AARUPADAI VEEDU INSTITUTE OF TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

17CVCC81 - COMPUTER AIDED BUILDING DRAWING LAB

FOR I SEMESTER (B.E. – CIVIL)

[REGULATION 2017]

<div style="border:1px solid">

LABORATORY MANUAL

</div>

NAME   : ……………………………………………………………….

REG. NO.   : …………………………………

CLASS   : ………………………………………………………………..

HoD/Civil Engg.

17CVCC81 - COMPUTER AIDED BUILDING DRAWING LAB

SYLLABUS

COURSE OBJECTIVES

- To acquire hands on experience in design.

- To prepare structural drawings for concrete / steel structures normally encountered in Civil Engineering practice.

LIST OF EXPERIMENTS

- Principal of planning, orientation and complete joinery details(paneled and glazed Doors and Windows)

- Building with load bearing walls

- Building with sloping roof

- R.C.C. framed structure.

- Industrial buildings – North light roof structures

COURSE OUTCOMES

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

INDEX

S.NO	DATE	NAME OF THE EXPERIMENT	PAGE NO.	MARKS	SIGNATURE
1		**INTRODUCTION**			
2		**BASIC DRAWING COMMANDS**			
3		**A PANELLED DOOR (DOUBLE DOOR)**			
4		**RESIDENTIAL BUILDING WITH R.C.C. FLAT ROOF**			
5		**RESIDENTIAL BUILDING WITH SLOPINGROOF**			
6		**INDUSTRIAL BULIDING**			

Expt. No.:1   **INTRODUCTION**

Aim:

CADD-Computer Aided Designing and Drafting

Overview:

CADD is an electronic tool that enables us to make quick and accurate drawings. CADD has number of advantages over drawings created on a drawing board. Electronic drawings can be modified quite easily and can be represented in a variety of formats. CADD extends its power to yet another branch of engineering called computer aided manufacturing (CAM). CADD and manufacturing program are often integrated into one system called CAD-CAM. This system import CADD drawings into CAM program to automate the manufacturing process. When the design is finalized, the drawings are brought into a CAD-CAM system that uses numerical data from the CADD drawing for actual manufacturing. There is separate category of programs called Computer Aided Engineering (CAE) that can use CADD drawing for engineering analysis. The CAE programs have a number of applications in Structural Design, Civil Engineering, Mechanical Engineering and Electrical Engineering.

Expectations from CADD

We can do amazing things with CADD that we never thought possible while creating drawings with pen or pencil. The following are some of the important capabilities that make CADD a powerful tool.

o Presentations.

o Flexibility in editing.

o Unit and accuracy levels.

o Storage and access for drawings.

o Sharing CADD drawings.

Presentations

There are a number of ready-made presentation symbols available in CADD that can be used to enhance the look of drawings. In addition to prepare impressive presentations on paper, we can use CADD to make an on-screen presentations. Advanced CADD programs ever allow us to create an animated image.

Flexibility in editing

CADD allows us to work with great accuracy. If we need to create highly accuracy geometric shapes, CADD is the answer. It can help avoid time-consuming mathematical calculations.

Unit and accuracy level

We can work with as high precession as 1/1000th of an inch.

Storage and access of drawing

A computer electronic filing system has the following advantages over the traditional filing system.

   o It is quick and convenient to organize CADD drawing in a computer.

   o It enables us to create a highly organized environment.

   o An electronic drawing never gets old and faded.

Sharing CADD Drawing

The electronic drawing can be shared by a number of users, allowing them to Co-ordinate projects and work as a team. This is accomplished by connecting different computer via a network

About AutoCAD

AutoCAD is a Computer Aided Design (CAD) program used by just about every Engineering and Design office in the world. Although there are alternative CAD packages, AutoCAD is so far the most widely used system. Autodesk's AutoCAD is the industry leader in CAD packages, Used by Civil Engineers, Architects, Mechanical and Electrical Engineers, Aeronautical Engineers plus many other disciplines. There have been several versions of AutoCAD over the years, with each new version introducing new and more powerful features than its predecessor. Any courses, whether through community colleges or online universities.

AutoCAD. Accurate, scale drawings can be created and published using AutoCAD powerful features. 3D 'models' can also be created giving the designer absolute control over the design from start to finish. The computerized model can be viewed through a 360° angle, and even 'rendered' with a texture on screen to give an idea of the finished product.

RESULT:

Thus the introduction about Computer Aided Designing and Drafting is studied successfully.

VIVA - VOCE

1. What is meant by AutoCAD?

2. What is the diff between CAD & CADD?

3. What are the applications of CAD?

4. Define-absolute co-ordinates

5. Define polar co ordinates

6. Define angular dimension?

7. What is meant by units?

8. What is the file formats used in design?

9. What are the fields where you see maximum use of Autocad?

10. How you can create a user interface in Autocad?

Expt. No.:2   BASIC DRAWING COMMANDS

Commands Used:

Command: Rectangle

        Starting point: 100,100

        End Point: 104,102

Command: Circle

        Centre point: 104,102

        Radius: 0.5

Command: Move

        Select object: Use any object icon selection method

        Basic point of displacement: 104, 102

        End Point of displacement: 102,101

Command: Polygon

        No. of Sides: 6

        Edge Centre point of polygon: E

        First point of edge: 100,100

        Second point of edge: 103,100

Command: Offset

        Select the object of offset [use only object selection method]

        Offset distance through [Current]:0.5

        Command: Rectangle

        First Point: 100,100

        Opposite Point: 104,102

Command: Circle

3P/2P/ttr<centre point>: 104,100

Diameter<radius>:0.5

Command: Copy

Select object [use only object selection method]

Base point: 104,100

First point of displacement: 104,102

Second point of displacement: 100,102

Third point of displacement: 100, 100

From point 100,100

To point: 102,100

To point: 102, 100, and 75

To point: 100, 75, 100, and 75

To point: 102, 102, and 75

To point: 102,103

To point: 100,103

To point: 102, 100, and 75

To point: 100,100

Command: Polygon

No. of Sides: 5

Edge <centre of polygon>100,100

Inscribed in circle/Circumscribed about circle radius of polygon: 0.5

Command: Array

Rectangular (or) polar array[R/P] <current>: Enter

Select object: Object Selection method

No. of rows (L) <L>:3

No. of columns<M>:5

No. of columns between row<3>:2

Distance between columns (M):2

Command: Mirror

Select objects: [use any object selection command]

First point of mirror line: 102,100

End point of mirror line: 102,103

Delete the source object: <N>

Command: Circle

3P/2P/ttr<centre point>: 100,100

Diameter<radius>:

Command: Arc

Start Point: 100,100

<Centre point>/<End point>: F

End point: 100,102

Command: Array

Rectangular (or) Polar(R/P) <current>: P

Base<Centre point of array>:100,100

No. of items: 6

Angle of items to fill = [10<=10] <360>

Rotate to fill array object [Y.M]: Y

Command: Line

From point: 100,100

To point: 103,100

Command: Arc

                Start point: 103,100

                Second point: 100,103

                End point: 97,100

Command: Array

                Rect/Polar(R/P) <current>: P

                Current: 100,100

                No. of items: 100

                Angle of items to fill = [10-2(10)] <360>:180

                Rotate angle array object (Y/N): (4)

Command: Circle

                3P/2P/ttr<centre point>: 100,100

                Diameter<radius>:1.5

Command: Break

                Enter the first point: 100, 100.5

Command: Rectangular

                First point: 100,100

                Opposite corner point: 104,103

Command: Circle

                3P/2P/ttr<centre point>: 100,100

                Diameter<radius>:1.5

Command: Trim

                Select cutting angle edge: Select the rectangle

                Select object: Now click the edge to erase with in cutting edge

Command: Polygon

          No. of sides: 3

          Edge <centre points>: E

          First point of edge: 100,100

          Second point of edge: 103,100

Command: Rectangle

          First point: 100,100

          Opposite Point: 103,103

Command: Scale

          Select object: Use only one object

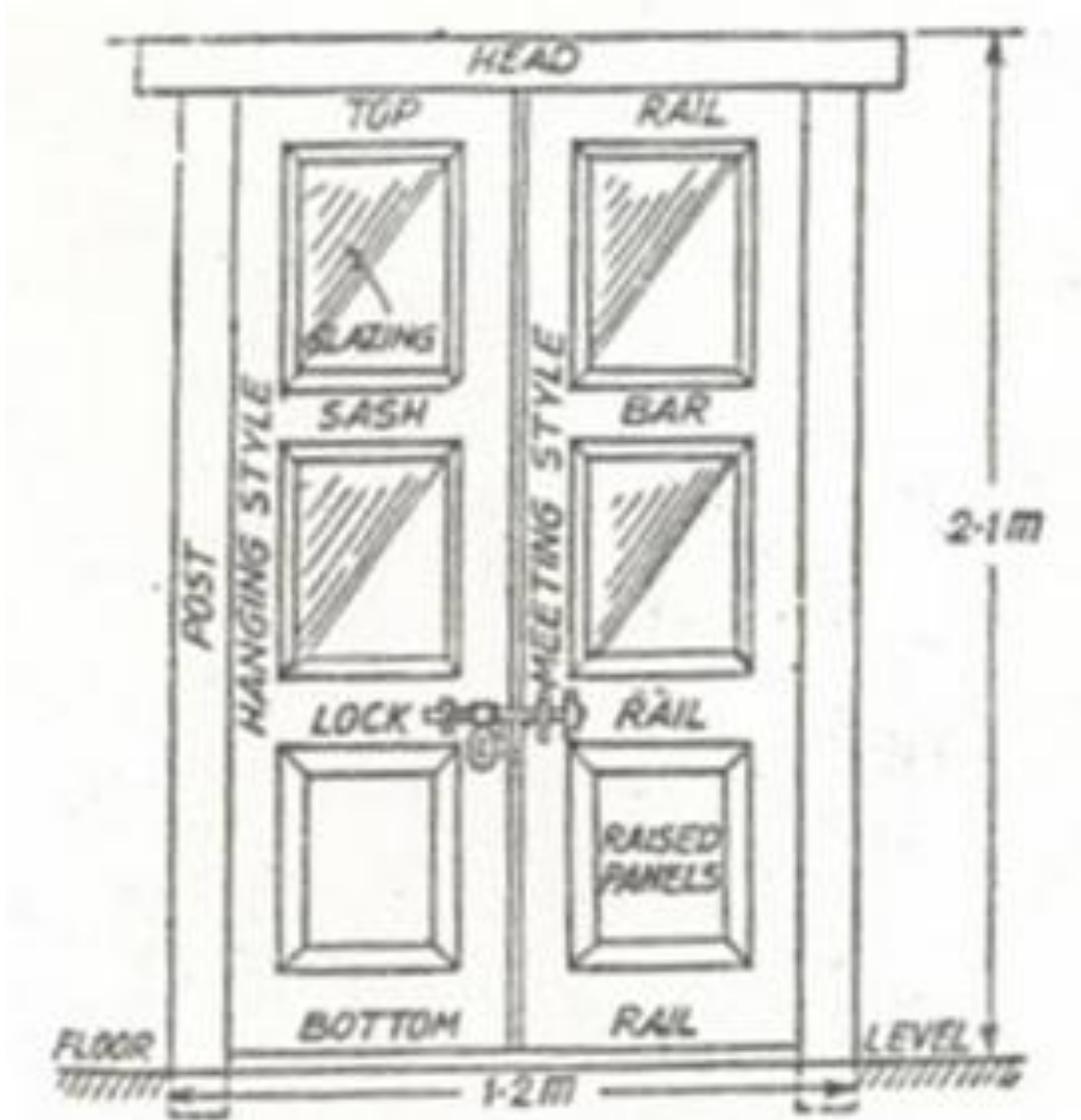   Select Base point: 100,100

          <Scale factor>:/reference: 2

RESULT:

          Thus the given drawing is drawn by using basic AUTOCAAD commands.

VIVA - VOCE

1. Define-current UCS

2. What is .dwg?

3. Definemirror

4. What is an object snap mode?

5. What is rotate?

6. What is meant by dimension?

7. Define offset

8. What is trim?

9. What is the difference between erase and trim?

10. What do you mean by array?

Expt. No.: 3   A PANELLED DOOR (DOUBLE DOOR)

Aim:

To draw a panelled door with double leaf using basic AutoCAD commands

Procedure:

1. Head : 100 x 80

2. Top Rail :40 x 100.

3. Frieze Rail : 40 x 100.

4. Lock Rail : 40 x 100.

5. Bottom Rail : 40 x 150.

6. Panel : 25 thick.

7. Post : 80 x 100.

8. Hanging style : 40 x 100.

9. Hold fast : 75 x 225 x 75.

COMMANDS USED:

Command: Rectangle

Starting point: 100,100

End Point: 104,102

Command: Offset

Select the object of offset [use only object selection method]

Offset distance through [Current]:0.5

Command: Rectangle

First Point: 100,100

Opposite Point: 104,102

Command: Copy

Select object [use only object selection method]

Base point: 104,100

First point of displacement: 104,102

Second point of displacement: 100,102

Third point of displacement: 100, 100

From point 100,100

To point: 102,100

To point: 102, 100, and 75

To point: 100, 75, 100, and 75

To point: 102, 102, and 75

To point: 102,103

To point: 100,103

To point: 102, 100, and 75

To point: 100,100

Command: Mirror
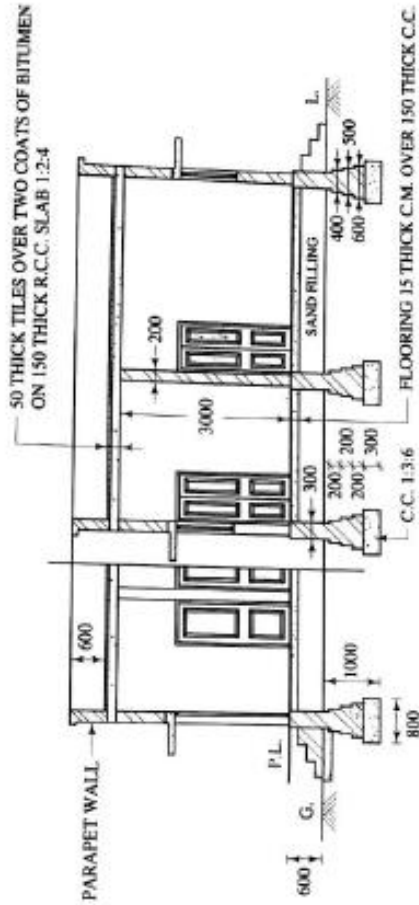
Select objects: [use any object selection command]

First point of mirror line: 102,100
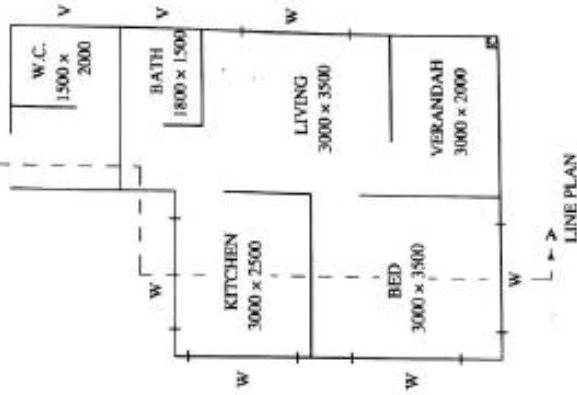
End point of mirror line: 102,103

Delete the source object: <N>

.

RESULT:

Thus a dPanelled door with double leaf is drawn using AUTO CAAD.

ELEVATION

DIMENSIONED PLAN

W.C. 1500 × 2000

BATH 1800 × 1500

LIVING 3000 × 3500

VERANDAH 3000 × 2000

KITCHEN 3000 × 2500

BED 3000 × 3500

50 THICK TILES OVER TWO COATS OF BITUMEN ON 150 THICK R.C.C. SLAB 1:2:4

FLOORING 15 THICK C.M. OVER 150 THICK C.C.

SAND FILLING

C.C. 1:3:6

PARAPET WALL

SECTION ON A-A

LINE PLAN

W.C. 1500 × 2000

BATH 1800 × 1500

LIVING 3000 × 3500

VERANDAH 3000 × 2000

KITCHEN 3000 × 2500

BED 3000 × 3500

REFERENCE

D	– DOOR PANELLED	– 1000 × 2000
D₁	– DOOR PANELLED	– 900 × 2000
D₂	– DOOR PANELLED	– 800 × 1800
W	– WINDOW PANELLED	– 2000 × 1000
V	– VENTILATOR GLAZED	– 800 × 500

M.I.G. HOUSE

ALL DIMENSIONS ARE IN mm

15
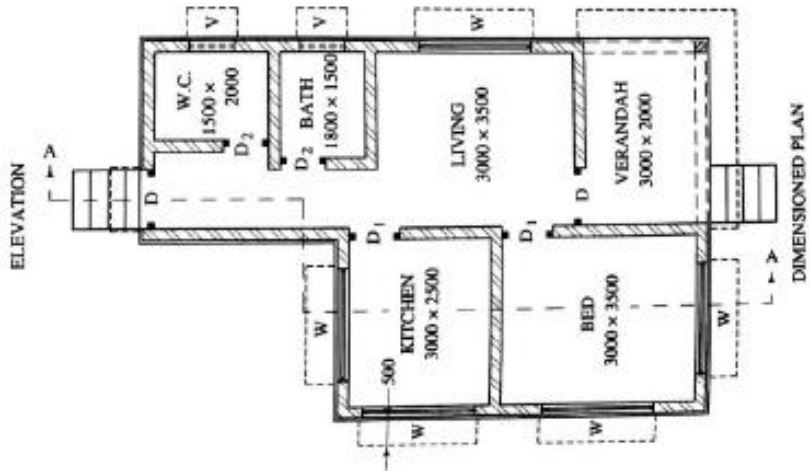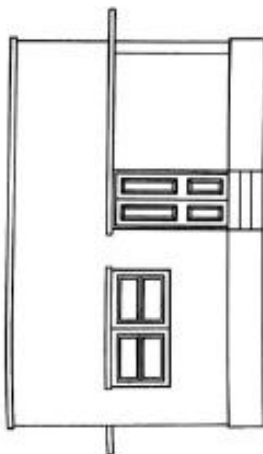
Expt. No.: 4   RESIDENTIAL BUILDING WITH R.C.C. FLAT ROOF

Aim:

To draw a residential room with R.C.C. flat roof using basic AutoCAD commands

Procedure:

1) To Draw Foundation:

The following commands are used to draw the foundation

    a) Line

    b) Hatch

    c) Rectangle

    d) Trim

    e) Copy

    f) Break

With the above commands footing was drawn to given boundaries.

2) Draw Basements:

For drawing the basement the following commands are used

    a) Line

    b) Hatch

    c) Rectangle

    Boundary Hatch command allows you to hatch a region enclosed with in a boundary layer picking a point inside the boundary. Hatch can be changed from the options suitable in the BH dialog box.

3) To draw Super Structure

For the following main wall, parapet and verandah, retaining walls the following commands must e be used.

    (a) Mline

    (b) BH

Parallel lines can be draw using MLine commands.

- Select ML in format menu.

- Element properties were chosen from Mline dialog box.

- We can modify the offset distance line type and colour.

4) Draw Roofing:

- To draw doors and windows, blocks and insert ends can be used.

- Blocks and creates a block of definition of selected objects.

- Select the block from the draw menu.

- The block menu name as given in the tank box.

- The select object command button was decided.

- All objects required to be in that block were selected.

(5) To draw lintel:

- To draw lintel, the line command is used.

- To draw flooring, line and hatch commands are used.

- Horizontal lines are drawn by using line commands.

- Floor finishing was hatched with a suitable pattern by using the hatch command.

(6) To draw step

Line and offset commands are used to offset commands is used to draw parallel lines at a particular interval.

Specifications

The following specifications correspond to a residential building with RCC Flat roof.

Foundations:

The following for all the main walls will be in 1:4:8 mix 800 mm wide and 200 mm thick at 650 mm below the ground level the masonry footing being 500x450 for walls.

Basement:

Basement will be in reinforced masonry in 1:5, 300 mm wide and 450 mm thick above the ground level for all walls and is filled with sand to a depth of 300mm.A DPC in 1:4:8, 20mm thick will be provided for all walls at basement level.

Superstructure:

The wall including basement will be plastered smooth in CM 1:4 externally and 1:6 internally of 20mm thick. Parapet walls 200 mm thick 500mm height will be provided all rounds.

Roofing:

Roofing will be of RCC 1:5:8 with 100mm thick flat side over line room. A weathering course in the brick lime concrete mix plastered with combination mortar 75mm thick over the roof.

Doorsand Windows

Panelled Door - 1000 mm x 2000 mm

Window Panel - 2000 mm x 1000 mm

Ventilator glazed - 800 mm x 500 mm

Result:

The residential room with RCC Flat roof was drawn using AUTOCAD.

VIVA - VOCE

1. What is Bylayer?

2. What is command: prompt?

3. What is cross hair cursor?

4. What is Foundations?

5. Define Basement

6. Define Superstructure

7. What is lintel?

8. What is roofing?

9. Define parapet wall

10. Difference between roof and slab

West Side

Expt. No.: 5   RESIDENTIAL BUILDING WITH SLOPING ROOF

Aim:

To draw a residential room with R.C.C. sloping roof using basic AutoCAD commands

Procedure:

1) To Draw Foundation:

The following commands are used to draw the foundation

    a) Line

    b) Hatch

    c) Rectangle

    d) Trim

    e) Copy

    f) Break

With the above commands footing was drawn to given boundaries.

2) Draw Basements:

For drawing the basement the following commands are used

    a) Line

    b) Hatch

    c) Rectangle

Boundary Hatch command allows you to hatch a region enclosed with in a boundary layer picking a point inside the boundary. Hatch can be changed from the options suitable in the BH dialog box.

3) To draw Super Structure

For the following main wall, parapet and verandah, retaining walls the following commands must e be used.

    (a) Mline

    (b) BH

Parallel lines can be draw using MLine commands.

- Select ML in format menu.

- Element properties were chosen from Mline dialog box.

- We can modify the offset distance line type and colour.

4) Draw Roofing:

- To draw doors and windows, blocks and insert ends can be used.

- Blocks and creates a block of definition of selected objects.

- Select the block from the draw menu.

- The block menu name as given in the tank box.

- The select object command button was decided.

- All objects required to be in that block were selected.

(5) To draw lintel:

- To draw lintel, the line command is used.

- To draw flooring, line and hatch commands are used.

- Horizontal lines are drawn by using line commands.

- Floor finishing was hatched with a suitable pattern by using the hatch command.

(6) To draw step

Line and offset commands are used to offset commands is used to draw parallel lines at a particular interval.

Specifications

The following specifications correspond to a residential building with RCC Flat roof.

Foundations:

The following for all the main walls will be in 1:4:8 mix 800 mm wide and 200 mm thick at 650 mm below the ground level the masonry footing being 500x450 for walls.

Basement:

Basement will be in reinforced masonry in 1:5, 300 mm wide and 450 mm thick above the ground level for all walls and is filled with sand to a depth of 300mm.A DPC in 1:4:8, 20mm thick will be provided for all walls at basement level.

Superstructure:

The wall including basement will be plastered smooth in CM 1:4 externally and 1:6 internally of 20mm thick. Parapet walls 200 mm thick 500mm height will be provided all rounds.

Roofing:

Roofing will be of RCC 1:5:8 with 100mm thick flat side over line room. A weathering course in the brick lime concrete mix plastered with combination mortar 75mm thick over the roof.
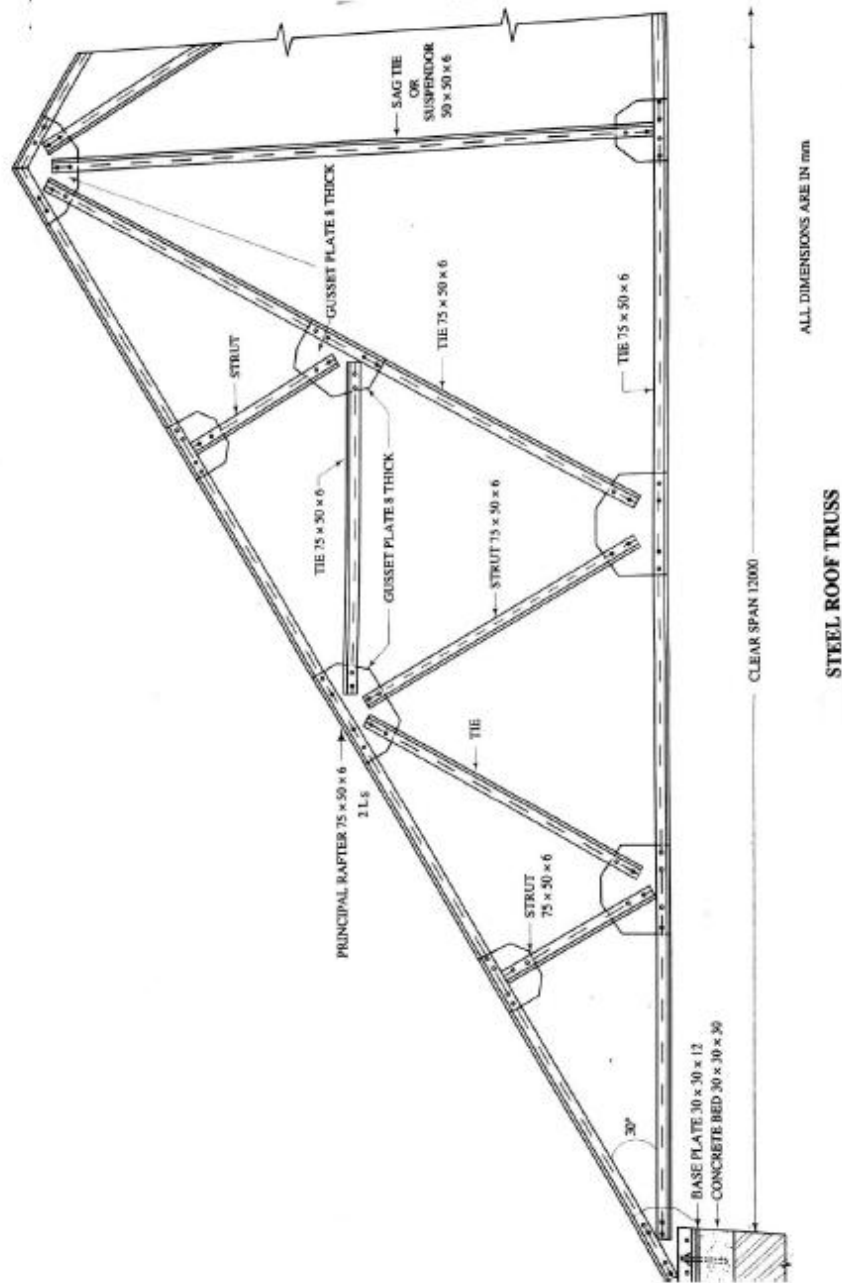
Doorsand Windows

Panelled Door - 1000 mm x 2000 mm

Window Panel - 2000 mm x 1000 mm

Ventilator glazed - 800 mm x 500 mm

Result:

   The residential room with RCC sloping roof was drawn using AUTOCAAD.

STEEL ROOF TRUSS

ALL DIMENSIONS ARE IN mm

Expt. No.:6   INDUSTRIAL BULIDING

Aim:

To draw a Industrial building with steel roof truss using basic AutoCAD commands

Procedure:

1) To Draw Foundation:

The following commands are used to draw the foundation

a) g) Line

b) h) Hatch

c) Rectangle

d) j) Trim

e) k) Copy

f) l) Break

With the above commands footing was drawn to given boundaries.

2) Draw Basements:

For drawing the basement the following commands are used

a) Line

b) Hatch

c) Rectangle

Boundary Hatch command allows you to hatch a region enclosed with in a boundary layer picking a point inside the boundary. Hatch can be changed from the options suitable in the BH dialog box.

3) To draw Super Structure

For the following main wall, parapet and verandah, retaining walls the following commands must e be used.

(a) Mline

(b) BH

Parallel lines can be draw using MLine commands.

- Select ML in format menu.

- Element properties were chosen from Mline dialog box.

- We can modify the offset distance line type and color.

(4) Draw Roofing:

- To draw doors and windows, blocks and insert ends can be used.

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(5) To draw lintel:

- To draw lintel, the line command is used.

- To draw flooring, line and hatch commands are used.

- Horizontal lines are drawn by using line commands.

- Floor finishing was hatched with a suitable pattern by using the hatch command.

(6) To draw step

Line and offset commands are used to offset commands is used to draw parallel lines at a particular interval.

SPECIFICATIONS

The following specifications correspond to a residential building with RCC Flat roof.

FOUNDATIONS:

The following for all the main walls will be in 1:4:8 mix 800 mm wide and 200 mm thick at 650 mm below the ground level the masonry footing being 500x450 for walls.

BASEMENT:

Basement will be in reinforced masonry in 1:5, 300 mm wide and 450 mm thick above the ground level for all walls and is filled with sand to a depth of 300mm.A DPC in 1:4:8, 20mm thick will be provided for all walls at basement level.

Result:

Thus the industrial building with steel roof truss was drawn using AUTOCAAD commands.

VIVA - VOCE

1. What is command line?

2. Define dimension variables

3. What is damp proof course?

4. What is a dwelling?

5. What is stone masonry?

6. What are the different types of foundation?

7. What are the different types of truss?

8. Draw north light truss

9. Define girder

10. Define purlin