COMPUTER AIDED DESIGNING LABORATORY (GR18A2021)

Name of the Student: …….

Branch: …… Department:……...

Roll No: ……Academic Year: ……

GOKARAJU RANGARAJU

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CERTIFICATE

This is to certify that it is a bonafide record of practical work done in the _____

Laboratory in _____ *semester of* _____ *year during the academic year*_____ *to* _____ .

Name of the Student : ……..

Roll. No. : ……..

Branch : …….

Section : …….....

Signature of the Internal Examiner	Signature of the Head of Department	Signature of the External Examiner

CONTENTS

MANDATORY INSTRUCTIONS

1. Students should report to the labs concerned as per the timetable.

2. Record should be updated from time to time and the previous experiment must be signed by the faculty in charge concerned before attending the lab.

3. Students who turn up late to the labs will in no case be permitted to perform the experiment scheduled for the day.

4. After completion of the experiment, certification of the staff in-charge concerned in the observation book is necessary.

5. The record of observations along with the detailed experimental procedure of the experiment performed in the immediate previous session should be submitted and certified by the staff member in-charge.

6. When the experiment is completed, students should disconnect the setup made by them, and should return all the components/instruments taken for the purpose.

7. Any damage of the equipment or burnout of components will be viewed seriously either by putting penalty to the lab for the semester/year.

8. Students should be present in the labs for the total scheduled duration.

9. Students are expected to prepare thoroughly to perform the experiment before coming to Laboratory.

10. DRESS CODE:
    1. Boys - Formal dress with tuck in and shoes.
    2. Girls - Formal dress (salwar kameez).

Experiment No: 1
INTRODUCTION TO COMPUTER AIDED DRAFTING

INTTRODUCTION

Computers use different software to perform tasks. With the help of special software, computers can be advantageously used to do the work of drafting. The process of constructing the drawings on the computer screen with the help of specially developed software and hardware is called COMPUTER AIDED DRAFTING. The drawings in CAD are cleaner and more exact than manual drawings.

The CAD system is based on what is called interactive computer graphics (ICG). ICG helps to convert the data entered by the user in form of graphics.

CAD workstation: A CAD workstation, in its simplest form, consists of a computer with a keyboard, mouse and monitor and loaded with CAD software. The keyboard and mouse are essential input devices whereas monitor is a real time output device. All the three are integral parts of computer and are always connected to central processing unit. For CAD applications, a computer with reasonably good processing unit is recommended.

Input Devices: The input devices are used to enter numeric data and commands and to control the cursor positions on the screen.

Keyboard and Mouse: The keyboard and mouse are basic input devices for any computer. For CAD purposes, a standard 104 – keyboard is sufficient. A two – button mouse with scroll wheel is recommended for computerized drafting.

Joystick: A Joystick is a cursor control device consisting of handled stick pivoted at one end. The stick can be moved side – to – side (or) front to back.

Trackball: A trackball can be treated as a mouse resting on its back. It has a ball that can be rolled inside a socket. The direction and speed of rotation of ball will decide the direction and speed of cursor movement.

Light pen: A light pen is a light sensitive input device and is used directly on computers GRT monitors. The pen, when placed against the screen; enabling the computer to identify the location of the pen on screen. A light pen can work with any CRT – based monitor, but not with LCD screens, projectors (or) other display devices.

Scanner: The most common Flatbed scanner is used to scan manual drawings. It analyzes the image and process it using optical character recognition technology.

Digitizer: Digitizer (or) pen tablet is an electro- magnetic graphic input device. It is used to construct new drawing (or) convert an existing drawing into digital form.

OUTPUT DEVICES:

The output devices show numeric value, active commands, cursor positions and drawing. These are used to take points of drawings.

Monitor: A monitor provides a screen for visual display. It enables real time control of drafting activity. For a better visibility, IT monitor may be preferred.

Printers: A printer is used to obtain print copies of drawings. Two types of printers, namely inject printer and laser printer are in common use. Inkjet printers are cheaper but cost per print is higher than that of laser printers.

Plotter: Plotter, is a printing device, used prominently for the print of larger sizes i.e. A3 to A0. Plotters print the drawing by moving a pen across surface of paper. Obviously the plotters are good at line art but incapable of drawing colored object with mixing and shadings.

ADVANTAGES OF CAD:

CAD offers the following advantages.

1. **Accuracy:** CAD helps to achieve very high degree of accuracy that is impossible to achieve manually.
2. **Speed:** With sufficient practice, a user can create the drawings specially. Similar objects can be copied (or) arrayed which saves time required for duplication. **Easy editing:** Drawings once constructed can easily be edited or modified as and when needed.
3. **Space Effectiveness:** A computer can store several thousand drawing files over a long period
   of time.
   Standard Libraries: CAD software have libraries containing drawings of standard parts such as gears, values, and pulleys.
4. **Scaling:** A drawing can be enlarged (or) reduced by any scale factor.
5. **Better visualization:** Use of different colours help avoiding confusion. 3D view of object can
   be easily created to boost imagination.
6. **Freedom from using drawings instruments:** A simple CAD system needs a computer with a mouse and keyboard to draw. The draftsmen need not use bulky drawing instruments like drawing board, drafter, set square, etc.

Experiment No: 2
SOFTWARE OF CAD: QCAD

QCAD is a free computer-aided design (CAD) software application for 2D design and drafting. It is available for Linux, Apple macOS, UNIX and Microsoft Windows. The QCAD GUI is based on the Qt framework.

QCAD is released under the GNU General Public License. Precompiled packages are available for 32-bit and 64-bit GNU/Linux platforms, Microsoft Windows OS and macOS. It is developed by Ribbon Soft. Development on QCAD began in October 1999, starting with code from CAM Expert. IT 2, designed to "make it more productive, more user friendly, more flexible and increase its compatibility with other products" began development in May 2002. It was first released in August 2011 with an ECMAScript (JavaScript) interface as major addition. Some of the interface and concepts behind QCAD are similar to those of AutoCAD.

It uses the AutoCAD DXF file format internally and to save and import files. AutoCAD DWG support is available as a commercial plugin.

It is a very useful tool to prepare desired drawings. According to instructions given by mouse (or) keyboard etc. it prepares drawings to the scale. It prepares exact, precise, neat and clean drawings. Drawings prepared by QCAD looks better than manually prepared drawings. It provides facility to correct errors, to increase (or) decrease size, to store drawing in disc, to send drawing to other places by storing inside disc, to repeat drawings in as many number as you want to rotate the drawings as you desire etc.

It provides various commands like circle, polygon, mirror, rotate, ellipse, arc, zoom, erase, hatch, chamfer, copy, redraw etc. Prepared drawings can be plotted on paper with a pen, plotter, dot matrix printer, laser printer (or) inkjet printer etc.

Commands Used for QCAD:

New

Toolbar / Icon:

Commands: new

Description:

Create new, empty drawings using this command. New drawings are completely empty (no entities, only one default layer, no blocks). As a frequent user of QCAD, you might instead want to create drawing templates with the layers and blocks you use the most and probably a drawing border. Once you have such a template you can load that instead of starting a new drawing from scratch.

Save

Toolbar / Icon:

Description:
This command saves the current drawing to the same file it was loaded from. If you want to save a newly created drawing or save the current drawing to a new file, use the menu File - Save As instead. You will then be asked for a file name before the drawing is saved.

PDF Export

Toolbar / Icon:

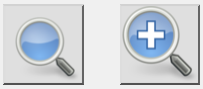
Menu: File > PDF Export
Description:
This tool exports the current drawing to a PDF file. Exporting to PDF is very similar to printing a drawing. You will most likely have to adjust your drawing scale and drawing position as well as page settings before exporting a drawing to PDF.
For this reason, QCAD automatically switches to the print preview when this tool is used. If the print preview does not match your expectations, cancel the export, adjust the page settings and start the PDF export again.

Drawing Preferences

Toolbar / Icon:

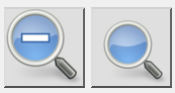
Menu: Edit > Drawing Preferences
Description:
The drawing preferences dialog allows you to change preferences that affect various aspects of the current drawing. These preferences are stored in your drawing.

Toolbar / Icon:



Commands: zoomin
Description:
This tool increases the current viewing factor. The same effect can also be achieved by turning the mouse wheel away from you.

Toolbar / Icon:



Menu: View > Zoom > Zoom Out
Description:

This tool decreases the current viewing factor. The same effect can also be achieved by turning the mouse wheel toward you.

Line Tools

ır / Icon:

Description:

Line Types

Most line tools allow you to choose the type of line to create in the options toolbar. The line types available are:

Auto: Automatically create a line of the same type as a chosen other line. This applies for the parallel line tool.

Line Segment: Creates line segments from a start point to an end point.

Infinite Line: Creates infinite lines that go through two given points. These are sometimes called X-lines or construction lines.

Rays: Creates rays from a given start point, through another point with an infinite length.

Line from 2 Points

Toolbar / Icon:


Menu: Draw > Line > Line from 2 Points
Shortcut: L, I
Commands: line | ln | li | l

Line from Angle

Toolbar / Icon:


Menu: Draw > Line > Line from Angle

Horizontal Line

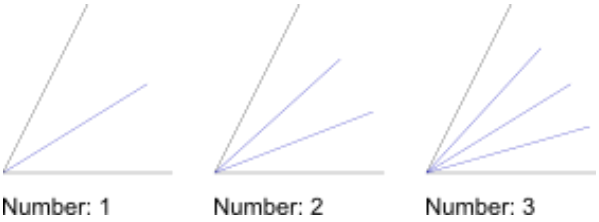
Toolbar / Icon:


Menu: Draw > Line > Horizontal Line
Shortcut: L, H
Commands: linehorizontal | lh

Angle Bisector

Toolbar / Icon:


Menu: Draw > Line > Angle Bisector
Shortcut: L, B
Commands: linebisector | bisector | lb



Parallel (with Distance)

Toolbar / Icon:


Menu: Draw > Line > Parallel (with Distance)
Shortcuts: L, P | P, A
Commands: lineparallel | lineoffset | parallel | par | lp | pa

Center, Point, Angles

Toolbar / Icon:


Menu: Draw > Arc > Center, Point, Angles
Shortcut: A, R
Commands: arcc | ar

2 Points and Radius

Toolbar / Icon:


Menu: Draw > Arc > 2 Points and Radius
Shortcut: A, D
Commands: arcradius | ad

2 Points and Angle

Toolbar / Icon:


Menu: Draw > Arc > 2 Points and Angle
Shortcut: A, 2
Commands: arc2 | a2

3 Points

ır / 

Menu: Draw > Arc > 3 Points
Shortcut: A, 3
Commands: arc3 | a3

Concentric (with Distance)

Toolbar / Icon:

Menu: Draw > Arc > Concentric (with Distance)
Shortcut: A, C
Commands: arcconcentric | ac

Center, Point

Toolbar / Icon:

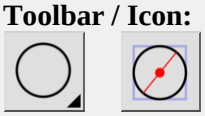
Menu: Draw > Circle > Center, Point
Shortcut: C, I
Commands: circle | ci

Center, Radius

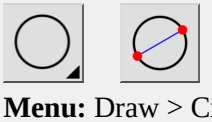
Toolbar / Icon:

Menu: Draw > Circle > Center, Radius
Shortcut: C, R
Commands: circlecr | cr

Center, Diameter

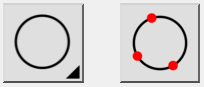
Toolbar / Icon:

Menu: Draw > Circle > Center, Diameter
Shortcut: C, A
Commands: circlediameter | ca

2 Points

Toolbar / Icon:

Menu: Draw > Circle > 2 Points
Shortcut: C, 2
Commands: circle2p | c2

3 Points

Toolbar / Icon:



Menu: Draw > Circle > 3 Points
Shortcut: C, 3
Commands: Circle3P | c3

Ellipse Arc

Toolbar / Icon:

Menu: Draw > Ellipse > Ellipse Arc
Shortcut: E, A
Commands: ellipsearc | ea

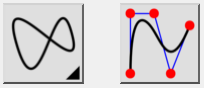
Ellipse with Radii

Toolbar / Icon:

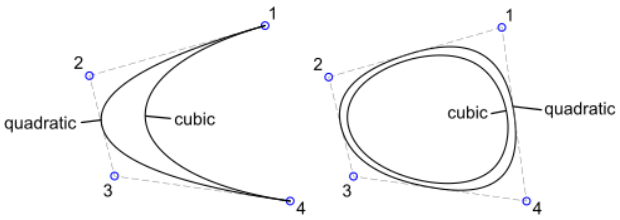
Menu: Draw > Ellipse > Ellipse with Radii
Shortcut: E, I
Commands: ellipseradii | ei

Spline (Control Points)

Toolbar / Icon:



Menu: Draw > Spline > Spline (Control Points)
Shortcut: S, P
Commands: spline | sp



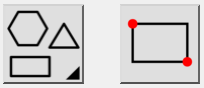
Draw Polyline

Toolbar / Icon:

Menu: Draw > Polyline > Draw Polyline
Shortcut: P, L
Commands: polyline | pl

Rectangle

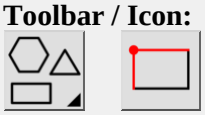
Toolbar / Icon:



Menu: Draw > Shape > Rectangle
Shortcut: R, E
Commands: rectangle | linerectangle | rect | re

Rectangle with Size

Toolbar / Icon:



Menu: Draw > Shape > Rectangle with Size
Shortcut: R, S
Commands: rectanglesize | linerectanglesize | rs

Polygon (Center, Corner)

Toolbar / Icon:

Menu: Draw > Shape > Polygon (Center, Corner)
Shortcuts: P, G, 1 | H, C
Commands: linepolygon | polygon | pg1

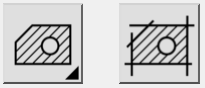
Hatch from Selection

Toolbar / Icon:

Menu: Draw > Hatch > Hatch from Selection
Shortcut: H, A
Commands: hatch | ha

Hatch from Segments

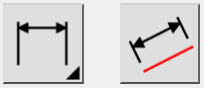
Toolbar / Icon:



Menu: Draw > Hatch > Hatch from Segments
Shortcut: H, S
Commands: hatchsegments | hs

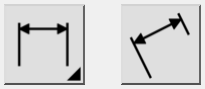
Aligned

Toolbar / Icon:



Menu: Dimension > Aligned
Shortcut: D, A
Commands: dimaligned | da

Rotated (Linear)

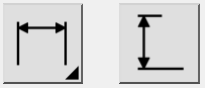
Toolbar / Icon:

Menu: Dimension > Rotated (Linear)
Shortcut: D, L
Commands: dimlinear | dimrotated | dl

Horizontal

Toolbar / Icon:

Menu: Dimension > Horizontal
Shortcut: D, H
Commands: dimhor | dimhorizontal | dh

Vertical

Toolbar / Icon:

Menu: Dimension > Vertical
Shortcut: D, V
Commands: dimver | dimvertical | dv

Leader

Toolbar / Icon:

Menu: Dimension > Leader
Shortcuts: D, E | L, D
Commands: leader | dimlea | de | ld

Radial

Toolbar / Icon:


Menu: Dimension > Radial
Shortcut: D, R
Commands: dimrad | dimradial | dr

Diametric

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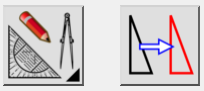
Menu: Dimension > Diametric
Shortcut: D, D
Commands: dimdia | dimdiametric | dd

Move / Copy

Toolbar / Icon:



Menu: Modify > Move / Copy
Shortcut: M, V
Commands: move | mv

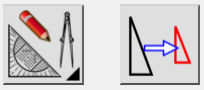
Rotate

Toolbar / Icon:

Menu: Modify > Rotate
Shortcut: R, O
Commands: rotate | ro

Scale

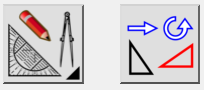
Toolbar / Icon:



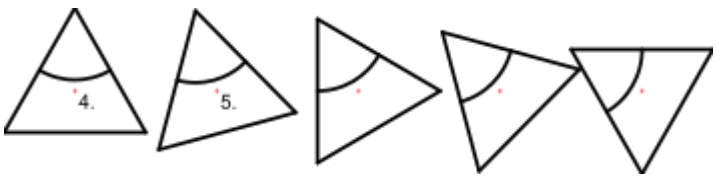
Menu: Modify > Scale
Shortcut: S, Z
Commands: scale | sz

Move and Rotate

Toolbar / Icon:



Menu: Modify > Move and Rotate
Shortcut: M, R
Commands: moverotate | mr

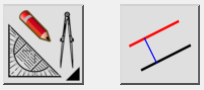


Rotate Two

Toolbar / Icon:


Menu: Modify > Rotate Two
Shortcut: R, 2
Commands: rotate2 | r2

Offset (with Distance)

Toolbar / Icon:


Menu: Modify > Offset (with Distance)
Shortcut: O, F
Commands: offset | of

Trim

Toolbar / Icon:

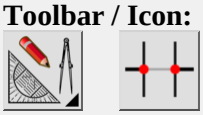

Menu: Modify > Trim
Shortcuts: R, M | X, T
Commands: trim | extend | rm | xt

Trim Both

Toolbar / Icon:


Menu: Modify > Trim Both
Shortcut: T, M
Commands: trim2 | extend2 | tm

Break out Segment

Toolbar / Icon:


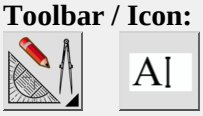
Menu: Modify > Break out Segment
Shortcut: D, 2
Commands: break | breakout | d2

Auto Trim

ır / 

Menu: Modify > Auto Trim
Shortcut: A, X
Commands: autotrim | ax

Edit Text

Toolbar / Icon:


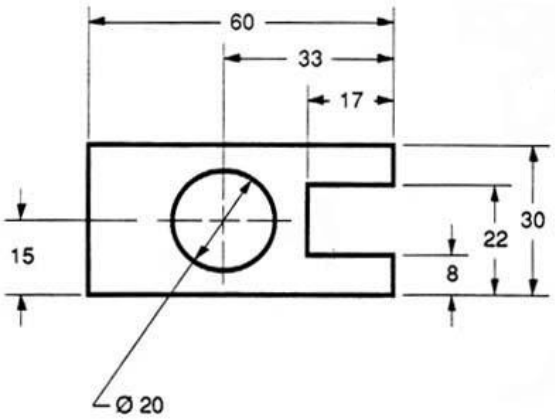
Menu: Modify > Edit Text
Shortcut: M, T
Commands: edittext | modifytext | mt

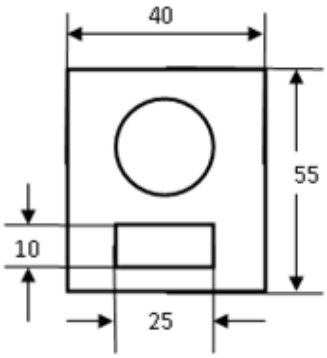
Edit Hatch

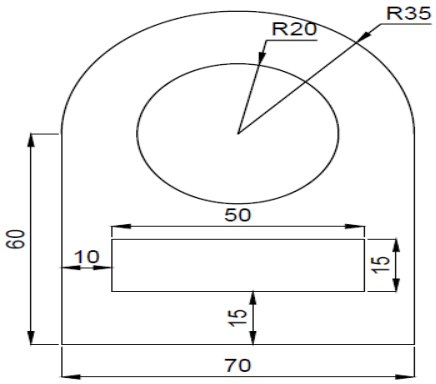
Toolbar / Icon:

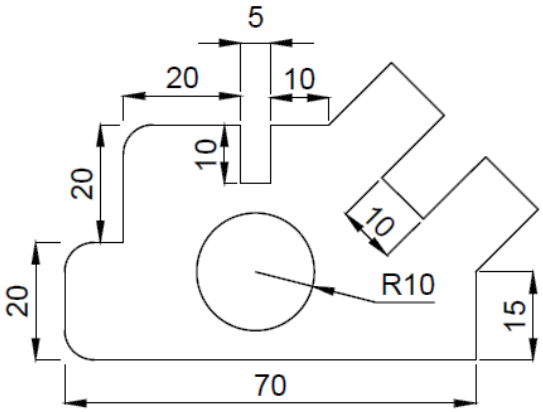

Menu: Modify > Edit Hatch
Shortcut: M, H
Commands: edithatch | modifyhatch | mh

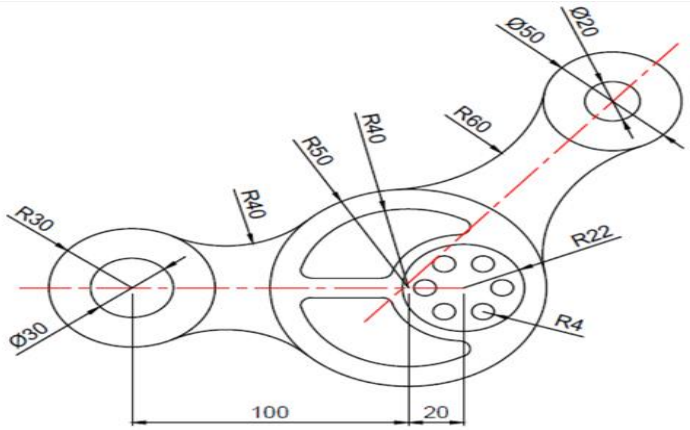
Experiment No: 3
PRACTICE EXERCISE & CONVENTIONAL SYMBOLS FORBUILDING MATERIALS, PLUMBING AND ELECTRIC FIXTURES

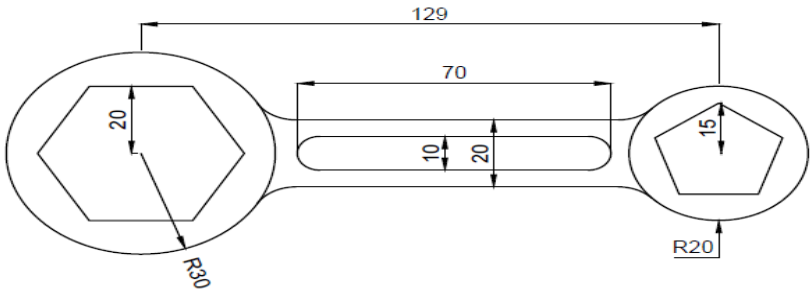


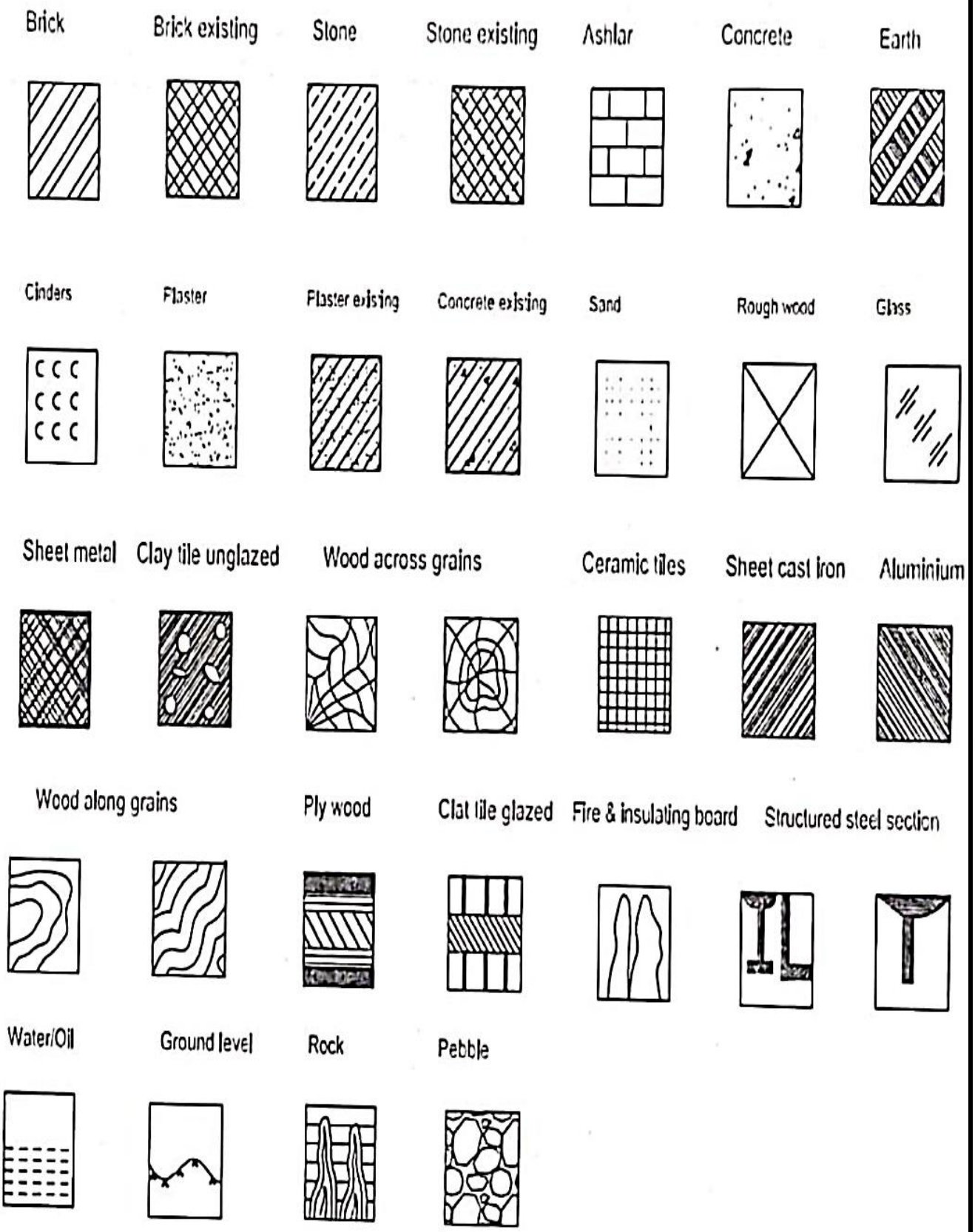




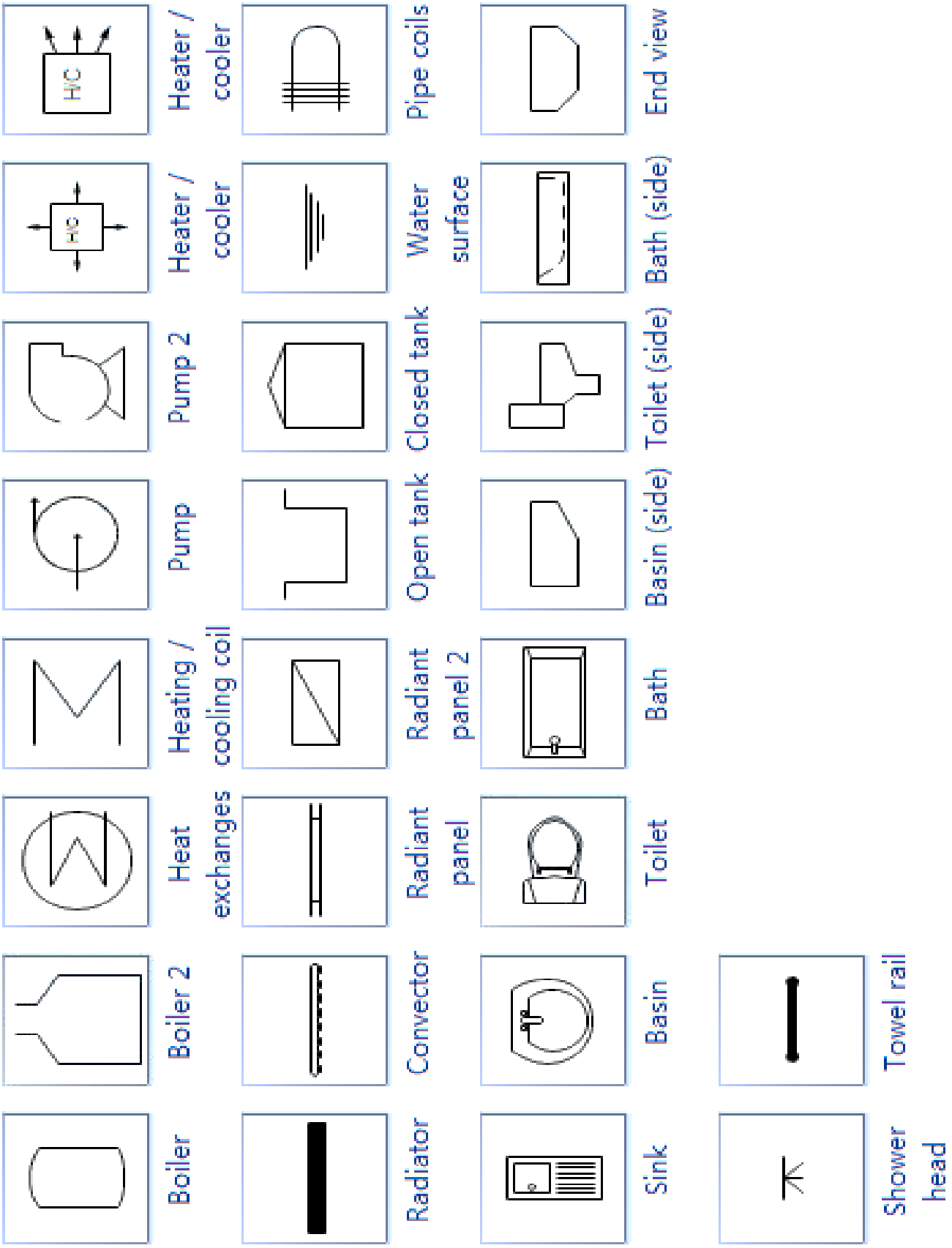




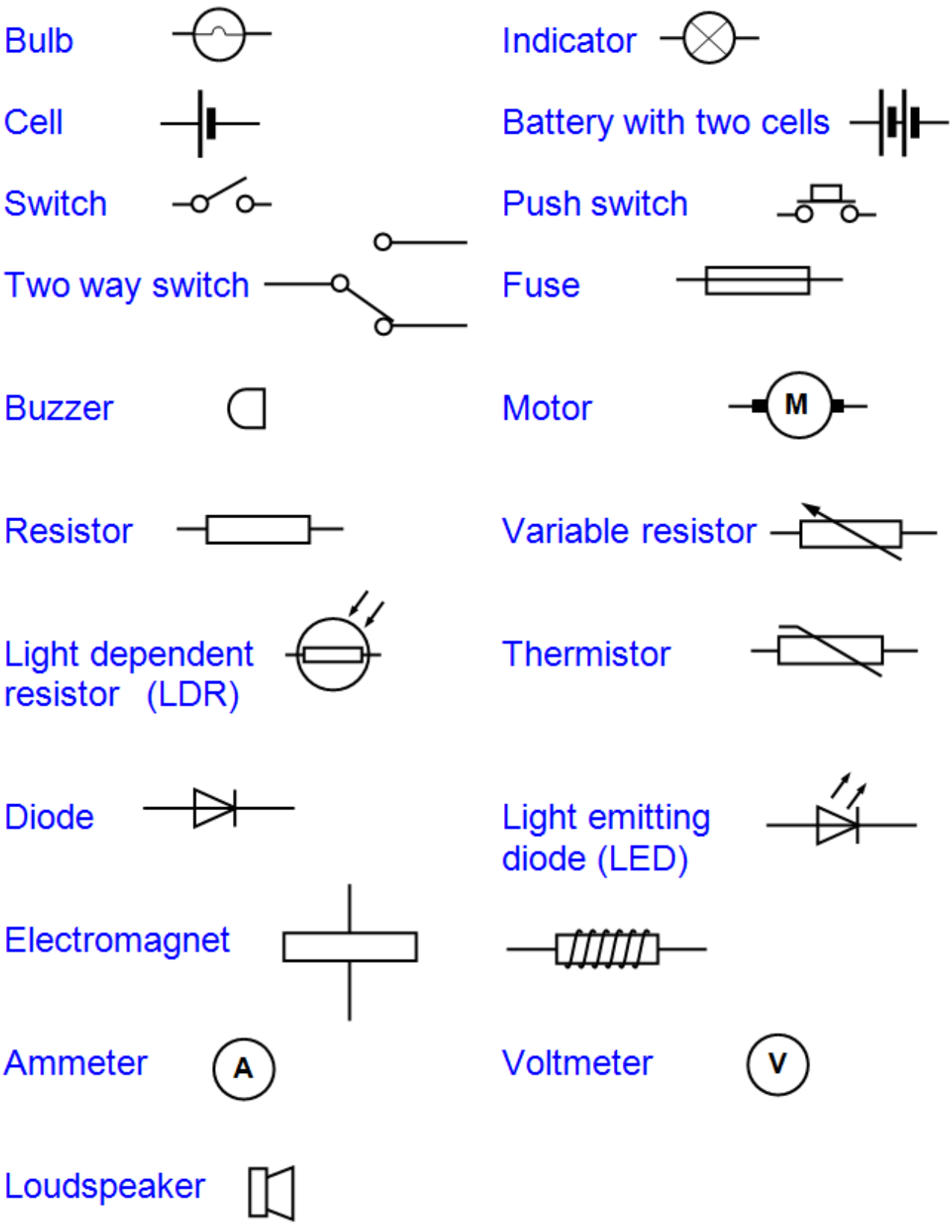




BUILDING MATERIALS SYMBOLS



PLUMBING SYMBOLS



ELECTRICAL SYMBOLS

Experiment – 4
BONDS IN BRICK MASONRY

The most commonly used types of bonds in brick masonry are:

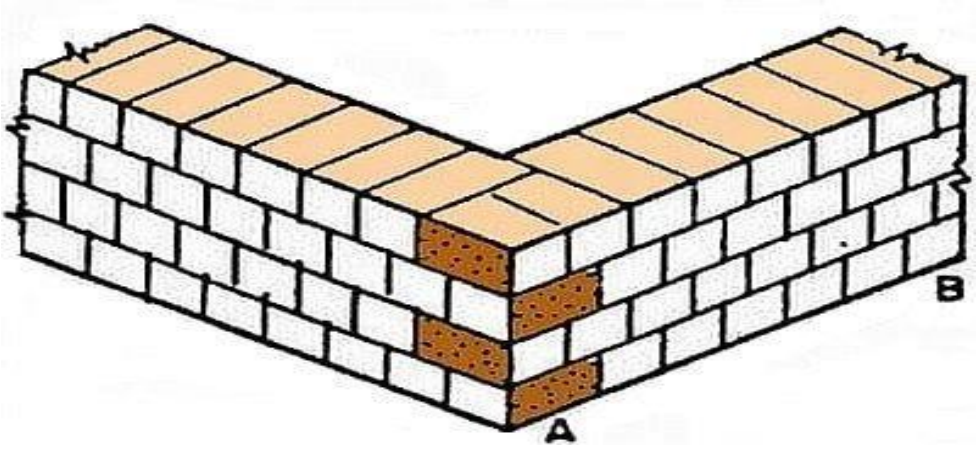
1. Stretcher bond
2. Header bond
3. English bond and
4. Flemish bond

STRETCHER BOND

Longer narrow face of the brick is called as stretcher as shown in the elevation of figure below. Stretcher bond, also called as running bond, is created when bricks are laid with only their stretchers showing, overlapping midway with the courses of bricks below and above. Stretcher bond in the brick is the simplest repeating pattern. But the limitation of stretcher bond is that it cannot make effective bonding with adjacent bricks in full width thick brick walls. They are suitably used only for one-half brick thick walls such as for the construction half brick thick partition wall. Walls constructed with stretcher bonds are not stable enough to stand alone in case of longer span and height. Thus they Then need supporting structure such as brick masonry columns at regular intervals. Stretcher bonds are commonly used in the steel or reinforced concrete framed structures as the outer facing. These are also used as the outer facing of cavity walls. Other common applications of such walls are the boundary walls, gardens etc.

Header bond

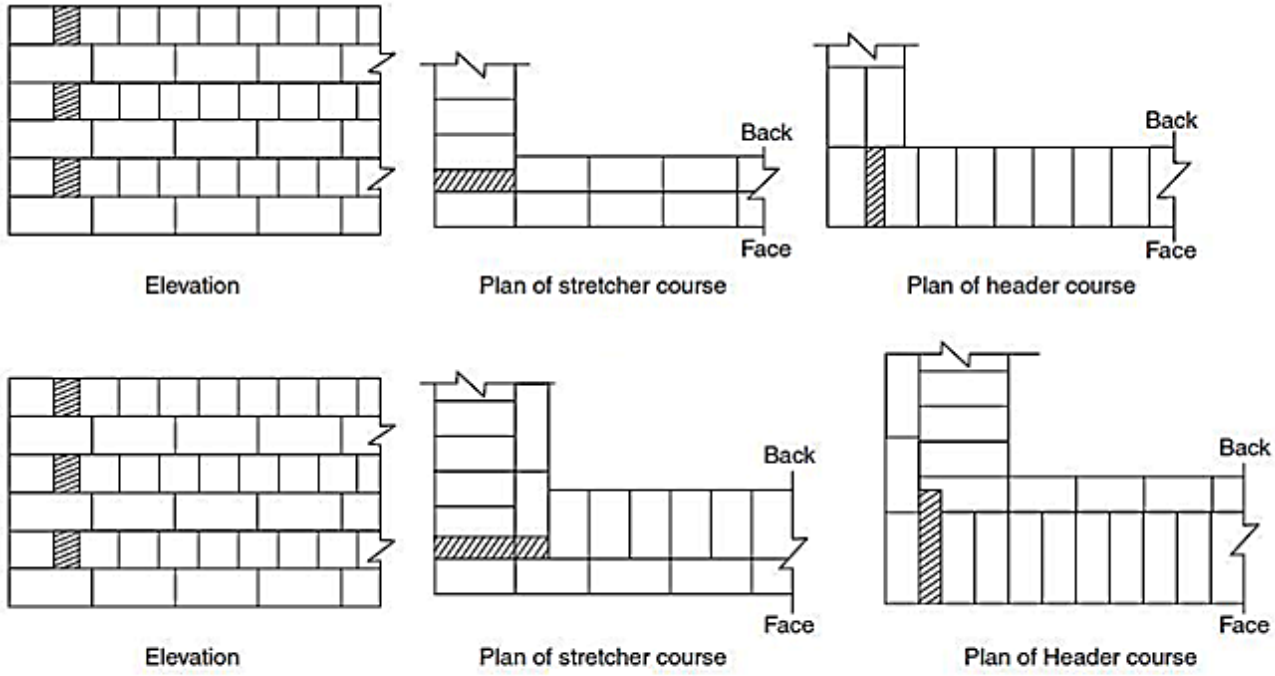
Header is the shorter square face of the brick which measures 9cm x 9cm. Header bond is also known as heading bond. In header bonds, all bricks in each course are placed as headers on the faces of the walls. While Stretcher bond is used for the construction of walls of half brick thickness whereas header bond is used for the construction of walls with full brick thickness which measures 18cm. In header bonds, the overlap is kept equal to half width of the brick. To achieve this, three quarter brick bats are used in alternate courses as quoins.



Header Bond Isometric View

ENGLISH BOND

English bond in brick masonry has one course of stretcher only and a course of header above it, i.e. it has two alternating courses of stretchers and headers. Headers are laid centered on the stretchers in course below and each alternate row is vertically aligned.To break the continuity of vertical joints, quoin closer is used in the beginning and end of a wall after first header. A quoin close is a brick cut lengthwise into two halves and used at corners in brick walls.



ENGLISH BOND
ONE BRICK & ONE AND HALF BRICK WALL

FLEMISH BOND

For the breaking of vertical joints in the successive courses, closers are inserted in alternate courses next to the quoin header. In walls having their thickness equal to odd number of half bricks, bats are essentially used to achieve the bond. Flemish bond, also known as Dutch bond, is created by laying alternate headers and stretchers in a single course. The next course of brick is laid such that header lies in the middle of the stretcher in the course below, i.e. the alternate headers of each course are centered on the stretcher of course below. Every alternate course of Flemish bond starts with header at the corner. The thickness of Flemish bond is minimum one full brick. The disadvantage of using Flemish bond is that construction of Flemish bond is difficult and requires greater skill to lay it properly as all vertical mortar joints need to be aligned vertically for best effects. For the breaking of vertical joints in the successive courses, closers are inserted in alternate courses next to the quoin header. In walls having their thickness equal to odd number of half bricks, bats are used to achieve the bond.

Flemish bonds have better appearance but are weaker than English bonds for load bearing wall construction. Thus, if the pointing has to be done for brick masonry walls, then Flemish bond may be used for better aesthetic view. If the walls have to be plastered, then it is better to use English bond.

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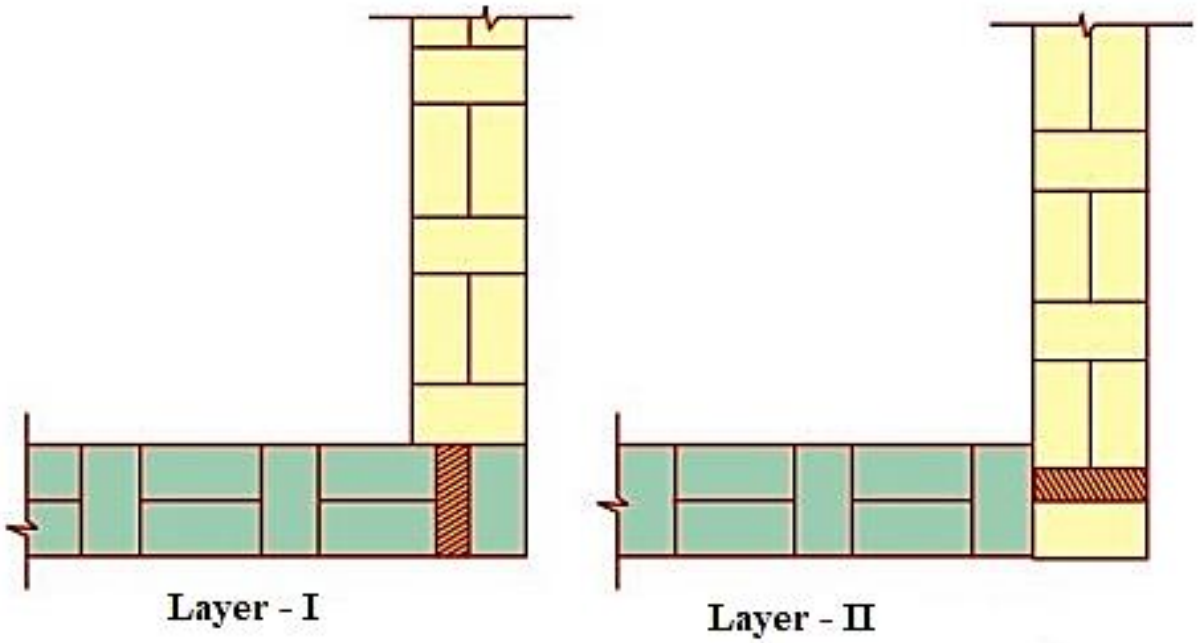
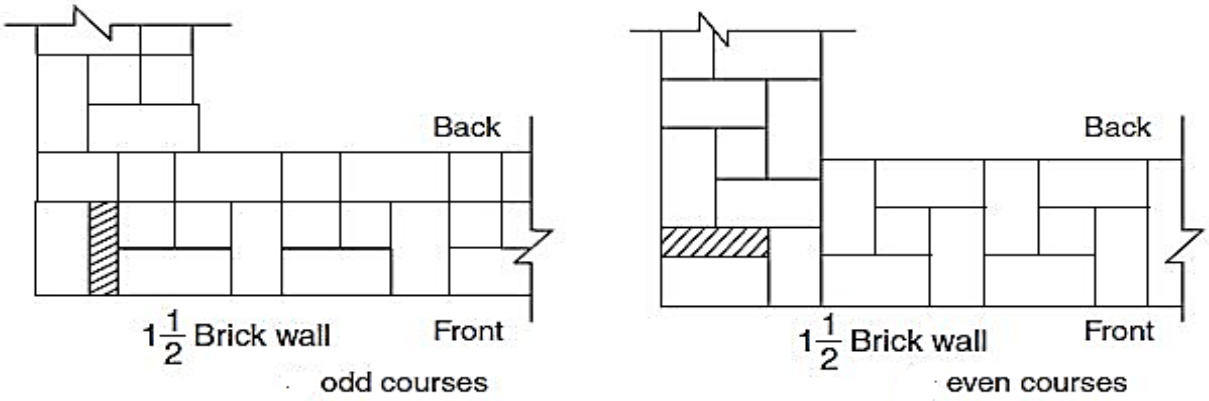
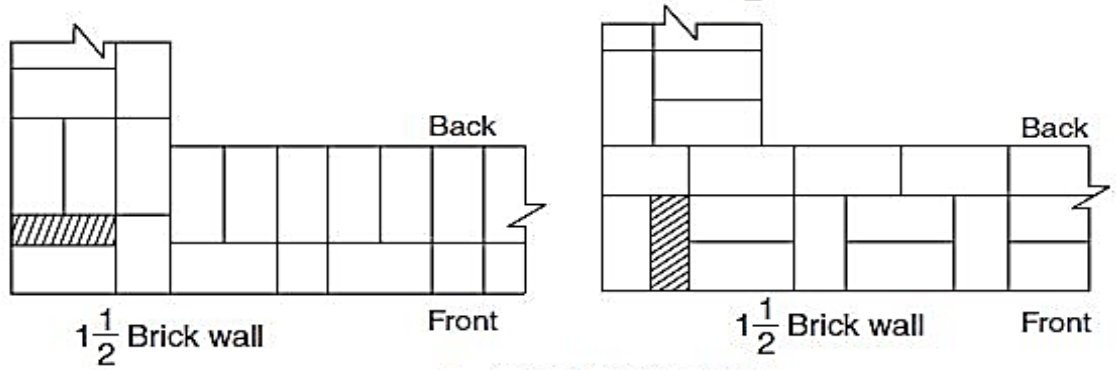


One brick thick flemish bond



Double flemish bond ($1\frac{1}{2}$ brick thick)



Single flemish bond

Experiment – 5
DRAWING PLANS OF BUILDING

PRINCIPLES OF PLANNING AND ORIENTATION

A building may be residential or public building. The plan, section along given vertical plane and elevation gives the details of building.

Plan:

Plan of building represents a horizontal section of building at given height seen from top. It is a general conventional to imagine that the building has been cut down by a horizontal plane at the sill level of the window and is seen from the top after removal of so cut part. The plan shows the arrangement of rooms, verandah or corridor, position of door, and window and other openings along with their respective sizes.

Section:

Section is also known as vertical section and sectional elevation or cross section. It is imagined that a finished buildings is cut vertically along a line so that the building is separated into two portions along the imagined vertical plane right from top of the building to the lowest part of foundation. The view that can be seen while travelling along this imaginary vertical plane when looking towards left is drawn to the same scale as that adopted for the plan. The line which is drawn on the plan to indicate the section is called sectional line and represented by A-B or XX. The arrow heads shall be marked to indicate the way in which the sectional view is to be drawn. The necessity of the section is to indicate all the vertical dimensions like, foundation details, basement, details of flooring, height of the super structure, sizes of doors and windows, thickness of roofing, width and depth of parapet wall, lintels, sunshades, portico and other details.

Elevation:

Elevation or front view is the outward view of a completed building along any side of the building. When a building is seen by standing in front of it, the view that can be viewed is known as front elevation. Similarly backside view is called rear elevation or from any side of it which is known as side elevation.

Plan aspect of residential building:

The planning of residential buildings requires careful considerations on the part of the architect.

The barest requirements for a family unit are living room, kitchen, bath and w.c. But for the purpose of discussion, the usual requirements of a normal residential unit can be mentioned as follows:

(1) Bath and w.c.
(2) Bed room
(3) Dining room
(4) Drawing room
(5) Garage
(6) Kitchen
(7) Living room
(8) Open chowk
(9) Passages
(10) Stair
(11) Store
(12) Verandah

PLANNING ASPECTS OF STRUCTURES

Following are the factors which are to be considered while planning the industrial structures:

(1) Functional aspect
(2) Lighting
(3) Materials of construction
(4) Mechanical layout
(5) Number of floors
(6) Site conditions
(7) Ventilation

Requirements of Industrial structures:

The size of industrial unit is generally decided by the number of workers or labourers employed by the unit and accordingly, the industrial unit is required to provide various facilities for the smooth functioning of the industrial concern. Following are the requirements of big industrial units:

(1) Canteen
(2) Cloak-room
(3) Drinking water
(4) Entrance
(5) Loading and unloading platforms
(6) Medical aid
(7) Office
(8) Sanitary block
(9) Storage

Principles underlying building bye-laws:

The broad principles to be observed while framing the building bye-laws.

(1) Permissible size of plots:

The minimum size of plot required for each family unit shall be as follows:
170m^2 for one family unit
300 m^2 for two semi-detached family units
670 m^2 for ownership flats.

(2) Margins:

The margins on road side and adjacent properties shall be respectively 4.50 m and 3.00 m. For plots having areas less than $300m^2$, they shall be respectively 3.00m and 2.00 m.

(3) Area of rooms:

Table shows the minimum areas of various rooms.

Sl. No.	Use of room	Minimum area	Remarks
1.	Living room, Bed room, Drawing room, Sitting room, Ladies room, Dining room, Study room	$9m^2$	No side to be less than 2.40m
2.	Store room, Kitchen	5.40 m^2	No side to be less than 1.80m
3.	Bath room, Dressing room, Pump room, Water room, Coal room	Minimum 1.35 m^2 and max. 4.50 m^2	No side to be less than 90cm.
4	W.C., Urinal	$0.81m^2$	No side to be less than 90cm.

(5) Plinth height:

It shall be 45cm above road level or plot level, whichever is higher.

(6) Height of floors:

The minimum heights shall be as follows:

2.10m: Bath room, w.c., pump room, coal room and water room.

2.70m: Floor height on each floor

The maximum height of floors shall not be more than 1.25 times the minimum height.

(7) Projections in margins:

Following projections in marginal spaces shall be permitted:

(i) Canopy of 3.00m width above 2.40m from ground level;

(ii) Gallery of maximum width 1.20 m at floor levels.

(iii) Stair attached to building and open to sky with minimum width of 90cm; and

(iv) Weather-shed of maximum width 50cm at lintel level

(8) Cellar:

The permission to construct cellar shall be granted with the following restrictions:

Height : 2.40m
Stair width : 90cm
Ventilation : One-tenth of floor area
Water and drainage connection : Not allowed
Use : For storage only
Maximum area : One-half of built-up area of G.F

(9) Loft:

The provision of loft shall be permitted in kitchen and store. The maximum width of loft shall be one-third the width in that direction. The maximum height above loft shall be 1.50m and bottom of loft shall be at a minimum height of 2.10m from floor level.

(10) Lift:

For buildings having more than three floors (exclusive of ground floor), lift shall be provided at the rate of one lift for 20 family units or part thereof. The lift shall be provided from ground floor and its minimum capacity shall be of 6 persons.

(11) Ventilation:

All rooms except coal room, water room, store room and garage shall have atleast one side adjacent to open space. Area of windows and ventilators excluding frames shall be atleast one-tenth of the floor area of room.

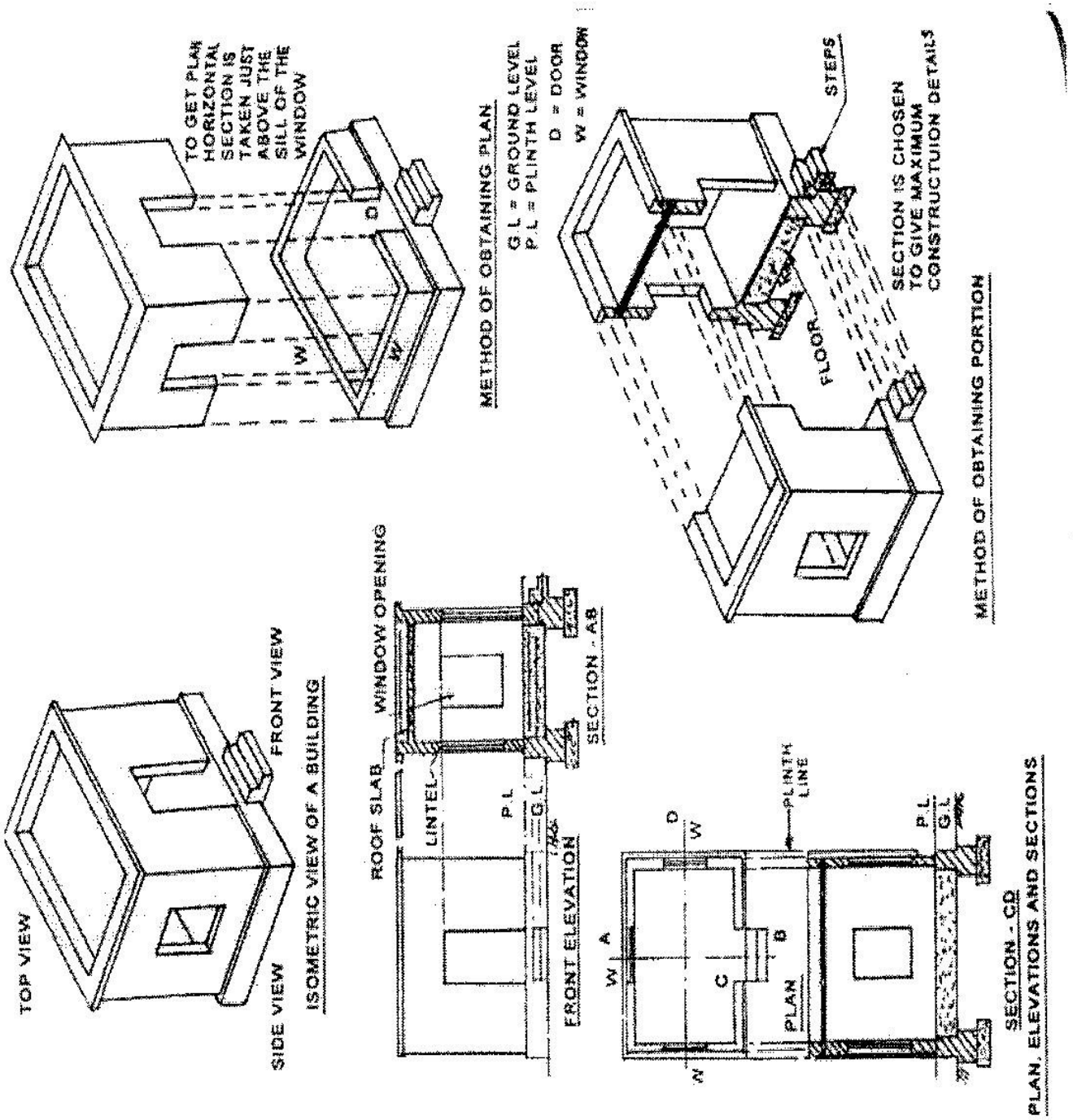
(12) Stair:

The minimum width of stair shall be 90 cm and it shall be made of fire-proof construction. The pitch of stair shall be within 30 to 45. The stair cabin shall not exceed 11m2 in area.

(13) Recommended sizes of doors, windows and ventilators :

Doors	D	1.20 m x 2.10 m
	D1	1.00 m x 2.10 m
	D2	0.90 m x 2.10 m
Windows	W	1.80 m x 1.20 m
	W1	1.50 m x 1.20 m
	W2	1.20 m x 0.60 m
Ventilators	V	0.60 m x 0.60 m
	V1	0.60 m x 0.45 m
	V2	0.30 m x 0.30 m

DEVELOPMENT OF VIEWS
(Method of obtaining plan, section and elevation)



Experiment – 6
SINGLE ROOM WITH R.C.C FLAT ROOF

Aim:

To draw a single room with R.C.C flat roof using Auto CAD with suitable scale the following views with complete dimensions and details.

1. Plan at window sill level.
2. Section on AB.
3. Front elevation.

Specifications:

The following specifications correspond to the line plan of the reading room with R.C.C flat roof.

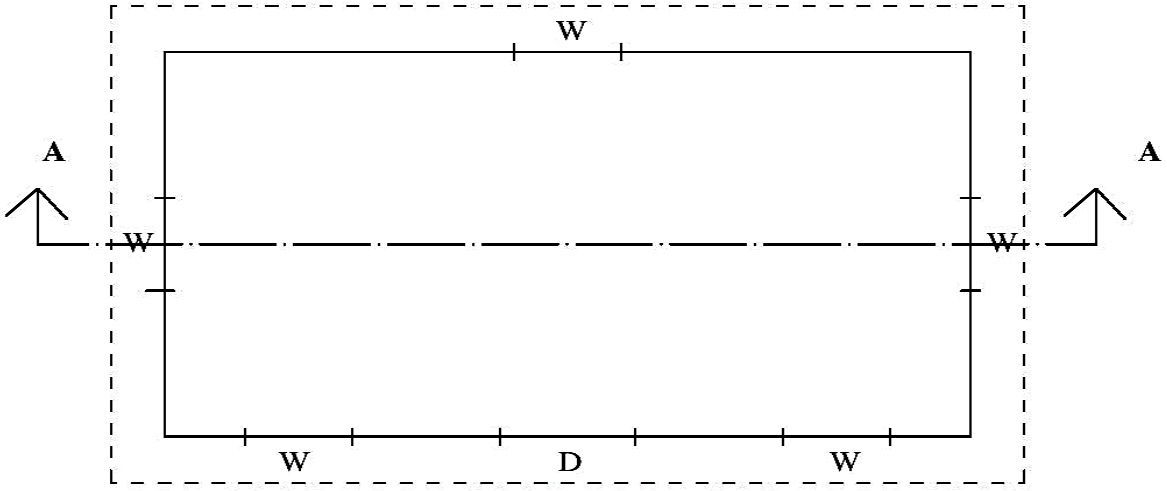
1. **Foundation:**
   The foundation for all main walls will be in cement concrete 1:4:8, 600 wide and 200 thick laid at 600 below ground level. The masonry footing will be in RR masonry in CM 1:5, the first footing being 400x400 for all walls.
2. **Basement:**
   The basement will be in RR masonry in CM 1:5, 200 wide 300 thick above G.L for all walls and is filled with clean sand to a depth of 150. A D.P.C in CM 1:3, 20 thick will be provided for all walls at basement level.
3. **Super structure:**
   All walls will be in B.W in CM 1:5, using 1st class B.W, 200 thick. The height of all walls will be 3000 above F.L. All walls including basement will be plastered smooth and CM 1:4 externally and 1:6 internally for 12.5 thick. Parapet walls, 200 thick and 450 high will be provided all round.
4. **Roofing:**
   The roofing will be of R.C.C 1:2:4 mix , 100 thick flat slab over the room. A weathering course in brick jelly lime concrete 1:5:9 mix plastered with combination mortar 75 thick over the slab.
5. **Doors, windows :**
   D- Flush door : 1500 into 2100
   W-Window paneled : 1200x1200
6. **Lintel:**
   All internal wall openings will be provided with R.C.C lintels, 1:1.5:3 mix; 150 thick. All external openings will be provided with R.C.C lintel – cum-sunshade, 1:1.5:3 mix, 600 wide and 50 thick.
7. **Flooring:**
   The flooring will be in CC 1:4:8, 130 thick and plastered smooth with CM 1:3, 20 thick.

8. Steps:

Steps will be in brick walk in CM 1:5 laid on a 1800 x450 x150 thick CC 1:4:8 footing. Rise 150, Tread 300.

Note:

1. Any other dimensions found necessary may be assumed suitably making clear indications of the same.
2. All dimensions indicated are in millimeter.



LINE PLAN

Experiment – 7

A RESIDENTIAL BUILDING WITH SINGLE BED ROOM

Aim:

To draw the following views with complete dimension for a residential building with single bed room (R.C.C flat roof)

1. Plan at window sill level.
2. Section on ABCD.
3. Front elevation.

Specifications:

The following specification correspond to the line plan of a house with single bed room and attached bathroom with R.C.C flat roof.

1. **Foundation:**

   The foundation for all main walls and verandah retaining walls will be CC 1:4:8 mix, 1000 wide and 200 thick laid at 1100 below ground level. The masonry footing will be in BW in CM 1:6 , the 1^{st} footing being 700x400 ant the 2^{nd} being 400 x 500 for all walls and verandah retaining walls.

2. **Basement:**

   The basement will be in BW in CM 1:6 ,200 wide and 600 high above GL for all main walls and verandah retaining walls is filled with clean sand to a depth of 450. A D.P.C in CM 1:3, 20 thick will be provided for all walls at basement level.

3. **Super structure:**

   All walls will be in B.W in CM 1:5, using 1^{st} class B.W, 200 thick. The height of all walls will be 3000 above F.L. the height of roof at verandah portion will be 2700. The partition wall in WC and bath 100 thick in BW in CM 1:5 using country bricks and carried up to a height of 2100. One brick pillar 200x400 will be provided in the verandah. All walls including basement will be plastered smooth and CM 1:4 externally and 1:6 internally for 12.5 thick. Parapet walls, 200 thick and 600 high will be provided all round.

4. **Roofing:**

   Theroofing will be of R.C.C 1:1.5:3 mix , 125 thick flat slab over the rooms and the verandah. A weathering course , 75 thick consists of two course of flat tiles set in CM 1:3 mixed with crude oil will be provided with slab.

5. **Doors, windows,etc.,:**

   D1-panelled door :1100x 2100
   D2-panelled door :900x 2100

W1-panelled Window :1200 x 1200
W2-Glazed Window :1500 x 1200
V1-Ventilator glazed :900 x 450
V2-Ventilator glazed :1500 x 450
J – R.C. Jolly : 2400 x 1200
CB-cupboard: 300 depth
S-shelf :200 depth

6. Lintel:

All internal wall openings will be provided with R.C.C lintels, 1:1.5:3 mix; 150 thick. All external openings will be provided with R.C.C lintel – cum-sunshade, 1:1.5:3 mix, 450 wide and 150 thick and 600 wide R.C.C lofts shall be provided in bed, kitchen and utility.

7. Flooring:

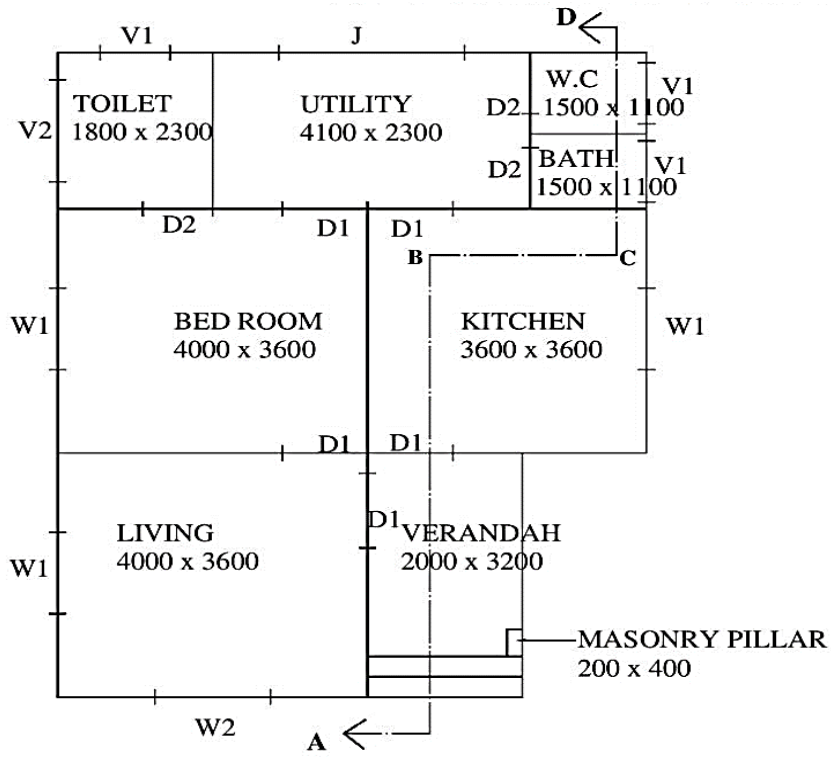
The flooring will be in CC 1:4:8, 130 thick and plastered smooth with CM 1:3, 20 thick.

8. Steps:

Steps will be in brick walk in CM 1:5 laid on 800 x150 thick CC 1:4:8 footing. Rise 200, Tread 300.

Note:

1. Any other dimensions found necessary may be assumed suitably making clear indications of the same.
2. All dimensions indicated are in millimeter.



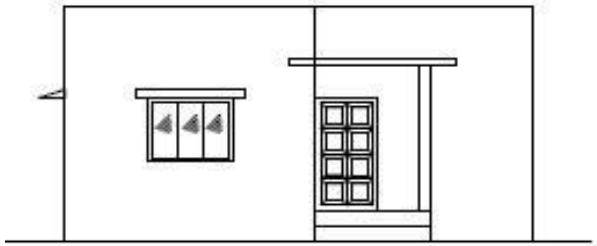
REFERENCE

TYPE	DESCRIPTION	SIZE
D1	Panelled Door	1100x2100
D2	Panelled Door	900x2100
W1	Panelled Window	1200x1200
W2	Glazed Window	1500X1200
V1	Ventilator (glazed)	900x450
V2	Ventilator (glazed)	1500x450
J	R.C.Jolly	2400x1200
CB	Cup Board	300 depth
S	Shelf	200 depth
	Steps:	
	Rise	200
	Tread	300

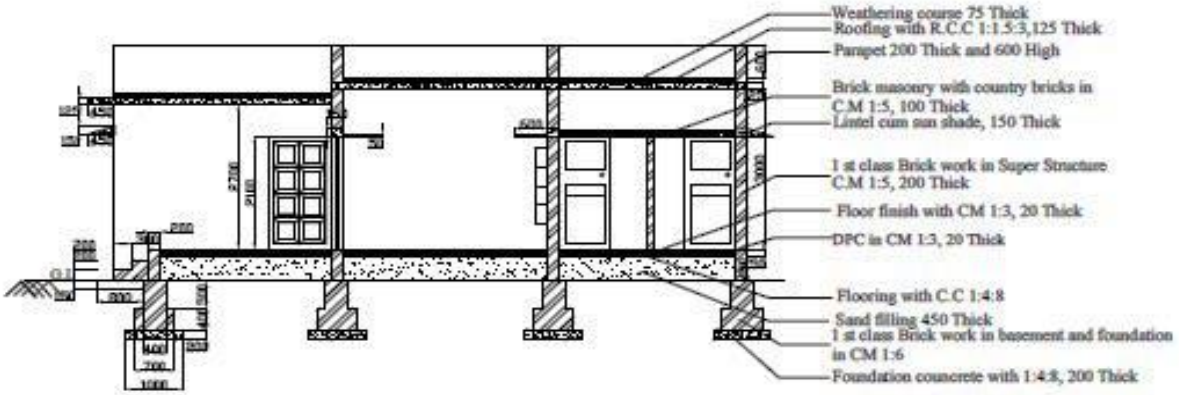
ALL DIMENSIONS ARE IN mm

LINE PLAN

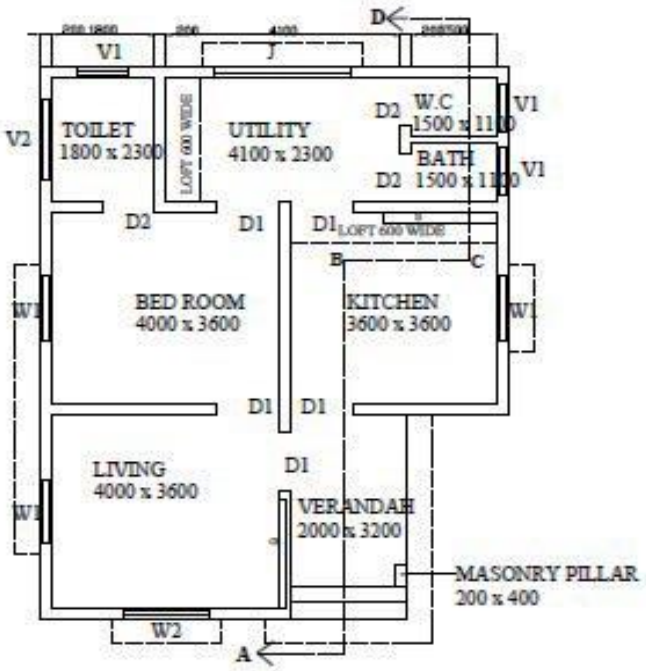
A RESIDENTIAL BUILDING WITH SINGLE BED ROOM



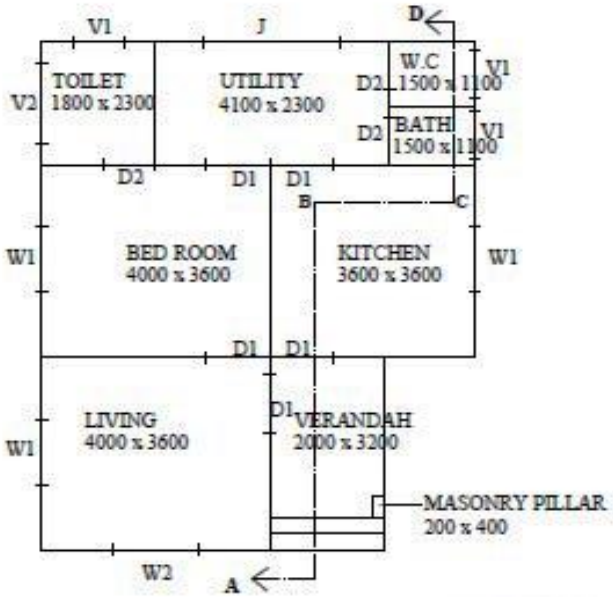
ELEVATION



SECTION ABCD



PLAN



LINE PLAN

REFERENCE

TYPE	DESCRIPTION	SIZE
D1	Panelled Door	1100x2100
D2	Panelled Door	900x2100
W1	Panelled Window	1200x1200
W2	Glazed Window	1500X1200
V1	Ventilator (glazed)	900x450
V2	Ventilator (glazed)	1500x450
J	R.C.Jolly	2400x1200
CB	Cup Board	300 depth
S	Shelf	200 depth
	Steps:	
	Rise	200
	Tread	300

ALL DIMENSIONS ARE IN mm

Experiment – 8

RCC FRAMED STRUCTURE WITH RCC ROOF SLAB

Aim:

To draw the following views with complete dimension for a residential building with single bed room (R.C.C flat roof)

1. Plan at window sill level.
2. Section on ABCD.
3. Front elevation.

Specifications:

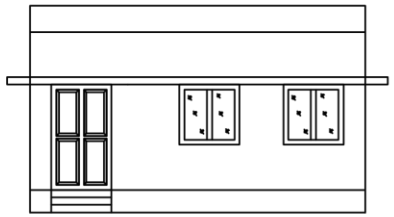
The following specifications correspond to the line plan of a RCC framed structure with RCC roof. All measurements are in "mm".

1. **Foundation:** The foundation for all main walls and verandah retaining walls will be in cement concrete 1:4:8 mix, 800 wide and 200 thick laid at 1000 below ground level. First footing will be in 300 x 300 and the second footing being 300 x 400 for all pillars.
2. **Basement:** The basement will be in brick work in cement mortar 1:6, 200 wide and 450 thick above ground level for all main walls and verandah retaining walls and is filled with clean sand to a depth of 300. A damp proof course, in cement mortar 1:3, 20 thick will be provided for all walls at basement.
3. **Superstructure:** All walls will be in brick work in cement mortar 1:5, using first class bricks200 thick. The height of main walls will be 3000 above the floor level. The partition wall in W.C. and bath will be 150 thick brick work in cement mortar 1:5. All the walls including basement will be plastered smooth with cement mortar 1:4 externally and 1:6 internally for 12.5 thick. Parapet walls 200 thick and high will be provided all rounds.
4. **Roofing:** The roofing will be of R.C.C 1:1.5:3 mix, 130 thick flat slabs over the rooms and verandah. A weathering course 75 thick, consists of two courses of flat tiles set in cement mortar 1:3 mixed with crude oil will be provided over the slab.
5. **Doors, Windows etc.,**

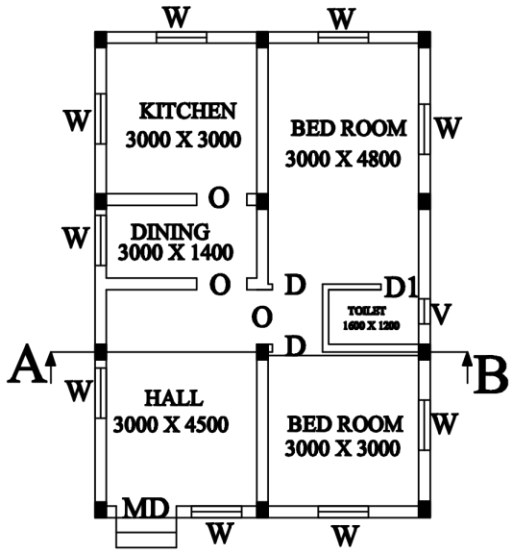
REFERENCE		
TYPE	**DESCRIPTION**	**SIZE**
MD	MAIN DOOR	1200 X 2100
D	PANELLED DOOR	1000 X 2100
D1	FLUSH DOOR	800 X 2100
W	WINDOW	1200 X 1200
V	VENTILATOR	500 X 400
O	OPENING	1200 X 2100

6. **Lintels:** All internal wall openings will be provided with RCC lintel 1:1.5:3 mix, 150 thick and all external wall openings will be provided with RCC lintel-cum-sunshade 1:1.5:3 mix, 450 wide and 150 thick.
7. **Flooring:** The flooring will be in cement concrete 1:4:8, 130 thick, plastered smooth with cement mortar 1:3, 20 thick for all the portions.
8. **Steps:** Steps will be in brick work in cement mortar 1:5 laid on 800 x 150 cement concrete 1:4:8 footing. Rise = 150, Tread = 300. All pillars size is 200 X 300.
9. **All dimensions are in "mm"**

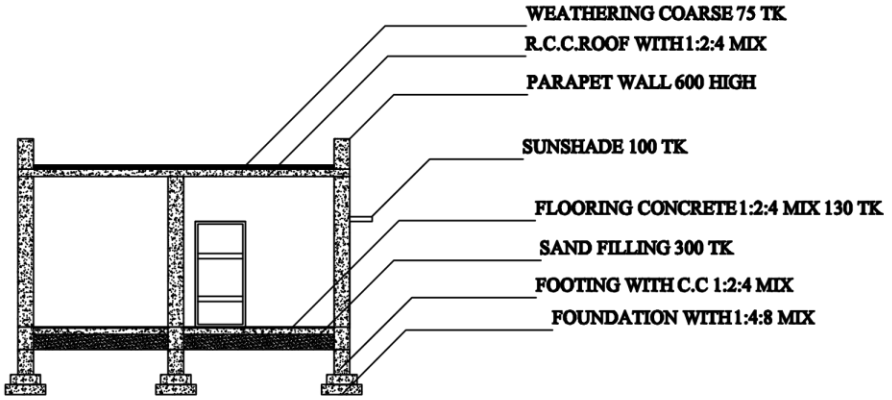
R.C.C. FRAMED STRUCTURE BUILDING



ELEVATION



PLAN



SECTION ON AB

REFERENCES		
MD	MAIN DOOR	1200 X 2100
D	PANELLED DOOR	1000 X 2100
D1	FLUSH DOOR	800 X 2100
W	WINDOW	1200 X 1200
V	VENTILATOR	500 X 400
O	OPENING	1200 X 2100

Experiment – 9
LIBRARY BUILDING WITH R.C.C FLAT ROOF

Aim:

To draw the following views with complete dimension for a residential building with two bed room (R.C.C flat roof)

1. Plan at window sill level.
2. Section on XY.
3. Front elevation.

Specifications:

The following specifications correspond to the line plan of a LIBRARY BUILDING.

Foundation:

The foundation for all main walls will be in CC 1:4:8 mix, 900 wide and 300 thick, laid at 1000 below ground level. The masonry footing will be in BW in CM 1:6 , the 1st footing being 700x300 ant the 2nd being 400 x 400 for all main walls

1. **Basement:**

The basement will be in BW in CM 1:5 , 200 wide and 600 high in rubble masonry above GL for all main walls. The basement will be filled with clean sand to a depth of 450. A D.P.C in CM 1:3, 20 thick will be provided for all walls at basement level.

2. **Super structure:**

All walls will be in BW in CM 1:5, using 1st class BW, 200 thick. The height of all walls will be 3600 above F.L. Pillars 300x300 are provided in the building. All walls including basement will be plastered smooth and CM 1:4 externally and 1:6 internally for 12.5 thick. Parapet walls, 200 thick and 450 high will be provided all round.

3. **Roofing:**

Theroofing will be of R.C.C 1:1.5:3 mix , 125 thick flat slab over the rooms. A weathering course , 75 thick will be provided over the slab.

4. **Doors, windows,etc.,:**

D- Door :1200x 2100
D1- Door :900x 2100
W1- Window :1500 x 1200
W2- Window :1000 x 1200

5. **Lintel:**

All external openings will be provided with R.C.C lintel – cum-sunshade, 1:1.5:3 mix, 450 wide and 150 thick.

6. **Flooring:**

The flooring will be in CC 1:4:8, 150 thick and plastered smooth with CM 1:3, 20 thick.

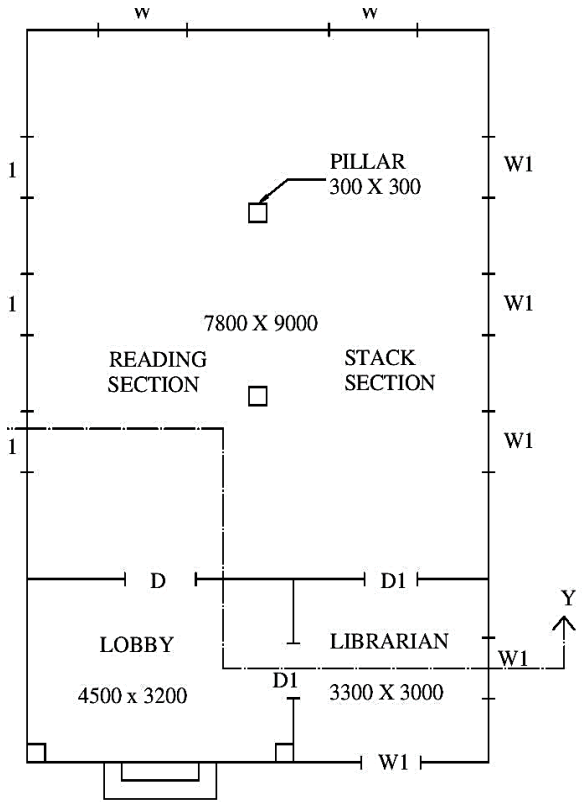
7. **Steps:**

Steps will be in brick walk in CM 1:5 laid on 800 x150 thick CC 1:4:8 footing. Rise 200, Tread 300.

Note:

1. Any other dimensions found necessary may be assumed suitably making clear indications of the same.

2. All dimensions indicated are in millimeter.



LINE PLAN

REFERENCE

Type	Description	Size
D	Door	1200 x 2100
W	Window	1500 x 1200
D1	Door	900 x 2100
W	Window	1000 x 1200
Steps		
	Rise	150
	Tread	300

ALL DIMENSIONS ARE IN mm

Experiment - 10
PLANNING OF FULLY TILED GABLED HOUSE

Aim:

To draw to a suitable scale the following views with complete dimensions and details for a fully tiled gabled house (Pitched roof)

1. Plan at window sill level.
2. Section on AB.
3. Front elevation.

Specifications:

The following specification correspond to the line plan of a fully tiled gabled house single bed room and attached bathroom with R.C.C flat roof.

1. Foundation:

The foundation for all main walls will be in PCC 1:4:8 mix, 800x200 laid at 1000 below ground level. The masonry footing will be in BW in CM 1:5, the 1st footing being 500x400 ant the 2nd being 400 x 400 for all main walls.

2. Basement:

The basement will be in BW in CM 1:5, 300 x450 above GL for all walls and filled with clean sand to a depth of 300. A D.P.C in CM 1:3, 20 thick will be provided for all walls at basement level.

3. Super structure:

All walls will be in BW in CM 1:5, 200 thick. The height of all walls will be 2700 and raised to suit the slope of the roof. The thickness of partition walls in WC and bath are 100 and are raised to suit the roof. All walls including basement will be plastered smooth and CM 1:4 externally and 1:6 internally for 12.5 thick.

4. Roofing:

The roofing for all the rooms will be with couple roof covered by Mangalore tiles laid on country wood reapers, 50x12.The lower end of common rafters will be resting on wall plates, 150x100. The end of common rafter will be fixed with eaves board, 25x200. The eaves projection will be 450 beyond the outer face of walls. Lime mortar borders (1:3), 200 wide and 50 thick will be provided with suitable spacing.

5. Doors, windows, etc.,:

D1-Flush door : 1000 x 2100
D2-panelled door : 900 x 2100
W1- Glazed Window : 900 x 1200

W2-Glazed Window : 1200 x 1200
V-Ventilator : 600 x 450

6. Flooring:

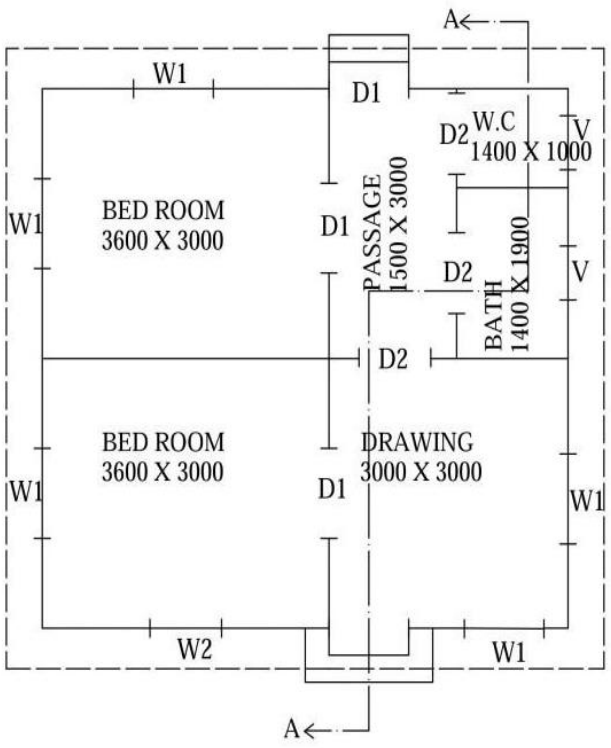
The flooring will be in CC 1:5:10 mix, 130 thick and finished smooth with cement plaster using CM 1:3, 20 thick for all the rooms.

7. Steps:

Steps will be in brick walk in CM 1:5mix laid on 100 thick CC 1:5:10 footing. Rise 150, Tread 300.

Note:

1.Any other dimensions found necessary may be assumed suitably making clear indications of the same.
2.All dimensions indicated are in millimeter.



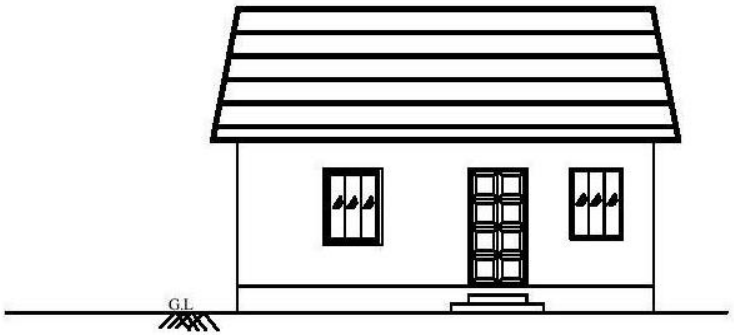
LINE PLAN

REFERENCE

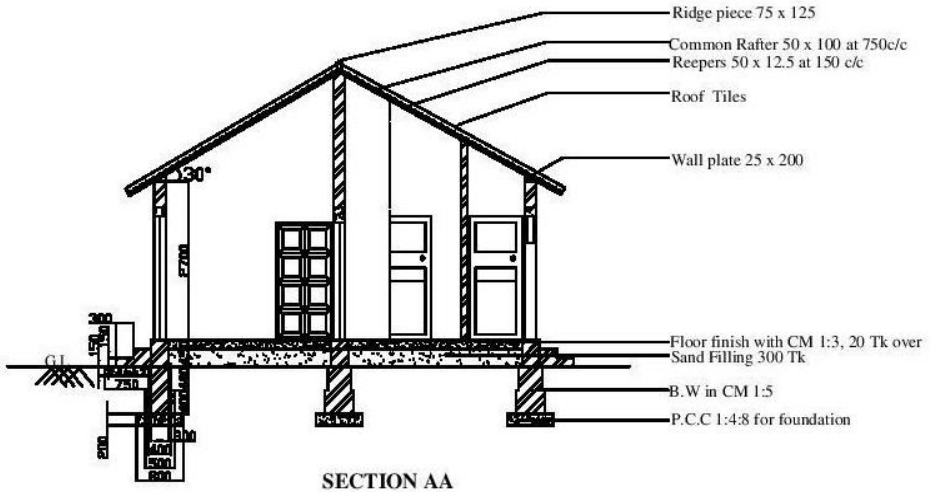
TYPE	DESCRIPTION	SIZE
D1	Panelled Door	1000x2100
D2	Panelled Door	900x2100
W1	Panelled Window	900x1200
W2	Glazed Window	1000X1200
V	Ventilator (glazed)	600x650
	Steps:	
	Rise	200
	Tread	300

ALL DIMENSIONS ARE IN mm

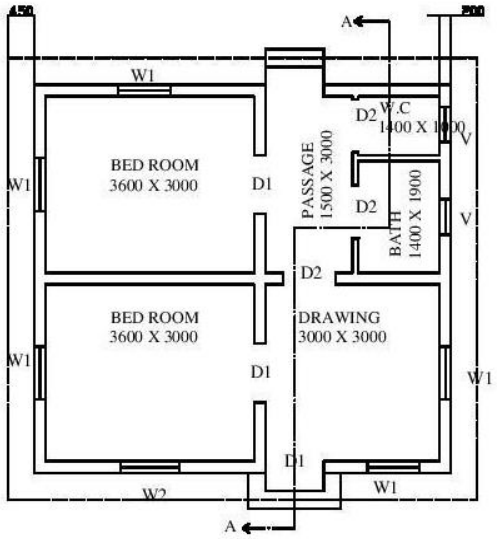
FULLY TILED GABLED HOUSE



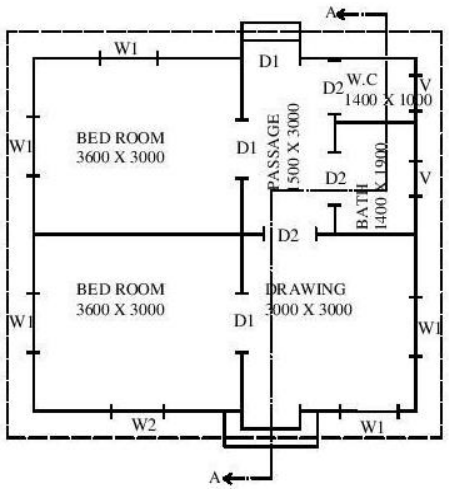
ELEVATION



SECTION AA



PLAN



LINE PLAN

REFERENCE

TYPE	DESCRIPTION	SIZE
D1	Panelled Door	1000x2100
D2	Panelled Door	900x2100
W1	Panelled Window	900x1200
W2	Glazed Window	1000X1200
V	Ventilator (glazed)	600x650
	Steps:	
	Rise	200
	Tread	300

ALL DIMENSIONS ARE IN mm

Experiment - 11

DEVELOPING SECTION AND ELEVATION FOR BUILDING

Aim:

To draw to a suitable scale the following views with complete dimensions and details of residential building:

1. Plan at window sill level.
2. Sectional elevation on PQRS.
3. Front elevation.

Specifications:

The following specifications correspond to residential building with R.C.C. flat roof.

1. Foundation:

The sloped isolated footing of size 1.2m x 1.2m x 500mm depth and the reinforcements of dia. 8@150c/c on bothways with a cc 1:2:4 are provided under all columns located at a depth of 1.2m below ground level.

2. Plinth beam:

The plinth beam of size 230 x 450mm is connected at ground level all around the building.

3. Super structure:

All main walls will be in brick work in cement mortar 1:5 using country bricks, 230 thick. The height of main walls will be 3000 above floor level. The partition walls in w.c. and bath will be 100 thick in brick work in cement mortar 1:5, using country bricks and carried up to a height of 2000. All the walls including basement will be plastered smooth with cement mortar 1:4 externally and 1:6 internally for 12.5 thick. Parapet walls 200 thick and 450 high will be provided all-round.

4. Roofing:

The roofing will be of R.C.C. 1:2:4 mix, 150 thick flat slab over all the rooms and verandah. A weathering course 75 thick, consists of two courses of flat tiles set in cement mortar 1:3 mixed with crude oil will be provided over the slab.

5. Doors, windows, etc.

D - Door panelled 1100 x 2100
D1 - Door panelled 800 x 2100
W - Window panelled 1500 x 1350
V - Ventilator 800 x 400
C - Cup-board 900 x 1200

6. Lintel:

All internal openings will be provided with R.C.C. lintel 1:2:4 mix, 150 thick and all external openings will be provided with R.C.C. lintel-cum-sunshade 1:2:4 mix, 150 thick.

7. Flooring:

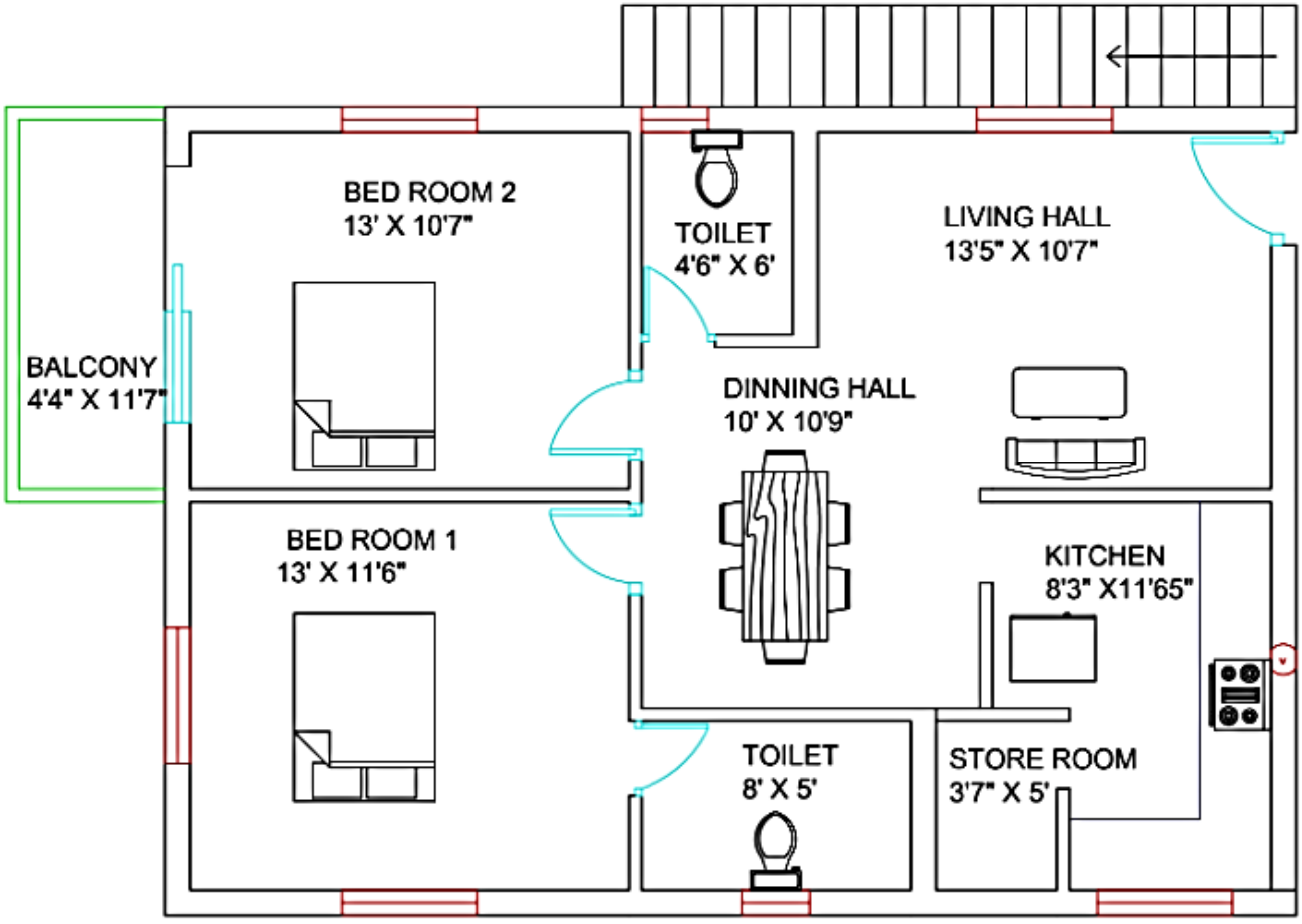
The flooring will be in cement concrete 1:4:8, 130 thick, plastered smooth with cement mortar 1:3, 20 thick for all the portions.

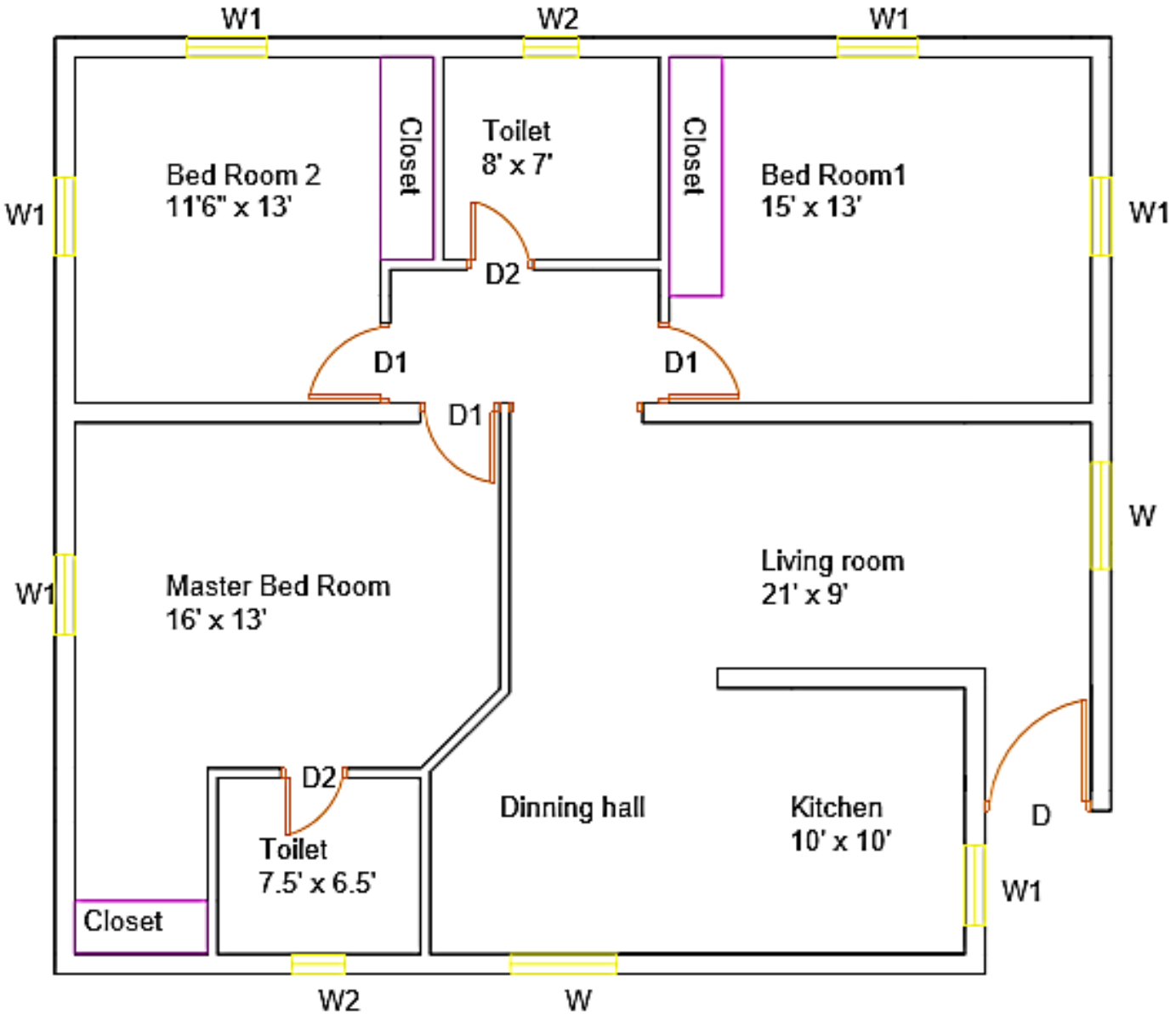
8. Steps:

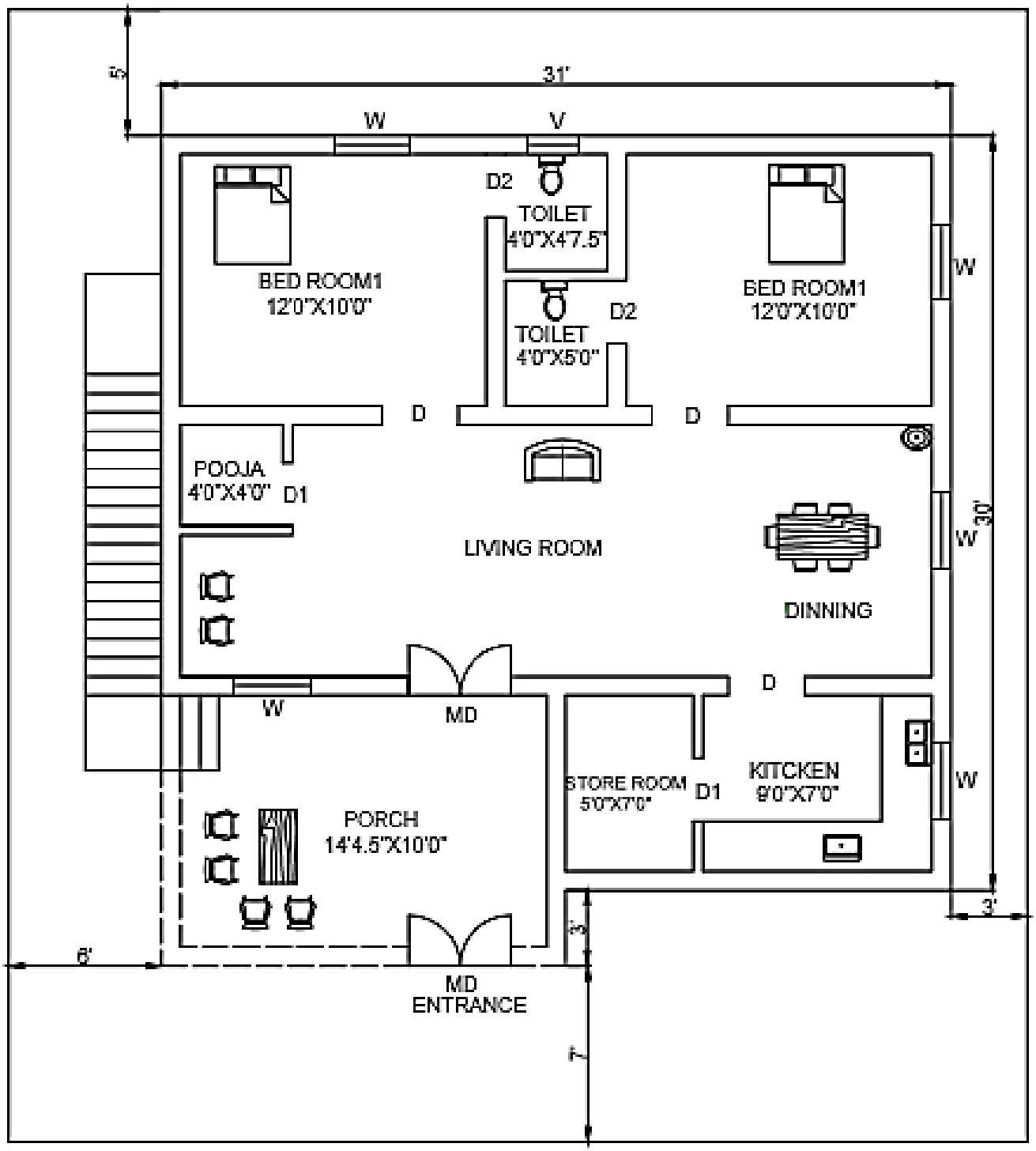
Steps will be in brick work in cement mortar 1:5 laid on a 800 x 150 cement concrete 1:4:8 footing. Rise 200, Tread 300.

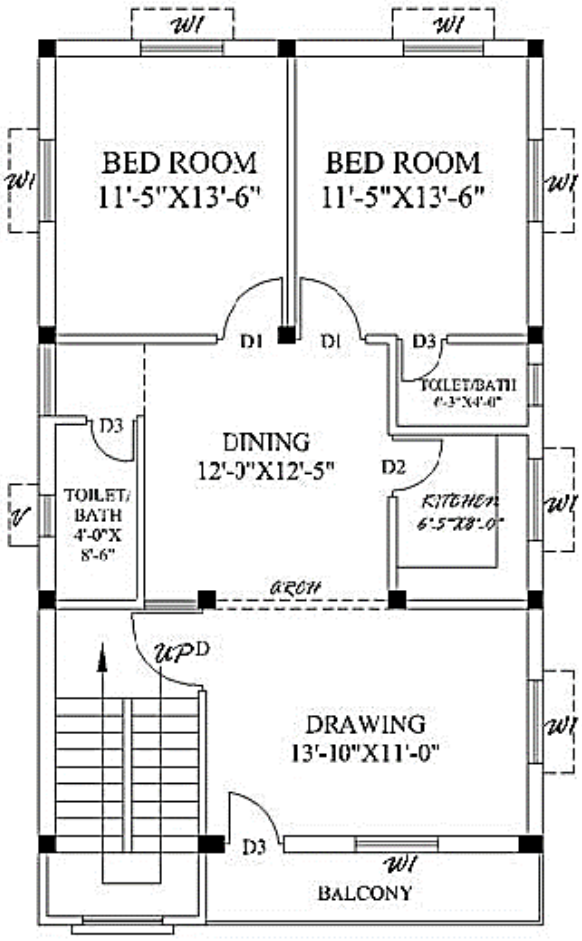
Note:

1. Any other dimensions found necessary may be assumed suitably making clear indications of the same.

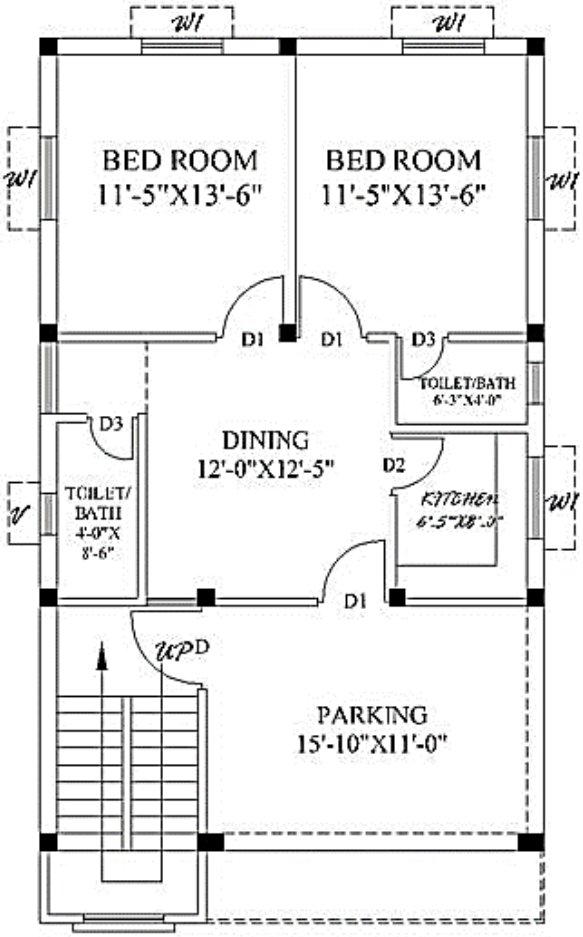



W1
W2
W1
Bed Room 2
11'6" x 13'
Closet
Toilet
8' x 7'
Closet
Bed Room1
15' x 13'
W1
W1
D2
D1
D1
D1
W
W1
Master Bed Room
16' x 13'
Living room
21' x 9'
D2
Dinning hall
Kitchen
10' x 10'
D
Toilet
7.5' x 6.5'
W1
Closet
W2
W


5'
31'
W
V
D2
TOILET
4'0"X4'7.5"
BED ROOM1
12'0"X10'0"
TOILET
4'0"X5'0"
D2
BED ROOM1
12'0"X10'0"
W
D
D
POOJA
4'0"X4'0"
D1
LIVING ROOM
DINNING
30'
W
D
W
MD
STORE ROOM
5'0"X7'0"
D1
KITCHEN
9'0"X7'0"
W
PORCH
14'4.5"X10'0"
3'
3'
6'
MD
ENTRANCE



1ST & 2ND FLOOR PLAN



GROUND FLOOR PLAN

Experiment - 12

WORKSHOP BUILDING WITH NORTH LIGHT ROOF TRUSS

Aim:

To draw to a suitable scale the following views with complete dimensions and details of residential building:

1. Plan at window sill level.
2. Sectional elevation on PQRS.
3. Front elevation.

Specifications:

The following specifications correspond to the line plan of a workshop building with north light roof truss roof. All measurements are in "mm".

1. **Foundation:** The foundation for all main walls and verandah retaining walls will be in cement concrete 1:4:8 mix, 900 wide and 200 thick laid at 1200 below ground level. First footing will be in 700 x 500 and the second footing being 500 x 500 for all walls.

2. **Basement:** The basement will be in brick work in cement mortar 1:6, 200 wide and 450 thick above ground level for all main walls and verandah retaining walls and is filled with clean sand to a depth of 300. A damp proof course, in cement mortar 1:3, 20 thick will be provided for all walls at basement level.

3. **Superstructure:** All walls will be in brick work in cement mortar 1:5, using first class bricks200 thick. The height of main walls will be 3230 above the floor level. The partition wall in W.C. and bath will be 150 thick brick work in cement mortar 1:5. All the walls including basement will be plastered smooth with cement mortar 1:4 externally and 1:6 internally for 12.5 thick. Parapet walls 200 thick and high will be provided all rounds.

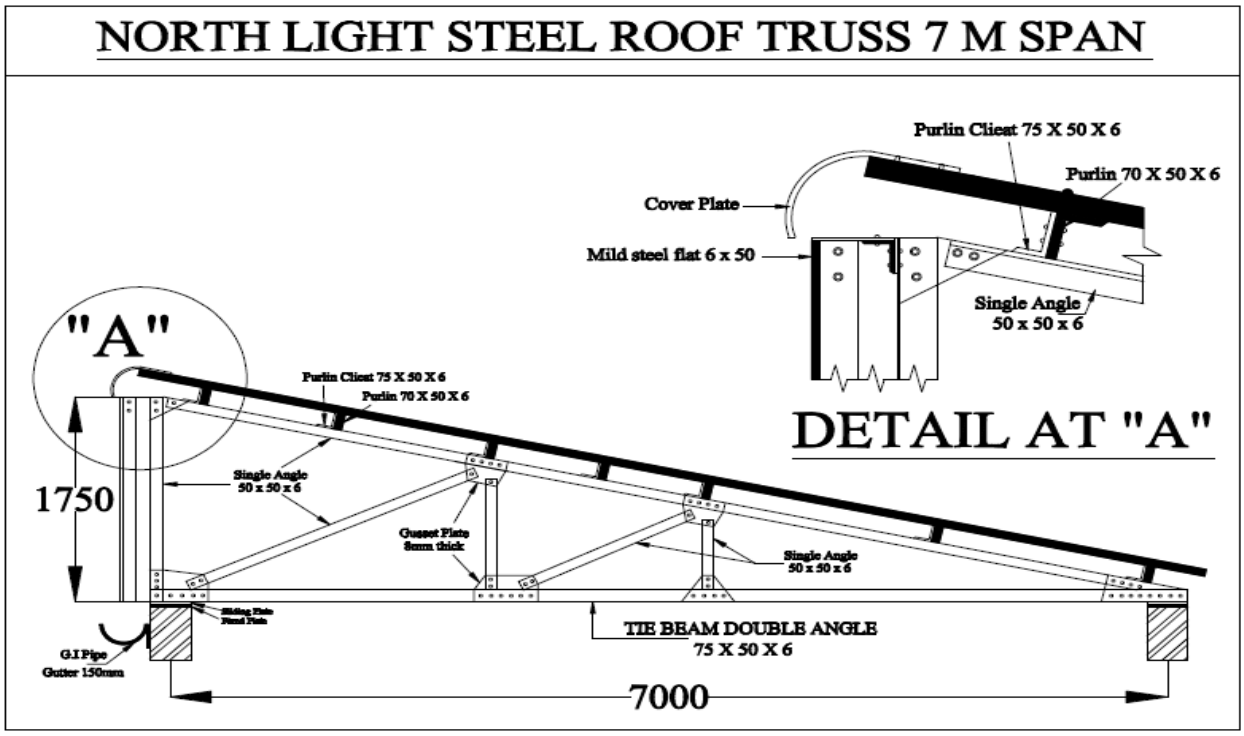
4. **Roofing:** A roof covered by Asbestos cement sheet on north light roof truss as designed. Assume the bay distances in C/C. take the angle is 45°

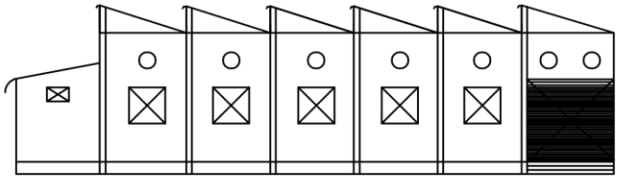
5. **Doors, Windows etc.,**

REFERENCE		
TYPE	DESCRIPTION	SIZE
RS	ROLLING SHUTTER	3000 X 3000
MD	MAIN DOOR	1600 X 2700
D1	DOOR	1300 X 2700
W	WINDOW	1300 X 1300

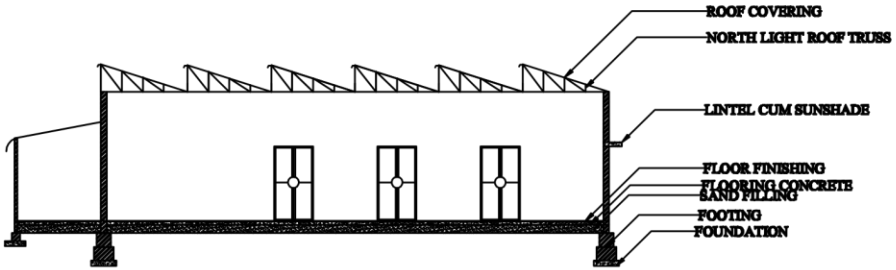
6. **Lintels:** All internal wall openings will be provided with RCC lintel 1:1.5:3 mix, 150 thick and all external wall openings will be provided with RCC lintel-cum-sunshade 1:1.5:3 mix, 450 wide and 150 thick.

7. **Flooring:** The flooring will be in cement concrete 1:4:8, 130 thick, plastered smooth with cement mortar 1:3, 20 thick for all the portions.
8. **Steps:** Steps will be in brick work in cement mortar 1:5 laid on 800 x 150 cement concrete 1:4:8 footing. Rise = 150, Tread = 300, Ramp in C.C 1:4:8 of size 3500 x 2500 will be provided.
9. **All dimensions are in "mm"**

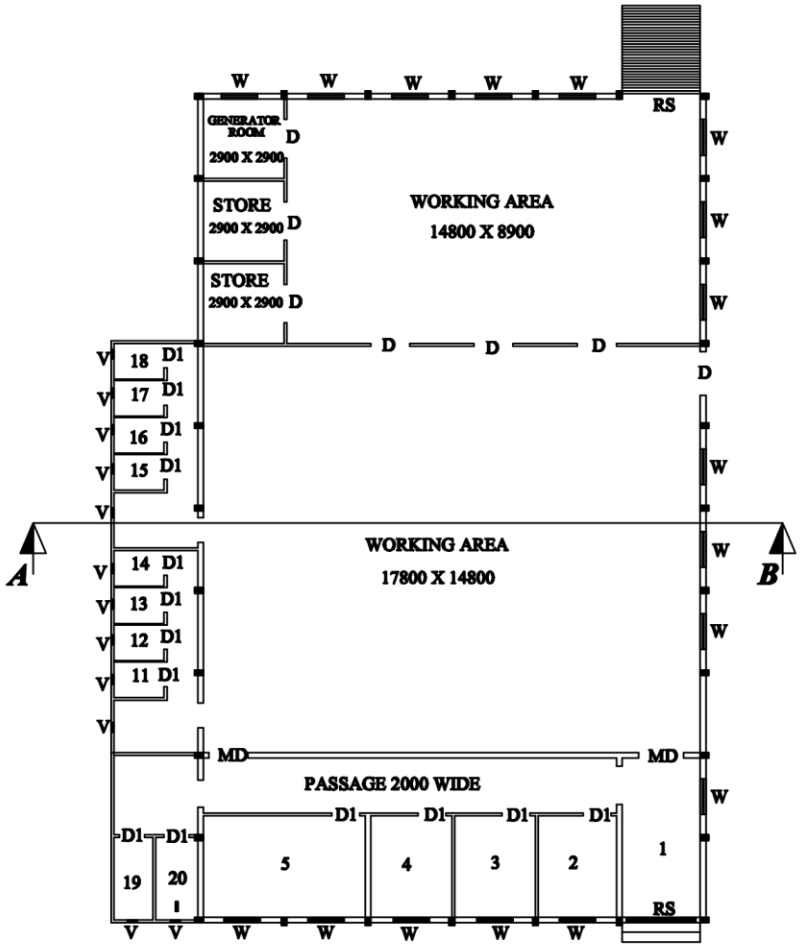




ELEVATION



SECTION ON AB



PLAN

REFERENCE

1	RECEPTION	2800 X 5800
2	WAITING HALL	2800 X 3700
3	MANAGER ROOM	2900 X 3700
4	OFFICE ROOM	2900 X 3700
5	MEETING HALL	5800 X 3700
11	TOILET (GENTS)	1800 X 1300
12	TOILET (GENTS)	1800 X 1300
13	TOILET (GENTS)	1800 X 1300
14	TOILET (GENTS)	1800 X 1300
15	TOILET (LADIES)	1800 X 1300
16	TOILET (LADIES)	1800 X 1300
17	TOILET (LADIES)	1800 X 1300
18	TOILET (LADIES)	1800 X 1300
19	TOILET (STAFF)	1400 X 3000
20	TOILET (STAFF)	1500 X 3000
RS	ROLLING SHUTTER	3000 X 3000
MD	DOOR	1600 X 2700
D	DOOR	1400 X 2700
D1	DOOR	1300 X 2700
W	WINDOW	1200 X 1200
V	VENTILATOR	800 X 500

ALL DIMENSIONS ARE IN mm

Experiment - 13

DETAILING OF BUILDING COMPONENTS

TRUSS

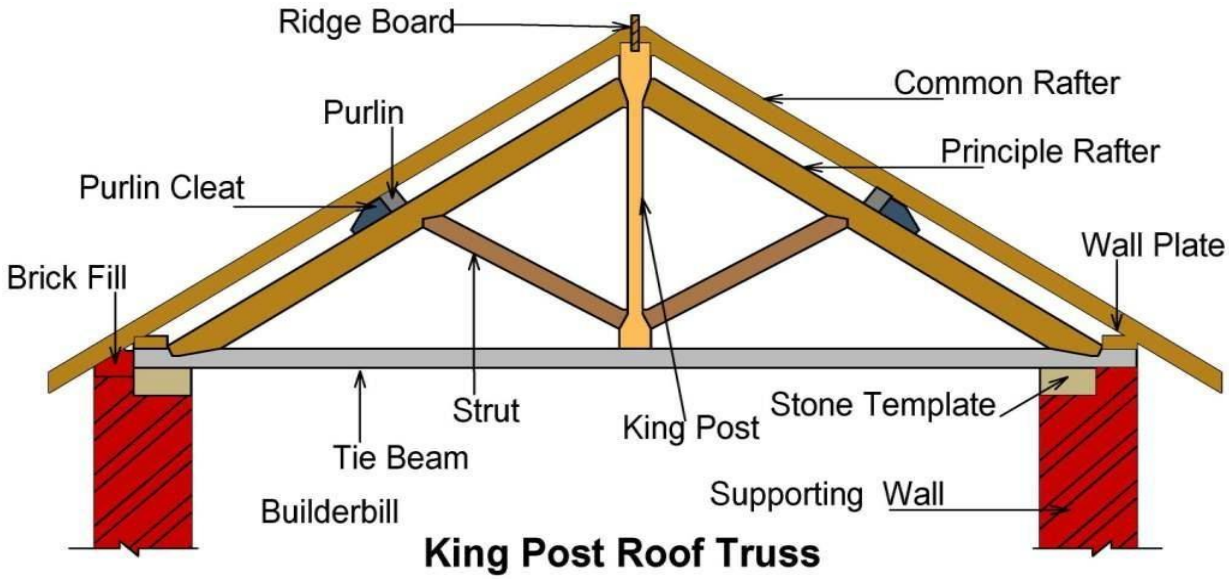
A truss is essentially a triangulated system of straight interconnected structural elements. The most common use of trusses is in buildings, where support to roofs, the floors and internal loading such as services and suspended ceilings, are readily provided. The main reasons for using trusses are: Long span, Lightweight, Reduced deflection (compared to plain members) and opportunity to support considerable loads.

KING POST TRUSS

King Post Truss Consists Following components:

1. Tie Beam
2. Two Inclined principal rafter
3. Two struts
4. King post
5. Ridge Beam

In king post truss, purlins are supported by the principal rafter. The purlins support the closely spaced common rafters. The slope of common rafters is same as that of the principal rafter. The common rafters support the roof covering. In king Post truss, The Bottom chord of the truss acts as tie beam and this tie beam receives the ends of the principal rafters and prevents the wall from spreading out due to thrust. The vertical king post is used to prevent the sagging of tie beam at the centre of a span. The Struts are connected to the tie beams and the principal rafters in the inclined direction. The Struts are used to prevent the sagging of principal rafters. Ridge beam is provided at the apex of the roof to provide end support of the common rafters. The trusses are supported on the bed blocks of stone or concrete which are fixed in the supporting walls. The Spacing of King Post truss is limited to 3 m centre to centre. The truss is suitable for spans varying from 5 to 8 metre. It is not suitable for the long span. The king post truss does not provide storage space because the frames are usually exposed and do allow extra room. King post truss is used when there is a need to support the weight of an expansive roof.



King Post Roof Truss

QUEEN POST TRUSS

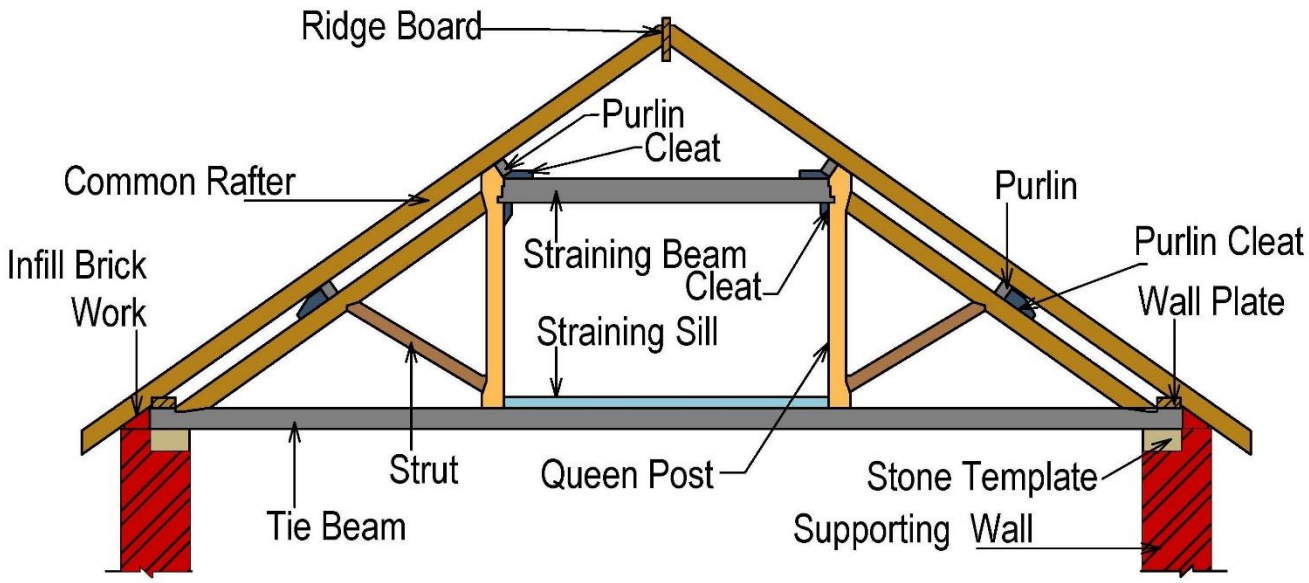
Queen Post Truss Consists of Following Components:

1. Two Queen posts
2. Two Principal Rafters
3. Struts
4. Tie Beam
5. Straining beams
6. Straining sills
7. Purlins

In this roof, The Queen posts are the tension members which are used to prevent the sagging of tie beam. The upper ends of the queen-posts are kept in position by straining beam. The straining beam receives the thrust from the principle rafters and also keeps the junction in a stable position. A straining sill is fixed on the tie beam and also fixed between the feet of Queen post. This straining sill is used for reducing the thrusts from struts.

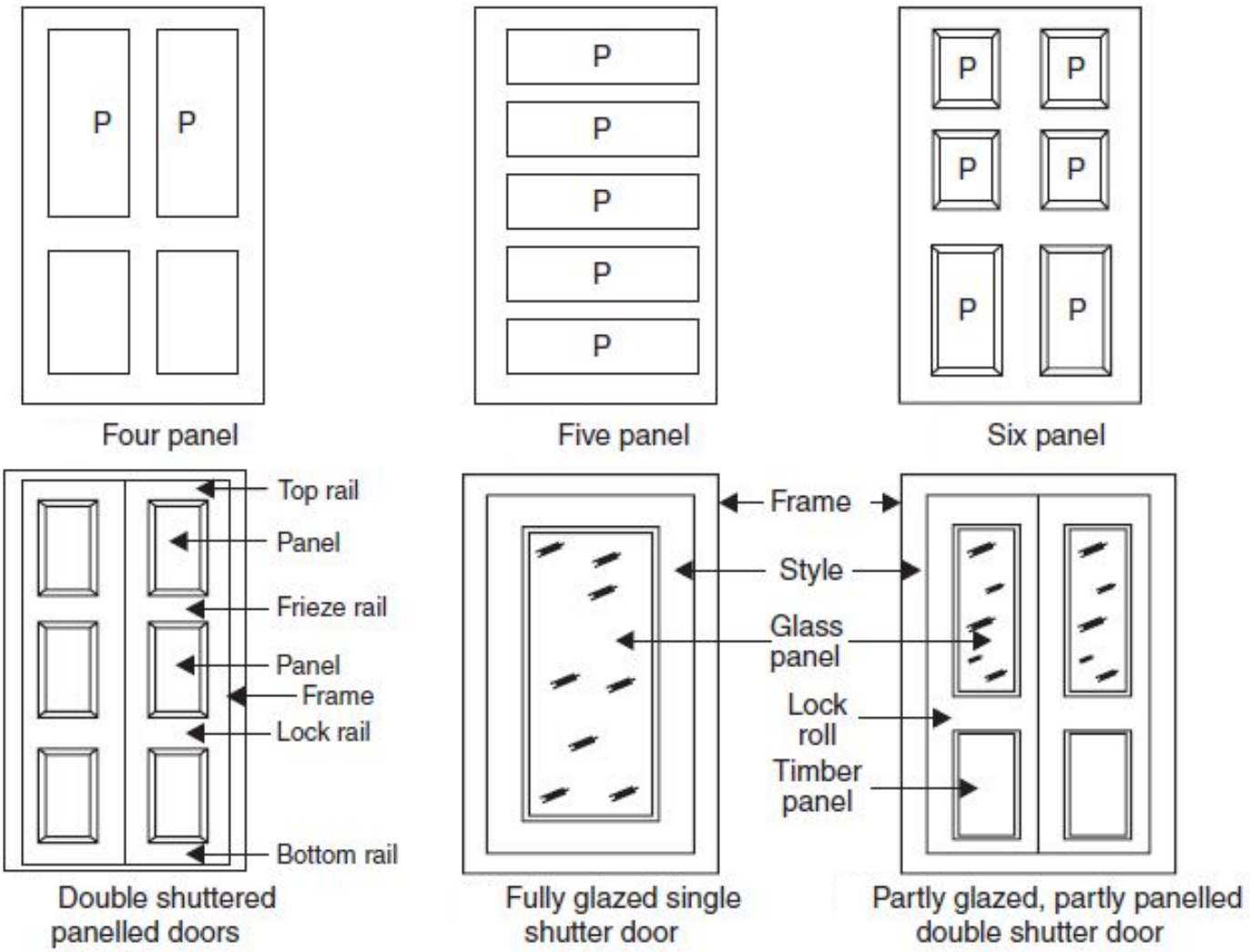
The principal rafters, Straining beams, struts and straining sill are in compression whereas the queen posts and tie beam are in tension. Purlins are horizontal wooden members laid on principal rafters on wall-to-wall to support common rafter of a roof which is fixed with cleat.

Queen post truss is suitable for 8 to 12 meters. This truss is made from a variety of materials such as timber or steel. The Queen post truss is simpler and lighter in weight. It does not put weight on the centre of the main tie beam, as the king post truss. Queen post truss is used when there is a need to cover large areas. It is relatively low-cost and can be made to fit almost any size or slope of the roof. It can also provide striking ceiling design that differentiates a home.



Queen Post Truss

PANELLED DOORS



Panelled and lazed doors

PANELLED WINDOW