



ENGINEERING DRAWING

LABORATORY MANUAL

B.Tech 1st Year

MECHANICAL ENGINEERING DEPARTMENT

**SARDAR VALLABHBHAI NATIONAL INSTITUTE OF
TECHNOLOGY, SURAT**

GENERAL INSTRUCTIONS FOR ENGINEERING DRAWING LAB

Drawing Equipments & Materials (for Laboratory Work)

- Mini Drafter
- Drawing sheets (A2 Size), Sketch book and Sheet container
- Set-Squares - 45° & 30°- 60° (Within built French curves and protractor).
- Drawing Clips(pins)
- 0.5 mm clutch pencil (with H & 2H leads) and Eraser
- Instrument Box (Engineering Compass Box)
- Circle master, scale and Roller scale

How to begin your drawing?

- Clean the drawing board and all the drawing instruments using handkerchief.
- Fix the drawing sheet on the drawing board (table).
- Fix the mini-drafter in convenient position.
- Spacing of drawing between two problems/views is to be planned before the commencement of the drawing.
- Write the problem number on the left top and then commence the drawing work.

Important guidelines for students:

- Students are required to draw sheet in the class (lab) itself. Students can take back the sheets only after final evaluation.
- On being absent in the lab, the sheet will not be assessed and will be awarded zero (0).
- Each student should get their sheets checked on the same day, otherwise it will be considered as late work and will be evaluated out of 5 marks.
- Any data written on the sheets should be in the block (CAPITAL) letters only.
- Name & Roll No. should be written on sheet in the title block with pen.
- Students should bring the drawing sheet ready for the practical. The borderlines and Title block should be drawn on the drawing sheet before coming for the practical.
- All problems of all sheets should be drawn by first angle projection method if not specify.
- Each student should make 12 drawing sheets (6 classwork + 6 Homework) in whole semester.
- At the time of external examination, all the sheets shall be submitted to the faculty concerned as below :
 - All the sheets should be properly arranged in the serial order.
 - All the sheets should be rolled together in a plastic Sheet Holder.

LIST OF PRACTICALS

SHEET NO

TITLE

SECTION-I [CLASS WORK]

CW1

Fundamental of Engineering Drawing

CW2

Orthographic Projection

CW3

Isometric Projection

CW4

Projection of Solid

CW5

Section of Solid

CW6

Penetration Curve & Surface Development

SECTION-II [HOME WORK]

HW1

Fundamental of Engineering Drawing

HW2

Orthographic Projection

HW3

Isometric Projection

HW4

Projection of Solid

HW5

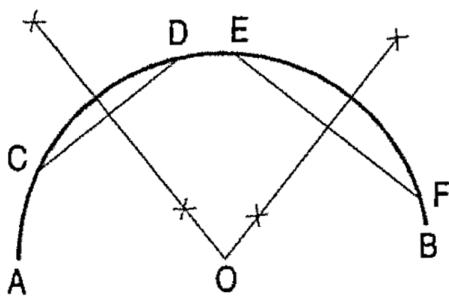
Section of Solid

HW6

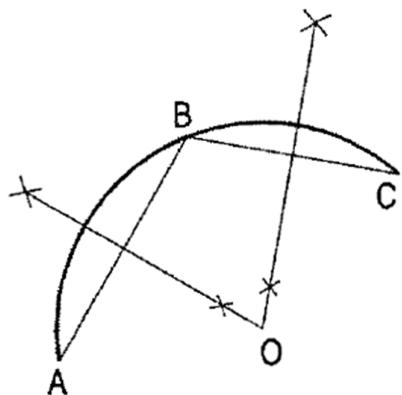
Penetration Curve & Surface Development

CW-1 FUNDAMENTAL OF ENGINEERING DRAWING

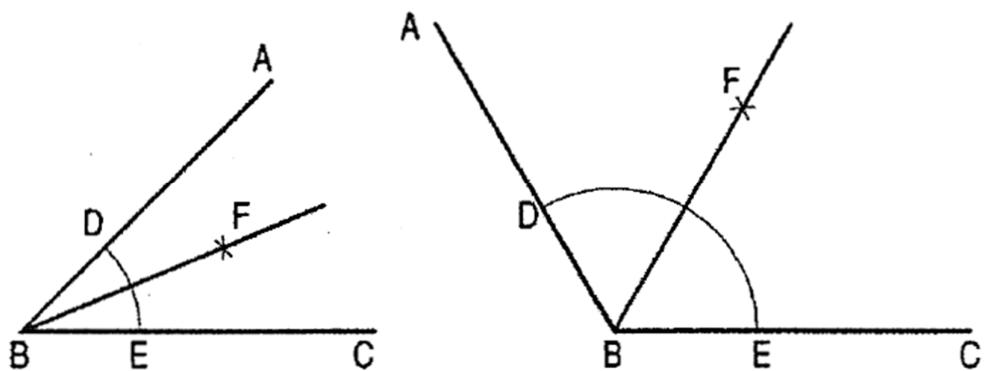
1. To find the centre of the given arc.



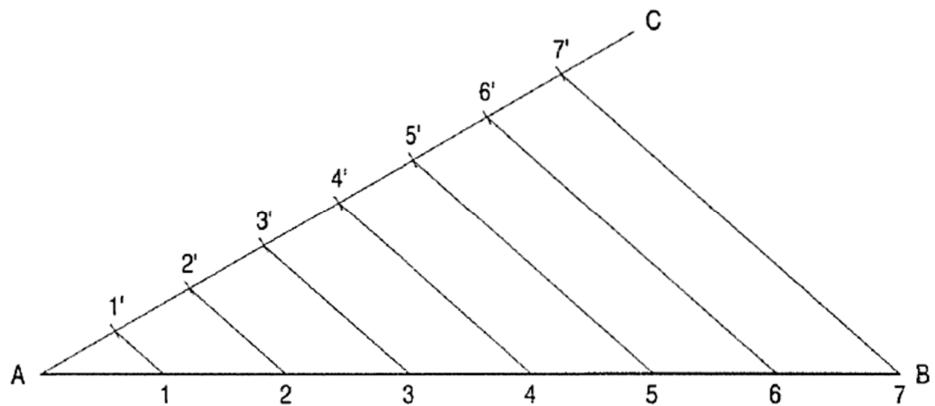
2. To draw an arc passing through three points not in a straight line.



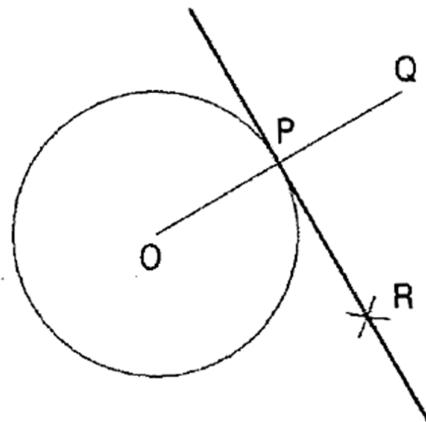
3. To bisect given angle.



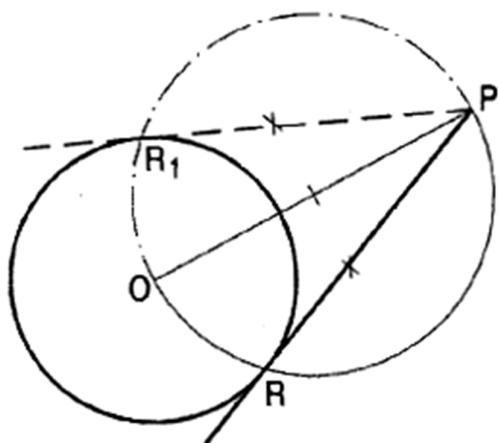
4. Divide a straight line six number of equal parts.



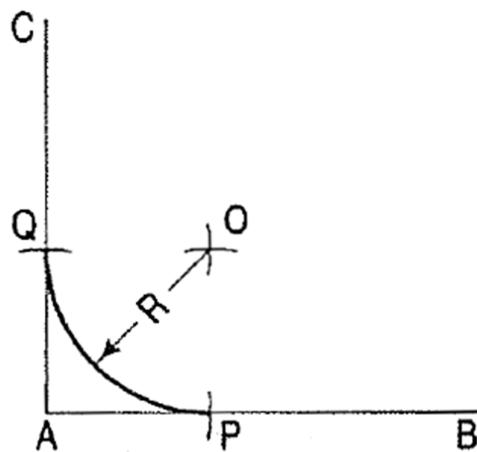
5. To draw a tangent to a given circle at any point P on it.



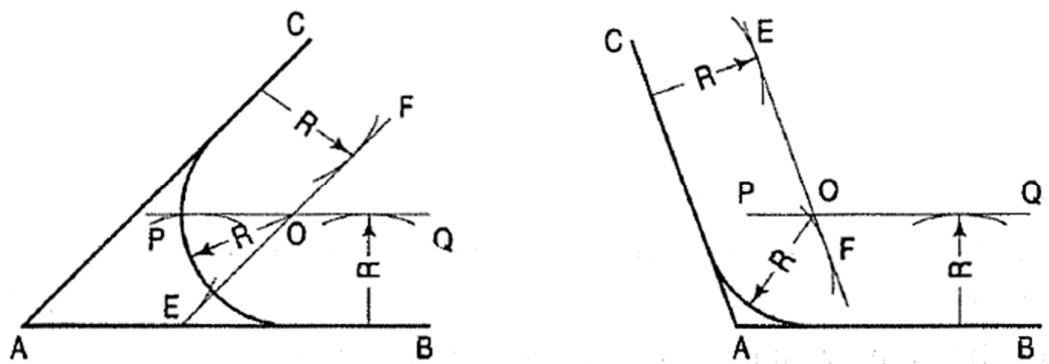
6. To draw a tangent to a given circle from a point P outside it.



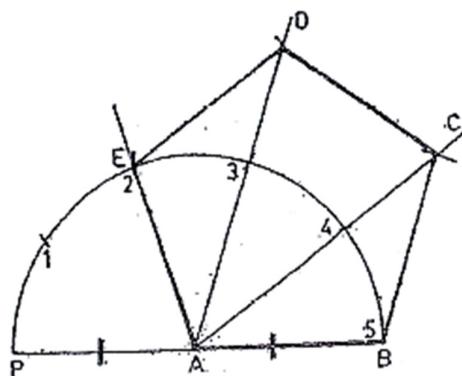
7. To draw an arc of given radius to touch two given straight line at right angle to each other.



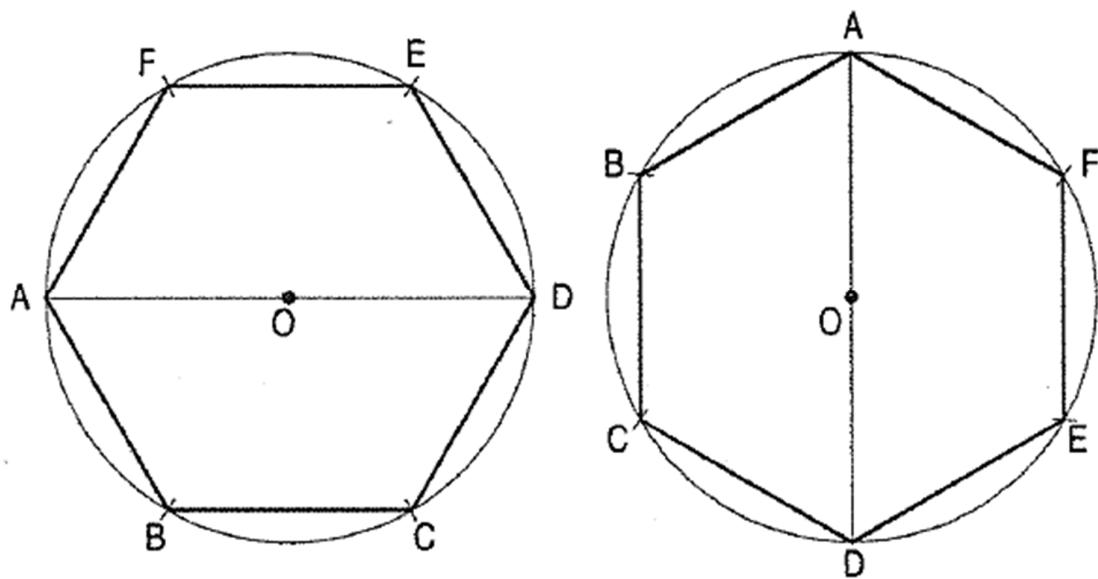
8. To draw an arc of a given radius touching two given straight line which make an acute angle between them.



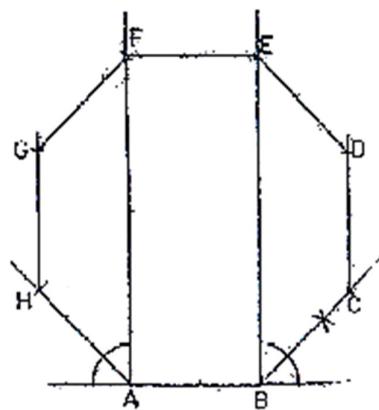
9. To construct regular pentagon with 40mm side.



10. To construct regular hexagon of side 35mm.



11. To construct regular octagon of side 25mm



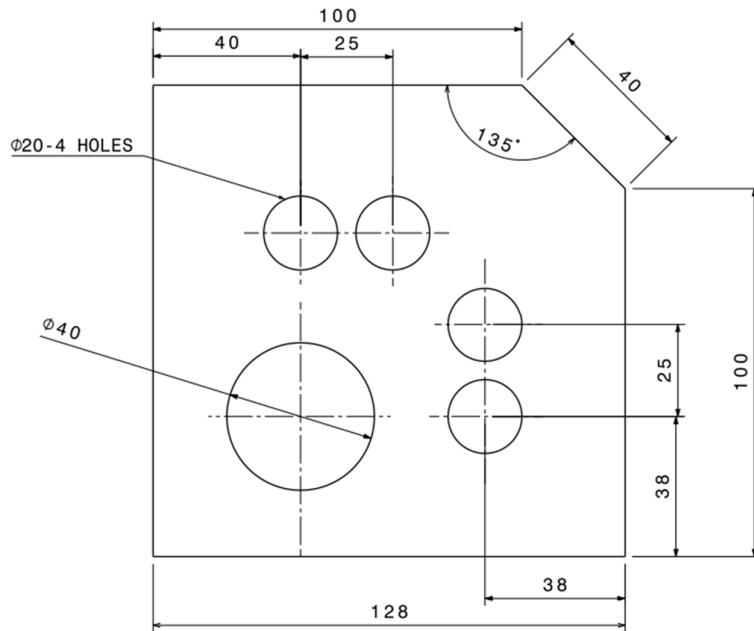
HW-1 FUNDAMENTAL OF ENGINEERING DRAWING

1. Types of Lines

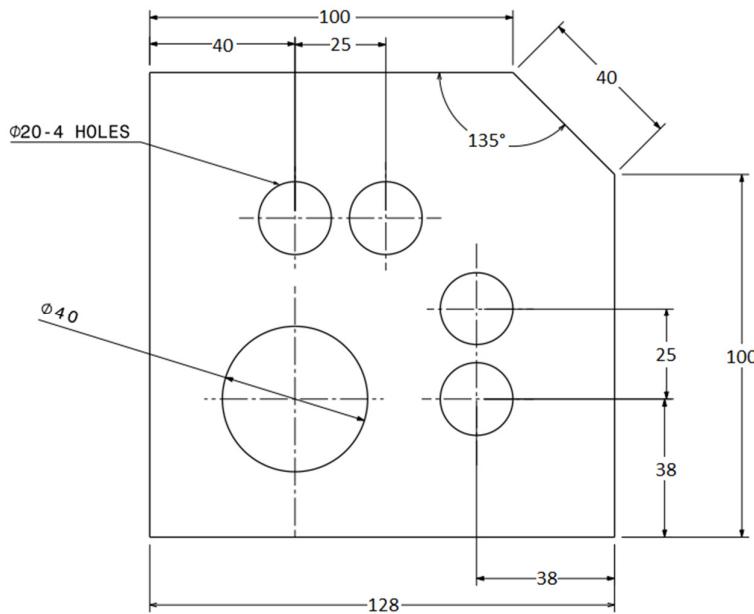
Lines	Pencil
Initial work and construction lines	H
Outlines, dotted lines, section-planes, dimension lines, arrowheads	2H
Centre lines, section lines	3H or 4H

Lines	Description	General Application
A	Continuous thick or Continuous wide	Visible outlines, visible edges; crests of screw threads; limits of length of full depth thread; lines of cuts and section arrows; parting lines of moulds in views; main representations in diagrams, maps, flowcharts; system lines(structural metal engg.)
B	Continuous thin (narrow) (straight or curved)	Imaginary lines od intersection; grid, dimension, extension, projection, short centre, leader, reference lines; hatching; outlines of revolved sections; root of screw treads; interpretation lines of tapered features; framing of details; indication of repetitive details
C	Continuous thin (narrow) freehand	Limits of partial or interrupted views and sections, if the limit is not a chain thin line
D	Continuous thin (narrow) with zigzags (straight)	Long-break line
E	Dashed thick (wide)	Line showing permissible of surface treatment
F	Dashed thin (narrow)	Hidden outlines; hidden edges
G	Chain thin, Long-dashed dotted (narrow)	Centre line; lines of symmetry; trajectories; pitch circle of gears, pitch circle of holes
H	Chain thin (narrow) with thick (wide) at the ends and at changing of position	Cutting planes
I	Chain thick or Long-dashed dotted (wide)	Indication of lines or surfaces to which a special requirement applies
J	Chain thin double-dashed or long-dashed double-dotted (narrow)	Outlines of adjacent parts alternative and extreme positions of movable parts, Centroidal lines, Initial outlines prior to forming, Parts situated in front of the cutting plane

2. Methods of indicating dimensions.

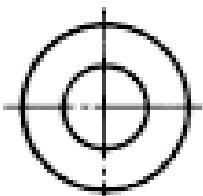
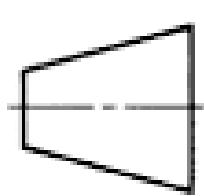


ALIGNED METHOD OF DIMENSIONING

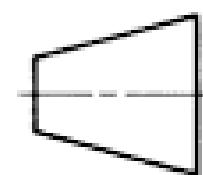
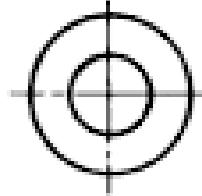


UNIDIRECTIONAL METHOD OF DIMENSIONING

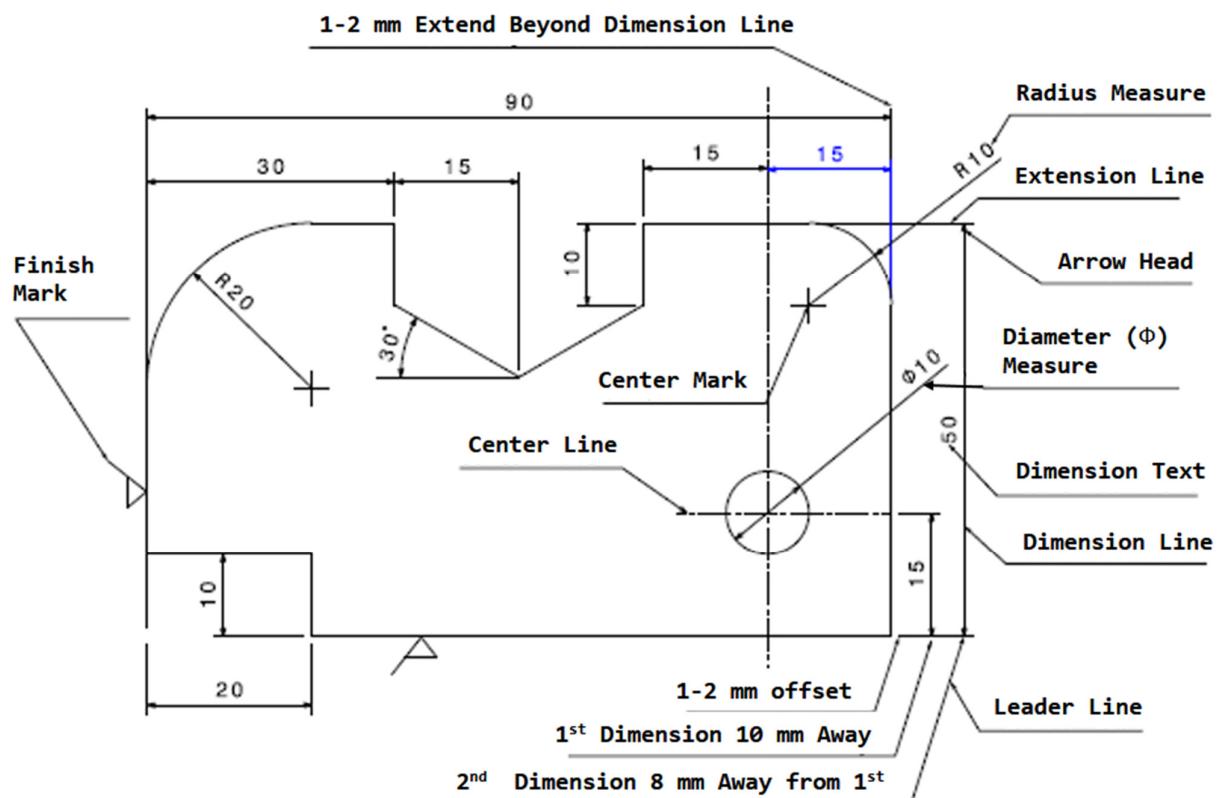
3. Symbol of first angle method



4. Symbol of third angle method



5. Dimensioning Conventions



CW – 2 ORTHOGRAPHIC PROJECTION

1. Fig. A shows the pictorial view of an object. Draw (i) front view (ii) Right hand side view (iii) Top view.

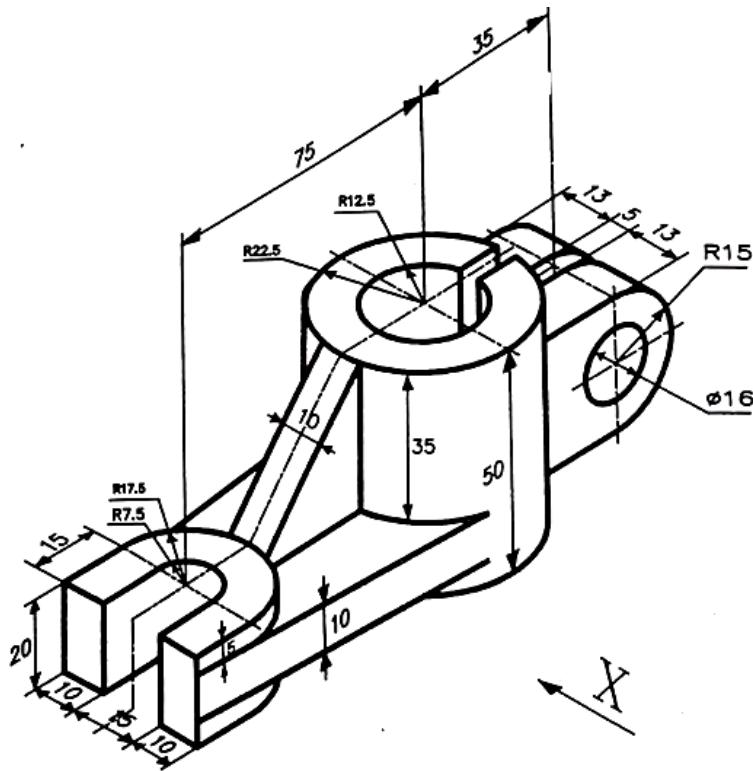


Fig. A

2. Fig. B shows the pictorial view of an object. Draw (i) Sectional front view (ii) Right hand side view (iii) Left hand side view (iv) Top view

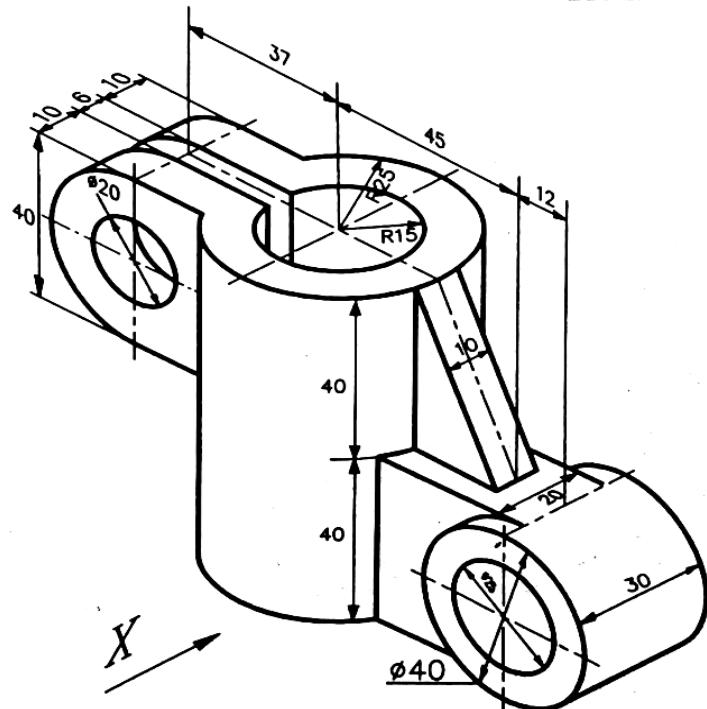


Fig. B

3. Fig. C shows the pictorial view of an object Draw (i) Sectional front view (ii) Right hand side view (iii) Left hand side view (iv) Sectional Top view
4. Fig. D shows an object. Draw sectional front view along section P-Q looking in the direction of arrow X, top view and sectional left hand side view along section R-S using first angle projection method.

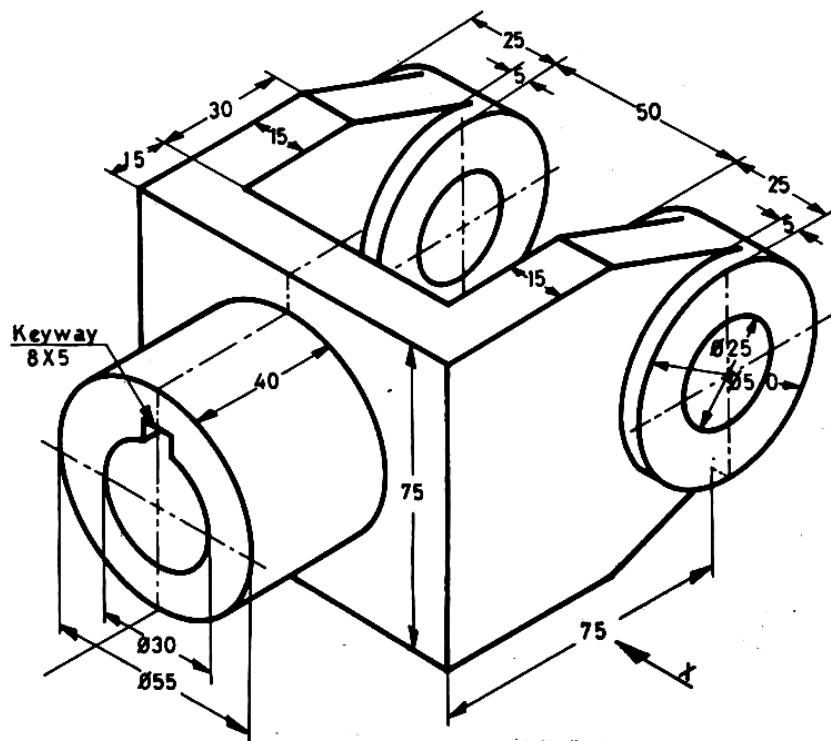


Fig. C

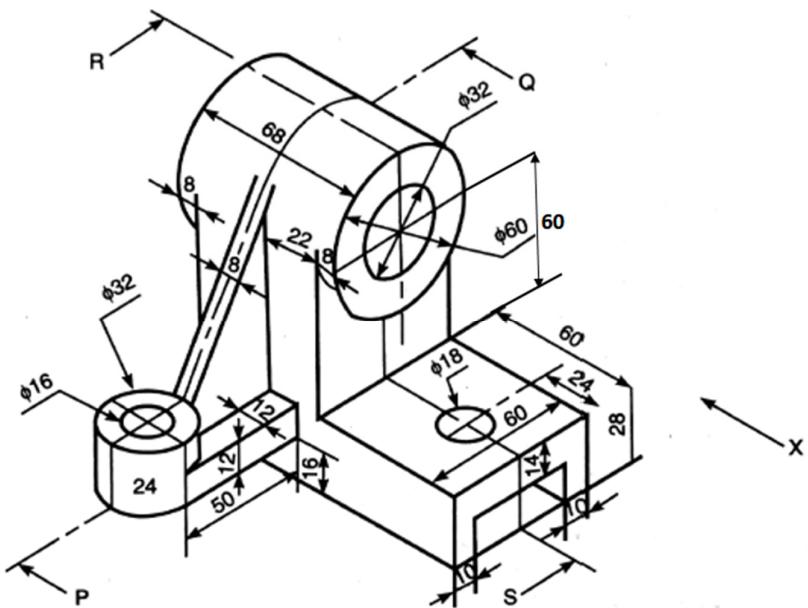


Fig. D

HW - 2. ORTHOGRAPHIC PROJECTION

1. Draw (i) Elevation (ii) Top plan (iii) L.H. sectional side view

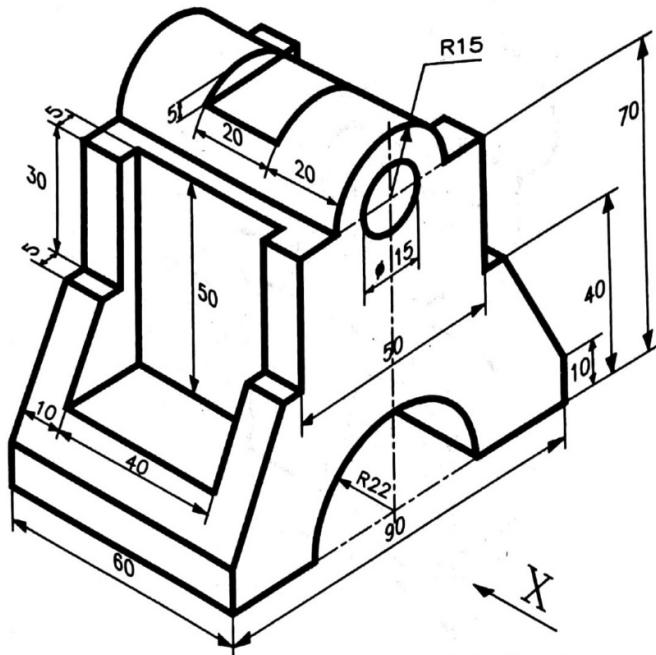


Fig. (a)

2. Fig. (b) Shows the three dimensional pictorial view of an object. Draw using first angle projection method, front view, top view and sectional left hand side view.

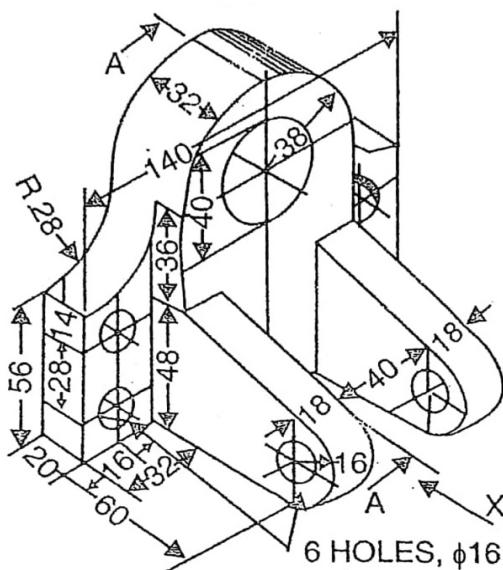


Fig. (b)

3. Draw (i) Full sectional FV (ii) L.H.S.V (iii) Top Plan

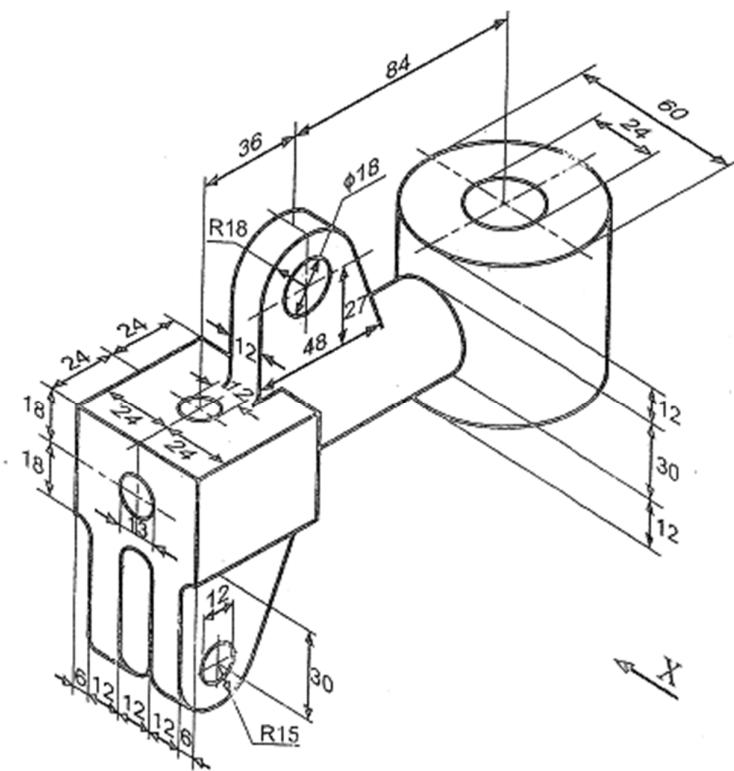


Fig. (c)

4. Fig.(d) shows a pictorial view of A GUIDE BRACKET Draw to scale full size the following views

- (i). Sectional elevation on the section plane A-A in the direction of X
- (ii).End view in the direction of arrow Y
- (iii).Plan

5. A pictorial view of an adjustable shaft support is shown in Fig (e). Draw to full size by using first angle method of projection

- (i). Front View from left
- (ii). Top View
- (iii). Sectional S. V. from right (Section Along XX)

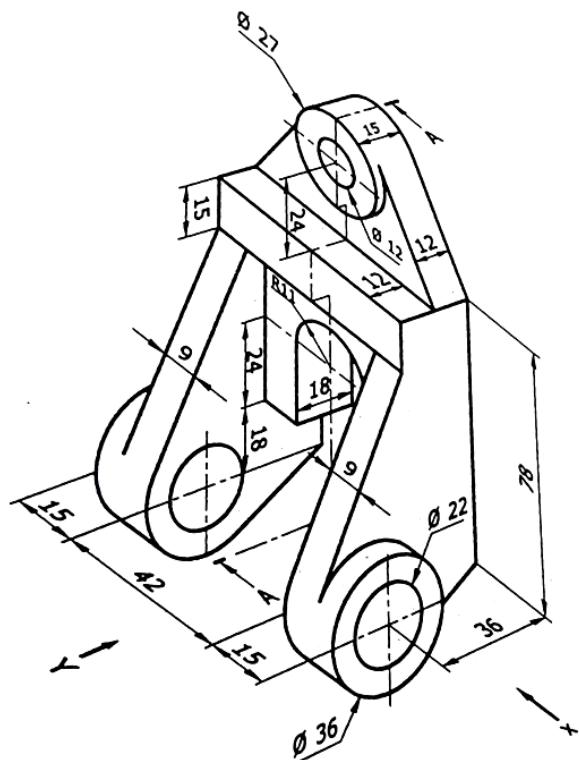


Fig.(d)

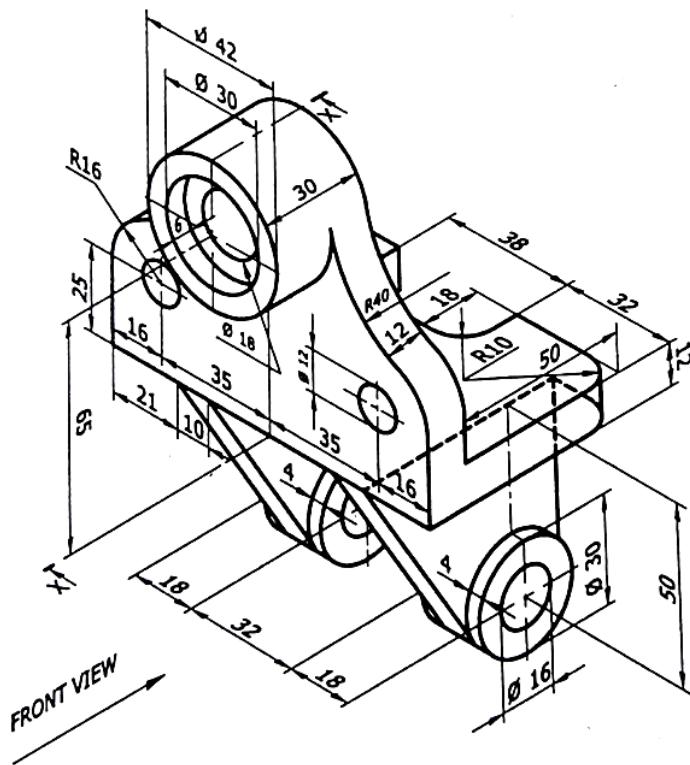
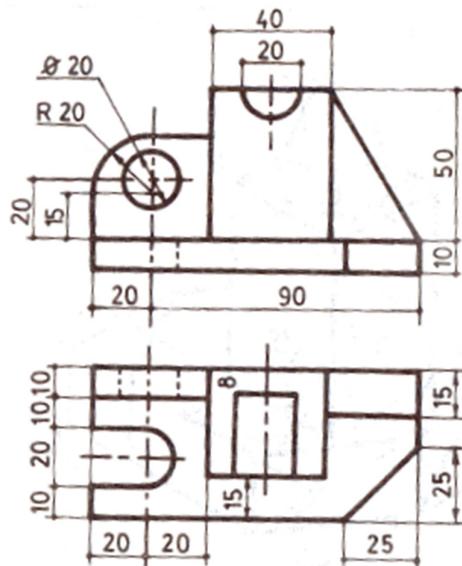


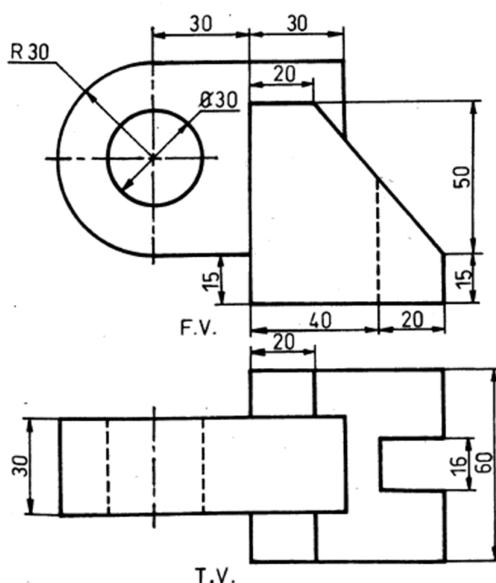
Fig.(e)

CW – 3 ISOMETRIC PROJECTION

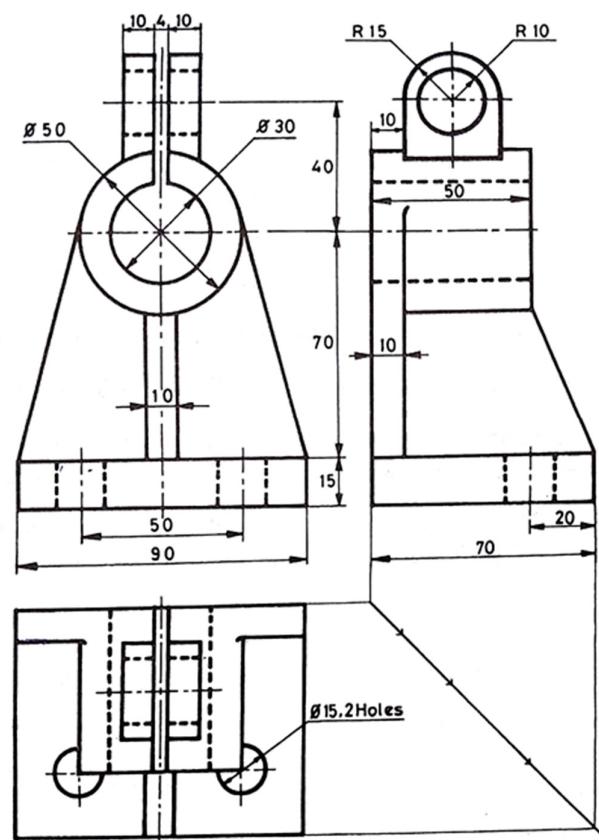
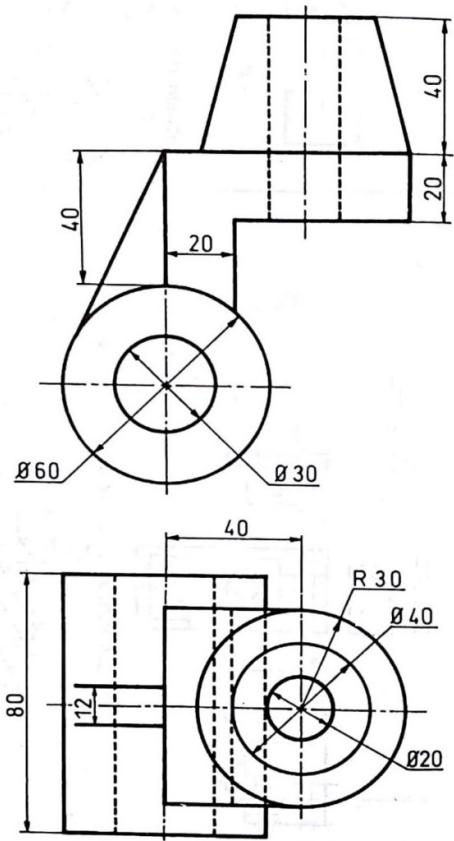
Following Figs. (i) - (iv) shows two orthographic views of an object by first angle projection method. Draw an isometric view with natural scale.



(i)



(ii)

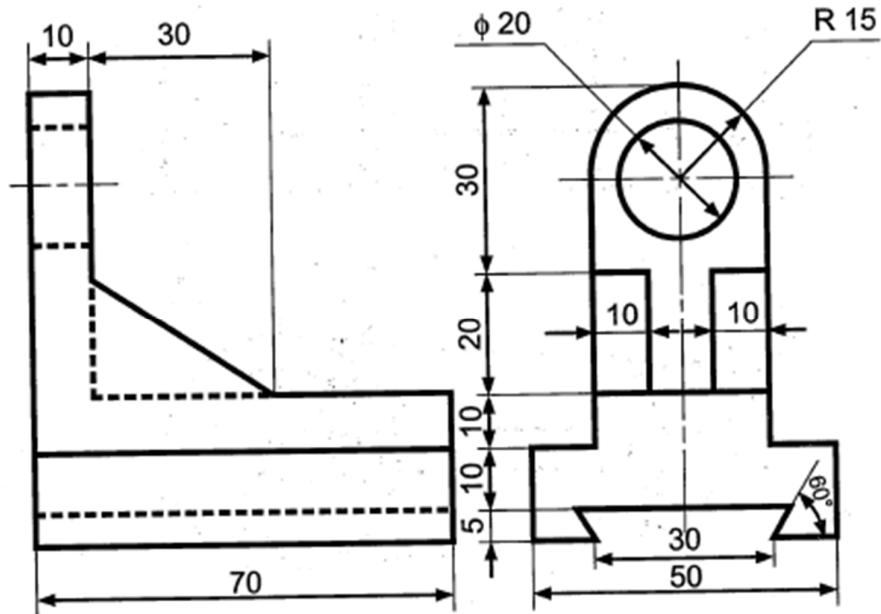


(iii)

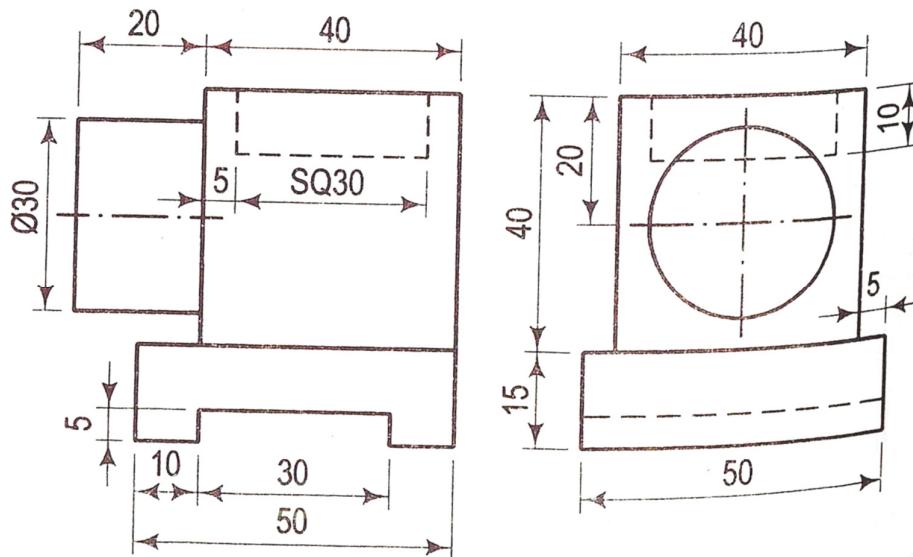
(iv)

HW – 3 ISOMETRIC PROJECTION

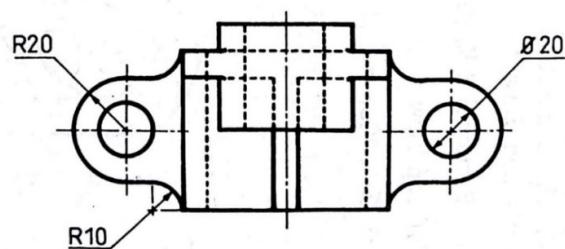
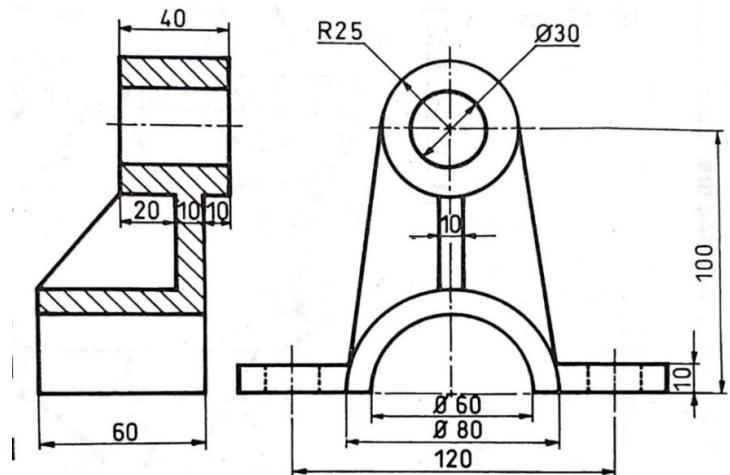
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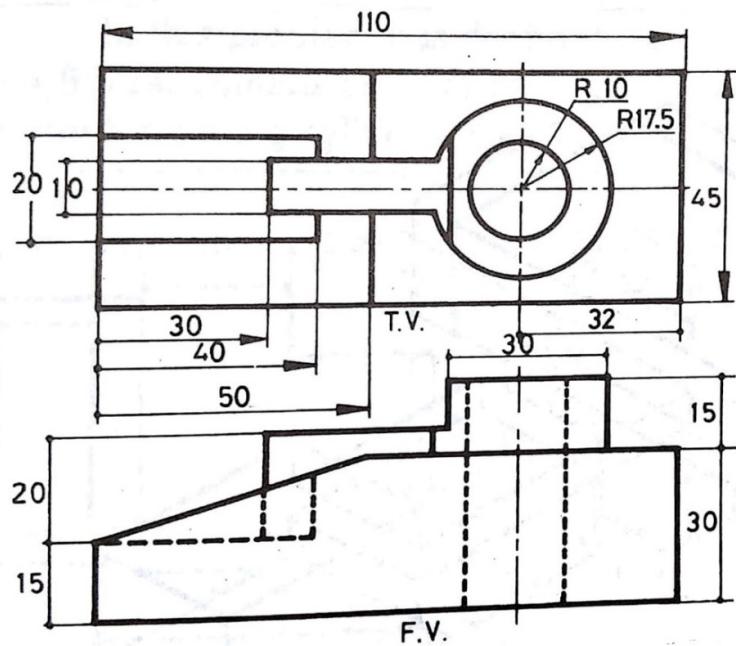
(i)



(ii)



(iii)



(iv)