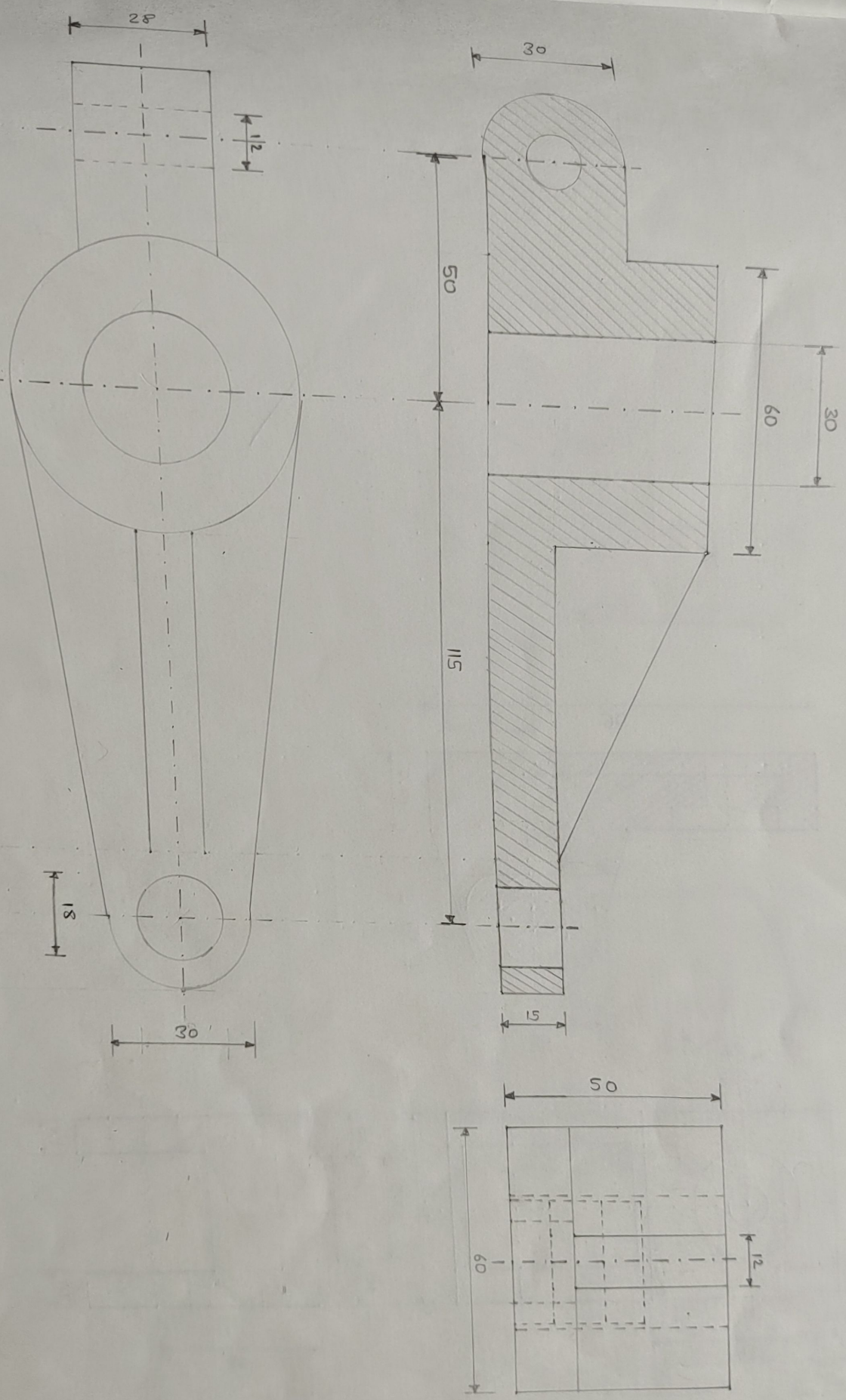
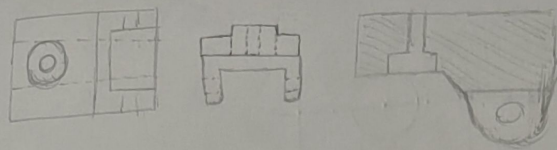
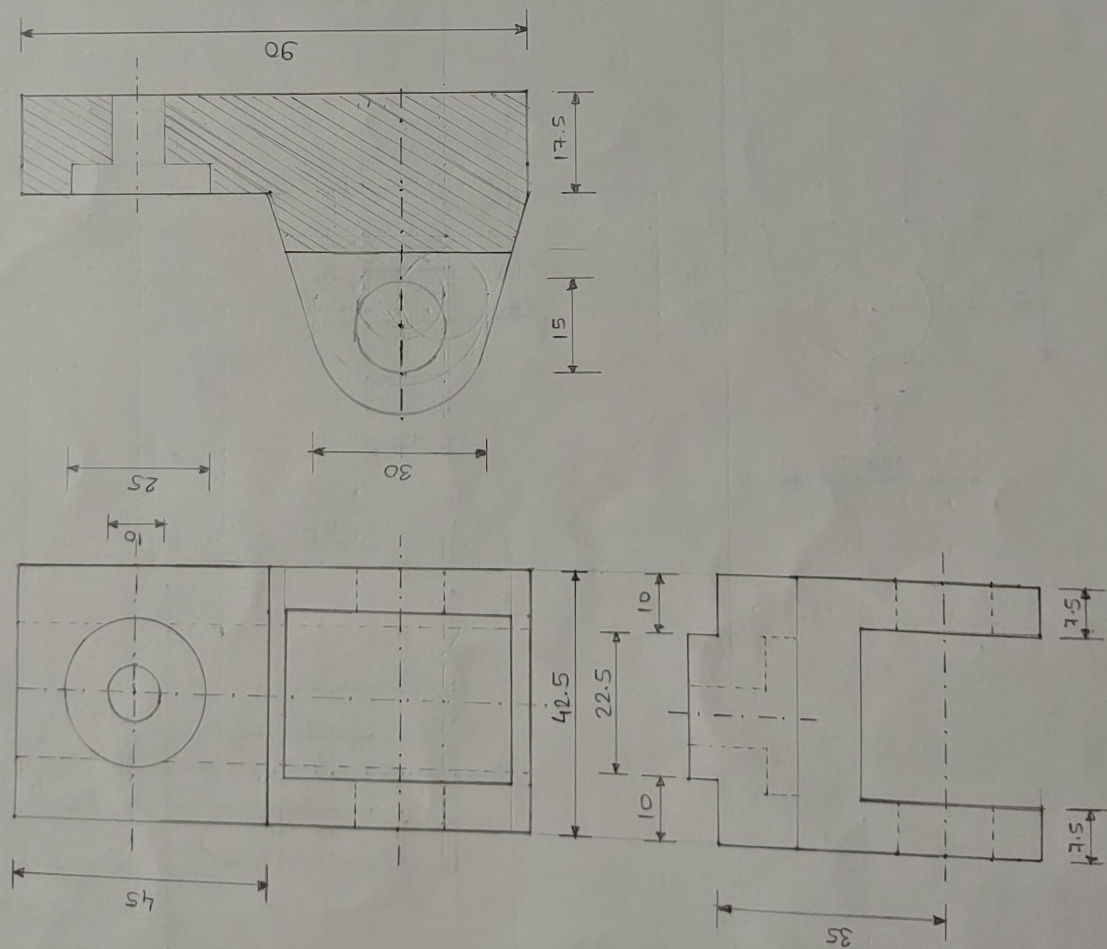


Q. 2.

- Q. Fig 3-39:-
 i) Sectional front view
 ii) Top view
 iii) Side view from the Right and



Q. Fig. S-42: i) Front View, ii) Sectional Side View and iii) Top View.
Use third-angle projection method. (All the values are taken in half ($\frac{1}{2}$))

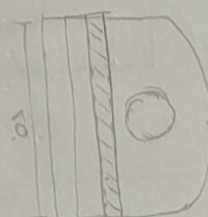
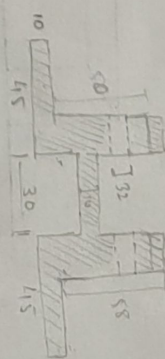
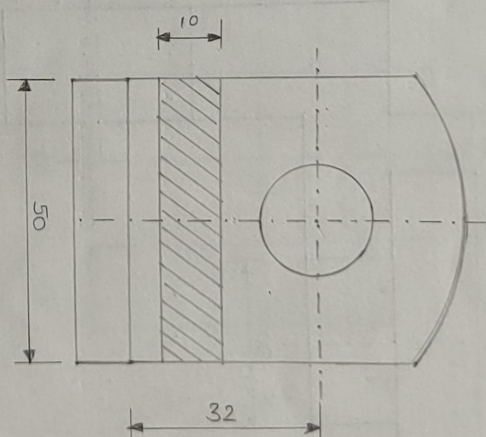
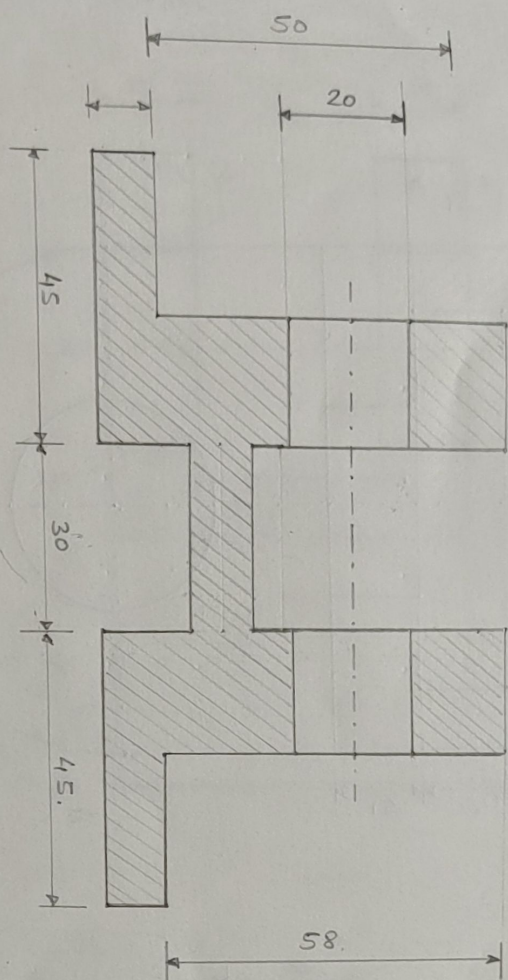


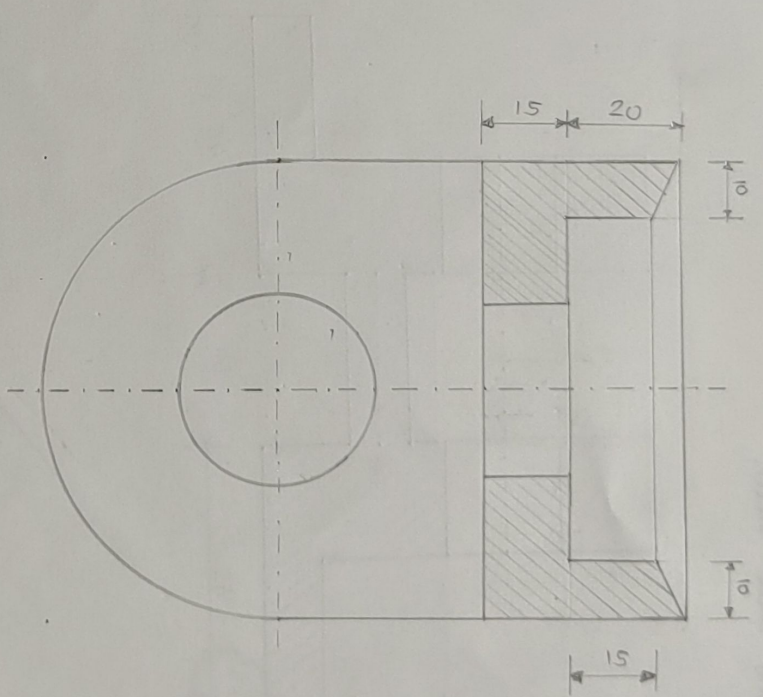
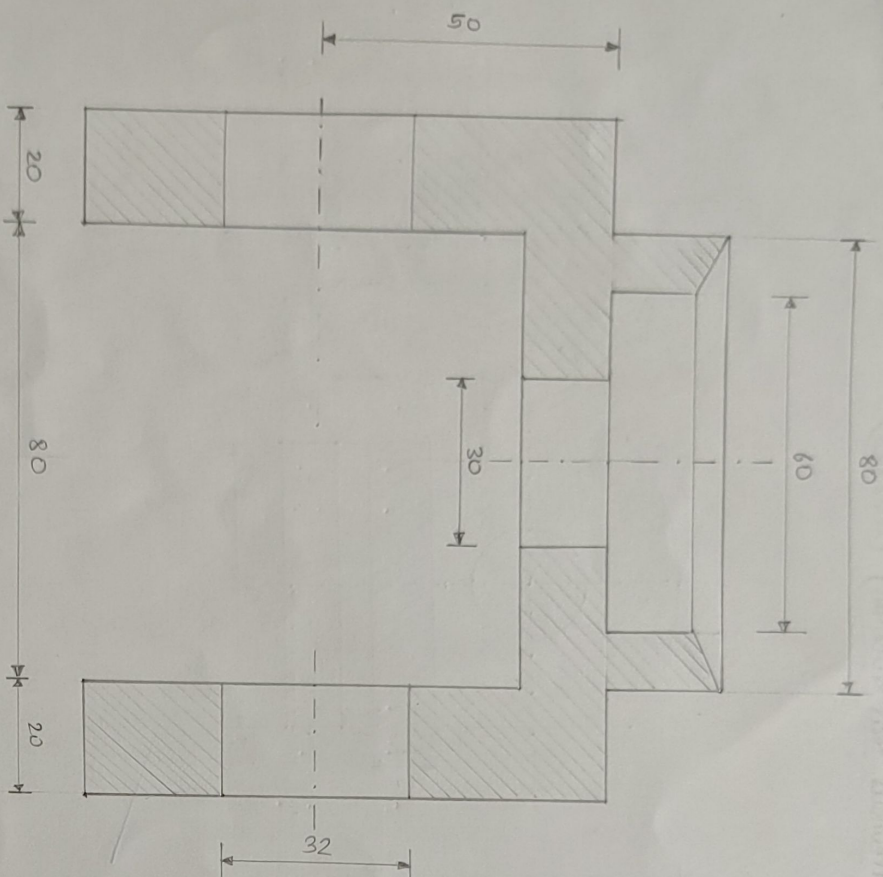
70
-20
50

23/03/24

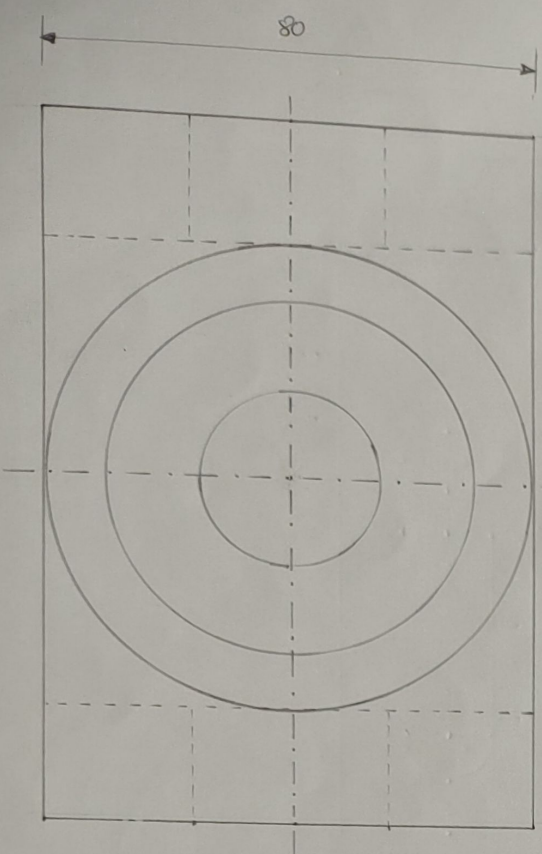
Q. Area

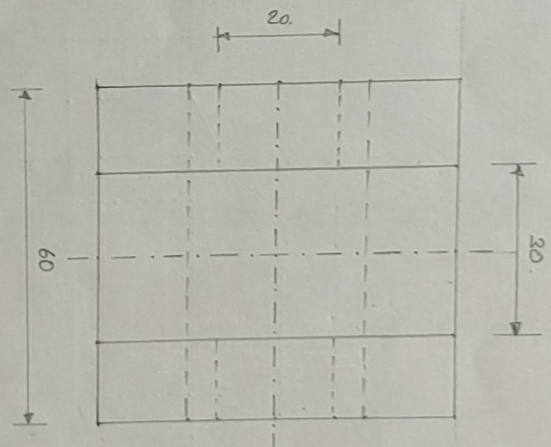
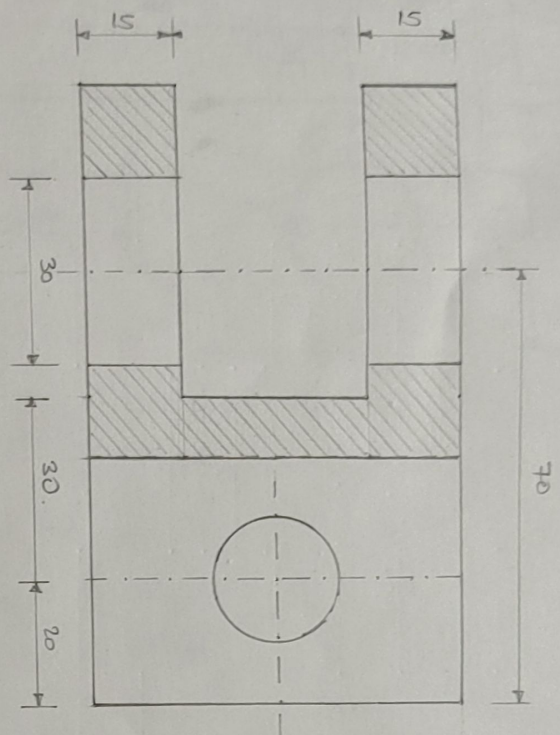
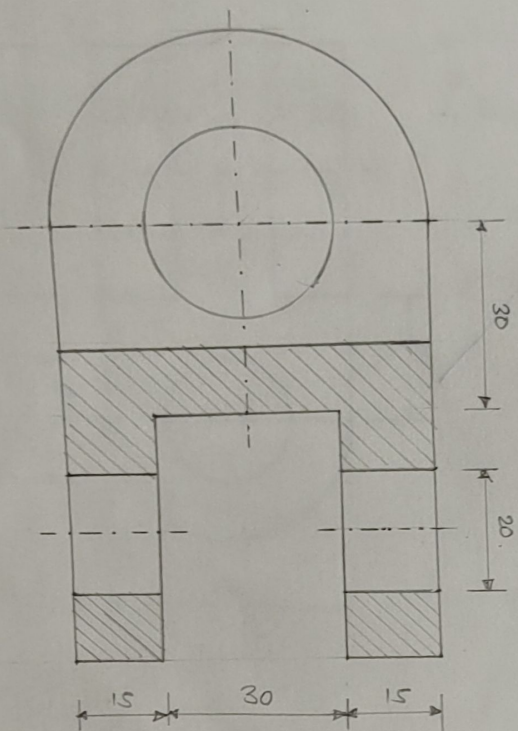
- Q. Draw the following views of given object in figure:
 i) Sectional front view.
 ii) Sectional side view.





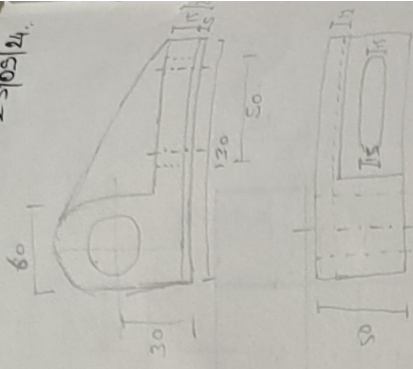
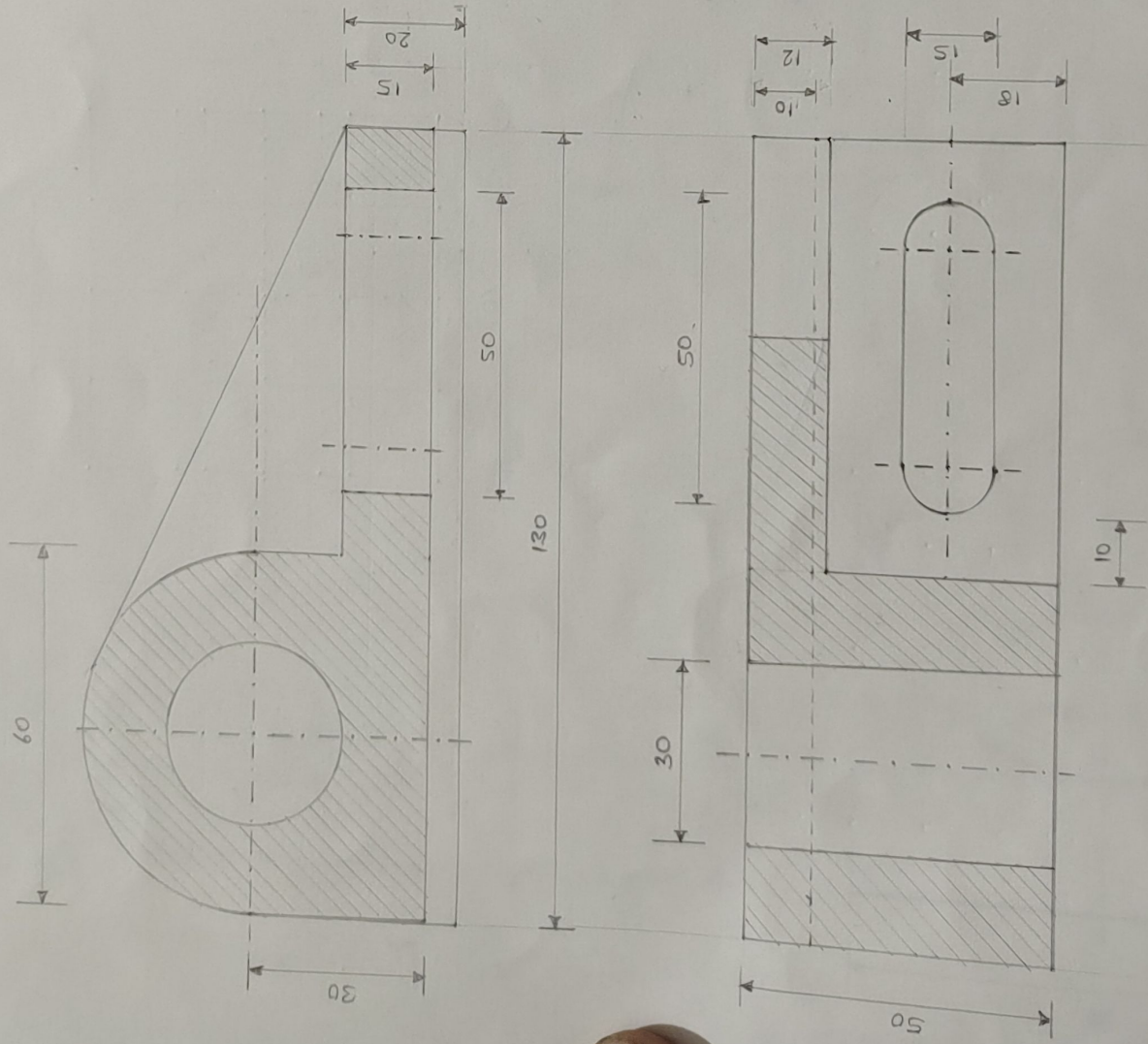
Q. Fig. 5-40: i) Sectional front view ii) Sectional side view iii) Top view.





Q. Draw the following views of object given in figure: 1) sectional front view
(Previous year Question 2018-19) 2) sectional top view.

25/05/24



Q. Draw Orthographic View of give figure :-

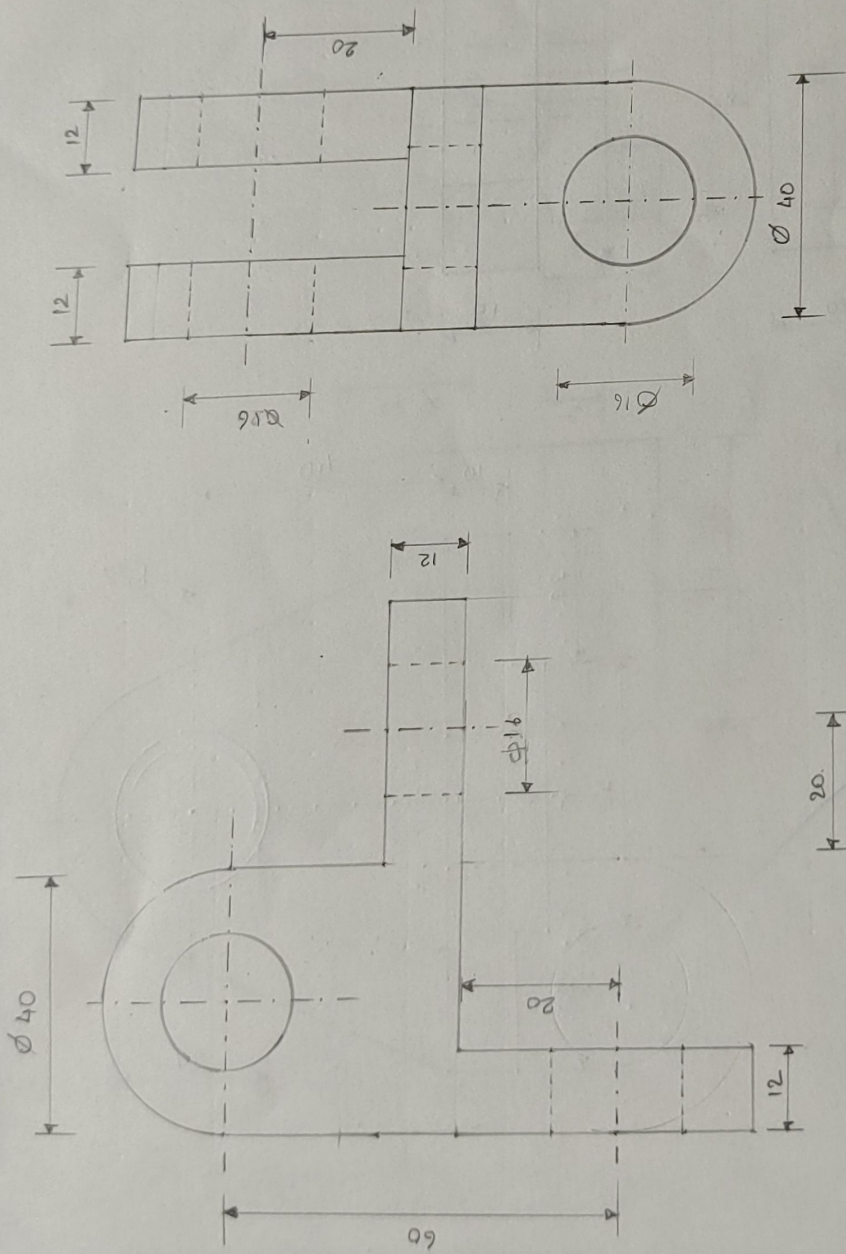
(Previous year paper 2020-21)

25/03/24

i) Front View

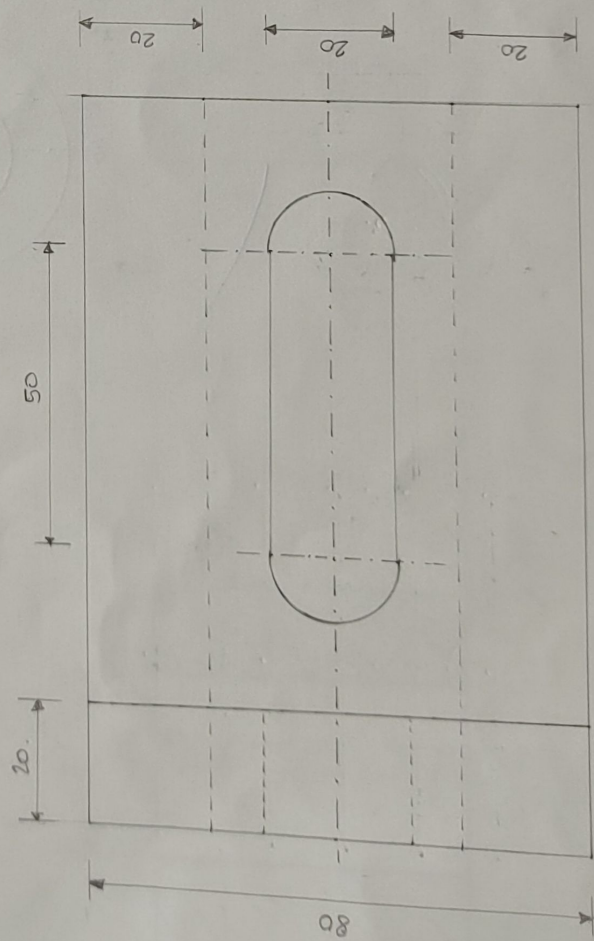
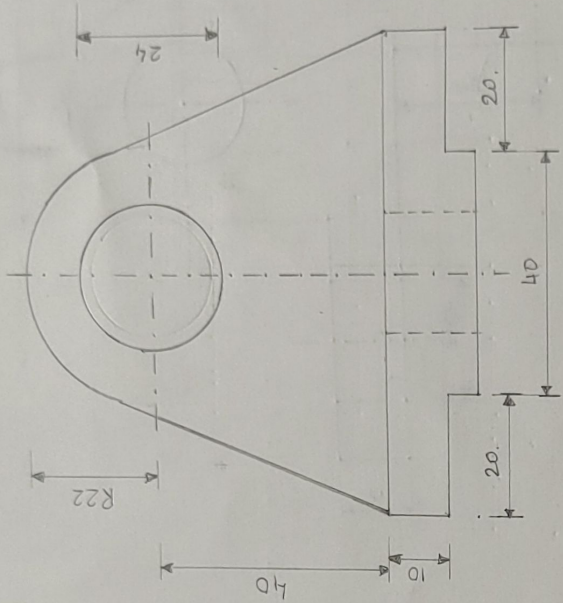
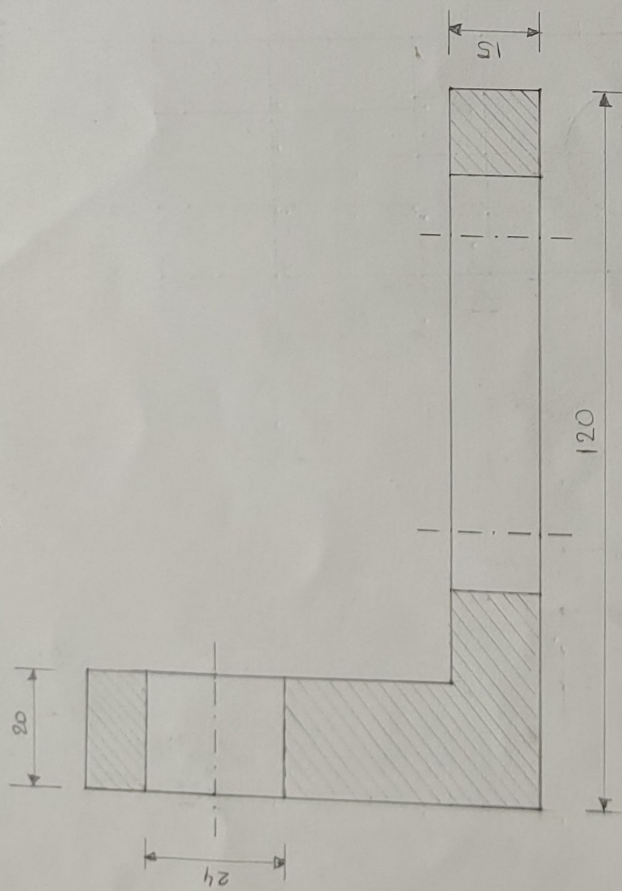
ii) Top View

iii) Side View

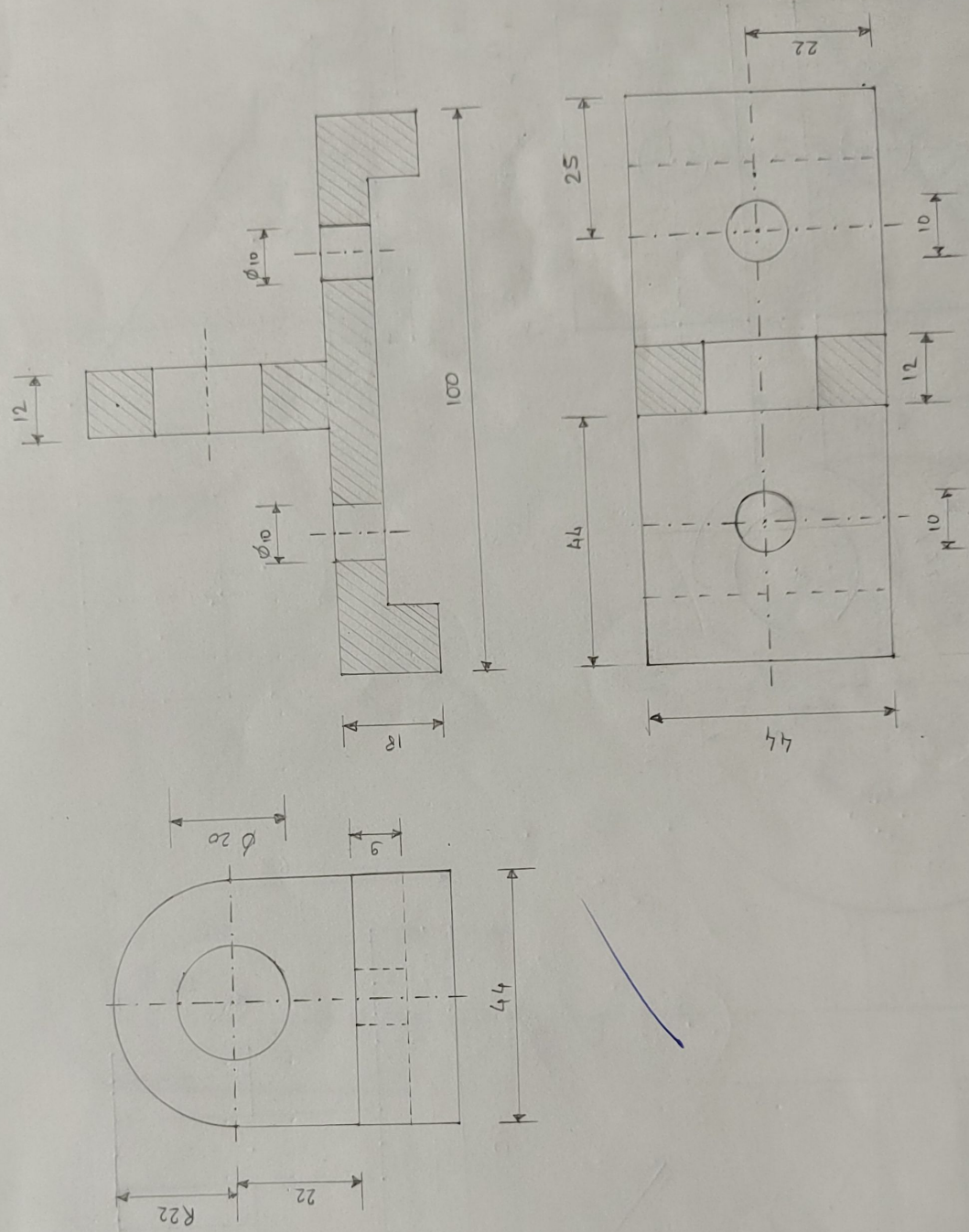


Q. Draw the following view of orthographic projection shown in figure
 i) Sectional front view ii) Top view iii) Side view.

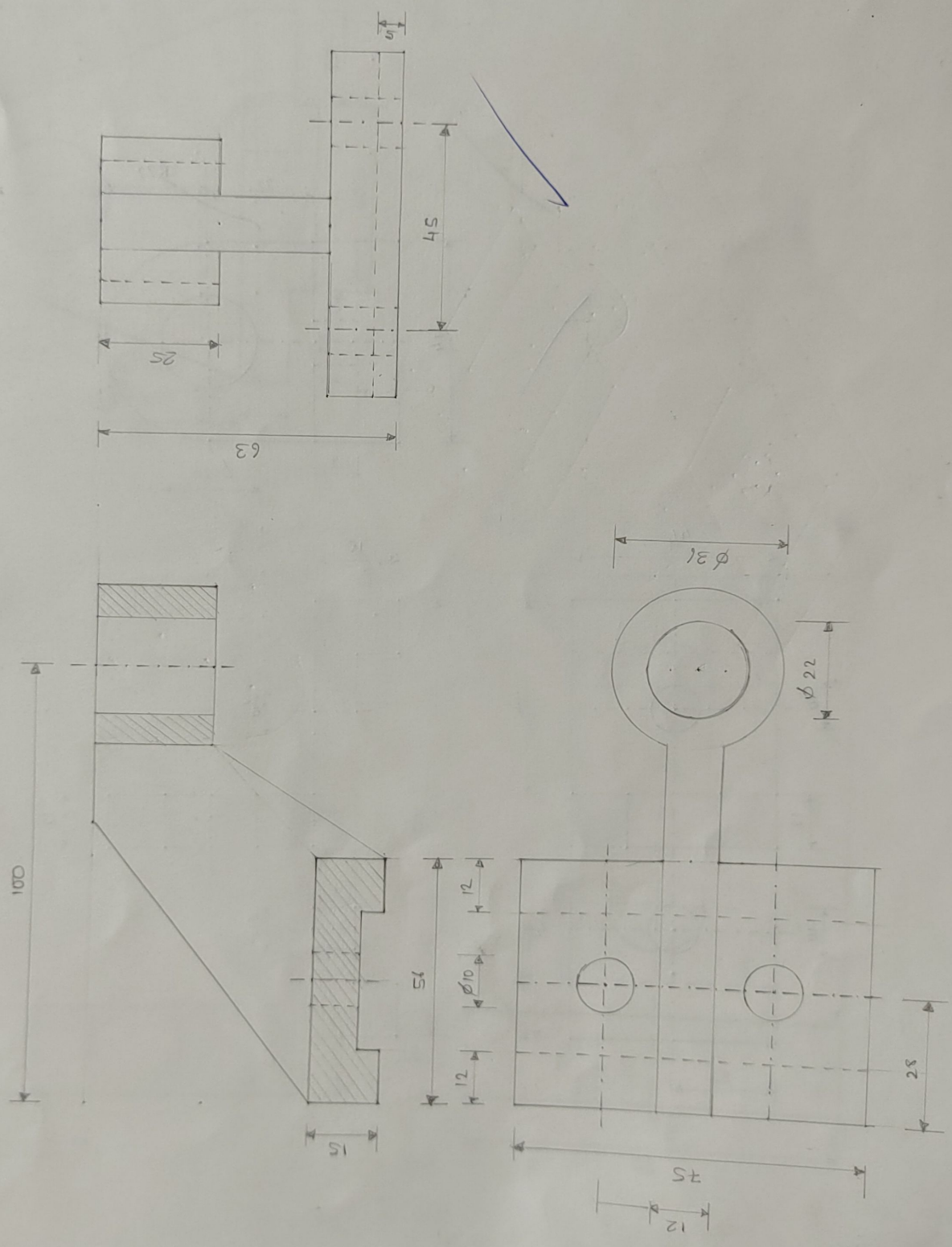
26/03/24



- Q) 1) Sectional front View
 2) Sectional top View
 3) State Right Hand Side View.

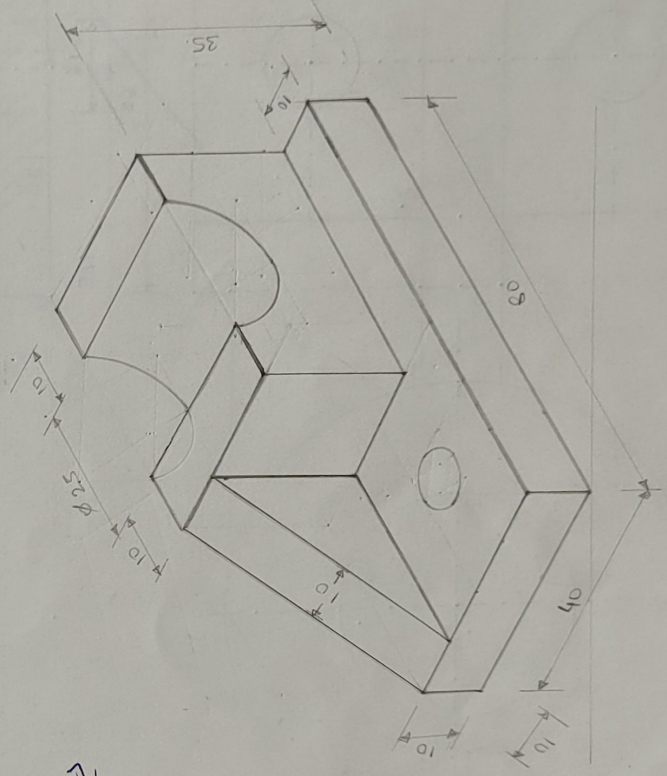
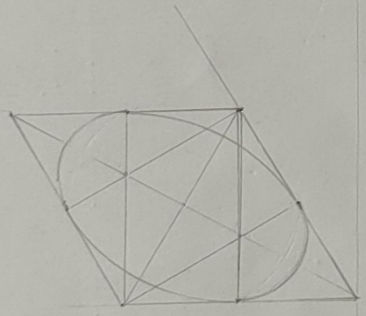


26/03/14

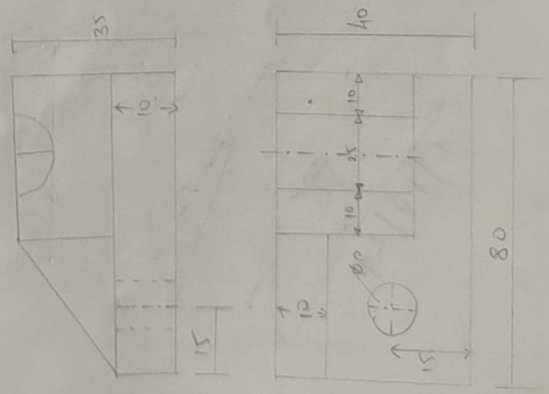


$$27/05/24..$$

ISOMETRIC



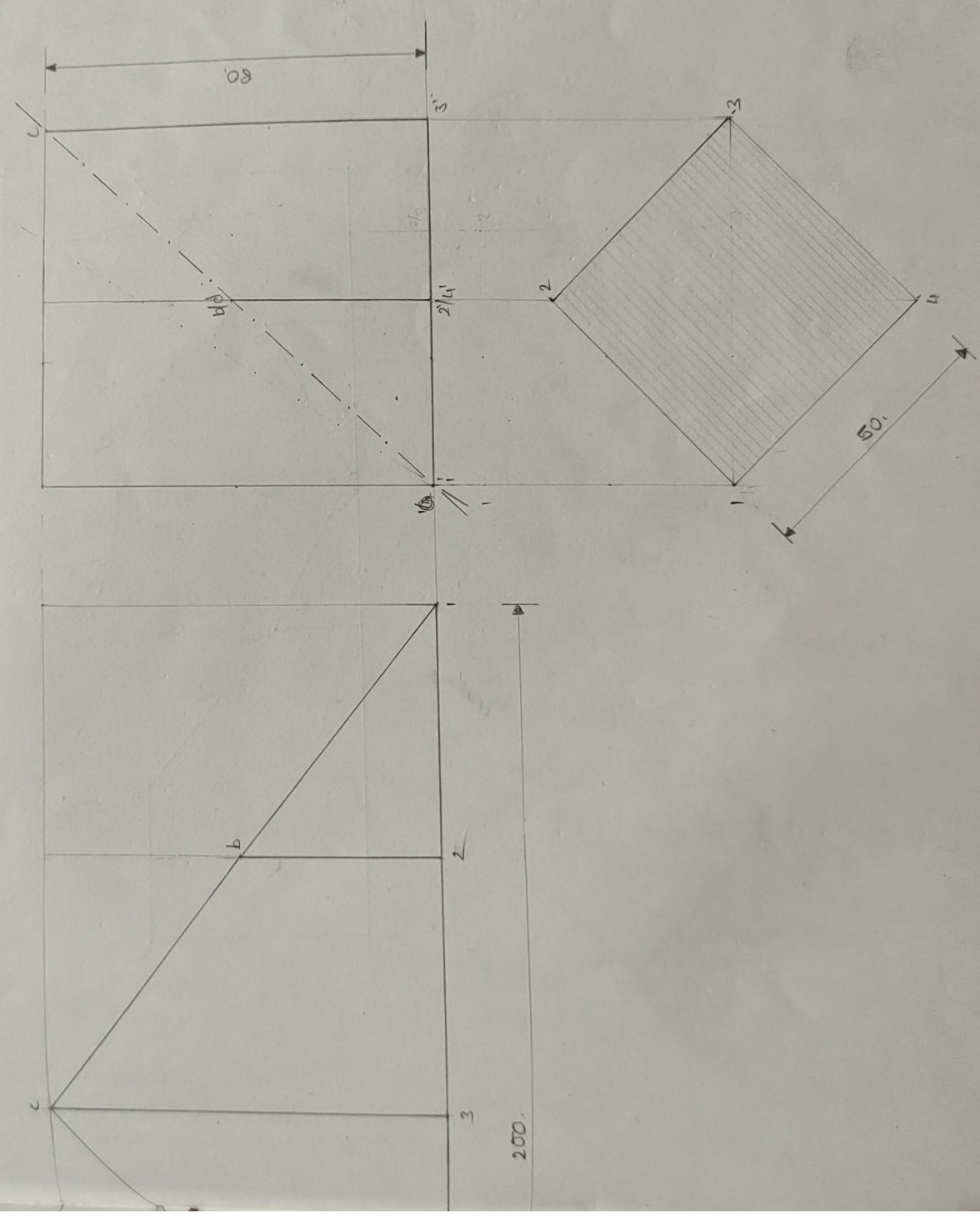
Ans =>



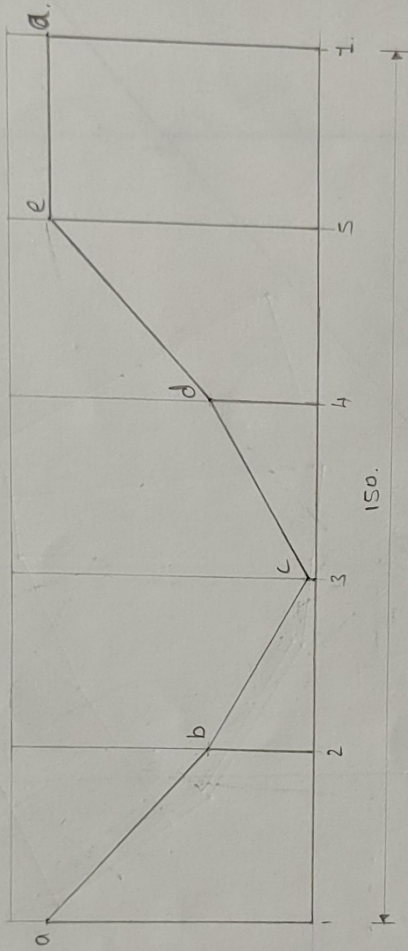
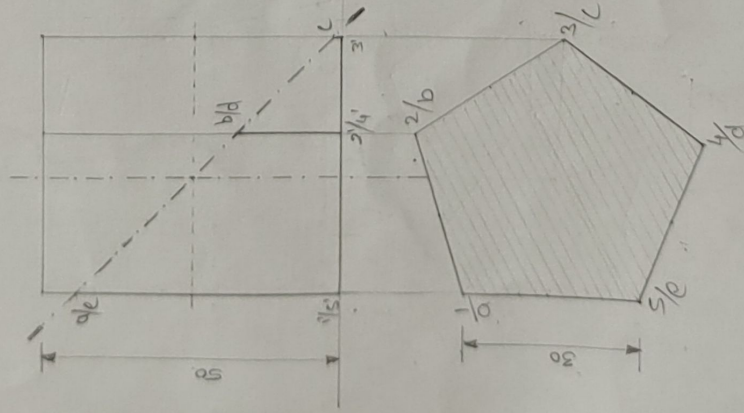
Q1

04/10/24

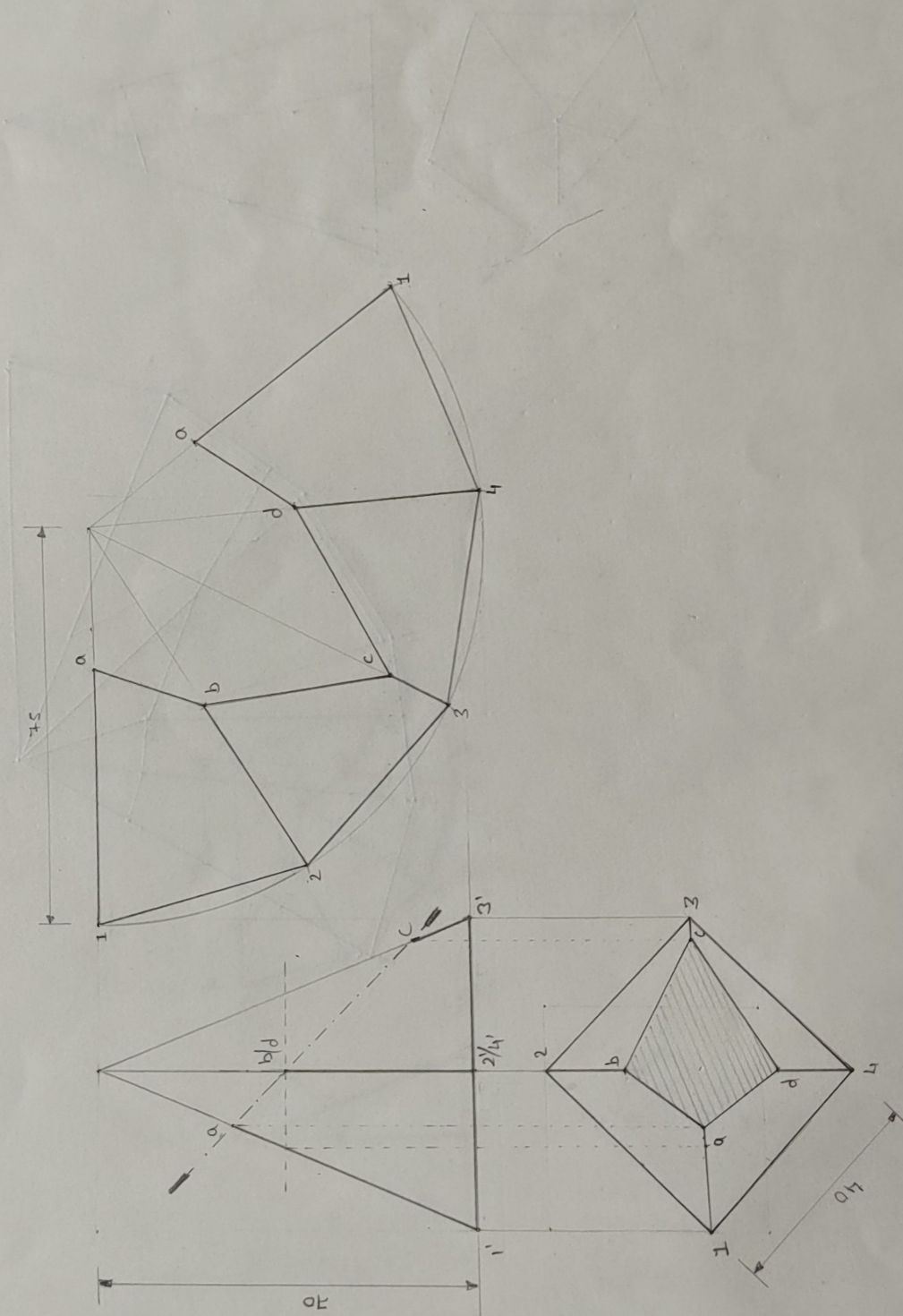
Q2: A square prism 50mm side of base and 80mm in height is resting on its base on HP and is cut by a section plane normal to VP and parallel to HP passing through the left bottom corner and top right corner of elevation. Draw front view, section of top view and true shape of section. Also draw the development of lateral surfaces.



Q.3) A pentagonal prism side of base 30mm and Axis 50mm long stands on HP on its base with one of the side of base perpendicular to the VP. It is cut by a section plane 45° inclined to the HP. And passing through the center of the axis. Draw the front view sectional top view & the Development of the surface.

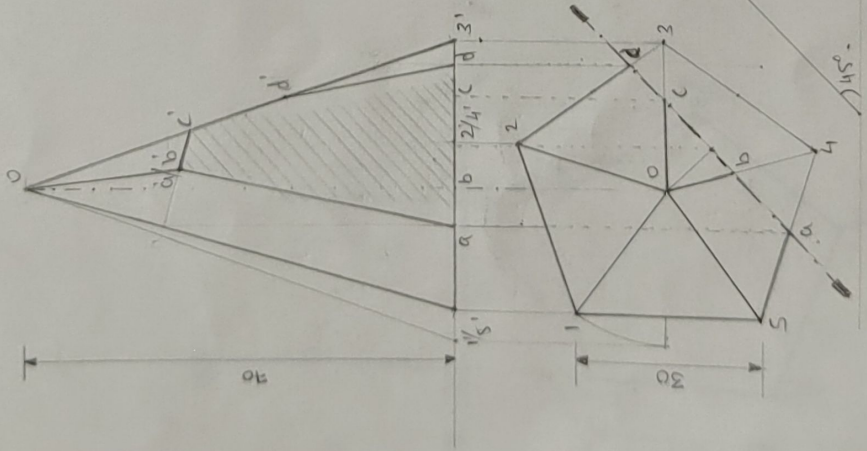
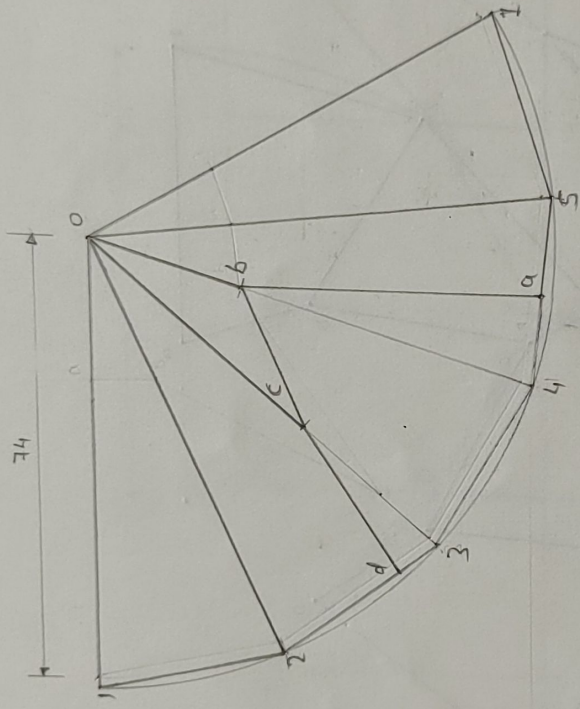


Q. A Square pyramid base 40mm long & axis 70mm long has its base on the H.P. and all the edges of the base equally inclined to the V.P. and base is perpendicular to V.P. inclined at 45° to H.P. and bisecting the axis.
 Draw: 1) Sectional top view 2) Front view 3) True shape of section.
 Also draw development of lateral surfaces.



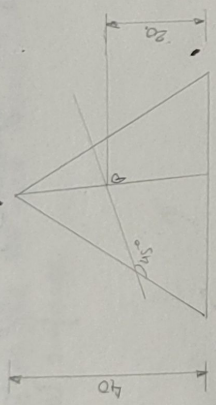
Q5 A pentagonal pyramid side of base 30mm and height 70mm is resting on its base on the HP, with a side of the base perpendicular to VP. It is cut by a vertical section plane (AVP) inclined at 45° degree and cut the pyramid at a distance of 10mm from its axis. Draw the following:
 1) Sectional front view 2) Top view 3) Also Draw Development.

03/10/21

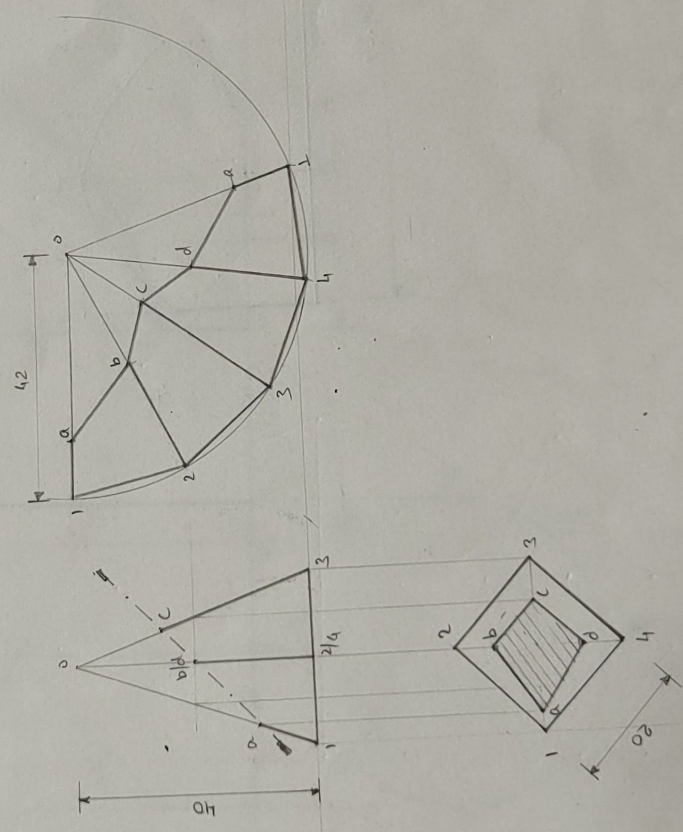


23/10/24.
from

Q1. Draw the development of the lateral surface of the Pyramid whose front view is given below. 08/10/24.



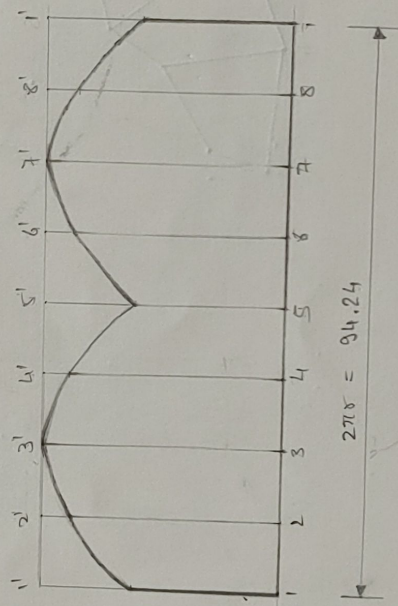
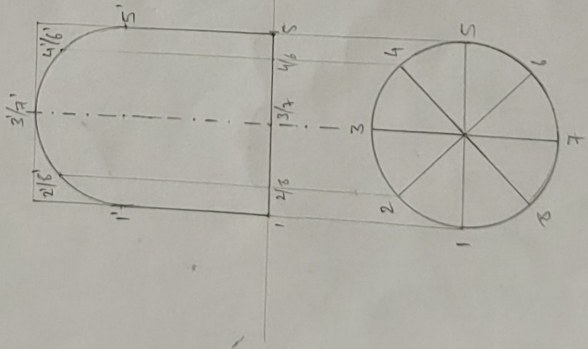
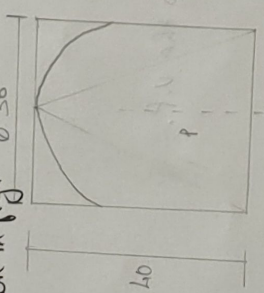
A square Pyramid side of the base 20 mm long and all the side of the base equally inclined to the V.P.



Q2) Draw the Development of lateral surface of the Part 'P' of each of the cylinders, the front views of which are as shown in Fig. - Q2.

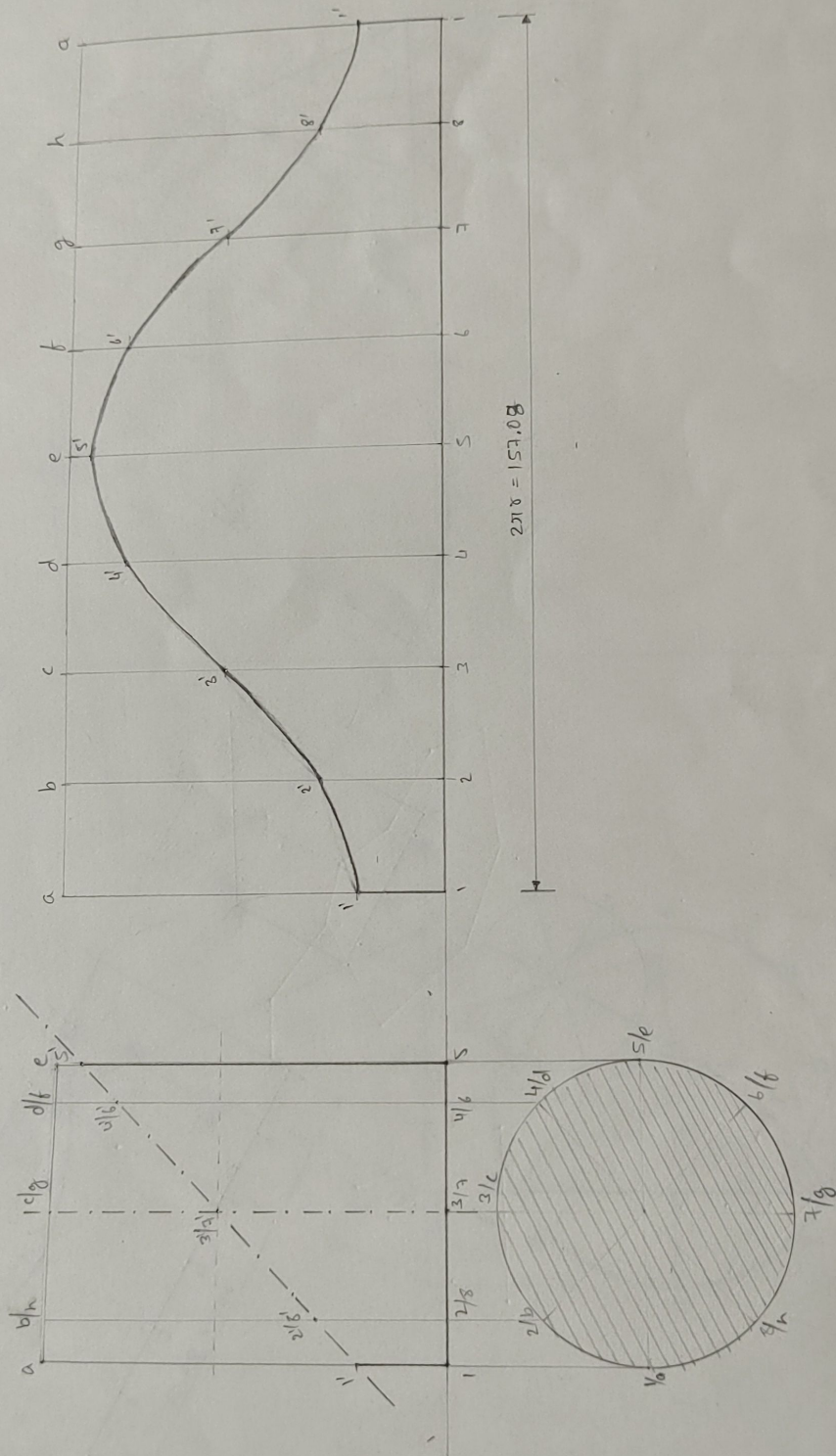
Q2) A

15/10/24

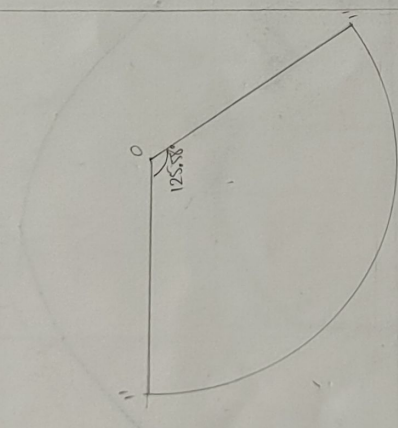
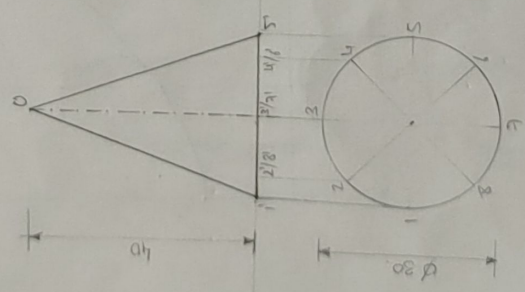
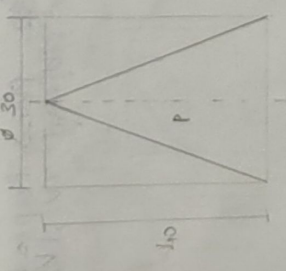


15/10/24

Q3) A cylinder of 50mm diameter and 70mm height has its axis vertical. It is cut by a section plane perpendicular to VP and inclined at 45° to the HP and intersecting the axis 40mm above the base. Draw the sectional TV, FV, and Development of lateral surface.



Q8 a)

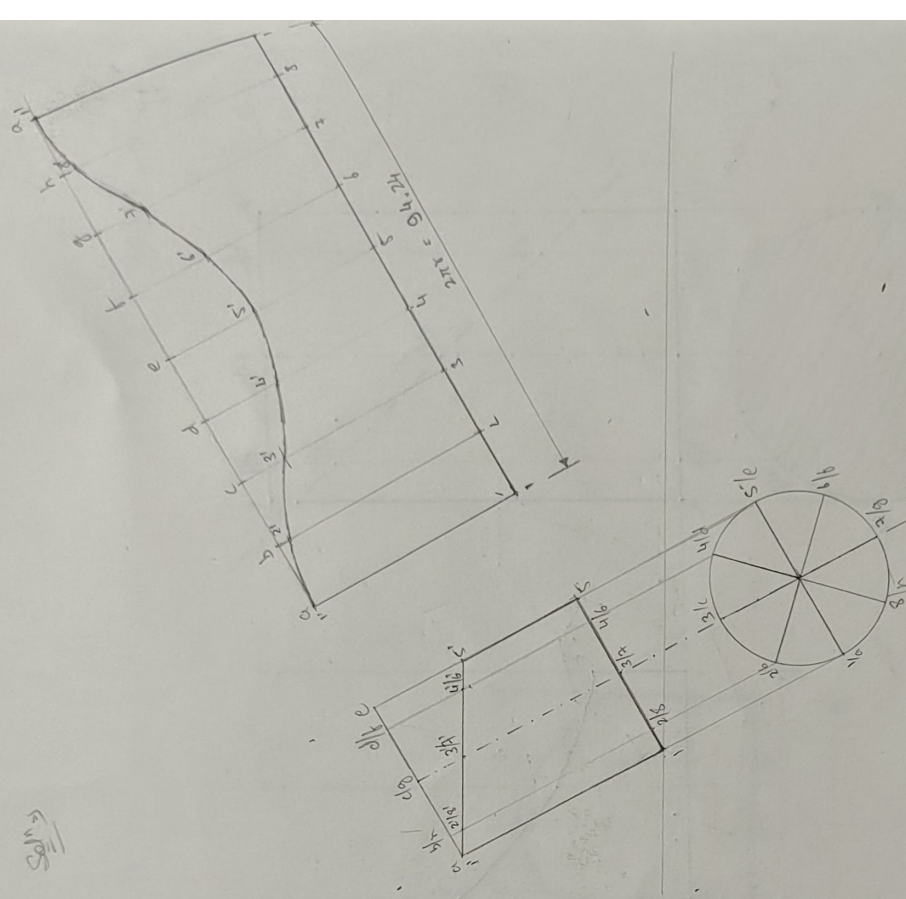
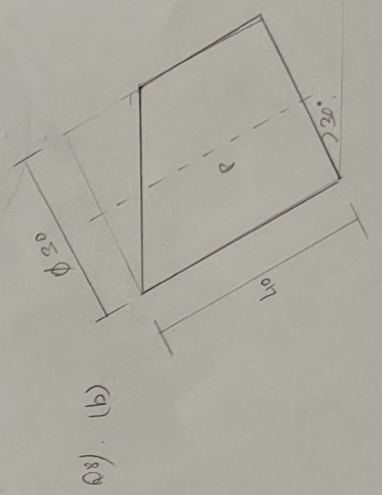


formula $\Rightarrow 360^\circ \times \frac{\text{radius of the cone}}{\text{slant height}}$

Solⁿ $\Rightarrow$

$$\Rightarrow 360^\circ \times \frac{15}{40}$$

Q8 b)



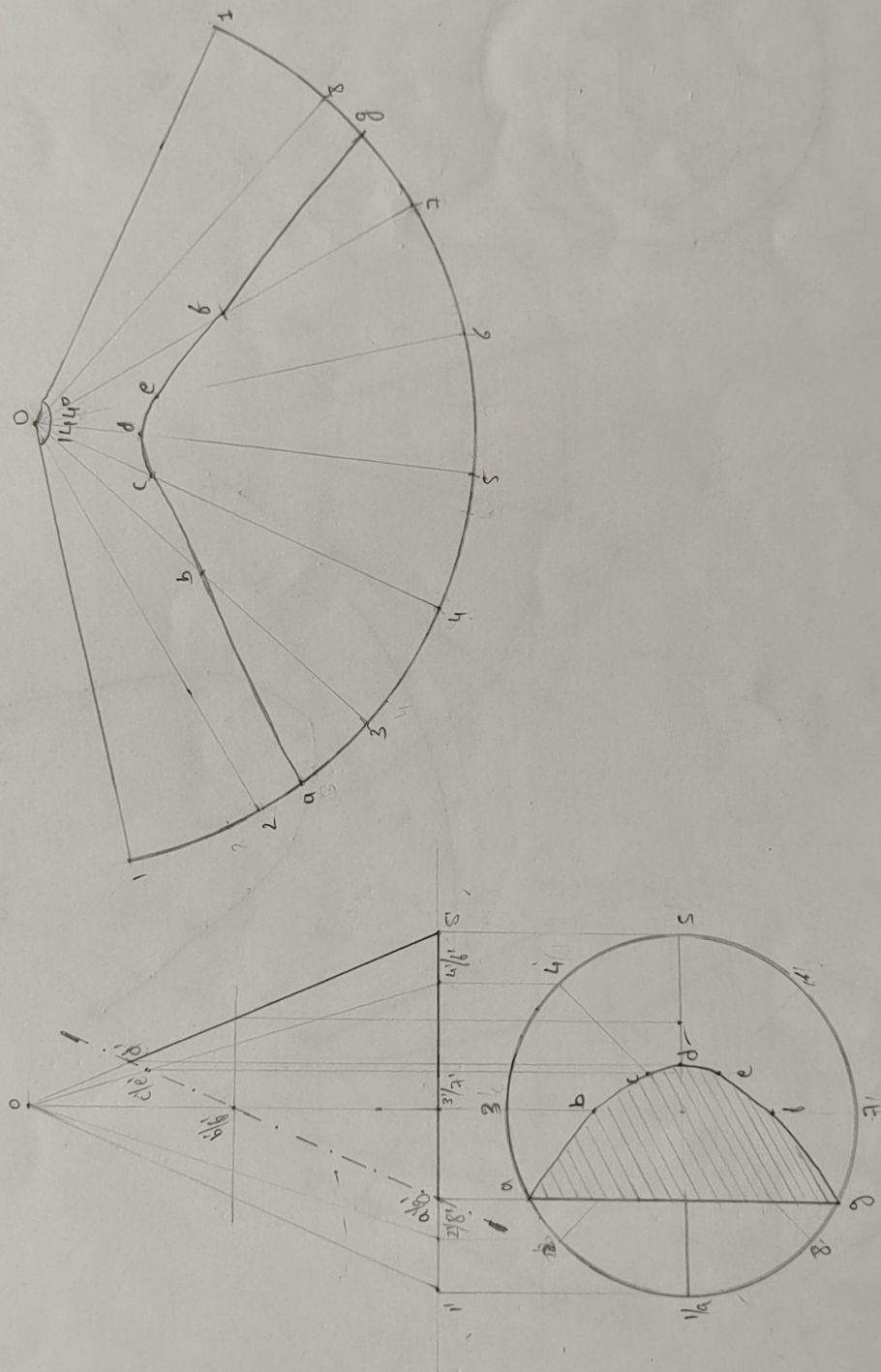
Q. A vertical cone base 60mm and axis 70mm long is cut by a section plane parallel to one of the end generator and perpendicular to VP. The cutting plane bisect the axis. Draw!

2) 10/24

1) section Top View 2) True shape of section 3) Development of lateral surfaces.

$$\frac{\Sigma}{h} \times 360 = \frac{20}{75} \times 360$$

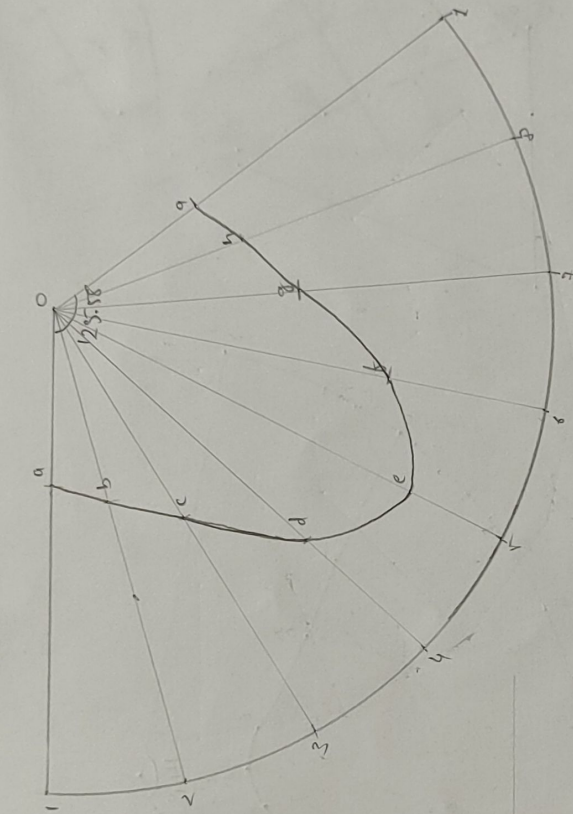
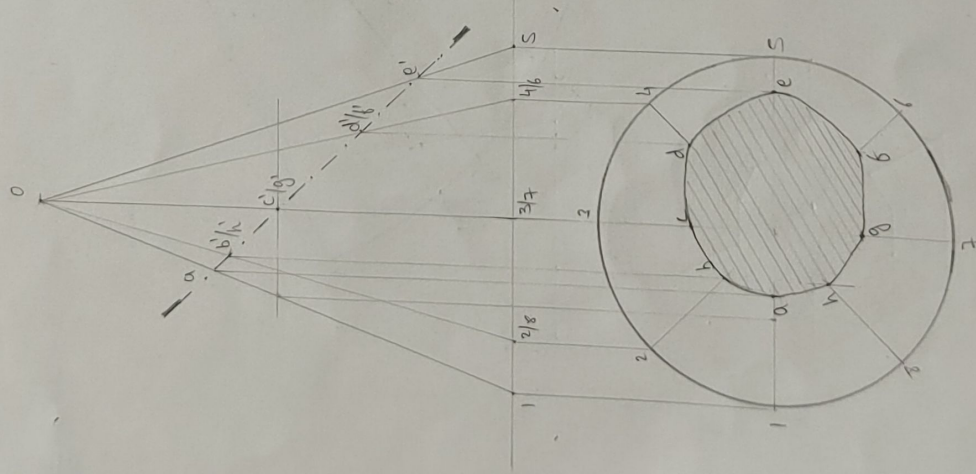
$$= 144^\circ$$



Q10. A Right circular cone base 60 mm. Diameter, and axis 80 mm long. Resting on PH base on to the HP. Cut by a section plane perpendicular to the VP and 45° inclined to the HP. And by cutting the HP the cone. the front section top view.

21/10/21

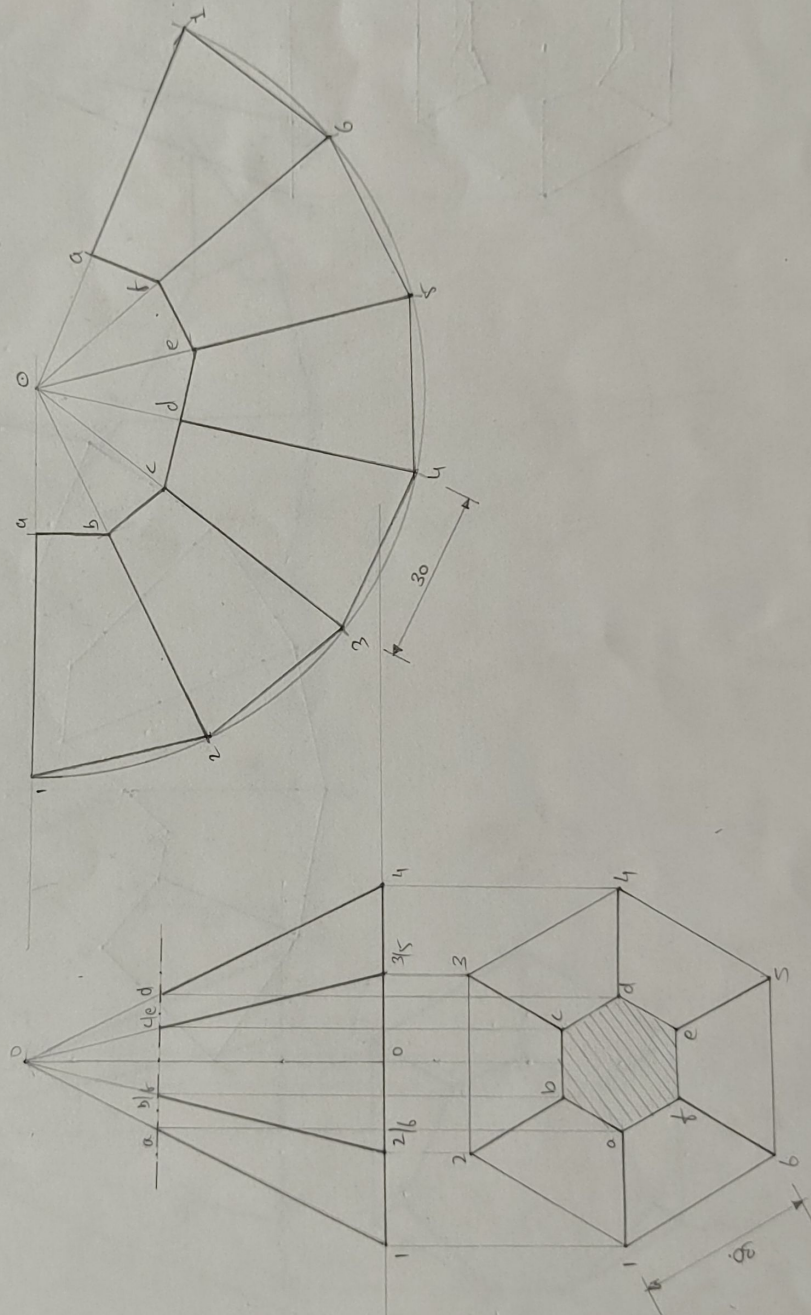
Draw the Front View, sectional Top View, and lateral Development.

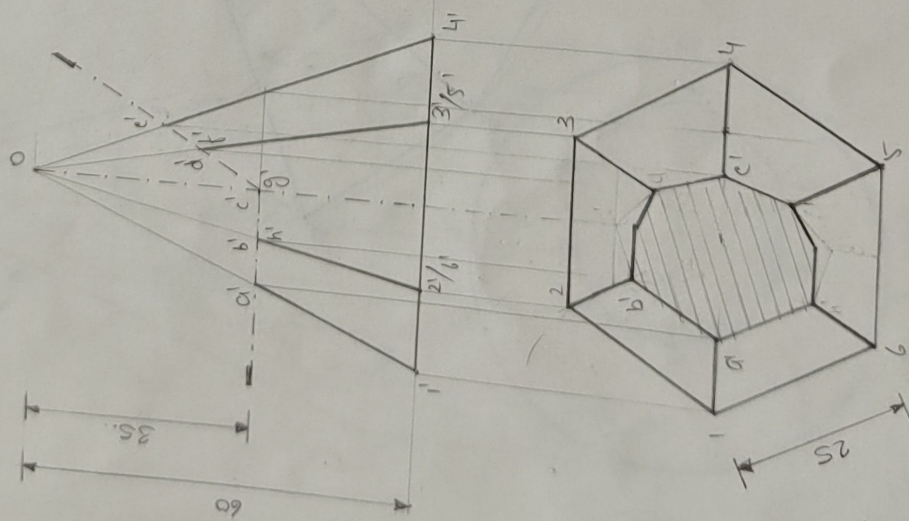
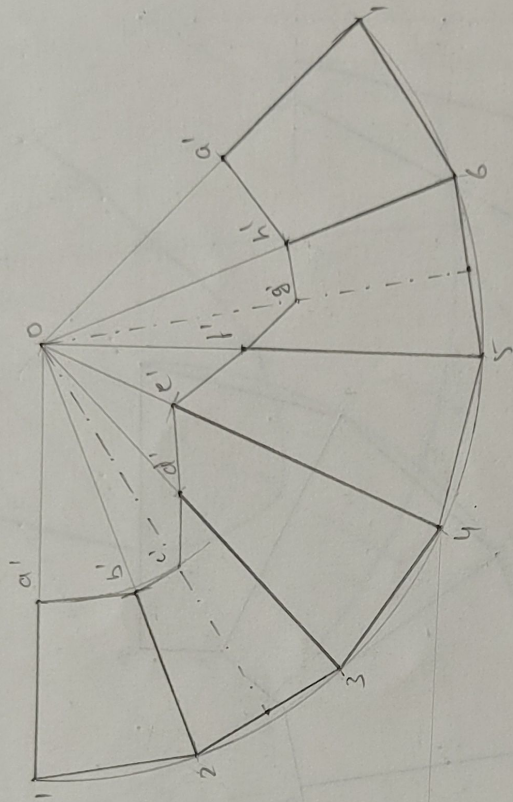


$$\frac{1}{1} \times 360 = \frac{30}{86} \times 360$$

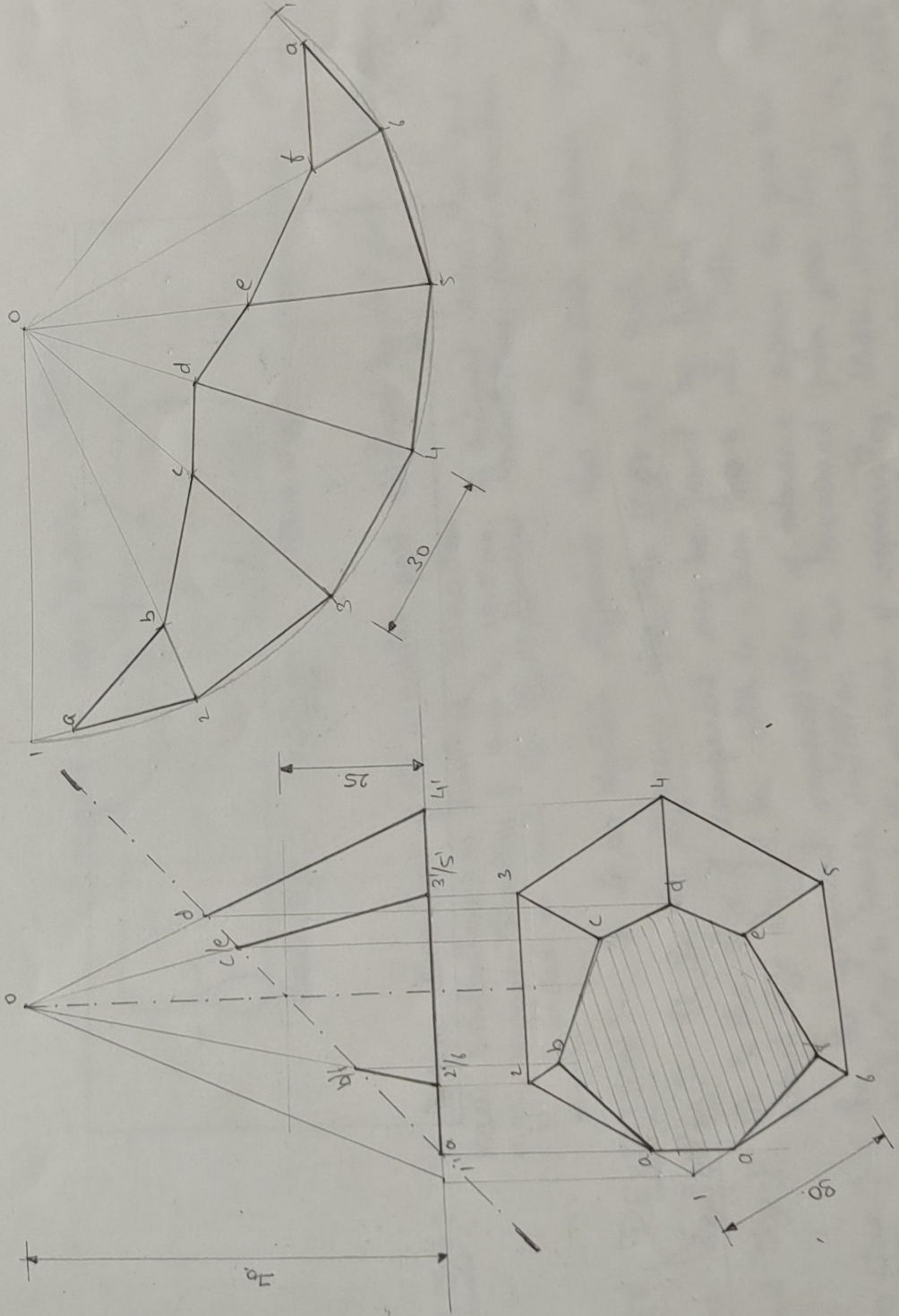
$$= 125.58$$

Q.111) A Hexagonal Pyramid of base 30mm and axis 60mm long rest on its PH base on HP. And one of the edge of the base is parallel to the VP, it is cut by the horizontal section plane at a distance of 38mm above the base. Draw the front view, section top view & its Development.

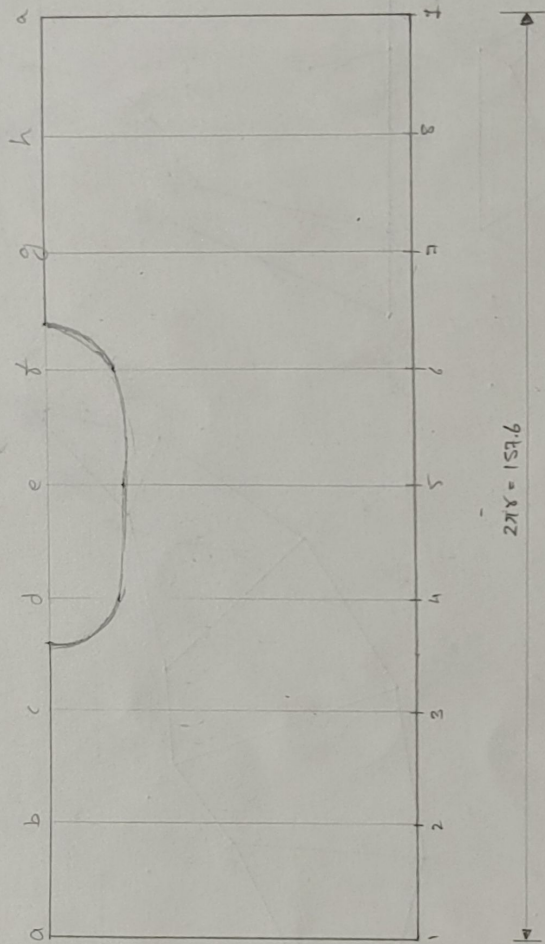
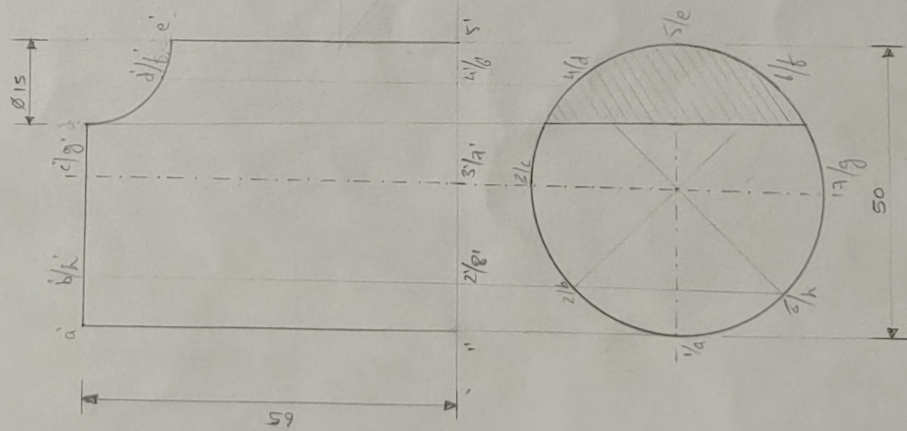




22/10/24..

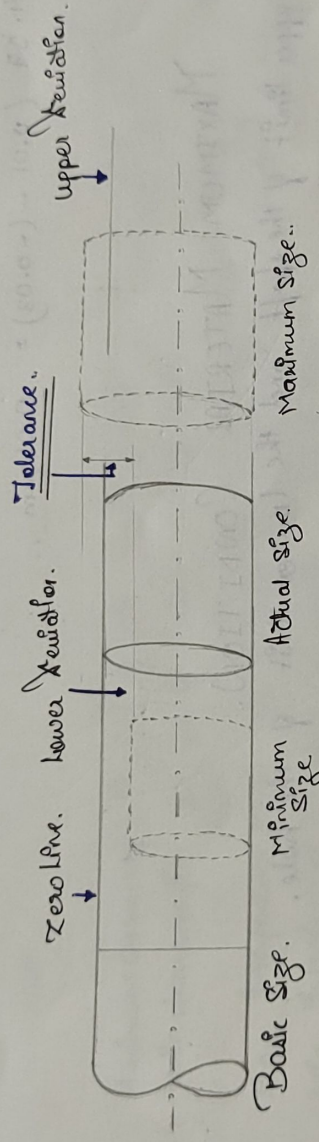


Q. 24



$$2 \times 8 = 159.6$$

Tolerance :- It is the difference b/w maximum limit and minimum limit of the dimension is known as Tolerance.



Basic Size :- It is the dimensions of the machine part obtained by designed calculation. The Basic Size is also known as Basic Dimensions or Nominal Dimensions.
e.g.:- Suppose Diameter of shaft is 25.5 mm by designed calculation and approximated to 25 mm so this 25 mm is called as Basic Size or Nominal Dimensions.

UPPER DEVIATION :- It is an algebraic difference b/w Max Limit and Basic Size.

Lower Deviation :- It is the difference b/w Min Limit and Basic Size..

Actual Size :- It is the size of component may be found by Actual measurement for a component to be acceptable actual size should be with in max limit & min. limit.

Zero Line :- In the graphical representation of tolerance system the zero line represent the basic size. The upper deviation & lower deviation are measured from zero line.

Unilateral System Limit :- It is the method of representing limits. When both the limit of size are on the same side of the zero line the component dimensions has unilateral limit.

Bilateral Limit :- When one of the limit of the size is on one side of zero line and other limit of the size is on the other side of zero line.

e.g. ± 0.5

14/11/24

Q1) Size of the shaft. $\phi 25 \pm 0.01$
 -0.03

Find 1) minimum limit 2) Max limit 3) upper deviation 4) Lower deviation 5) Tolerance 6) Basic size.

- 1) max limit $\Rightarrow 25 + 0.01 = 25.01 \text{ mm}$
- 2) min limit $\Rightarrow 25 - 0.03 = 24.97 \text{ mm}$
- 3) Upper deviation $= 25.01 - 25 = 0.01 \text{ mm}$
- 4) Lower deviation $= 24.97 - 25 = -0.03 \text{ mm}$
- 5) Tolerance $= 25.01 - 24.97 (0.01 - (-0.03)) = 0.04 \text{ mm}$
- 6) Basic size $= 25 \text{ mm}$

MAXIMUM MATERIAL CONDITION.

It is defined as the upper limit of the shaft and the lower limit of the hole.

Min Material Condition This is defined as the lower limit of the shaft and the upper limit of the hole.

Basic Shaft: A basic shaft is one (1) whose upper deviation is zero.

Basic Hole: A basic hole is one whose lower deviation is zero.

Allowance: It is the intentional difference plus the maximum material limit of the mating parts.
 allowance = lower limit of hole - upper limit of shaft.

Q2	Shaft	Hole
$\phi 27.470 \text{ mm}$	$\phi 27.5 \text{ mm}$	
$\phi 27.445 \text{ mm}$	$\phi 27.523 \text{ mm}$	

- Find:
- 1) Hole tolerance
 - 2) Shaft tolerance
 - 3) Allowance

- 1) Hole tolerance $\Rightarrow$ max limit - min limit $\Rightarrow 27.523 - 27.5 \Rightarrow 0.023 \text{ mm}$
- 2) Shaft tolerance $\Rightarrow$ max limit - min limit $\Rightarrow 27.470 - 27.445 \Rightarrow 0.025 \text{ mm}$
- 3) Allowance $\Rightarrow$ max shaft limit - max hole limit $\Rightarrow 27.470 - 27.523 \Rightarrow -0.053 \text{ mm}$
 $\Rightarrow$ 0.053 mm material.

Fit :- This is the term used to indicate the condition of tightness and looseness b/w two mating parts assembled together.

1) Clearance Fit :- When smallest Hole is larger than the largest shaft. A clearance fit is obtained.
Formula :- (Same as allowance). (Clearance fit = Lower limit of Hole - Upper limit of shaft. (+ve))

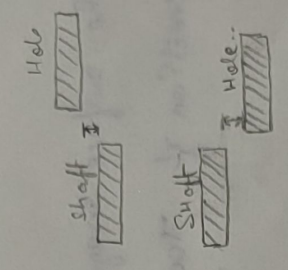
2) Interference Fit :- When the largest Hole is smaller than the smallest shaft. An interference fit is obtained.

Formula :- Interference fit $\Rightarrow$ Lower limit of shaft - Upper limit of Hole (+ve).
e.g.:- Shrink fit, Heavy or medium Press fit.

Shrink fit } Interference fit
Press fit }
Heavy or medium }
Loose Running - etc }

Formulas :-

- 1) Clearance fit :-
e.g.:- Loose fit
Maximum Clearance fit $\Rightarrow$ UL of Hole - LL of shaft
Min clearance fit $\Rightarrow$ LL of Hole - UL of shaft
- 2) Interference fit :-
Max interference fit $\Rightarrow$ UL of shaft - LL of Hole
Min interference fit $\Rightarrow$ LL of shaft - UL of Hole.



3) Transition Fit :- This is obtained by overlapping tolerance zones of a shaft and Hole. This fit doesn't guarantee either clearance or interference.
e.g.:- Push fit, Force fit and light Press fit.

Q1 $\Rightarrow$

Hole	Shaft
$\phi 25^{+0.025}_{+0.000}$	$\phi 25^{-0.02}_{+0.04}$
$\phi 25^{+0.023}_{+0.000}$	$\phi 25^{+0.042}_{+0.028}$

Find :- 1) Hole Tolerance 2) Shaft tolerance
3) Allowance 4) Type of fit :-

- ① Ans :-
- 1) Hole Tolerance $\Rightarrow 25.025 - 25.000$
 $\Rightarrow +0.025 \text{ mm}$
 - 2) Shaft tolerance $\Rightarrow 24.98 - 24.96$
 $\Rightarrow +0.02 \text{ mm}$
 - 3) Allowance $\Rightarrow 25.000 - 24.98$
 $= 0.02 \text{ mm}$
 - 4) Type of fit $\Rightarrow$ Clearance fit
 $\text{max} \Rightarrow 25.025 - 24.96 = 0.065 \text{ mm}$
 $\text{min} \Rightarrow 25.000 - 24.98 = 0.02 \text{ mm}$
- ② Ans :-
- 1) Hole Tolerance $\Rightarrow 25.023 - 25.000$
 $\Rightarrow 0.023 \text{ mm}$
 - 2) Shaft Tolerance $\Rightarrow 25.042 - 25.028$
 $= 0.014 \text{ mm}$
 - 3) Allowance $\Rightarrow 25.000 - 25.00042$
 $= 0.0005 - 0.042$
 - 4) Type of fit $\Rightarrow$ Clearance fit
 $\text{max} \Rightarrow 25.042 - 25.000 = 0.042$
 $\text{min} \Rightarrow 25.028 - 25.023 = 0.005$

Roughness? - A surface produced by a super finishing process, when it is observed under microscope shows micro irregularities. This surface irregularities are known as surface Roughness or surface quality or surface texture.

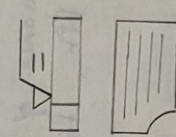
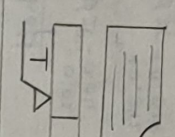
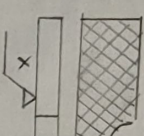
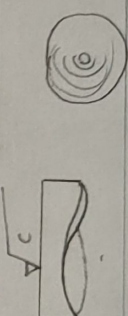
Ideal Surface? It is a hypothetical perfect surface without any micro-irregularities.

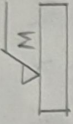
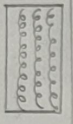
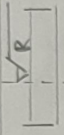
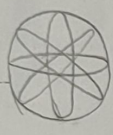
Roughness? It refers to the peak and ^{valley} ~~valleys~~ which will be observe on the machine surface

⇒ It represent height of peaks or depth of valley measured from the mean line for 5 consecutive cycle

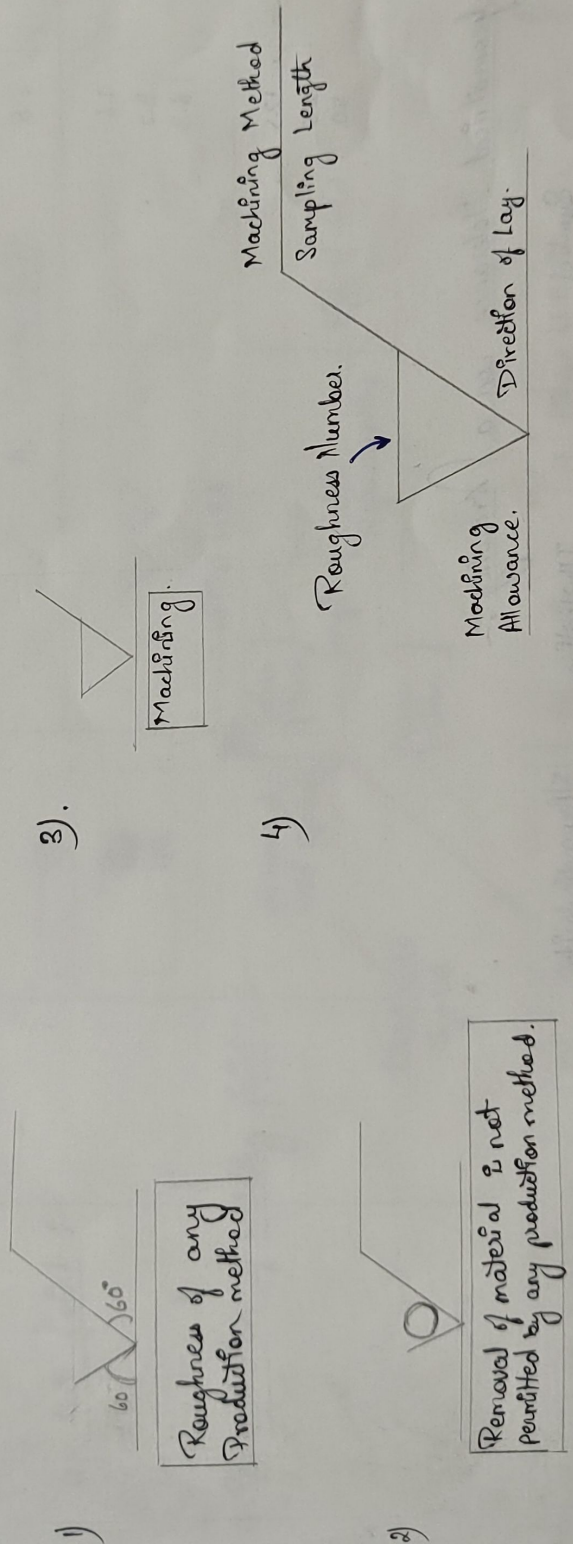
Waviness? This is the surface irregularities in the form of wave with larger wavelength

Lay? It is the direction of Tool marks or scratches which are represented on drawing with surface finish symbol.

Symbol	Description	Illustration.
1) 	Lay parallel to the line representing surface to which the symbol is shown.	
2) 	Lay Perpendicular to the line representing surface to which the symbol is shown.	
3) 	Lay angular in both direction to the line representing the surface to which the symbol is shown.	
4) 	Circular relating to the center of the surface to which symbol is shown.	

1) M.	Multi Directional..	 
2) R.	Approximately Radial. relating to the center of the surface to which Symbol is shown..	 

Representation of Surface Roughness on Drawing :-



Roughness grade as Recommended by BIS.

Roughness Grade Number.	Roughness Value (Ra (mm))..	Symbol.
N1 N3 N4	.025 .05 .1	
N4 N5 N6	.2 .4 .8	
N2 N8 N9	1.6 3.2 6.3	
N10 N11 N12.	12.5 25 50.	

9) Run Out 1) Axial Runout 2) Radial Runout		
10) Cylindricity.		

Representation of Geometrical Tolerance on a Drawing :-

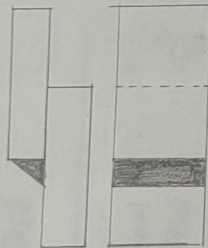
Characteristics to be tolerated.	Symbol.	Illustration.
1) Straightness		
2) Flatness		
3) Circularity.		
4) Parallelism		

5) Perpendicularity		
6) Angularity.		
7) Concentricity and co-axiality		
8) Symmetry		

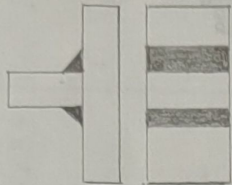
Welding joint :- Welding is technique of making permanent joint. It is the process of joining two or more parts are joined together by means of heat, pressure or both.

types of welded joints :- There are four important types of welded joints :-

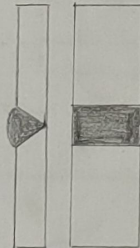
1. Lap joint :-



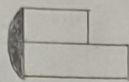
3. Tee joint :-



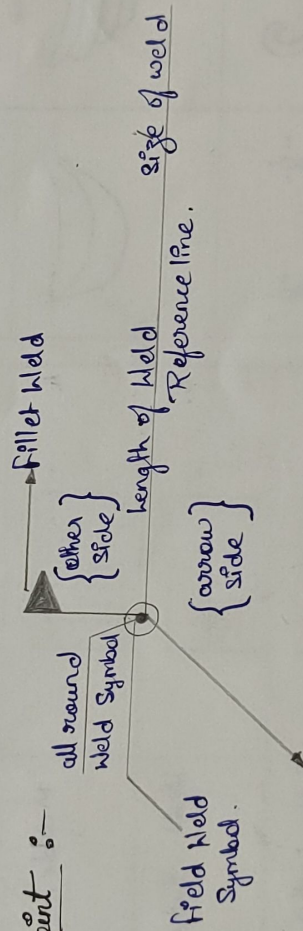
2. Butt joint :-



4. Corner joint



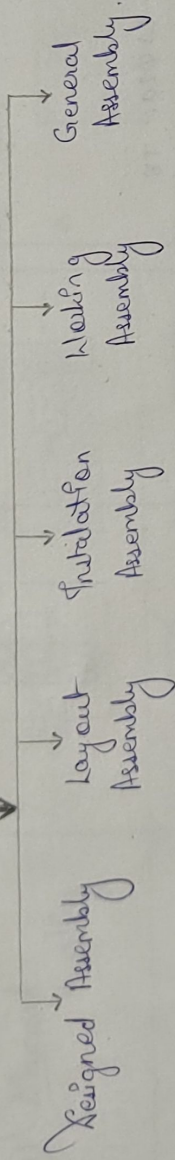
Representation of welding joint :-



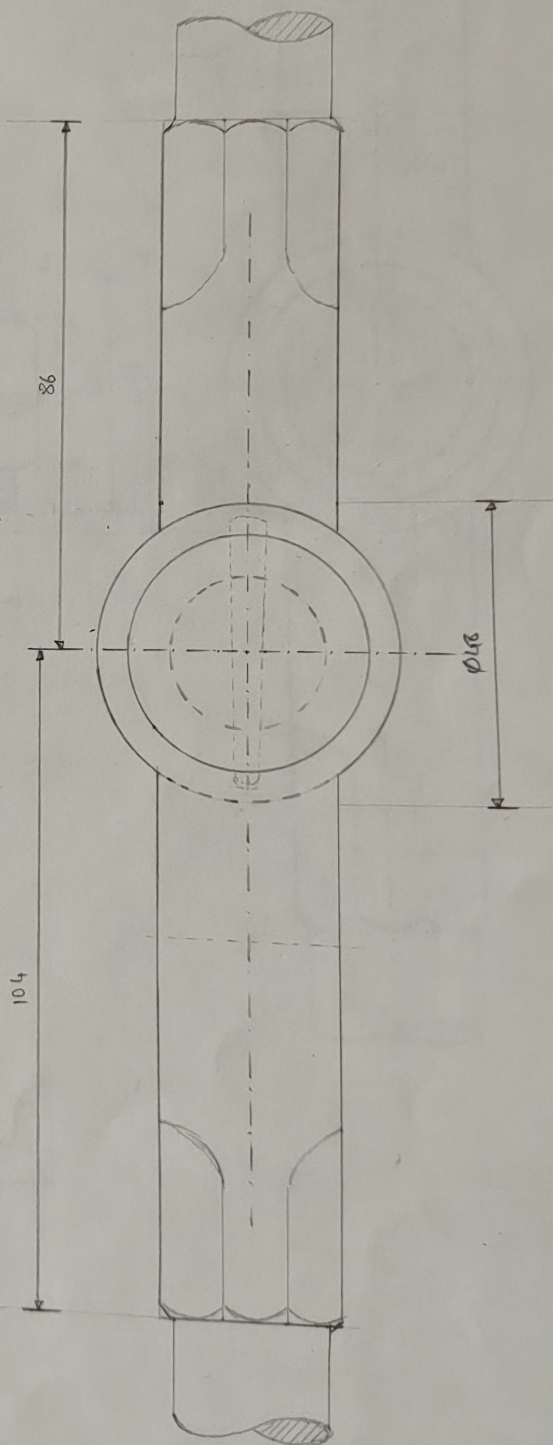
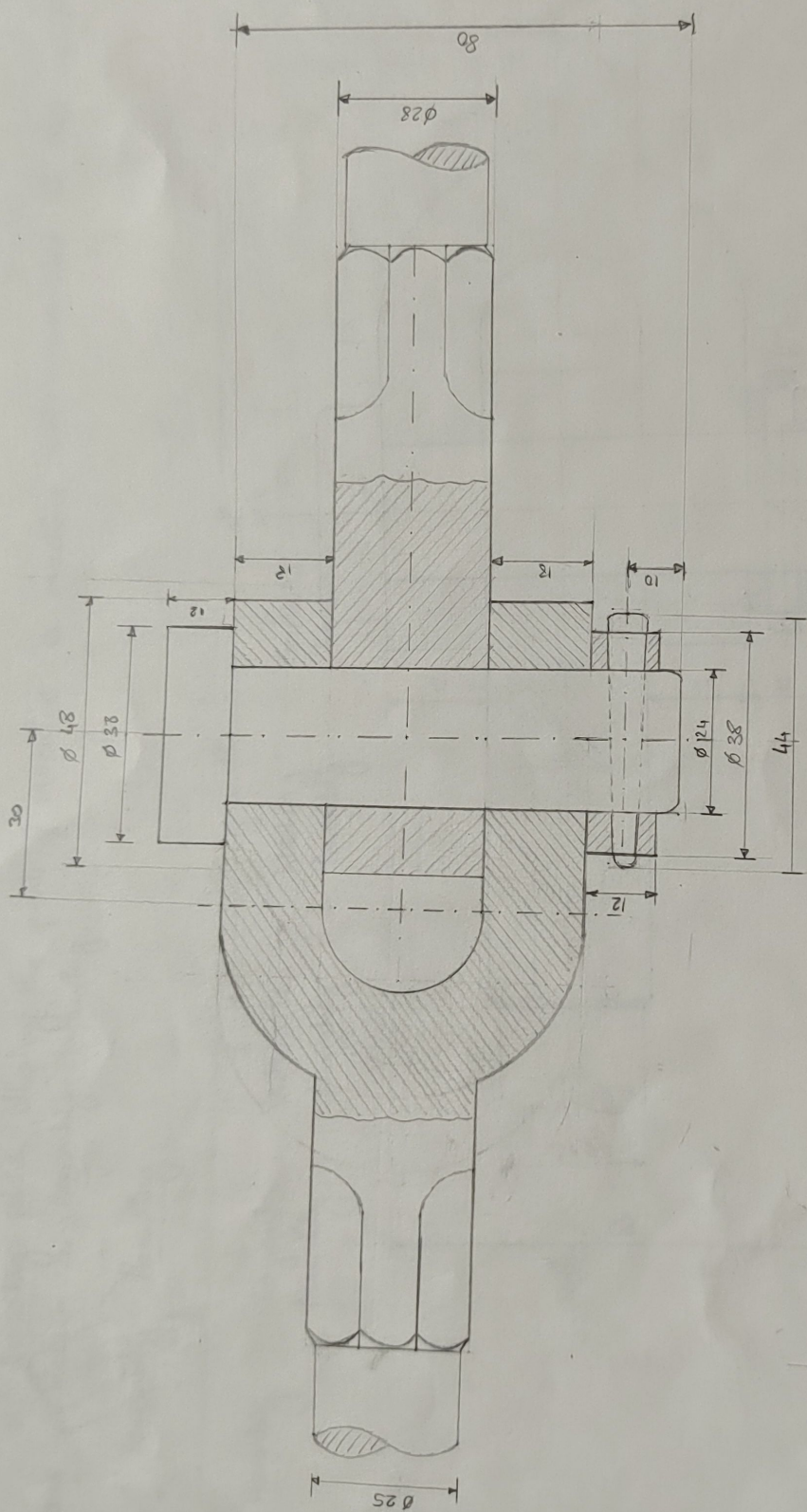
Form of Weld	Symbol	Illustration			
Fillet			7. Single U butt	O	
Square butt			8. Single bevel butt	P	
Spot			9. Double bevel butt	B	
Edge			10. Single J butt	D	
Single V butt					
Double V butt					

A Drawing which display the parts of machine or machine with assembled in their relative working positions. is known as Assembly Drawing.

Types of Assembly Drawing.

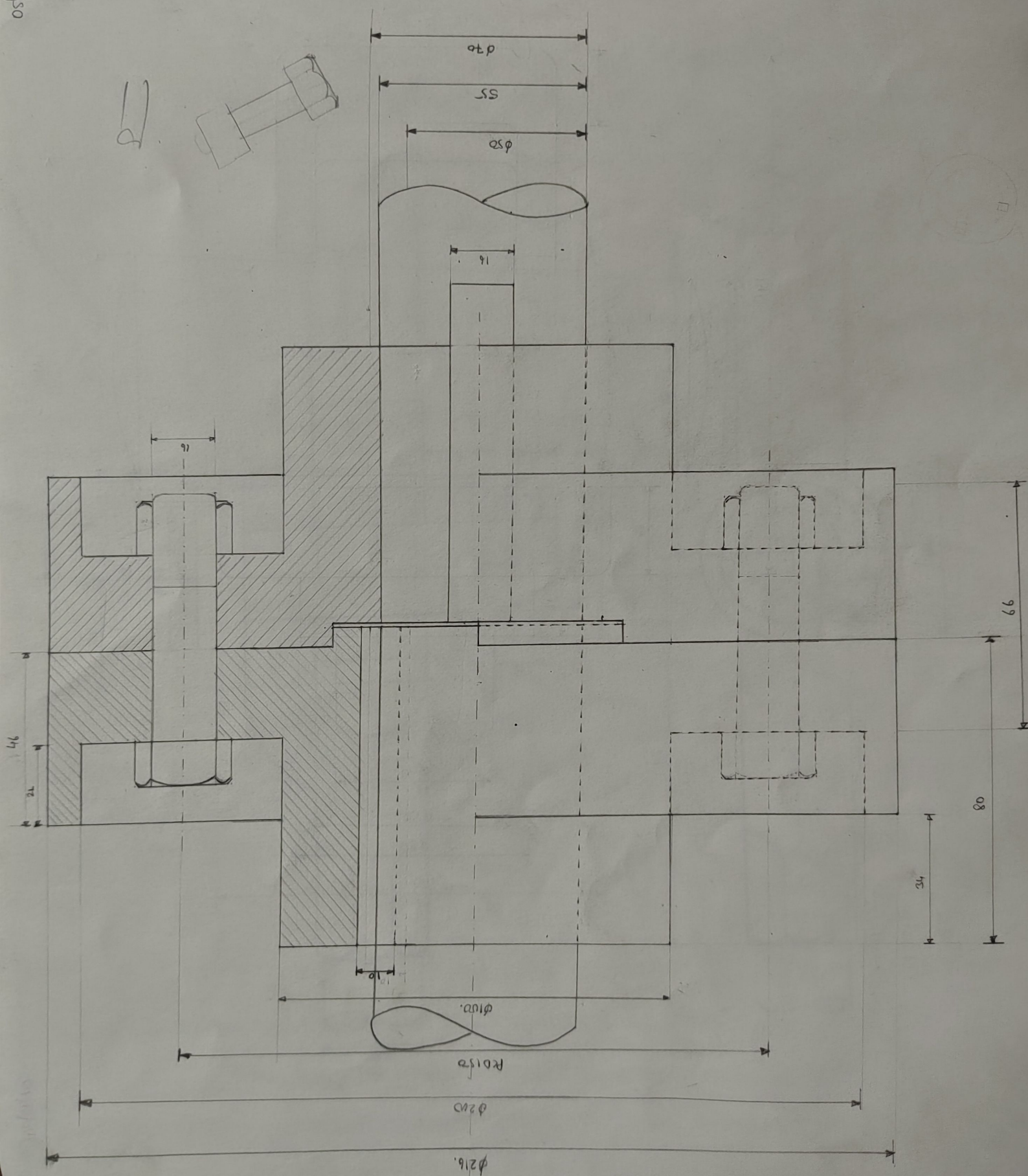
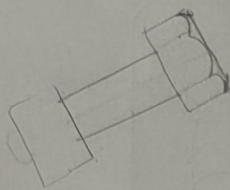




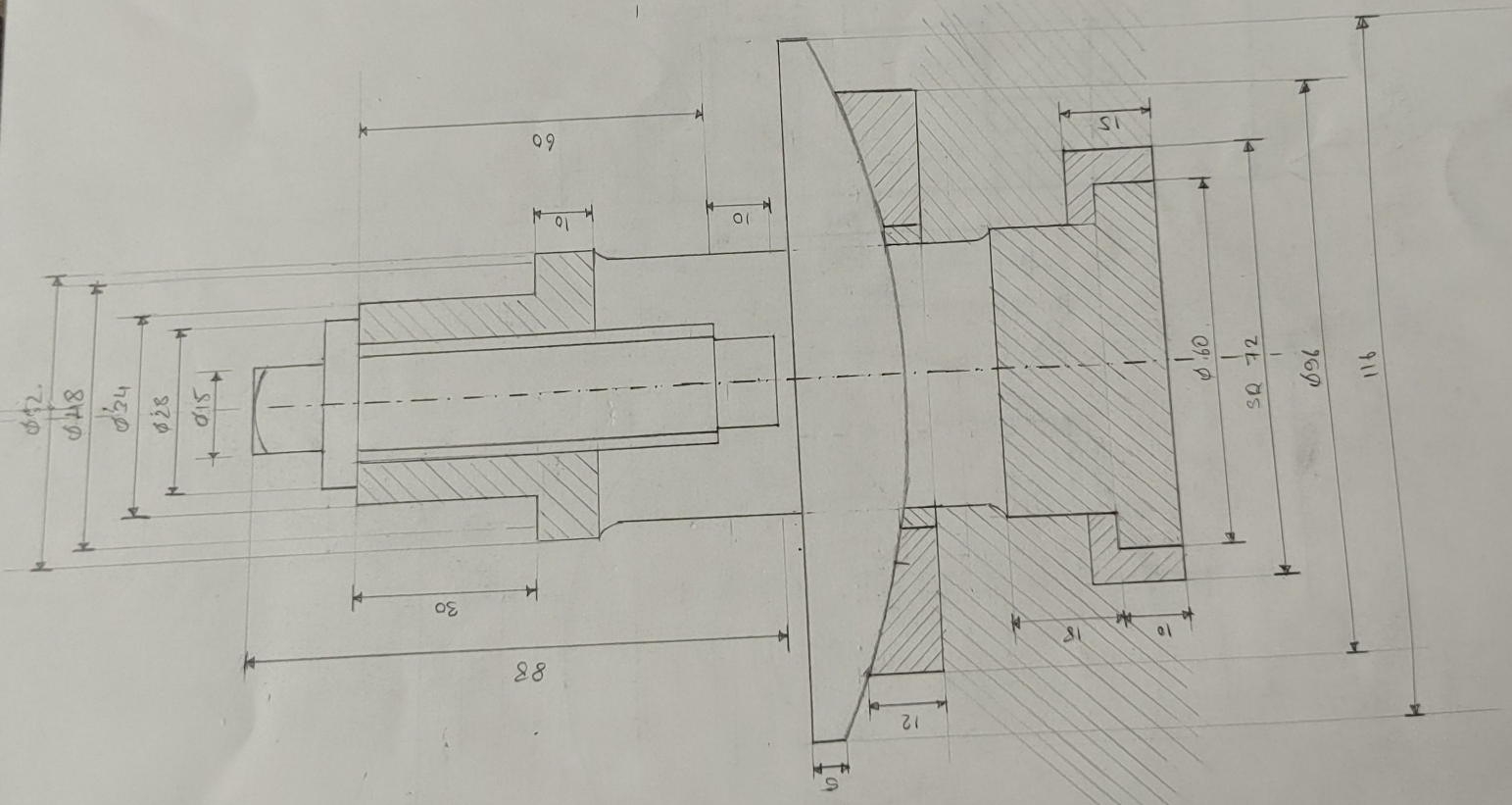


Q27

11

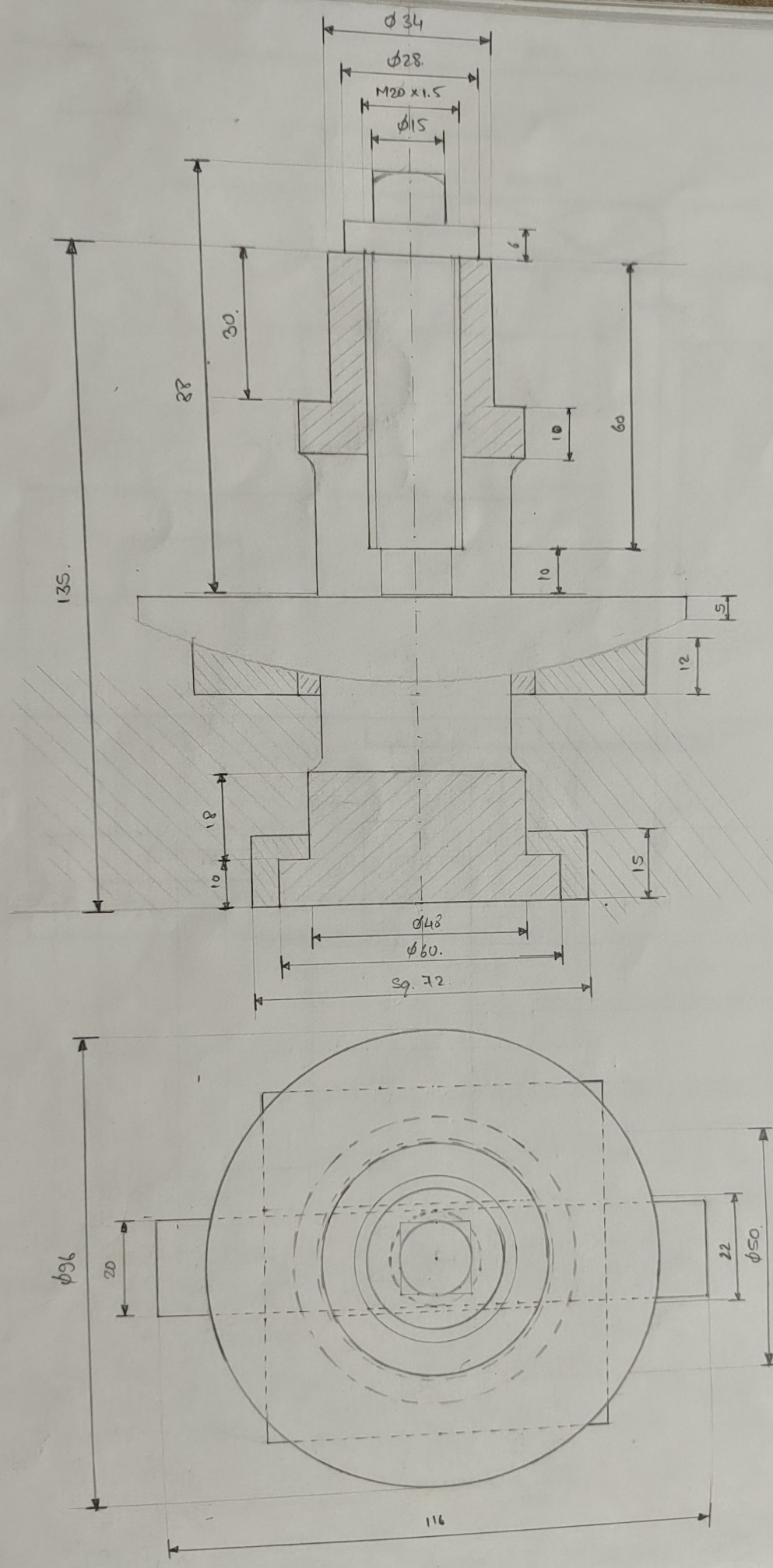


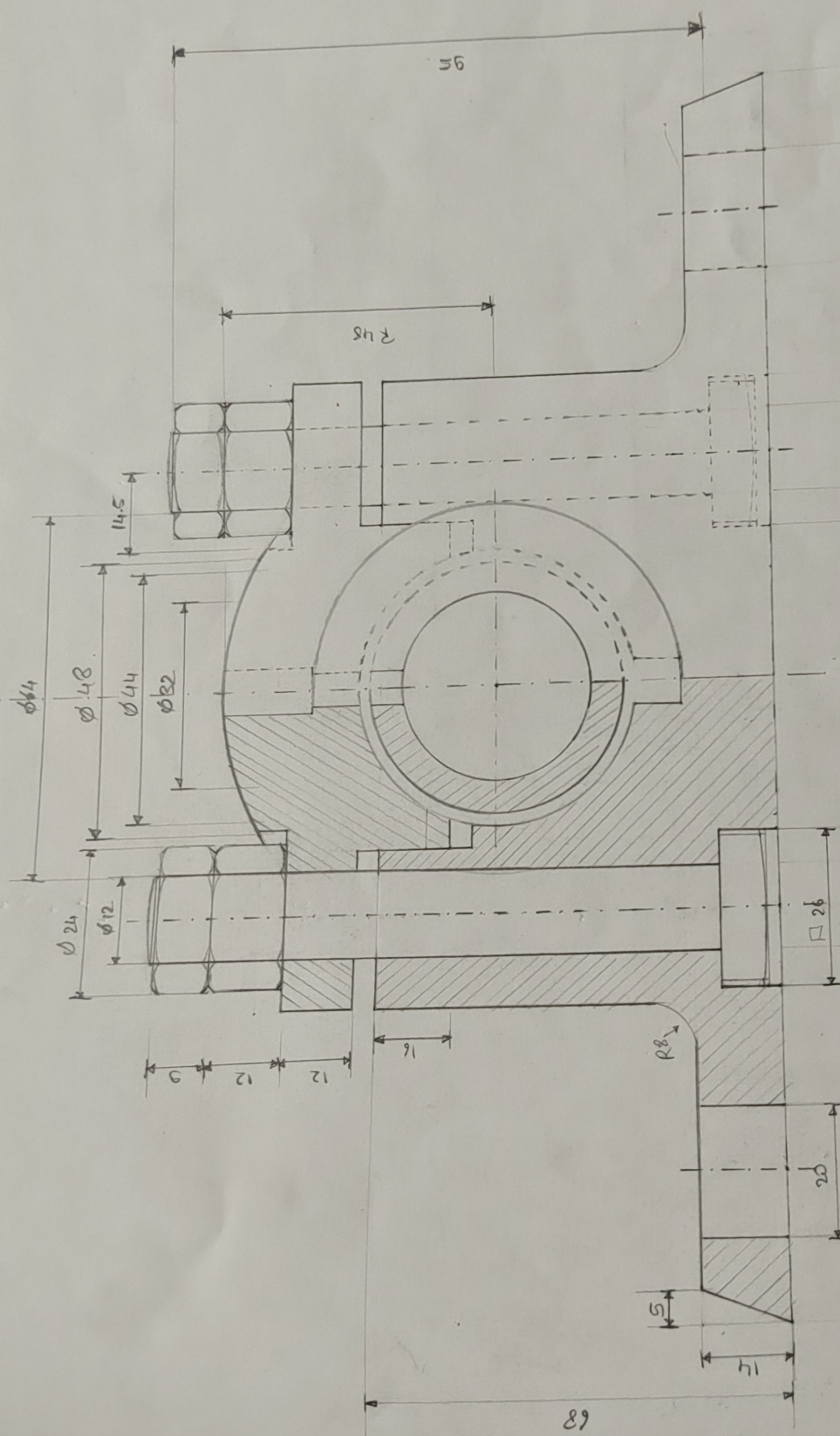
07/12/24.



12/24

10/12/24..

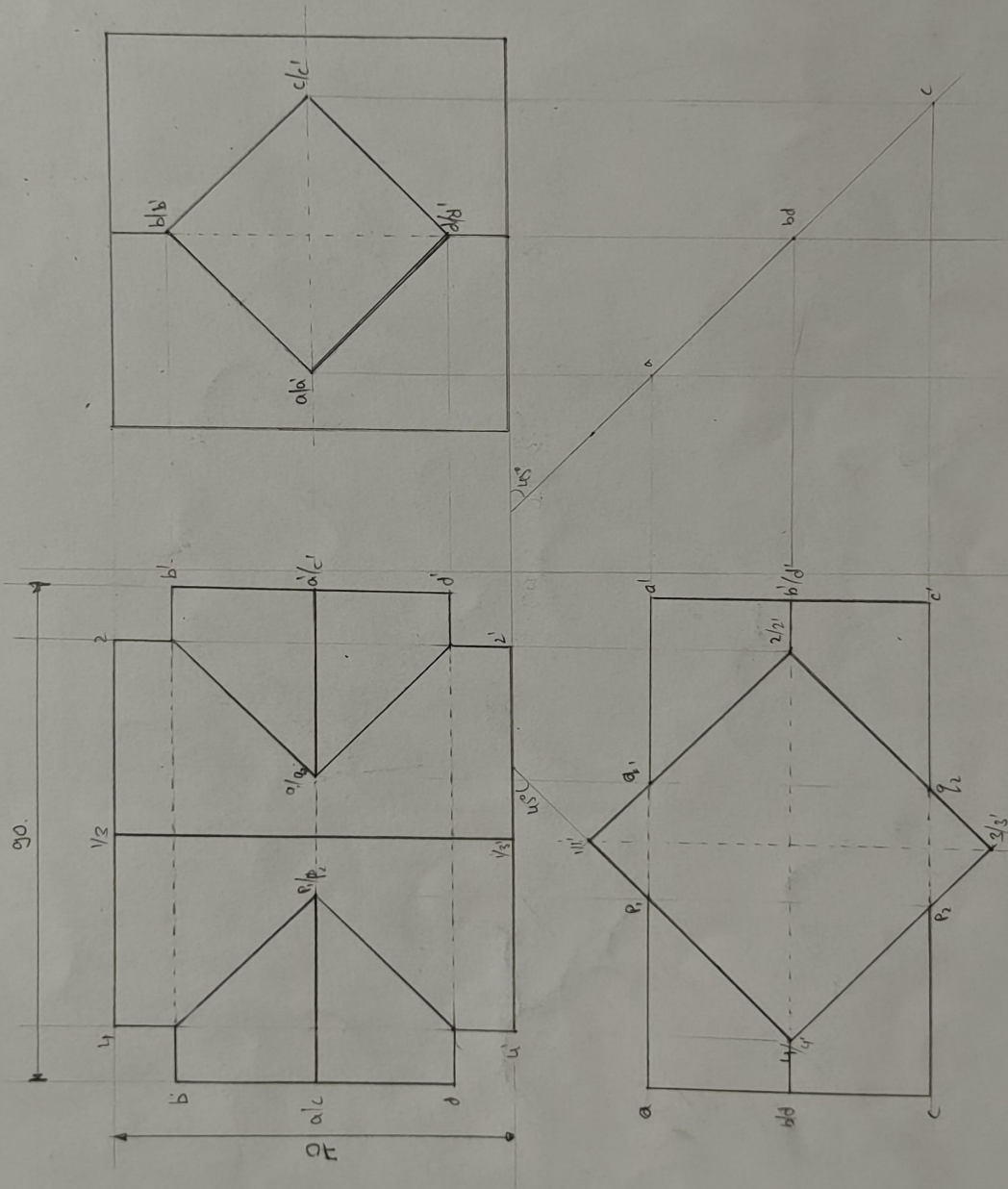




UNIT 7 → INTER SECTION OF SOLIDS

Q1)

A vertical square prism base of 50mm side is completely penetrated by a horizontal square prism base 35mm side. so that their axis intersect. The axis of horizontal prism is parallel to the VP. While the faces of vertical prism are equally inclined to the VP. Draw the projection of the solid showing line of intersection. (Assume suitable length for the prism).



A vertical cylinder of 80 mm diameter is completely penetrated by another cylinder of 60 mm diameter, their axes intersecting each other at right angles. Draw their projections showing curves of penetration assuming the axis of the intersecting cylinder to be parallel to the VP. (Assume suitable lengths for the cylinders.)

