2: **Estimate the material and labour cost for polish or varnish (Fig 1)**

	Name of materials	Quantity	Approximate rate
1	Chopping knife	1 No.	1 x 50 = 50
2	Water emery sheet (grid 80, 120, 220, 320 each)	2 Nos. each	10 x 6 = 60
3	Wood putty	1/2 kg	50 x ½ = 25
4	Putty knife 50 mm, 100 mm each	2 Nos. each	50 x 2 = 100
5	Wood sealer	1 Litre	150 x 1 = 150
6	Polish wood	1 Litre	200 x 1 = 200
7	Cotton waster	½ kg	100 x 1 = 100
8	Brush 50 mm, 25 mm each	1 No.	50 x 2 = 100
9	Thinner	1½ kg	100 x 1½ =150
10	Cotton	¼ kg	80 x ¼ = 20
			Total = 955/-

Details of the estimate

Cost of materials	=	955. 00
Over head cost 10 %	=	96. 00
Wages for Wood polish worker (1 day = 1000) 2 days x 1000	=	2000. 00
Other cost rent and Electricity	=	150. 00
Administrative cost	=	100. 00
	=	3301. 00
Profit 20 %	=	660. 00
	=	3961. 00
Prime cost of selling Rs.		= 3961/-

Fig 1



TABLE

Estimation of the prime cost approximately

— — — — — — — —

Design the full height and low height partition wall with different construction and finishing material

Objectives: At the end of this exercise you shall be able to
- **draw the full height partition wall plan and scetion using AutoCAD**
- **draw the low height partition wall plan and section using AutoCAD.**

PROCEDURE

TASK 1 : **Prepare plan, section of full height aluminium partition wall as per given sketch Fig 1&2 using AutoCAD**

1 Draw the plan.

2 Draw the aluminium partition wall plan section using various commands in AutoCAD.

3 Draw the section view.

4 Complete the drawing by printing dimension and other related notes.

5 Take a print A3 size paper.

Data of finishing material			Part no
1	44.5 x 101.6 x 1810	Horizontal SG Top	1
2	44.5 x 101.6 x 2010	Vertical SG Allum section	2
3	44.5 x 101.6 x 1600	Vertical DG Allum section	3
4	44.5 x 101.6 x 440	Horizontal DG MID Allum section	4
5	44.5 x 101.6 x 320	Vertical Allum section	5
6	44.5 x 101.6 x 1630	Vertical DG Part section Allum	6
7	44.5 x 101.6 x 1810	Horizontal SG Part section Allum	7
8	44.5 x 101.6 x 1630	Horizontal SG Part section Allum	8
9	M8 Hex Nut STD	As required	
10	M8 STUD, STD	As required	
11	As required self tapping screw STD	As required	
12	As required Self tapping screw STD	As required	
13	As required equal angle 25x25x2 - Aluminium	As required	
14	As required particle board 12mm STD	As required	
15	As required packing rubber STD	As required	
16	As required glazing clips STD	As required	

Fig 1

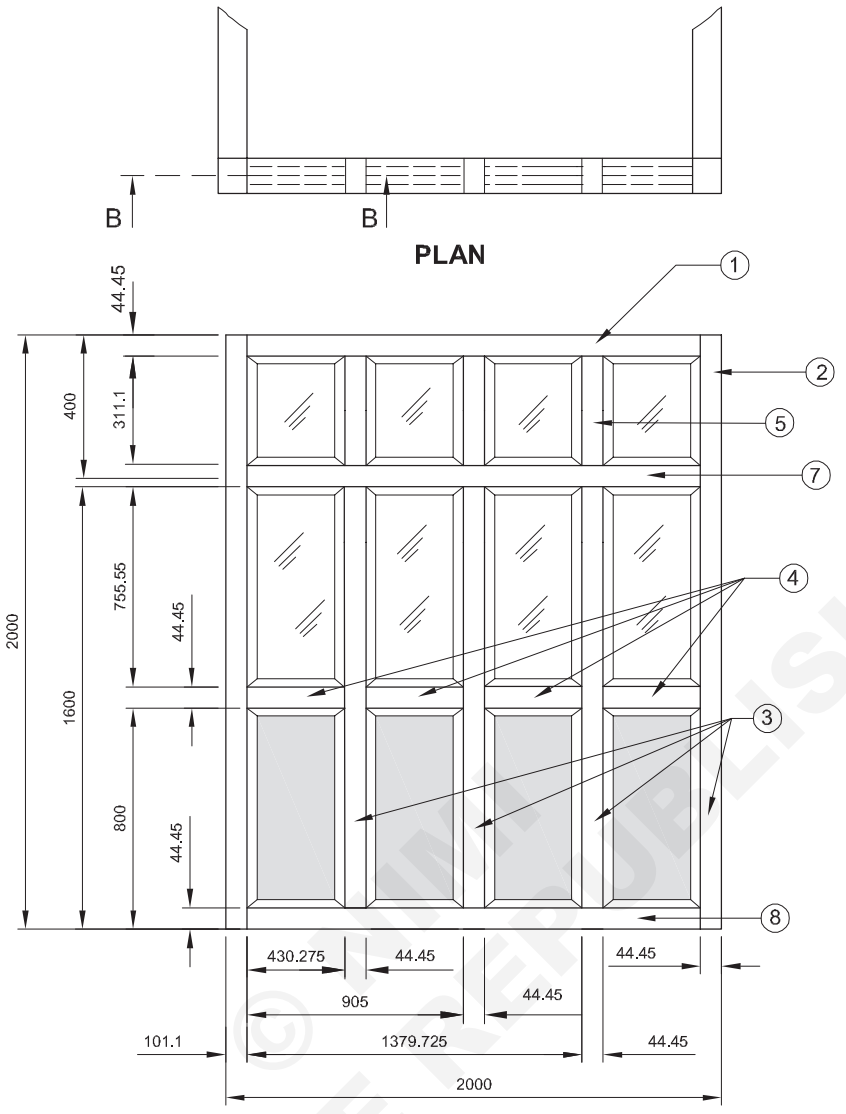
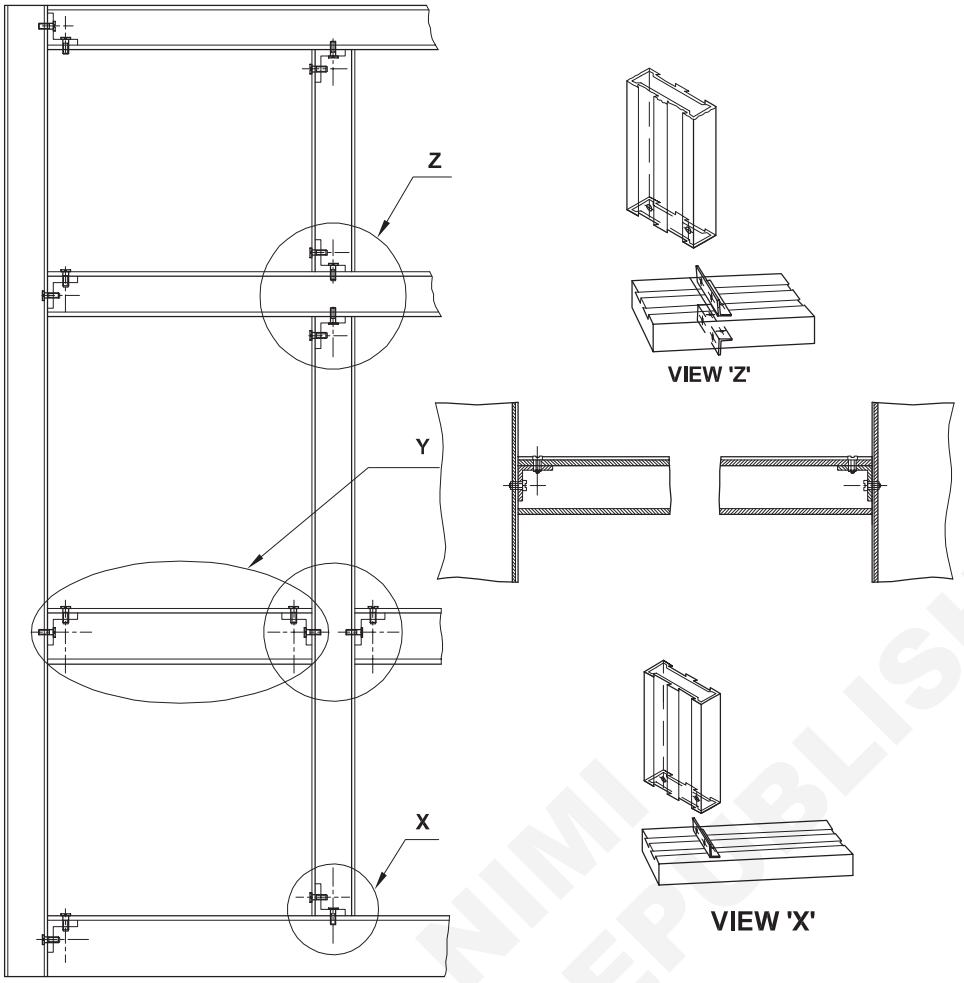


Fig 2



SECTION OF PARTITION ILLUSTRATION OF JOINTS

— — — — —

TASK 2 : **Draw the plan and section of low level partition wall with aluminium construction using AutoCAD Fig 1&2**

1 Draw the plan.

2 Draw the low level partition wall plan and section using various commands in AutoCAD.

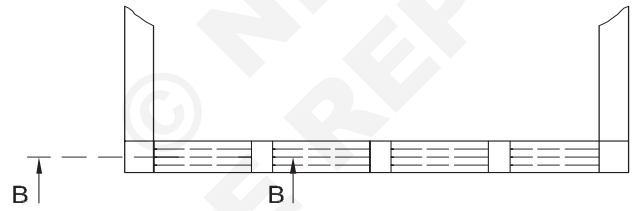
3 Draw the section view.

4 Complete the drawing by printing diemension and other related motes.

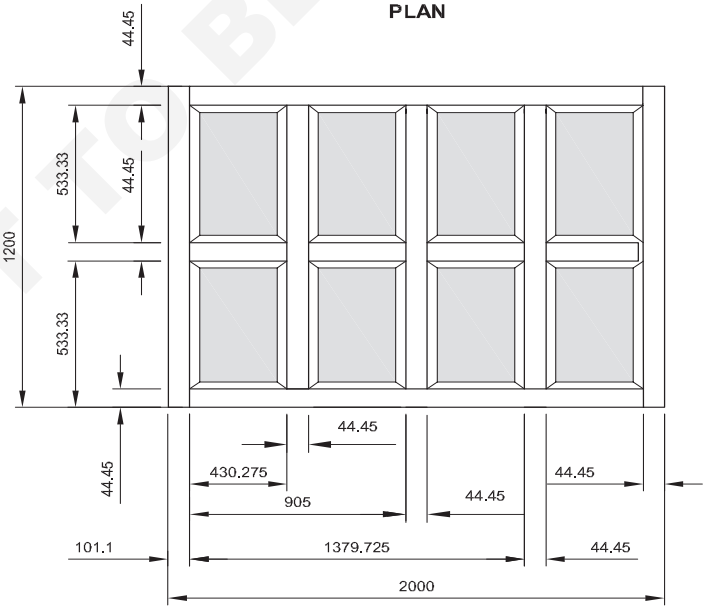
5 Take a print A3 size paper.

Data for finishing material			Part no
1	44.5 x 101.6 x 1810	Horizontal SG Top Allum section	1
2	44.5 x 101.6 x 1630	Vertical SG Allum section	2
3	44.5 x 101.6 x 1600	Vertical DG Allum section	3
4	44.5 x 101.6 x 440	Horizontal DG MID Allum section	4
5	44.5 x 101.6 x 1810	Vertical Allum section	5
6	MS Hex Nut - STD	As required	
7	MS STUD - STD	As required	
8	Self tapping screw STD	As required	
9	Equal angle 25x25x2 - Aluminium	As required	
10	Glass 5mm STD	As required	
11	Particle board 12mm STD	As required	
12	Packing rubber STD	As required	
13	Glazing clips STD	As required	

Fig 1



PLAN

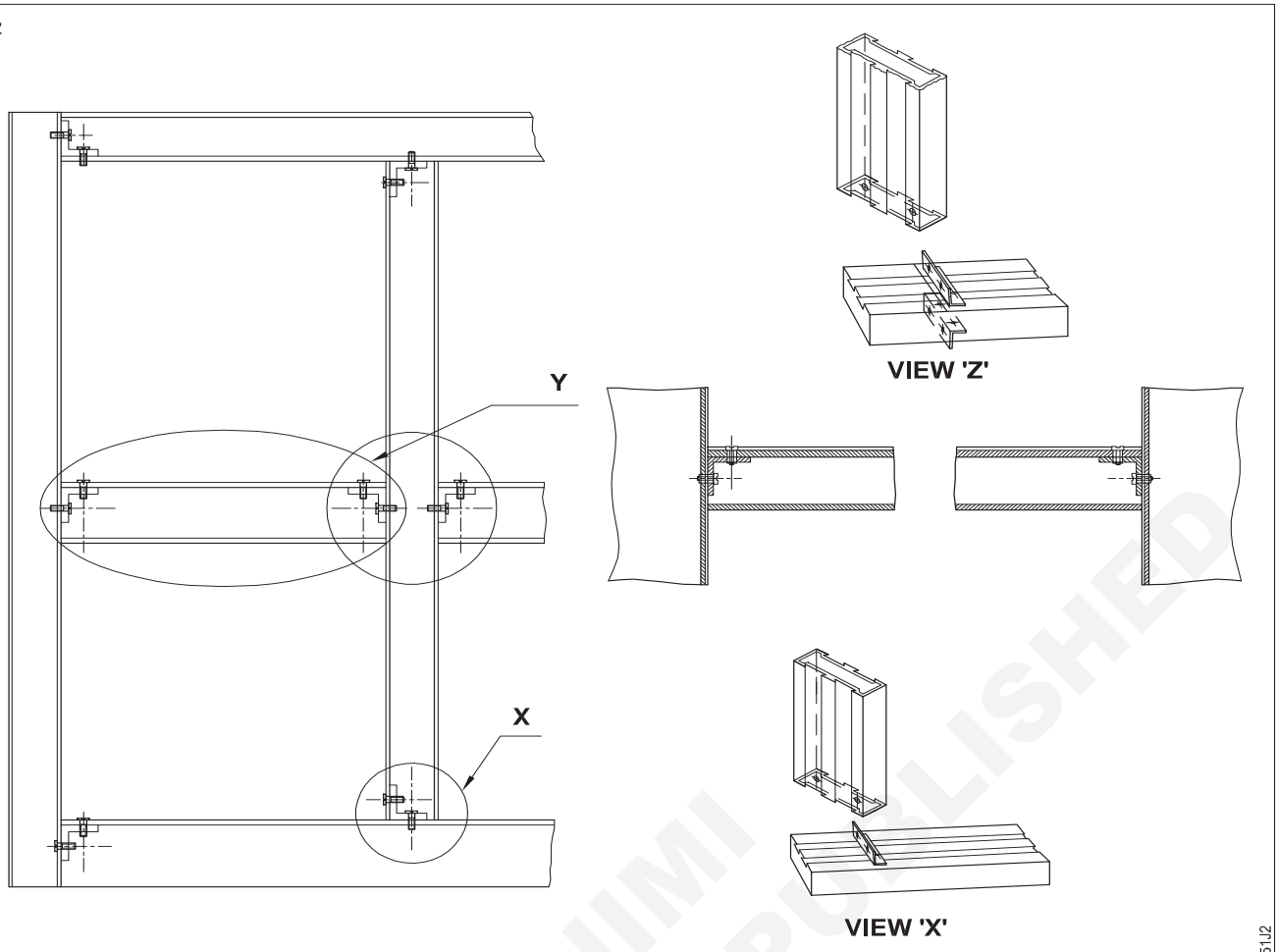


ELEVATION

LOW LEVEL ALUMINIUM PARTITION

ID20N1951J1

Fig 2



SECTION OF LOW LEVEL PARTITION WALL ILLUSTRATION OF JOINTS

Skill sequence

Aluminium partition wall

Objectives: At the end of this exercise you shall be able to

- **identify different types aluminium partition sections used in partition frame**
- **make frames by using aluminium angles piece and screws (invisible method)**
- **fix glasses in partition frame using glazing clips and rubber packing**
- **fix particle board in partition frame by using glazing clip.**

1 Identify aluminium partition sections to make partition frame. (Fig 1)

2 Mark to required length and mark with try square, cut exactly perpendicular, if not the squareness of the frame will effect.

3 Cut the aluminium angle less than the width of the section.

4 Mark centre line at B/2 and S/2 in section and angle piece.

5 Mark hole centre from centre line to D/2+E/2 distance either side and mark from the edge of angle piece of R/2 distance. (Fig 2)

6 Drill primary hole of f3 mm holes on angle piece for guiding self tapping screw to fix on frame sections.

Fig 1

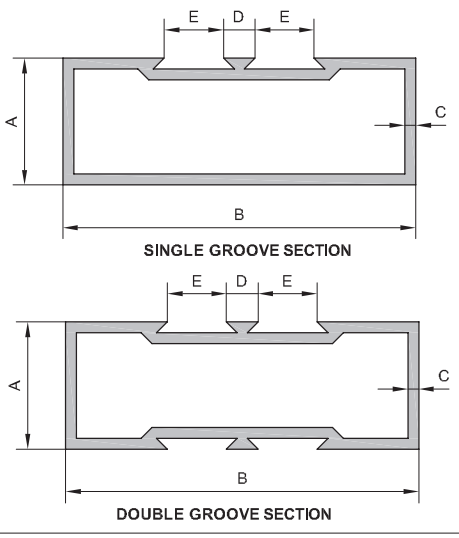
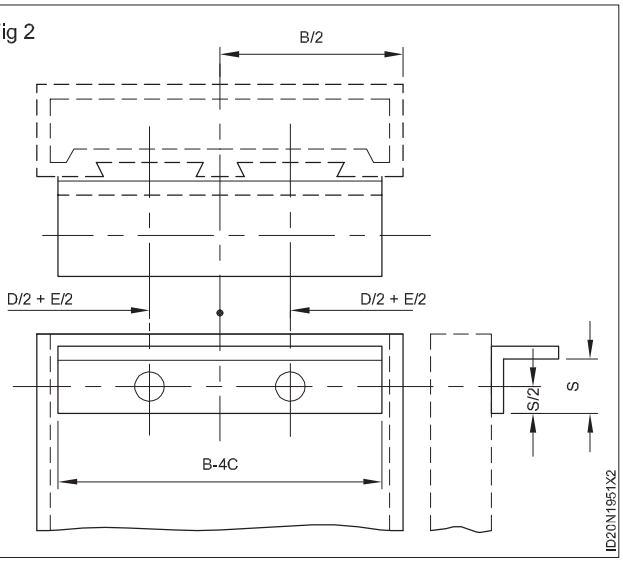


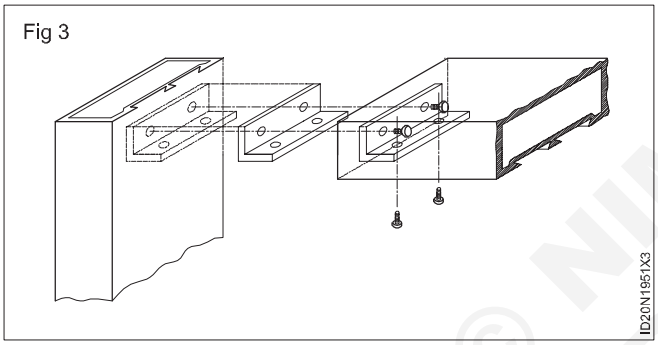
Fig 2



7 Mark the angle position on frame section as per drawing.

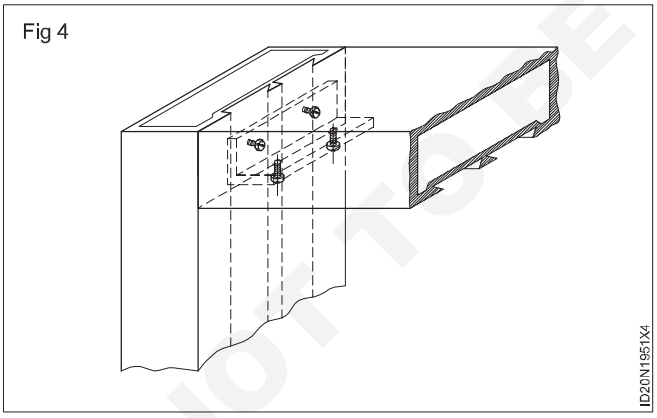
8 Fix angle piece on frame by self tapping screw. (Fig 3)

Fig 3



9 Insert joining member as shown in Figure. (Fig 4)

Fig 4



10 The angle piece will be inside the joining member and fixed by self tapping screws as shown.

11 Similarly assemble all section members to complete frame structure.

12 Fix the partition frame on to wall and floor by grouting.

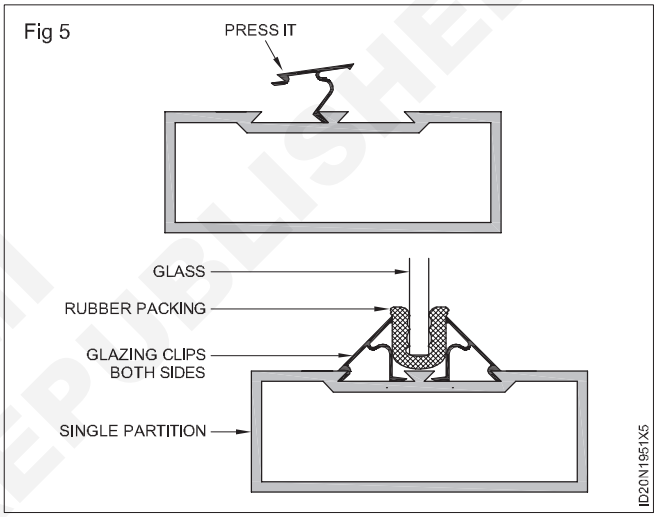
Thus angle pieces will not be visible and only heads of the screws will appear from outside.

Now assemble glazing clips on both the grooves of the bottom partition first and only one glazing clips on one side groove of the remaining three sides.

Apply rubber adhesive in the middle slot of the rubber packing and insert it in the edges of the required size glass as supplied.

Hold the glass alongwith the rubber packing vertically above the gap between two glazing clips and press it down against the glazing clips till it rests on the collar of the rubber packing. (Fig 5)

Fig 5



Now fix the glazing clips on the other groove of the top section so that the glass remains in vertical position.

Finally fix the glazing clips on other groove of sections on sides similarly.

Particle board (Novapass) is to fixed between glazing clips, rubber packing is not required. You can fix the particle board on partition with glazing clips as described above.

Draw plan, Sectional plan front elevation of block board partition wall with specification and dimension

Objectives: At the end of this exercise you shall be able to
- **draw the elevation section, block board partition wall**
- **draw the wooden panelling with specification and dimension using auto CAD.**

PROCEDURE

TASK 1 : **Draw the plan, section and elevation of block board partition wall with specification and dimension using AutoCAD (Fig 1)**

Specification and dimension:

Vertical corner ground wooden pieces	= 5x5cm
Vertical middle wooden pieces	= 10x5cm
Horizontal top and bottom wooden pieces	= 5x5cm
Horizontal middle wooden pieces	= 10x5cm
Block boards	= 100x40x2cm

1 Draw to scale 1:20 (or) 5 cm = 1 meter as shown, otherwise choose any convenient scale.

2 Draw block board partition using various commands is AutoCAD refer to Ex.No. 1.7.41

3 First draw the front elevation, then the plan and the cross-section taking the help of orthographic projections.

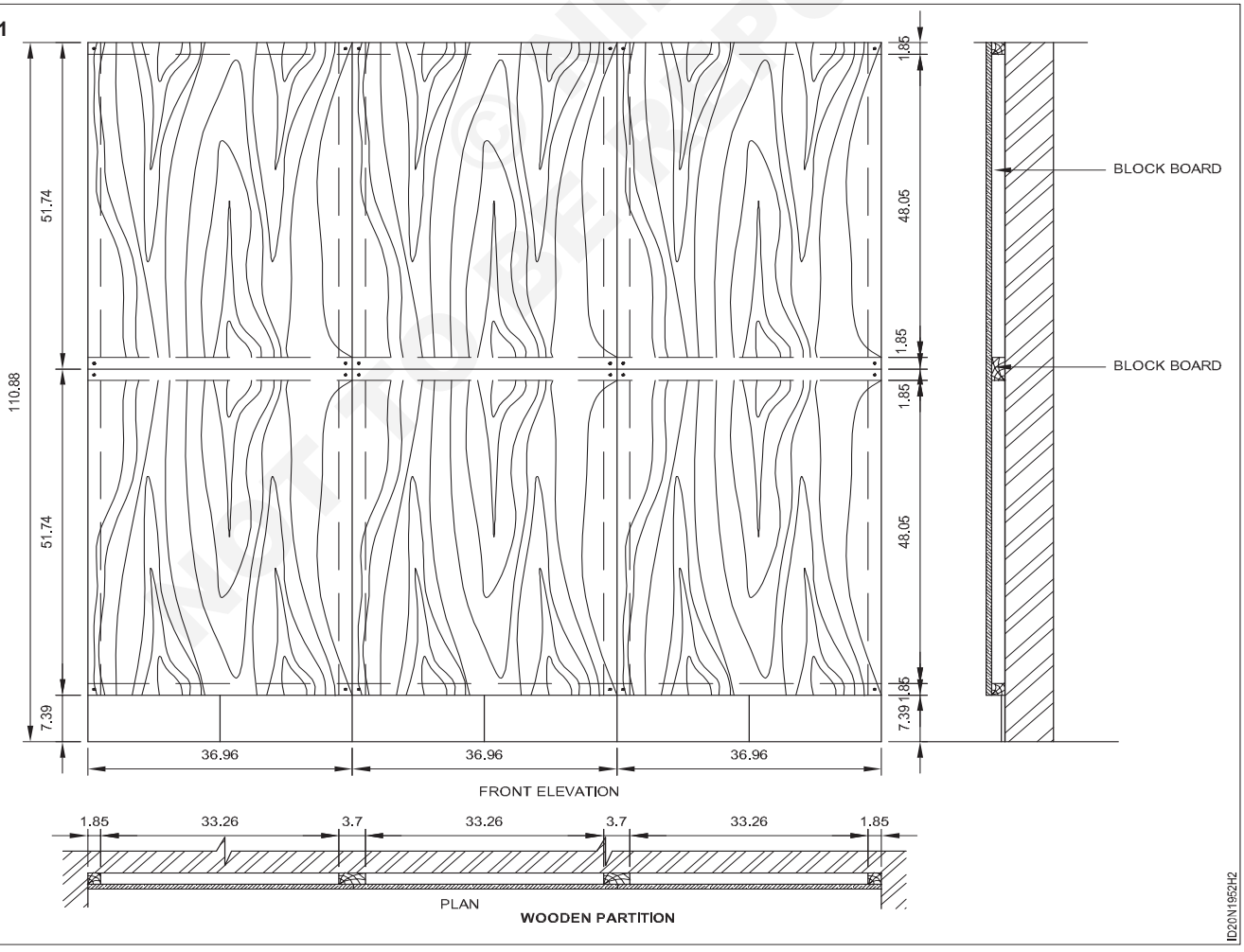
4 Take the outer dimensions of widthxheight = 300x300 cm. then draw the inner parts.

5 The dotted lines in the elevation show the framework for panelling.

6 Complete the drawing by printing dimension and other related.

7 Take print A3 size paper.

Fig 1



TASK 2: **Draw wooden panelling which is a slap type of partition, using assumptions and proper dimensions (Fig 1)**

Specification and dimension

Room size = 300cm width and 200cm height.

Particle board = 185x90x1cm thick.

Bead = 2.5x2.5cm

Wooden stud = 10x5

1 Draw to scale1:20 (or) 5 cm=1 meter as shown otherwise choose any convenient scale.

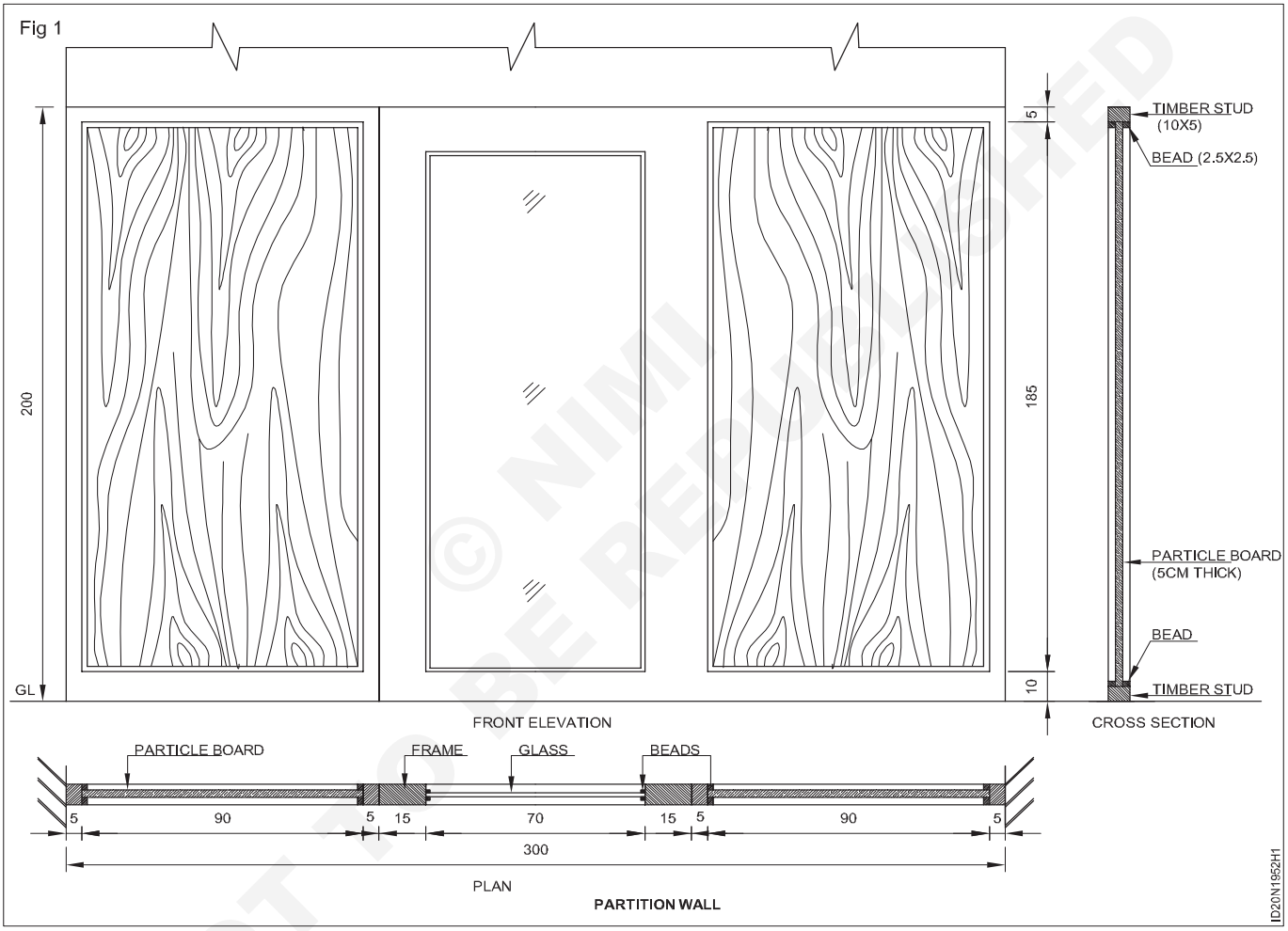
2 Draw the slap type partition, plan, elevation and cross section using various commands in AutoCAD.

3 First draw the front elevation, then the plan and the cross-section taking the help of orthographic projections.

4 Draw the outer dimensions of widthxheight=300x200 cm. and draw the inner parts.

5 Complete the drawing by printing dimension and other related motor.

6 Take a print A3 size paper.



Layout the plumbing/Drainage/Sanitary plan

Objectives: At the end of this exercise you shall be able to

- **draw layout the plumbing and drainage plan using AutoCAD**
- **draw sanitary plan using AutoCAD**
- **understand the different waste disposal systems.**

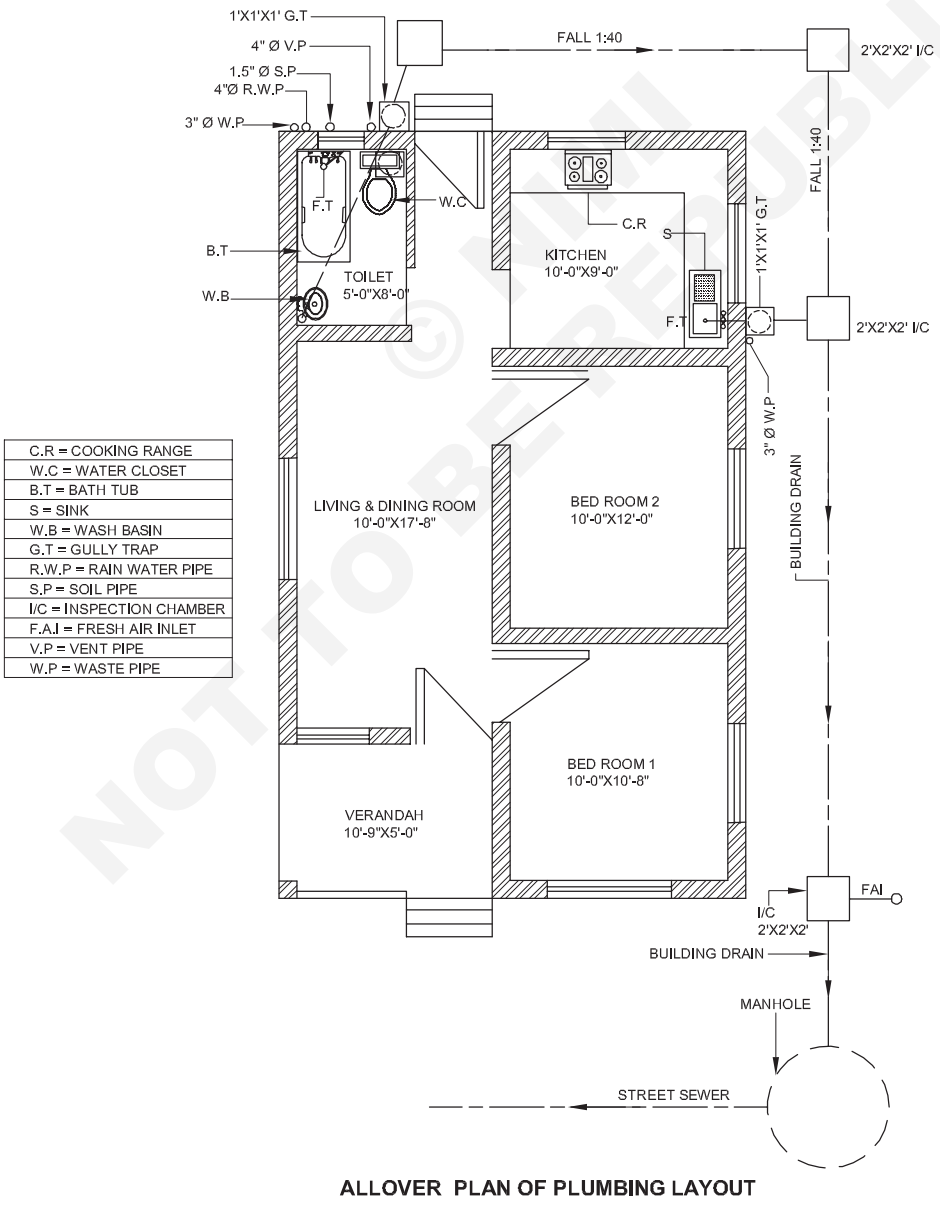
PROCEDURE

Draw the details of the different types buildings layout the plumbing / drainage / sanitary plan as per drawing TASK 1 to TASK 8 using AutoCAD. Take a print in A4 size paper

TASK 1 : **Prepare the detailed plan of plumbing layout through AutoCAD. (Fig 1)**

1 Line sketch showing arrangements of pipe line
2 Give standard dimensions for the building elements
3 Develop the working plan of plumbing layout through AutoCAD.

Fig 1



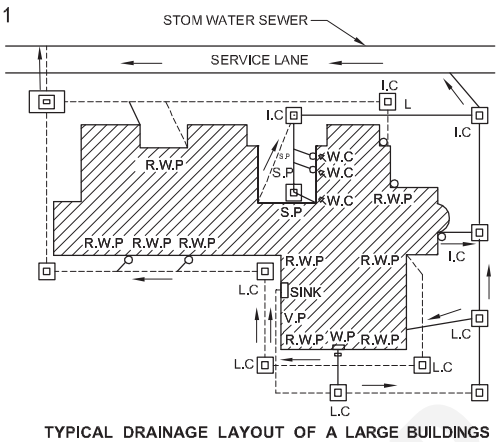
ALLOVER PLAN OF PLUMBING LAYOUT

ID20N11053H1

TASK 2 : **Draw the drainage pipes in the proper sequence as well as expand the abbreviations and mention the (a) diameter of pipes (b) Source of water - sanitary water supply. (Fig 1)**

1 Prepare the details of drainage layout as per given drawing using AutoCAD.

Fig 1



TYPICAL DRAINAGE LAYOUT OF A LARGE BUILDINGS

ID20N111053J1

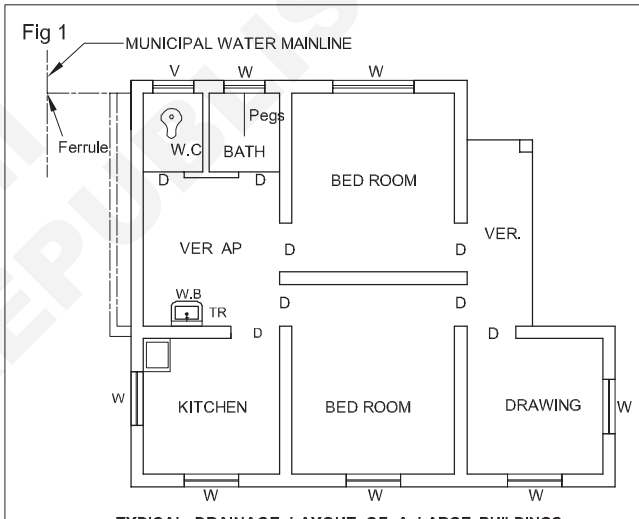
— — — — —

TASK 3 : **In the given drawing of 2BHK flat, the 1) Sewage pipes 2) Water distribution pipes (Fig 1).**

1 Draw the layout and plan of task 3 to 8 showing all details as per given using AutoCAD.

2 Mark the dimensions and complete the drawing.

Fig 1



TYPICAL DRAINAGE LAYOUT OF A LARGE BUILDINGS

ID20N111053M1

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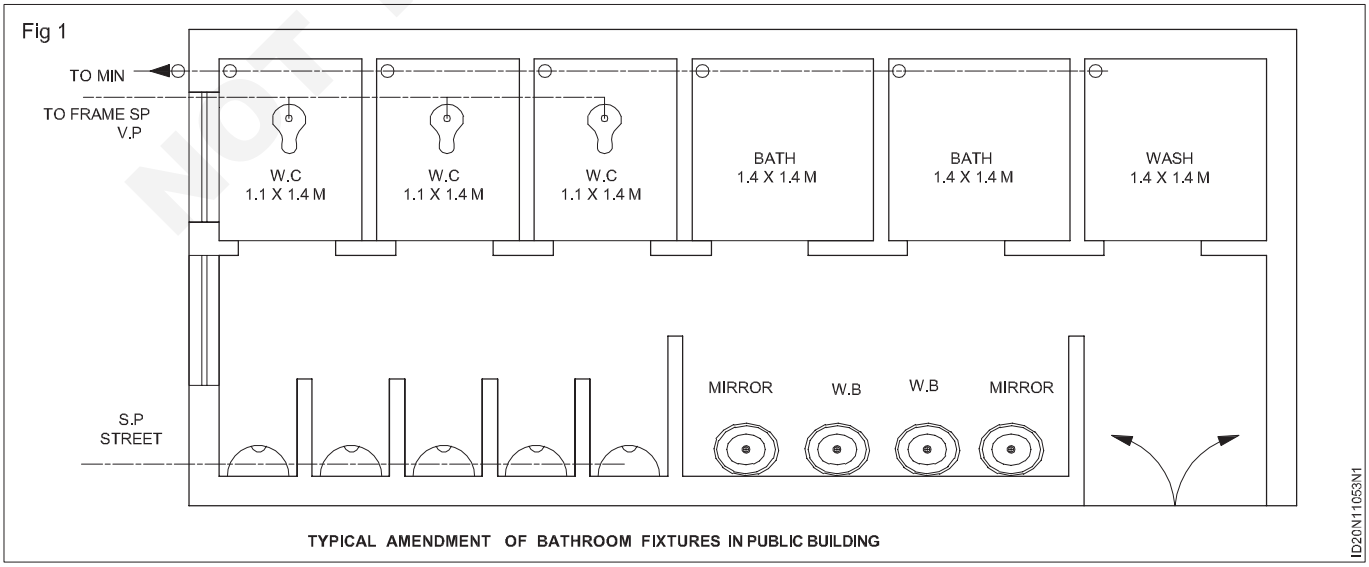
TASK 4 : **Draw a section of typical WC showing the pipe layouts data has to be taken from the figure below. (Fig1)**

Fig 1

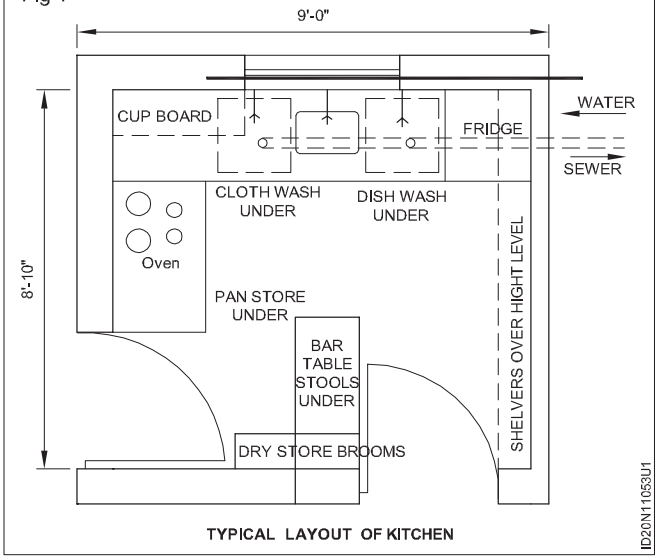


TYPICAL AMENDMENT OF BATHROOM FIXTURES IN PUBLIC BUILDING

ID20N111053N1

TASK 5 : **Draw the given figure. Use the color codes and represent a) Fresh water inlet pipe b) Waste water pipe. (Fig 1)**

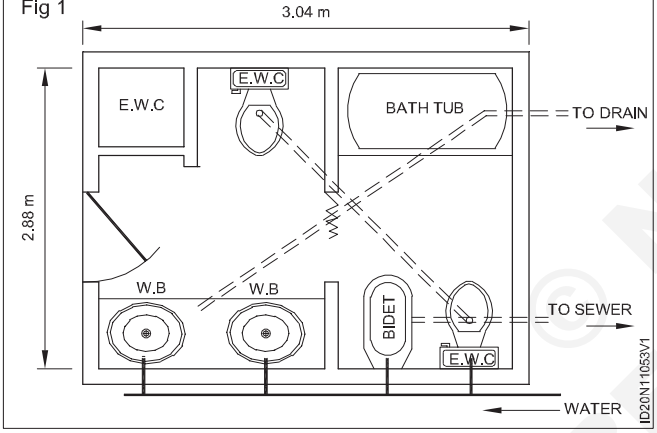
Fig 1



TYPICAL LAYOUT OF KITCHEN

TASK 6 : **Draw the representation of soil pipe, mention its (a) color code (b) diameter of pipe. (Fig 1)**

Fig 1

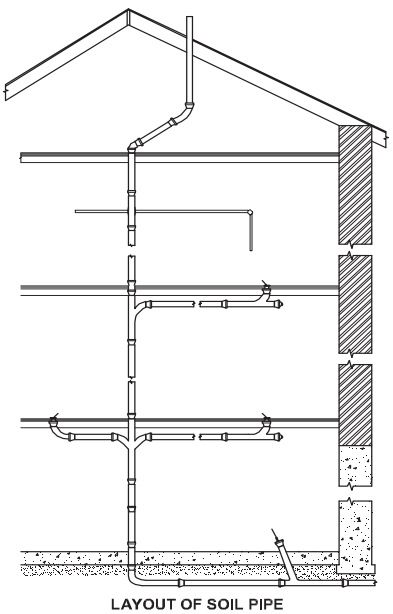


TASK 7 : **Identify vent pipe, soil branch, water closet, clean outs and main in given figure of soil pipe layout. Draw the given figure, layout of soil pipe. (Fig 1)**

1 Draw the topmost pipe which branches out is known as vent pipe and its branch as vent branch.

2 Draw the pipe when goes underground it joins the main sewer and clean out is associated with it.

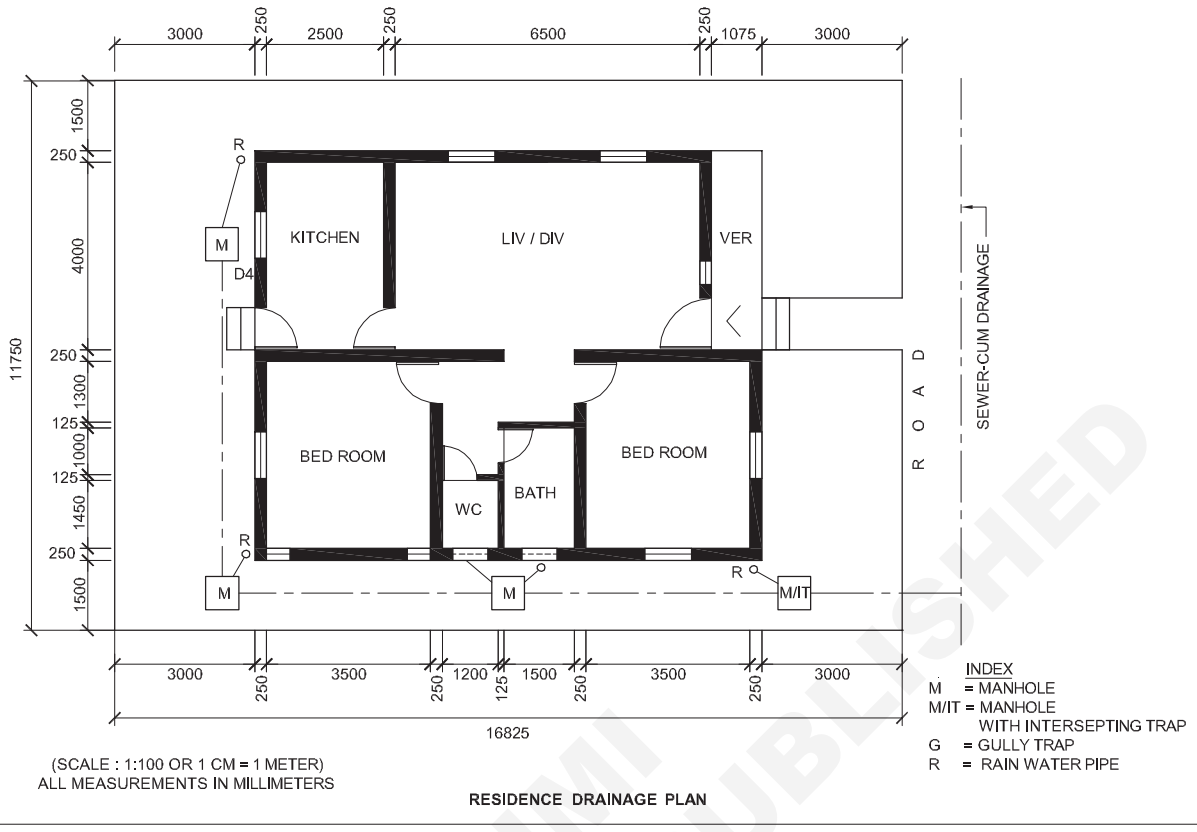
Fig 1



LAYOUT OF SOIL PIPE

TASK 8 : **Draw the residence drainage plan. It is assumed that the drainage and sewer lines are combined. (Fig 1) (Note - Use the suitable symbols for plumbing)**

Fig 1



Laying of rain water pipe

Objectives: At the end of this exercise you shall be able to
- **fix rain water pipe (PVC).**

1 Measure and mark out the centre line of the pipe by chalk line and plumb.Fig.1.

2 Check the pipe, bend, shoe for visible defects.

3 Fix the brackets at required length.

4 Take the measurements of pipe line considering the bend will be inserted in pipe and shoe will be atleast 50mm above the ground formation level.

5 Make hole in parapet wall larger than bend's outside diameter.

6 Fix the bend in concrete 1:2:4 at the hole.

7 Cure the concrete.

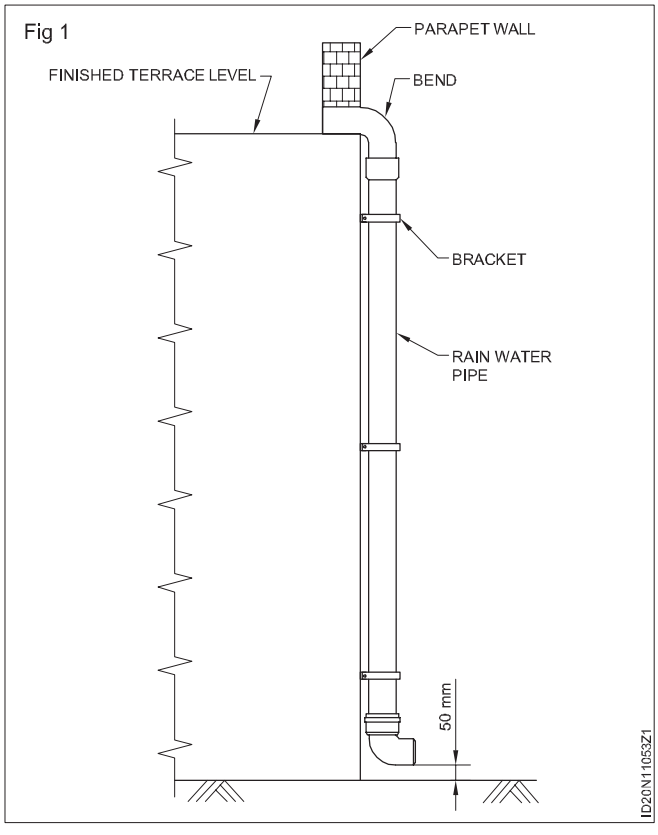
8 Joint pipes from bottom of bend.

9 Fix brackets loosely.

10 Fix shoe to pipe and bracket.

11 Test verticality of pipe with plumb bob.

Fig 1



Make top plan, side & front elevation of santitary fittings with dimension

Objectives: At the end of this exercise you shall be able to

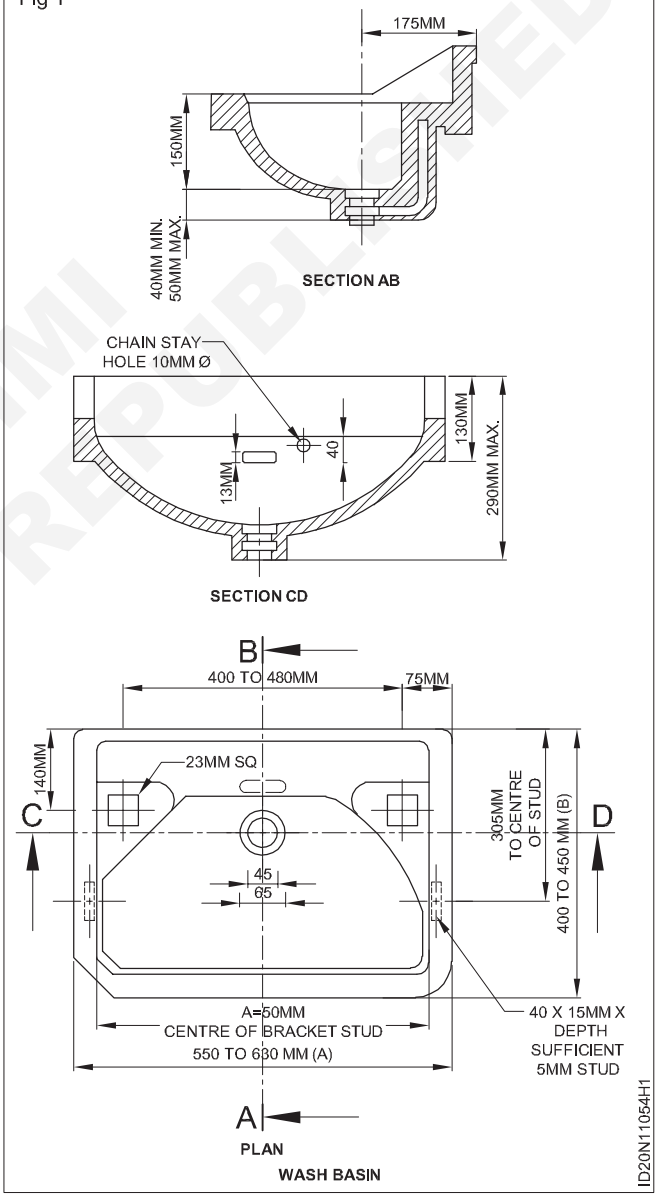
- **draw the different sanitary fittings in building using AutoCAD**
- **draw the arrangement of sanitary fittings in toilet and bathroom.**

PROCEDURE

TASK 1 : **Draw the detailed drawings of the sanitary fittings in toilet and bathrooms (Fig 1)**

1 Draw the details of sanitary fittings as per given drawing using AutoCAD and take a print in A3 size paper.

Fig 1



TASK 2 : **Prepare the drawing showing the arrangement of sanitary fittings in toilet and bathrooms (Fig 1 to 17)**

1 Draw the plan of toilet with (1) ordinary W.C and (2) European W.C (3), bathroom with separate W.C (4) combined bath and W.C (5) public levatory showingall details as per given drawing using Auto CAD.

2 Show the arrangement of sanitary fittings in the plan.

3 Mark the dimensions and complete the drawing.

4 Take a print in A3 size paper.

Fig 1

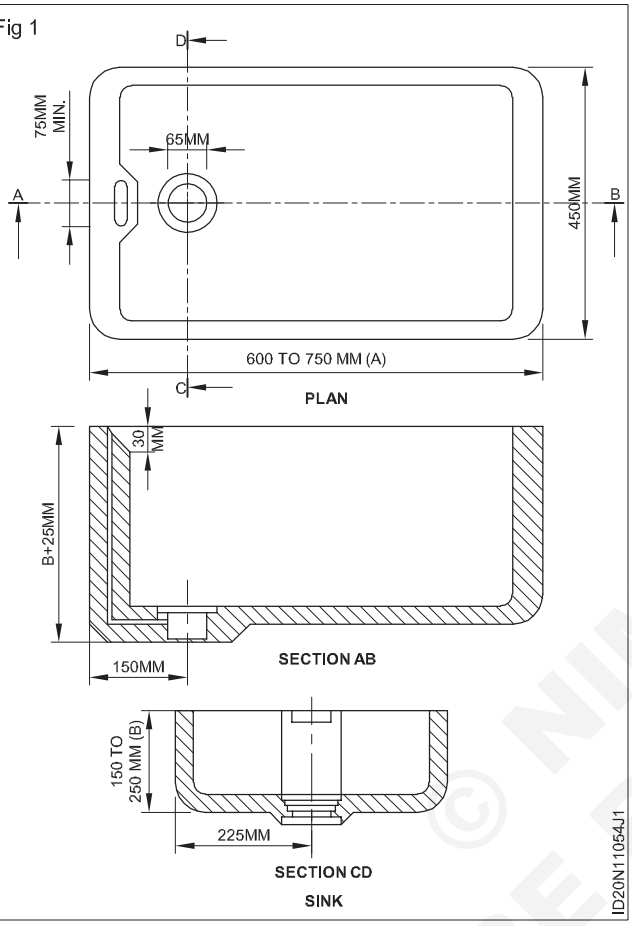


Fig 2

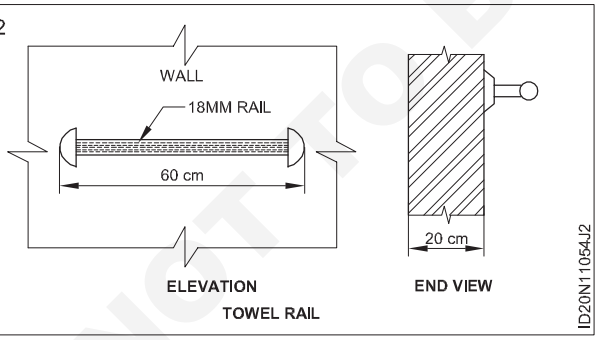


Fig 3

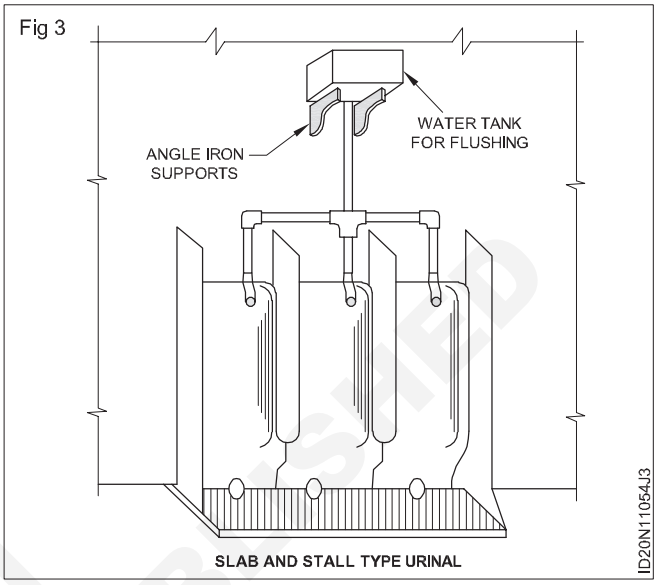


Fig 4

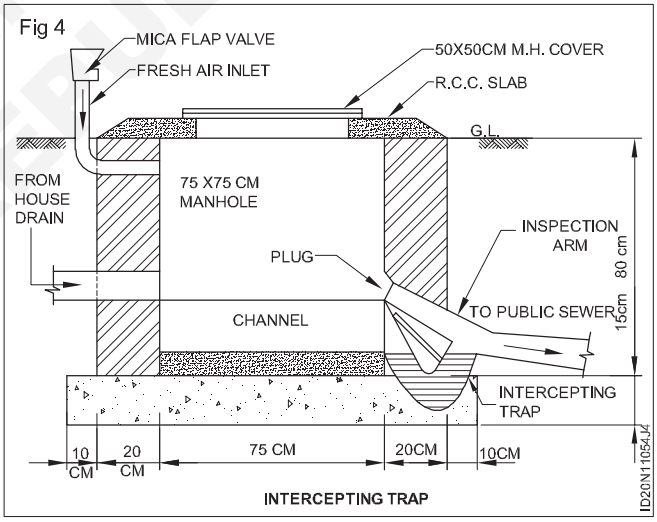


Fig 5

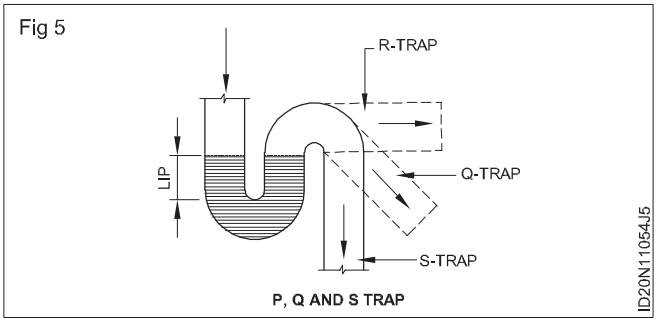
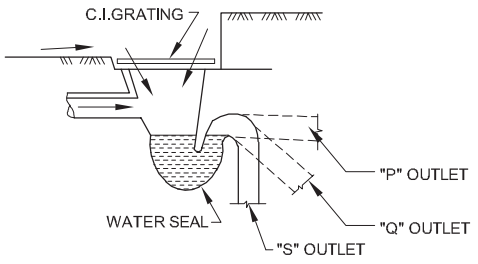


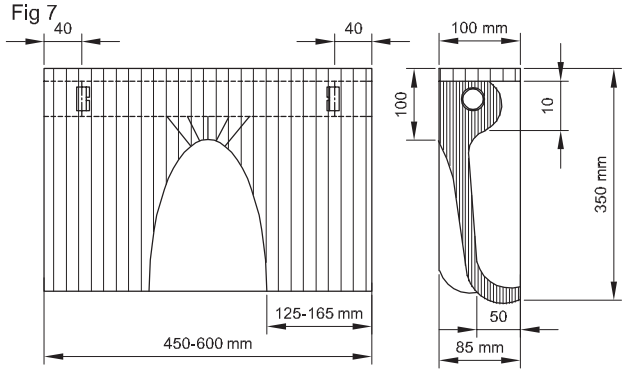
Fig 6



3-WAY GULLY TRAP

ID20N11054J6

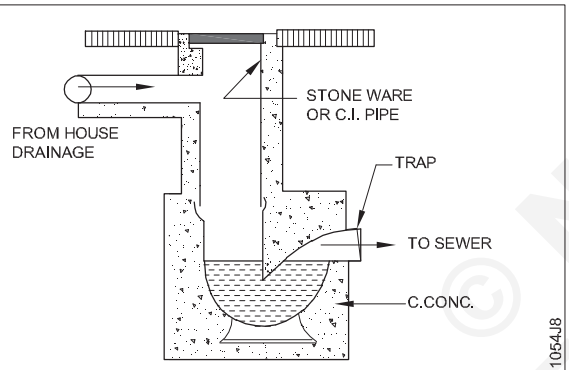
Fig 7



SQUATTING PLATE URINAL

ID20N11054J7

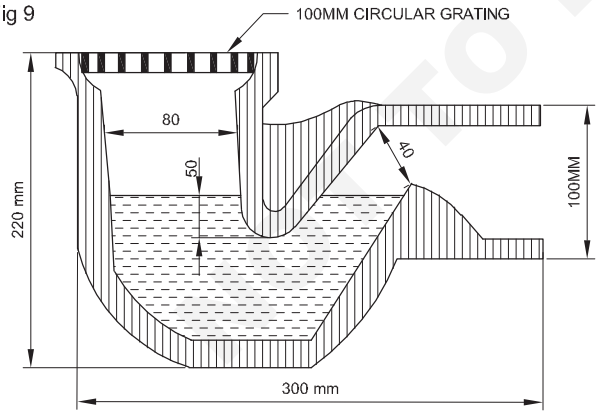
Fig 8



DEEP SEATED GULLY WITH
PROVISION OF SILT COLLECTION

ID20N11054J8

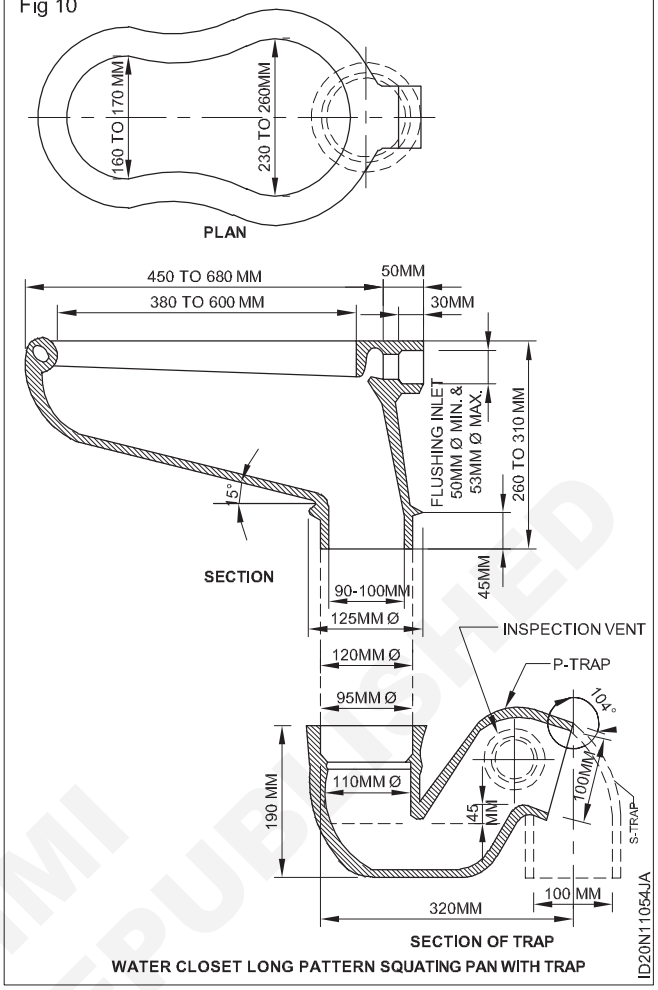
Fig 9



FLOOR TRAP

ID20N11054J9

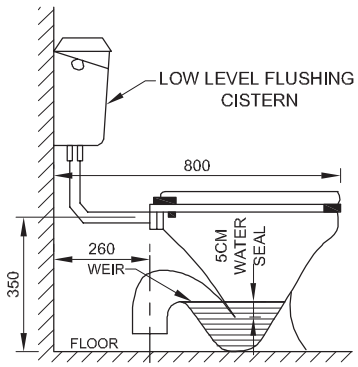
Fig 10



WATER CLOSET LONG PATTERN SQUATING PAN WITH TRAP

ID20N11054JA

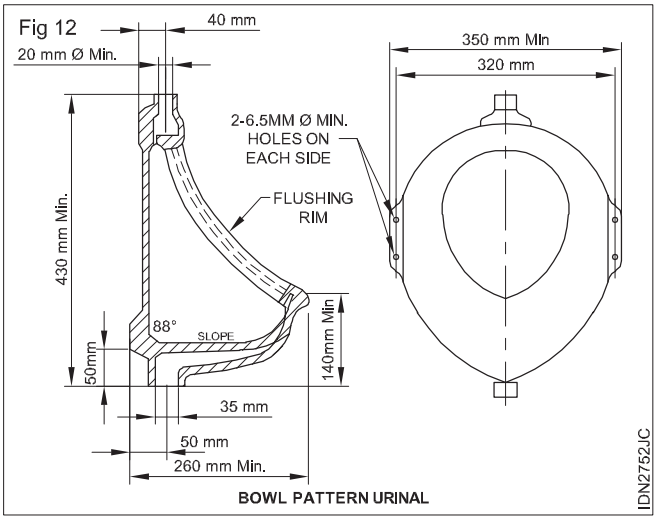
Fig 11



EUROPEAN TYPE WATER CLOSET

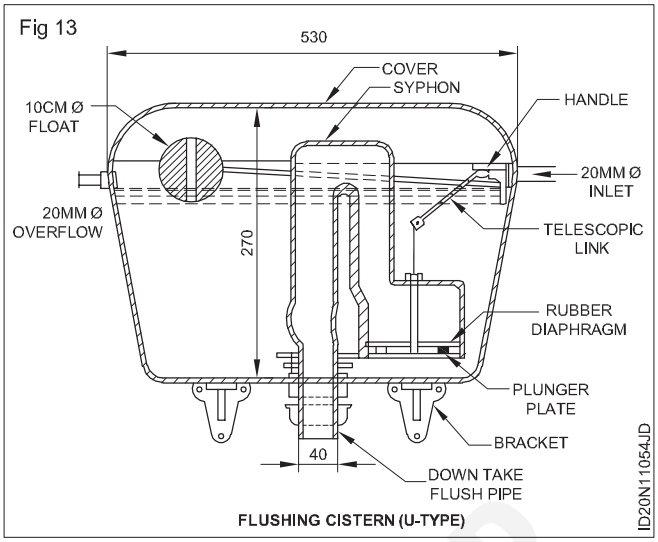
ID20N11054JB

Fig 12



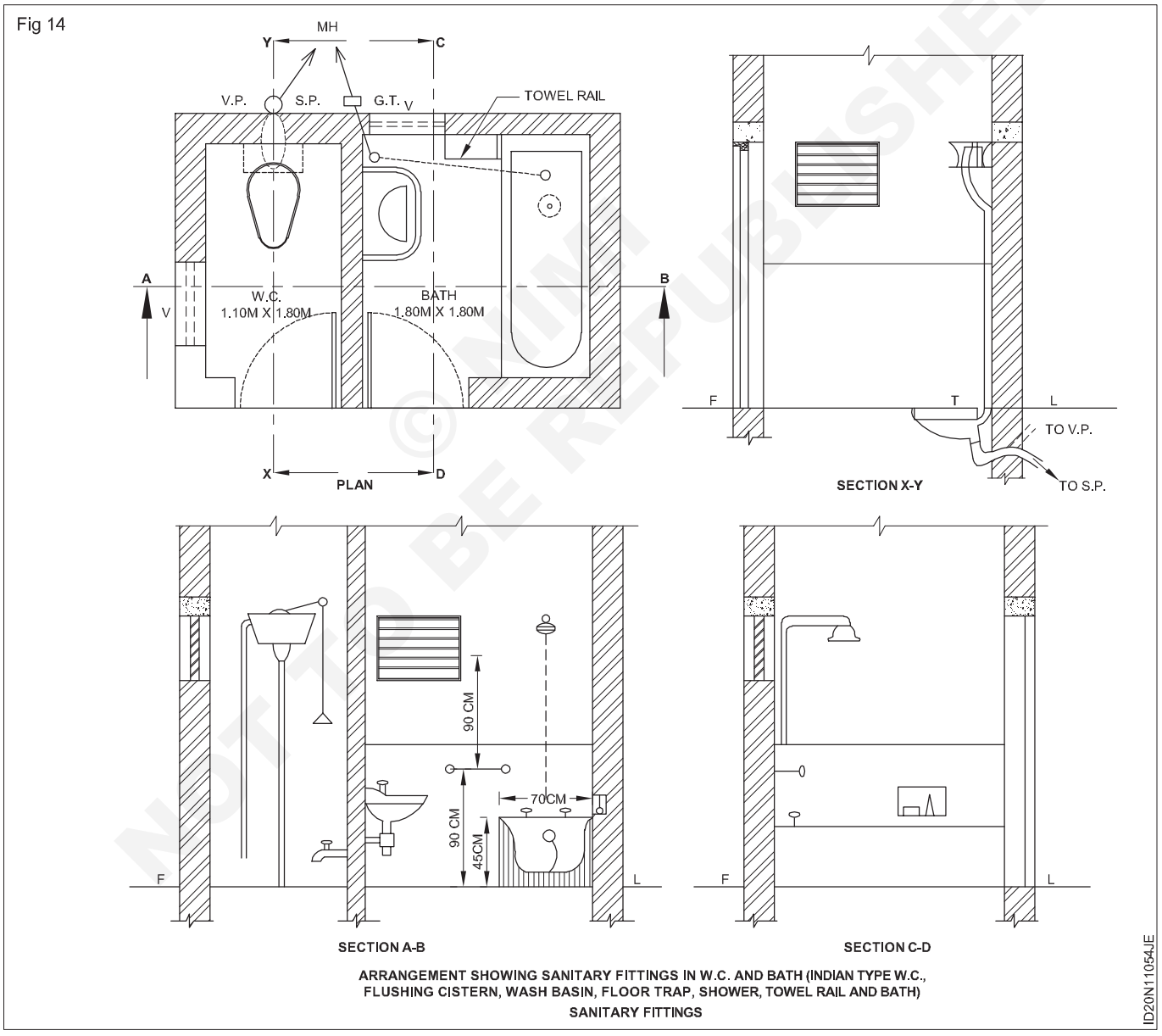
BOWL PATTERN URINAL

Fig 13



FLUSHING CISTERN (U-TYPE)

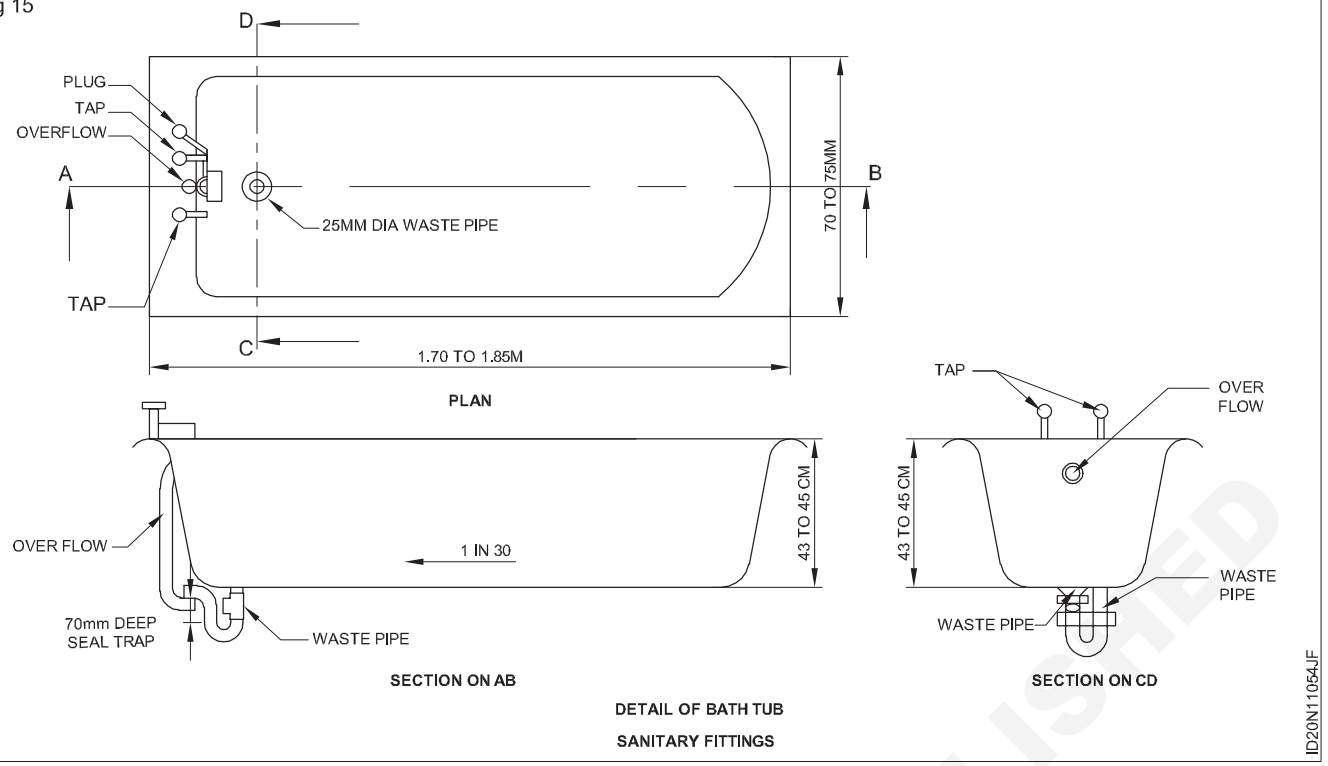
Fig 14



ARRANGEMENT SHOWING SANITARY FITTINGS IN W.C. AND BATH (INDIAN TYPE W.C., FLUSHING CISTERN, WASH BASIN, FLOOR TRAP, SHOWER, TOWEL RAIL AND BATH)

SANITARY FITTINGS

Fig 15



DETAIL OF BATH TUB

SANITARY FITTINGS

Fig 16

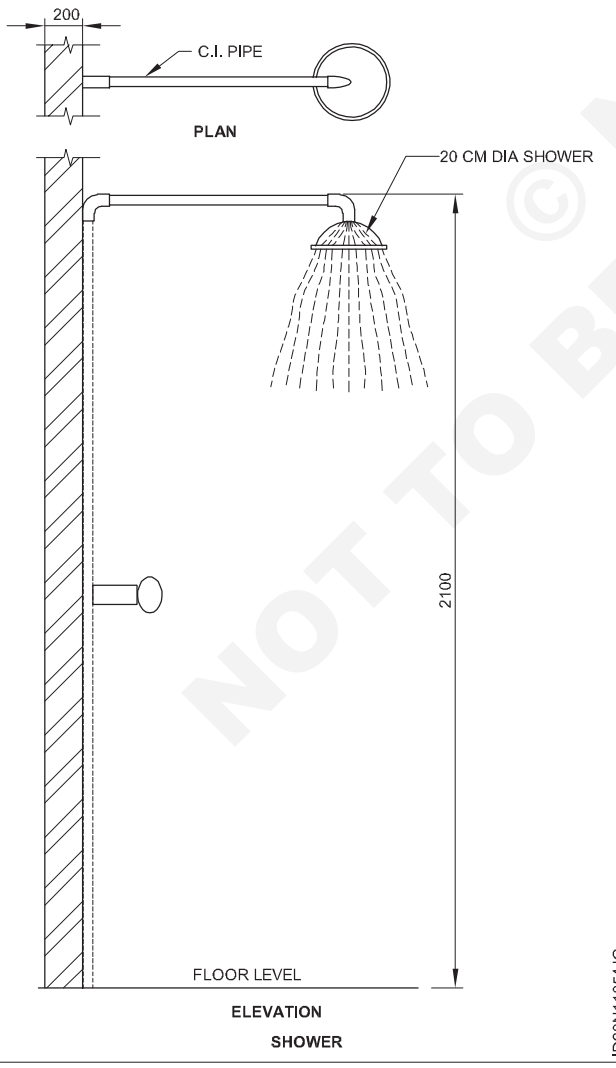
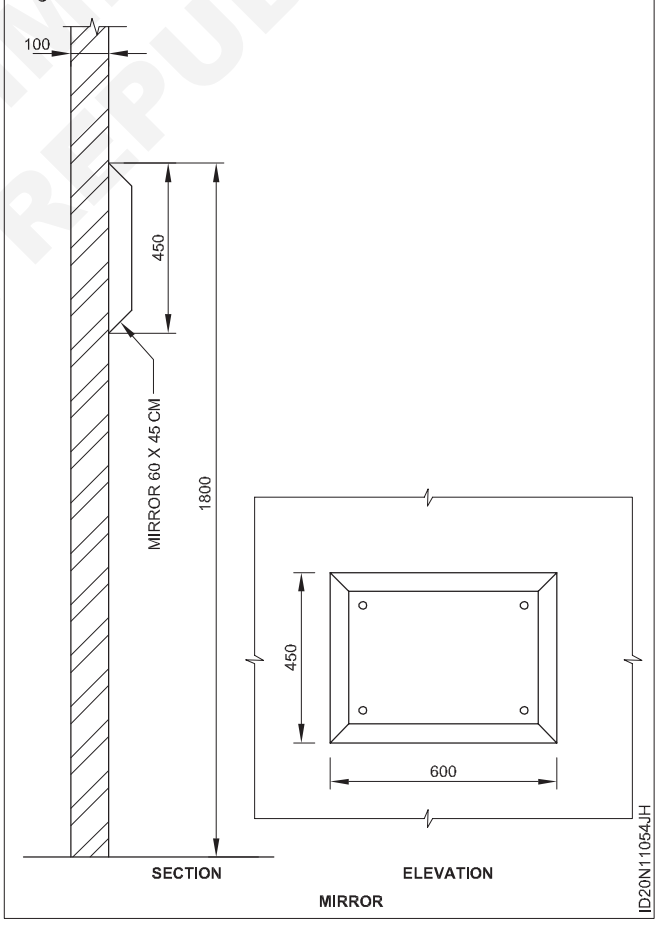


Fig 17



Free hand sketches of graphic symbols for plumbing

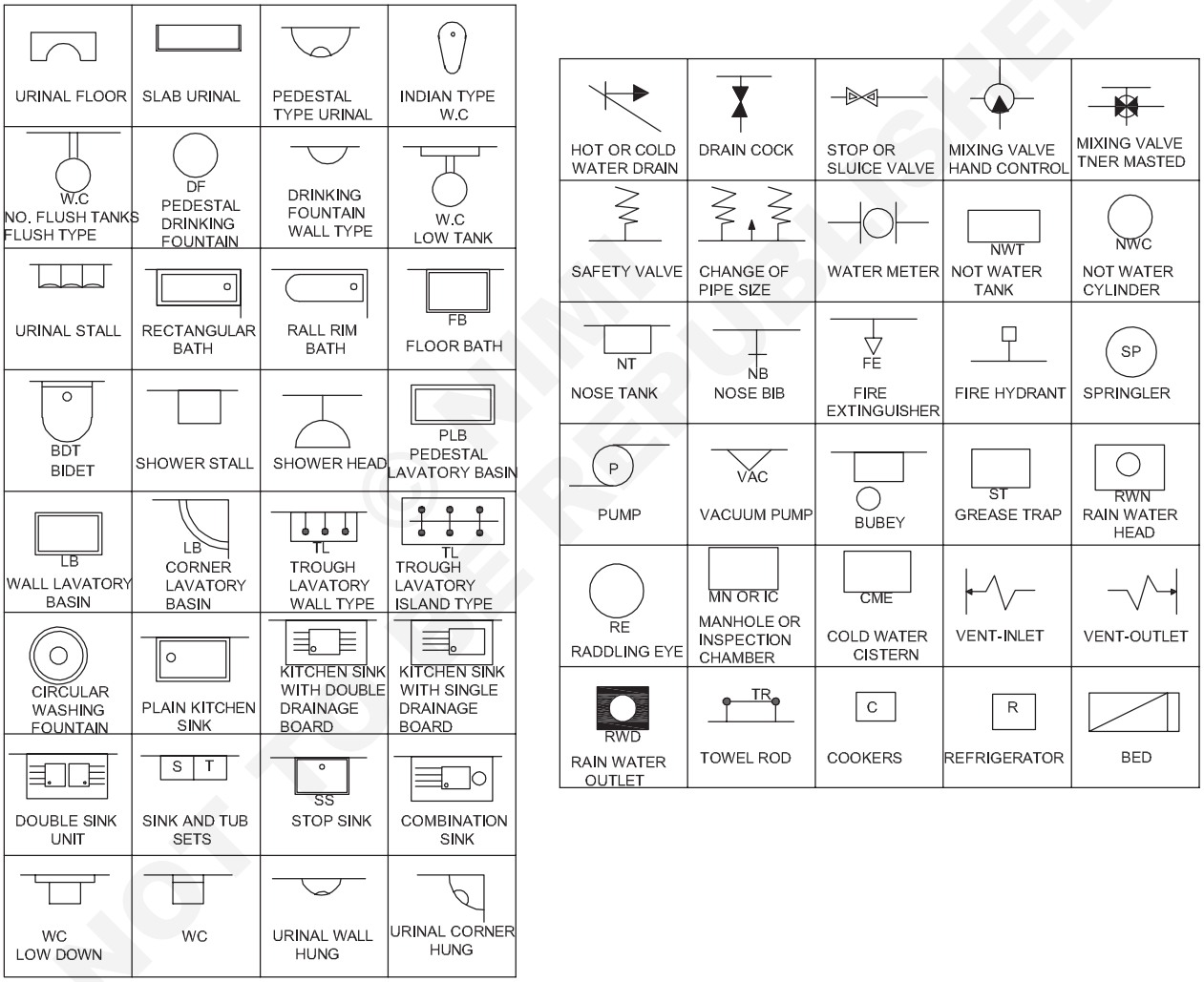
Objectives: At the end of this exercise you shall be able to

- **draw free hand sketches of graphical symbol of plumbing using CAD**
- **draw with dimensions approximate.**

PROCEDURE

TASK 1 : **Draw the plumbing symbol given below using CAD (Fig 1)**

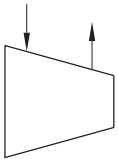
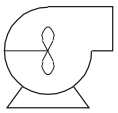
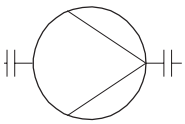
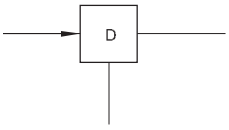
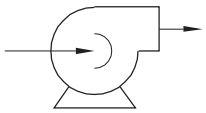
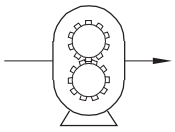
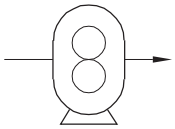
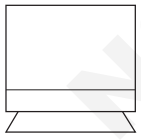
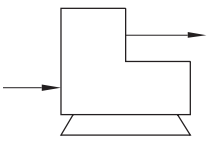
Fig 1

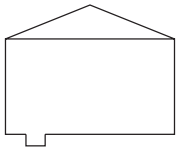
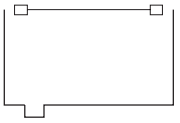
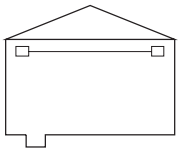
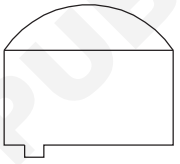
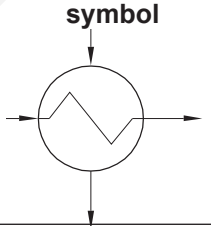
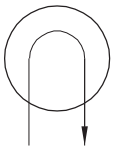
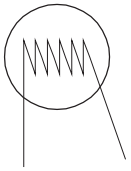
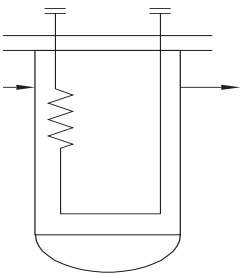


SYMBOLS USED IN PLUMBING

ID20N11055H1

TASK 2 : **Draw and write the correct name of given plumbing symbol (Sl.No 1 to 18)**

Sl. No.	Symbol	Name of plumbing Fixture
1	**Compressed Symbol** 	
2		
3		
4	**Pumps symbol** 	
5		
6		
7		
8		
9		

Sl. No.	Symbol	Name of plumbing Fixture
10	**Tank symbol** 	
11		
12		
13		
14		
15	**Heat Exchanger symbol** 	
16		
17		
18		

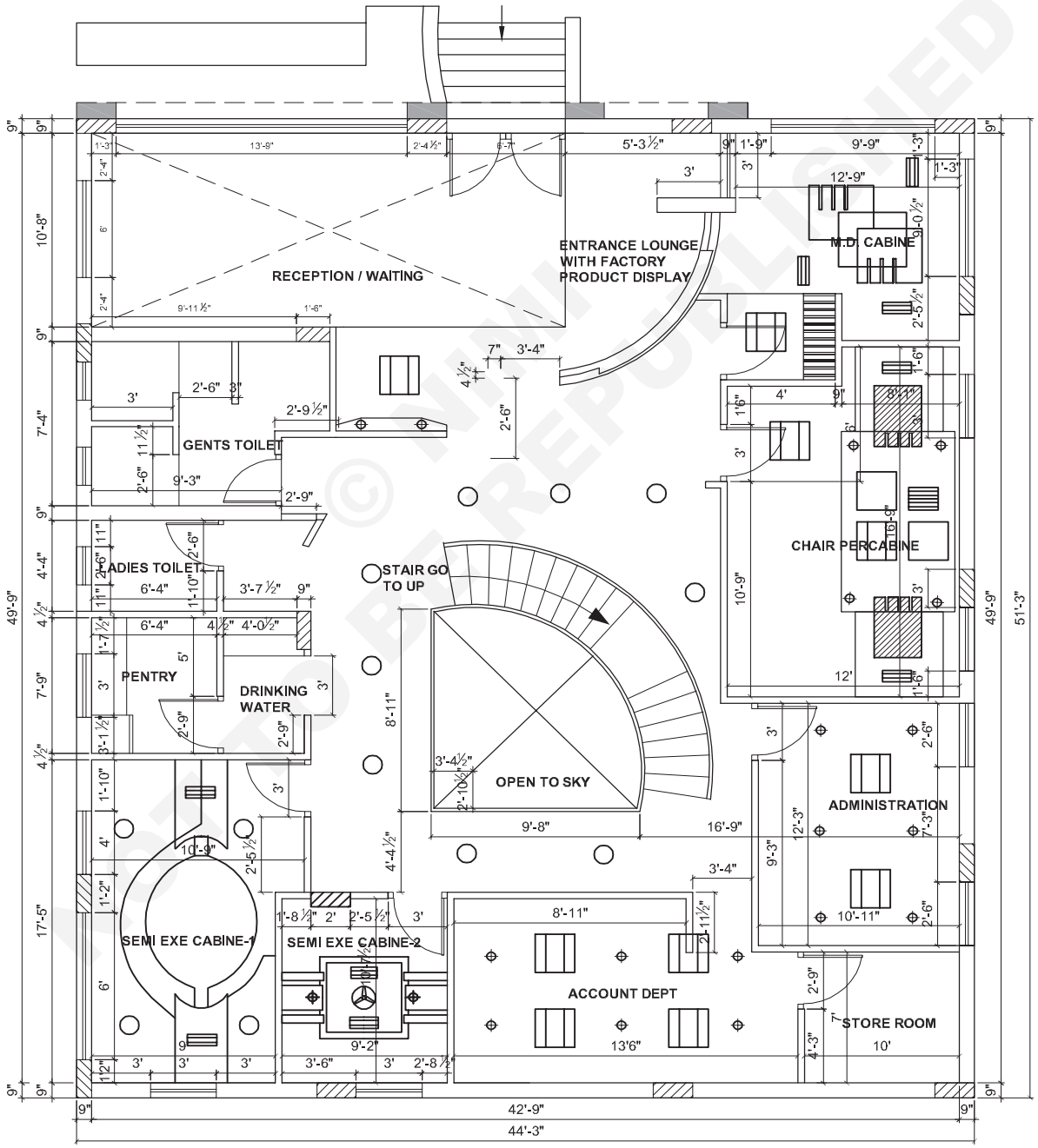
Layout plan of false ceiling with lighting position

Objective: At the end of this exercise you shall be able to
- **draw paln of false ceiling layout and lighting position using AUTOCAD.**

PROCEDURE

Draw the layout plan of the false ceiling layer with lighting position using CAD (Fig 1)

Fig 1



DATA

Sizes of rooms are given in the plan

Draw the layout of the plan

Draw the false ceiling layout

Draw the lighting position

Setp 1: Open the AutoCad software.

Step 2: Draw the building outline of the office by using the “Line” command. Click the “Line” icon to activate the command. Left -click to start and end the line.

Step 3: Offset the building outline the desired thickness of the exterior wall. Use the “Offset” command.

Step 4: Draw all interior walls by using the same “Line” and “Offset” commands.

Step 5: Use the “Trim” command to trim any messy intersections on the exterior or interior conditions. Left-click the “Trim” icon to activate the too. Select the “cutting edge” line followed by the line that you would like to trim off.

Step 6: Cut openings for doors and windows by drawing lines and then trimming away the opening.

Step 7: Draw the doors and windows where the new openings exits.

Step 8: Activate the text command to enter the names of rooms and their sizes.

Step 9: Activate the dimension icon and click the edges of each wall that you would like to dimension to. This will give the drawing a more professional look and also gives people a sense of the space.

Step 10: Insert the false ceiling design and lighting position and prepare the details.

Step 11: Using ploylne command draw a line over the outer wall and using area command find the area of the building.

Step 12: Plot the drawing to a printer or ta a PDF format. Hit the plot icon to open the plot settings. Choose the layout type, pen settings, and window view that you would like to use.

Step 13: Print the layout plan in A3 size paper.

Layout of electrical Accessories plan & elevation

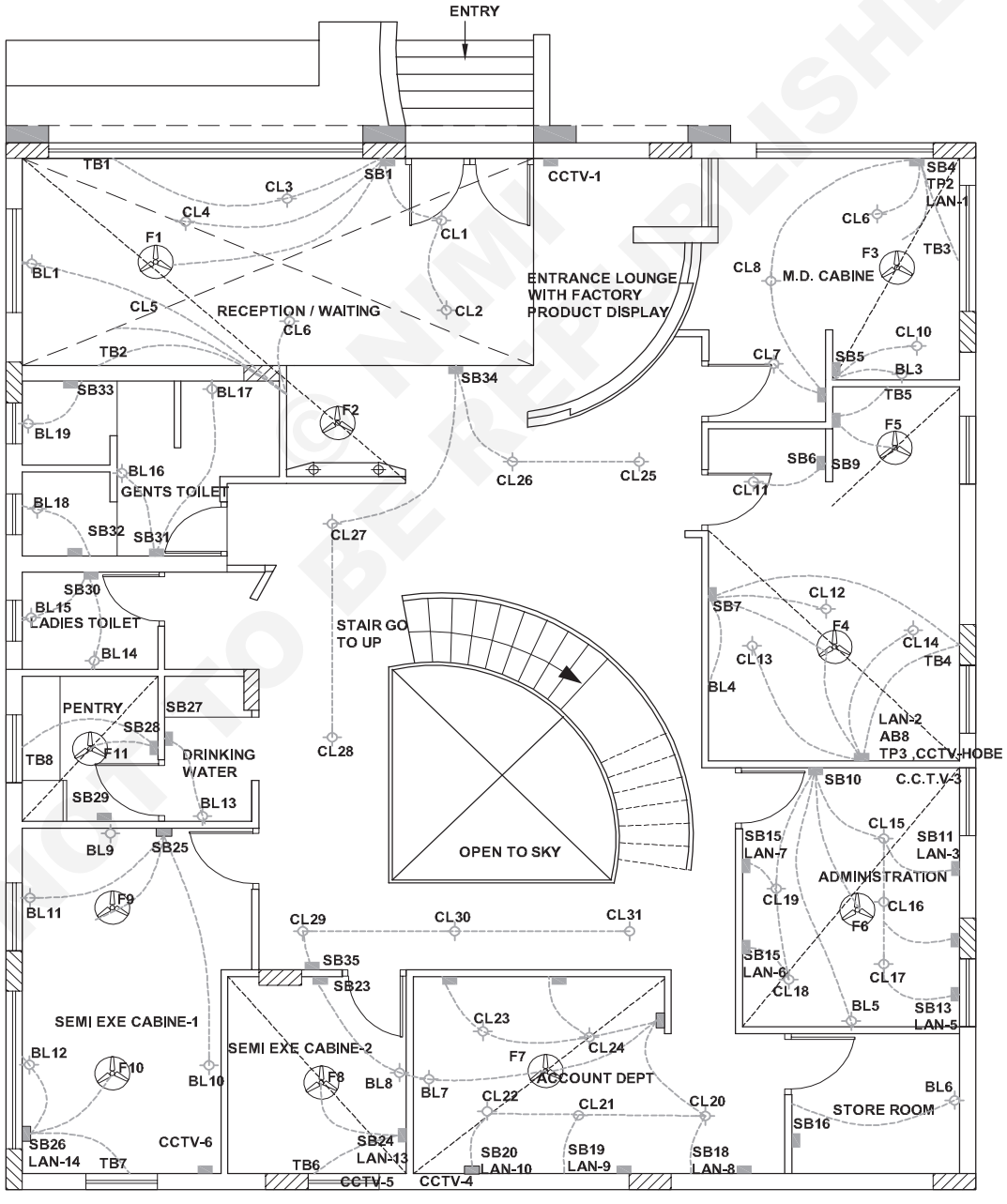
Objective: At the end of this exercise you shall be able to
- **draw paln and elevation of electrical layout.**

PROCEDURE

TASK 1: **Draw the layout of electrical accessories plan & elevation using AutoCAD**

Draw the electrical layout as given in Fig 1 using AutoCAD with proper scale and take the print of layout plan in A3 size paper.

Fig 1



ELECTRICAL LAYOUT

ID20N11057H1

Data

Switch boxes

Ceiling light

Local area network

Back light

Closed circuit television

Tube light

1 Draw the plan

2 Draw the symbols of fittings

3 Draw the summarise the points of electrical fittings

LEGEND		
S.No	Particulars	Short form
1	Switch box	SB
2	Ceiling light	CL
3	Local area network	LAN
4	Back light	BL
5	Closed circuit television	CCTV
6	Fan	F

— — — — —

Free hand sketches of graphic symbols for electrical

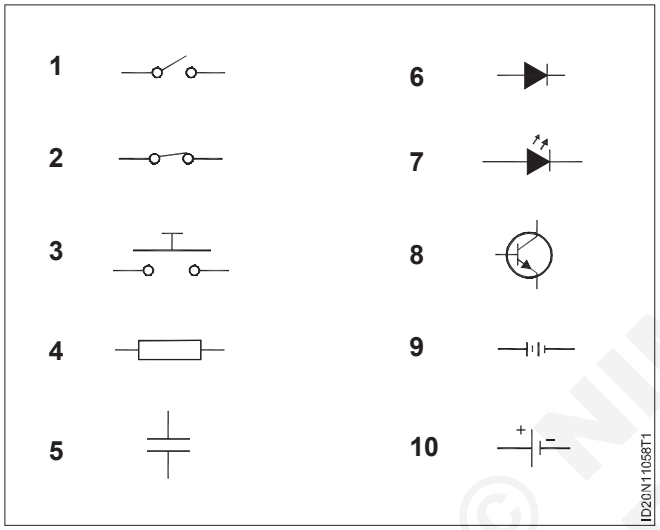
Objectives: At the end of this exercise you shall be able to

- **draw free hand sketches of electrical symbol using CAD**
- **draw with dimensions approximate.**

PROCEDURE

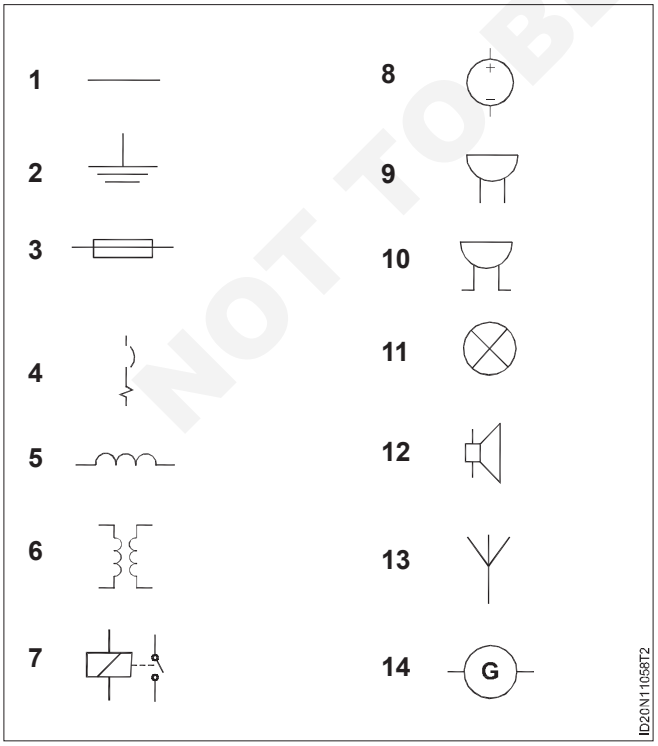
Draw the details of the different types of electrical graphic symbols as per drawing Task 1 to Task 4 using AutoCAD. Take a print in A4 size paper.

TASK 1 : **Draw basic electrical symbols**



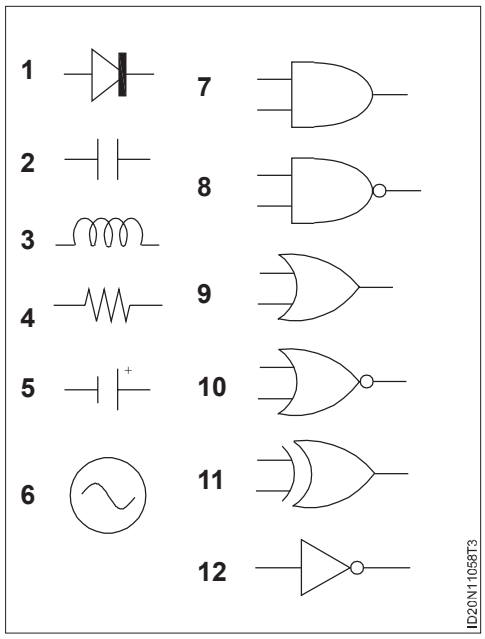
Sl.No.	Symbol
1	Switch (Open)
2	Switch (Closed)
3	Push-Button Switch
4	Resistor
5	Capacitor
6	Diode
7	LED
8	Transistor
9	Battery
10	Cell

TASK 2 : **Draw additional electrical symbols**



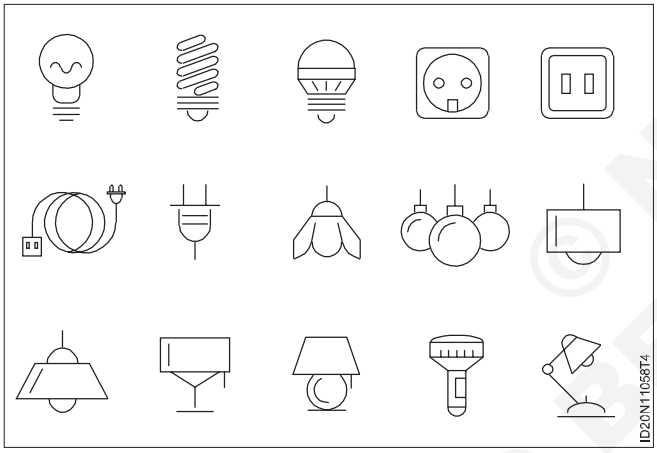
Sl.No.	Symbol
1	Wire
2	Ground
3	Fuse
4	Circuit Breaker
5	Inductor
6	Transformer
7	Relay
8	Power Source
9	Bell
10	Buzzer
11	Lamp
12	Loudspeaker
13	Antenna
14	Generator

TASK 3 : **Draw electrical and electronic symbols**



Sl.No.	Symbol
1	Diode
2	Capacitor
3	Inductor
4	Resistor
5	DC voltage source
6	AC voltage source
7	And gate
8	Nand gate
9	Or gate
10	Nor gate
11	Xor gate
12	Inverter (Not gate)

TASK 4 : **Draw electrical symbols related with lighting**



Layout plan of window and split A/C with Specification

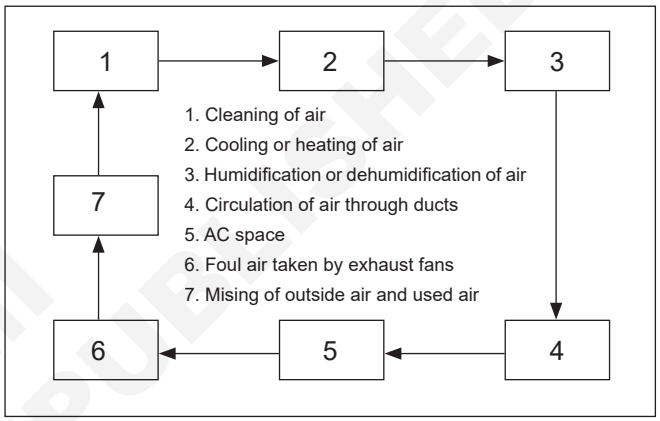
Objectives: At the end of this exercise you shall be able to

- **draw layout plan of window A/C using AutoCAD**
- **draw layout plan of split A/C using AutoCAD**
- **specification of window A/C and split A/C.**

PROCEDURE

TASK 1 : **Draw diagram for air conditioning cycle with the help of requirements given below data.**

1 Draw the details of air conditioning cycle as per given drawing using auto CAD and take a print in A4 size paper.



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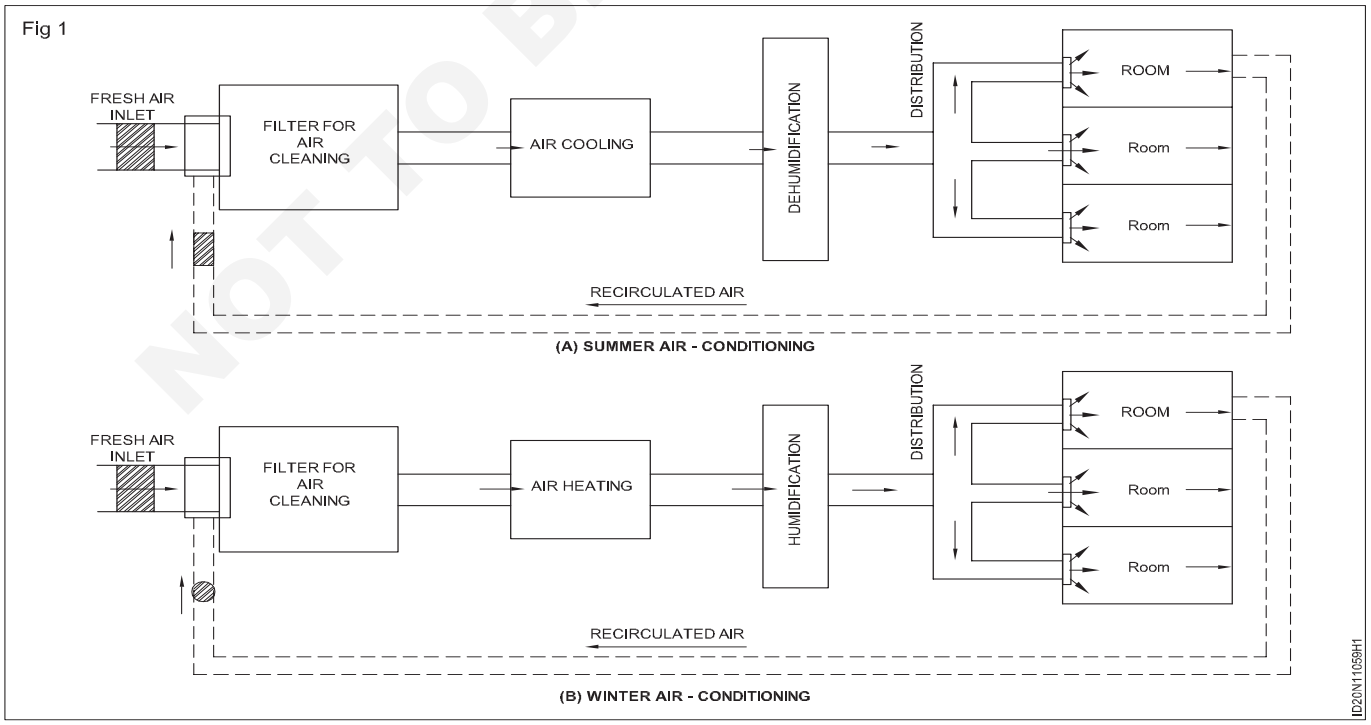
TASK 2 : **Draw the cycles of operations in air conditioning with suitable parts (summer AC/winter AC).**

1 Draw the details of cycles of operations in air conditioning as per given drawing using AutoCAD and take a print in A4 size paper. (Fig 1)

Fig 1



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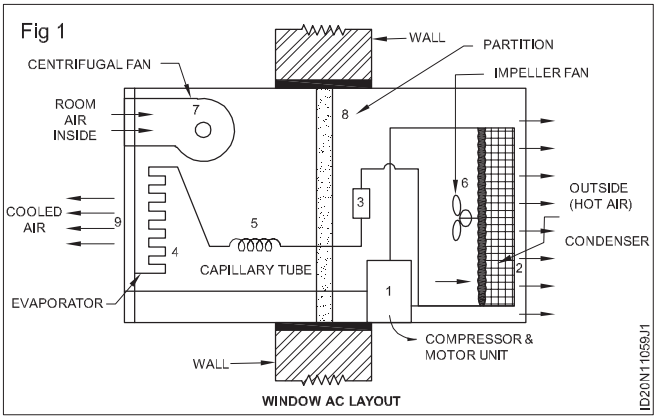
TASK 3 : **Prepare the detailed lay out of the window A/C.**

1 Draw the layout of window A/C as per given Fig 1 with proper scale and all details using AutoCAD and take a print in A4 size paper.

Fig 1



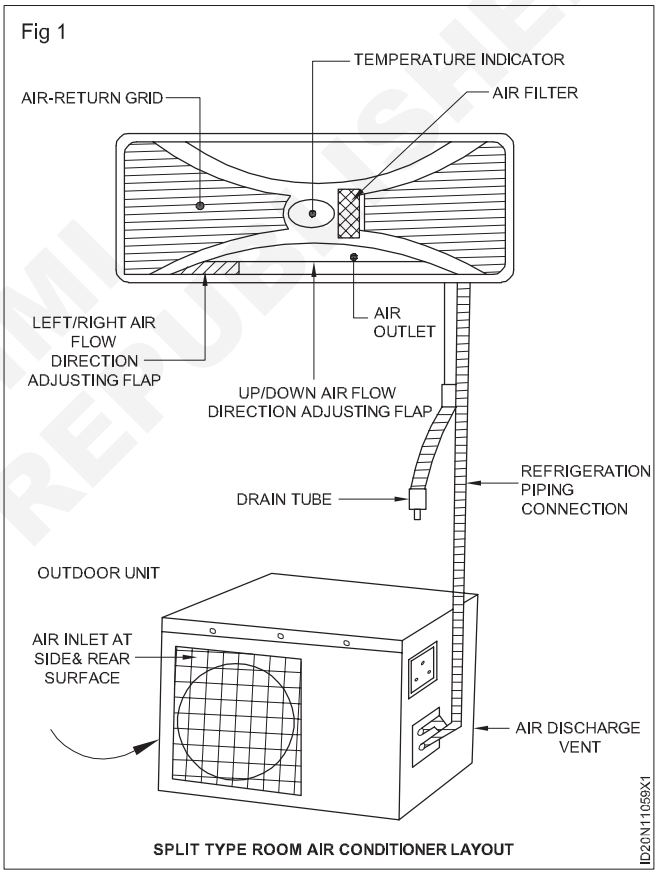
WINDOW AC LAYOUT

— — — — —

TASK 4 : **Prepare the detailed layout of the split A/C.**

1 Draw the layout of split A/C as per given Fig 1 and with proper scale all details using AutoCAD and take a print in A4 Size paper.

Fig 1



SPLIT TYPE ROOM AIR CONDITIONER LAYOUT

— — — — —

TASK 5 : **Specification of window and split A/C**

Specification of window A/C.

Cooling capacity of window AC

Ton of AC	Compressor	Kilo Calorie	Fan motor HP	Room temperature
0.5	0.75	6000 BTU/Hr	1/32 HP	72°F
1.0	1.5	12000BTU/Hr	1/16 HP	72°F
1.5	2.0	18000BTU/Hr	1/5 HP	72°F
2.0	2.5	24000BTU/Hr	1/5 HP	72°F

For 1 ton window A/C

Name of window AC	Heigth	Length	Breadth	Grill temp.	Room temp
Usha AC	47 cm	70 cm	55 cm	58°F	72°F
Feddars AC	45 cm	68 cm	52 cm	56°F	70°F
Kelvinator AC	48 cm	72 cm	55 cm	58°F	72°F
GE AC	48 cm	72 cm	55 cm	58°F	72°F
Voltas AC	47 cm	70 cm	52 cm	56°F	70°F

Technical specifications of split air-conditioner

Cooling capacity	TR	1.0	1.5	2.0
	BTU/Hr.	12000	18000	24000
	Kcal/Hr.	3000	4500	6000
Power spply	Volt Phase Cycle	230 1 50	230 1 50	230 1 50
Power input	Watts	1140	1850	2470
Running current	Amps	6.0	8.5	11.0
Energy Efficient Ratio	BTU/W	10.	9.7	9.7
Air circulation at high speed	M^3/min CFM	10M^3/min 350	13 450	15 525
		Thermosensor	Theromostat	
Condenser & evapo-rator	H.P Mfd	1/6 2.5	1/5 2.5	1/4 4
Compressor	Type	Rotary Reciprocating	Rotary Reciprocating	Reciprocating
Refrigerant		R22	R22	R22
Cooling unit fan speed-mode		3	3	3

— — — — —

Office design layout plan

Objective: At the end of this exercise you shall be able to
- **draw plan of the office layout using AutoCAD.**

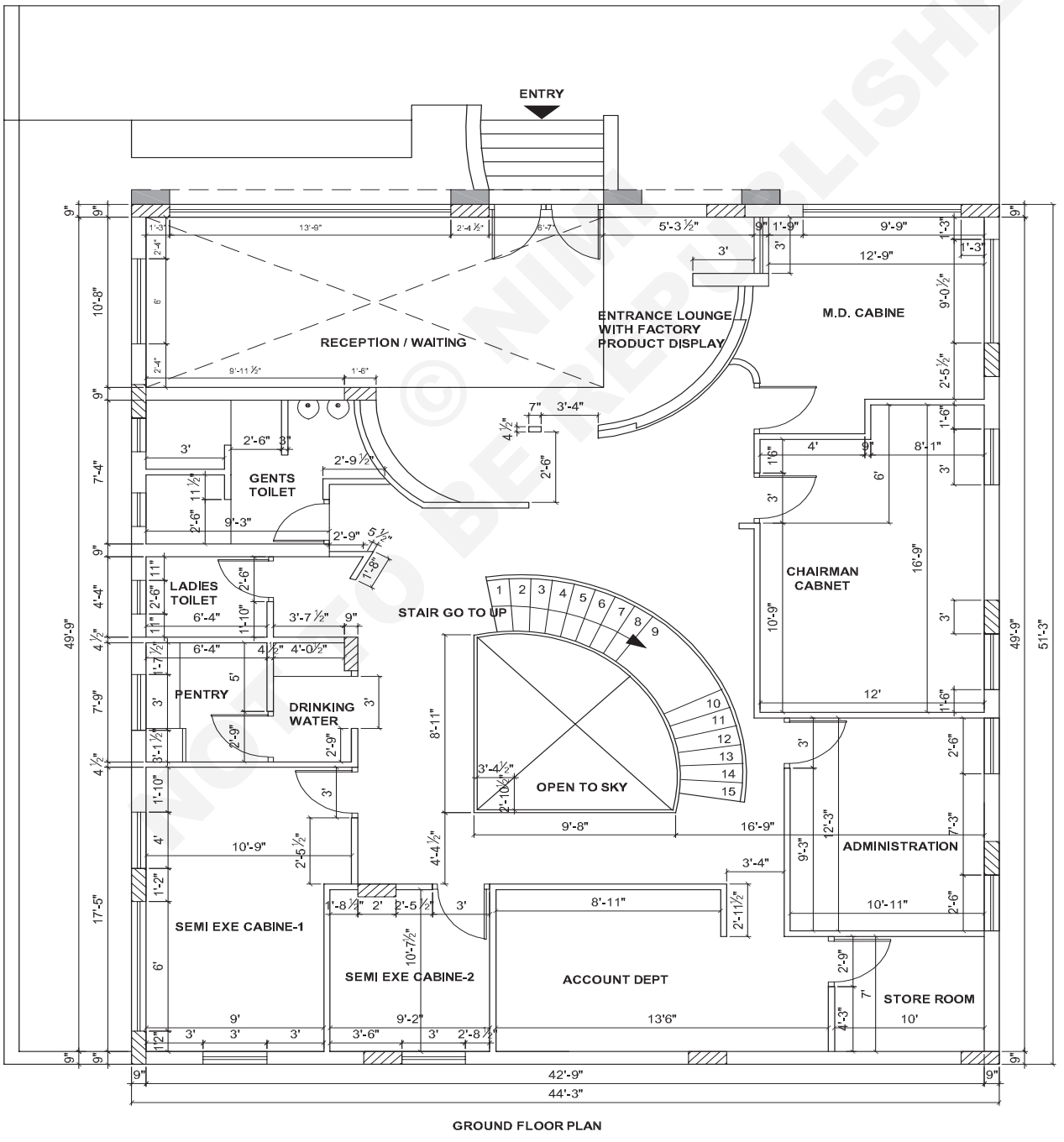
PROCEDURE

TASK 1 : **Draw the plan of office layout with required measurements through AutoCAD (Fig 1 & 2)**

1 Draw the office plan.
2 Draw the ground floor plan and first floor plan of the office building using AutoCAD.
3 Complete the layout plan by printing dimension and other related notes.

Step 1 : Open the AutoCad software.
Step 2 : Draw the building outline of the office by using the “Line” command. Click the “Line” icon to activate the command. Left -click to start and end the line.

Fig 1



Step 3 : Offset the building outline the desired thickness of the exterior wall. Use the “Offset” command.

Step 4 : Draw all interior walls by using the same “Line” and “Offset” commands.

Step 5 : Use the “Trim” command to trim any messy intersections on the exterior or interior conditions. Left-click the “Trim” icon to activate the too. Select the “cutting edge” line followed by the line that you would like to trim off.

Step 6 : Cut openings for doors and windows by drawing lines and then trimming away the opening. If you want a 3’-0” door (90 cm), draw a line perpendicular to the wall, set it 3’0”, and trim way the excess lines.

Step 7 : Draw the doors and windows where the new openings exits.

Step 8 : Activate the text command to enter the names of rooms and their sizes.

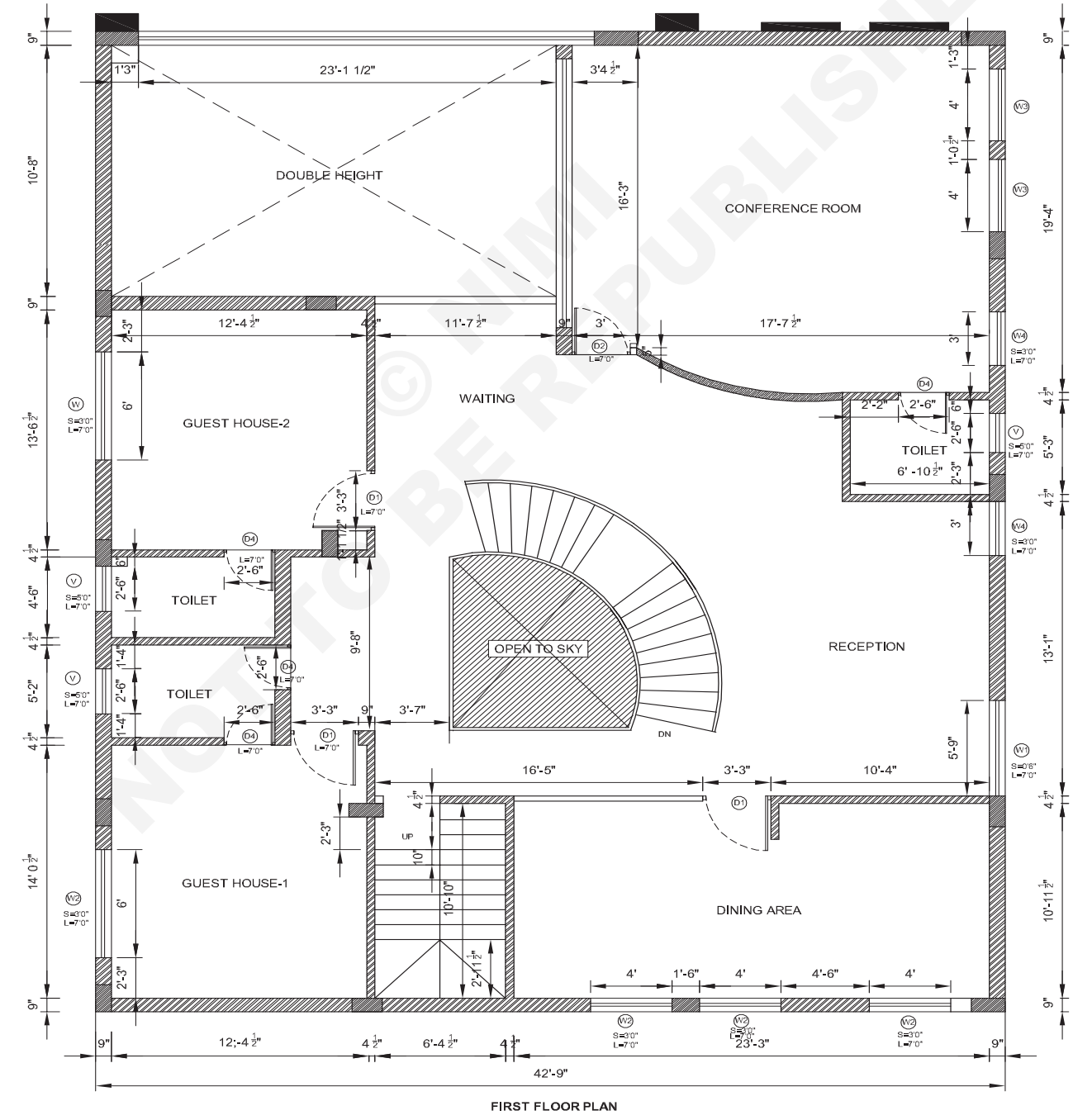
Step 9 : Activate the dimension icon and click the edges of each wall that you would like to dimension to. This will give the drawing a more professional look and also gives people a sense of the space.

Step 10 : Using ploylne command draw a line over the outer wall and using area command find the area of the building.

Step 11 : Plot the drawing to a printer or to a PDF format. Hit the plot icon to open the plot settings. Choose the layout type, pen settings, and window view that you would like to use.

Step 13 : Take printout in A3 size paper.

Fig 2



Office elevations

Objective: At the end of this exercise you shall be able to
- **draw elevations of the office using AutoCAD.**

TASK 1 : **Draw the office elevations using AutoCAD (Fig 1)**

1 Draw the elevation of the office building using AutoCAD.

2 Complete the drawing by printing dimension and other related notes.

3 Draw the base line to draw the elevation of the office.

4 Draw the projected lines from the plan to create front view of the office using line command.

5 Draw the elevation of the office using modify commands like offset, trim, fillet, extend to complete the outline.

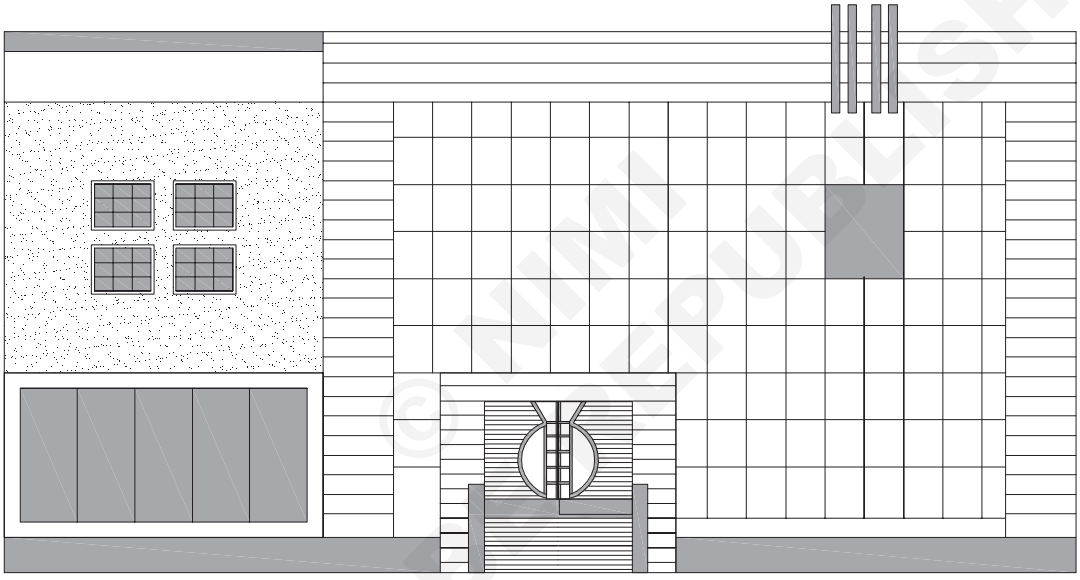
6 Using block, insert block commands prepare the doors and windows in elevation.

7 Assign proper line weights to create the effective apperance of the building.

8 Plot the drawing to a printer or to a PDF format. Hit the plot icon to open the plot settings. Choose the layout type, pen settings and windows view that you would like to use.

9 Take print in a A3 size sheet.

Fig 1



OFFICE FRONT ELEVATION

ID20N11160J1

TASK 2 : **Draw the section of the office using AutoCAD (Fig 1)**

1 Draw the section view

2 Draw the section of the office building as shown in Fig 1 through AutoCAD.

3 Draw the section of the office

4 Draw the base line to draw the section in the plan, the width of walls, rooms has to be drawn according to the disign using line, offset, trim commands.

5 Use the hatch commands to show the R.C.C. rubble masonry in the section.

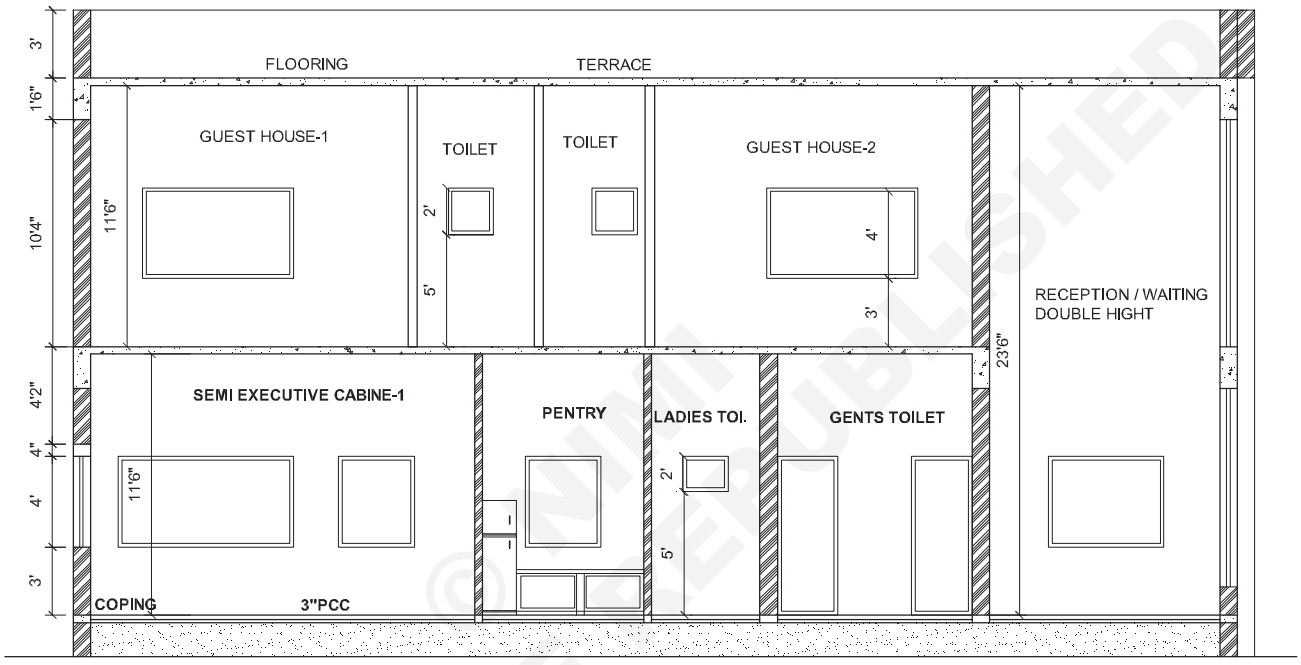
6 Activate the text commands for mentioning the name and size of the rooms.

7 Using dimension command complete the dimensioning of the section drawing.

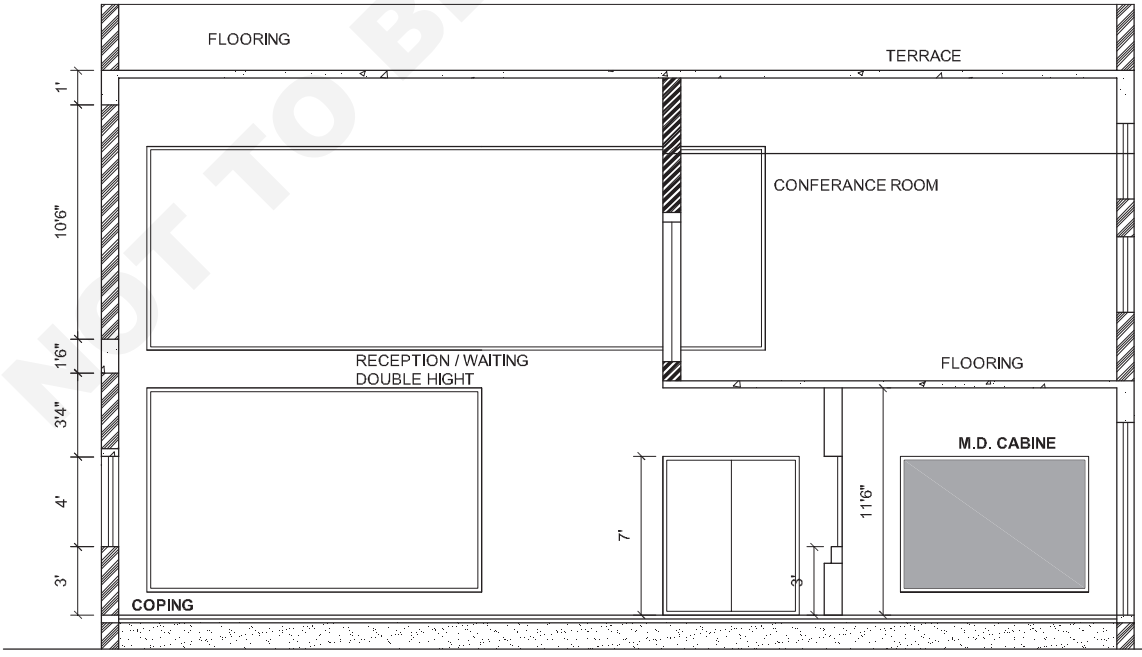
8 Plot the drawing to a printer or to a PDF format. Hit the plot icon to open the plot settings. Choose the layout type, pen settings and windows view that you would like to use.

9 Take printout in A3 size paper.

Fig 1



SECTION AA'



SECTION BB'

ID20N11160X1

TASK 3 : **Draw the sectional elevation of the chairman cabinet from the plan. Using AutoCAD**

1 Draw the plan given of the chairman cabinet.

2 Draw the sectional line AA' and BB' in the plan (vertually, horizontally).(Fig 1)

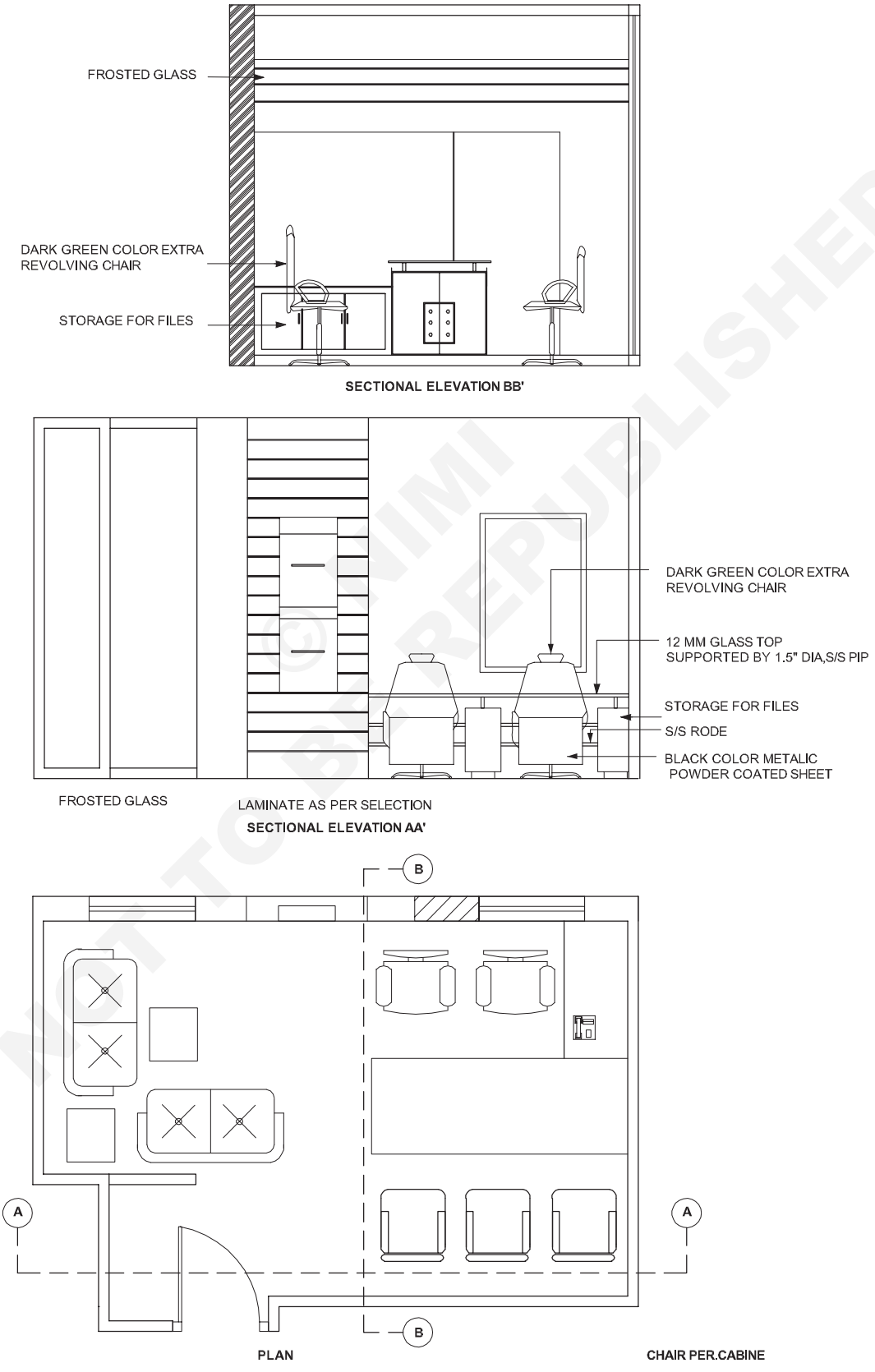
3 Draw sections with required details and measurement in required scale using various commands in AutoCAD.

4 Complete the drawing by printing dimension and other related notes

5 Take printout in A3 size paper.

Dimensions have to be assumed.

Fig 1



Working details to furniture layout of office design project

Objective: At the end of this erercise you shall be able to
- **office design furniture details and electrical using AutoCAD.**

PROCEDURE

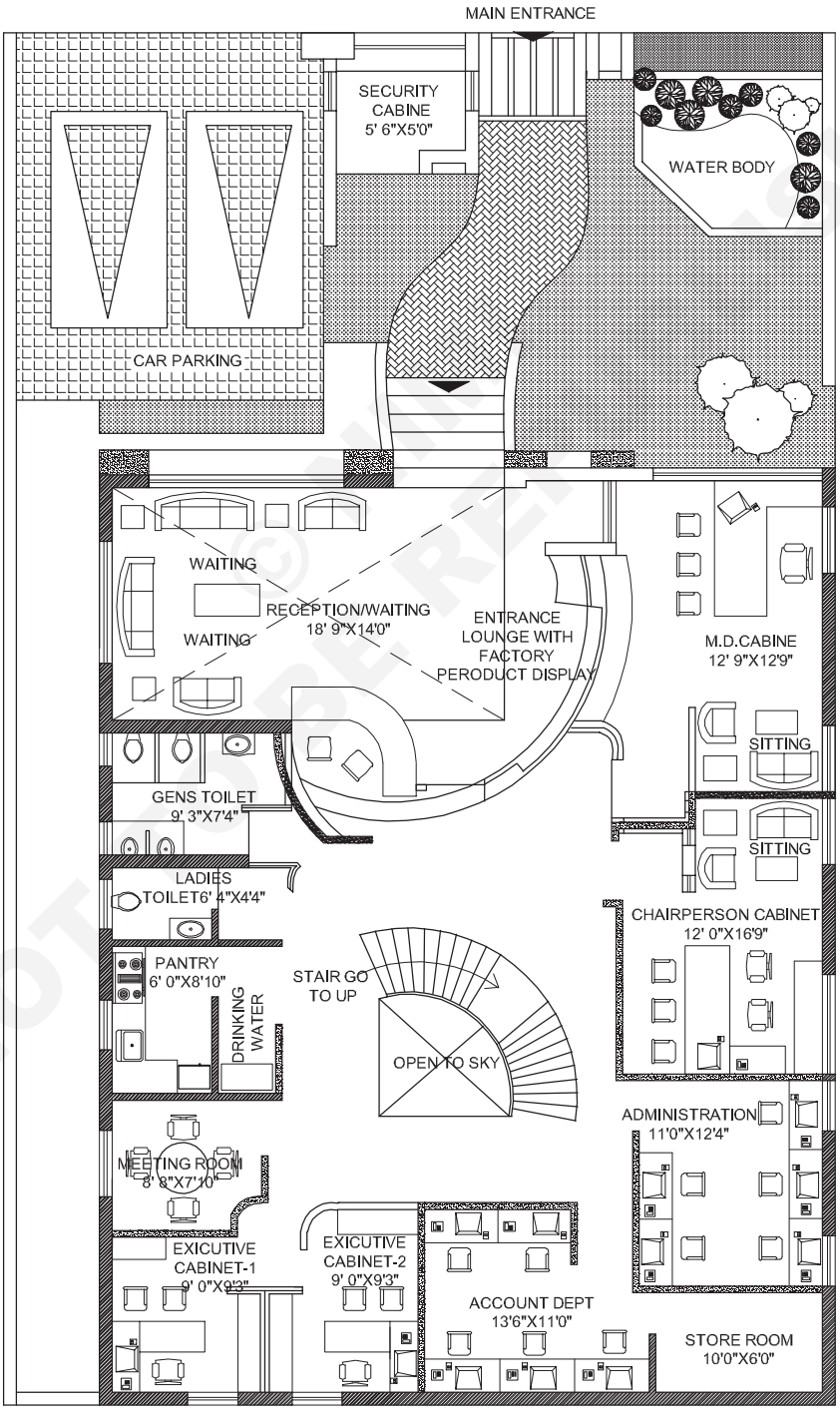
TASK 1 : **Draw the Furniture layout using AutoCAD**

1 Prepare the office furniture layout showing all details as per given Fig 1 and 2 through AutoCAD.

2 Mark the dimensions complete the layout plan

3 Take a print on A3 size paper.

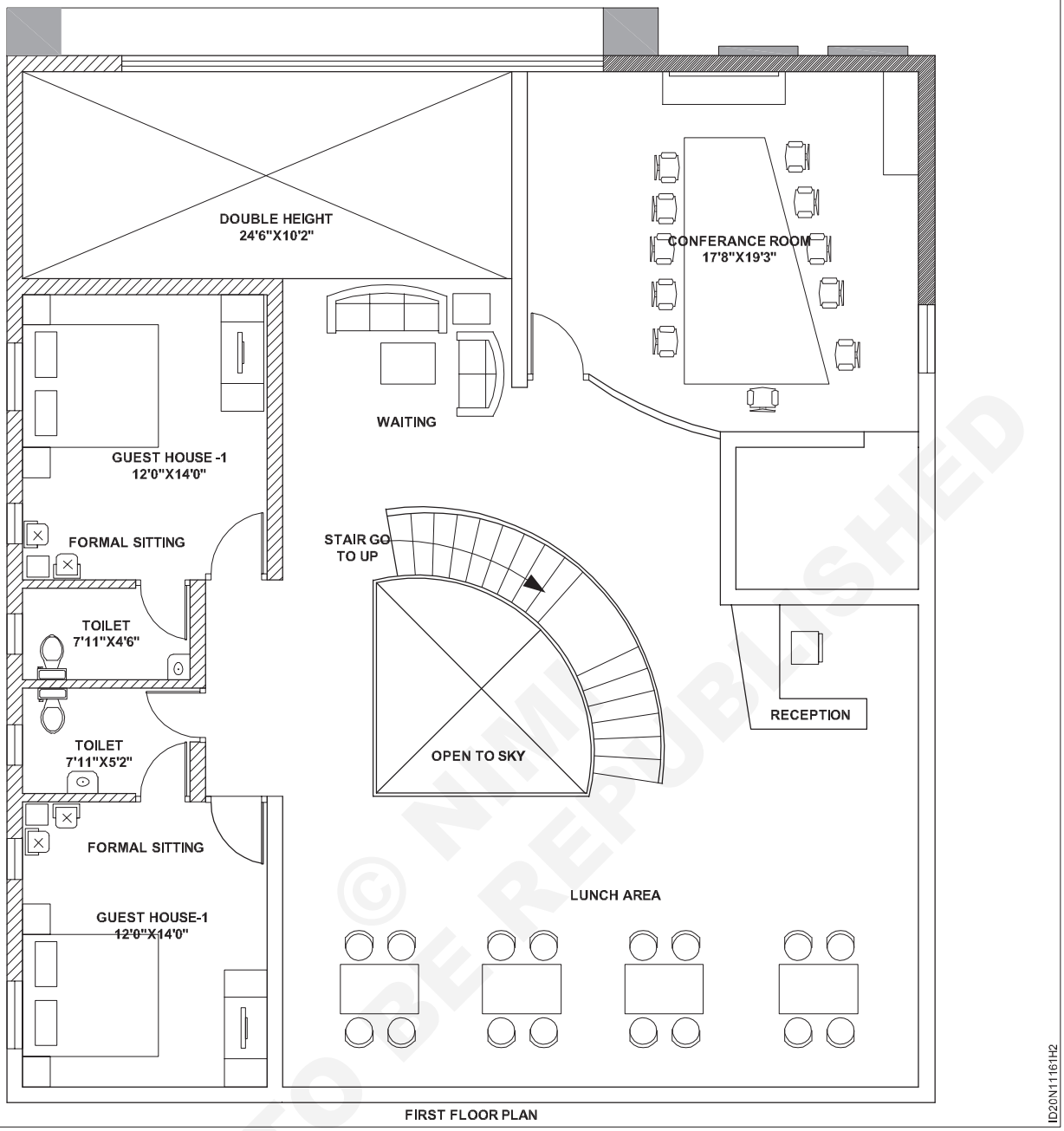
Fig 1



GROUND FLOOR PLAN

ID20N11161H1

Fig 2



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TASK 2 : **Draw the layout plan of false ceiling with lighting position (Refer to exercise no. 1.10.56) using AutoCAD**

— — — — —

TASK 3 : **Draw the electrical layout through AutoCAD (Refer to exercise no. 1.10.57)**

Free hand sketch for office design project details

Objective: At the end of this exercise you shall be able to
- **understand theory of furnishing fabric upholster.**

PROCEDURE

TASK 1 : **Draw the freehand sketch of typical furniture used in office (Fig 1)**

Data has to be assumed

Assumption

The modular sections vary depending upon the manufacturing company. The particular unit is made for using a computer and working space. This metal modular furniture is made of the following.

1 Hollow corner section of 5x5 cm.

2 Hollow square tubes of 60x5 cm. and 90x5cm with provision for fixing fascia tiles and electrical wiring.

3 Separate drawers & shelves unit 75 cm. height, which can be fixed to the hollow sections.

4 Separate worktops of 1cm. thickness, which can be fixed to the hollow sections.

5 The entire unit is fixed with standard screws and metal angles.

Drawing method

Steps

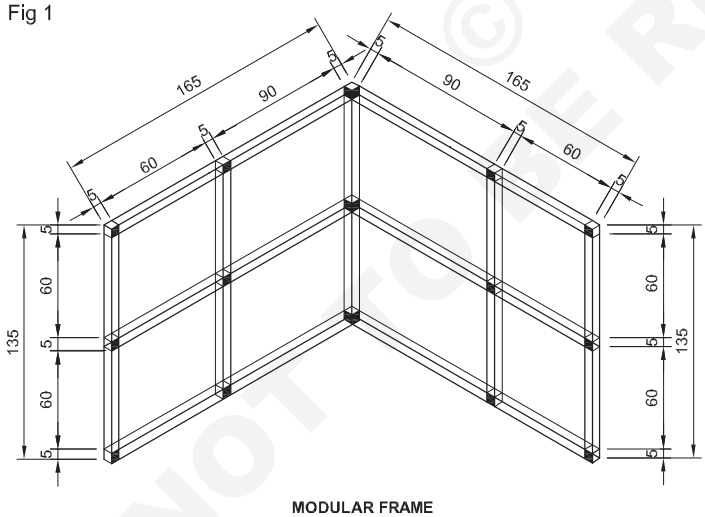
1 Draw to scale : 1:20 (or) 5 cm = 1 meter as shown otherwise choose any convenient scale.

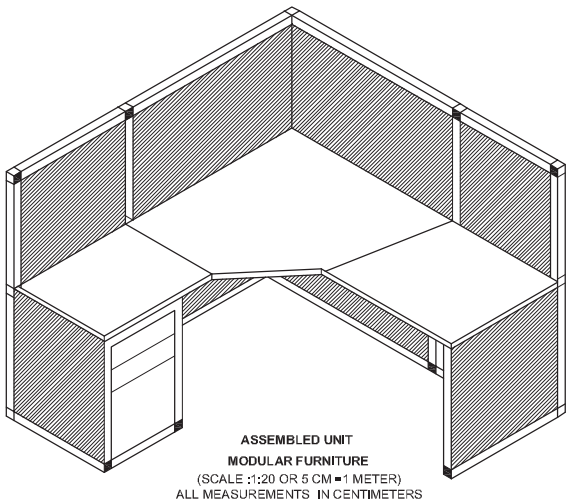
2 The drawing is in isometric view using CAD.

3 First, draw the modular frame as shown in isometric view. The inner lines are shown for proper understanding of the frame. The corners are of standard size.

4 Then, draw the assembled unit with fascia tiles, workshop and shelves. The height of the workshop is 75cm. The width of the trawers and shelves is 50 cm.

Fig 1





TASK 2 : **Design furniture for an antique shop located in your area**

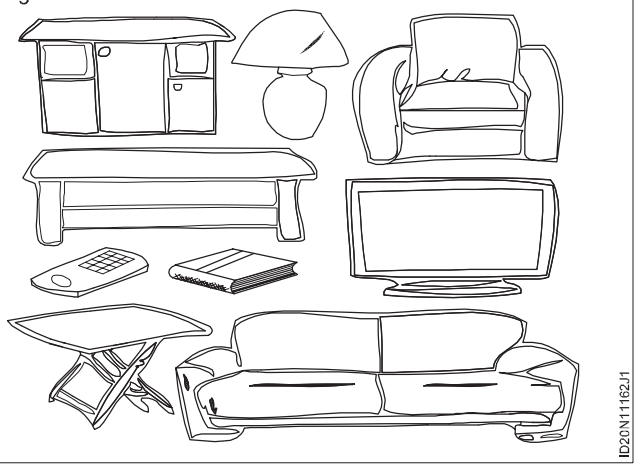
Style and theme depends on the students creativity and requirements

1 Students creativity matters based on their understanding of furniture styles.

2 Prepare the drawing sheet (A2) by given figures in sequence.

3 Use drawing pencil (HB) to draw the given figures in a sketch format.

Fig 1



4 Ensure that the drawn figure is proportionate. (i.e) neither very big or nor very small)

Note: While drawing ensure that 30cm sale is not used to draw the figures instead it should be done roughly with bare hand. (Figs 1 & 2)

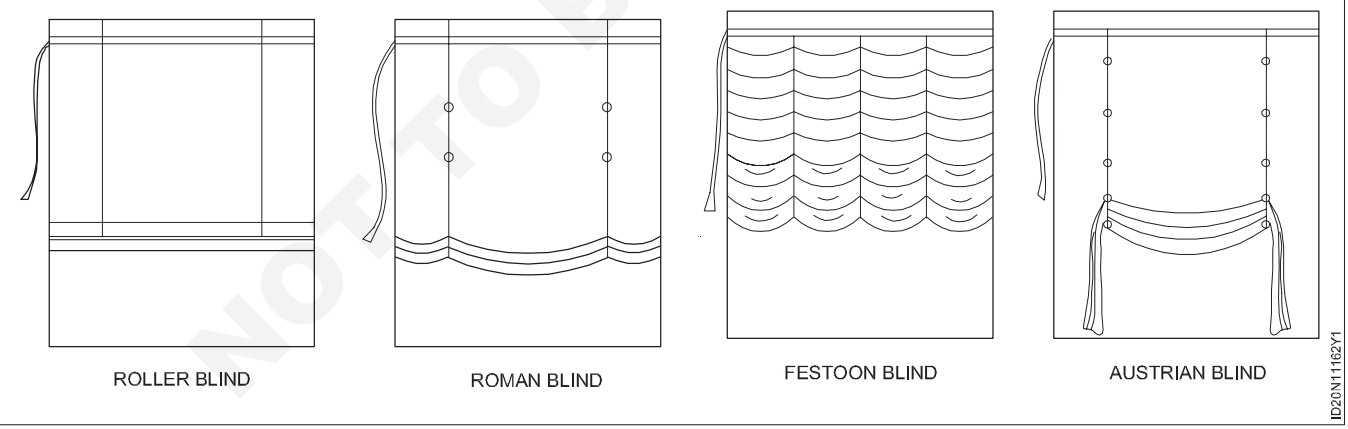
Fig 2

— — — — —

TASK 3 : **Draw any four type of window treatments (blends) used in interiors.**

1 Draw the diagrams as given in the Fig 1 (Freehand sketches).

Fig 1



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Rendering with Gradient & Hatches

Objectives : At the end of this exercise you shall be able to
- **render with gradient**
- **render with hatches.**

PROCEDURE

TASK 1 : **Gradient**

Command alias	Button	Classic menu
Gradient		Draw => Gradient

A gradient fill is a solid hatch fill that gives the blended color effect of a surface with light on it. The color in gradient fill makes a smooth transition from light to dark or from dark to light.

In a two color gradient fill the color with the transition from light color to dark and from first color to the second color. The hatch and gradient dialog box includes the same options.

The following options are only for gradient tab.

Color: Specifies whether to fill the hatch boundary with a monochromatic or two-color blend.

One color: Specifies a fill that uses a smooth transition between a color and a specified tint (the color mixed with white) or between a color and a specified shade (the color mixed with black). (GFCLRSTATE system variable)

Two color: Specifies a fill that uses a smooth transition between two colors. (GFCLRSTATE system variable)

Color swatches: Specifies the colors for the gradient fill (either one color or two colors). Click the browse button [...] to display the select color dialog box, where you can select an AutoCAD color index (ACI) color, true color, or color book color. (GFCLR1 and GFCLR2 system variables)

Shade and tint slider: Specifies the tint (the selected color mixed with white) or shade (the selected color mixed with black) of a color to be used for a gradient fill of one color. (GFCLRLUM system variable)

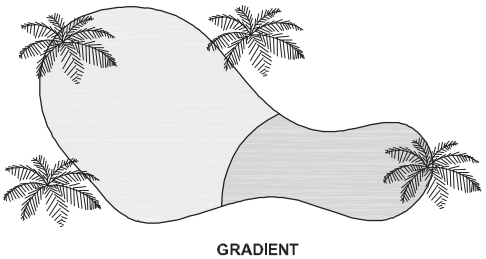
Gradient patterns: Displays fixed patterns for gradient fills. These patterns include linear sweep, spherical, and parabolic.

Orientation: Specifies the angle of the gradient and also whether it is symmetrical.

Centered: Specifies a symmetrical gradient configuration. If this option is not selected, the gradient fill is shifted up and to the left, creating the illusion of a light source to the left of the object. (GFSHIFT system variable)

Angle: Specifies the angle of the gradient fill. The specified angle is relative to the current UCS. This option is independent of the angle specified for hatch patterns. (GFANG system variable) (Fig 1).

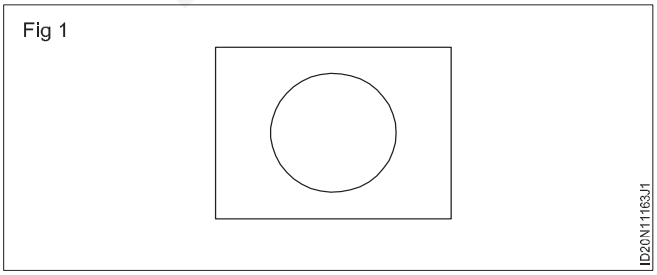
Fig 1



TASK 2 : **Creat the image by using gradient**

Consider the below image Fig 1.

Fig 1



Step 1: Select the gradient icon from the drop-down list of the hatch.

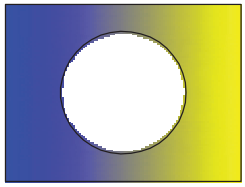
Step 2: Pick internal points of any object or select objects. Here, we have picked an internal point outside the circle.

Step 3: A gradient will be created inside the rectangle, as shown below Fig 2.

Lets consider another gradient pattern. It will look like the below image Fig 3.

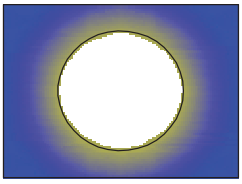
We can also select the desired patterns from the list of patterns as shown below Fig 4.

Fig 2



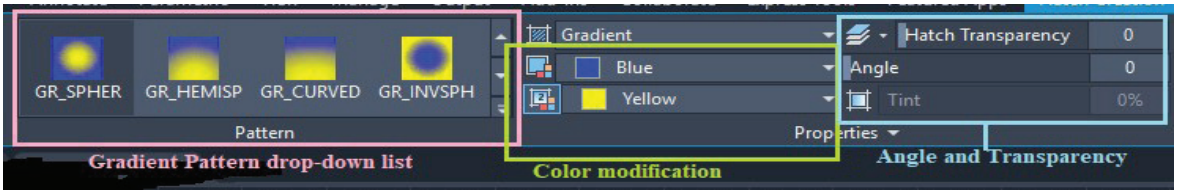
ID20N11163J2

Fig 3



ID20N11163J3

Fig 4



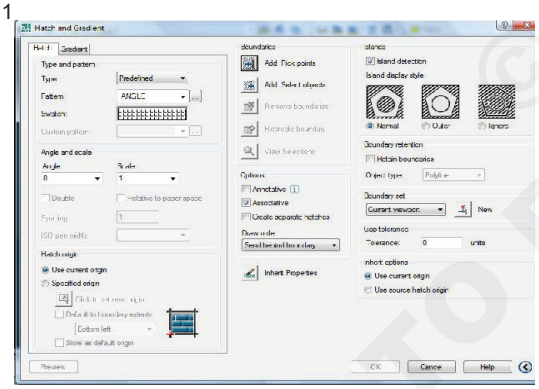
TASK 3 : **Hatch**

Command alias	Button	Classic menu	Ribbon/application menu
H		Draw => Hatch	Home => Draw => Hatch

Drafters and designers use repeating patterns called hatching to fill regions in a drawing for various purposes. In a cross section view hatch patterns helps the viewer differentiate between components of an assembly and indicate the material of each.

The following options are displayed. (Fig 1)

Fig 1



Type and pattern: Specifies the hatch's type, pattern, color, and background color.

Type: Specifies whether to create a predefined, user-defined, or custom hatch pattern.

Predefined patterns are stored in the acad. pator acadiso. pat files supplied with the program.

User-defined patterns are based on the current linetype in your drawing. A custom pattern is a pattern that is defined in any custom PAT files that you have added to the search path.

Pattern: Displays a selection of ANSI, ISO, and other industry-standard hatch patterns. Select SOLID to create solid fill. The pattern option is available only when type is set to predefined. (HPNAME system variable)

[...] Button

Displays the hatch pattern palette dialog box, in which you can preview images for all predefined patterns.

Color

Overrides the current color with a specified color for hatch patterns and solid fills. (HPCOLOR system variable)

Background color: Specifies the background color for new hatch objects. Choose none to turn off the background color. (HPBACKGROUND COLOR system variable)

Swatch: Displays a preview of the selected pattern. Click the swatch to display the hatch pattern palette dialog box.

Custom pattern: Lists the available custom patterns. The most recently used custom patterns appear at the top of the list. The custom pattern option is available only when type is set to custom. (HPNAME system variable)

[...] Button: Displays the hatch pattern palette dialog box, in which you can preview images for all custom patterns.

Angle and scale: Specifies an angle and scale for the selected hatch pattern.

Angle: Specifies an angle for the hatch pattern relative to the X axis of the current UCS. (HPANG system variable)

Scale: Expands or contracts a predefined or custom pattern. This option is available only when type is set to predefined or custom. (HPSCALE system variable)

Double: For user-defined patterns, draws a second set of lines at 90 degrees to the original lines, creating a crosshatch. This option is available only when type is set to user defined. (HPDOUBLE system variable)

Relative to paper space: Scales the hatch pattern relative to paper space units. This allows you to display hatch patterns at a scale that is appropriate for your named layout. This option is available only from a named layout.

Spacing: Specifies the spacing of lines in a user-defined pattern. This option is available only when type is set to user defined. (HPSPACE system variable)

ISO pen width: Scales an ISO predefined pattern based on the selected pen width. This option is available only when type is set to predefined and pattern is set to one of the available ISO patterns.

Hatch origin: Controls the starting location of hatch pattern generation. Some hatches, such as brick patterns, are meant to be aligned with a point on the hatch boundary. By default, all hatch origins correspond to the current UCS origin.

Use current origin: Uses the hatch origin point stored in the HPORIGIN system variable.

Specified origin: Assigns a new hatch origin using the following options.

Click to set new origin: Specifies the new hatch origin point directly.

Default to boundary extents: Calculates a new origin based on the rectangular extents of the boundary for the hatch object. Choices include each of the four corners of the extents and its center. (HPORIGINMODE system variable)

Store as default origin: Stores the value of the new hatch origin in the HPORIGIN system variable.

Boundaries: The following options are displayed.

Pick points: Determines a boundary from existing objects that form an enclosed area around the specified point. While picking internal points, you can right-click in the drawing area at any time to display a shortcut menu that contains several options.

Select: Determines a boundary from selected objects that form an enclosed area.

When you use the select objects option, interior objects are not detected automatically. You must select the objects within the selected boundary to hatch or fill those objects according to the current island detection style. Each time you click select objects, hatch clears the previous selection set. While selecting objects, you can right-click at any time in the drawing area to display a shortcut menu. You can undo the last selection or all selections, change the selection method, change the island detection style, or preview the hatch or gradient fill.

Remove: Removes from the boundary definition any of the objects that were added previously.

Recreate: Creates a polyline or region around the selected hatch or fill, and optionally associates the hatch object with it.

Display boundary objects: Displays the boundary grip controls for the selected hatch so that you can use to grip-edit both the boundary and the hatch object. When you select or use the display boundary objects option to select a non-associative hatch, the hatch boundary grips are displayed.

When you select an associative hatch, it displays only a single grip point of the hatch. To display the boundary grip controls of the objects associated with the hatch, use the display boundary objects option. You can only edit an associative hatch by grip-editing the associated boundary objects.

Options: Controls several commonly used hatch or fill options.

Annotative: Specifies that the hatch is annotative. This property automates the process of scaling annotations so that they plot or display at the correct size on the paper. (HPANNOTATIVE system variable)

Associative: Specifies that the hatch or fill is associative. A hatch or fill that is associative is updated when you modify its boundary objects. (HPASSOC system variable)

Create separate hatches: Controls whether a single hatch object or multiple hatch objects are created when several separate closed boundaries are specified. (HPSEPARATE system variable)

Draw order: Assigns a draw order to a hatch or fill. You can place a hatch or fill behind all other objects, in front of all other objects, either behind the hatch boundary, or in front of the hatch boundary. (HPDRAWORDER system variable)

Layer: Assigns new hatch objects to the specified layer, overriding the current layer. Select use current to use the current layer. (HPLAYER system variable)

Transparency: Sets the transparency level for new hatch or fills, overriding the current object transparency. Select use current to use the current object transparency setting. (HPTRANSPARENCY system variable).

Inherit properties: Hatches or fills specified boundaries using the hatch or fill properties of a selected hatch object. After selecting the hatch object whose properties you want the hatch to inherit, right-click in the drawing area and use the options on the shortcut menu to switch between the select objects and pick internal point options. The HPINHERIT system variable controls whether the hatch origin of the resulting hatch is determined by HPORIGIN or by the source object.

Islands: Specifies the methods used to hatch or fill boundaries within the outermost boundary.

Island detection: Controls detection of internal closed boundaries, also called as islands. (HPISLANDDETECTIONMODE system variable).

i Select ANS132 hatch and click ok (Fig 2 & Flg 3).

ii Specify the scale as 25.

iii Choose add pickpoints and click the internal points of walls.

Fig 2

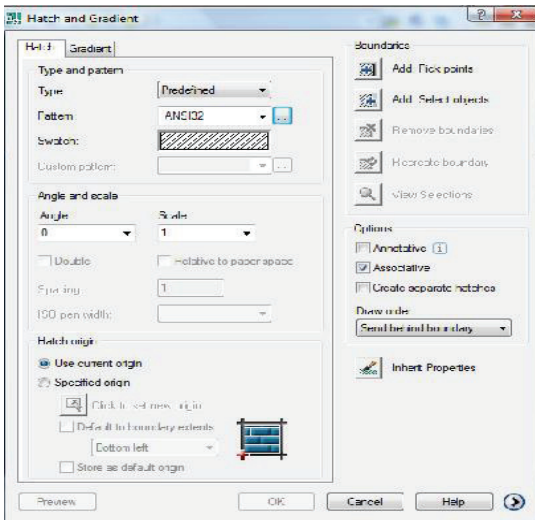
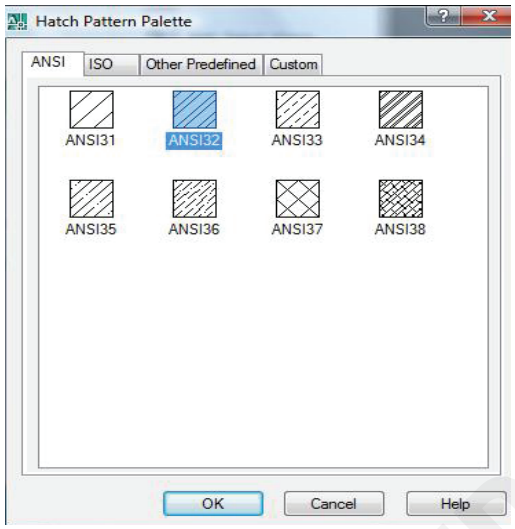


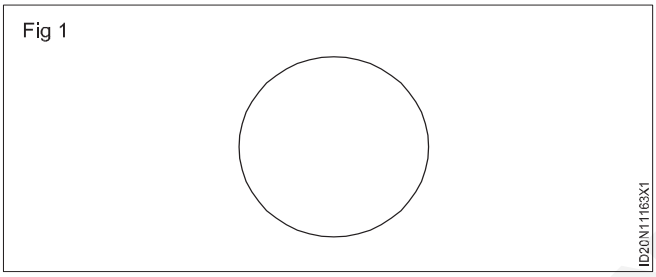
Fig 3



TASK 4 : **Create the image by hatch command**

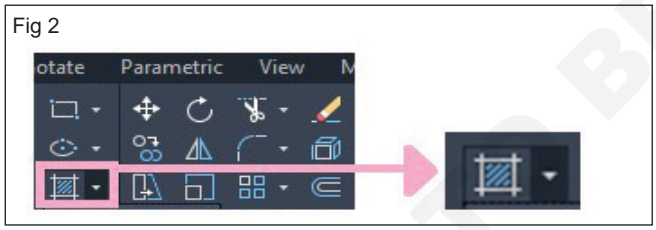
Consider the below image Fig 1.

Fig 1



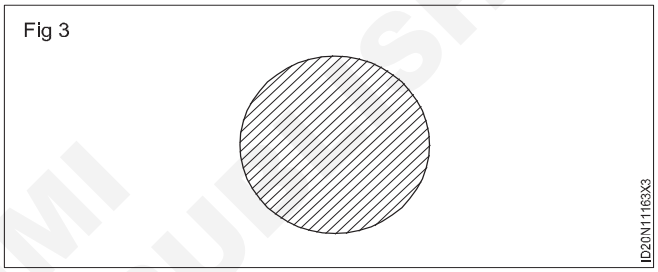
Step 1: The steps to fill hatch pattern are listed below
Select the hatch icon from the ribbon panel, as shown in the below image Fig 2.Type on the command line or command prompt and press Enter.

Fig 2



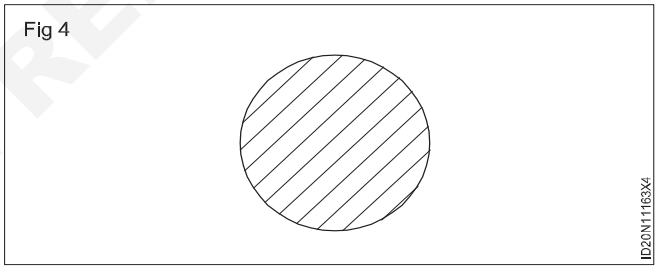
Step 2: Pick internal points of any object
or
select

Fig 3



Here, we have picked an internal point inside a circle. We can click any point inside a circle.

Fig 4

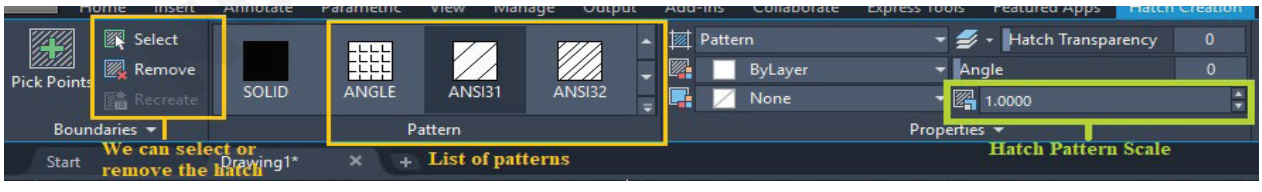


A batch pattern will be created inside the circle, as shown below Fig 3.

To modify the lines we have increased the hatch pattern scale. The Fig 4 will now appear as Fig 4.

We can also select the desired patterens from the list of patterns, as shown below Fig 5.

Fig 5



The greater like hatch pattern scale, the higher will be the distance between the lines in the hatch pattern.

When we click on the arrow near the hatch icon, a drop-down list appears, as shown in the below image Fig 6.

Boundary: The boundary command creates a separate region or polyline from the enclosed area.

Fig 6