D Y PATIL
RAMRAO ADIK INSTITUTE OF TECHNOLOGY
NAVI MUMBAI

Lab Manual

First Year Semester- I

Department of Engineering Sciences

Subject: Engineering Graphics

Odd Semester

Index

Study and Evaluation Scheme

Course Code	Course Name	Teaching Scheme			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical	Tutorial	Total
FEC 104	Engineering Graphics	03	04	--	03	02	--	05

Course Code	Course Name	Examination Scheme		
		Term Work	Practical	Total
FEL 103	Engineering Graphics	25	25	50

Term Work:

Term work shall consist of three components which include drawing sheets, drawing sketch book and AutoCAD printouts based on entire syllabus.

The distribution of marks for term work shall be as follows:

Drawing sheets : 10 marks

A3 Sketch book : 10 marks

Attendance (Theory and Practical) : 05 marks

The final certification and acceptance of term work ensures the satisfactory performance of laboratory work and minimum passing in the term work.

AutoCAD Examination: (2hrs):

1) **Minimum 1 problem from 1 or 2 or 4 of component-3 and**
2) **Minimum 1 problem from 3 of component-3.**
3) **Print out of the Answers have to be taken preferably in A3 size sheets and should be assessed by External examiner. Knowledge of concepts and accuracy of drawing should be considered during evaluation.**

Engineering Drawing

Sheet No. : 01

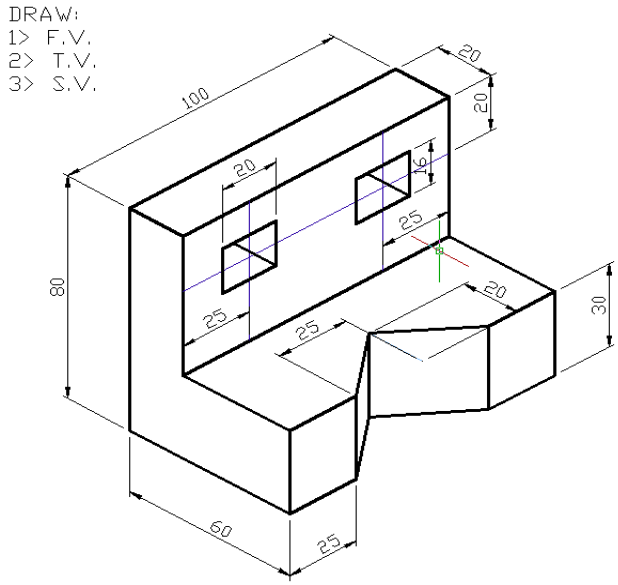
Orthographic Projection without sect

SHEET NO. 1

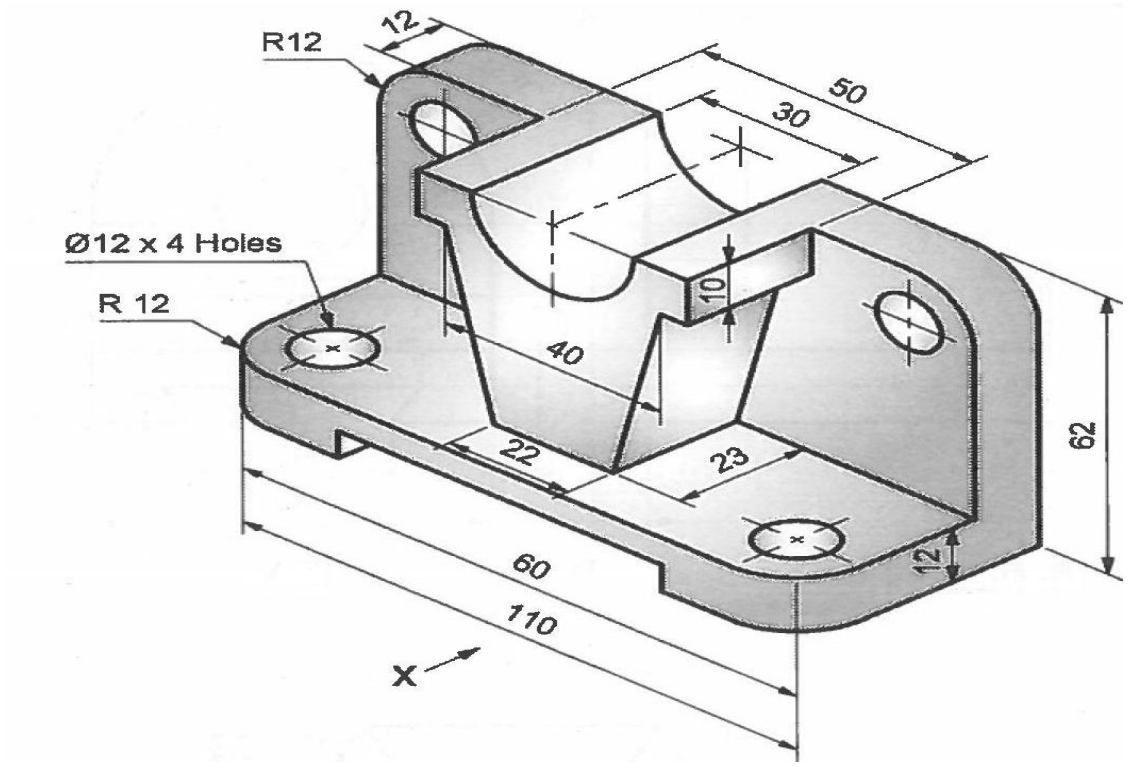
ORTHOGRAPHIC PROJECTION WITHOUT SECTION

CO2	**Apply the basic principles of projections in converting 3D views to 2D drawings.**
CO3	**Read a given drawing.**

Q.1

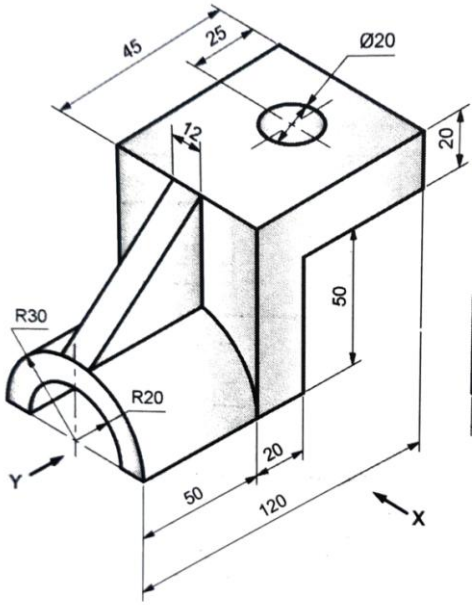


Q.2 Fig shows Pictorial view of an object. Draw F.V, T.V and S.V



Q.3 For the object shown in Fig. Draw the following views

i) Front view in the direction of arrow ii) Top view iii) Dimension the view



Q.4 Fig. shows Pictorial view of an object, draw the following views, a. Front View b. RHSV c. Top view d. Insert at least 6 dimensions

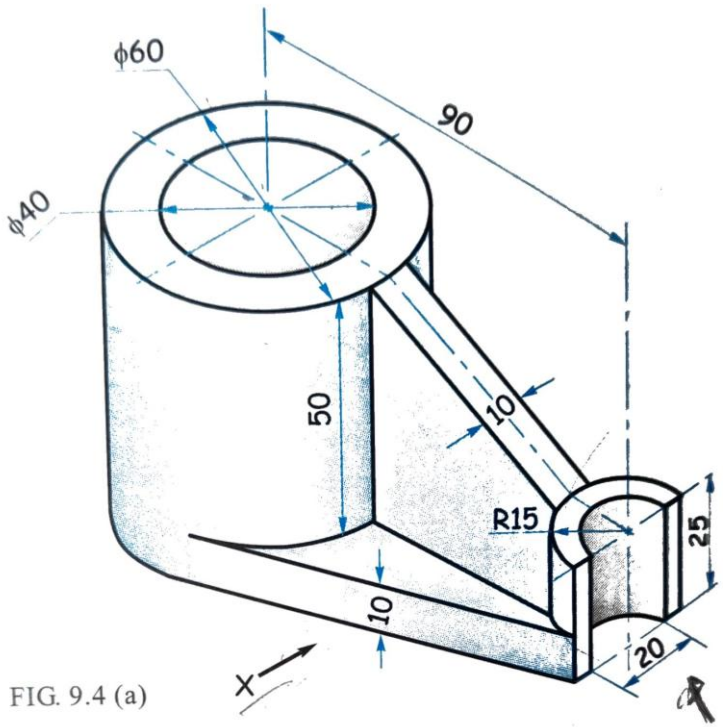
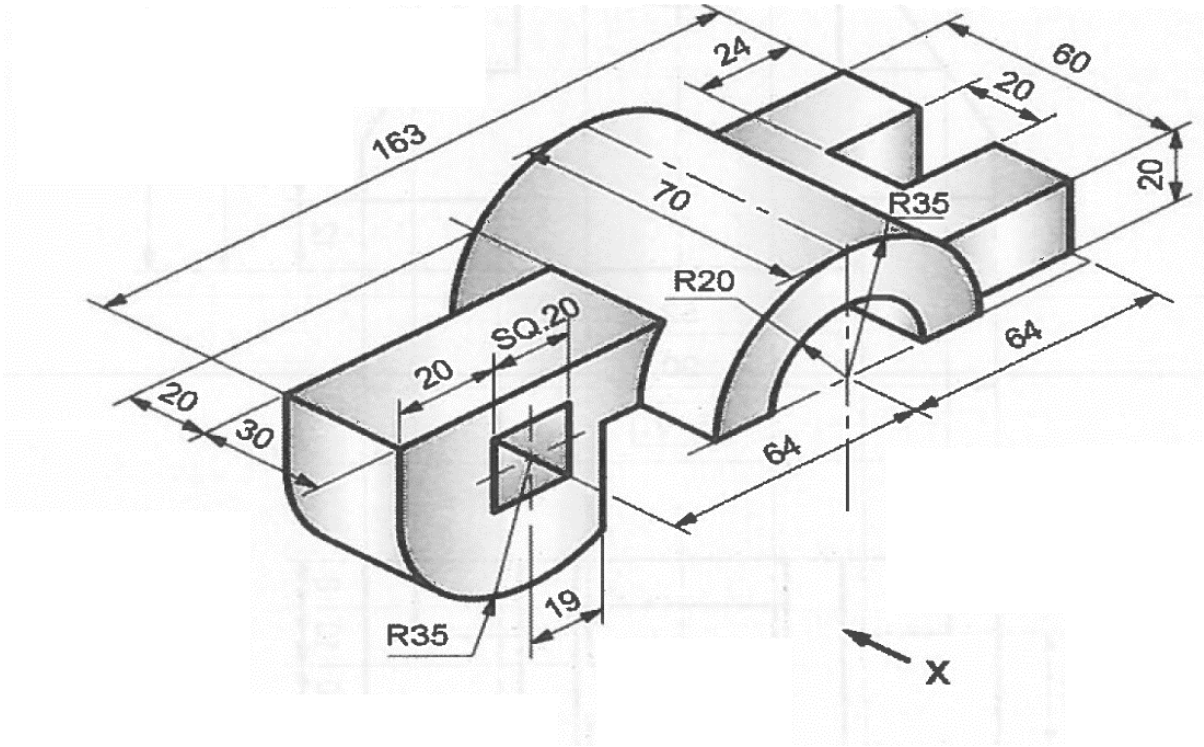
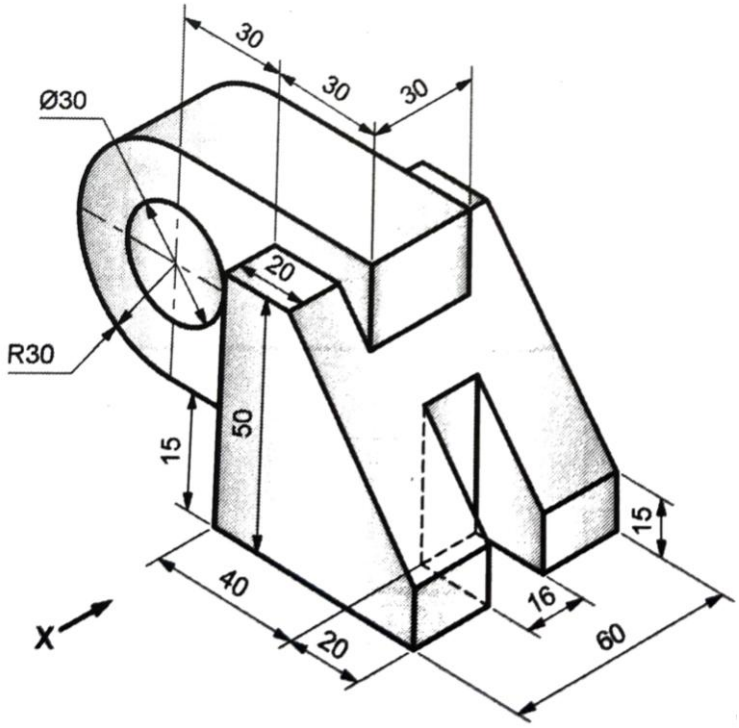


FIG. 9.4 (a)

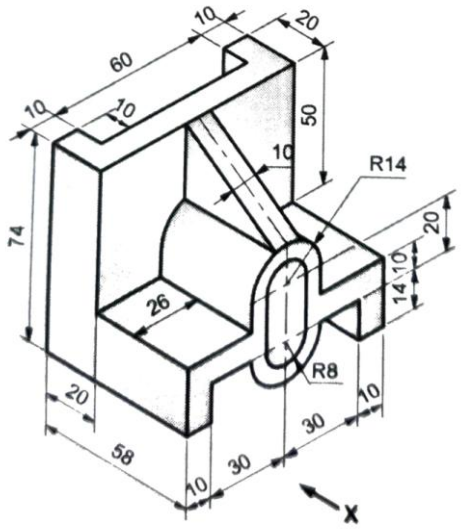
Q.5. Draw F.V. & T.V. looking in the direction X



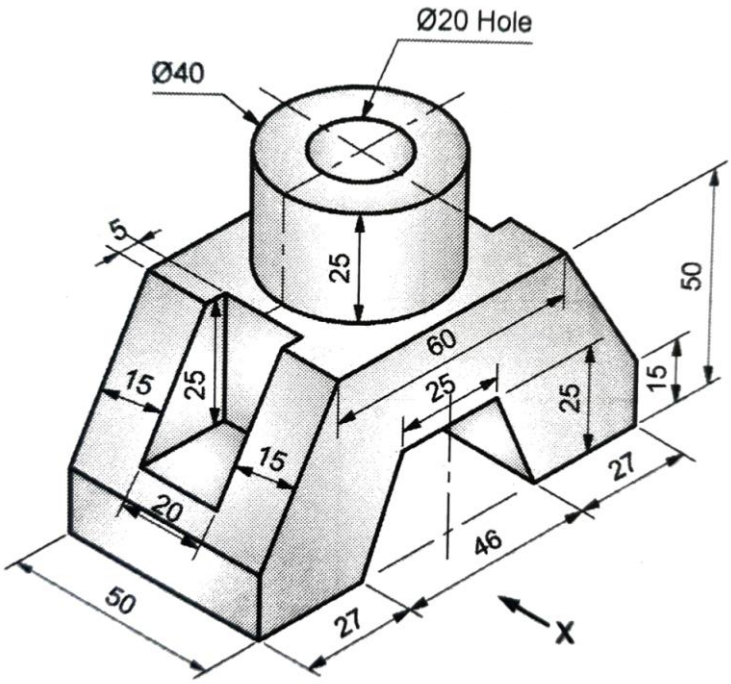
Q.6. Draw F.V. & T.V. looking in the direction X



Q.7. Draw F.V. & T.V. looking in the direction X



Q.8. Draw F.V. & T.V. looking in the direction X



All dimensions are in mm

Q.9. Draw F.V. & T.V. looking in the direction X

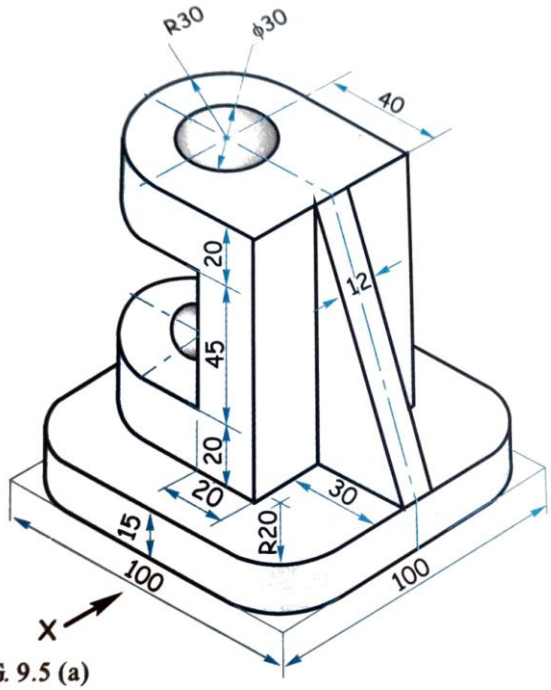
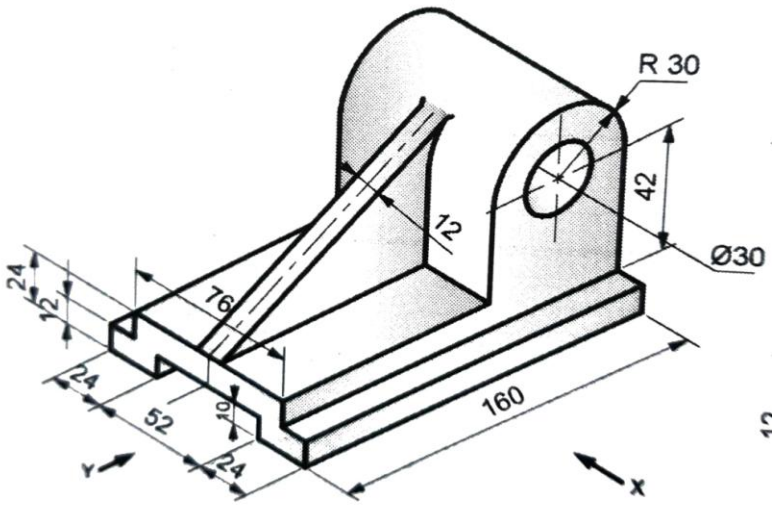


FIG. 9.5 (a)

Q.10. Draw F.V. & T.V. looking in the direction X



Engineering Drawing

Sheet No. : 02

Orthographic Projection with section

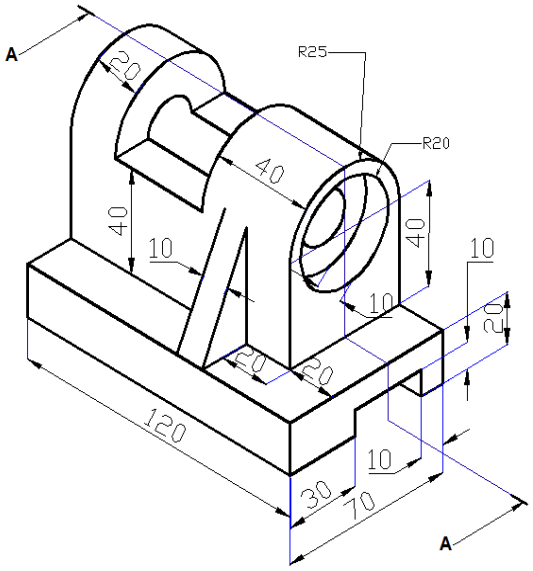
Date-

SHEET NO. 2
ORTHOGRAPHIC PROJECTION WITH SECTION

CO2	**Apply the basic principles of projections in converting 3D views to 2D drawings.**
CO3	**Read a given drawing.**

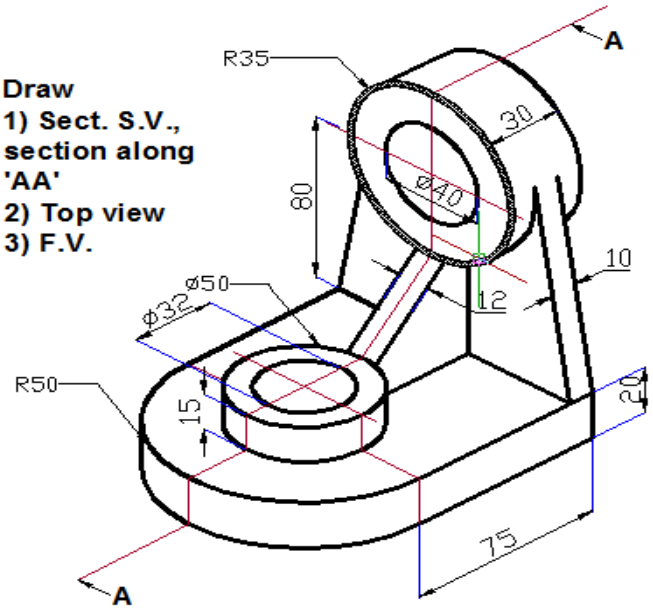
Q.1.

Draw
1) Sect. F.V., section along 'AA'
2) Top view
3) S.V.



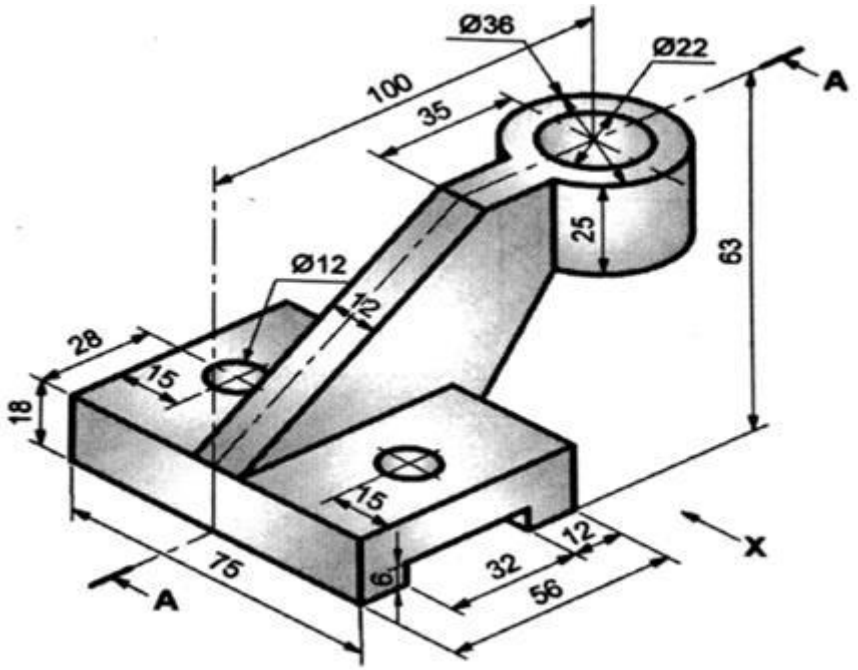
Q.2

Draw
1) Sect. S.V., section along 'AA'
2) Top view
3) F.V.



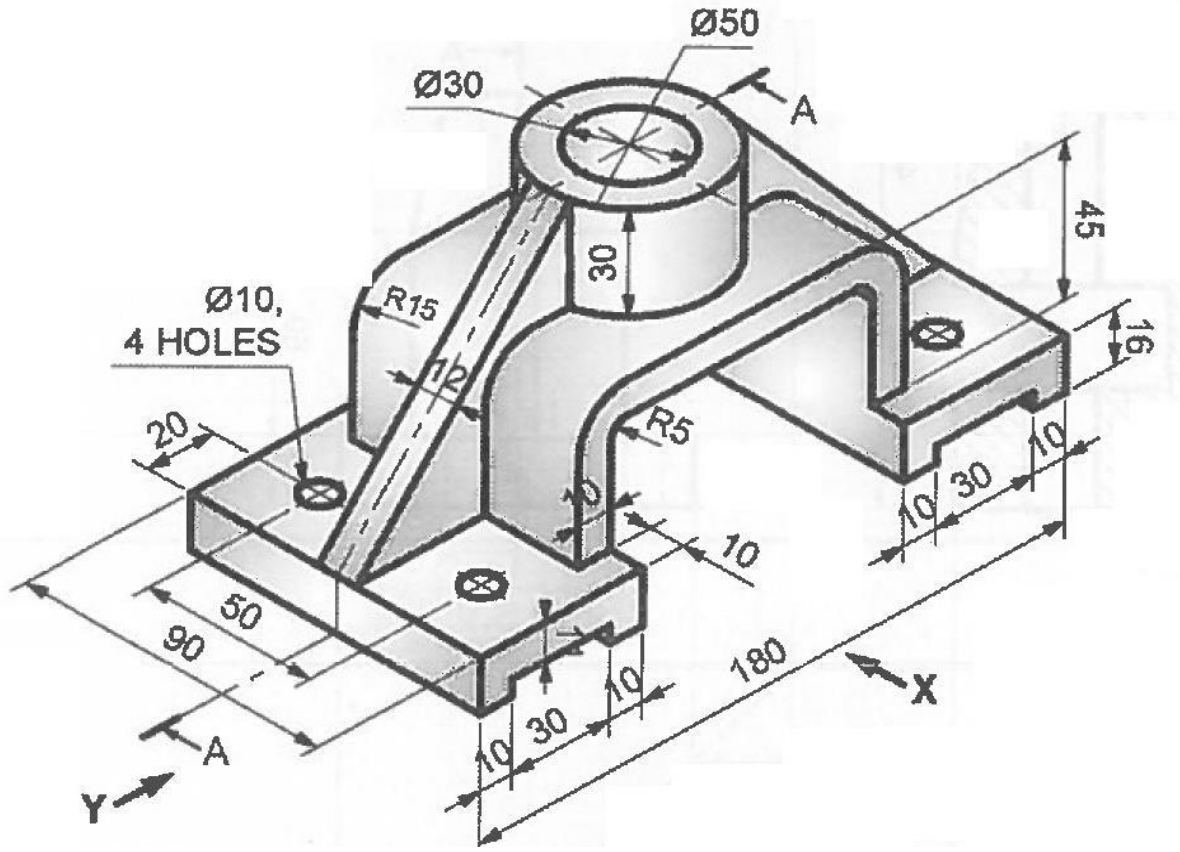
Q.3. Fig. shows Pictorial view of an object, draw the following views,

a. Sectional Front View (along A-A) b. Top view c. LHSV d. Insert at least 6 dimensions.

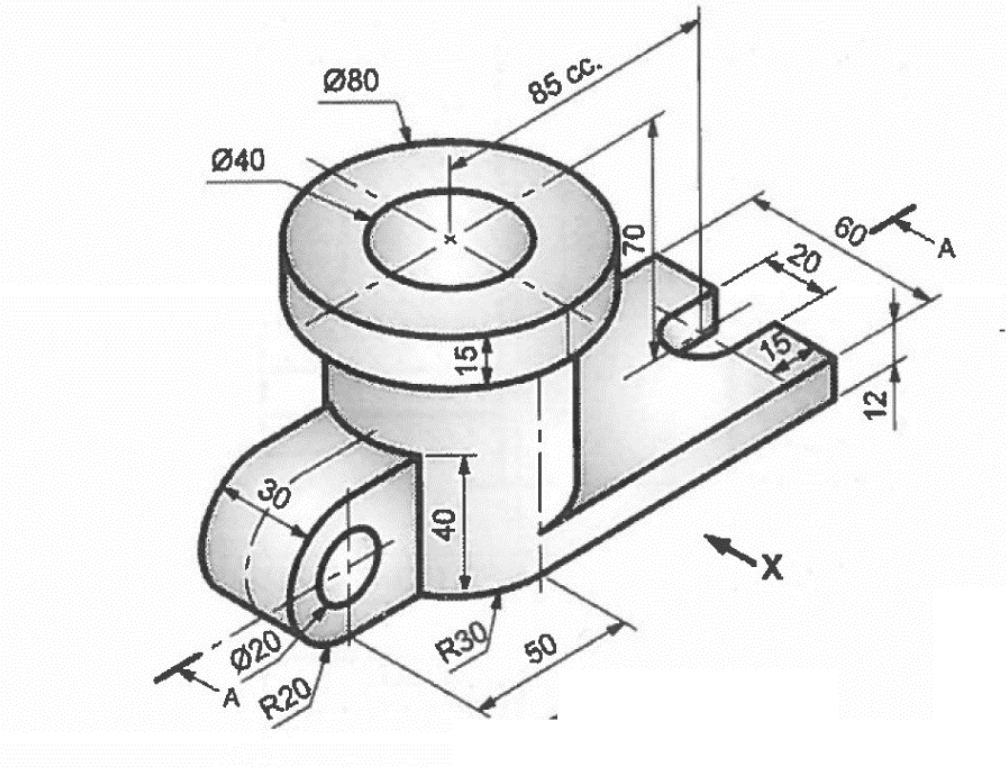


Q.4 Fig shows a pictorial view of a spindle bearing. Draw to a full scale, the following views using first angle method of projection

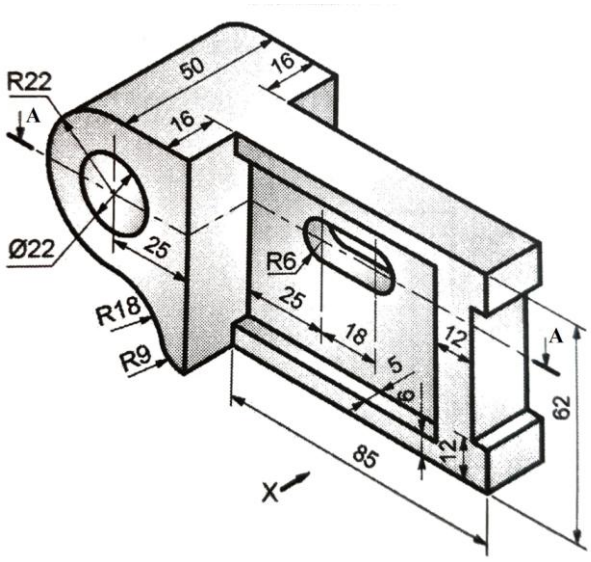
a) Sectional Front View along section plane A-A, b) Top View c) Left hand side view



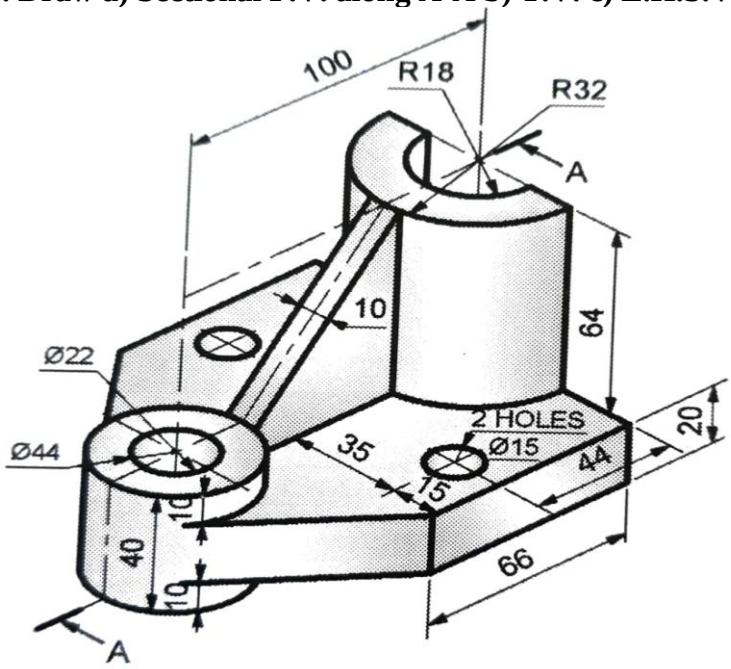
Q.5. Draw a) Sectional F.V. along A-A b) T.V. c) L.H.S.V. d) dimensions



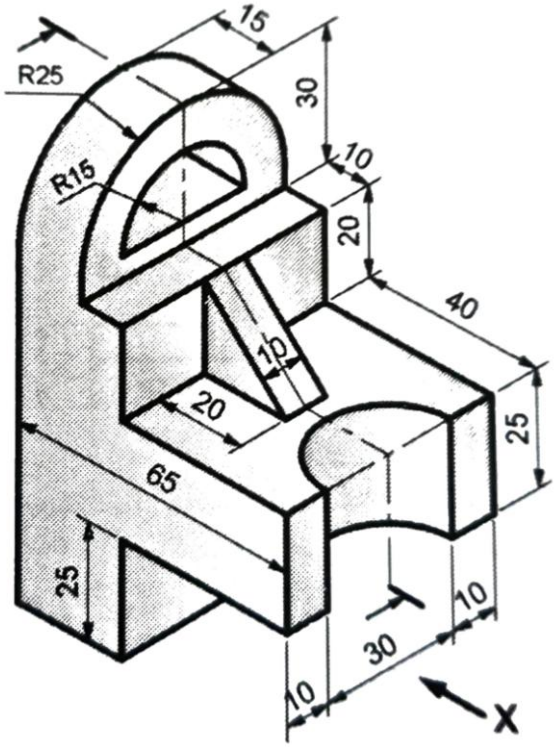
Q.6. Draw a) Front View b) Sectional T.V. along A-A c) R.H.S.V. d) dimensions



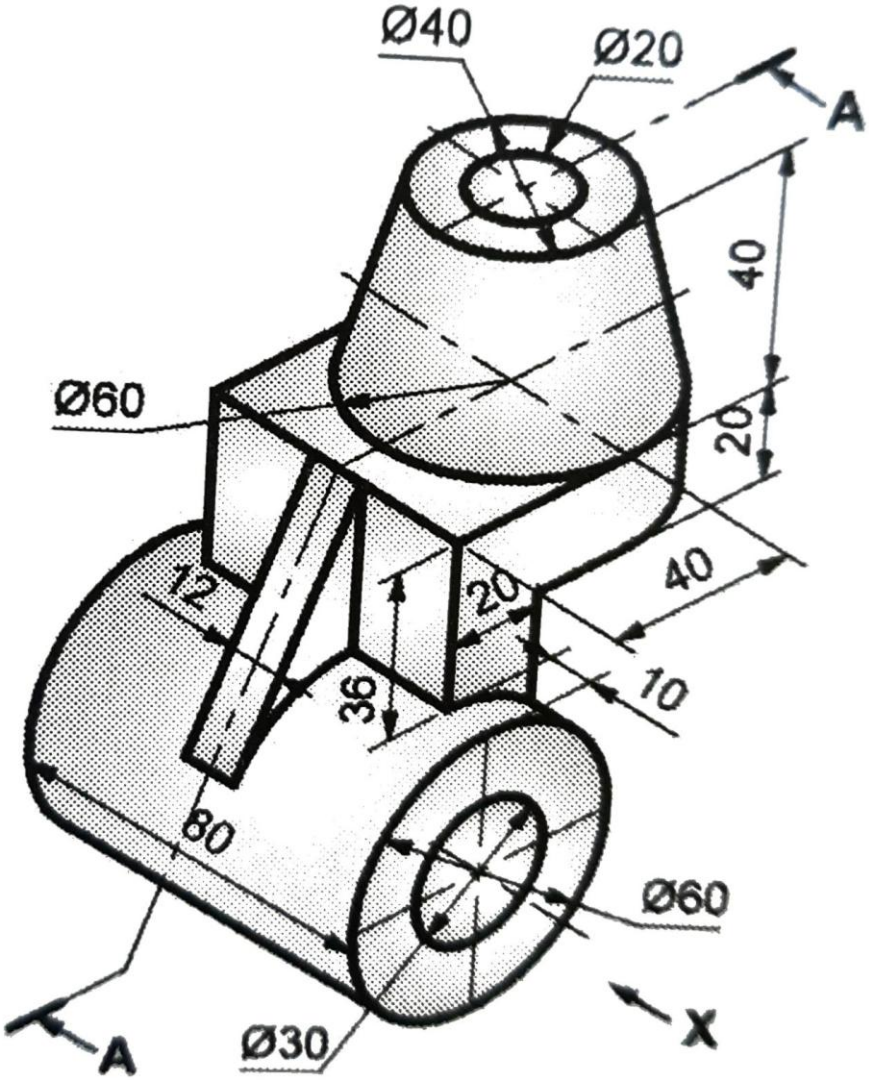
Q.7. Draw a) Sectional F.V. along A-A b) T.V. c) L.H.S.V. d) dimensions



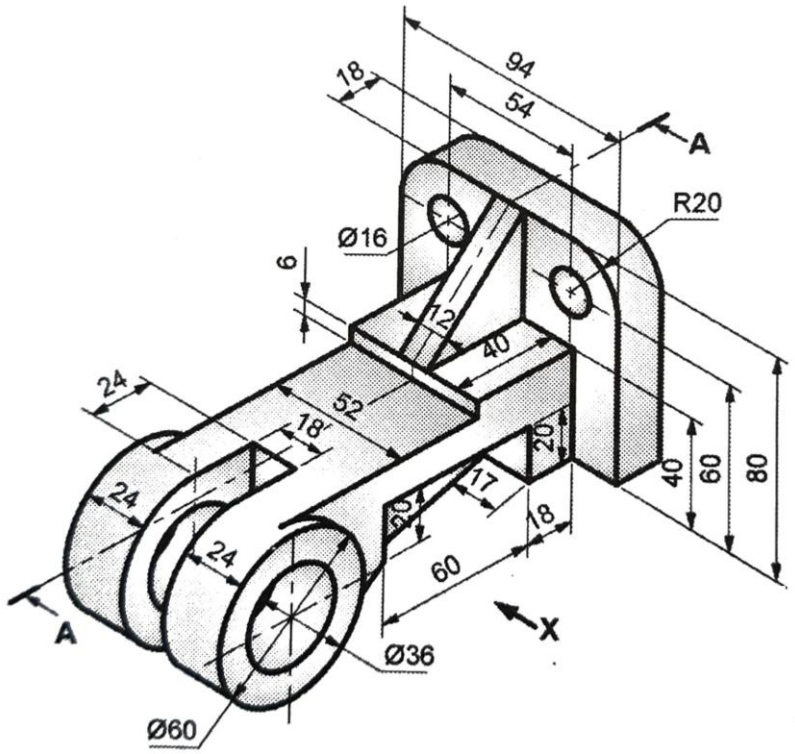
Q.8. Draw a) F.V b) T.V. c) Sectional side view d) dimensions



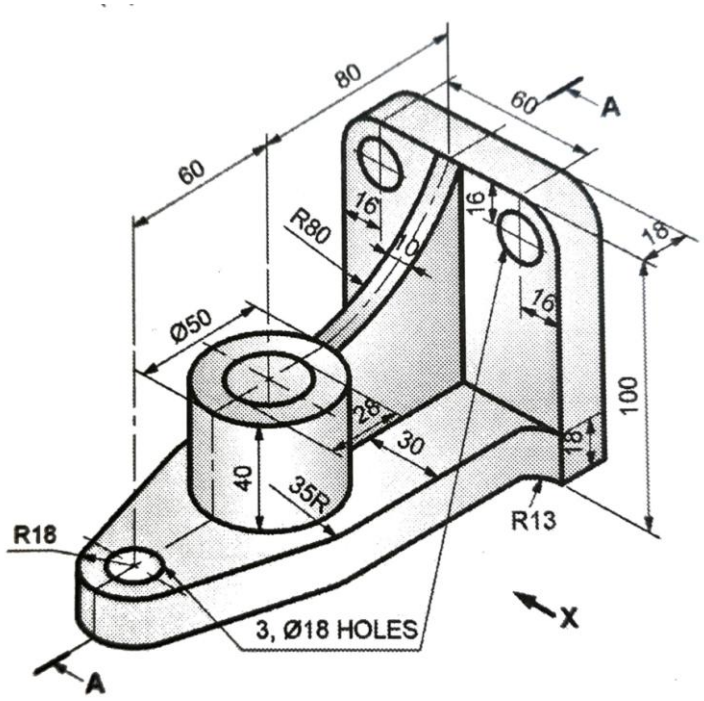
Q.9. Draw a) Sectional F.V. along A-A b) T.V. c) L.H.S.V. d) dimensions



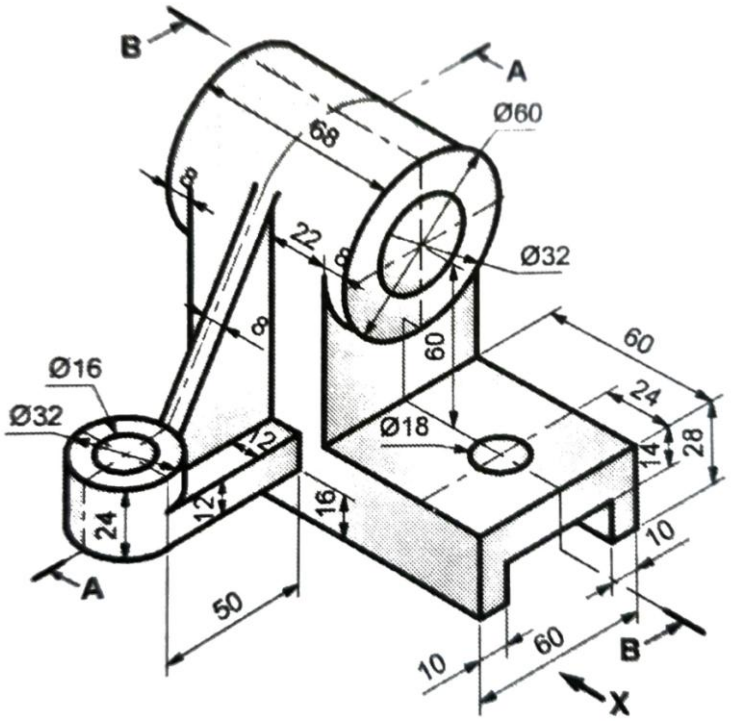
Q.10. Draw a) Sectional F.V. along A-A b) T.V. c) L.H.S.V. d) dimensions



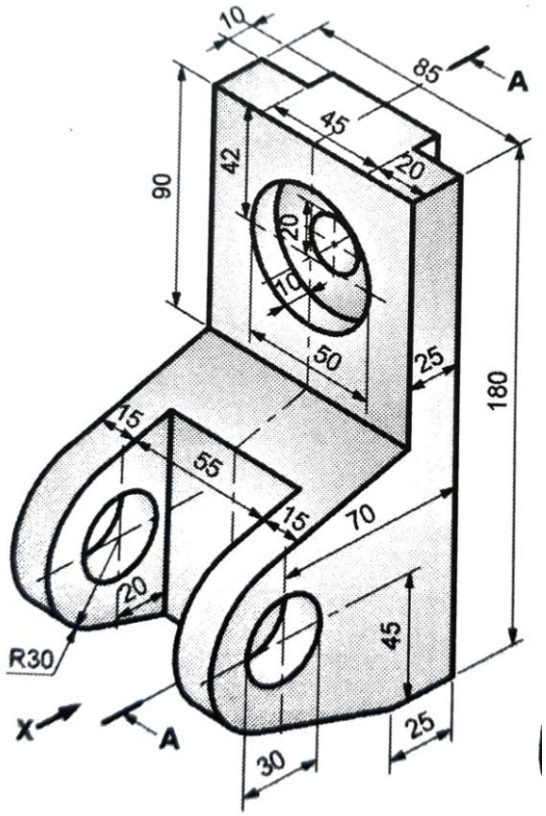
Q.11. Draw a) Sectional F.V. along A-A b) T.V. c) L.H.S.V. d) dimensions



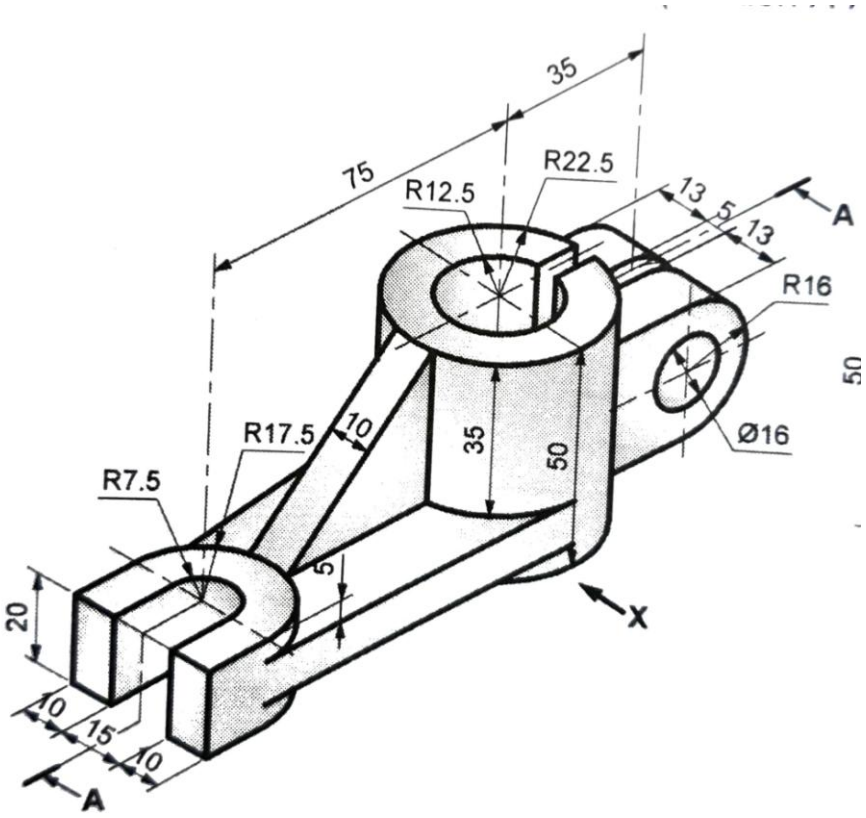
Q.12. Draw a) Sectional F.V. along A-A b) T.V. c) sectional side view along sec-B –B



Q.13. Draw a) F.V b) T.V. c) Sectional side view along sec-A-A d) dimensions



Q.14. Draw a) Sectional F.V view along sec-A-A b) T.V. c) L.H.S.V. d) dimensions



Engineering Drawing

Sheet No. : 03

Isometric Views

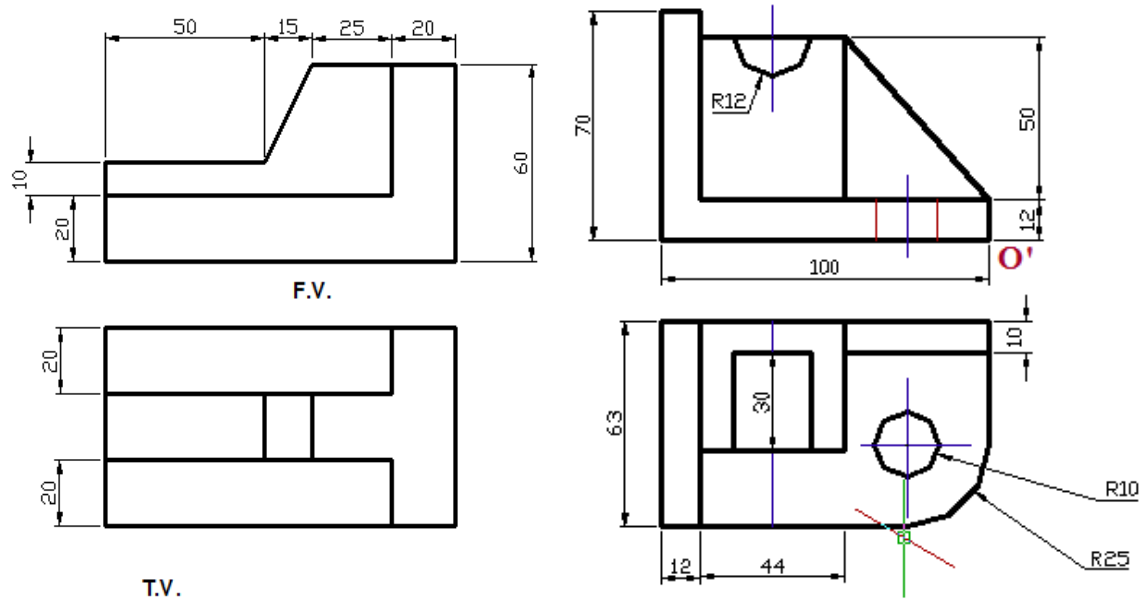
Date-

SHEET NO. 3
ISOMETRIC VIEWS

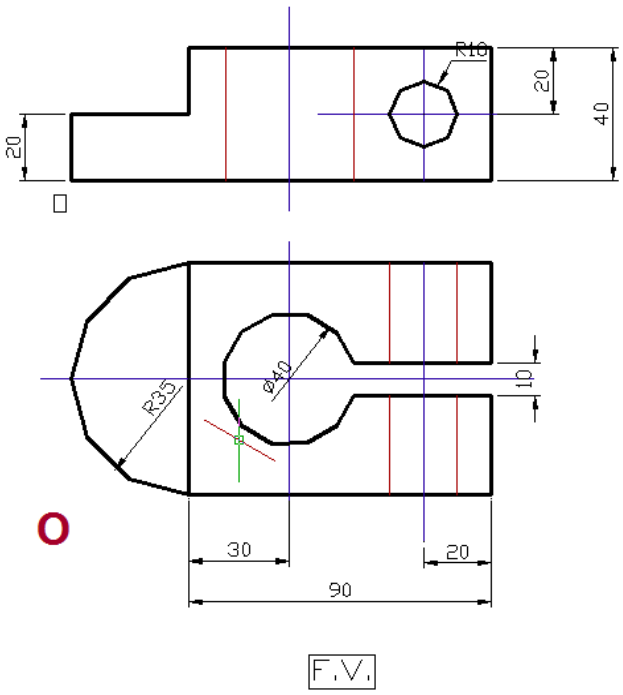
CO4	Visualize an object from the given two views.

Q.1.

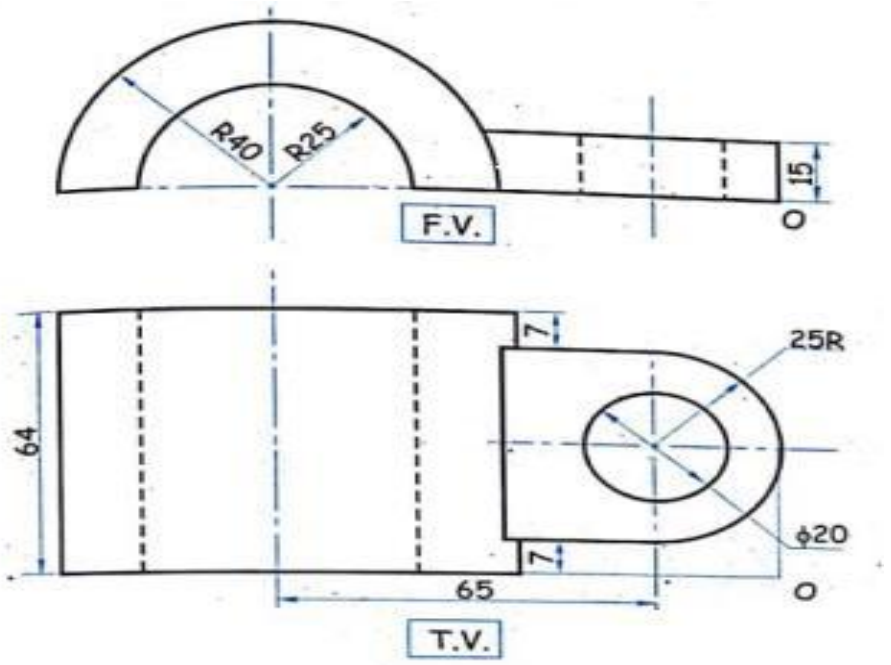
Q.2.



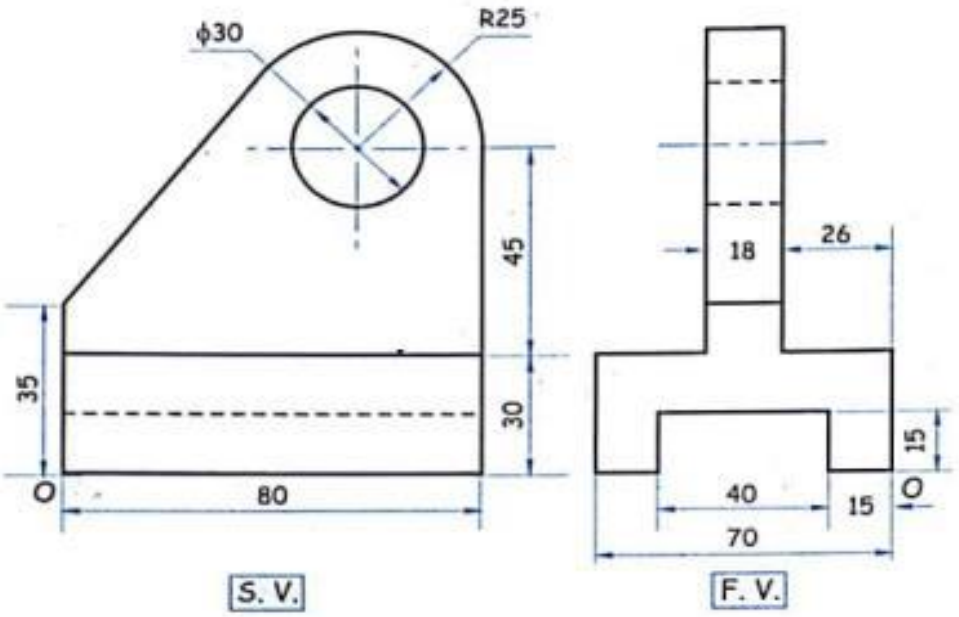
Q.3.



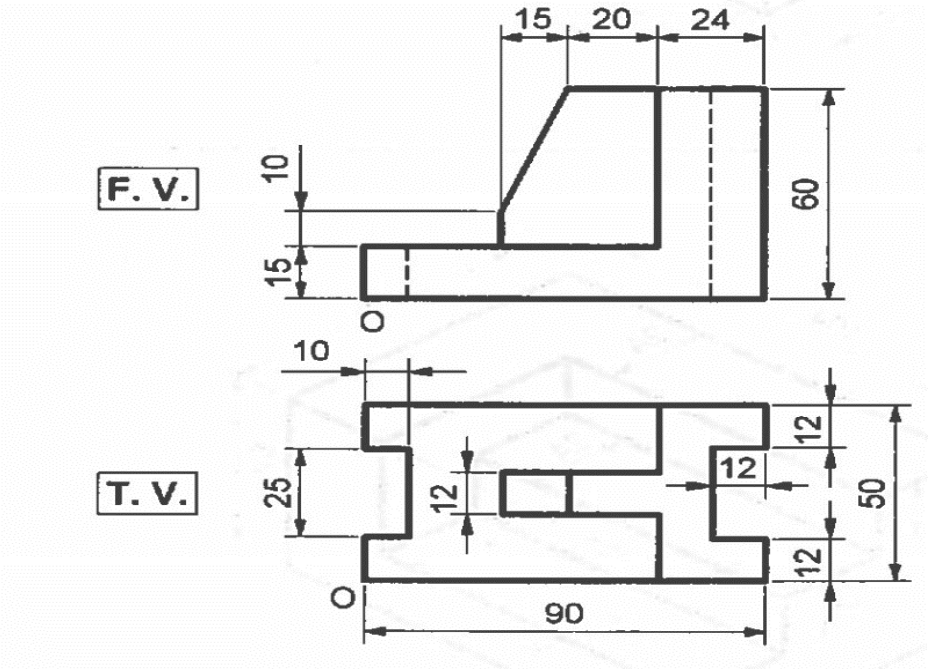
Q.4.


R40
R25
15
F.V.
64
7
25R
ϕ20
7
65
T.V.

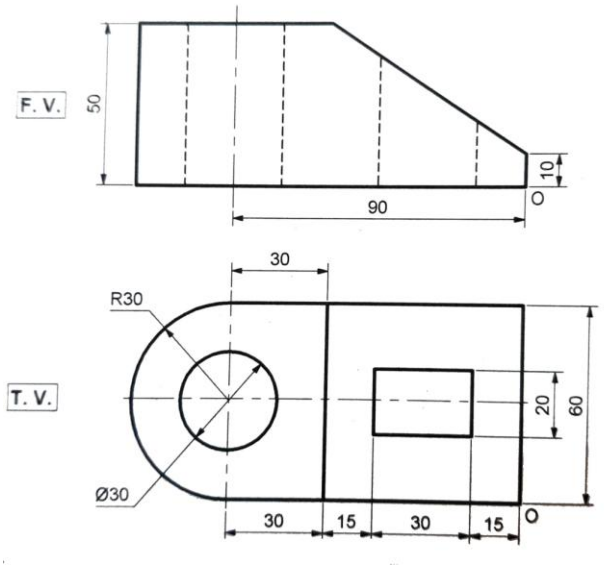
Q.5.


ϕ30
R25
45
35
30
80
S. V.
18
26
15
40
15
70
F. V.

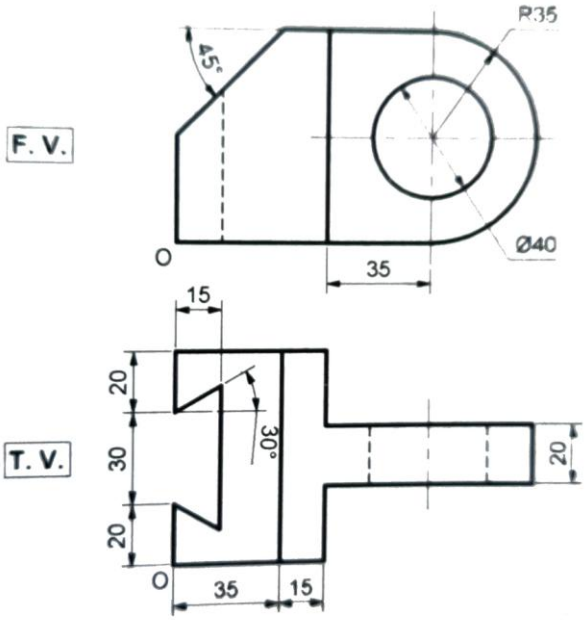
Q.6.


F. V.
15
20
24
10
15
60
O
T. V.
10
25
12
12
12
12
50
O
90

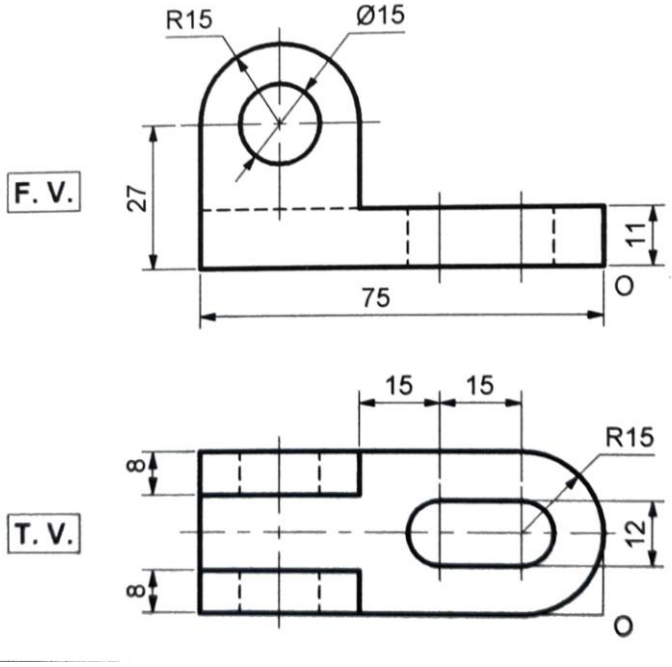
Q.7.


F. V.
50
10
O
90
T. V.
30
R30
Ø30
20
60
30
15
30
15
O

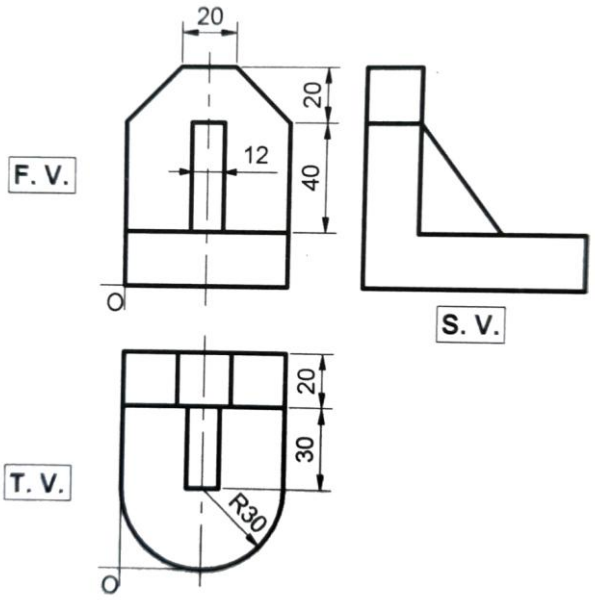
Q.8.


F. V.
T. V.
R35
45°
Ø40
35
15
20
30
30°
20
20
35
15

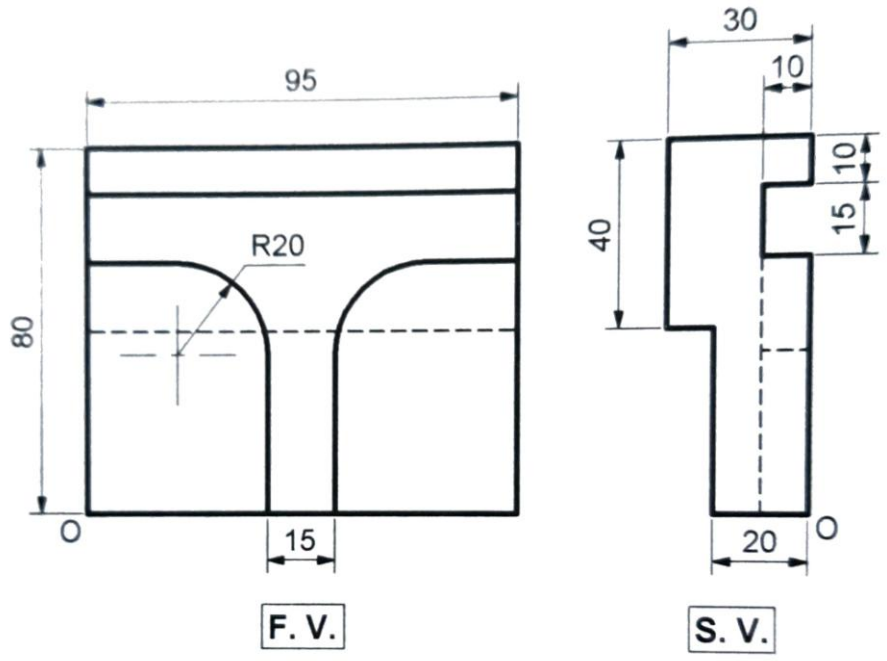
Q.9.


F. V.
T. V.
R15
Ø15
27
11
75
15
15
R15
8
8
12

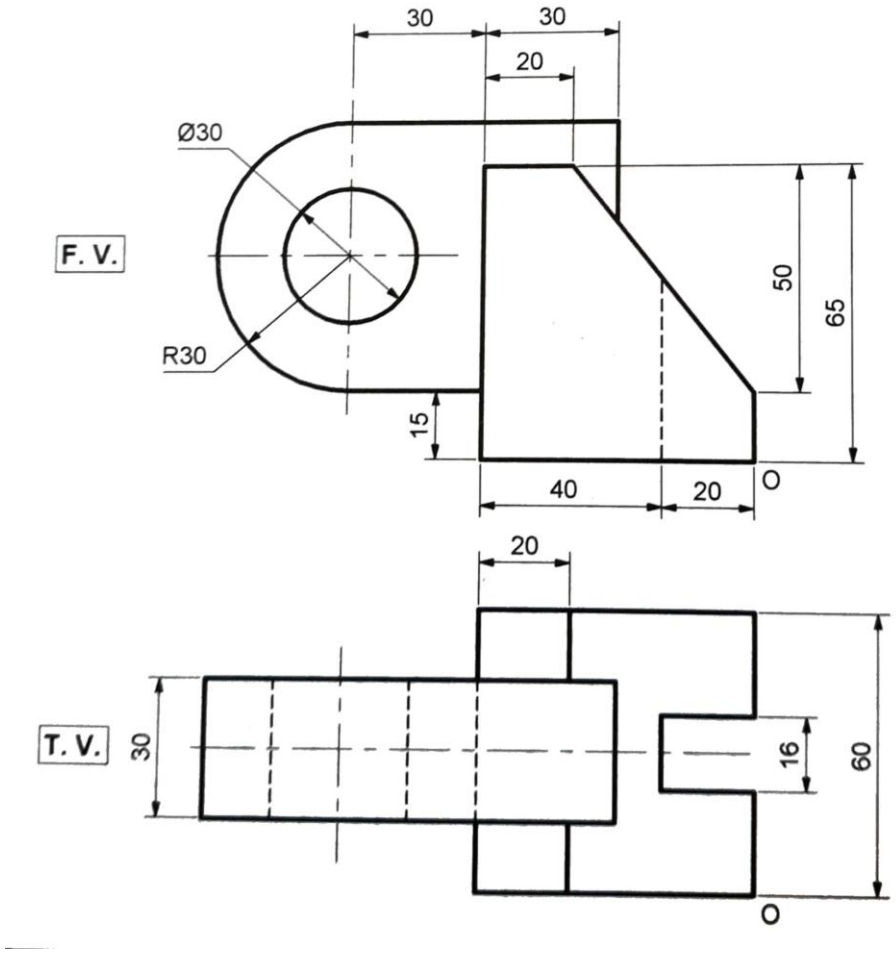
Q.10.


20
20
12
40
F. V.
O
S. V.
20
30
T. V.
R30
O

Q.11.


95
80
R20
O
15
F. V.
30
10
10
15
40
20
O
S. V.

Q.12.



Engineering Drawing

Sheet No. : 04

Projection of Solids

Date-

SHEET NO. 4
PROJECTION OF SOLIDS

CO1	Apply the basic principles of projections in 2D drawings.

1. **A pentagonal pyramid, edge of base 30 mm, length of axis 60 mm stands on one edge of base on the HP inclined at 45° to the VP while the axis is inclined at 60° to the HP. Draw the projections of a pyramid.**

2. **A cone of base 60 mm diameter and 70 mm high rests on circular rim in such a way that one of its generators is perpendicular to the HP. The plane containing vertical generator and axis is parallel to VP.**

3. **A cylinder with 50 mm diameter of its base and axis measuring 70 mm has its axis inclined at30° to the VP and the elevation of the axis is inclined at 30°0 to the ground line XY. Draw the projection of the cylinder.**

Engineering Drawing

Sheet No. : 05

Section of Solids

Date-

SHEET NO. 5
SECTION OF SOLIDS

CO1	**Apply the basic principles of projections in 2D drawings.**

1. **A cube of 40mm long edges is resting on HP on its face. Its vertical surfaces are equally inclined to the VP. It is cut by an AIP such a way that a true shape of the section is an equilateral triangle of maximum size. Locate cutting plane in FV and produce sectional TV.**

2. **A right circular cone of 60 mm base diameter and 80 mm altitude is resting with its base on the HP and cut by a plane parallel to one of its generator bisecting the axis. Draw the true shape of the section and name the curve obtained in true shape.**

3. **A cylinder of 50 mm dia base and 75 mm axis length is resting on the HP. It is cut by AIP (auxiliary inclined plane) in such a way that the true shape of the section is an ellipse of largest possible major axis. Draw the sectional plan, true shape of section and find the inclination of the sectional plane with HP.**

Engineering Drawing

Sheet No. : 06

Engineering Curves, Projection of Lines, Projection of Solids.

Date-

SHEET NO. 6

ENGINEERING CURVES, PROJECTION OF LINES, PROJECTION OF SOLIDS.

CO1	Apply the basic principles of projections in 2D drawings.

1. **A circle of 60 mm diameter rolls on a straight line without slipping. Draw the locus of point P for one complete revolution of the circle. The point P is 38 mm above the straight line and towards the left of the vertical center line of the circle. Name the curve and draw the normal and tangent at any point on curve.**

2. **Draw an involute of a circle of 40 mm diameter. Draw the tangent and normal from a point 100mm away from the center of the circle.**

3. **A circle of 50 mm diameter rolls along a straight line without slipping, draw the curve traced by a point 'P' on the circumference of the circle for one complete revolution.**

4. **The distance between the end points of a line AB 70 mm long is 35 mm long & is inclined at 30° to the HP. The end point A is 10 mm above HP & 20 mm in front of the VP. Draw the projections of line AB.**

5. **The FV of 85mm long straight-line AB measures 60mm while its TV measures 70 mm. Draw the projections of AB if its end A is 10 mm above the HP & 20 mm behind the VP while its end B is in the first quadrant. Determine the inclination of the line AB with the reference plane.**

6. **A line AB, 75 mm long is inclined to the HP at 40° and to the VP at 30°. End A is in the HP and 15 mm behind the VP. Draw the projection of line AB.**

7. **A hexagonal prism, edge of base 25 mm axis 60 mm length has an edge of the base on the HP and inclined at 30° to the VP and rectangular face containing that base edge is inclined at 45° to the HP. Draw its projections.**

8. **A pentagonal pyramid of 50 mm edge of the base and 80 mm length of axis has one of its triangular faces in the VP. The shorter edge of the face is inclined at 60° to the HP. Draw the projections of pyramid if its apex is away from HP.**

9. **A pentagonal pyramid, base edges 40mm and axis length 75mm rests on its slant edge on HP, which is inclined at 30° to VP. Draw its projections with apex nearer to the observer.**

Engineering Drawing

Sheet No. : 07

Section of Solids

Date-

SHEET NO. 7
SECTION OF SOLIDS

CO1	**Apply the basic principles of projections in 2D drawings.**

1. **A cone of base diameter 40 mm and axis 90 mm long is resting on its base on ground. It is cut by section plane perpendicular to the VP and parallel to one of its end generator 10 mm away. Draw the FV, sectional TV, sectional side view and the true shape of a section.**

2. **A pentagonal pyramid of 30 mm side of base and 70 mm axis is resting on one of its side of base on the ground, such that the axis is parallel to the VP and inclined to HP at 30°. It is cut by the vertical section plane, which is inclined to the VP at 45° and bisects the axis. Draw the sectional FV, TV and the true shape of a section.**

3. **A hexagonal pyramid base 30 mm side and axis 65 mm long has its base on HP with edge of base parallel to VP. A section plane perpendicular to VP and inclined at 60° to HP bisects the axis of the pyramid. Draw the FV, sectional TV and true shape of the section.**

Engineering Drawing

Sheet No. : 08

Orthographic Projection without section

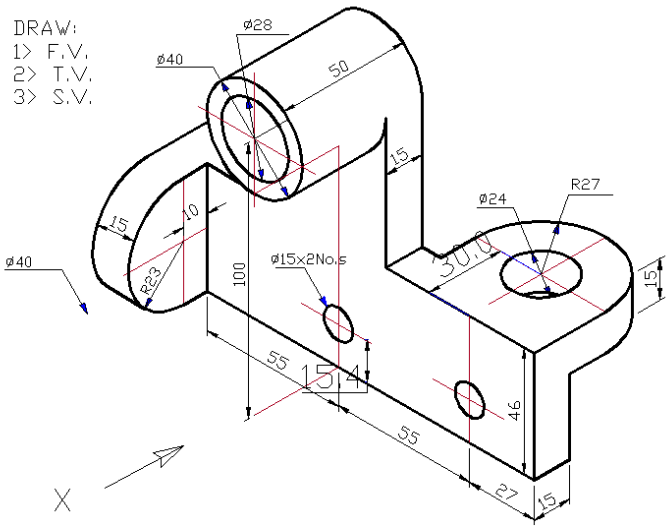
Date-

SHEET NO. 8
Orthographic Projection without section,
Orthographic Projection with section,

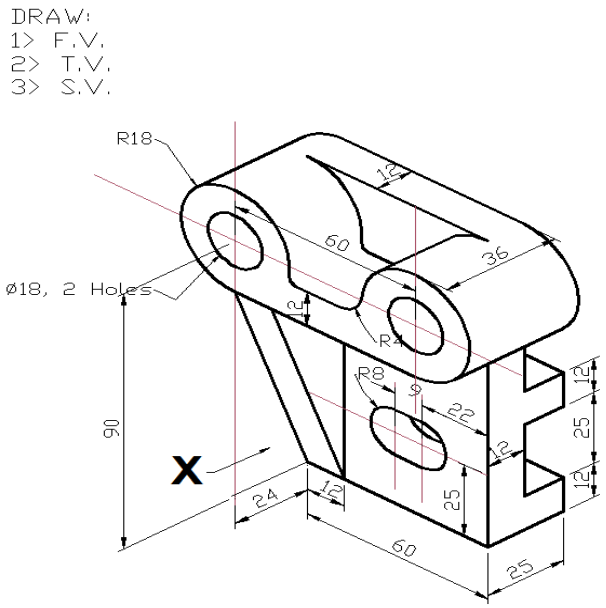
CO2	**Apply the basic principles of projections in converting 3D views to 2D drawings.**
CO4	**Visualize an object from the given two views.**

Orthographic Projections without section

Q.1



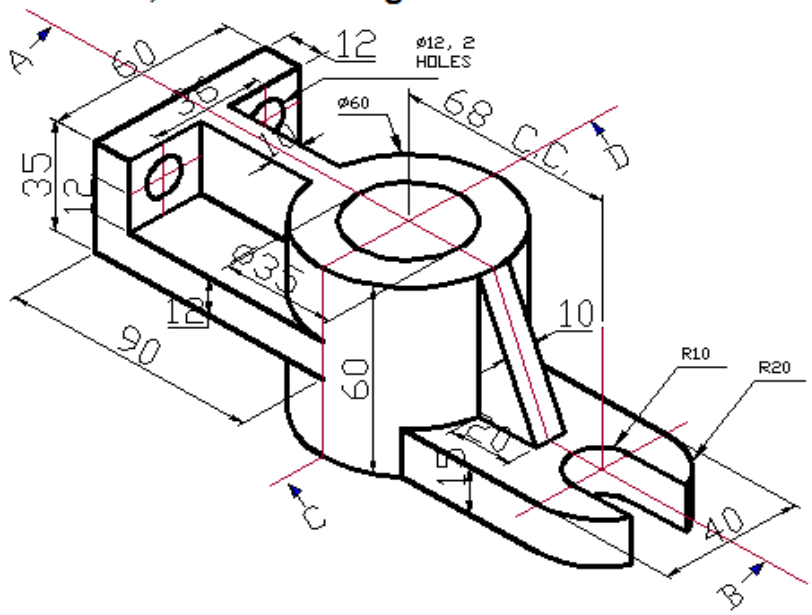
Q.2.



Orthographic Projections with section

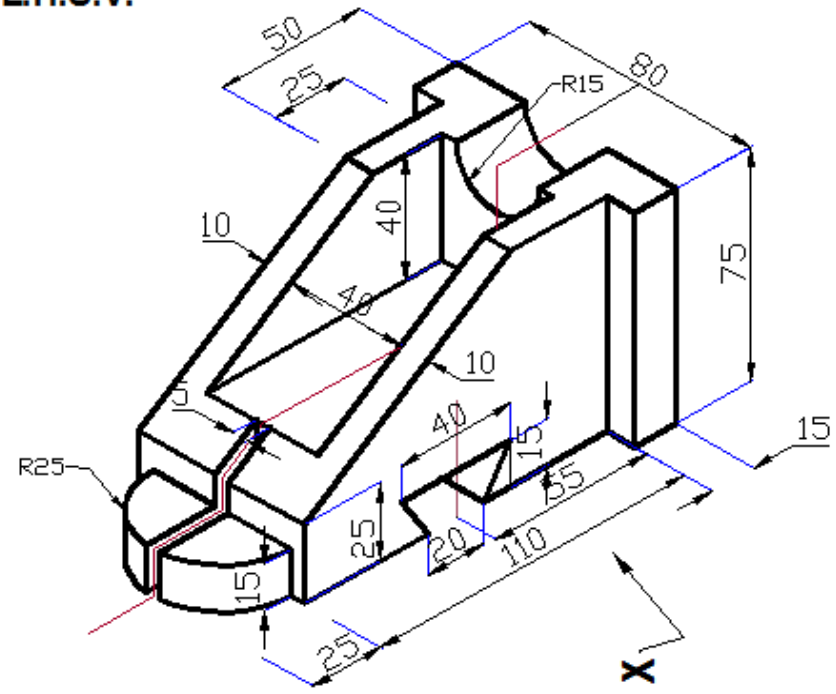
Q.3.

Draw
1) Sect. F.V., section along 'AB'
2) Top view
3) Sect. S.V., section along 'CD'



Q.4.

Draw
1) Sectional F.V., section along 'AA'
2) T.V.
3) L.H.S.V.



Engineering Drawing

Sheet No. : 09

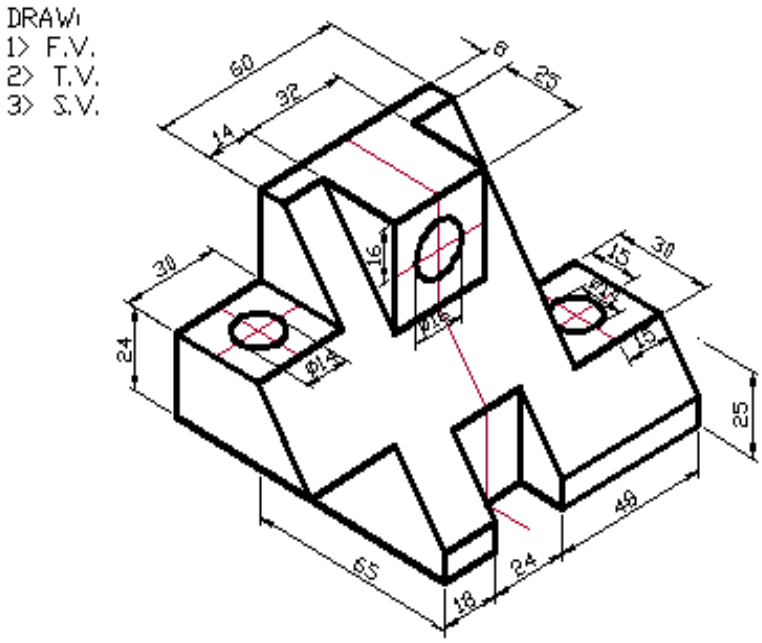
Orthographic Projection without section

Date-

SHEET NO. 9
ORTHOGRAPHIC PROJECTION WITHOUT SECTION

CO5	Use CAD tool to draw different views of a 3D object.

Q.1.



Q.2. Draw F.V. ,T.V.,L.H.S.V.

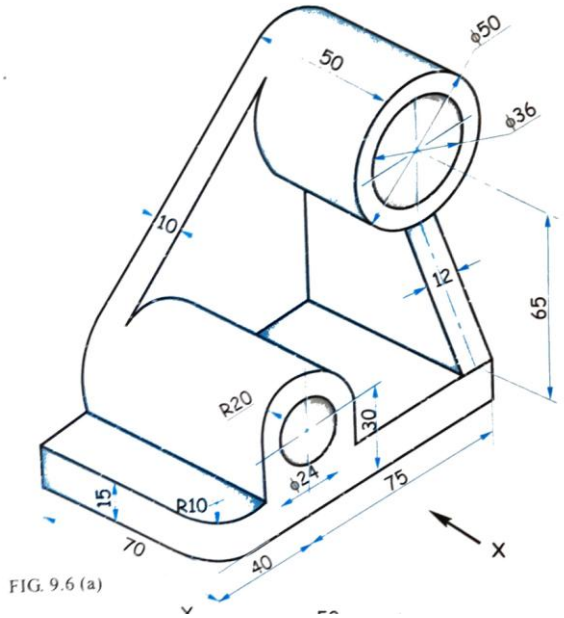


FIG. 9.6 (a)

Engineering Drawing

Sheet No. : 10

Orthographic Projection with section

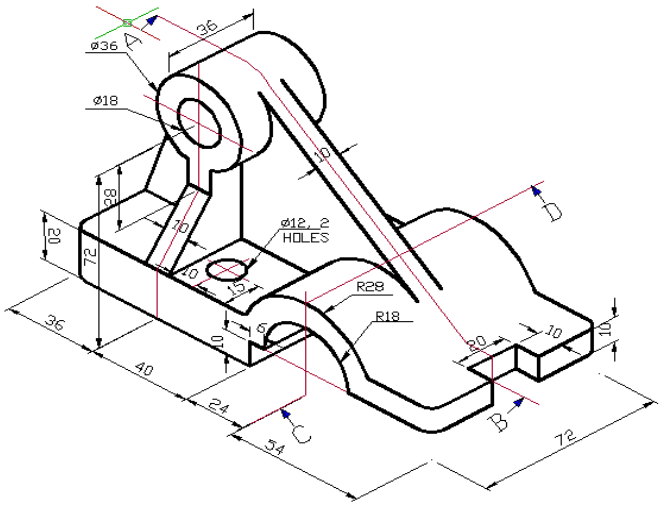
Date-

SHEET NO. 10
ORTHOGRAPHIC PROJECTION WITH SECTION

CO5	Use CAD tool to draw different views of a 3D object.

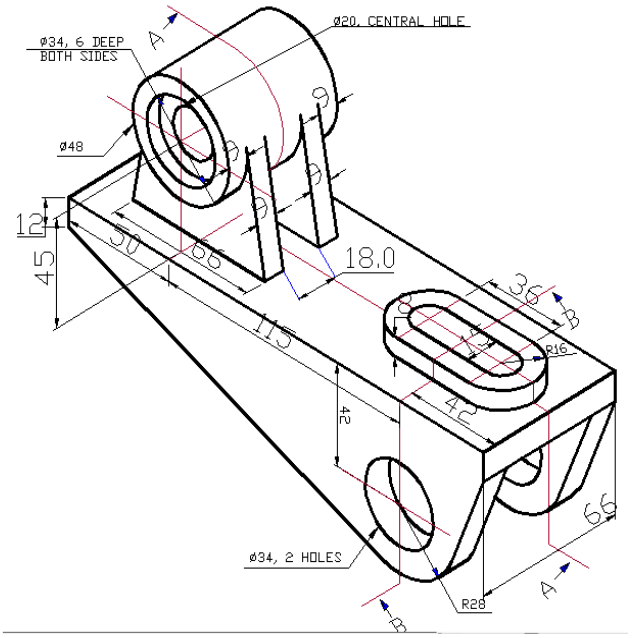
Q.1.

Draw
1) Sect. F.V., section along 'AB'
2) Top view
3) Sect. S.V., section along 'CD'



Q.2.

Draw
1) Sect. F.V., section along 'AA'
2) Top view
3) L.H.S.V.



Engineering Drawing

Sheet No. : 11

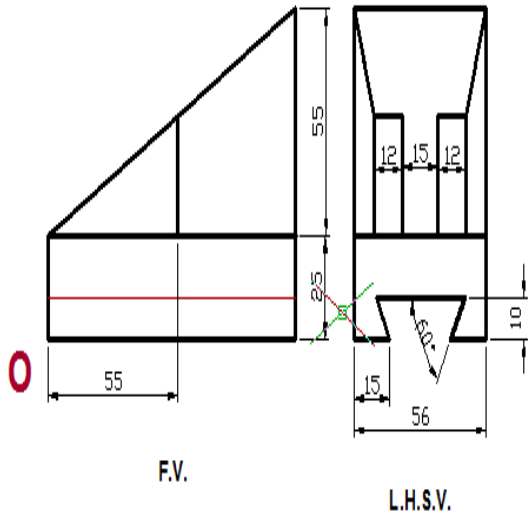
Isometric Views

Date-

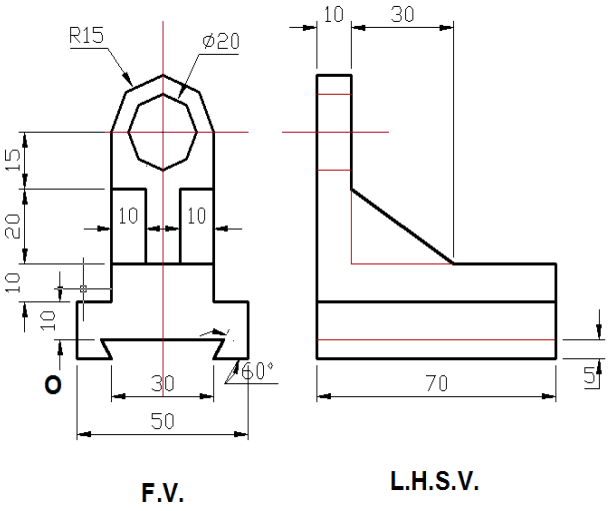
SHEET NO. 11
ISOMETRIC VIEWS

CO6	Use CAD tool to draw an object in 3D.

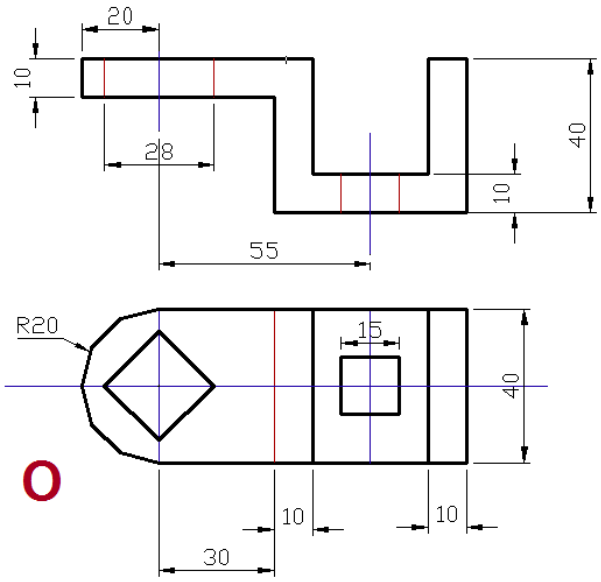
Q.1.



Q.2

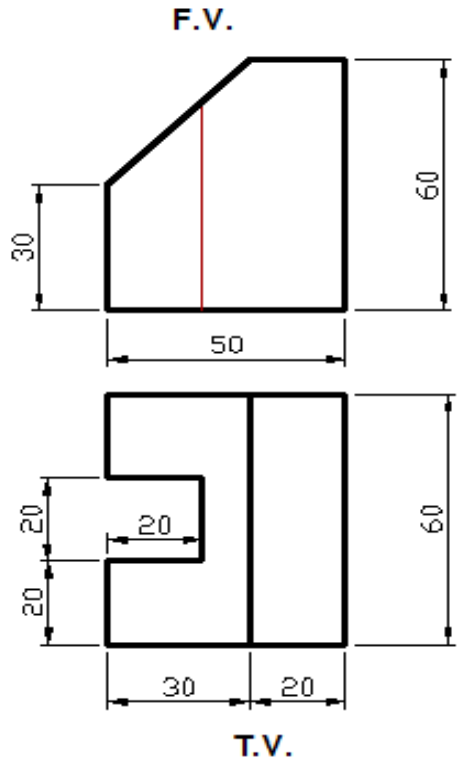


Q.3.

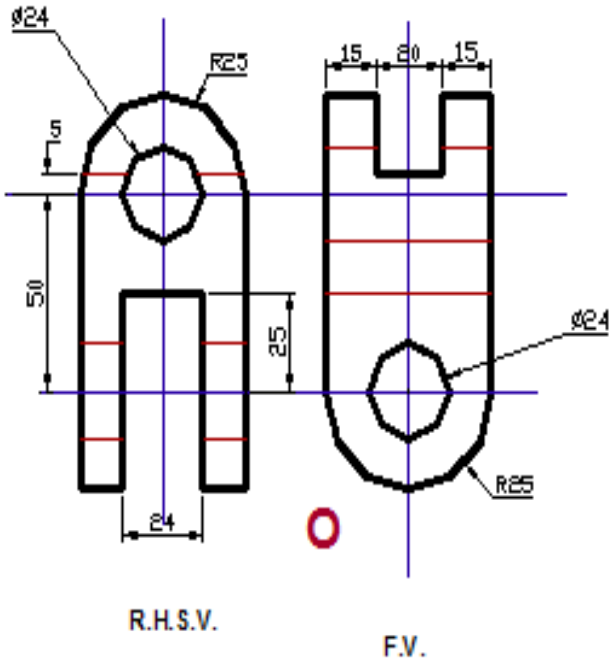


Isometric Views

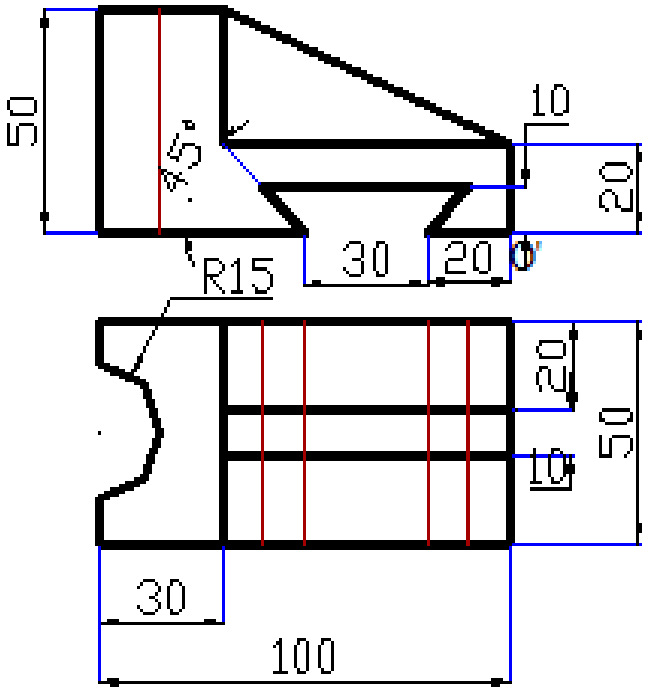
Q.5.



Q.6.



Q.7.



T.V.

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