



CIVIL ENGINEERING

LAB MANUAL

CIVIL ENGINEERING DRAWING -1

Prepared by-

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OBJECTIVES:

To introduce the students to draft the plan, elevation and sectional views of buildings in accordance with development and control rules satisfying orientation and functional requirements as per National Building Code.

LIST OF EXPERIMENTS

1. Principles of planning, orientation and complete joinery details (Paneled and Glazed Doors and Windows)
2. Buildings with load bearing walls
3. Buildings with sloping roof
4. R.C.C. framed structures.

OUTCOMES:

The students will be able to draft the plan, elevation and sectional views of the buildings, industrial structures, and framed buildings using computer softwares.

TEXTBOOKS:

1. Sikka V.B., A Course in Civil Engineering Drawing, 4th Edition, S.K.Kataria and Sons, 2015.
2. George Omura, Mastering in Autocad 2005 and Autocad LT 2005- BPB Publications, 2008

REFERENCES:

1. Chuck Eastman, Paul Teicholz, Rafael Sacks, Kathleen Liston, BIM Handbook: A Guide to building information modeling for Owners, Managers, Designers, Engineers, and Contractors, John Wiley and Sons. Inc.,2011.
2. Marimuthu V.M., Murugesan R. and Padmini S., Civil Engineering Drawing-I, Pratheeba Publishers, 2008.
3. Shah.M.G., Kale. C.M. and Patki.S.Y., Building Drawing with an Integrated Approach to Built Environment, Tata McGraw Hill Publishers Limited, 2007.
4. Verma.B.P., Civil Engineering Drawing and House Planning, Khanna Publishers, 2010.

CIVIL ENGINEERING DRAWING 1

Sl. No.	Name of the Experiment	Page No.
CYCLE 1 - EXPERIMENTS		
1	Study Excise -Auto Cad commands	
2	Principles of planning , orientation and complete joinery details (paneled and glazed doors and windows)	
3	A reading room with RCC flat roof	
4	A residential building with single bed room	
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CYCLE 2 - EXPERIMENTS		
6	Fully tiled gabled house	
7	Residential building with load bearing walls and pitched roof	
8	RCC framed building with RCC roof	
9	Primary health centre	
10	School building	
11	School building	

Pre Caution

1. Students should wear lab coat in CAD lab.
2. Students are advised to enter the CAD lab WITH FORMAL SHOES ONLY.
3. They are not supposed to move the systems and monitors.
4. They should enter in the login name and password assigned to each student.
5. Students are advised to complete their record work before the next class.
6. Students are asked to logout from their area and switch off the computers after leaving
7. Students can access the printers through lab technician.
8. Students have free access to use the computers and software available in the lab.
9. During the laboratory hours, accessing the internet is strictly prohibited.
10. Computer games are strictly prohibited in the CAD lab.

'General Instructions to Students'

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CONVENTIONS & SYMBOLS

Sl. No.	Term	Abbreviation
1.	Aggregate	Agg
2.	Approximate	Approx
3.	Asbestos cement	asb/cem
4.	At	@
5.	Air Conditioner	A/C
6.	Brick work	BWK
7.	Brick on edge	BOE
8.	Building	Bldg
9.	Bench mark	BM
10.	Cast-iron	CI
11.	Cement concrete	CC
12.	Centre to centre	c to c, c/c
13.	Cement mortar	CM
14.	Coarse rubble masonry	CR
15.	Random rubble masonry	RR

Sl. No.	Term	Abbreviation
16.	Column	COL
17.	Concrete	CONC
18.	Corrugated	CORR
19.	Cross-section	CS
20.	Cupboard	CB
21.	Collapsible gate	CG
22.	Door	D
23.	Damp proof course	DPC
24.	Diameter	dia,
25.	European water closet	EWC
26.	Figure	Fig.
27.	Finished floor level	FFL
28.	Floor trap	FT
29.	Flushing cistern	FC
30.	Fresh air inlet	FAI
31.	Full supply level	FSL




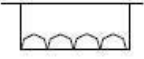






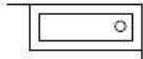
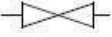



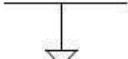
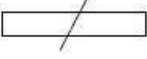


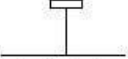


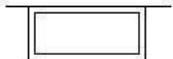



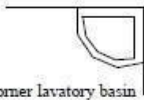



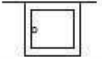


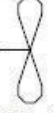
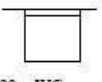

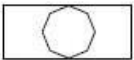

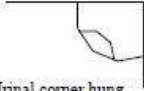

Sl. No.	Term	Abbreviation
32.	Full tank level	FTL
33.	First floor	FF
34.	Floor level	FL
35.	Flush out latrine	FOL
36.	Galvanized	Galv
37.	Galvanized iron	GI
38.	Grease trap	GRT
39.	Ground level	GL
40.	Grills	G
41.	Gully trap	GT
42.	Height	Ht
43.	Indian water closet	IWC
44.	Imperial (standard) wire gauge	SWG
45.	Inspection chamber	ICH, IC
46.	Intercepting trap	IT

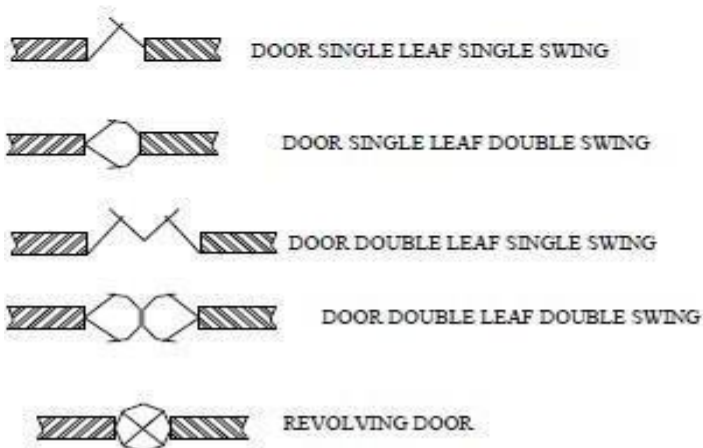
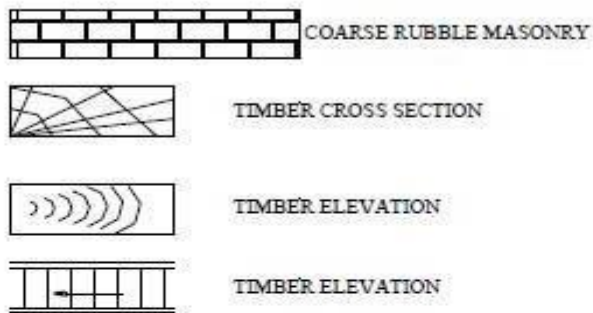
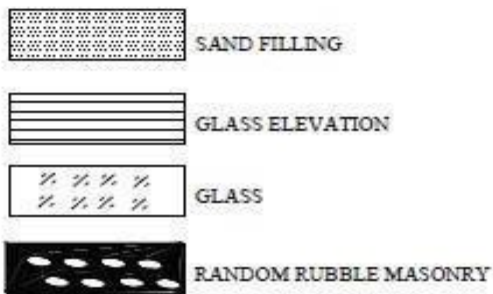
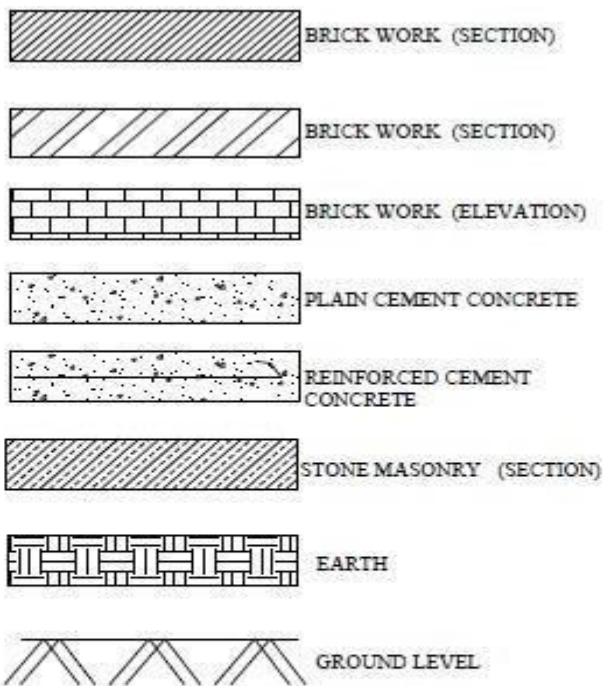
Sl. No.	Term	Abbreviation
47.	Joist	J
48.	Jolly work	JW
49.	Kilo	K
50.	Kilogram	KG
51.	Kilometer	KM
52.	Litre	LT.
53.	Level crossing	LC
54.	Low water level	LWL
55.	Lime mortar	LM
56.	Lime concrete	LC
57.	Maximum flood level	MFL
58.	Maximum water level	MWL
59.	Manhole	MH
60.	Maximum	Max
61.	Mild steel	MS
62.	Millimeter	Mm

Sl. No.	Term	Abbreviation
63.	Minimum	MIN
64.	Not to scale	NTS
65.	Number	No.
66.	Overhead tank	OHT
67.	Plain cement concrete	PCC
68.	Plinth level	PL
69.	Prestressed concrete	PCONC
70.	Radius	Rad
71.	Rainwater pipe	RWP
72.	Rolled section / Rolling shutter	RS
73.	Rolled steel joist or I-section	RSJ OR I
74.	Reinforced Cement Concrete	RCC
75.	Ribbed tor steel	RTS
76.	Stone ware pipe	SWP
77.	Surki mortar	SM
78.	Sink	S

Sl.No.	Term	Abbreviation
79.	Soil pipe	SP
80.	Standard	Std
81.	Septic tank	ST
82.	Switch	Sw
83.	Ventilator	V
84.	Vent pipe	VP
85.	Wash basin	WB
86.	Water closet	WC
87.	Window	W
88.	Window cum ventilator	W/V
89.	Water level	WL

SYMBOLS

 1. Light plug	 11. Immersion heater	 21. Exhaust fan	 31. Urinal stall
 2. Power plug	 12. Bell point	 22. Fan regulator	 32. Indian type WC
 3. Meter	 13. Bell	 23. Rectangular bath	 33. Stop valve or sluice valve
 4. Light bracket	 14. Buzzer	 24. Bidet	 34. Fire extinguisher
 5. Fluorescent light (single)	 15. Telephone instrument point internal	 25. Shower head	 35. Fire hydrant
 6. Fluorescent light (double)	 16. Fire alarm push	 26. Wall lavatory basin	 36. Pump
 7. One-way switch	 17. Aerial	 27. Corner lavatory basin	 37. Gully
 8. Two-way switch	 18. Ceiling fan	 28. Plain kitchen sink	 38. Manhole or inspection chamber
 9. Intermediate switch	 19. Bracket fan	 29. WC	 39. Rainwater outlet
 10. Electric unit heater	 20. Tower rail	 30. Urinal corner hung	 40. Refrigerator



Exp No.:

Date:

1. STUDY EXERCISE - AUTOCAD COMMANDS

AIM

To study the basic commands used in AUTOCAD drawing

OBJECTIVE

To study the basic commands used in AUTOCAD drawing in accordance with development and control rules satisfying orientation and functional requirements as per National Building Code.

KEYWORDS:

Auto Cad Software

THEORY

CAD means Computer Aided Design or Drafting. Auto cad is most widely used software developed by auto desk. Auto cad is a drafting package in almost all engineering branches. There are drafting packages like cad are DIAP, CAMD, and Delights. Auto cad is one of the most popular cad packages. It is a general purpose computer aided design. We can draw geometrical entries like plan, section and elevation of a building.

- We can make accurate drawings like plan, section and elevation of a building.
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EXPERIMENT PROCEDURE

STEPS :

ARC	Creates an arc
AREA	Calculates the area and perimeter of objects or of defined areas
ARRAY	Creates multiple copies of objects in a pattern
BHATCH	Fills an enclosed area or selected objects with a hatch pattern
BLOCK	Creates a block definition from objects you select
BOUNDARY	creates a region or a polyline from an enclosed area
BOX	Creates a three-dimensional solid box
BREAK	Erases parts of objects or splits an object in two
CAL	Evaluates mathematical and geometric expressions
CHAMFER	Bevels the edges of objects
CIRCLE	Creates a circle

COPY	Duplicates objects
DIST	Measures the distance and angle between two points
DIVIDE	Places evenly spaced point objects or blocks along the length or perimeter of an object
DONUT	Draws filled circles and rings
ELLIPSE	Creates an ellipse or an elliptical arc
ERASE	Removes objects from a drawing
EXPLODE	Breaks a compound object into its component objects
EXPORT	Saves objects to other file formats
EXTEND	Extends an object to meet another object
EXTRUDE	Creates unique solid primitives by extruding existing two-dimensional objects
FILLET	Rounds and fillets the edges of objects
GRID	Displays a dot grid in the current viewport
GROUP	Creates a named selection set of objects
HATCH	Fills a specified boundary with a pattern

RESULT:

The study of basic commands used in AUTOCAD and able to draft the plan ,section , elevation of a structure using these command

Exp No.:

Date:

2. PRINCIPLES OF PLANNING, ORIENTATION AND COMPLETE JOINERY DETAILS (PANELED AND GLAZED DOORS AND WINDOWS)

To draw a paneled and glazed doors and windows using basic AutoCAD commands

OBJECTIVE

To introduce the students to draft the paneled and glazed doors and windows using accordance with development and control rules satisfying orientation and functional requirements as per National Building Code.

KEYWORDS:

Auto Cad Software

THEORY

CAD means Computer Aided Design or Drafting. Auto cad is most widely used software developed by auto desk. Auto cad is a drafting package in almost all engineering branches. There are drafting packages like cad are DIAP, CAMD, and Delights. Auto cad is one of the most popular cad packages. It is a general purpose computer aided design. We can draw geometrical entries like plan, section and elevation of a building.

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EXPERIMENTAL PROCEDURE

STEP 1

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

STEP 2

Planning aspects of industrial 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

STEP 3

Requirements of big industrial units :

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:

170m² for one family unit

300 m² for two semi-detached family units

670 m² 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 300m², they shall be respectively 3.00m and 2.00 m.

(3) Area of rooms:

Table shows the minimum areas of various rooms.

Sl.	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

(14) Joinery Details

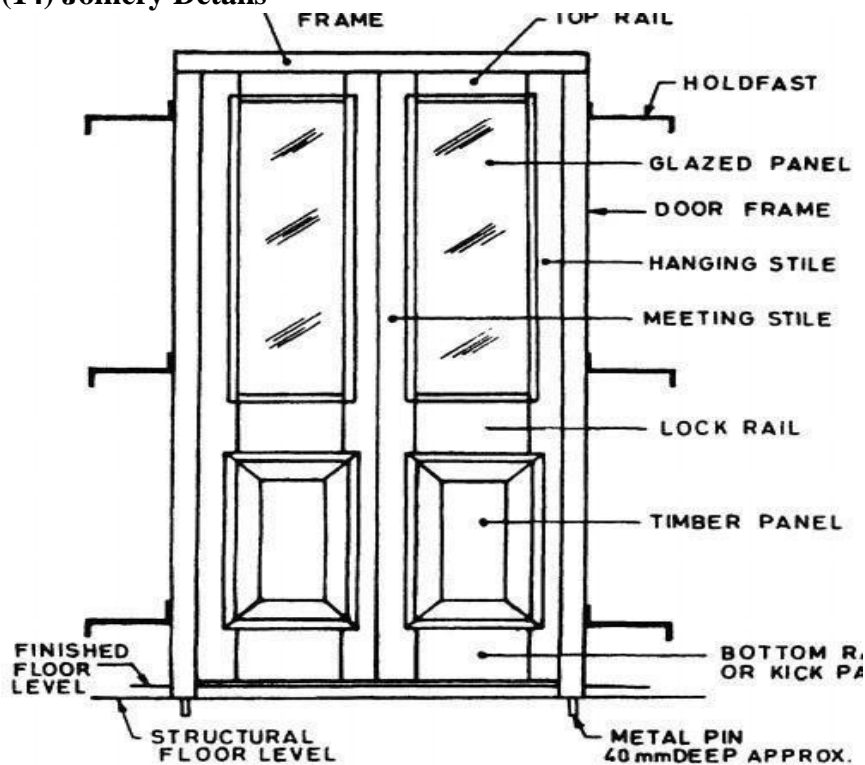


FIG. 1 TYPICAL ILLUSTRATION OF DOUBLE PANELLED DOOR WITH TIMBER AND GLAZED PANELS

Exp No.:

Date:

3. A READING ROOM WITH R.C.C FLAT ROOF

Aim:

To draw a reading 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.

OBJECTIVE

To introduce the students to draft the plan, elevation and sectional views of RCC buildings in accordance with development and control rules satisfying orientation and functional requirements as per National Building Code.

KEYWORDS:

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EXPERIMENTAL PROCEDURE

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

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:

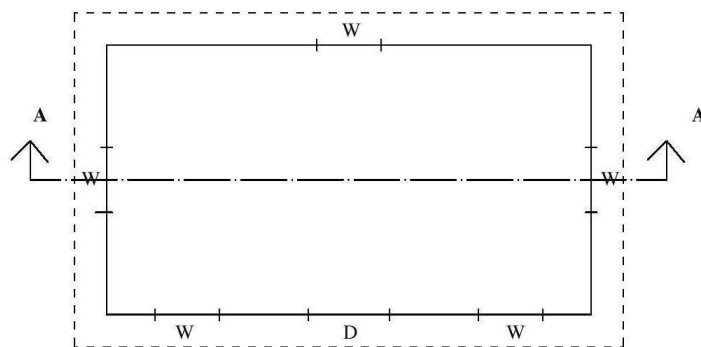
The flooring will be in CC 1:4:8, 130 thick and plastered smooth with CM 1:3, 20 thick.

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.

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LINE PLAN

REFERENCE

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

PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

ALL DIMENSIONS ARE IN mm

Exp No.:

Date:

4. 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.

OBJECTIVE

To introduce the students to draft the plan, elevation and sectional views of residential building with single bed room buildings in accordance with development and control rules satisfying orientation and functional requirements as per National Building Code.

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EXPERIMENTAL PROCEDURE

Specification 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 1st footing being 700x400 and the 2nd 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 1st 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.,:

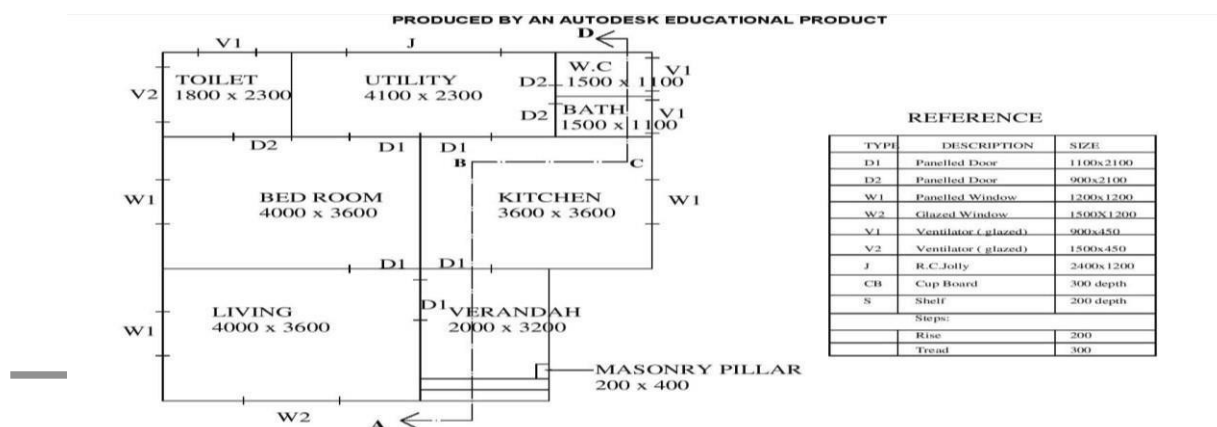
- D1-panelled door :1100x 2100
- D2-panelled door :900x 2100
- W1-panelled Window :1200 x 1200
- W2-Glazed Window :1500 x 1200
- V1-Ventilator glazed :900 x 450
- V2-Ventilator glazed :1500 x 450
- J - R.C. Jolly : 2400 x 1200
- CB-cupboard: 300 depth
- S-shelf :200 depth

6. Lintel:

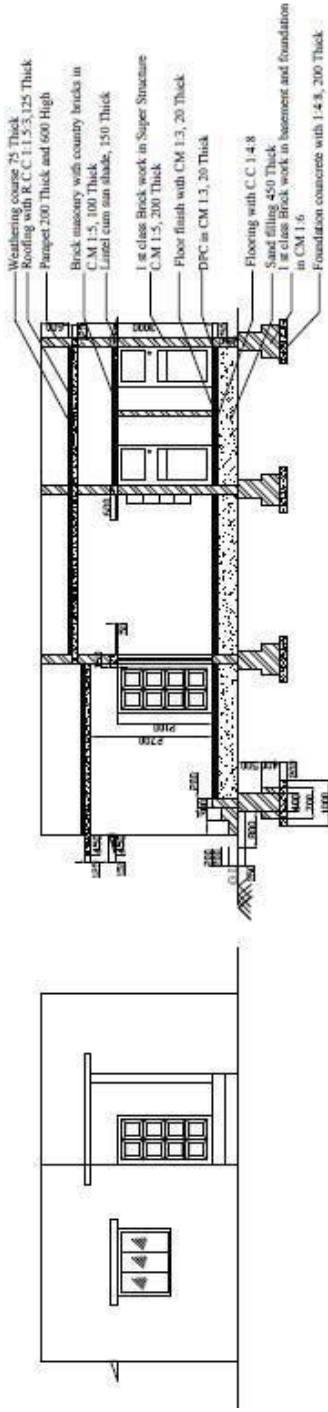
All internal wall openings will be provided with R.C.C lintels, 1:1.5:3 mix; 150 thick. All external openings will be provided with R.C.C lintel - cum-sunshade, 1:1.5:3 mix, 450 wide and 150 thick and 600 wide R.C.C lofts shall be provided in bed, kitchen and utility.

7. Flooring:

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



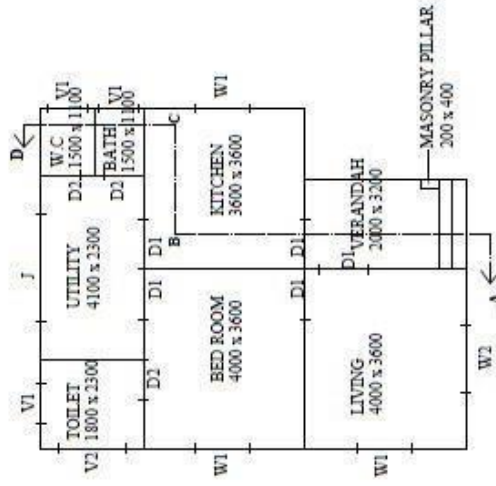
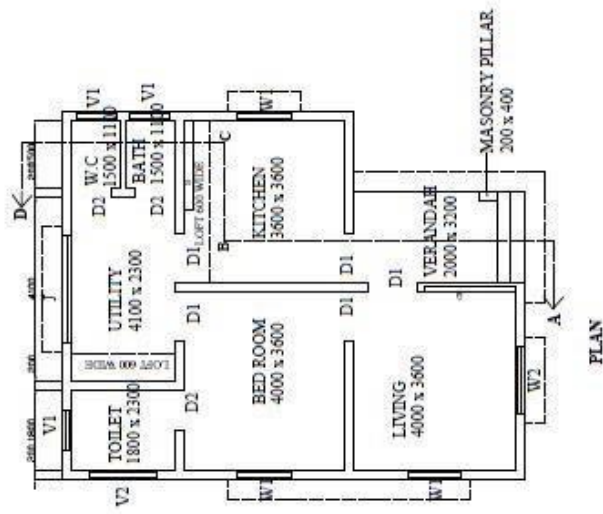
A RESIDENTIAL BUILDING WITH SINGLE BED ROOM



- Weathering course 75 Thick
- Roofing with R.C.C 1:1.5:3, 125 Thick
- Panquet, 200 Thick and 600 High
- Brick masonry with country bricks in C.M 1:5, 100 Thick
- Lintel cum sun shade, 150 Thick
- 1st class Brick work in Super Structure
- C.M 1:5, 200 Thick
- Floor finish with CM 1:3, 20 Thick
- D.P.C in CM 1:3, 20 Thick
- Flooring with C.C 1:4:8
- Sand filling 450 Thick
- 1st class Brick work in basement and foundation in CM 1:6
- Foundation concrete with 1:4:8, 200 Thick

ELEVATION

SECTION ABCD



ALL DIMENSIONS ARE IN mm

REFERENCE

SYMBOL	DESCRIPTION	SIZE
D1	Standard Door	1100 x 2100
D2	Standard Door	900 x 2100
W1	Standard Window	2000 x 1200
W2	Standard Window	2000 x 1200
V1	Standard Verandah	2000 x 3200
V2	Standard Verandah	2000 x 3200
J	J.C.C. (1:4:8)	200 x 200
CB	Chp Board	200 x 200
S	Sand	200 x 200
	Slips	200
	Blks	200
	Found	200

RESULT:

The A residential building with single bed room are drawn successfully using AutoCAD commands



Exp No.:

Date:

5. 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.

OBJECTIVE

To introduce the students to draft the plan, elevation and sectional views of a Library building with RCC slab buildings in accordance with development and control rules satisfying orientation and functional requirements as per National Building Code.

KEYWORDS:

Auto Cad Software

THEORY

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- Reduced engineering personal requirement.
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- Drawings prepared in the software can be stored safely.

EPERIMENTAL PROCEDURE

Specifications:

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

1. 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

2. 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.

3. 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.

4. 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.

5. Doors, windows,etc.,:

D- Door :1200x 2100

D1- Door :900x 2100

W1- Window :1500 x 1200

W2- Window :1000 x 1200

6. Lintel:

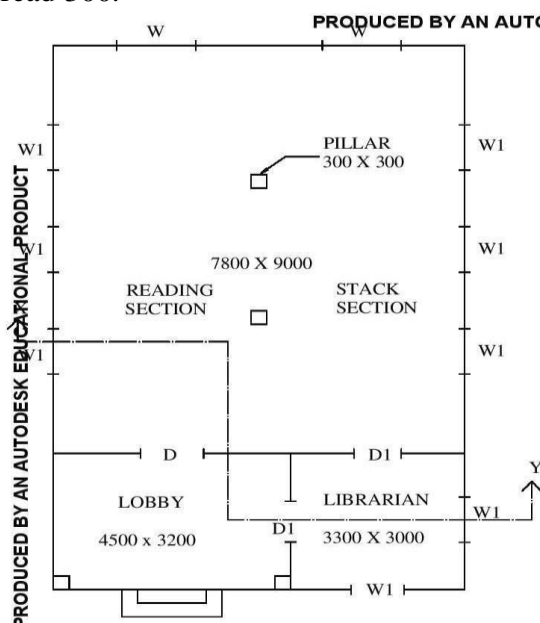
All external openings will be provided with R.C.C lintel - cum-sunshade, 1:1.5:3 mix, 450 wide and 150 thick.

7. Flooring:

The flooring will be in CC 1:4:8, 150 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.



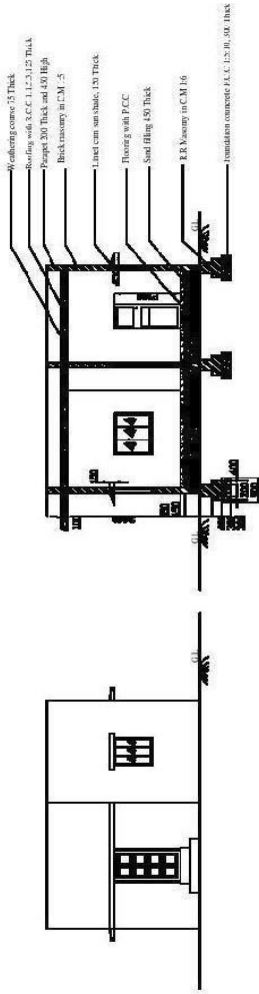
LINE PLAN

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

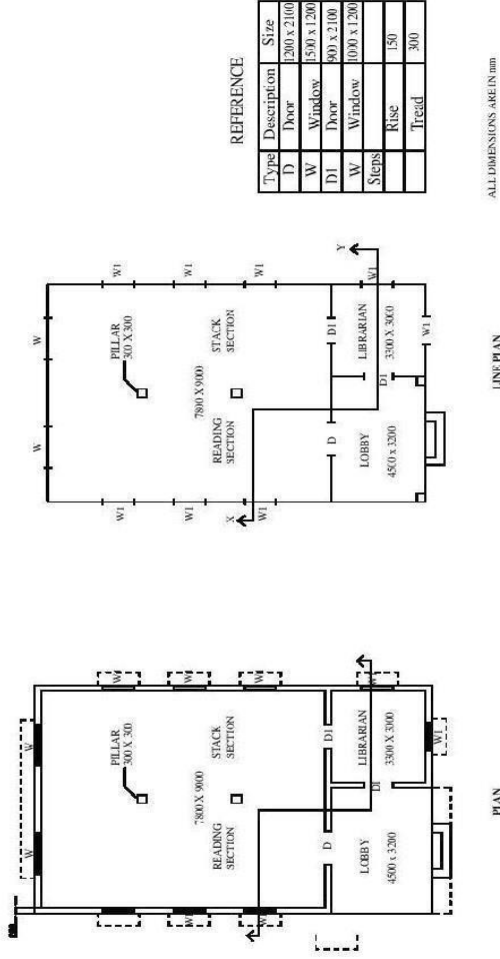
ALL DIMENSIONS ARE IN mm

A LIBRARY BUILDING WITH R.C. C.FLAT ROOF



SECTION XY

ELEVATION



LINE PLAN

PLAN

REFERENCE

Type	Description	Size
D	Door	200 x 2100
W	Window	500 x 1200
DI	Door	900 x 2100
W	Window	1000 x 1200
Steps	Rise	150
	Tread	300

RESULT:

The library building with single bed room are drawn successfully using AutoCAD commands

Exp No.:

Date:

6. RESIDENTIAL BUILDING WITH LOAD BEARING WALLS AND PITCHED ROOF

Aim:

To draw to a suitable scale the following views with complete dimensions and details for residential building (R.C.C Piched roof)

1. Plan at window sill level.
2. Front elevation
3. Sectional elevation on EFGH
4. Section at EFGH.

OBJECTIVE

To introduce the students to draft the plan, elevation and sectional views of a Fully tiled gabled house buildings in accordance with development and control rules satisfying orientation and functional requirements as per National Building Code.

KEYWORDS:

Auto Cad Software

THEORY

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EXPERIMENTAL PROCEDURE

Specifications:

The following specifications correspond to a residential building.

1. Foundation:

The depth of foundation will be 750 mm below ground level. The concrete course at the base of the foundation will be 100 mm wide and 150 mm deep. The footings will be of brick masonry with 1st class brick in cement mortar (1:4). Width of 1st and 2nd footings will be 500 mm and 700 mm respectively and each having thickness of 300 mm.

2. Plinth:

The plinth height will be 450 mm, above ground level. Thickness of wall in plinth will be 300 mm. A D.P.C. will be provided 50 mm thick in C.M. 1:3.

3. Superstructure:

The wall in super structure will be 1st class brick in C.M. 1:6. Thickness of all walls will be 300 mm except the partition wall between W.C. and bath, which will be 200 mm thick. All exterior windows and the verandah opening will be having a chajja projection of 600 mm. The kitchen will be having shelves (as shown in the line sketch) in there tier. Projection of shelves will be 450 mm beyond the wall. A cooking platform of 750 mm width will be provided at a height of 750 mm from floor level. Width of the sink will be 450 mm. Size of the cupboard will be 1050 mm x 300 mm x 2100 m. The verandah opening will be 2250 mm. Height of wall for the court yard is 2300 mm.

4. Roofing:

Roofing will be of R.C.C. (1:2:4) 125 mm thick. Provide lime terrace of thickness 100 mm over the roof slab. The parapet height will be 450 mm. Coping will except for dining space, kitchen, W.C. and bath which in turn will be having ceiling height of 3150 mm. Ceiling height for verandah will be 3000

5. Flooring:

Provide patent stone flooring of 25 mm thickness over 100 mm thick rammed khoa over sand filling.

6. Steps :

Rise 150 mm and Tread 200 mm. Door and window frame is 100 mm x 75 mm

7. Size of doors and window : D

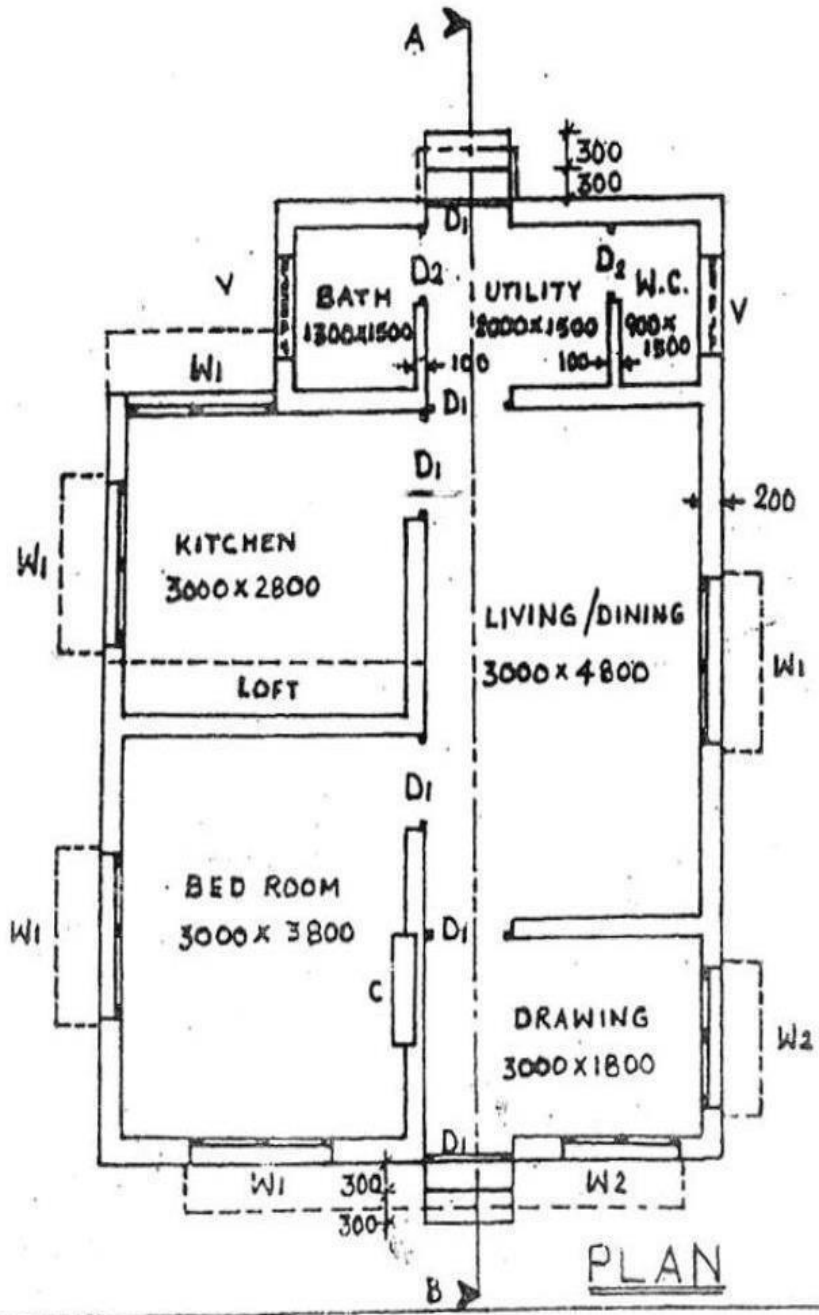
- 1000 mm x 2100 mm D1
- 750 mm x 2100 mm D2 -
- 1100 mm x 2100 mm D3 -
- 600 mm x 2100 mm D4 -
- 1200 mm x 2100 mm W -
- 1800 mm x 1200 mm W1 -
- 1500 mm x 1200 mm W2 -
- 900 mm x 1200 mm W3 -
- 600 mm x 900 mm

Note:

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

2. All dimensions are in millimetres.

FRONT ELEVATION



RESULT:

The residential building with single bed pitched roof are drawn successfully using AutoCAD commands

Exp No.:

Date:

7. 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.

OBJECTIVE

To introduce the students to draft the plan, elevation and sectional views of Residential building with load bearing walls and pitched roof in accordance with development and control rules satisfying orientation and functional requirements as per National Building Code.

KEYWORDS:

Auto Cad Software

THEORY

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EXPERIMENTAL PROCEDURE

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 and 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:

Theroofing for all the rooms will be with couple roof covered by mangalore tiles laid on country wood reepers, 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:

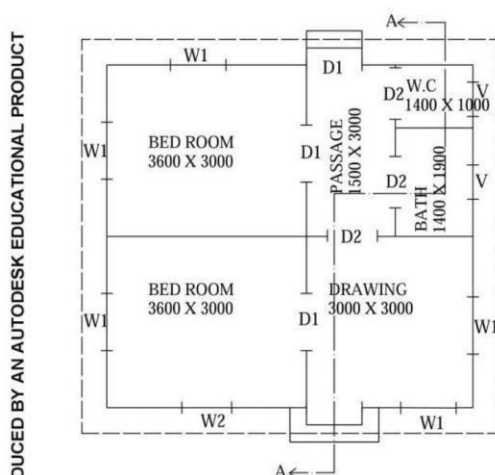
The flooring will be in CC 1:5:10 mix, 130 thick and finished smooth with cement plaster using CM 1:3, 20 thick for all the rooms.

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

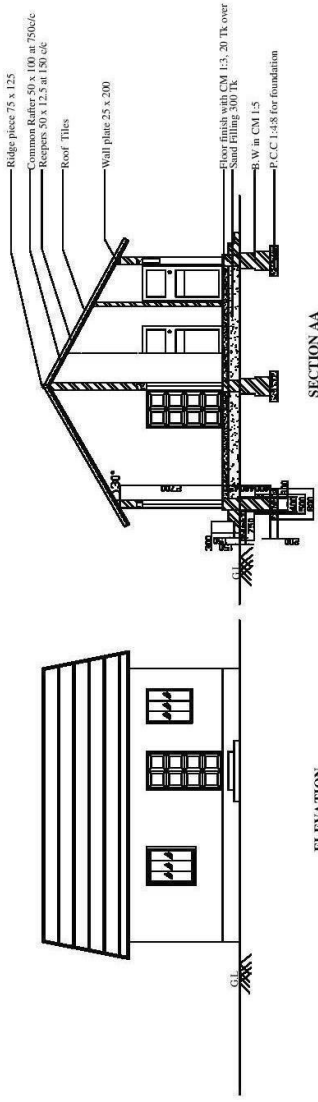
ALL DIMENSIONS ARE IN mm

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

PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

FULLY TILED GABLED HOUSE

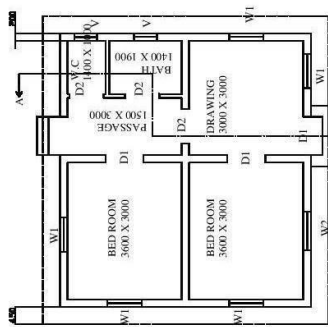


PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

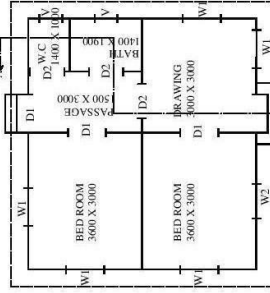
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ELEVATION

SECTION AA



PLAN



LINE PLAN

REFERENCE

TYPE	DESCRIPTION	SIZE
D1	Flushed Door	1000 X 2100
D2	Flushed Door	900 X 2100
W1	Flushed Window	900 X 2200
W2	Flushed Window	1000 X 2200
W	Common Window	600 X 650
	Roof	200
	Foot	300

ALL DIMENSIONS ARE IN mm

PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

RESULT:

The fully tiled gabled house are drawn successfully using AutoCAD commands

Exp No.:

Date:

8. RCC FRAMED BUILDING WITH RCC ROOF

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.

OBJECTIVE

To introduce the students to draft the plan, elevation and sectional views of draw Primary health centre in accordance with development and control rules satisfying orientation and functional requirements as per National Building Code.

KEYWORDS:

Auto Cad Software

THEORY

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EXPERIMENTALPROCEDURE

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:

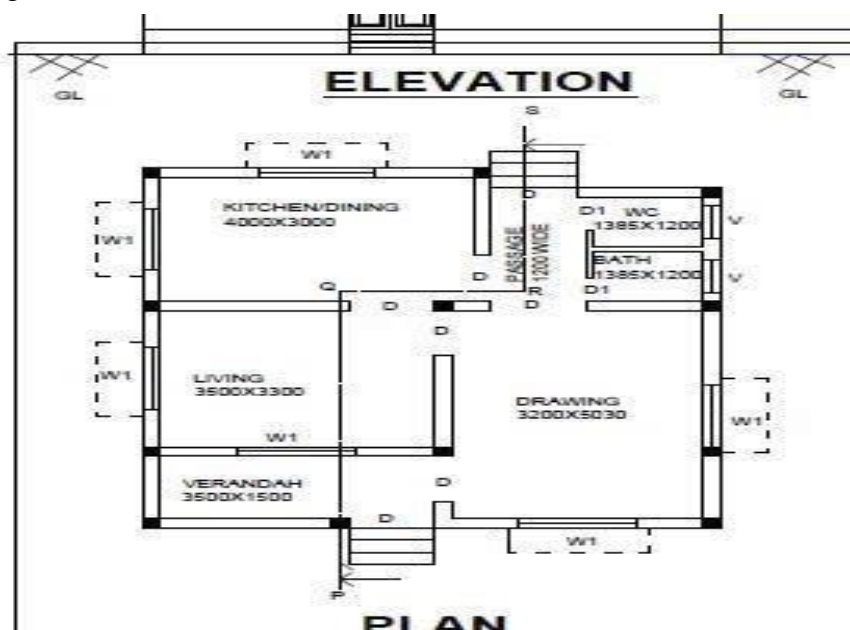
All internal openings will be provided with R.C.C. lintel 1:2:4 mix, 150 thick and all external openings will be provided with R.C.C. lintel-cum-sunshade 1:2:4 mix, 150 thick.

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.



RESULT:

The R.C.C framed structure are drawn successfully by using AutoCAD commands

Exp No.:

Date:

9. PRIMARY HEALTH CENTRE

To draw to a suitable scale the following views with complete dimensions and details of primary health center:

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

OBJECTIVE

To introduce the students to draft the plan, elevation and sectional views of draw a School building in accordance with development and control rules satisfying orientation and functional requirements as per National Building Code

KEYWORDS:

Auto Cad Software

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EPERIMENTAL PROCEDURE

Specifications:

The following specifications correspond to a primary health centre.

1. Foundation:

The foundation for all main walls will be in cement concrete 1:4:8 mix, 1500 wide and 400 thick laid at 1100 below ground level. The masonry footing will be in brick work in cement mortar 1:5, first footing being 1100 x 600 and the second being 800 x 500 for all main walls. The foundation for verandah retaining walls will be in cement concrete 1:4:8 mix, 1000 wide and 200 thick, laid at 700 below ground level. It will have a footing in brick work in cement mortar 1:5 to a width of 400.

2. Basement:

The basement will be in brick work in cement mortar 1:5, 500 wide and 450 thick above ground level for all main walls, 400 wide and 450 thick above ground level for verandah retaining wall. It 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. Super structure:

All main walls will be in brick work in cement mortar 1:5 using first class bricks, 300 thick. The height of main walls will be 4500 above floor level. The partition walls in w.c. and bath will be 100 thick in brick work in cement mortar 1:5, using first class bricks and carried up to a height of 2500. Masonry pillars in brick work in cement mortar 1:5 using first class bricks, 300 x 300 will be provided in the verandah to a height of 2600. R.C.C. beams 1:2:4 mix, 300 x 400 will be provided over the pillars. Parapet walls 200 thick and 600 high will be provided all-round. All the walls including basement will be plastered smooth with cement mortar 1:4 externally and 1:6 internally for 12.5 thick.

4. Roofing:

The roofing will be of R.C.C. 1:2:4 mix, 150 thick flat slab. A weathering course 200 thick, consists of two courses of flat tiles set in cement mortar 1:5 mixed with crude oil will be provided over the slab.

5. Doors, windows, etc.

- C.G - collapsible gate - 1500x2100
- D - Flushed door - 1200x2100
- D1 - Glazed door - 1200x2100
- D2 - Panelled door - 1000x2100
- D3 - Flushed door - 1000x2100
- G.W - Grilled window - 1500x1200
- W - Panelled window - 1200x1200
- W1 - Glazed window - 1500x1200
- W2 - Glazed window - 1200x1200
- V - Glazed ventilator - 600x600
- V1 - Glazed ventilator - 450x450
- U -Urinal - 600x1000

6. Lintel:

All internal openings will be provided with R.C.C. lintel 1:2:4 mix, 150 thick. 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.

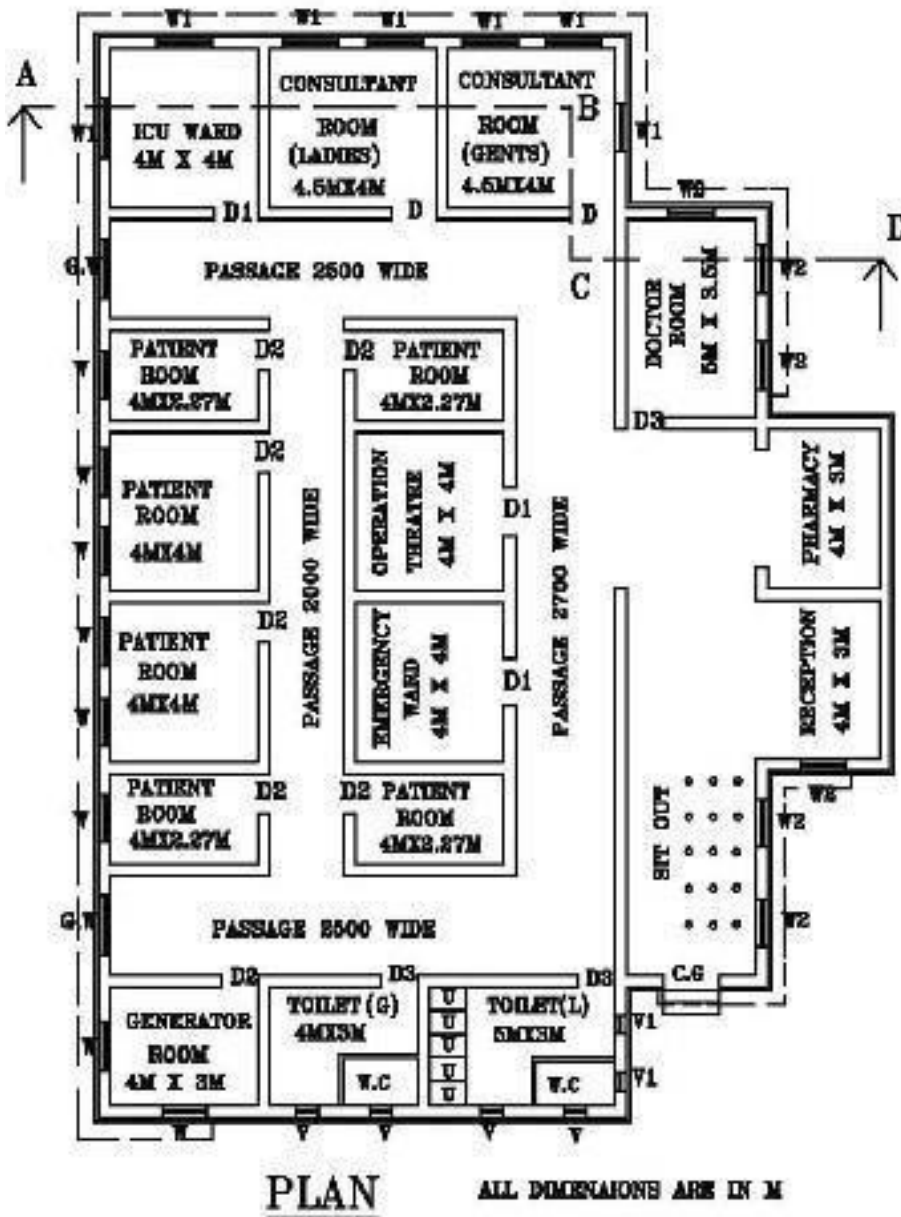
8. Steps:

Steps will be in brick work in cement mortar 1:5 laid on a 700 x 150 cement concrete 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 are in millimetres

PRIMARY HEALTH CENTRE



RESULT:

The primary health center is drawn successfully using AutoCAD commands

Exp No.:

Date:

10. SCHOOL BUILDING

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

OBJECTIVE

To introduce the students to draft the plan, elevation and sectional views of draw a Workshop building in accordance with development and control rules satisfying orientation and functional requirements as per National Building Code

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

KEYWORDS:

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EPERIMENTAL PROCEDURE

Specifications:

The following specifications correspond to a primary school.

1. Foundation:

The foundation for all main walls and verandah retaining walls will be in cement concrete 1:4:8 mix, 1000 wide and 300 thick laid at 1100 below ground level. The masonry footing will be in brick work in cement mortar 1:5, the footing being 700 x 400 and the second being 500 x 400 for all main walls and verandah retaining walls.

2. Basement:

The basement will be in brick work in cement mortar 1:5, 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. Super structure:

All main walls will be in brick work in cement mortar 1:5 using first class bricks, 200 thick. The height of main walls will be 4000 above floor level. The partition walls in w.c. and bath will be 100 thick in brick work in cement mortar 1:5, using first class bricks and carried up to a height of 2200. Masonry pillars in brick work in cement mortar 1:5 using first class bricks, 200 x 200 will be provided in the verandah to a height of 2200. R.C.C. beams 1:2:4 mix, 200 x 300 will be provided over verandah pillars. Parapet walls 200 thick and 450 high will be provided all-round. All the walls including basement will be plastered smooth with cement mortar 1:4 externally and 1:6 internally for 12.5 thick.

4. Roofing:

The roofing will be of R.C.C. 1:2:4 mix, 150 thick flat slab. A weathering course in brick jelly concrete plastered with combination mortar 1:5:9 mix, 100 thick will be provided over the slab.

5. Doors, windows, etc.

D - Steel door 1200 x 2200

D1 - Door 900 x 1200

W - Steel window 1200x1200

V - Ventilator 1500x600

W1- Steel window 1200x1200

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.

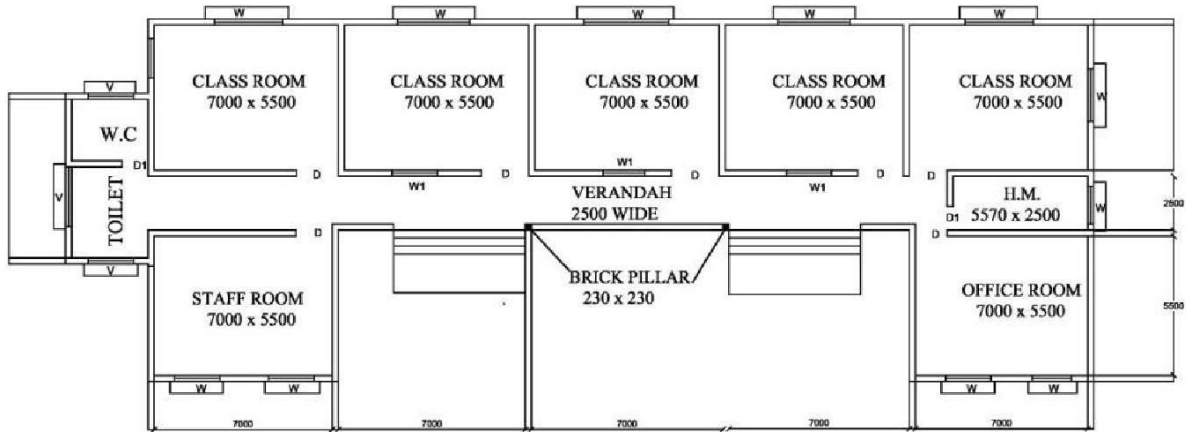
7. Flooring:

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 30

SCHOOL BUILDING



PLAN

VIVA - VOCE

PRE LAB

1. What are all the steps involved in site clearance?
- 2 How will you mark a site for setting out a foundation?
- 3 Define the term masonry.
- 4 Explain the sequence of operation in construction with an example.
- 5 What is composite masonry?

POST LAB

- 1 What are all the types of ashlar masonry?
- 2) Differentiate English bond and Flemish bond.
- 3) Write notes on zig-zag bond
- 4) Write notes on temporary shed
- 5) What are all the types of scaffolding?

RESULT:

The school building is drawn successfully using AutoCAD commands

Exp No.:

Date:

11. WORKSHOP BUILDING

Aim:

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

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

KEYWORDS:

Auto Cad Software

THEORY

CAD means Computer Aided Design or Drafting. Auto cad is most widely used software developed by auto desk. Auto cad is a drafting package in almost all engineering branches. There are drafting packages like cad are DIAP, CAMD, and Delights. Auto cad is one of the most popular cad packages. It is a general purpose computer aided design. We can draw geometrical entries like plan, section and elevation of a building.

- We can make accurate drawings like plan, section and elevation of a building.
- Improved engineering productively
- Reduced engineering personal requirement.
- Drawing modification or eraser to intake.
- Drawings prepared in the software can be stored safely

EPERIMENTAL PROCEDURE

Specifications:

The following specifications correspond to a workshop building

1. Foundation:

The foundation for all walls will be cement concrete 1:4:8 mix, 1100mm wide and 300mm thick laid at 1500 below ground level. The masonry footing will be in brick work in cement mortar 1:5, first footing being 1100 x 400, second being 900 x 400 and the third being 700 x 400 for all walls.

2. Basement:

The basement will be in brick work in cement mortar 1:5, 500 wide and 450 thick above ground level for all walls and is filed with clean earth 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. Super structure:

All main walls will be in brick work in cement mortar 1:5 using country bricks, 300 thick. The height of all walls will be 4000 above floor level. Interior wall of foreman rooms will be in brick work in cement mortar 1:5, using first class brick 200 thick and carried up to a height of 3000. All the walls including basement will be plastered smooth with cement mortar 1:4 externally and 1:6 internally for 12.5 thick.

4. Roofing:

Pratt truss of span 18000, height 1500 will be provided at a spacing of 6000 c/c. North light roof truss of span 6000, height 1500 will be provided at a spacing of 3000 c/c. The roofing will be of asbestos cement sheet laid on angle purlin over the north light roof truss. Glass panels of thickness 3 will be provided in the north direction.

5. Doors, windows, etc.

D1 - Rolling steel shutter 3000 x 3200

D2 - Flush door 1000 x 2200

W - Window glazed 1500 x 1200

W1 - Peep window glazed 1200 x 300

C - Ventilator glazed 1800 x 400

6. Lintel:

All external openings of doors and windows will be provided with R.C.C. lintel-cum-sunshade 1:2:4 mix, 150 thick and all internal openings will be provided with R.C.C. lintel 1:2:4 mix, 100 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.

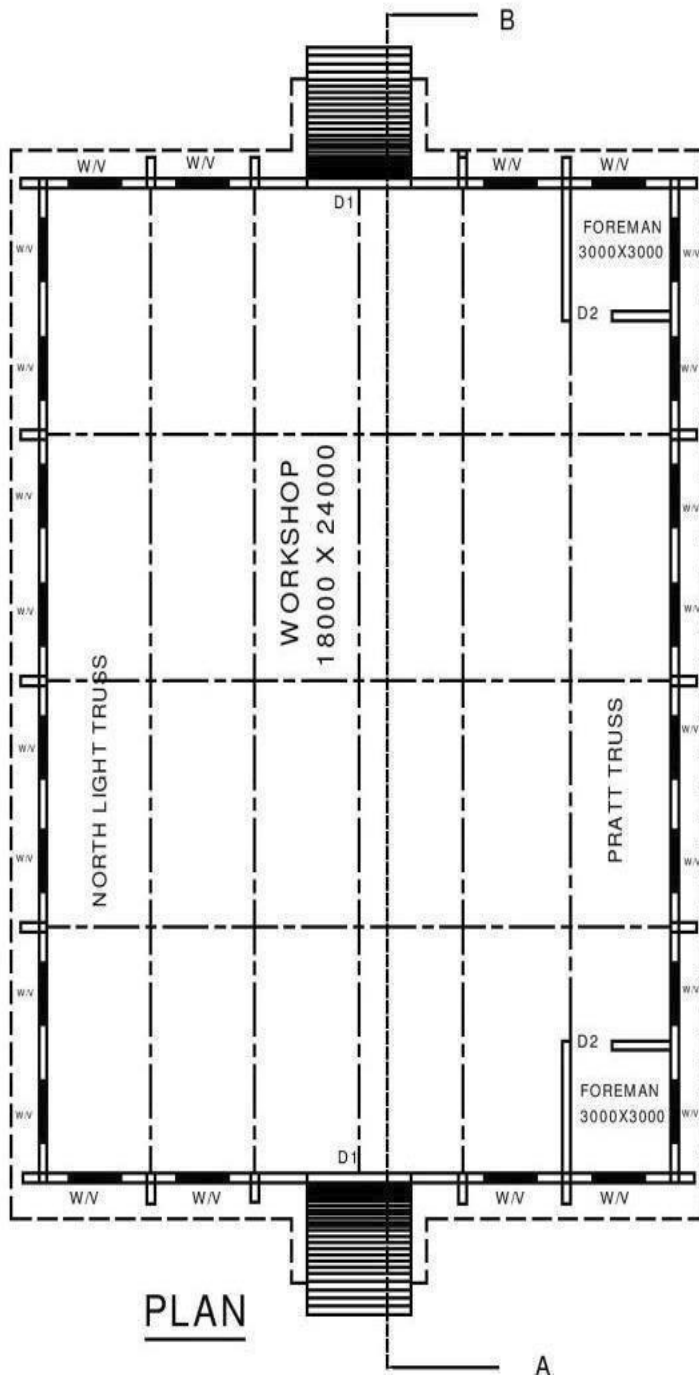
8. Ramp 003A

Ramp will be in cement concrete 1:3:6, 3600 x 2000 laid over concrete footing. 1:3:6 of 150 thick.

Note :

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

WORKSHOP BUILDING



RESULT:

The workshop building is drawn successfully using basic AutoCAD commands