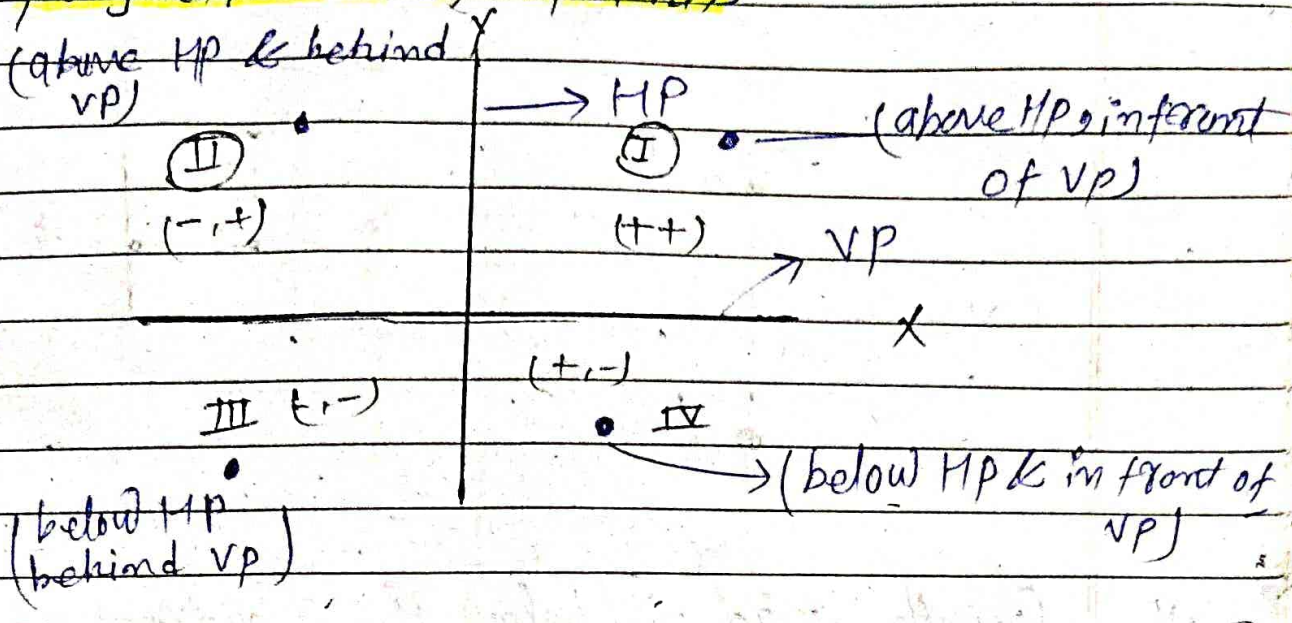
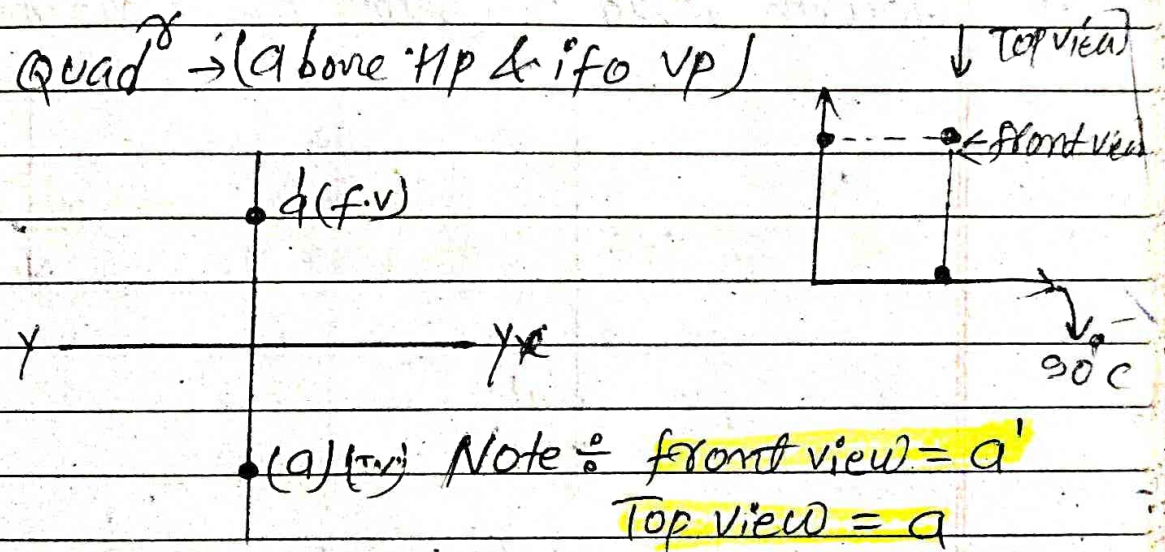
EGD

Page No. 1
Date / 20

* projection of points

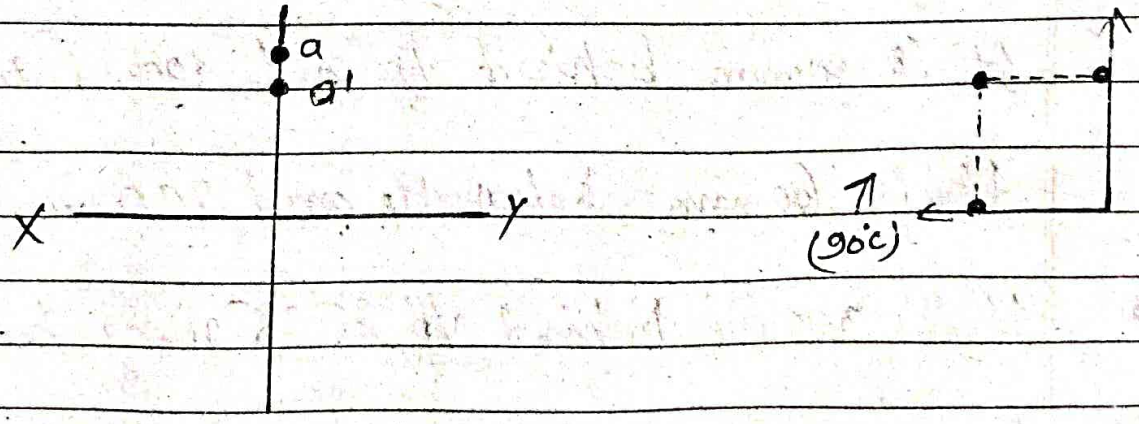


* first Quad → (above HP & ifo VP)

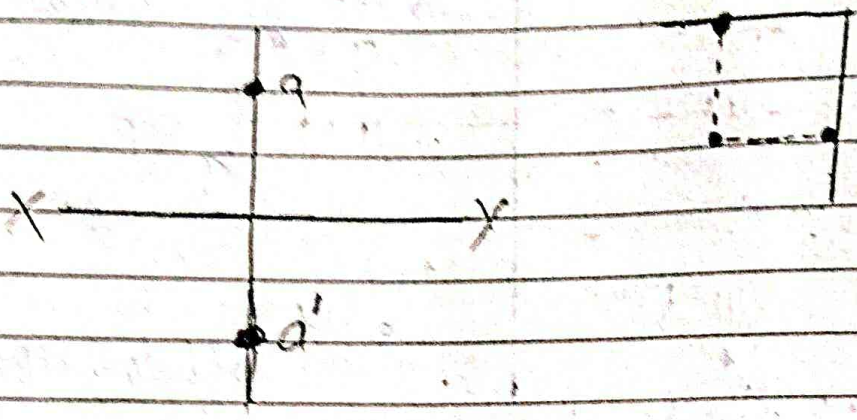


Note : front view = a'
Top view = a

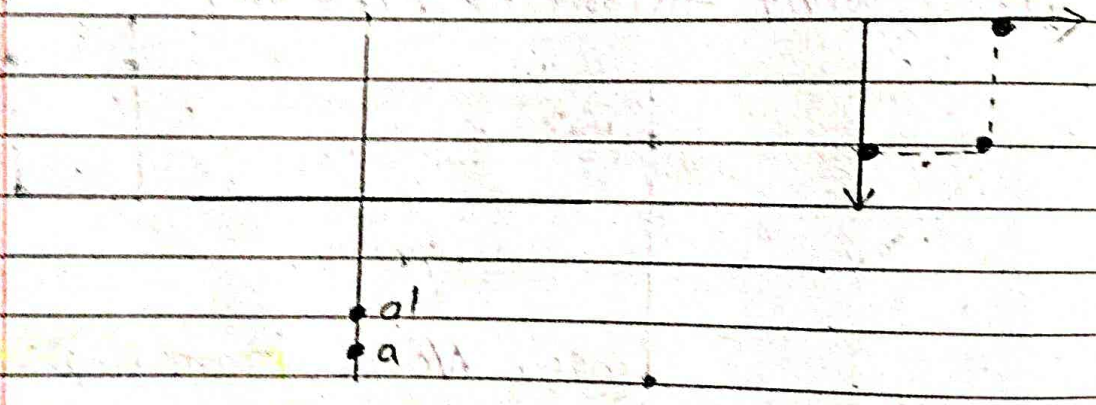
* Second Quad → (above HP & behind VP)



* Third Quad → (behind VP & below HP)



* fourth quad → (below HP & in front of VP)



* projection of points

Q1 It is 15 mm in front of Vp & 25 mm above

Q2 It is 20mm behind Vp and 40mm above Hp

Q3 It is 60 mm below Hp and 20 mm in front of

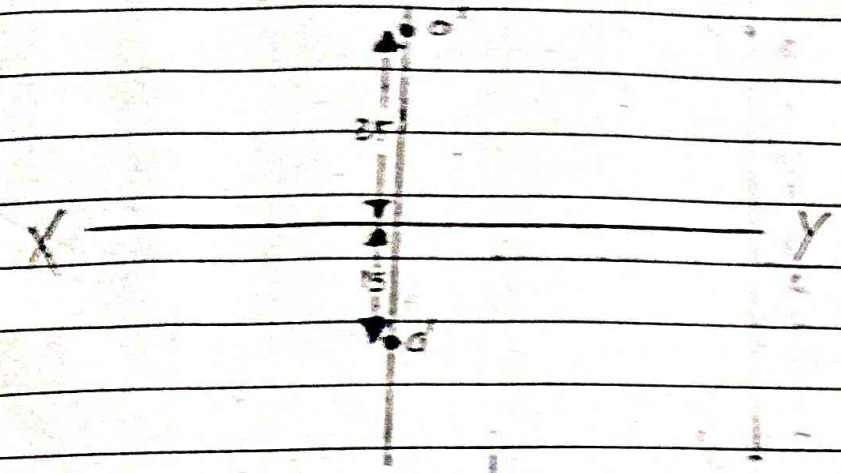
Q4 It is 30mm behind Vp & 25 mm below Hp.

Q5 It is 40 mm in front of Vp and is in Hp

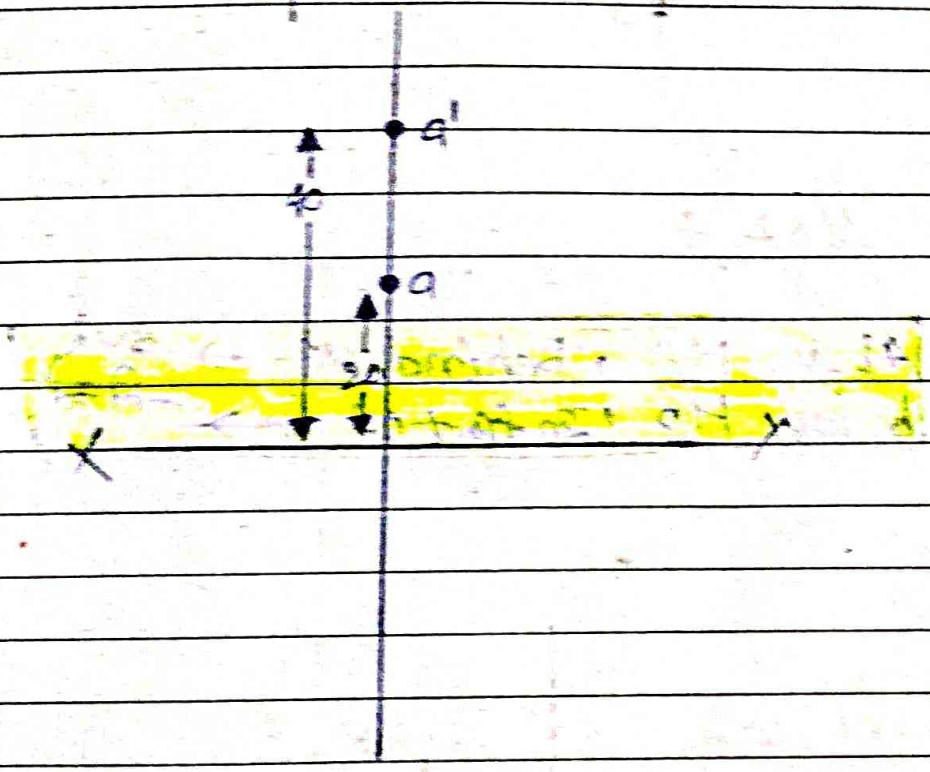
Q6 It is 45mm behind Vp and is in Hp

Q7 It is 50 mm above Hp and is in Vp

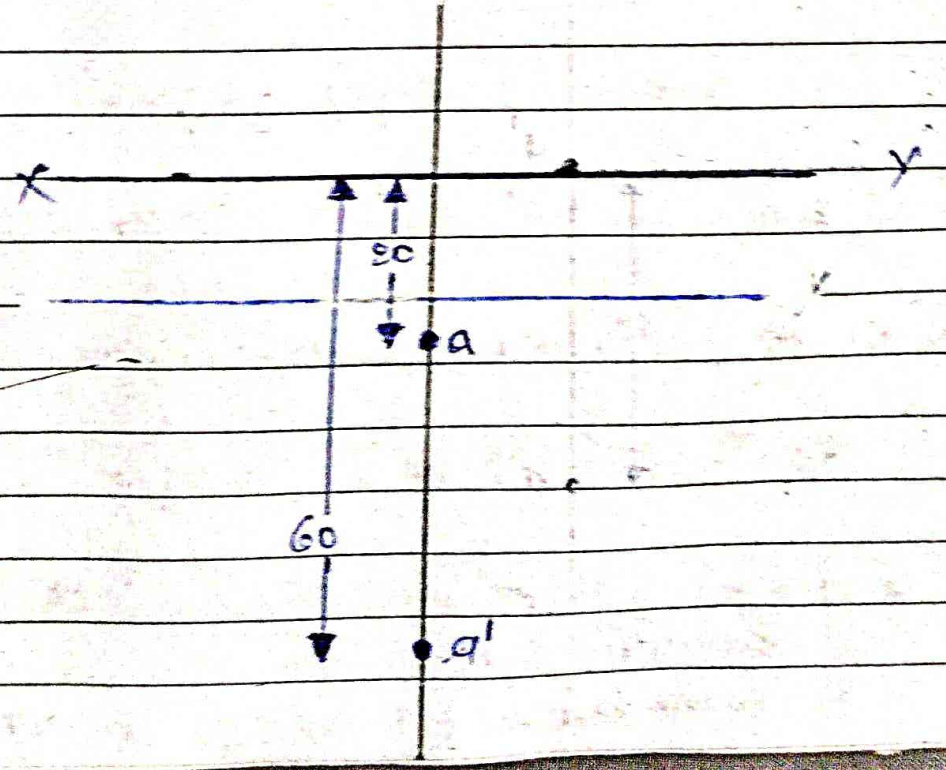
(1)



(2)



(3)



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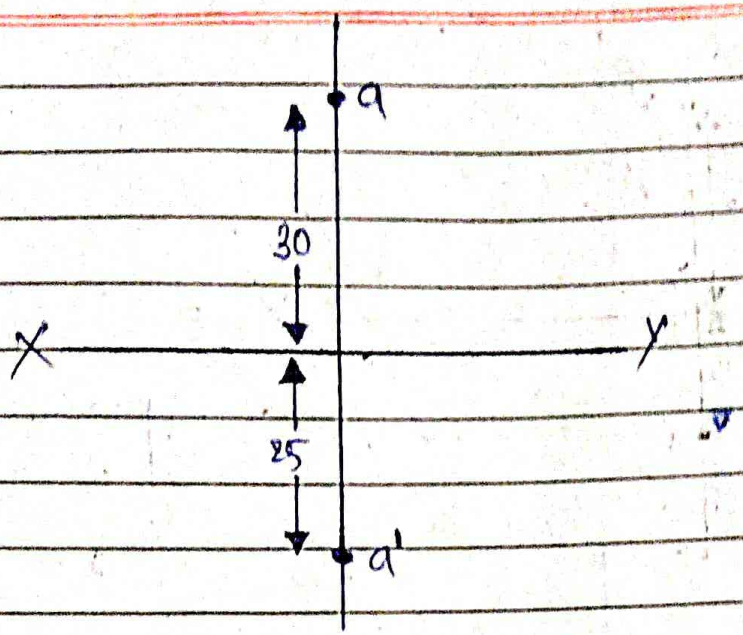
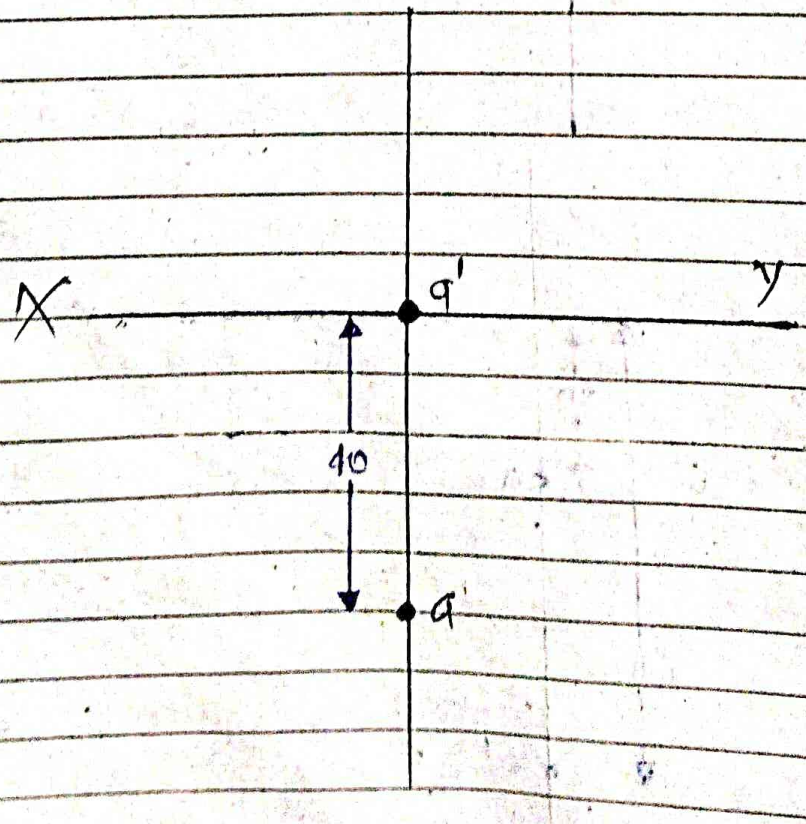
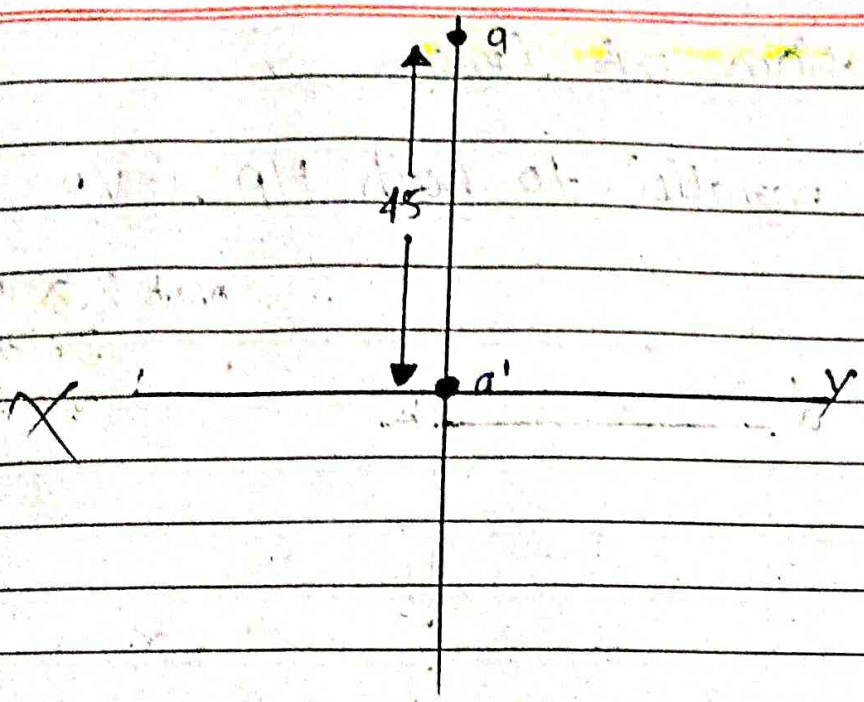


(5) Note :-

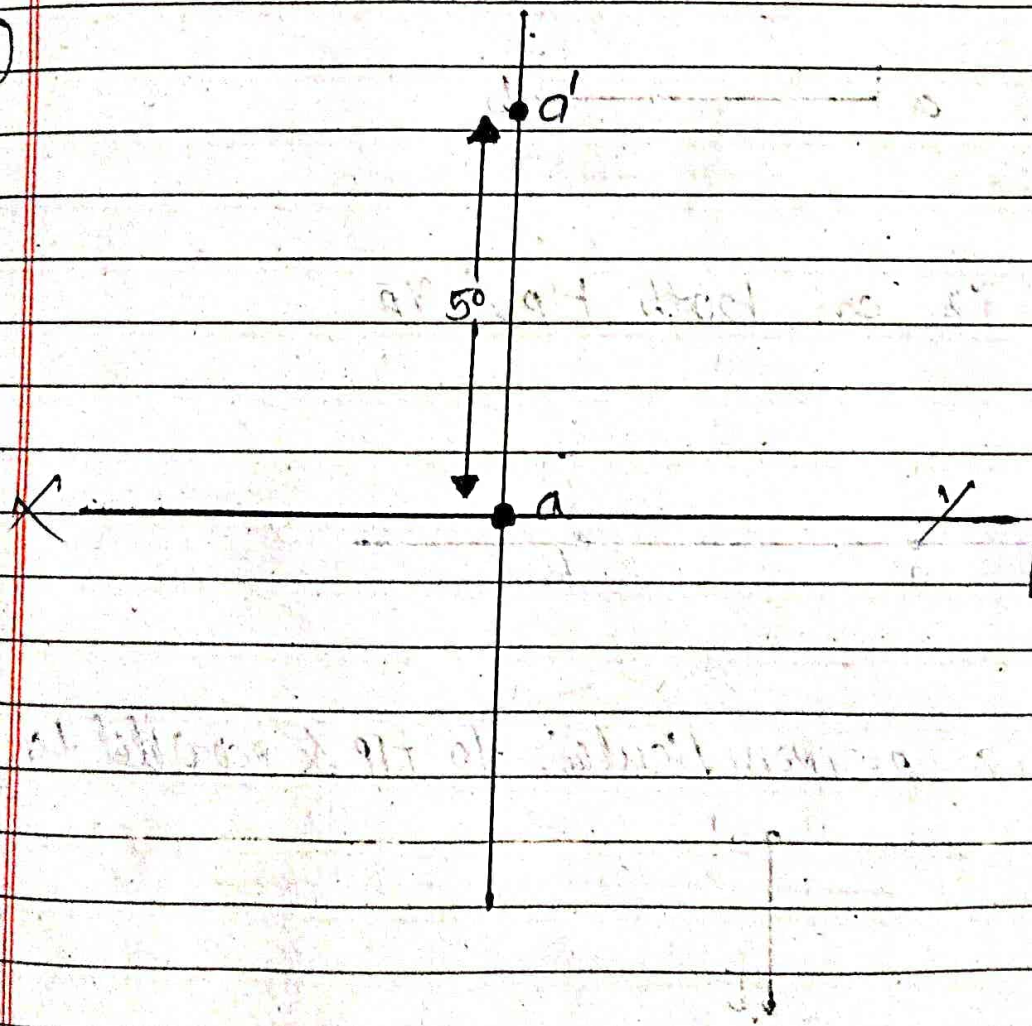
Above HP, Behind VP → ऊपर, पीछे
below HP, In front of VP → नीचे



(6)



(7)

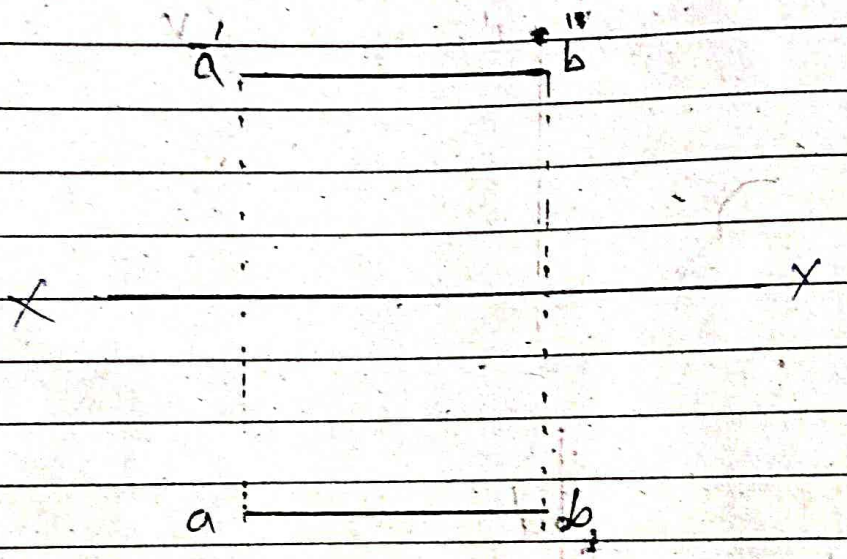


VP में q → xy पर
HP में a' → xy पर

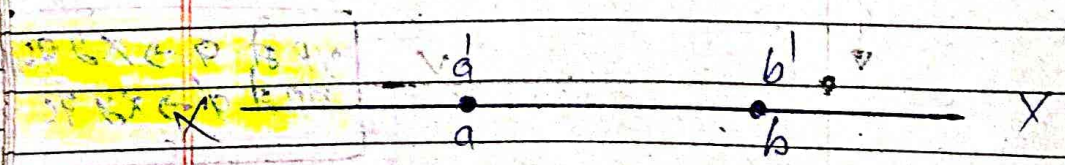
* **projection of line**

(i) Line is parallel to both HP & VP

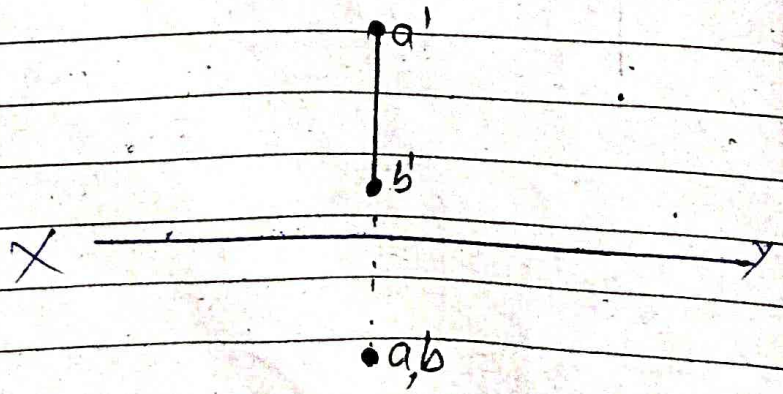
Note: X axis is always front view line



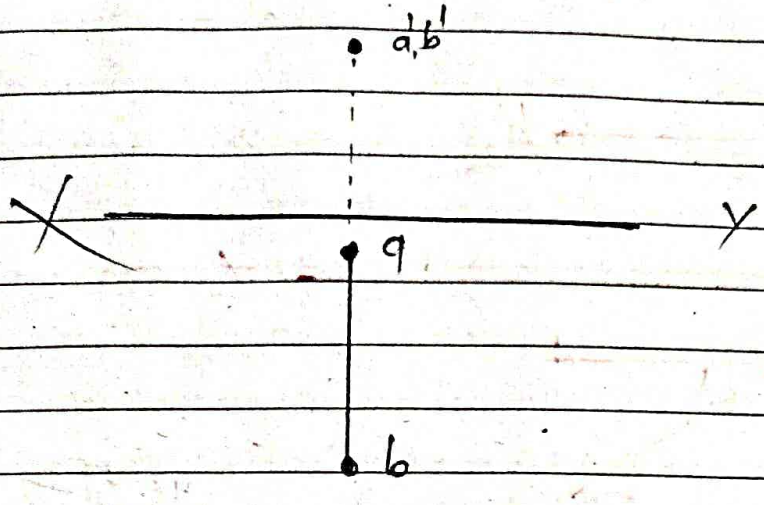
(ii) Line is on both HP & VP



(iii) Line is perpendicular to HP & parallel to VP

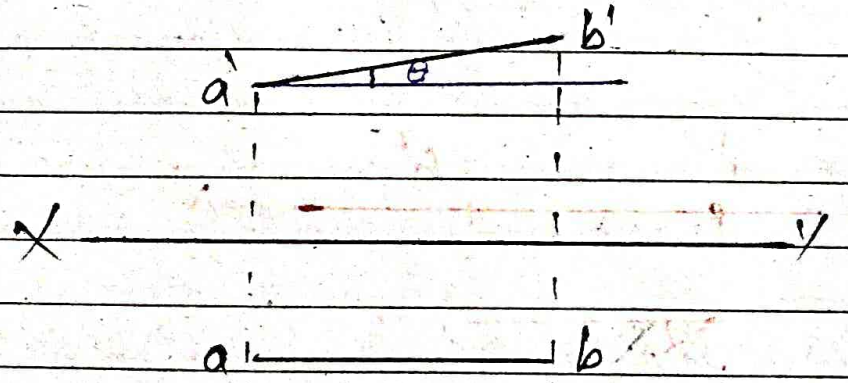


(iv) Line is perpendicular to VP & parallel to HP

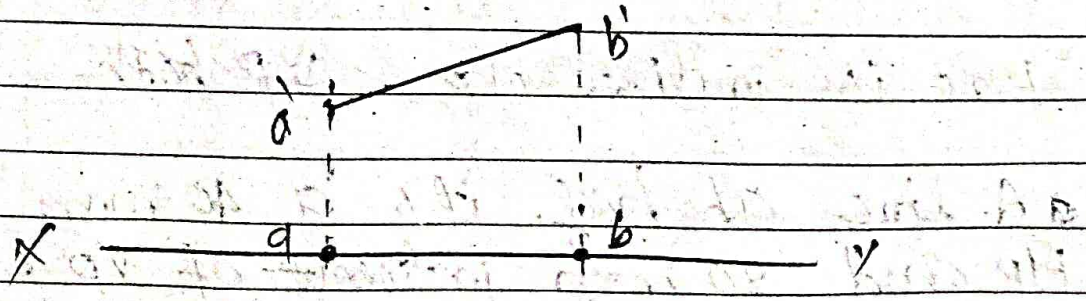


(v) Line is incline to HP & parallel to VP

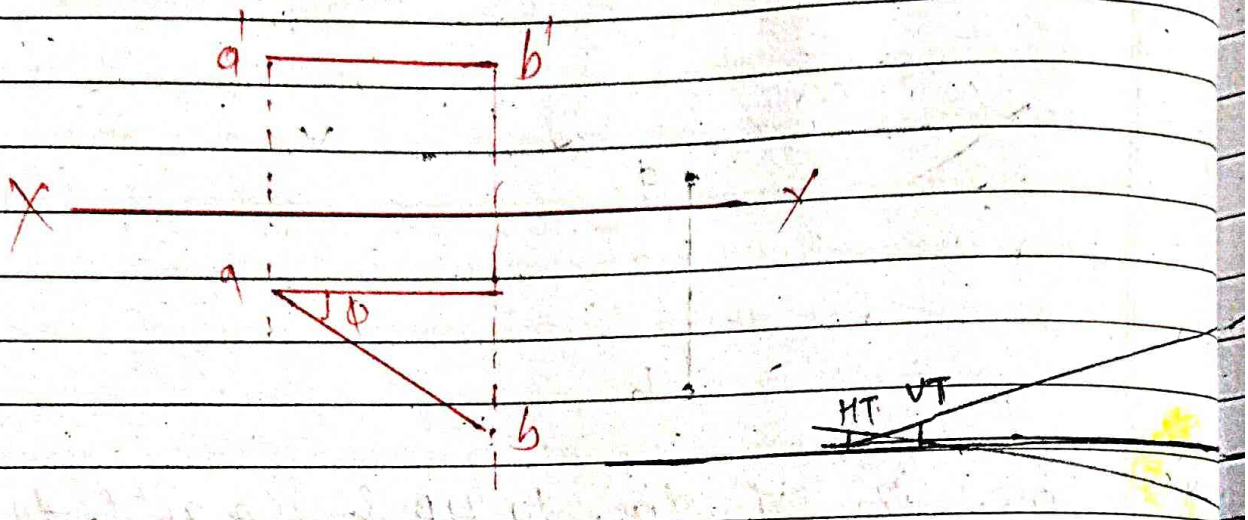
incline → तिरछा



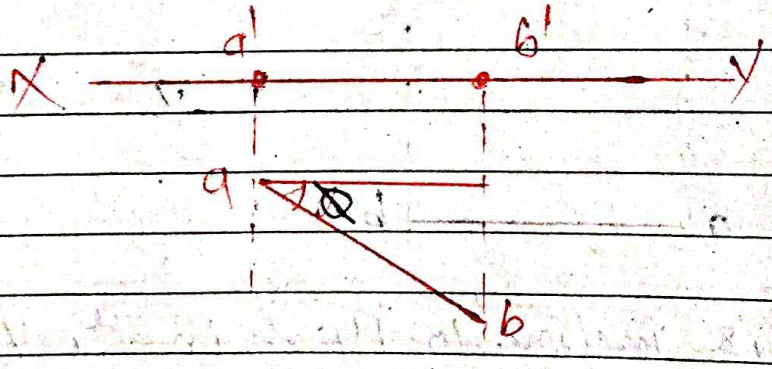
(vi) Line is incline to HP & in the VP



(vii) Line is parallel to HP & incline to VP



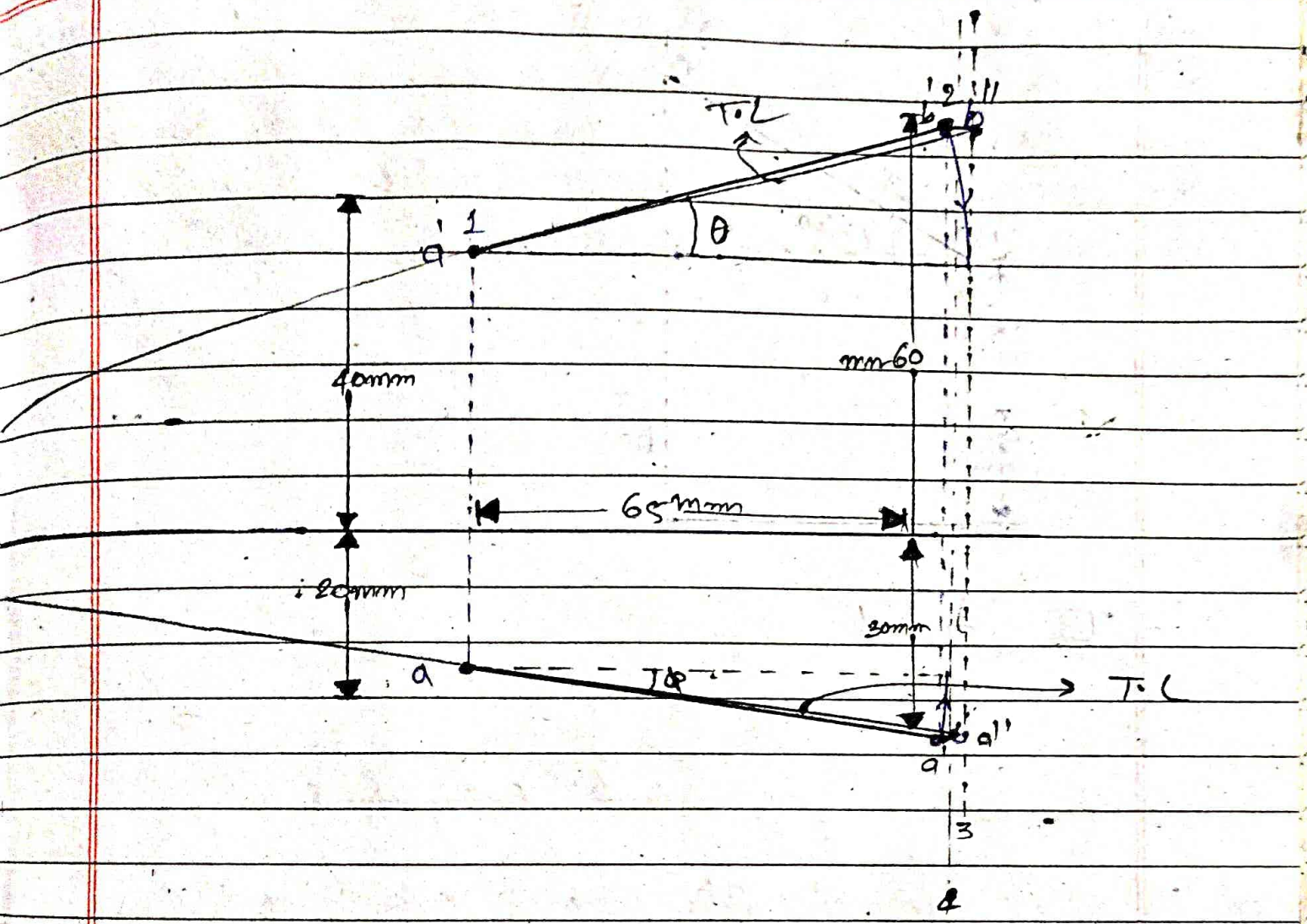
(viii) Line is in HP & incline to VP



* Line is incline HP & V.P both

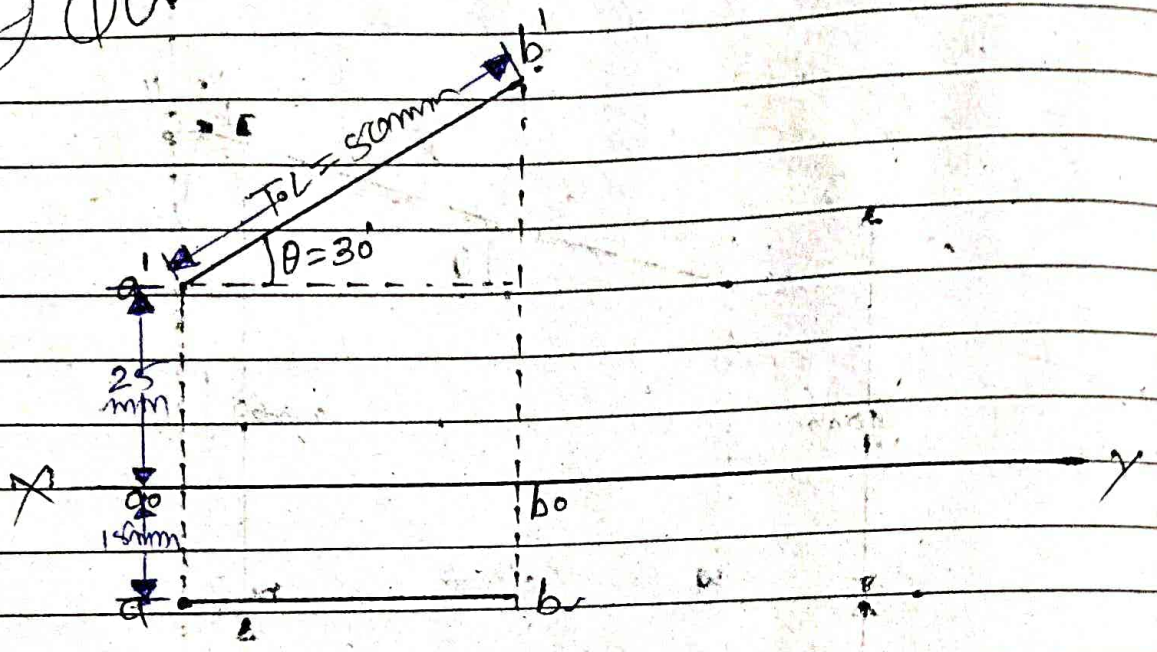
* A line ab has its a 40 mm above HP and 20 mm infront of VP and b is 60 mm ~~infront of VP~~ above HP and 30 mm infront of the VP. the distance between projectors is 65 mm draw the projections of the line and find the true length of ab, θ, ϕ and locate its traces,

Problem 9.1 → A line AB has its end A 25mm above HP and 20mm in front of VP while its end B is 55mm above HP and 65mm in front of VP. Draw its true length of AB, θ, ϕ and locate its traces. If end projectors are 60mm apart.

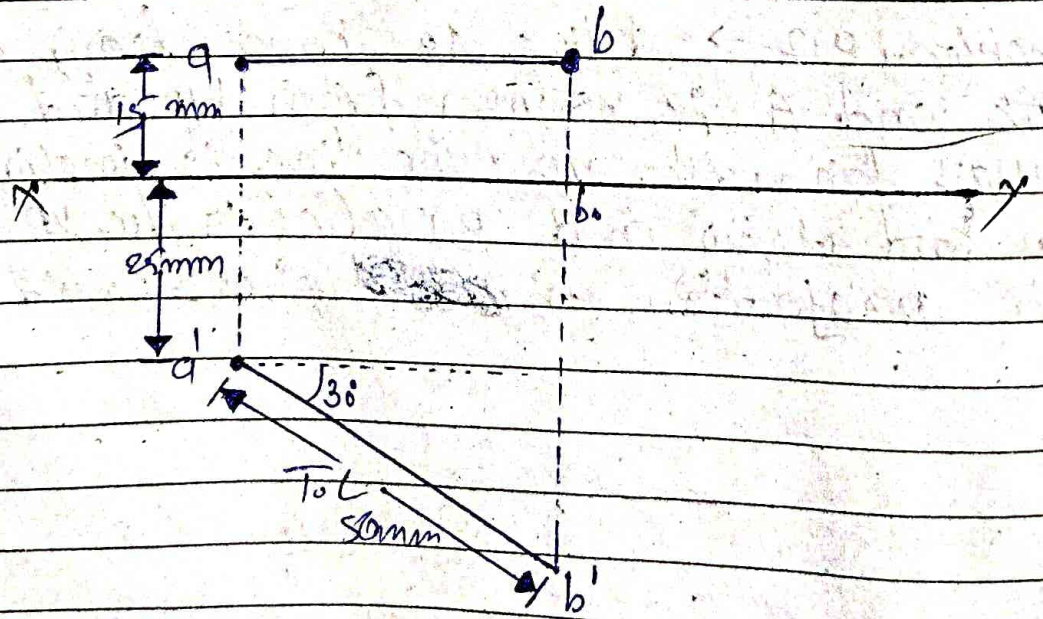


Problem 9.2 → A line AB 50mm long has in its end A is 25 mm from HP and 15 mm away from the VP. The line is inclined to the HP at 30° and parallel to the VP. Draw its projections in first and 3rd quadrant.

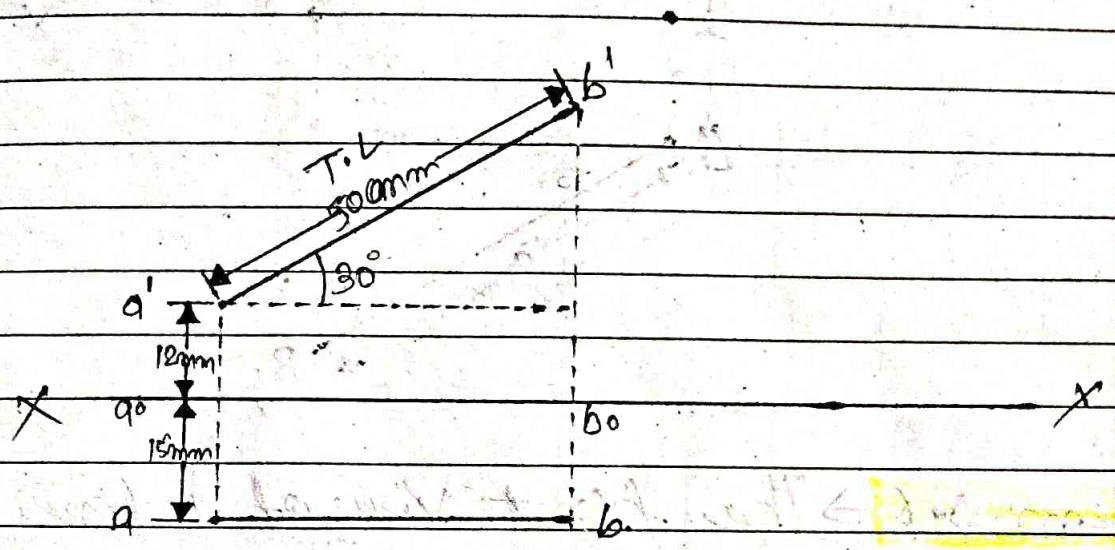
(I) Qu. 4 d



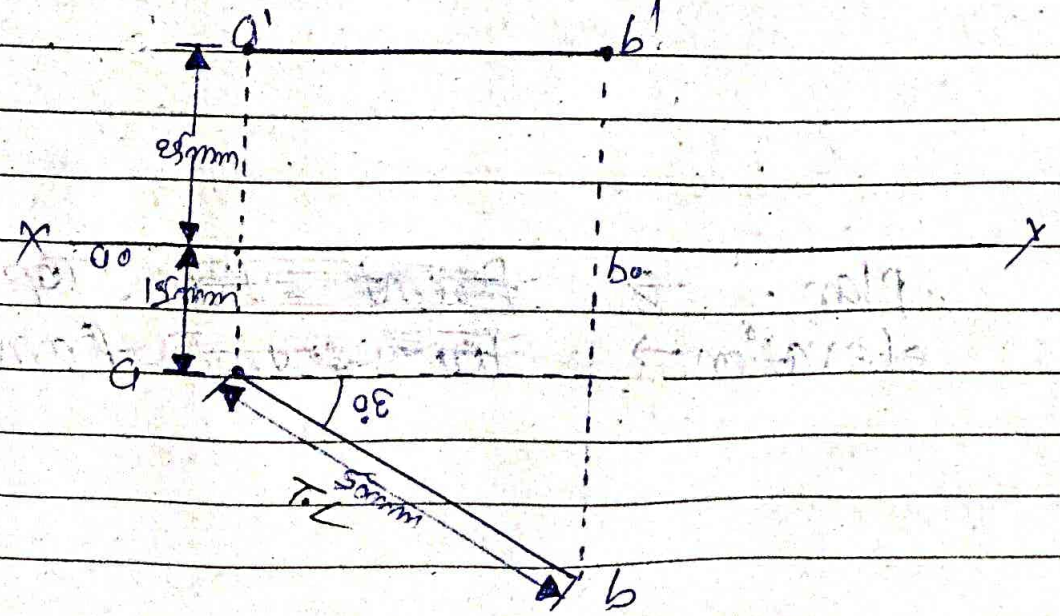
III Qurd



problem 9.3 ⇒ A straight line AB 50 mm long makes an angle of 30° to the HP. The end A is 12 mm above the HP and 15 mm infront of the VP. Draw the top view and front view of the line AB.

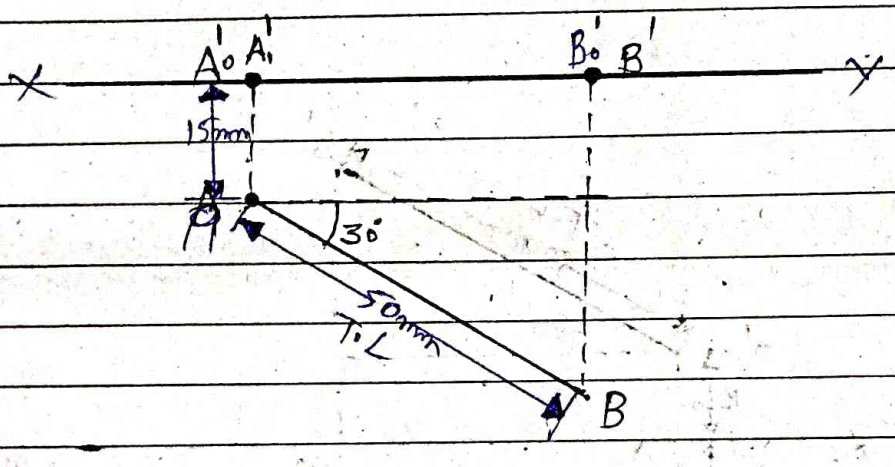


problem 9.4 ⇒ A line AB 50mm long, has its end A is 25 mm away from HP and 15mm away from the VP. The line is inclind to the VP at 30° and is parrall to the HP. Draw its projection in first quadrant



problem 9.5 ⇒ A line AB 50mm long, has its end A is in Hp and 15mm infront of the Vp. The line is inclined to the Vp at 30° and is parallel to the Hp. Draw its projections.

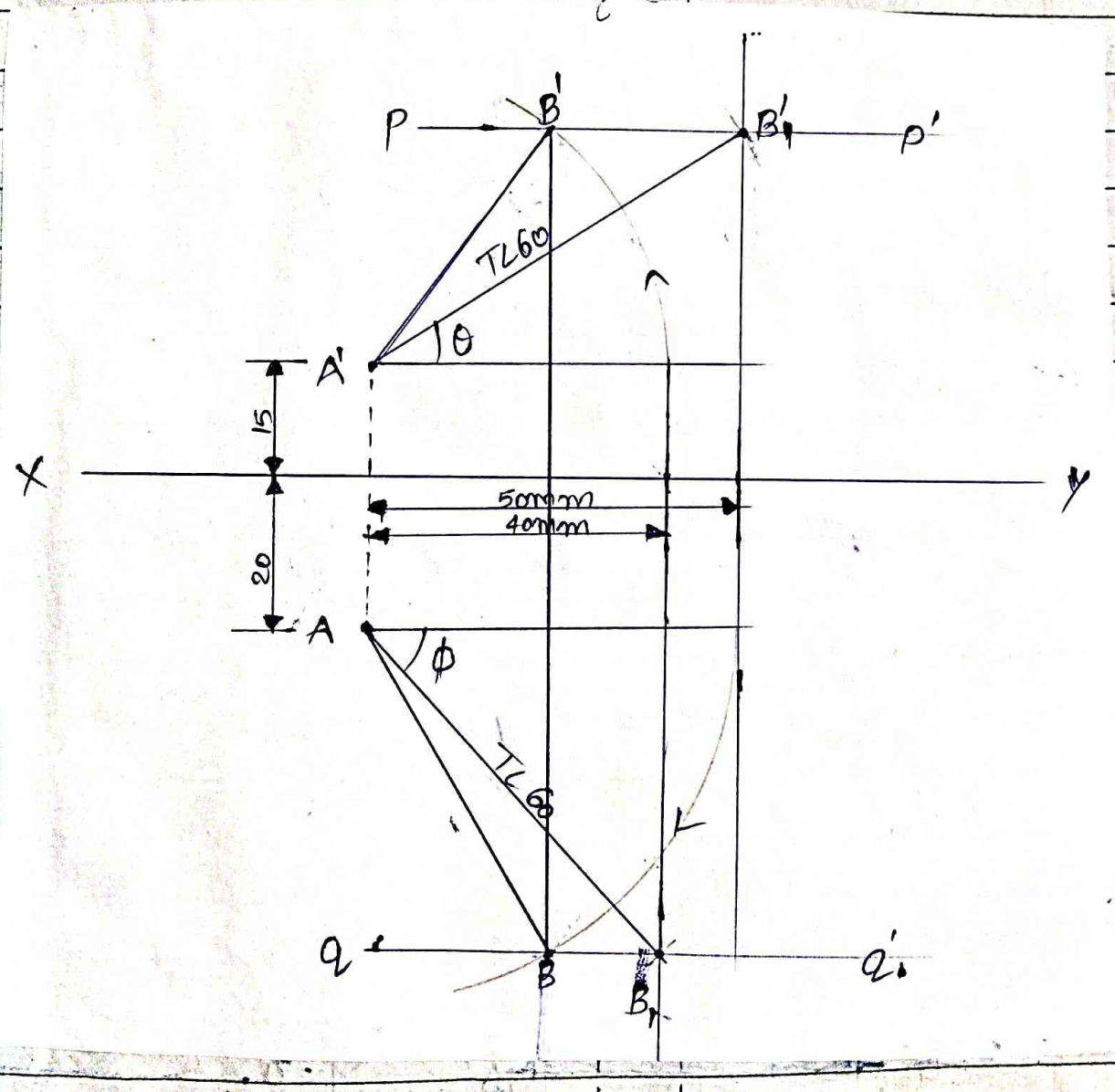
→



problem 9.6 → The front view of a line AB 60mm long measure 40mm. The line is parallel to the Hp and the end A is 15 mm above Hp and 20 mm infront of the Vp. Draw the projections of the line and determine its inclination with the Vp.

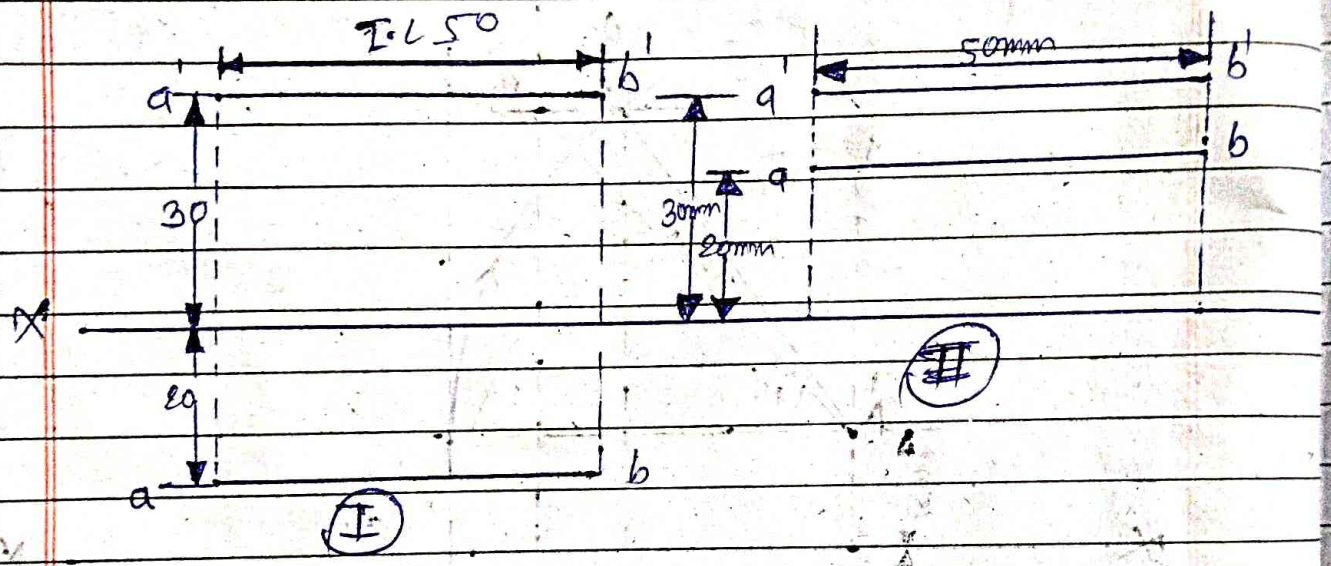
plan → ~~Front View~~ Top View
elevation → ~~Top View~~ front view

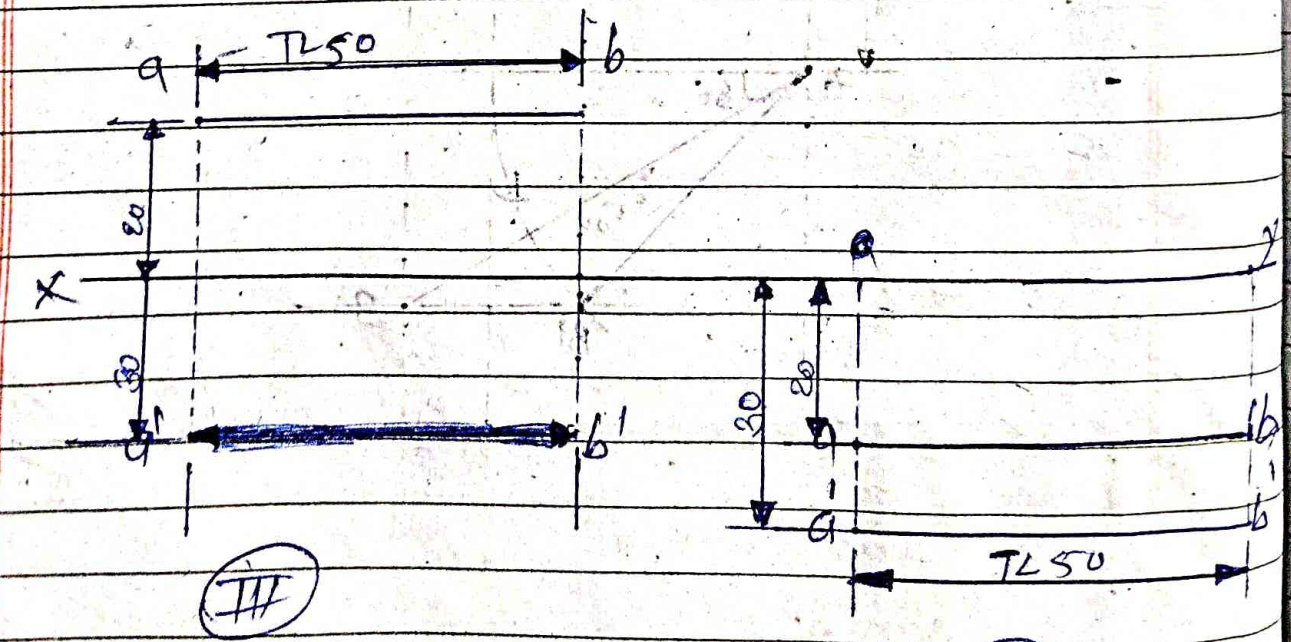
Q9) plan and elevation of a line AB 60mm long, measures 50mm and ... mm respectively. End A is 15mm above HP and 20mm in front of ... Draw its projections and determine the true inclination ... th HP and VP respectively.



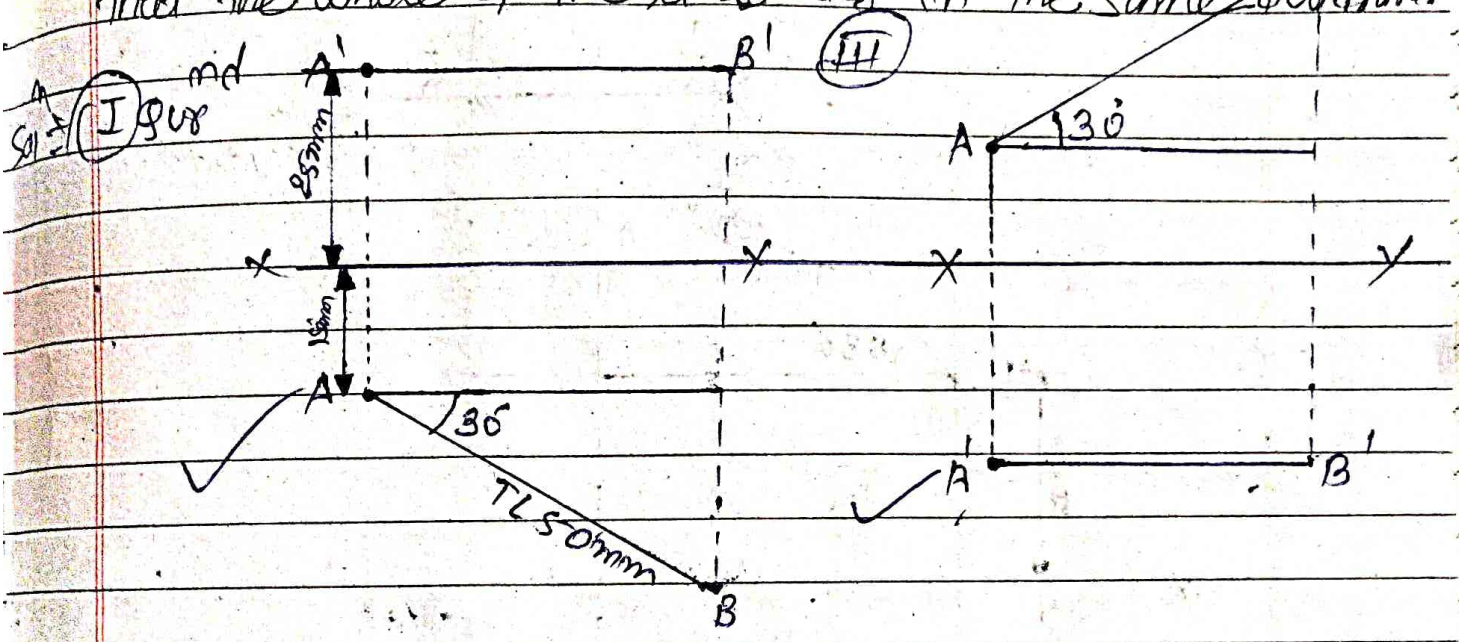
(Pg 9)

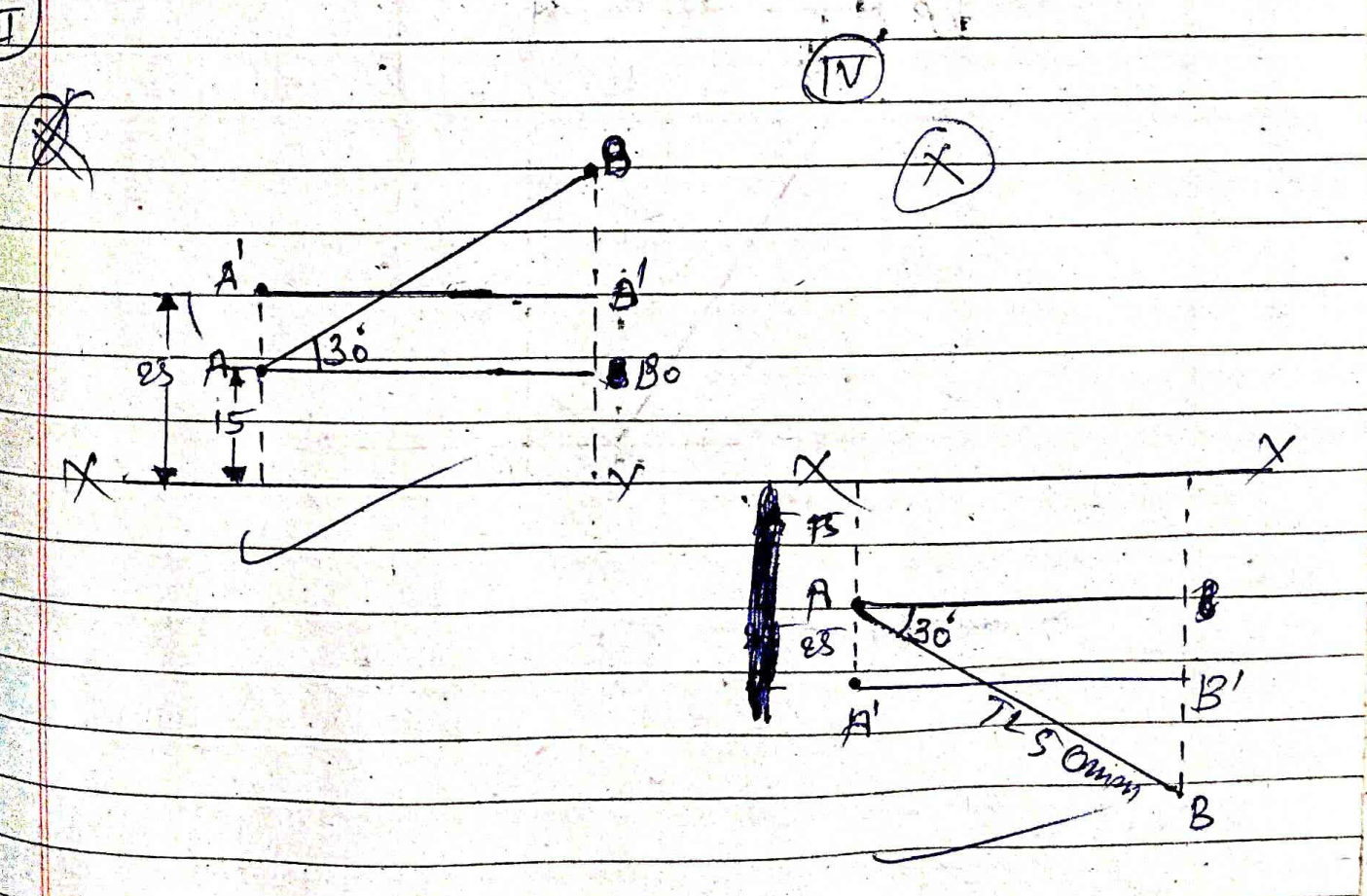
Problem 9.1 → A line AB 50mm long has its end A 30 mm away from the HP and 20 mm away from the VP. The line is parallel to both HP and VP. Draw its projections in all the four quadrants.



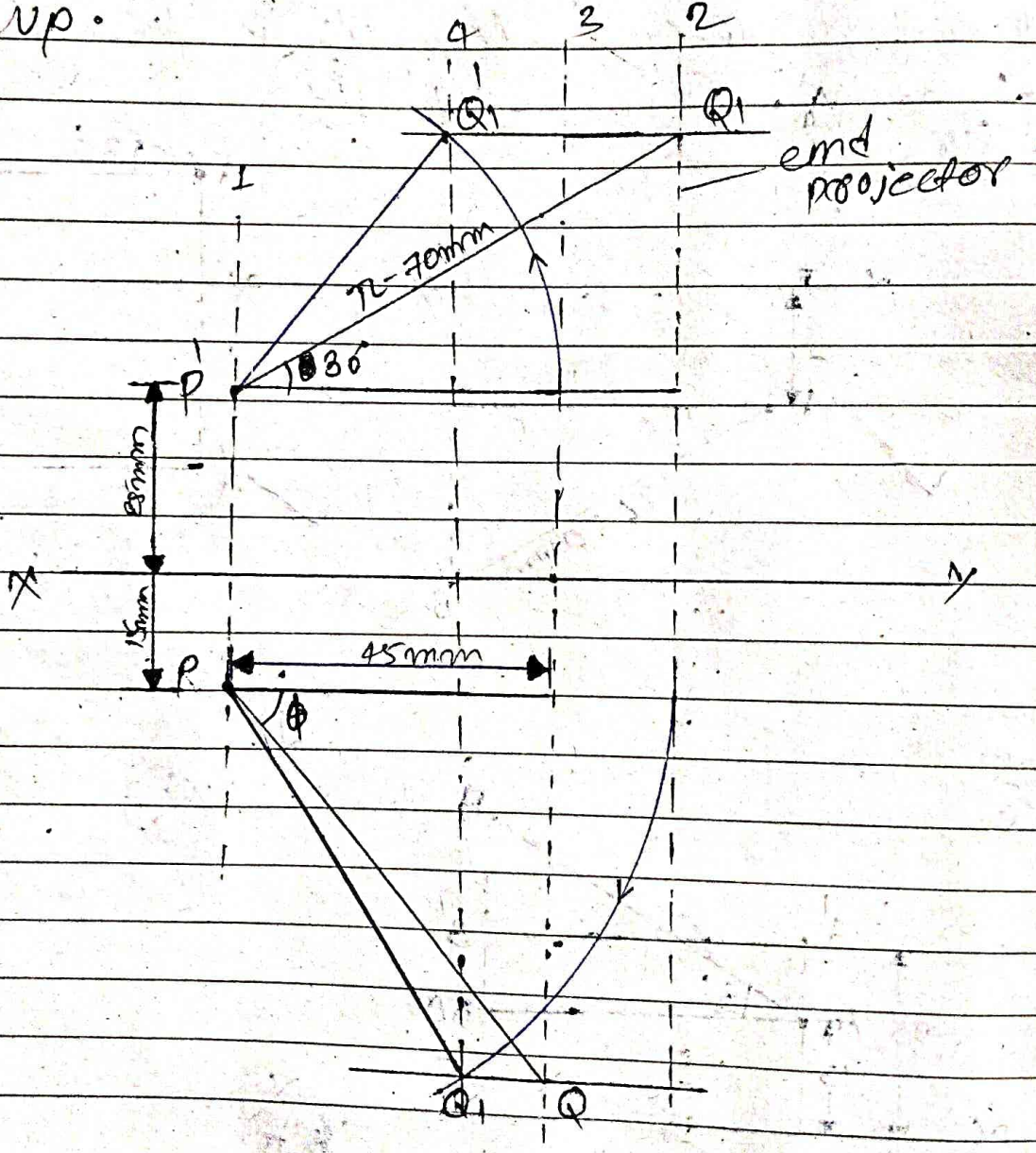


Prob A line AB 50mm long, has its end A, 25 mm away from the HP and 15mm away from the VP. The line is inclined to the VP at 30° and is parallel to the HP. Draw its projections in all the four quadrants. Assume that the whole of the line lies in the same quadrant.

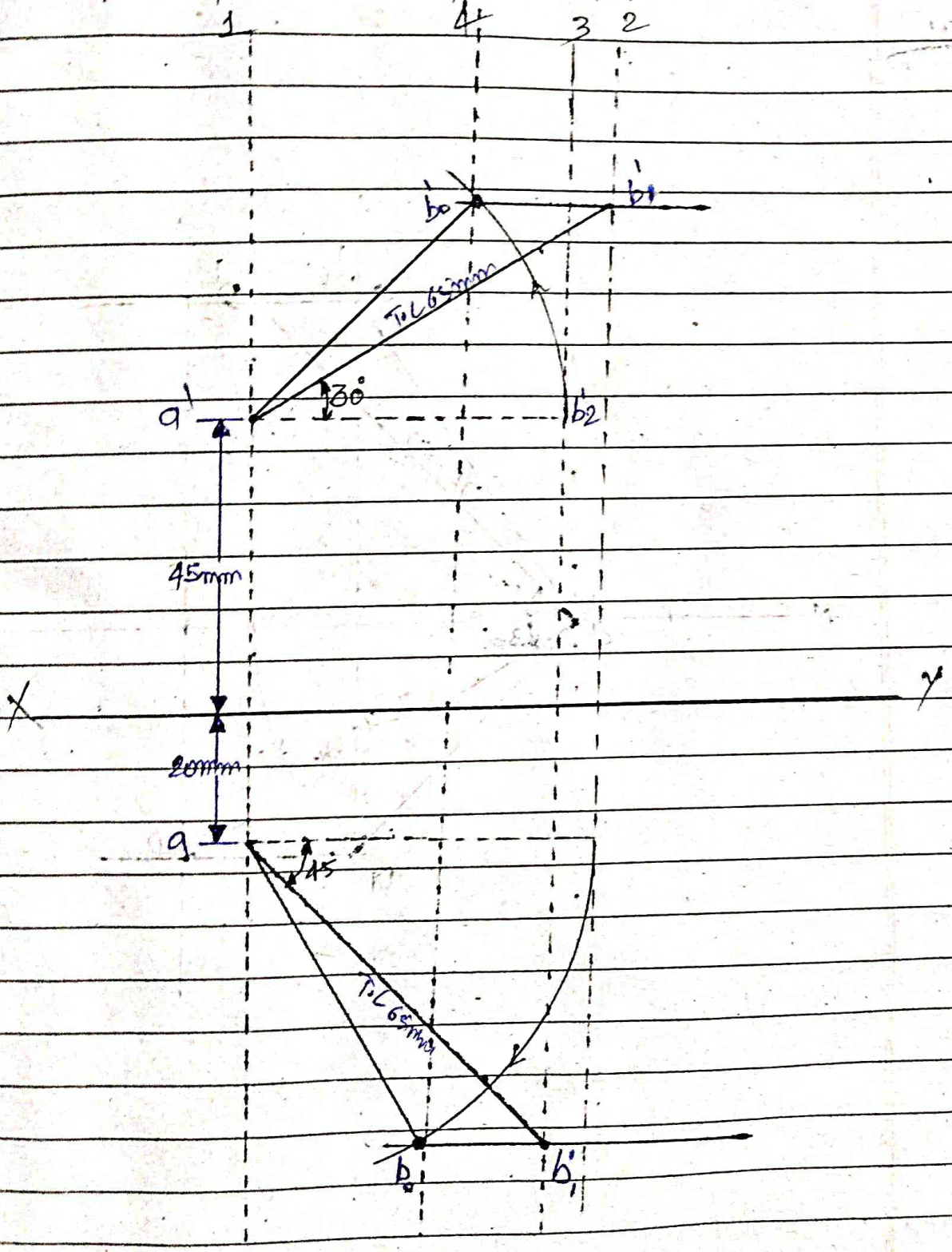




P.No A 70mm long line PQ is inclined at 30° to the HP. The end P is 15 mm in front of the VP and 25 mm above the HP. The front view of the line measure 45 mm. Draw the projection of the line PQ and determine its true angle of inclinati with the VP.

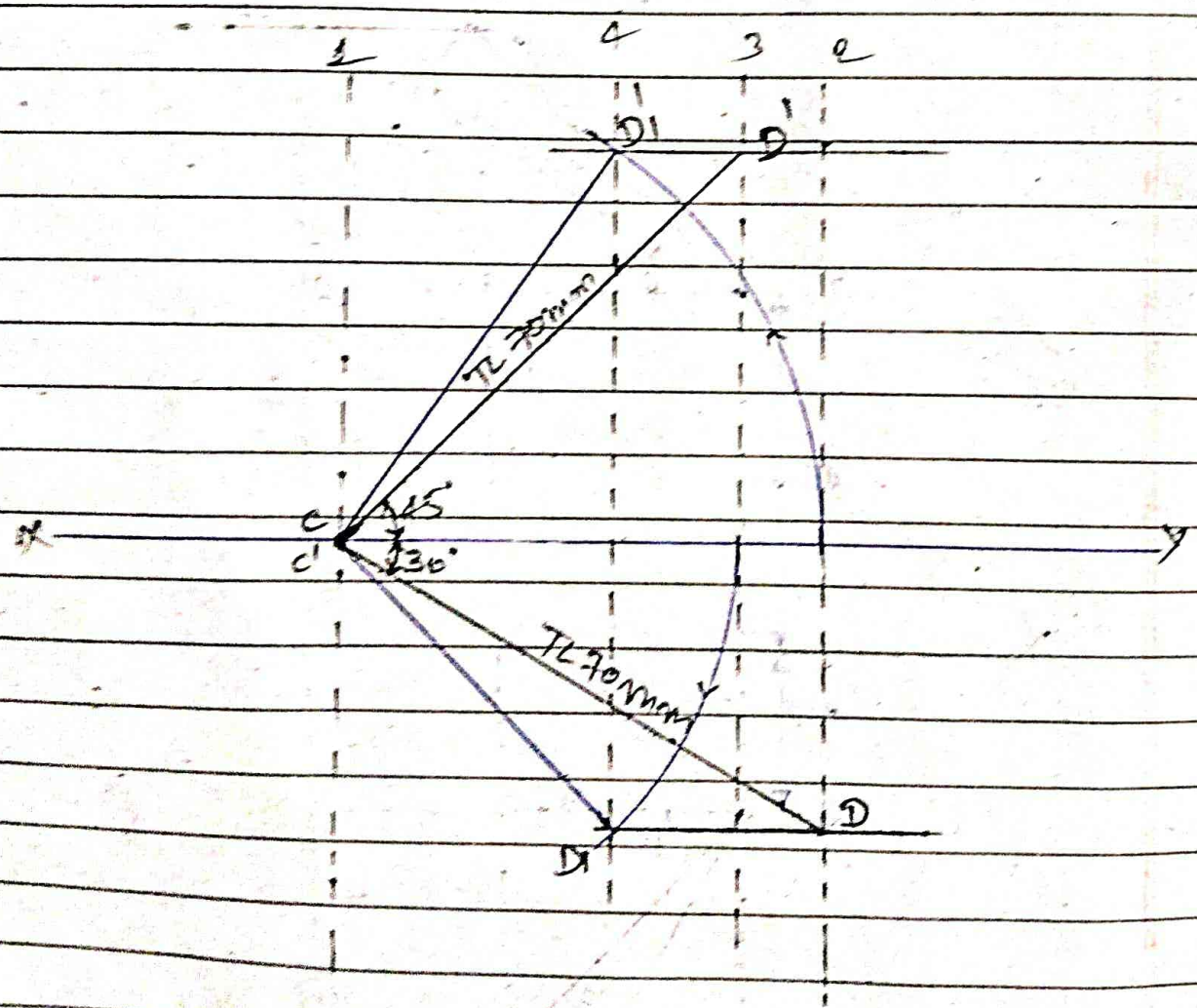


* A line 65 mm long is inclined to HP at 30° & 45°C to VP. and A is 45 mm above HP and 20mm y infront of VP draw projection.



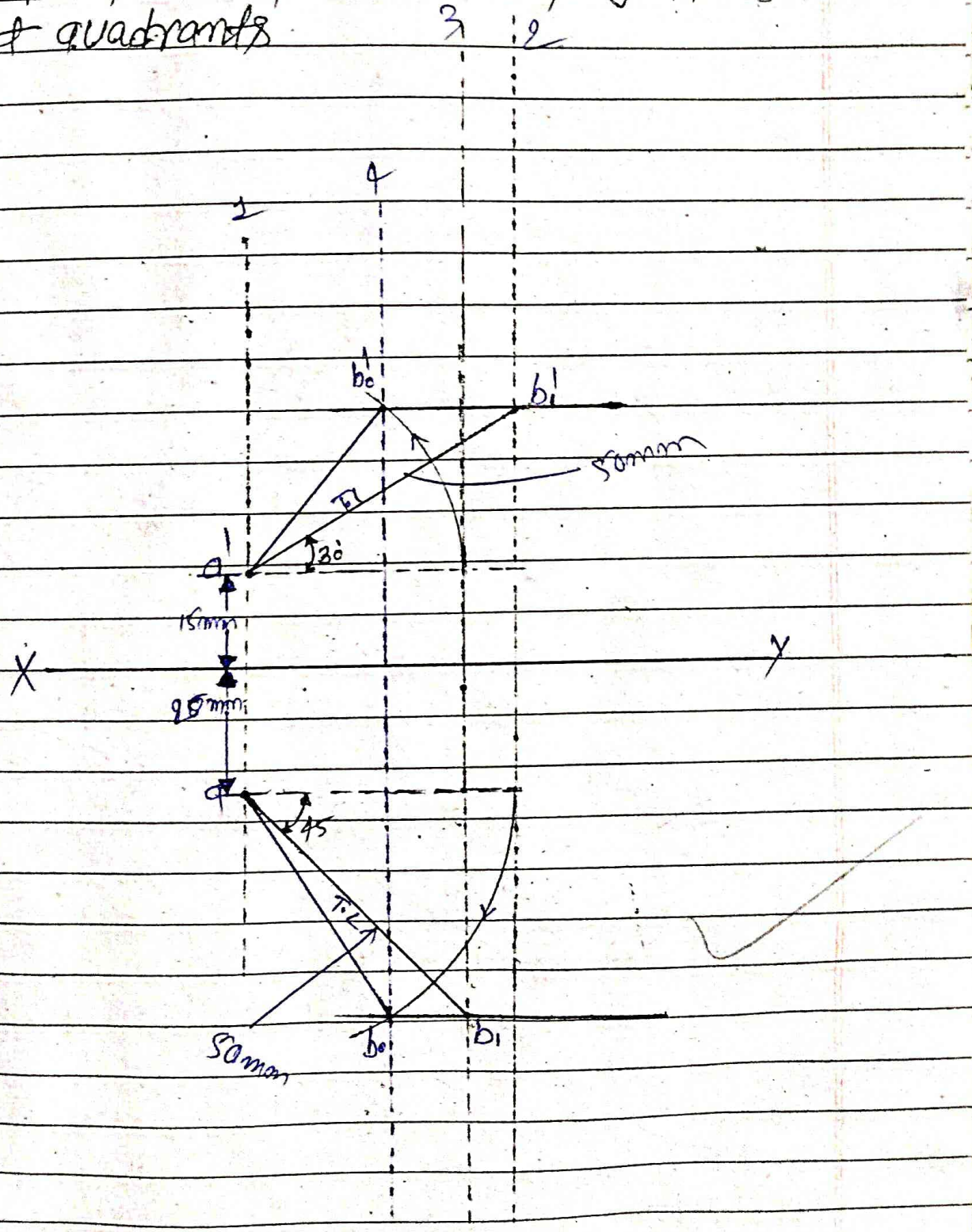
Q10 A line CD 70 mm long is inclined at 45° to HP and 30° to VP such that the point C lies of both HP and VP. Draw its projection

Soln



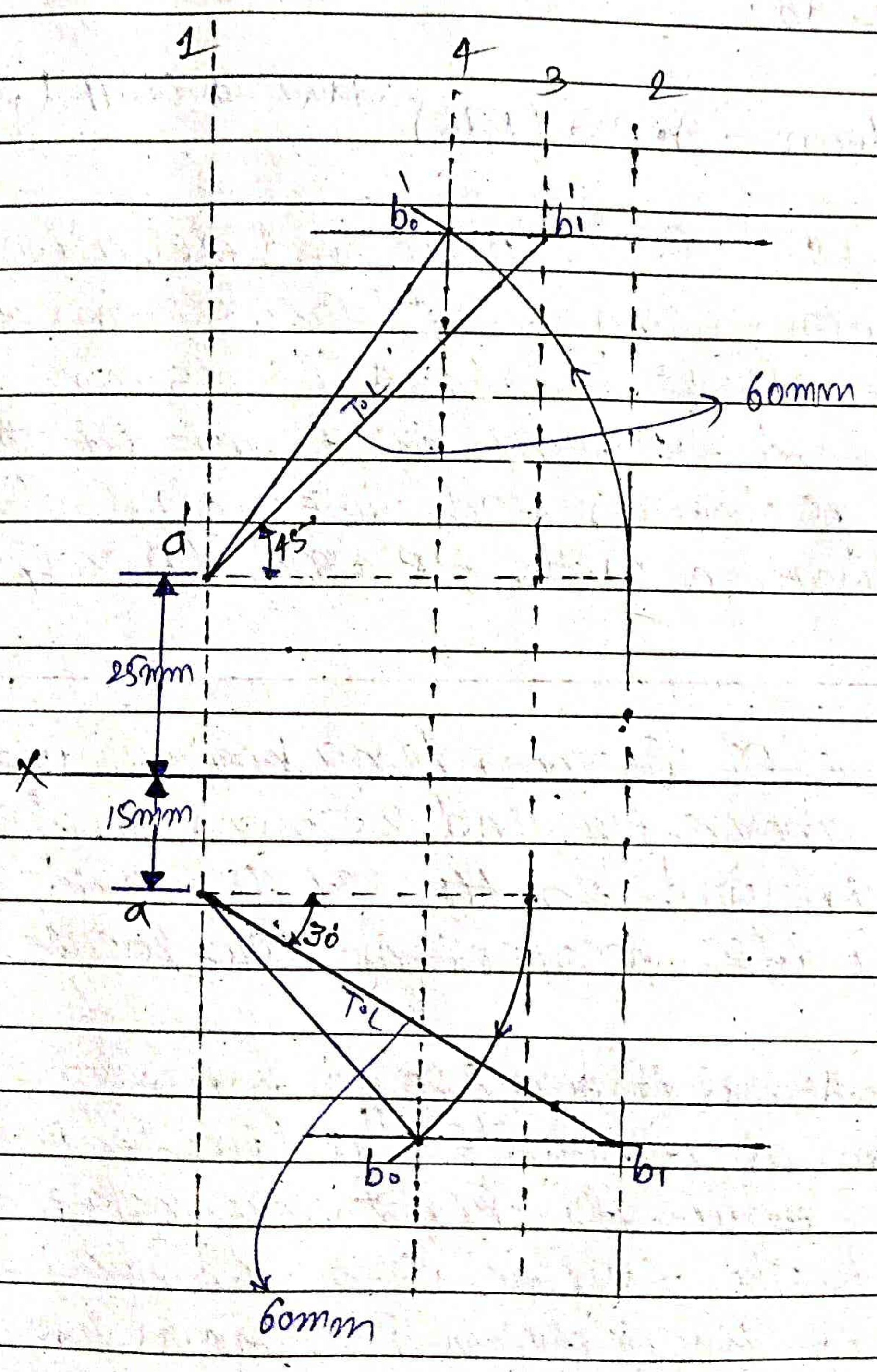
pg8

problem 9.15 → A line AB, 50 mm long has its end A 15mm away from Hp and 20mm away from the vp. it is inclined at 30° to the Hp and 45° to the vp. Draw its projections in ~~1st~~ quadrants



(Pyq) 9 Mar/2

problem 9.1.6 → A straight line AB 60mm long makes an angle of 45° to Hp and 30° to the vp. The end A is 15 mm in front of vp and 25mm above Hp Draw the projection AB.



Problem 9.18 → A straight line AB, 70mm long, makes an angle of 45° to the HP and and 30° to the VP. The end A is 15mm in front of the VP and 20mm above HP. Draw the plan and elevation of the line AB.

Problem – 9.28 (PYQ) जरूर बनाना (PYQ)

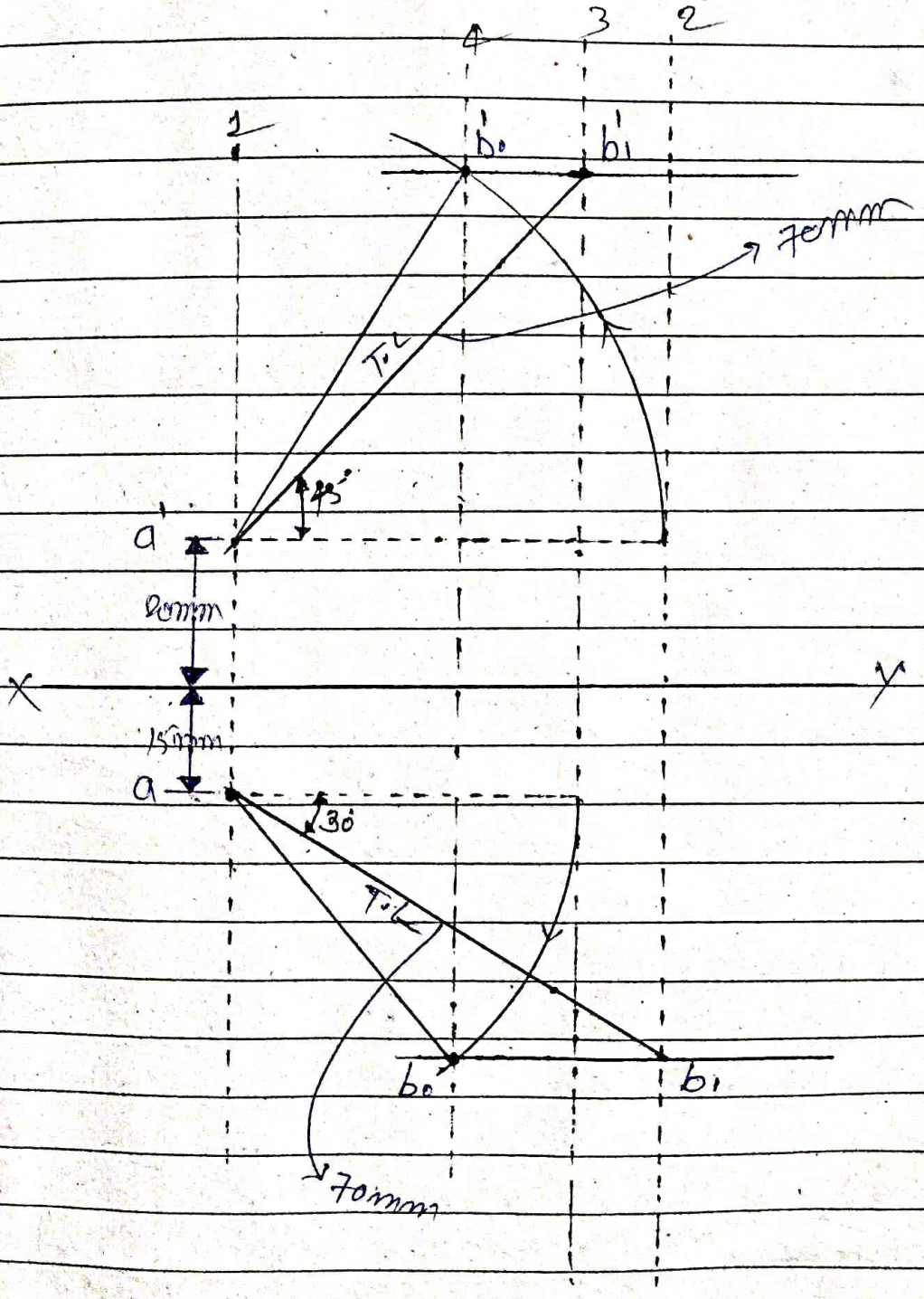
(PYQ) f-14-9-6 - plan and elevation of a line AB. 60mm long, measure 50mm and 40mm respectively. End A is 15mm above HP and 20 mm in front of the VP. Draw its projection and determine the true inclination with HP and VP respectively.

(PYQ) A line PQ 60mm long having its end P 15 mm above HP and 25 mm in front of VP is inclind to HP at 45° and 30° to VP. Draw its projections and locate its traces.

(EX) A line AB has its end A 20mm in front of VP and end B 55mm above the HP. The line is inclind at 30° to HP while its front view makes an angle of 45° to the xy line. Draw its projections, when its top view is 50mm long. find the true length of true angle of inclintion with the VP.

pg 8

problem 9.18 → A Stright line AB 70mm long makes an angle of 45° to the HP and 30° to the VP. The end A is 15mm infront of the VP and 20mm above HP, Draw the plan and elevation of the line AB.



This chapter deals with various types of lines, lettering and layout of sheet which are used in engineering drawing.

2.2 LINES

As the basis of engineering drawing is a line, a set of conventional symbols representing all the lines needed for different purposes may well be called an alphabet of lines. In the drawing each line has a specific measuring and functions. For use in technical drawing, the types of lines and their applications as recommended by Bureau of Indian Standards (BIS) are given in Table 2.1.

Table 2.1 Types of lines and their applications

S.No.	Type of Line	Conventional Representation	Applications or Uses
1.	Continuous thick		Visible outline and edges
2.	Continuous thin		Dimension lines, Extension lines, Construction lines, Leader lines, Section lines
3.	Continuous thin wavy		Short break lines or Irregular boundaries
4.	Continuous thin with zig-zag		Long break lines
5.	Short dashed thin	2 to 3 mm, 1 to 2 mm	Hidden outlines and edges
6.	Long chain thin	15to30mm, 1 to 2 mm, 2 to 3 mm	Centre lines, Pitch circles, Locus lines
7.	Long chain thin but thick at the ends		Cutting plane lines
8.	Long chain thick		Indication of lines or surfaces to which a special treatment is applied
9.	Long chain thin with double dashed		Outline of adjacent parts, Alternative and extreme positions of movable parts

Note ÷ किसी तरफ से पूरी फिगर दिखे उसको ही view लेंगे चाहे front view हो या top view

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Types of planes

(1) principal planes ÷ The planes on which the projections are taken, called as principal planes.
Ex → Horizontal plane, vertical plane

(2) Secondary planes ÷ two types of plane
(i) perpendicular plane
(ii) oblique planes

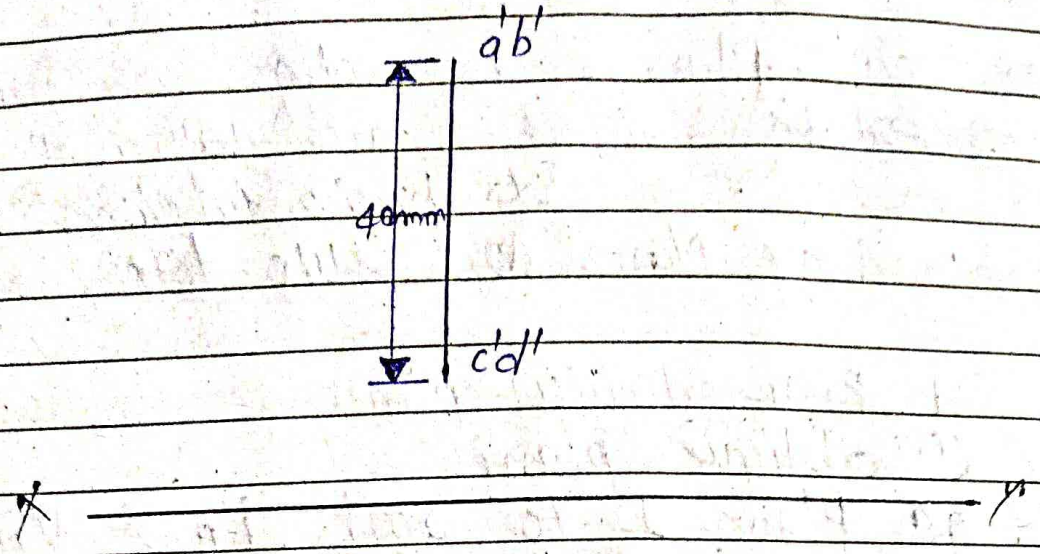
(i) perpendicular planes

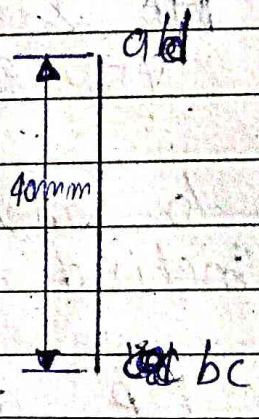
(a) perpendicular to both the principal planes.

(b) perpendicular to one of the principal planes and parallel to the other plane.

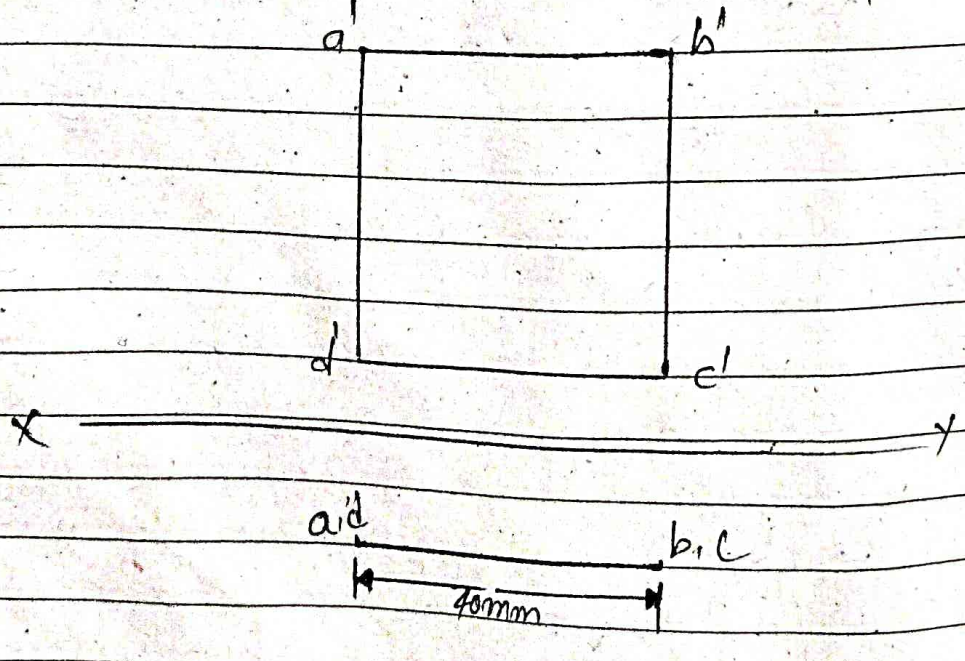
(c) perpendicular to one of the principal planes and inclined to the other plane.

(a) Plane ⊥ to both HP and VP.



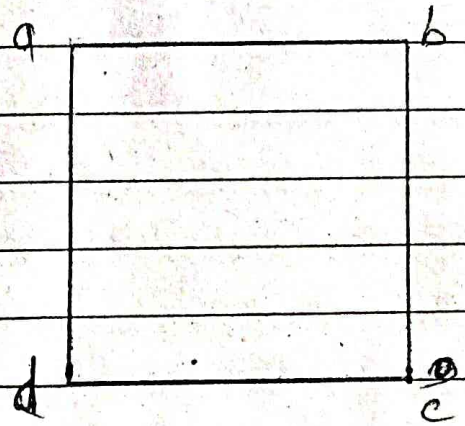


(b) Plane ⊥ HP & ∥ to VP



(b) plane ⊥ VP & // HP.

a'd' ——— b'c'



* Tricks for plane → M.S.P

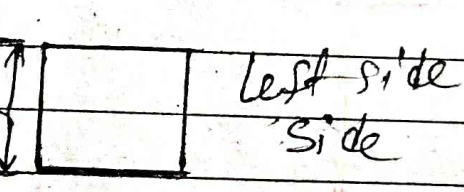
Side in HP
edge in HP
corner in HP
surface incline to HP
plane incline to HP
edge ∥ to HP

x ——— y
तो plane xy लाइन के नीचे बनेगा

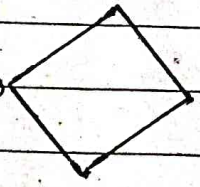
* Side in VP
edge in VP
corner in VP
surface incline to VP
plane incline to VP
edge ∥ to VP

तो plane xy line के ऊपर बनेगा
x ——— x

* Side या Edge

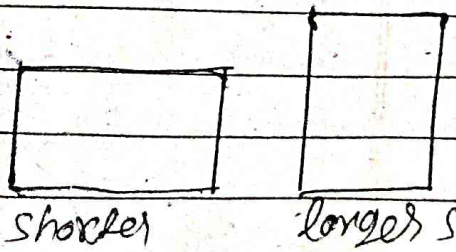


Corner →



left side corner

* Shorter side in HP

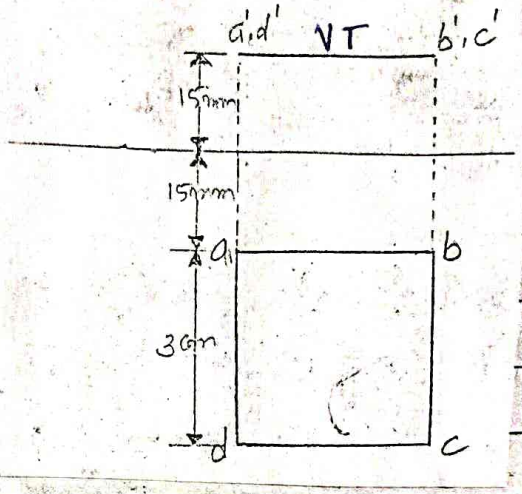


* Note:- True shape का straight line xy लाइन के ऊपर बनेगा या xy लाइन में बनेगा इसको trick edge/side in HP/VP → xy लाइन में करना
edge/side parallel to HP तो straight line parallel to xy करना है

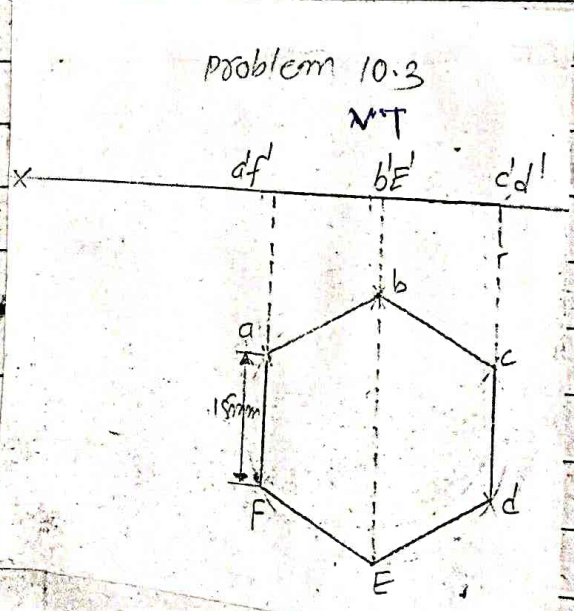
28.

PROBLEM 10.2 A square lamina ABCD of 30 mm side is parallel to HP and is 15 mm from it. Draw its projections in first quadrant only and locate its traces.

problem 10.2



problem 10.3 ⇒ A regular hexagonal lamina of side 25mm side rests on HP such that one of its sides is perpendicular to VP. Draw its projections in first quadrant only and locate its trace.



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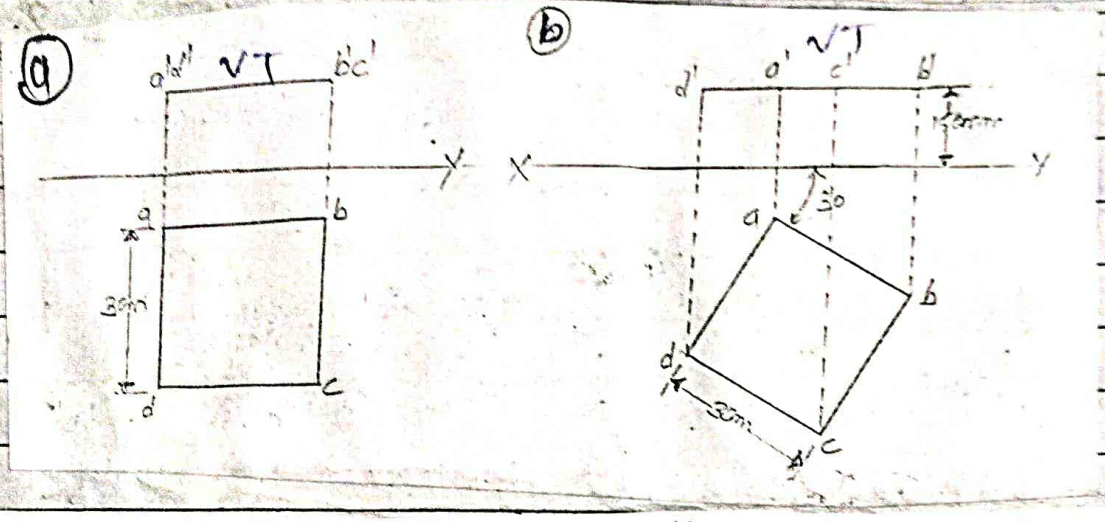
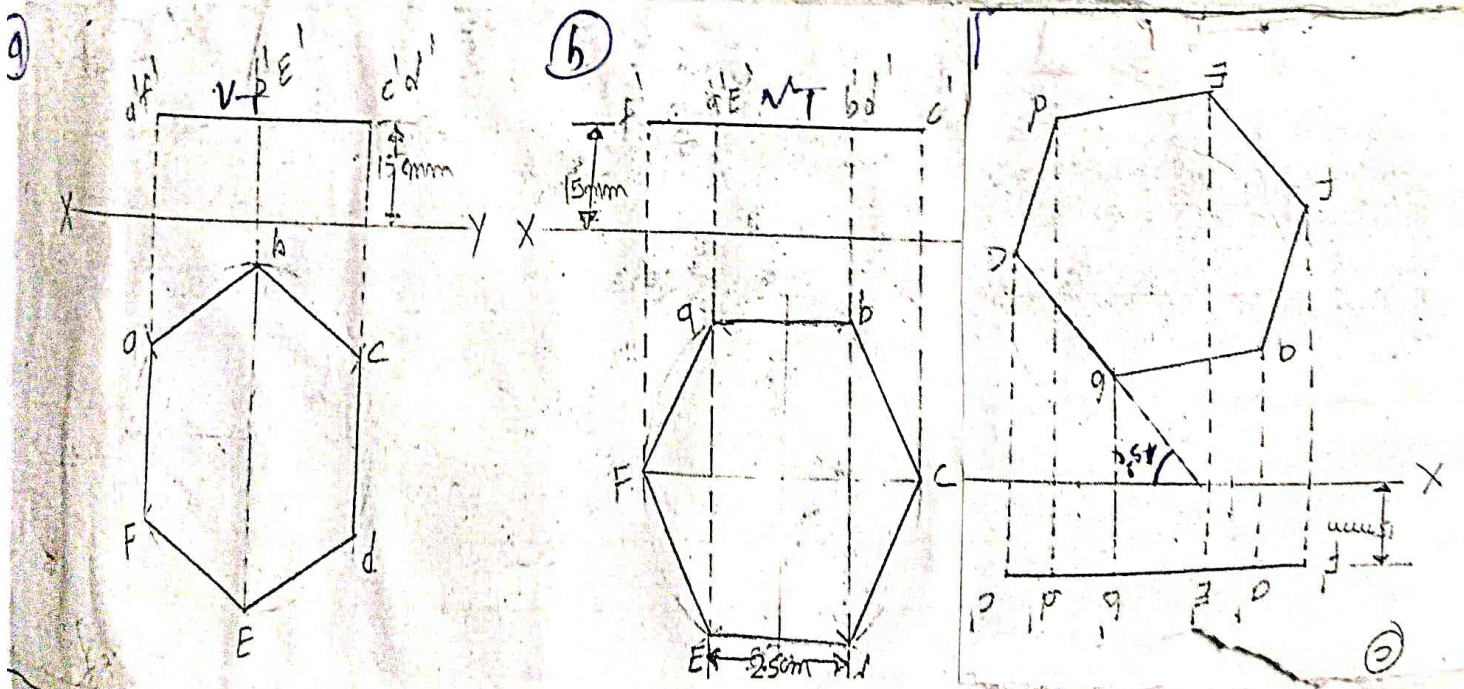
PROBLEM 10.4 A square lamina ABCD of 30 mm side is parallel to HP and is 15 mm from it. Draw its projections when (a) a side is parallel to the VP; (b) a side is inclined at 30° to the VP. Locate its traces too.

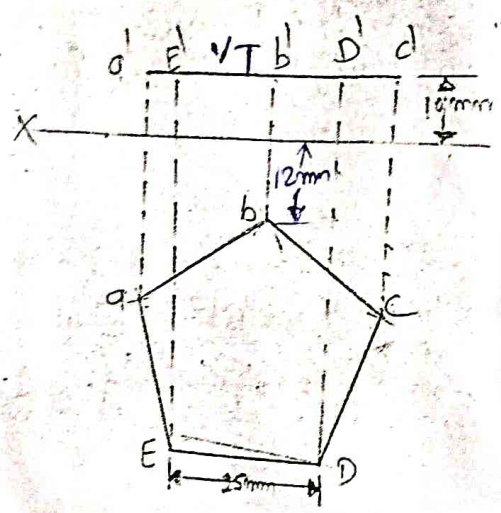


PROBLEM 10.5 A regular hexagonal lamina of side 25 mm is parallel to HP and 15 mm from it. Draw its projections when (a) a side is perpendicular to the VP; (b) a side is parallel to the VP; (c) a side is inclined at 45° to the VP. Locate its traces too.



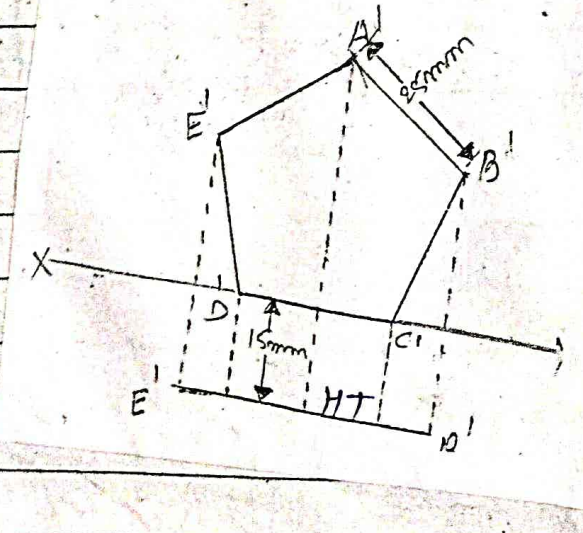
PROBLEM 10.8 *A regular pentagonal lamina ABCDE of 25 mm side, having one of its side is parallel to VP and 10 mm above HP. A corner opposite to this side is 12 mm infront of the VP. Draw the projections when the lamina is parallel to HP and locate its traces too.*

problem 10.8

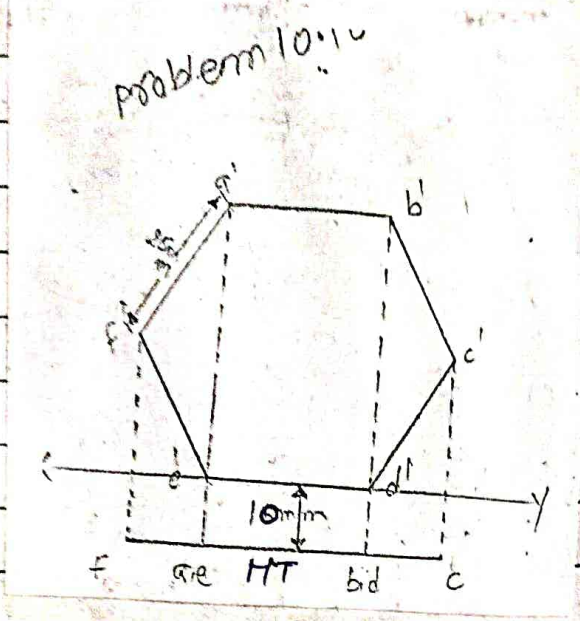


PROBLEM 10.9 *A regular pentagonal lamina ABCDE 25 mm side, has its side CD lies on HP. Draw its projections when its plane is parallel to and 15 mm infront of VP. Also locate its traces.*

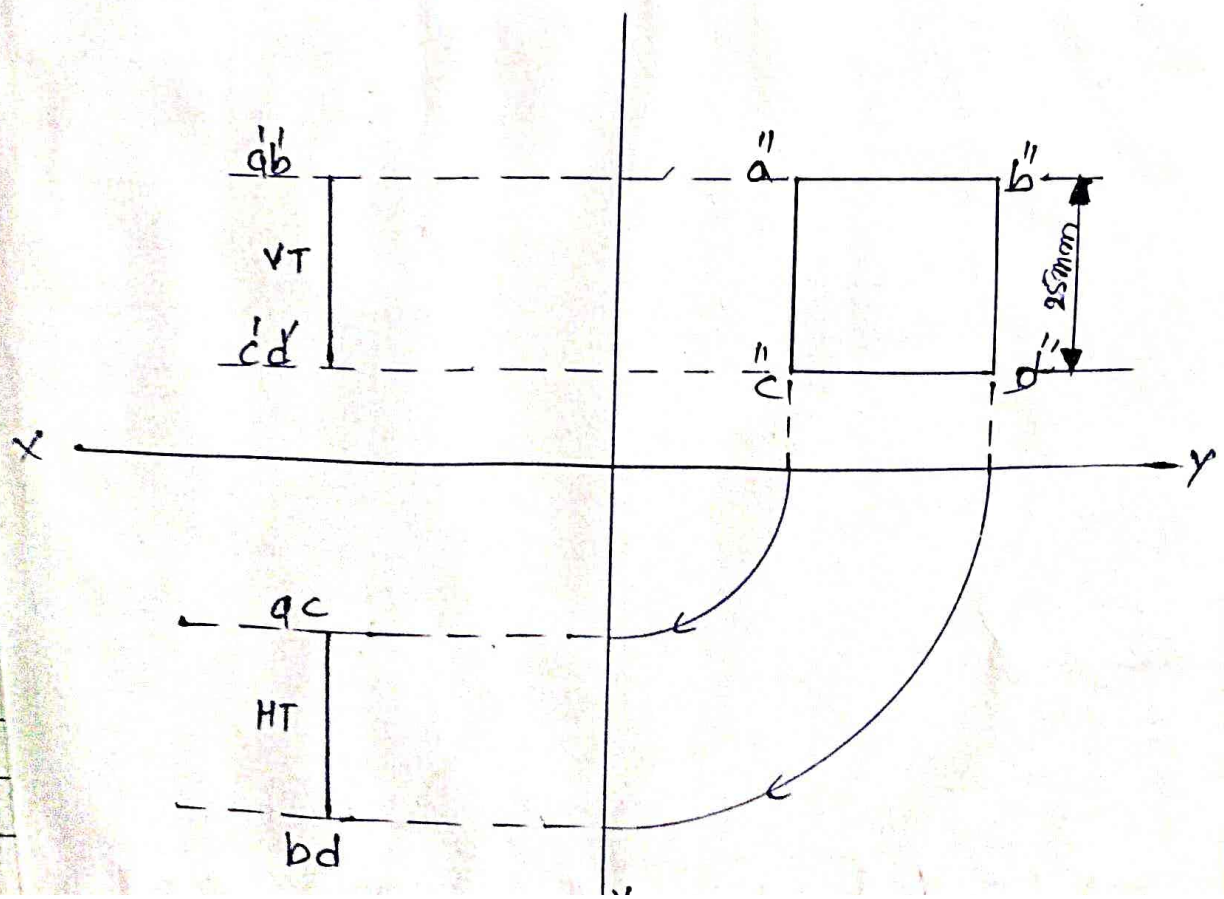
problem 10.9



ROBLEM 10.10 *A regular hexagonal lamina ABCDEF 25 mm side, has its side DE lies on HP. jections when its plane is parallel to and 10 mm infront of VP. Also locate its traces.*

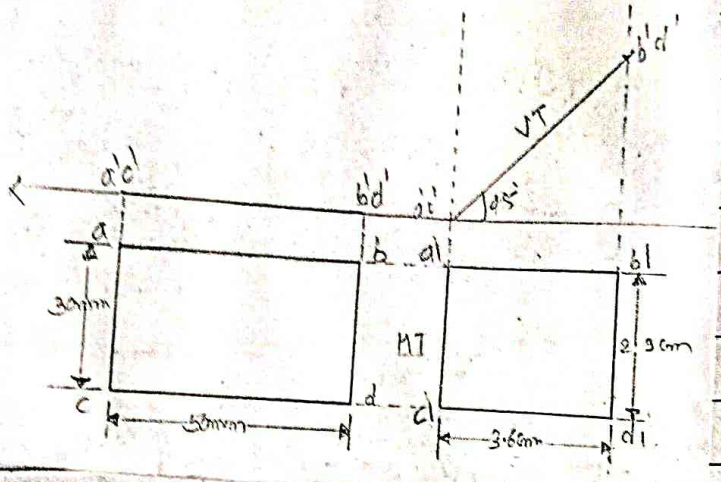


problem 10.13 → A square lamina ABCD of 25 mm side is perpendicular to both HP and VP, so it ~~will give three~~ Draw its projections in first quadrant only and locate its traces too.



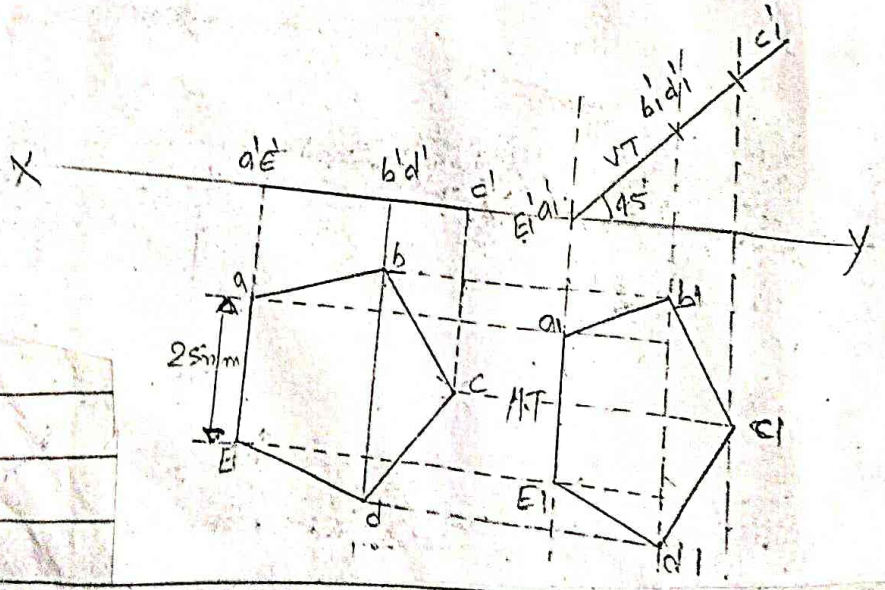
PROBLEM 10.15 *A rectangular lamina ABCD of 50 mm × 30 mm is inclined to HP at 45° and perpendicular to VP. It rests on one of it sides say AB in HP. Draw its projections in first quadrant only and locate its traces too.*

problem 10.15



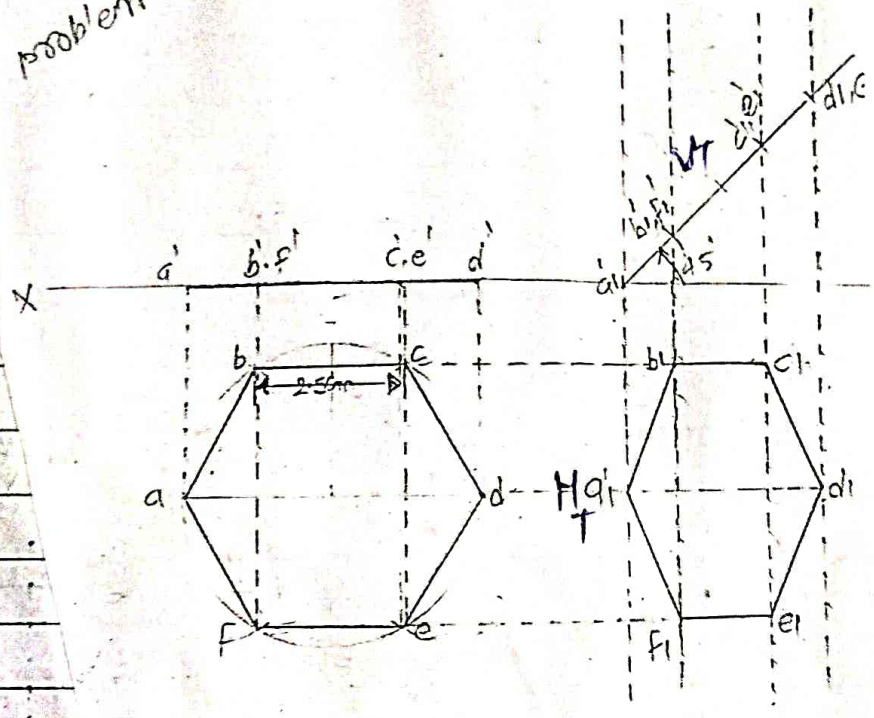
PROBLEM 10.16 *A regular pentagonal lamina ABCDE of 25 mm side has one side on the HP. Its surface inclined at 45° to the HP and perpendicular to the VP. Draw its projections and show its traces.*

problem 10.16



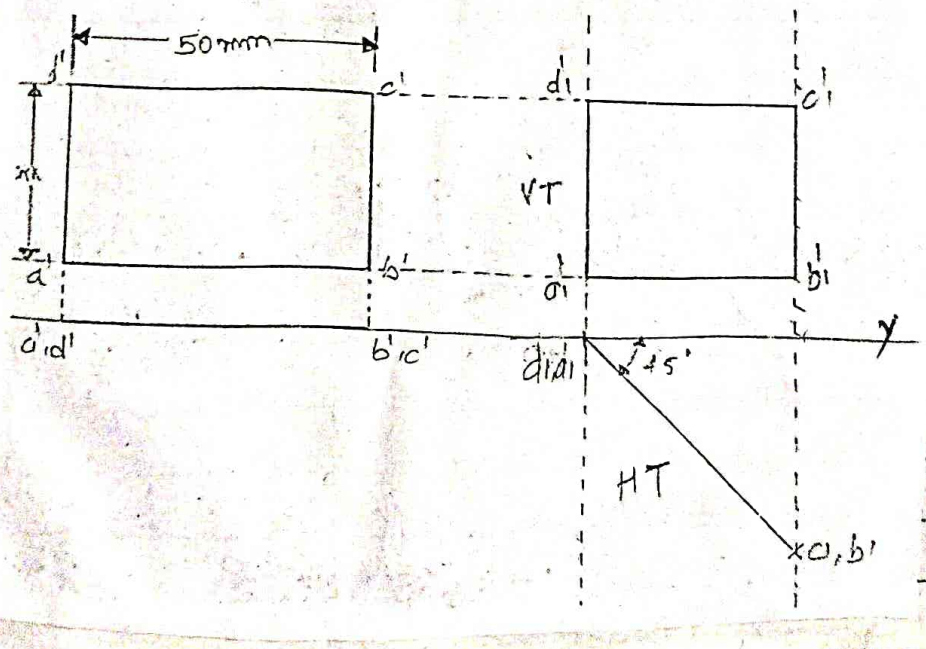
PROBLEM 10.21 *A regular* Hexagonal *lamina ABCDEF of 25 mm side, lies on one of its corner in HP ch that the surface is inclined at 45° to the HP and perpendicular to the VP. Draw its projections and locate its ces.*

problem 10.21

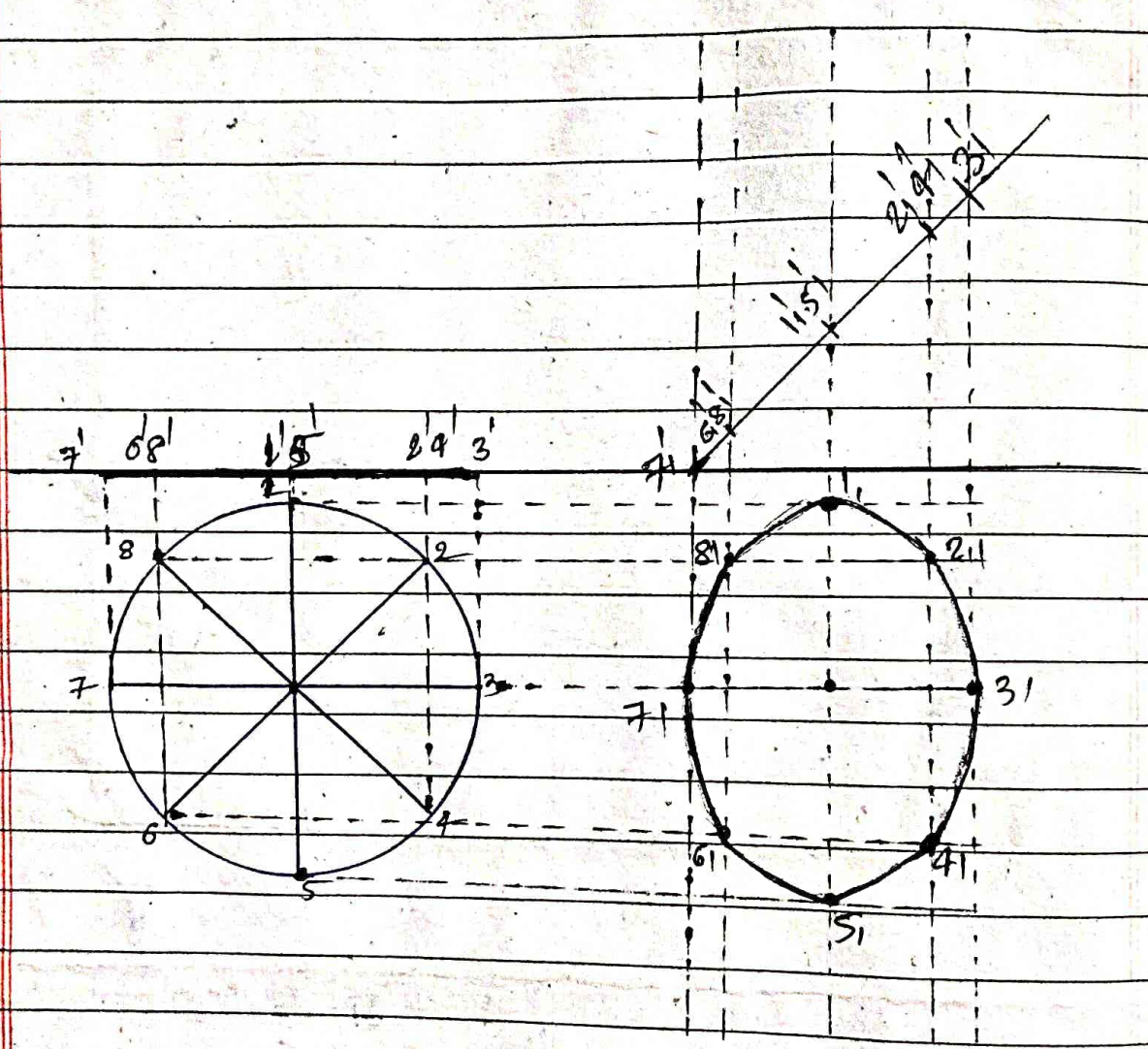


PROBLEM 10.23 *A rectangular lamina ABCD of 50 mm × 30 mm is inclined to the VP at 45° and perpendicular to HP. Its one of the sides say AD lies in VP. Draw its projections and locate its traces too.*

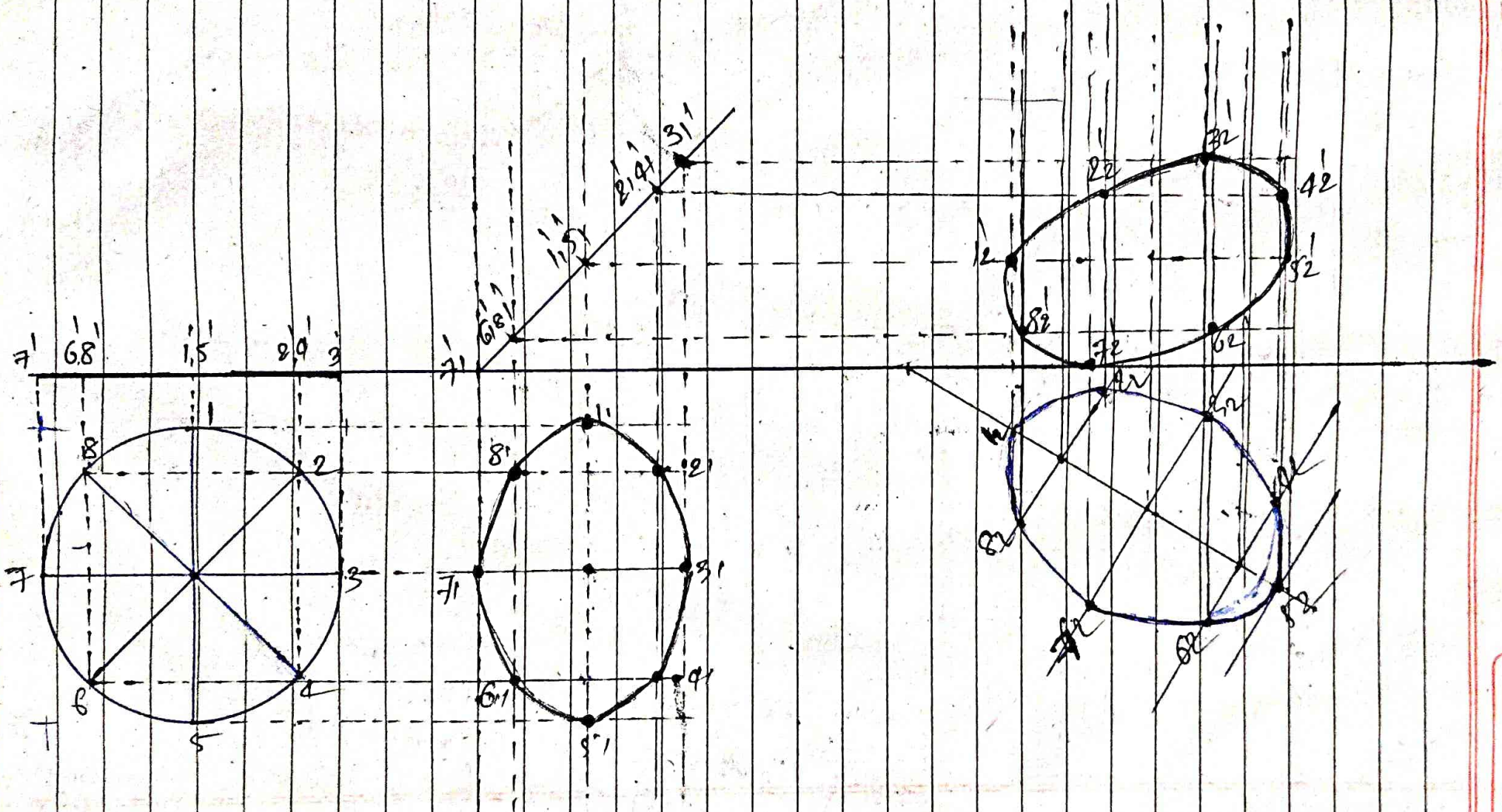
problem 10.23



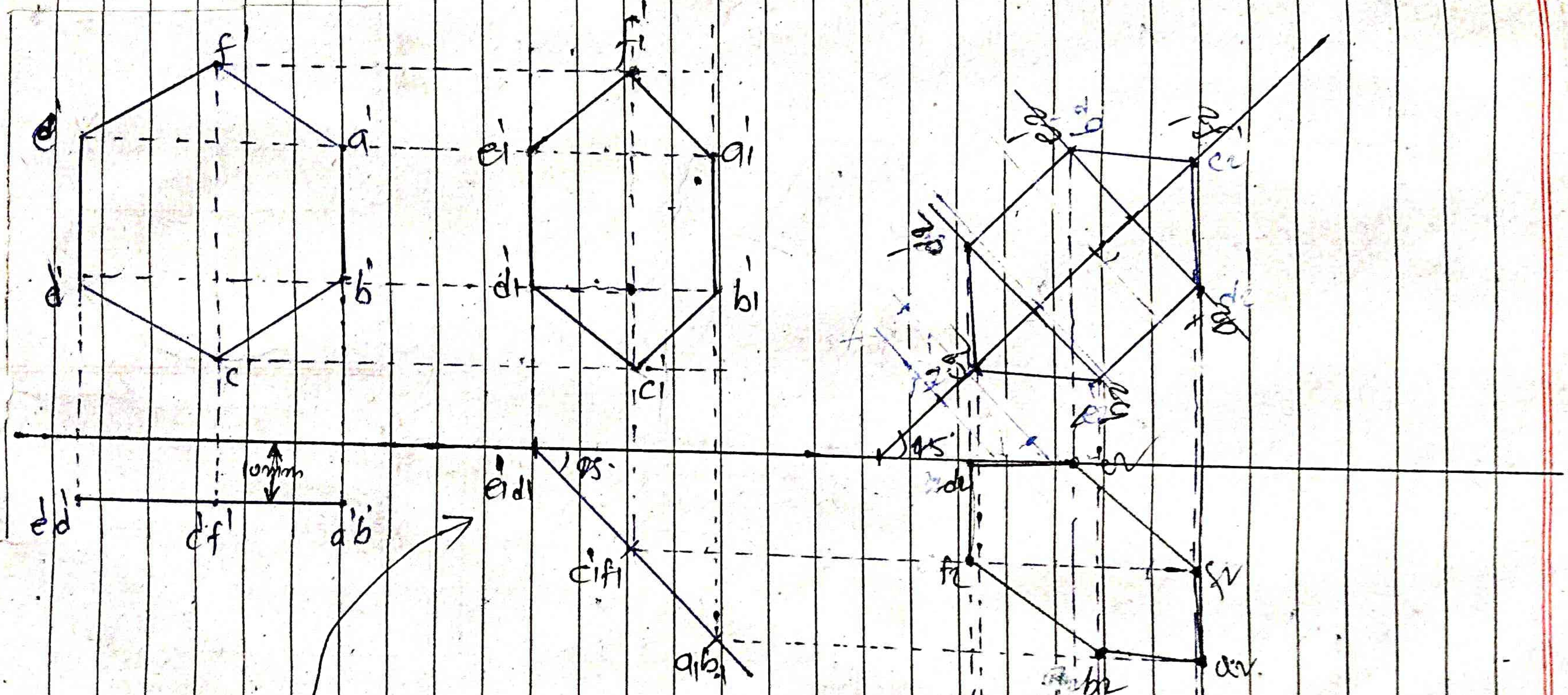
PROBLEM 10.19 *A thin circular plate of ϕ 50 mm and negligible thickness rests on HP on its rim and makes an angle of 45° to HP. Draw its projections.* (PTU, Jalandhar December 2015)



problem-10.31 → A thin circular plate of Ø 50mm and negligible thickness rests on HP on its rim and makes an angle of 45° to it. One of its diameters is inclined to VP at 30°. Draw its projections keeping distance of the centre of the circular plate 35 mm infront of the VP.

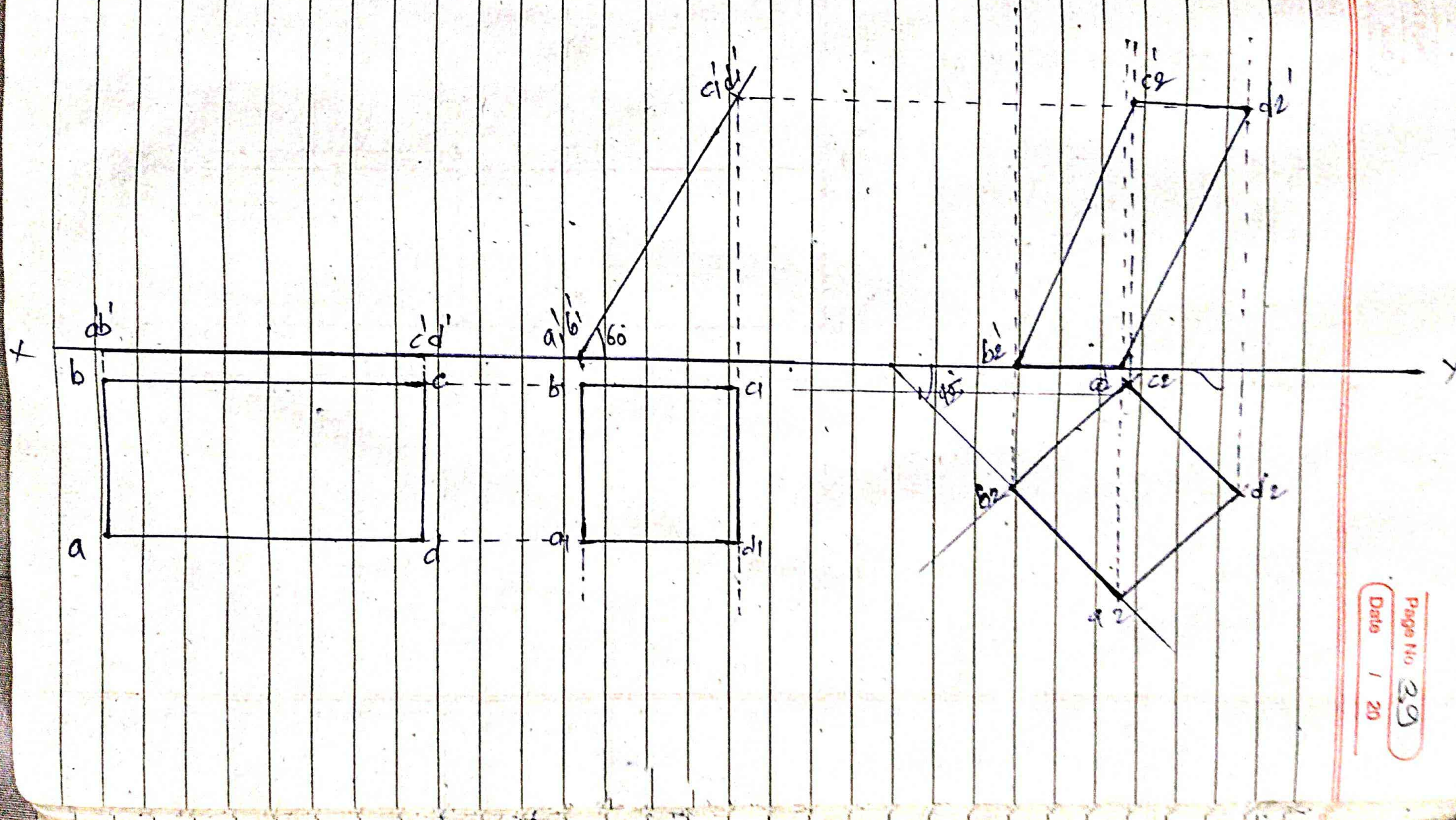


Problem-10.33 → A regular hexagonal lamina ABCDEF of 25mm side, has its plane inclined at 45° to the VP and its diagonal FC parallel to VP and inclined to HP at 45°. Draw its projection when its side DE is nearest to the VP and 10mm in front of it.

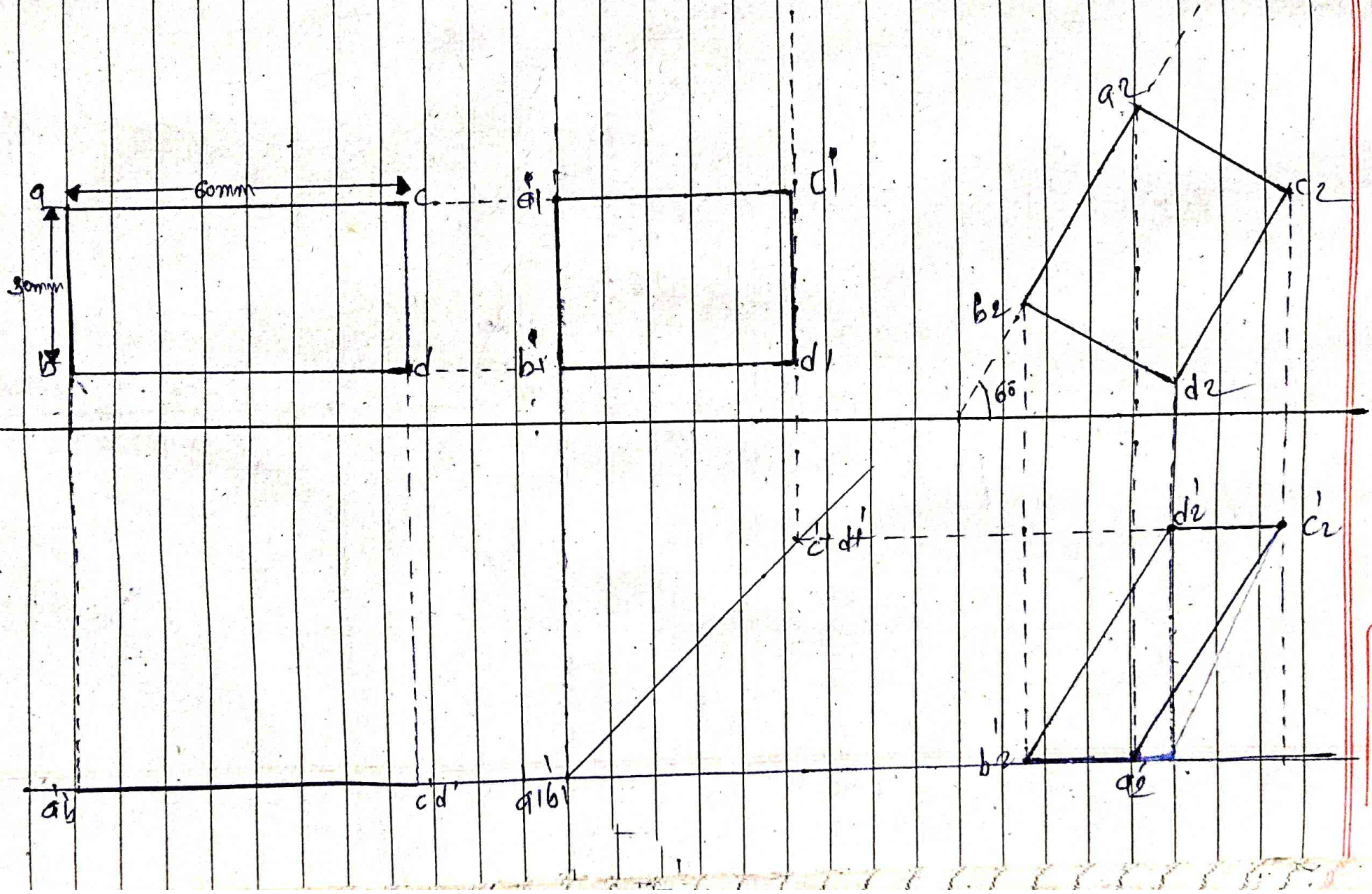


यहाँ थोड़ा गलती हुआ है ध्यान रखना → यहाँ 10mm ऊपर बनाना था लेकिन बना दिया है तो इसी 10mm ऊपर ही बनाना

Problem 10-28> A rectangular lamina ABCD of 60mm x 30mm has its side AB in HP and inclined at 45° to VP and the plane of the lamina is inclined at 60° to the HP. Draw its projection

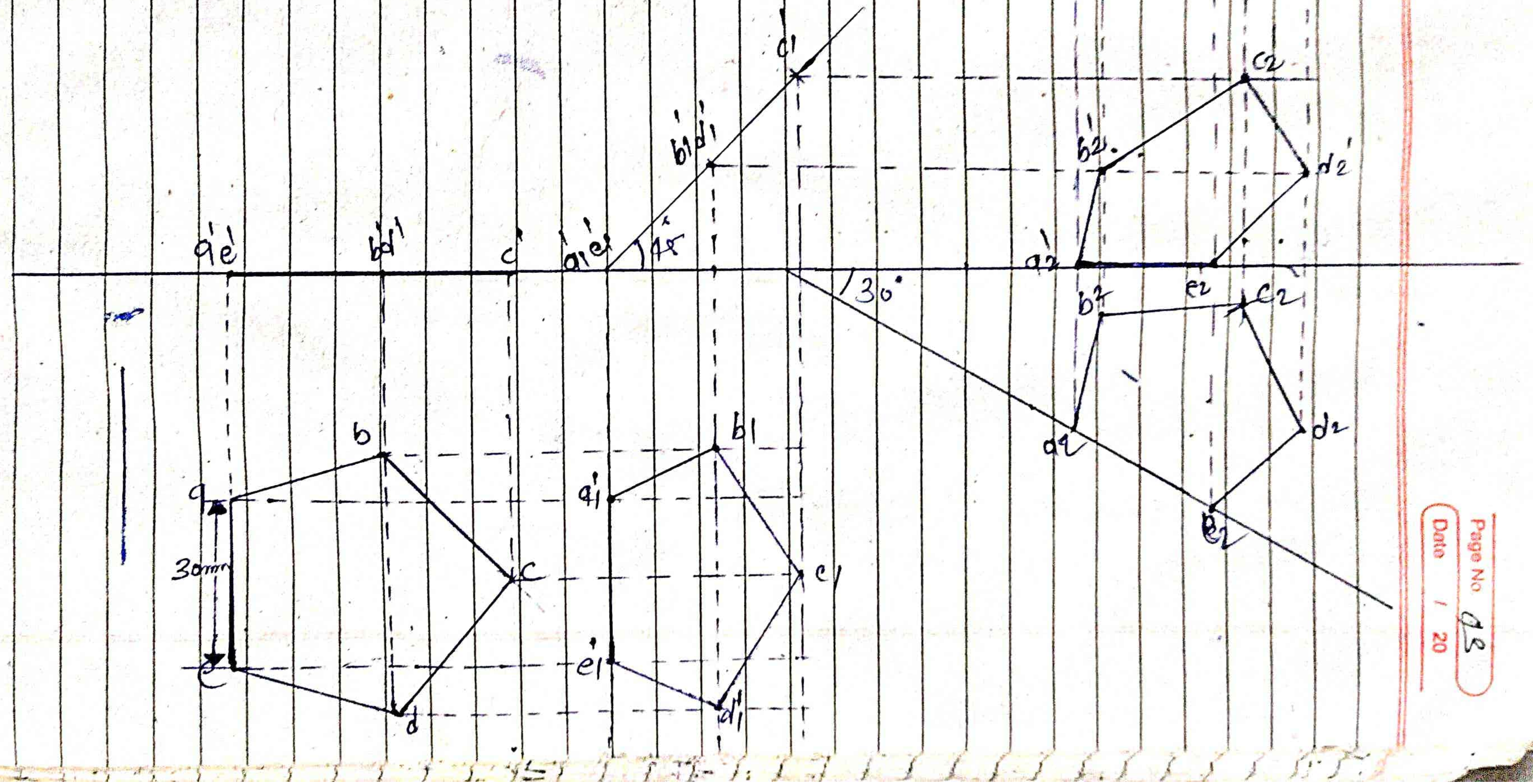


problem 10.29 A rectangular lamina ABCD of 60 mm x 30 mm has its side AB on ground and inclined at 60° to VP and plane of the lamina is inclined at 45° to the HP. Draw its projection in third angle.



Problem :- No - 30 A regular pentagonal lamina ABCDE of 20 mm side, rests on HP on one of its sides such that it is inclined to the HP at 45° and the side on which it rests inclined at 30° to the VP. Draw its projections.

(108)

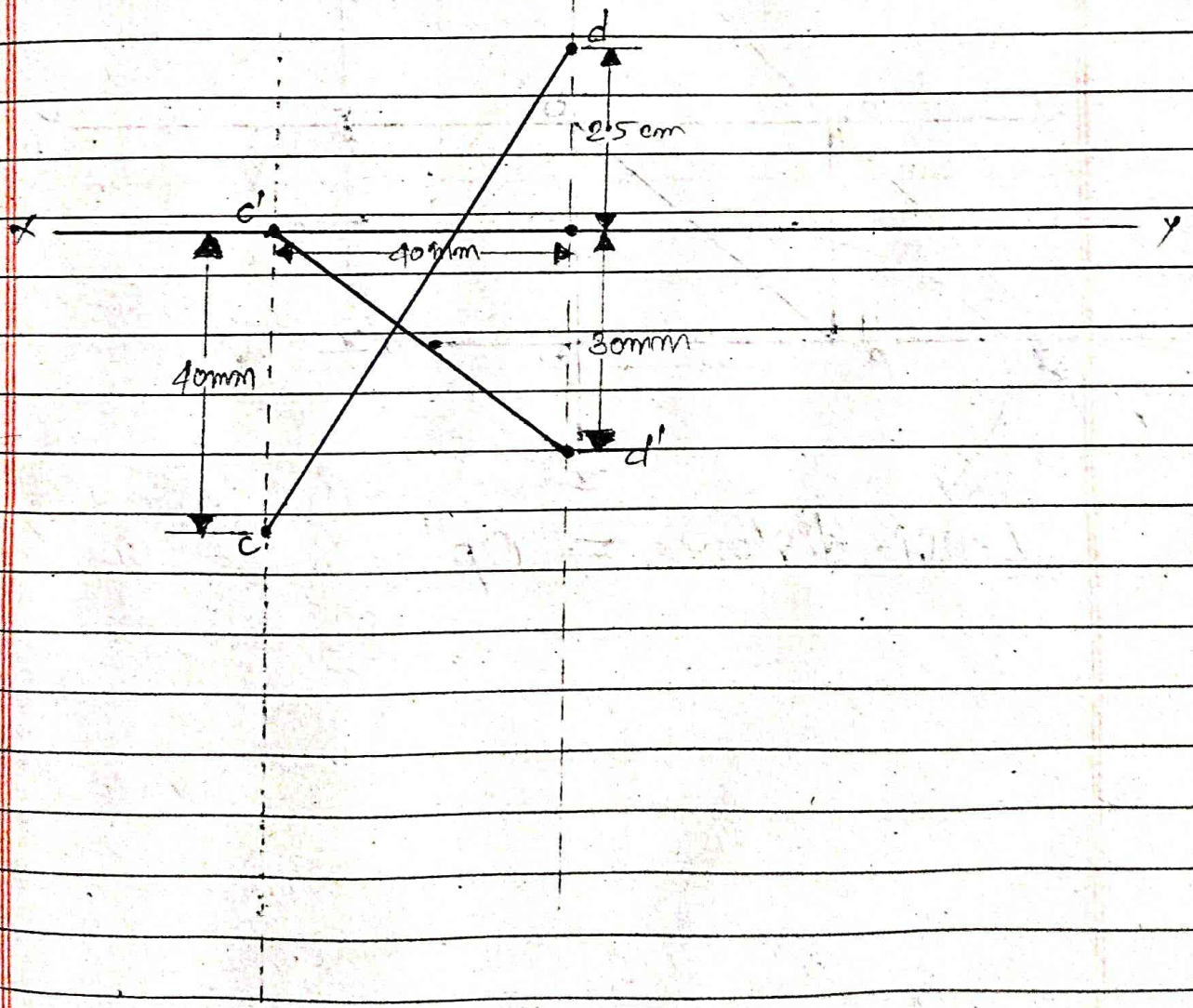


MST - Q - P - 1 - Q - 3.

pg 90

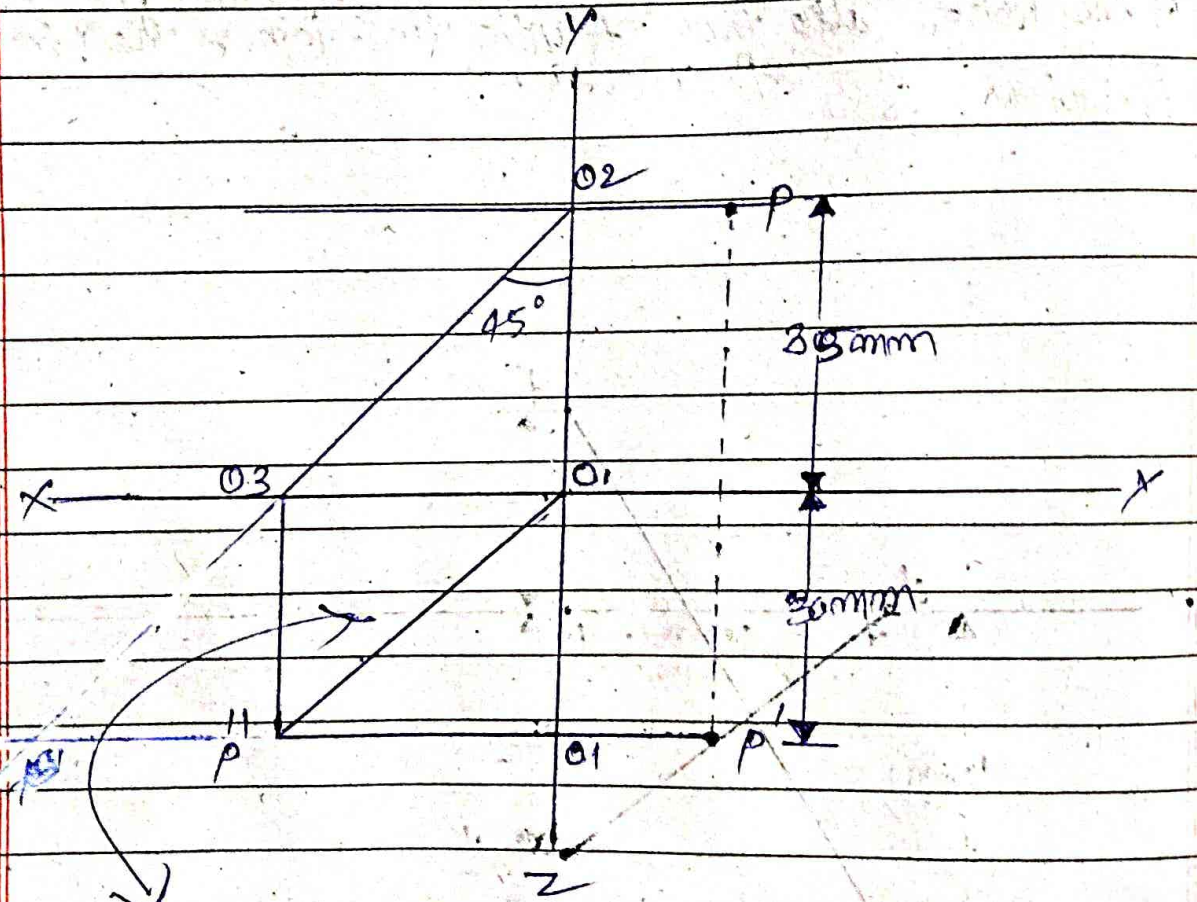
problem → 8.5 → A point C is in Hp and 40 mm in front of the Vp. Another point D is 30mm below Hp and 25mm behind the Vp. The distance blw the end projectors is 60mm. Draw the projections of the points also draw straight lines joining there front and top views.

End projectors →



pyq

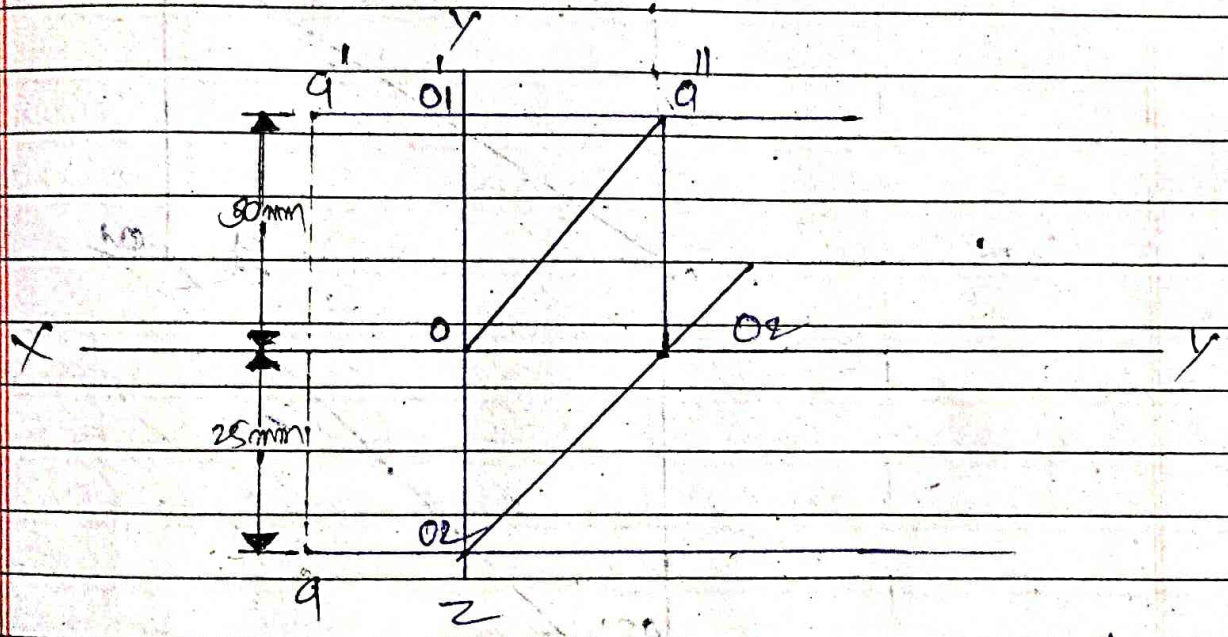
Ex A point p is 30 mm below the H.P and 30 mm behind the V.P. Determine its least distance from xy line.



Least distance = OP''

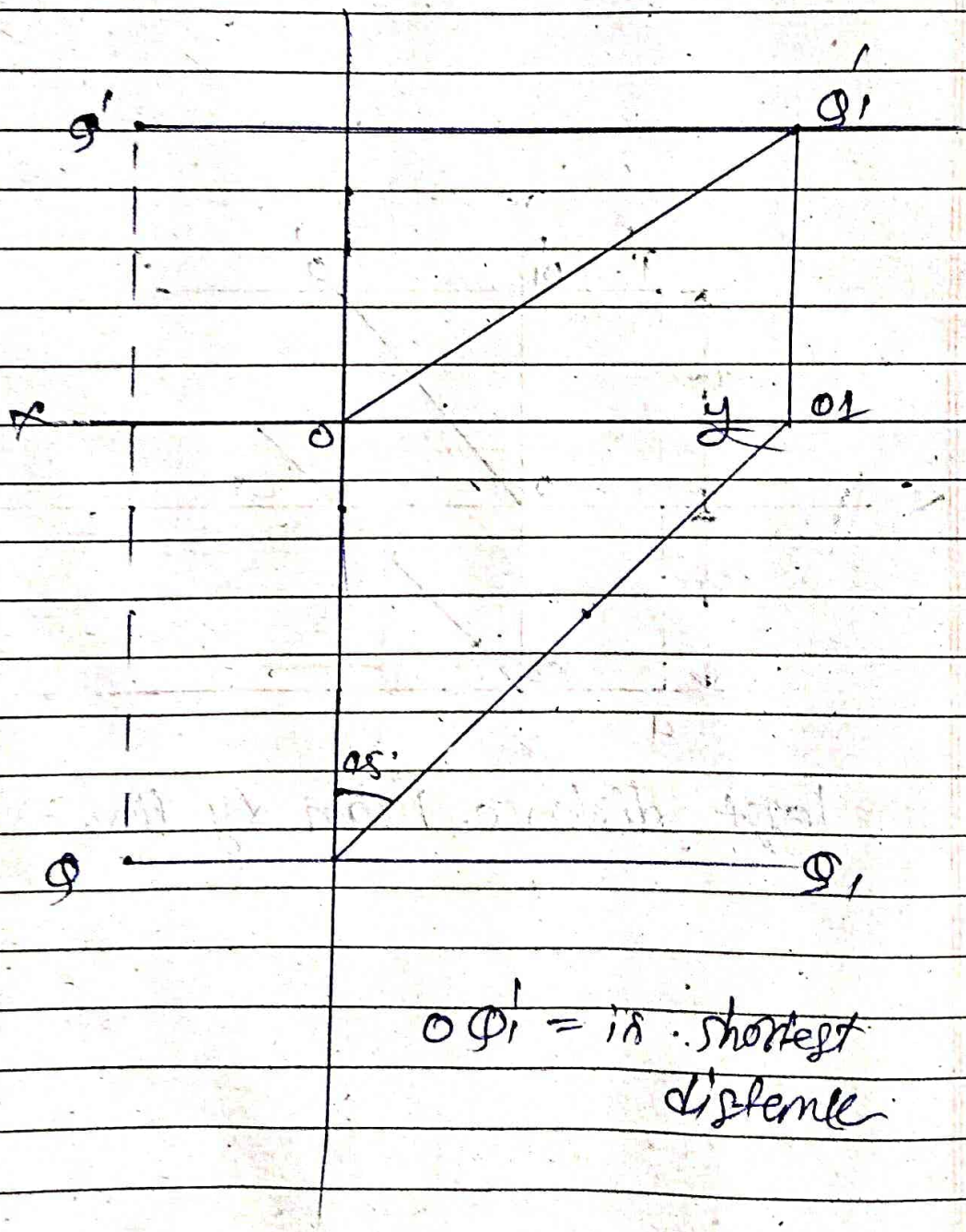
(29)

* problem 8.3 → A point A is 30mm above the HP and 25mm infront of the VP. Determine its least distance B from xy line.



least distence from xy line = oa''

Pg8) A point 'Q' lies 40mm above H.P and 60 mm in front of V.P. Draw its projection and find its shortest distance from origin.



$o q_1'$ = is shortest distance

Q9) * Differentiate b/w first angle and third angle

first angle	third angle
(i) object placed in 1st Quadrant	object placed in 3rd Quadrant.
(ii) Draw front view above xy line	Draw front view below xy line.
(iii) Draw top view below xy line.	Draw top view above xy line
(iv) Draw side view of object right or left side of front view	Draw side view of object right or left side front view

* What is dimensioning

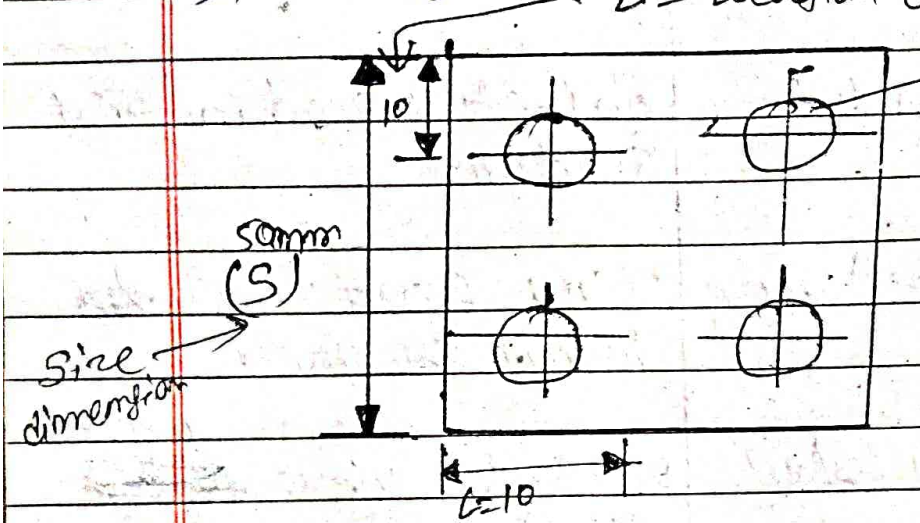
ans ⇒ The shape of the object like length, width, height, size, position, and any other details required for the manufacturing of the object, this information is called dimensioning.

* Types of dimensions
(1) Size dimension
(2) location dimension.

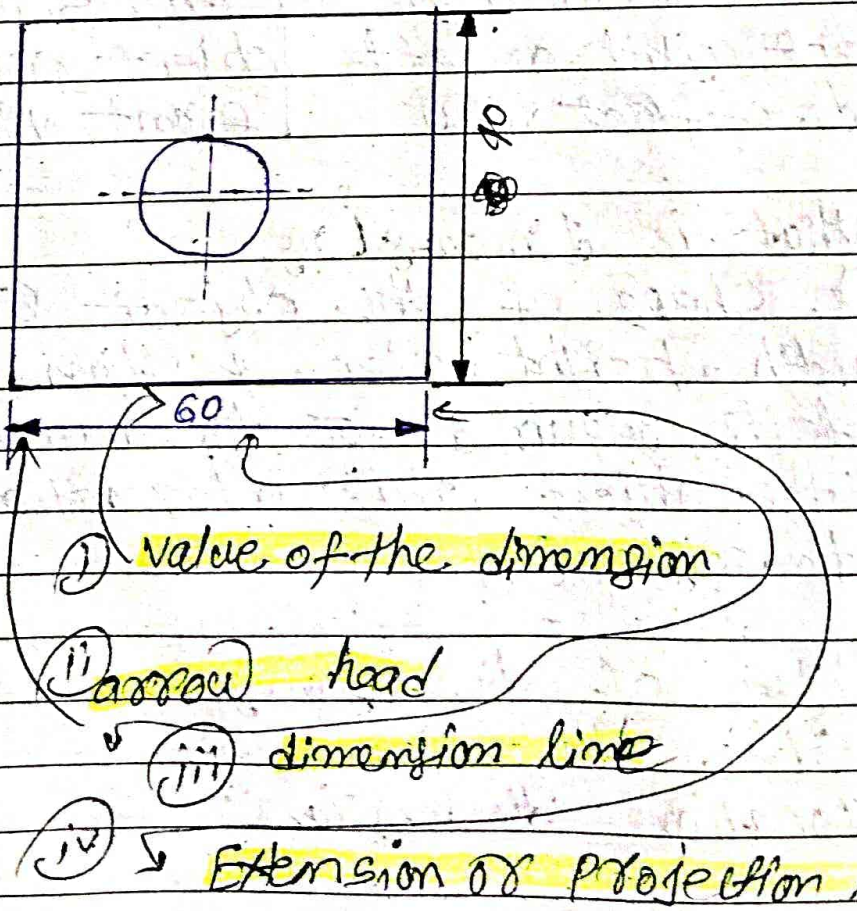
(i) Size dimension :- It gives the size of a piece, it is denoted by S.

It is denoted by (L).

(ii) Location dimension :- It gives relationship of the component parts (holes, slots) of a piece of structure.

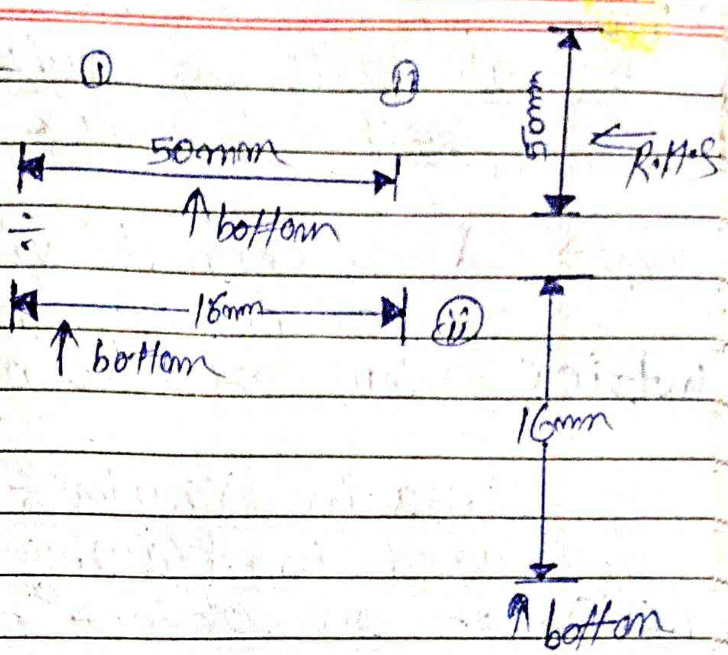


* Elements of dimensioning

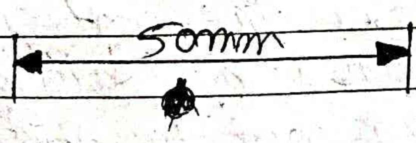
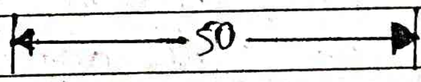
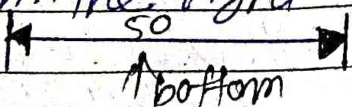
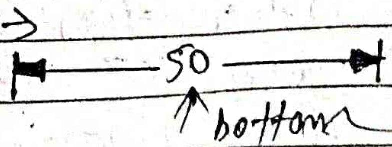
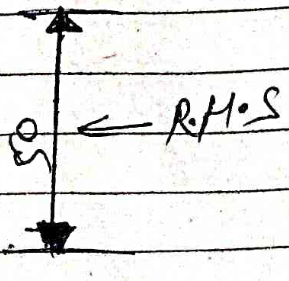
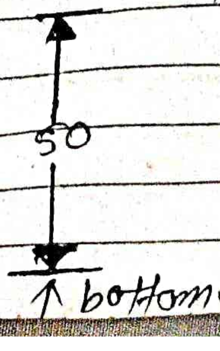


* Placing of dimensions

(i) Aligned system :-
(ii) Unidirectional system :-



(pyq) (*) Differentiate between aligned and uni-directional method of dimensioning using a suitable example

Aligned System	Unidirectional system
(i) In an aligned system all the dimensions are placed above the dimension line.	In unidirectional system all the dimensions are placed in one direction
Ex → 	
(ii) They may be read either from the bottom or from the right side	They may be read from the bottom of the drawing.
Example (i) 	Ex → (i) 
Example (ii) 	(ii) 

Q48 * What is a sectional view? Why sectional views are used in drawing.

ans ⇒ A Sectional view is the representation of an object that shows an internal or interior view of the object.

Uses in drawing: Sectional views are used in drawing to show the interior parts of an object that cannot be seen in a conventional orthographic view.

Q49 * What do you mean by section plane?

ans ⇒ A Section plane also known as a cutting plane. A section plane is an imaginary plane that is used to cut a three dimensional object. This allows you to see the interior of the object as well as hidden features that may not be visible from the outside.

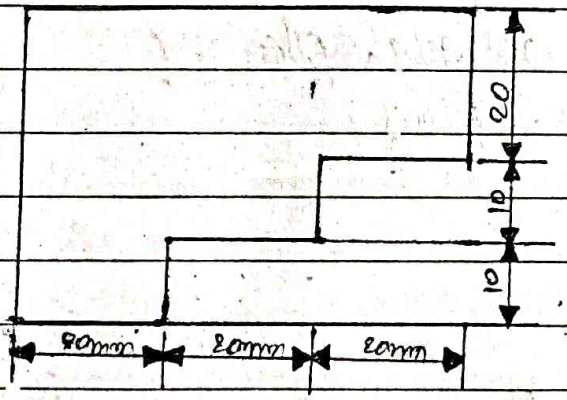
finals

Q48 * Define Trace of a line: The point of intersection of line with any plane, the point of intersection is called trace of a line.

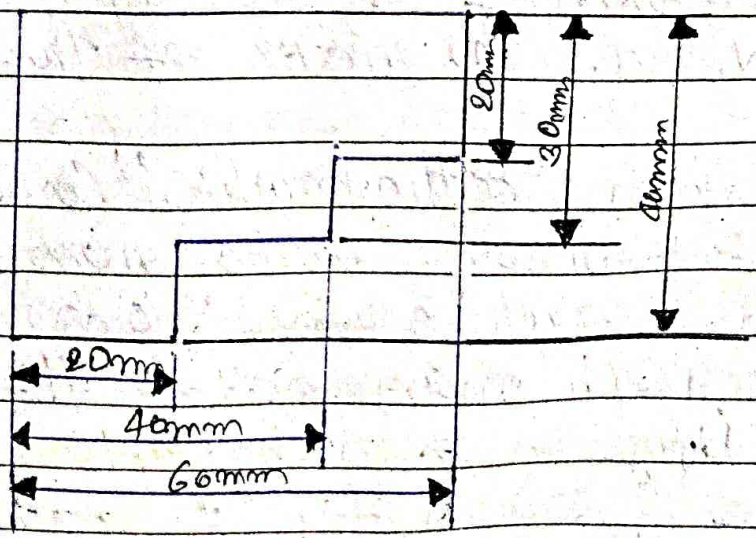
(4 d) (*) Methods of dimensioning OR Enlist methods of dimensioning with neat sketch of each.

(i) chain dimensioning
(ii) parallel dimensioning
(iii) combined dimensioning

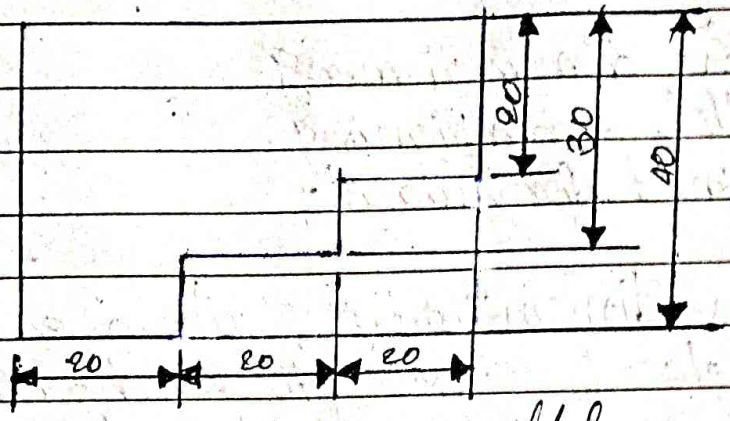
(i) chain dimensioning :- When each dimension is placed next to each-other without any gap between the dimensions.



(ii) parallel dimensioning :- When each dimension is placed parallel to each-other is called parallel dimensioning.



(iii) Combined dimensioning :- In combined dimensioning chain and parallel both dimensioning are used.



chain & parallel

(iv) what are oblique plane?

ans ⇒ An oblique plan

(v) (c)

What is orthographic projection and why they are named so?

ans)

An orthographic projection is a way of representing a 3D object by using several 2D views of the object.

The term "orthographic" comes from the greek words "ortho" means "straight" and "graph" means "to draw" Orthograph name reflects the fact that the lines in an orthographic projection are drawn straight perpendicular to the projection plane.

Q9 ★ Why the projections of an object not drawn in 2nd and 4th quadrants?

ans ⇒ because when we make projections of an object in 2nd and 4th quadrant so we have to rotate the HP 90° so whom we rotate the HP with 90° ang so the top and front views will be overlap and drowing ~~get~~ destroy so we donot make projections in 2nd and 4th quadrant..

Q9 ★ Name the various dimensioning techniques

ans ⇒ (i) Linear dimensions
(ii) Angular dimensions
(iii) Radial dimensions.
(iv) Geometric dimensions.

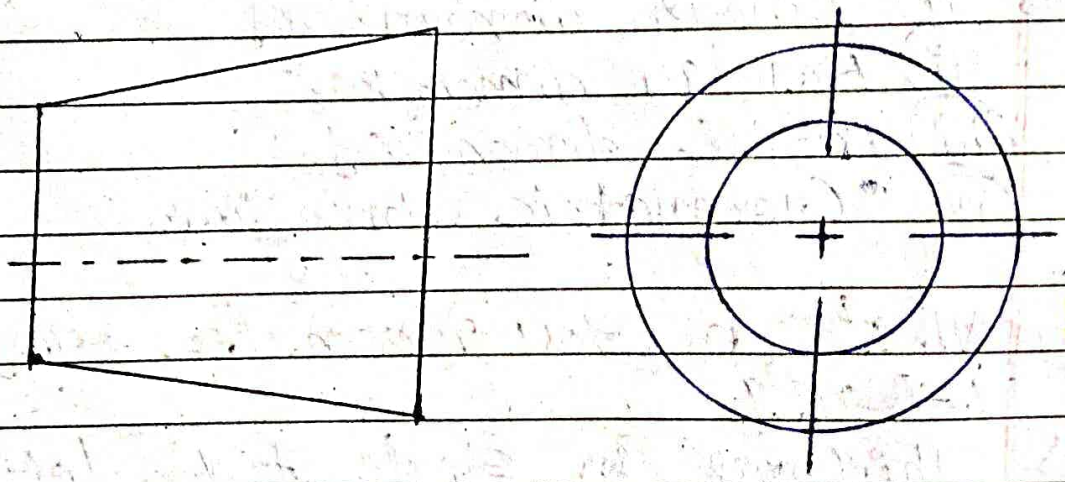
Q9 ★ What do you mean by single stroke letters?

ans ⇒ Thickness in single stroke letters is obtained by a single stroke of pencil.

→ Single stroke letters refer to letters that can be written with a single stroke of a pencil without lifting the writing instrument from the paper. It is also known as unjoined or monoline letters.

Ayu

* Draw the symbol to represent 1st angle projection?

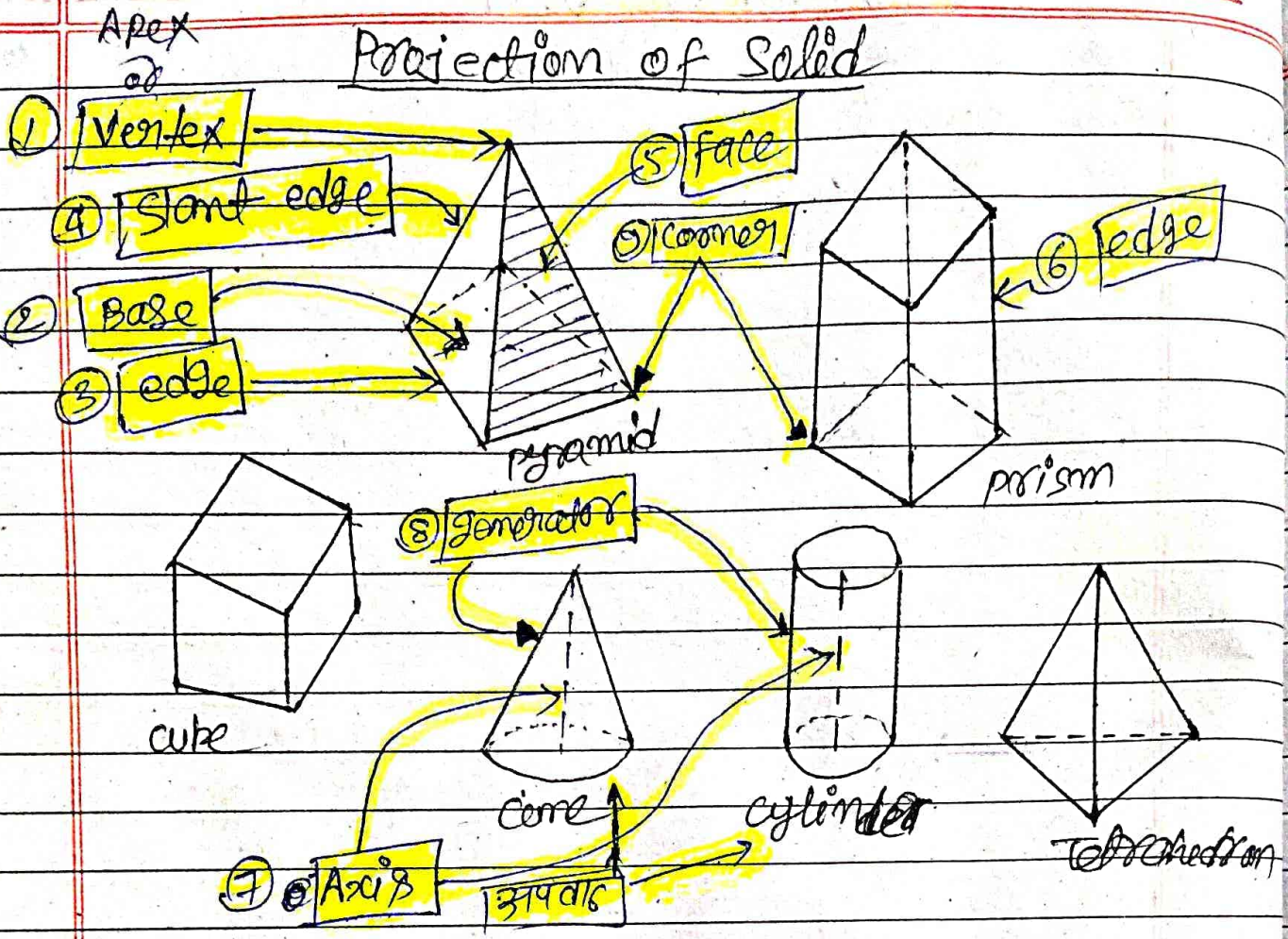


first angle projection symbol

* HT → The line in which the plane meets the HP is called the horizontal trace

* VT → The line in which the plane meets the VP is called VT.

Projection of Solid



* Right Solid → axis is ⊥ to base
* oblique Solid → axis is inclind to base
* regular Solid → symmetric about axis

* prism :- prism has rectangular or square faces and two base (Top & bottom) are polyhedra.

* pyramid :- faces are triangle + base is polyhedra (one base)

* Types of Solid :- (i) prism (ii) pyramid (iii) regular polyhedra Ex ⇒ cube (iv) Solids of revolution

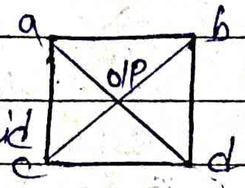
* projection of Solid में सबसे पहले draw करना होता है।

(i) True shape of base
(ii) T.S of Solid (height Show करना है।)
(iii) [redacted] Tilted Solid (Solid को inclind करना है)
(iv) TV/FV
(v) ATP → Auxiliary inclind plane use करके और inclind करना है

* कौन सा shap कब कैसे बनाना है;

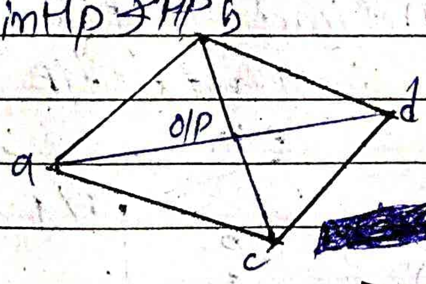
(i) square pyramid has edge of base in HP.
face in HP or ⊥ HP
Slant face ⊥ to HP or in HP or in VP

[redacted] pyramid



(ii) " " " Corner of base in HP.
Slant edge in Hp ⊥ HP

Right [redacted] side में corner होना ही चाहिए

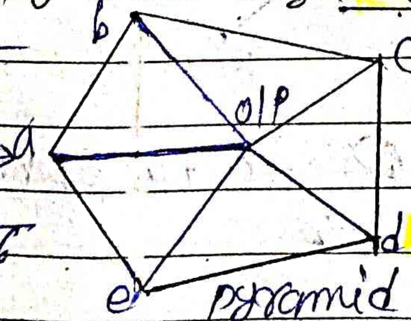


[redacted] pyramid

(iii) Pentagonal pyramid has edge of base in HP.

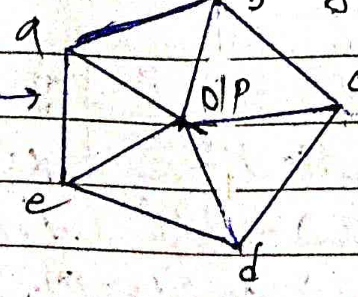
right side में edge होना चाहिए इसलिए अपवाद नही है

face in HP or ⊥ HP
[redacted] Slant face in HP or VP
[redacted]
Same for hexagonal



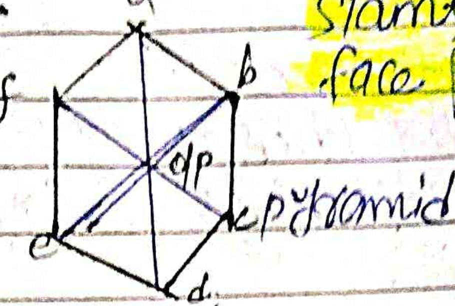
pyramid

(iv) Pentagonal pyramid has corner of base in HP.

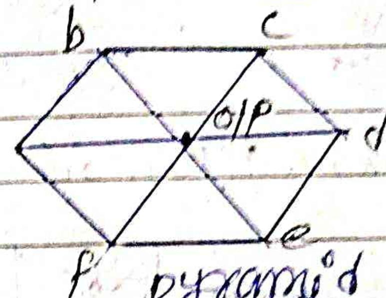


pyramid

(v) Hexagonal pyramid has one of it's [edge] of base in HP.
Slant face in HP [or VP]
face in/HP or ⊥ HP

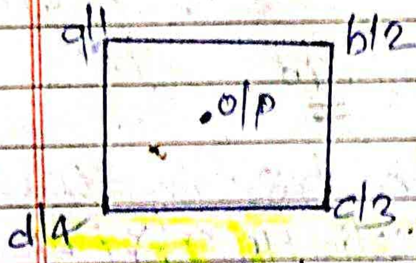


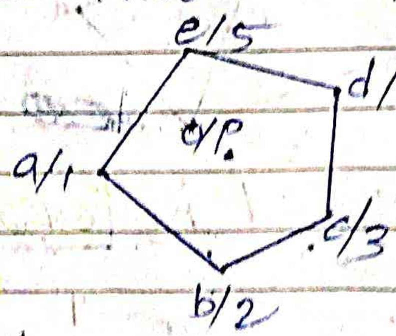
(vi) Hexagonal Pyramid has one of it's [Corner] of base in HP

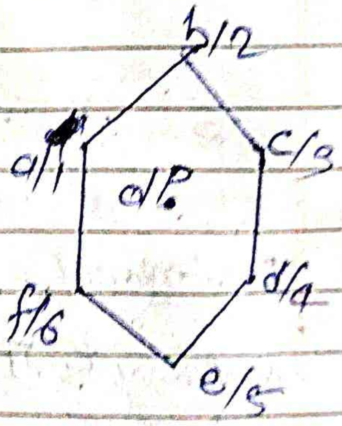


[Same for cube]

* edge of base in HP, ~~Corner of base in HP~~
vertical face inclined to HP
rectangular face inclined to HP







slant edge
* Vertical edge ⊥ to HP or VP
Corner of base in HP

[Same for tetrahedron]

* Side in HP, face in HP
edge in HP, face ⊥ to HP
corner in HP, axis ⊥ to HP
surface ⊥ to HP, base ⊥ to HP
generator in HP

तो true shap
xy line के नीचे
draw करें
और VP के लिए xy
के ऊपर

* line join करने का rules

(1) outer points dark
(2) Draw the base (ऊपर से देखो Base दिख रही तो dark line नहीं तो dot line)
(3) Draw the edges (dark line को dot line से काटना और dot line को dark line से काटना)
(4) Draw the axis (axis line, dot line से करना)

(3) Draw the edge में अगर कोनी point पर दो dark line है, तो third line भी dark जाएगी या दो dot line होंगी तीसरा line भी dot ही जाएगी ये सिर्फ internal projection में apply होगी

Note → अगर questions में simple question दिया हो और बोले की draw the projections तो सिर्फ से ही front view, top view, side view बनाना है अगर second stage या third stage की बात न की गई हो, तो।

PYQ Distinguish between frustum of a solid and truncated of a solid?

	frustum solid	truncated solid
(i)	When solid object such as cone or pyramid is sliced parallel to its base is called frustum solid	When solid object such as cone or pyramid is cutting off a portion of a solid is called truncated solid.
(ii)	frustum has two bases.	truncated has only one ba
(iii)	It has two flat surface original solid had also flat surface.	It has at least one flat surface, original solid had a curved surface.
(iv)	It's sliced parallel to it's base.	It's cutting portion typically parallel to the base

PYQ Differentiate between the prism and pyramid.

	prism	pyramid
(i)	It have two base	It has one base.
(ii)	its sides are rectangular in shape	Its sides are triangle in shape.
(iii)	It does not has an apex.	It has an apex.
(iv)	Sides of prism are perpendicular to the base	Sides of pyramid are inclind to the base.

PYQ Give applications of development of solids?

ans ⇒ (i) To create 3D models of objects.
(ii) buildings 3D models.
(iii) machines 3D models.
(iv) medicine field 3D models.
(v) Construction of storage vessels, chemical vessels, boilers.

PYQ what are oblique Planes?

ans ⇒ The plane which are inclined to both the reference planes HP and VP are called oblique planes.

PYQ Classify various types of polyhedra.

ans ⇒ Polyhedra
(1) regular polyhedron
(i) Tetrahedron
(ii) Cube
(iii) octahedron
(iv) Dodecahedron
(v) Icosahedron
(2) irregular polyhedra
(i) Truncated tetrahedron
(ii) Rhombic dodecahedron
(iii) Truncated icosahedron
(iv) Bipyramid
(v) Johnson solids

PYQ which types of solid surfaces are developed by radial line method?

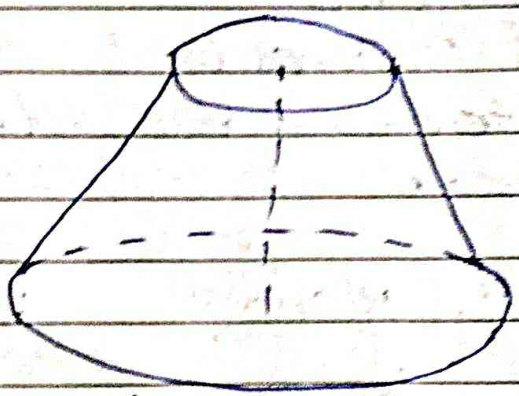
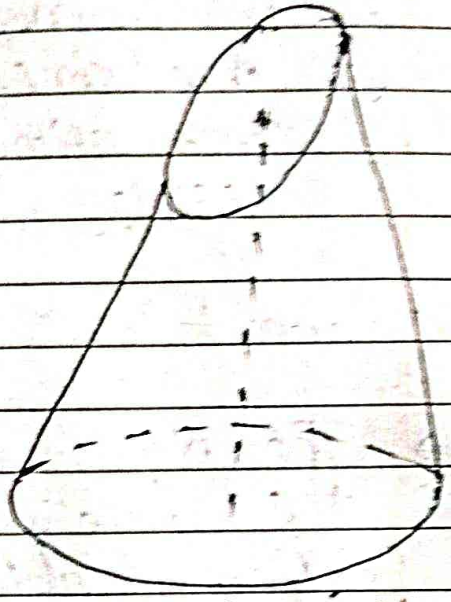
ans ⇒ Pyramids and Cones

Ans ⇒ Parallel line method
Prisms cylinders

(Q4) Neat sketch of frustum and truncated solid

Or

Sol :

frustum solid	truncated solid
	
parallel cutting	inclined cutting

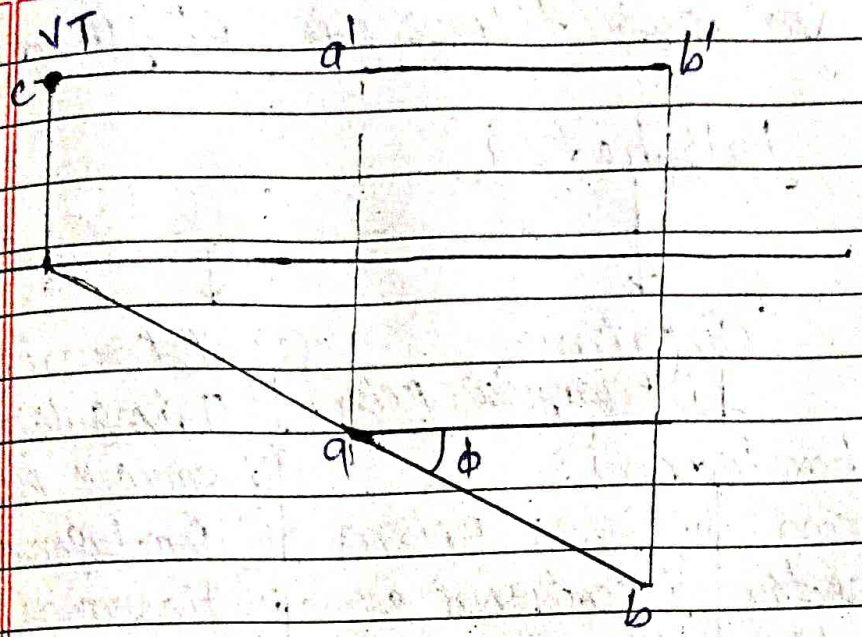
(Q5) Give relation between isometric and true length.

ans ⇒ The relationship between isometric length and true length is that isometric drawing are approximately 80% size of true length. This is because isometric length is the ratio of 2/3 of true length.

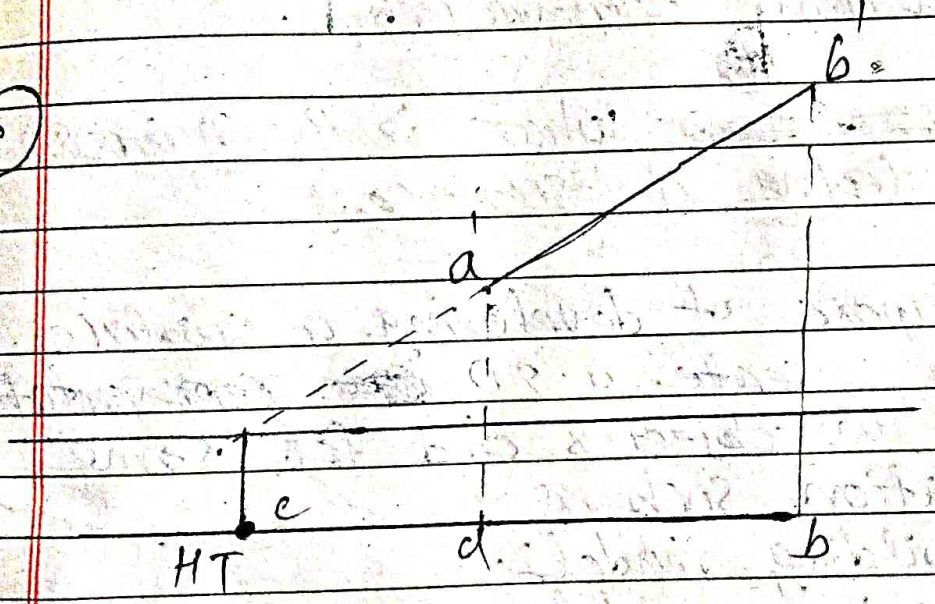
(Q6) (i) Draw the trace of a line when it is kept parallel to HP and inclined to VP.

(ii) Draw the trace of a line when it is kept parall to VP and inclined to HP.

(i)



(ii)



PYQ What are oblique solids?

ans⇒ Oblique solids are three dimensional object that oblect has a slanted or tilted face and its axis inclined to the base.

PYQ What do you mean by development of surfaces

ans⇒ development of surfaces is the process of unfolding a 3D object onto a flat surface.
2D

Q9) Classify various types of polyhedra?

ans ⇒ Polyhedra

- (a) Regular Polyhedra
  - (i) Cube or hexahedron
  - (ii) Octahedron
  - (iii) Dodecahedron
  - (iv) Icosahedron
- (b) Prisms
  - (i) Triangular prism
  - (ii) Square prism
  - (iii) Pentagonal prism
  - (iv) Hexagonal prism
- (c) Pyramids
  - (i) Triangular pyram
  - (ii) square pyramid
  - (iii) Pentagonal pyra
  - (iv) Hexgonal pyram

Q10) ~~Describe the term~~ what is the purpose of developing a surface?

ans ⇒ The purpose of developing a surfaces is to create a 2D representation of a 3D object's and for some application such as

- building models.
- machine models.
- Construction of storage vessels.
- manufacturing.
- design.

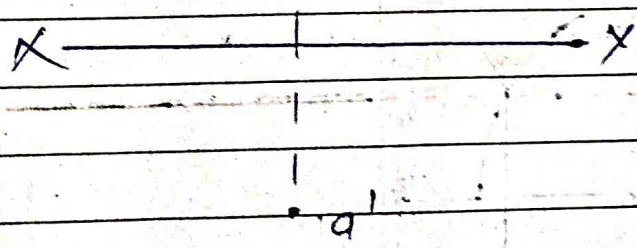
PYQ Explain the differences between Cylinder and Cone.

	Cylinder	Cone
(i)	It have two base.	It has one base.
(ii)	It does not have apex.	It has apex.
(iii)	It's face is known as generator.	It's face is known as generator
(iv)	The cross-sectional area of a cylinder is constant.	The cross-sectional area of a cone is varies.

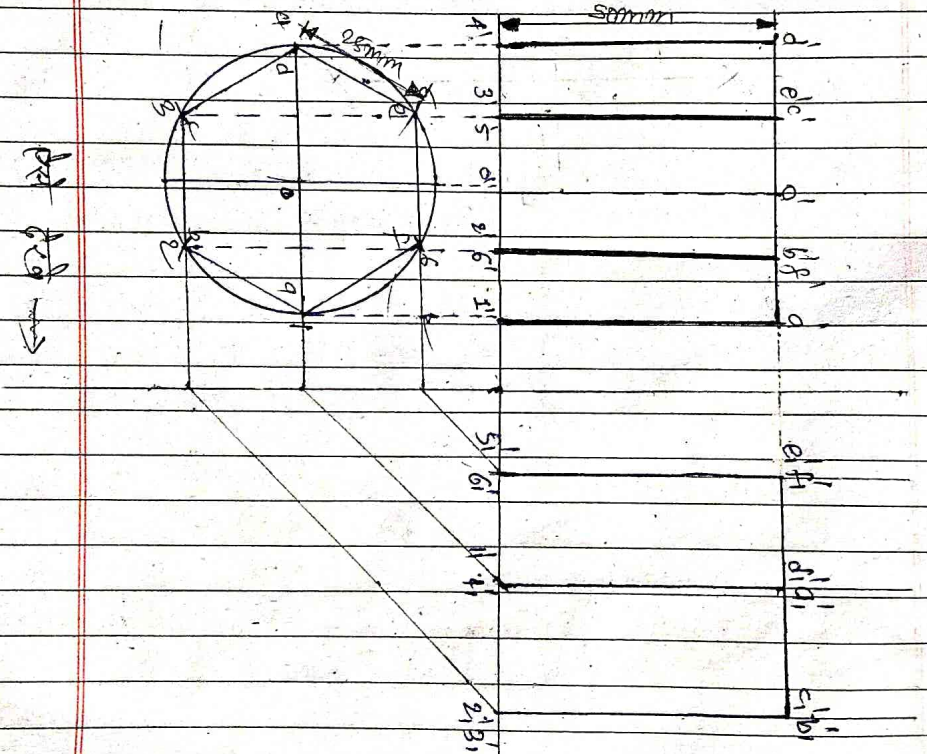
Note : elevation view → front view
plan view → Top view

(v) [illegible]

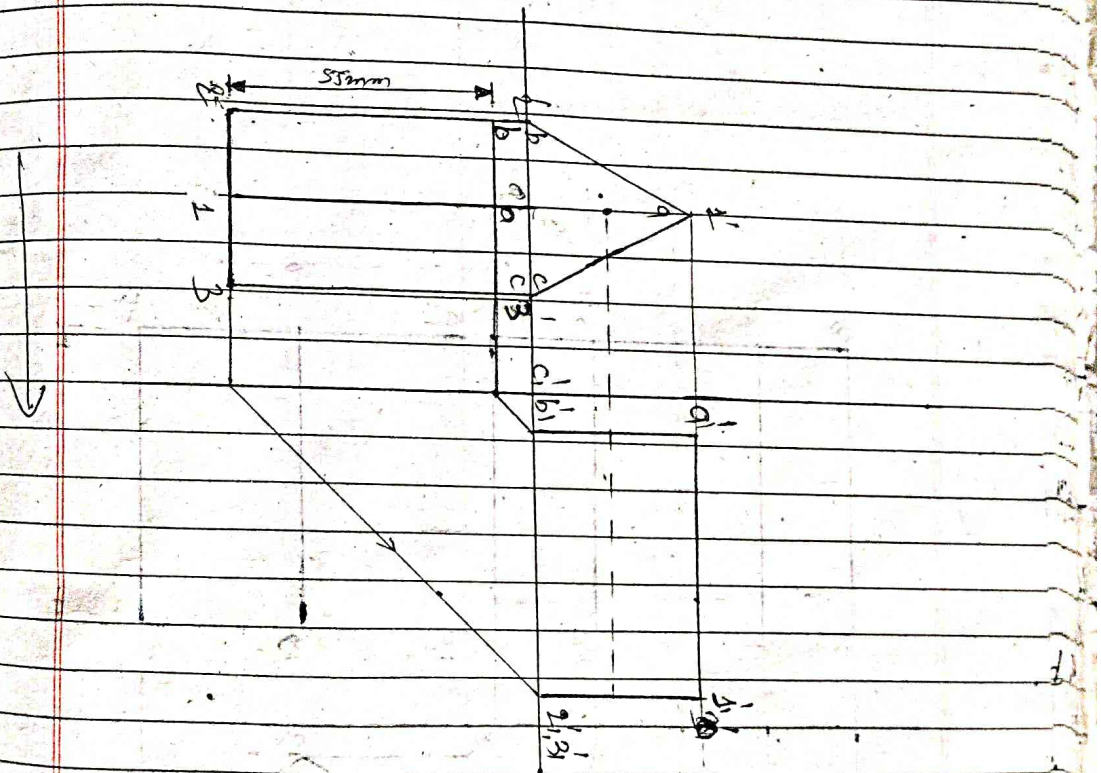
Ex(1) A point 20 mm below the HP and 45 mm behind the VP. Draw its projections.



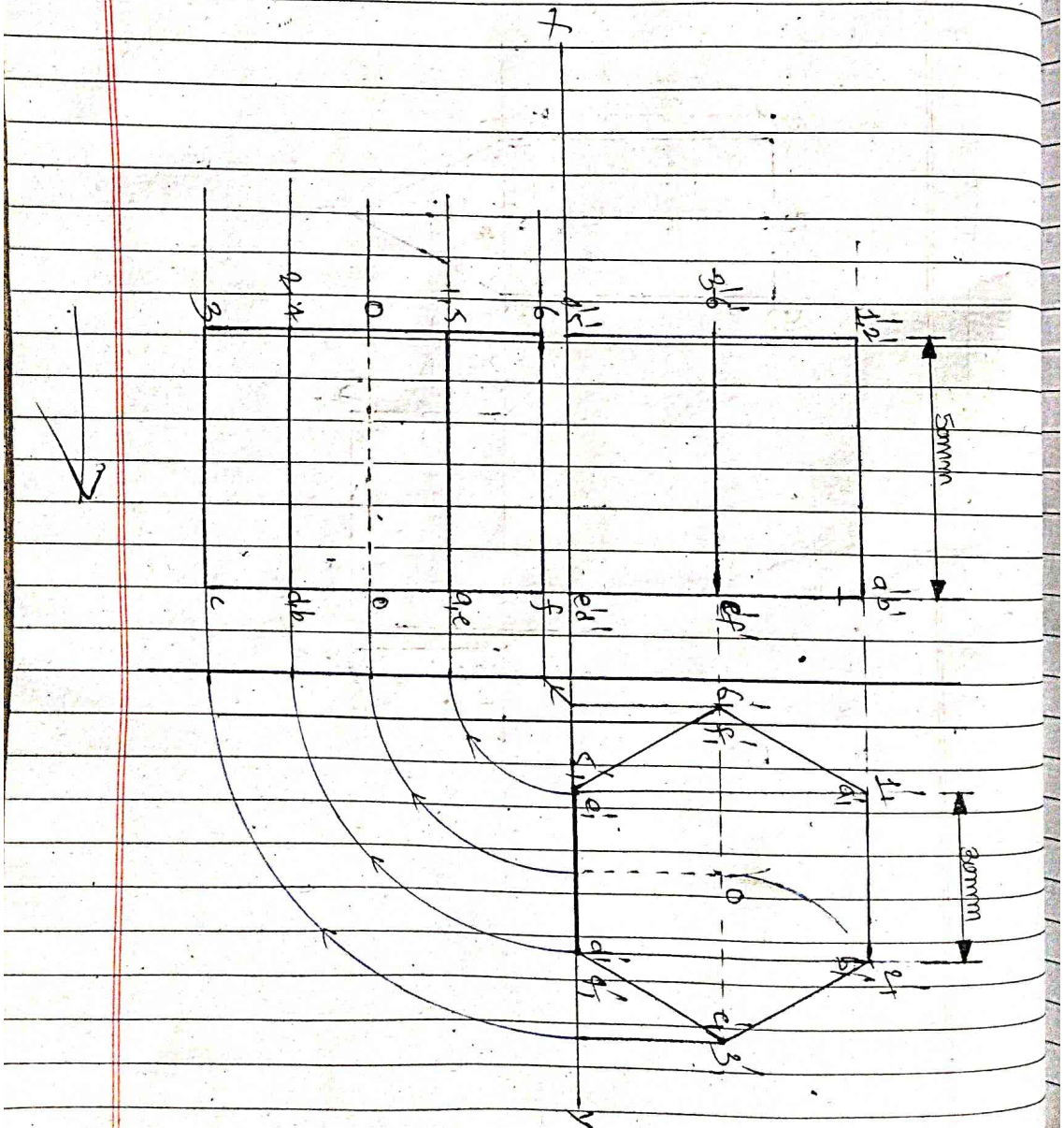
EX8 A right regular hexagonal prism, side of base 25 mm and axis 50 mm long, having one of its base edges parallel to the VP with its axis perpendicular to the HP. Draw its projection of front, top and side views.



Prp A triangular prism side of base 30 mm and axis 55 mm long. lies on one of its rectangular face in Hp, with its axis perpendicular to VP. Draw it three view.

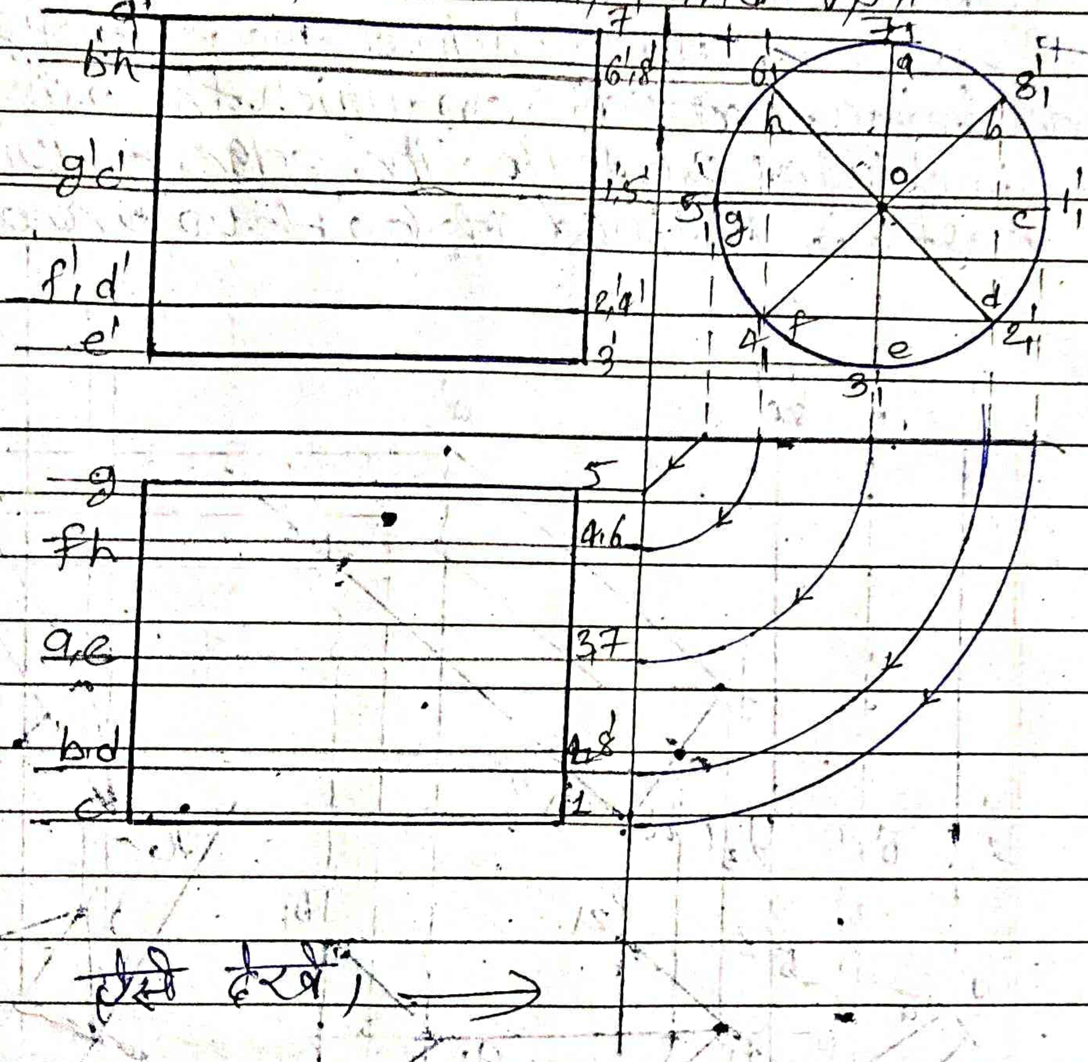


Pro A right regular hexagonal prism, edge of base 30 mm and length 50mm, lies on one of its rectangular faces on Hp, such that its axis is parallel to both Hp and Vp. Draw its projections.

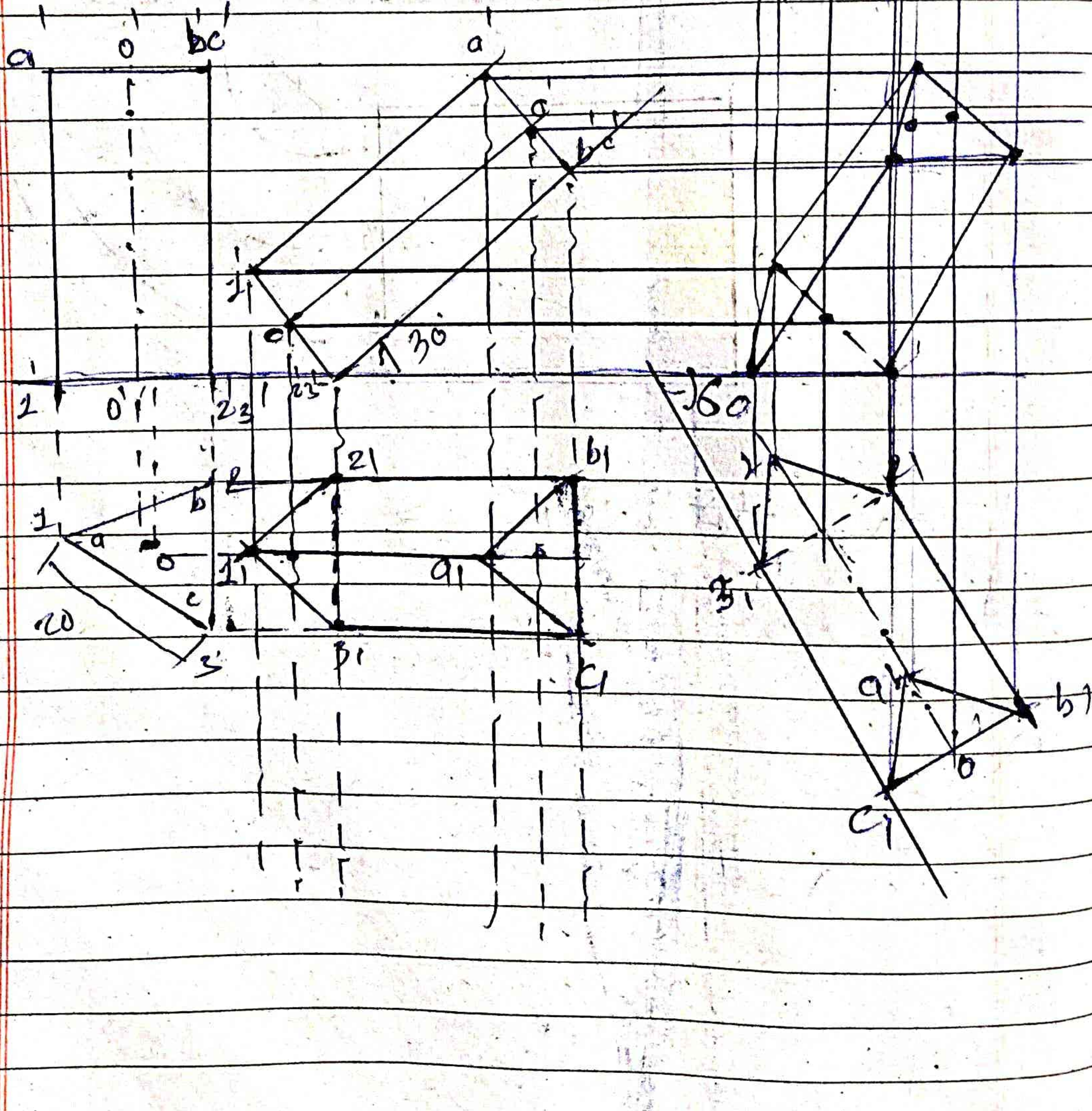


Exq Draw the side view of a cylinder if its axis is parallel to both HP and VP?

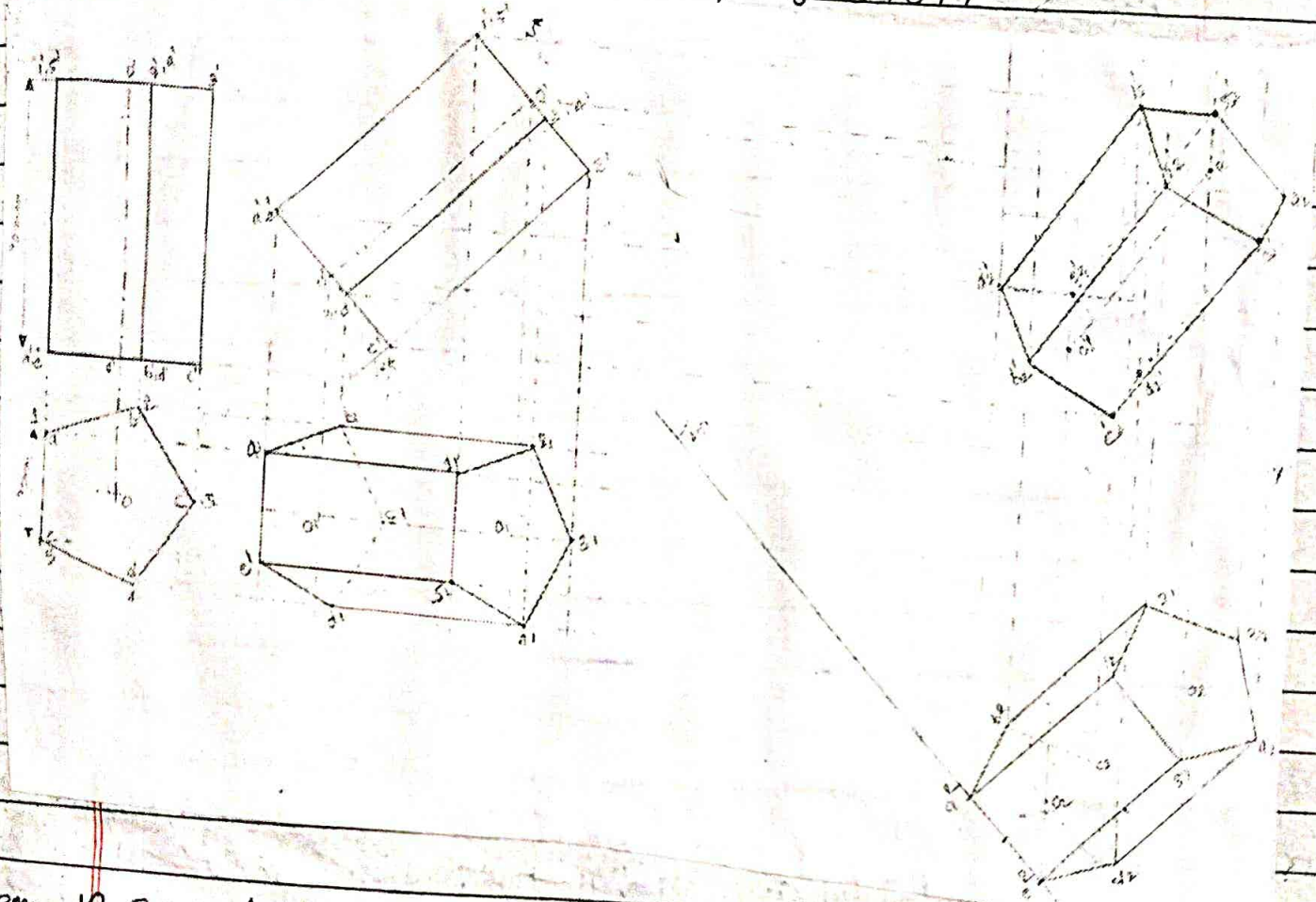
ans



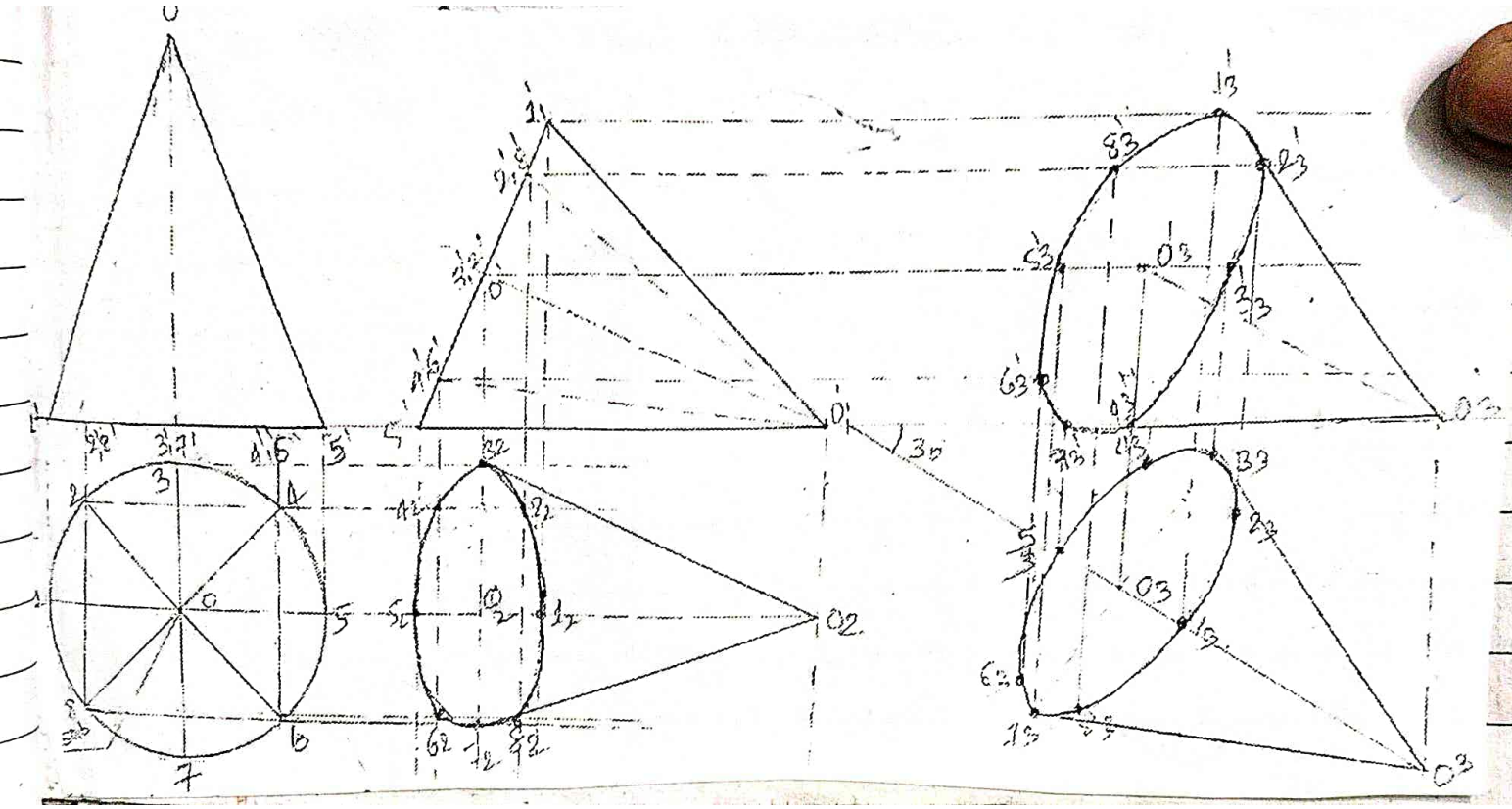
P.X8 An equilateral triangular prism 20mm side of base and 50mm long rests with one of its base edge on Hp such that the rectangular face containing that edge on which the prism rests is inclined at 30° to Hp. The edge on which prism rests is inclined at 60° to vp. Draw its projection.



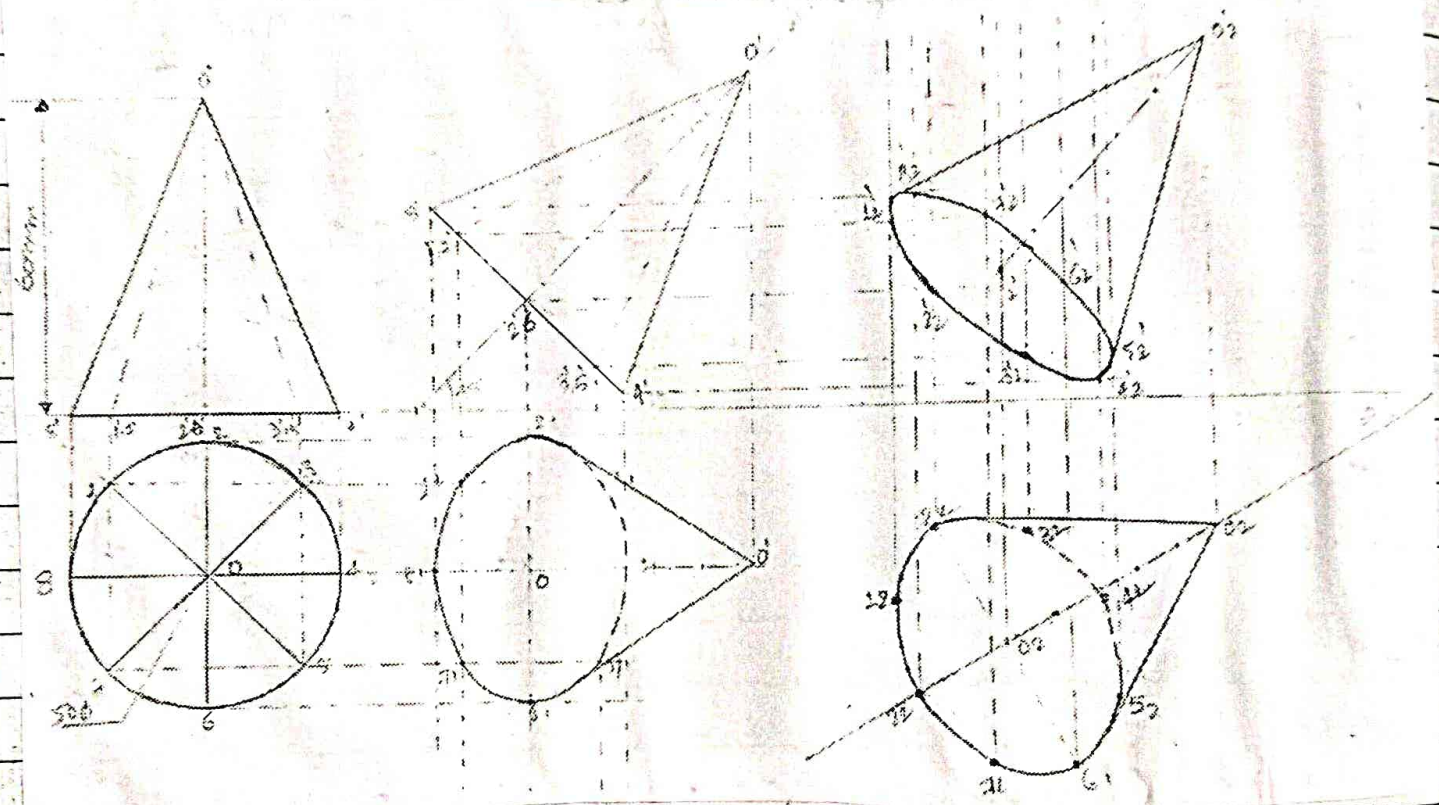
problem-12.50 → A right regular pentagonal prism, side of base 30mm and height 70mm, rests on one of base opposite to the corner is inclind at 45° to the VP. Draw its projection.



oblem-12.52 → A right circular cone diameter of base 50mm and height 60 mm lies on one of its elements in HP such the element is inclind to the VP at 30°, Draw its projection.

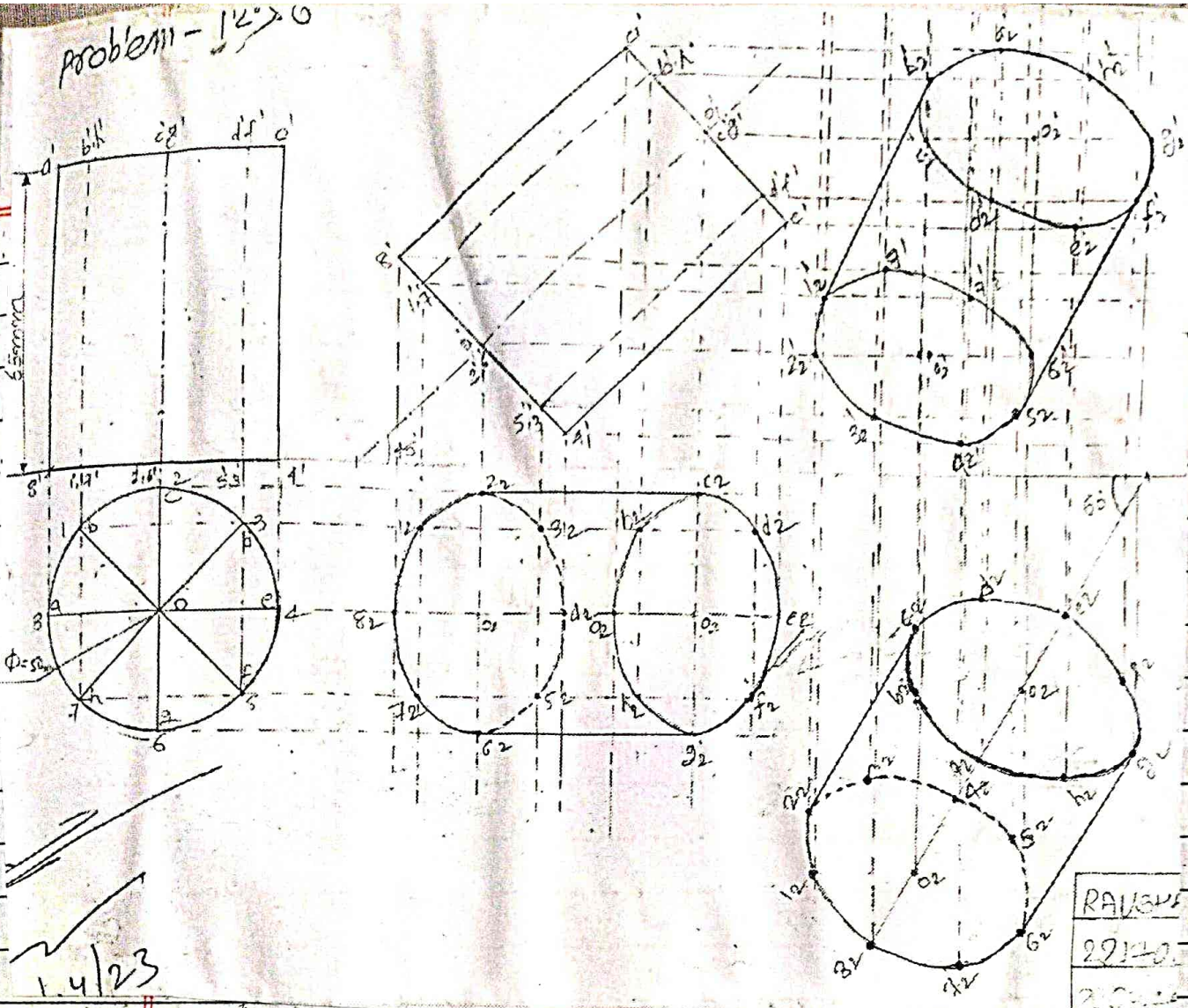

O
1
2
3
4
5
6
7
O1
O2
O3

problem :- Q.54 → A right circular cone, diameter of base 50 mm and height 60 mm rests on its base rim on Hp with its axis inclined at 45° to it such that top view of the axis inclind at 30° to Vp.

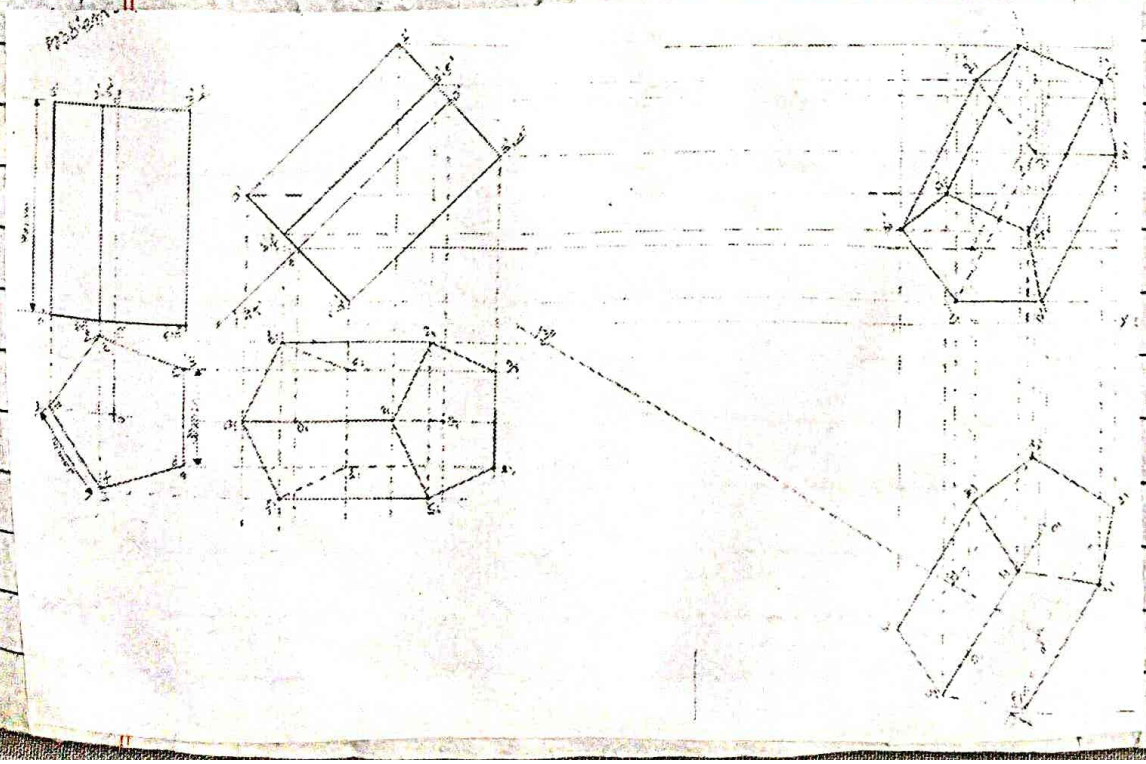


problem → Q12.56 → A right circular cylinder, diameter of base 50 mm and height 65 mm rests on Hp on its base rim such that its axis is inclind at 45° to the Hp and top view of the axis is inclind at 60° to the Vp. Draw its projection.

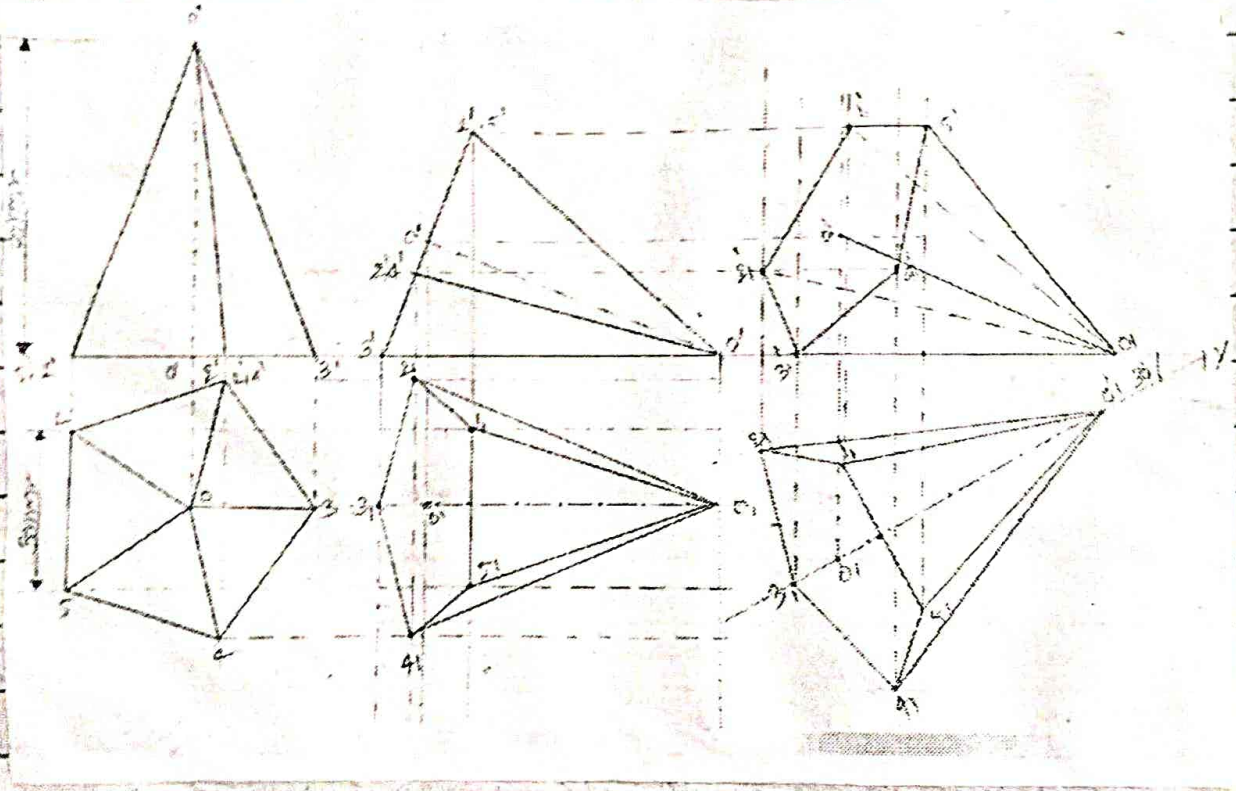
problem 12.57 →



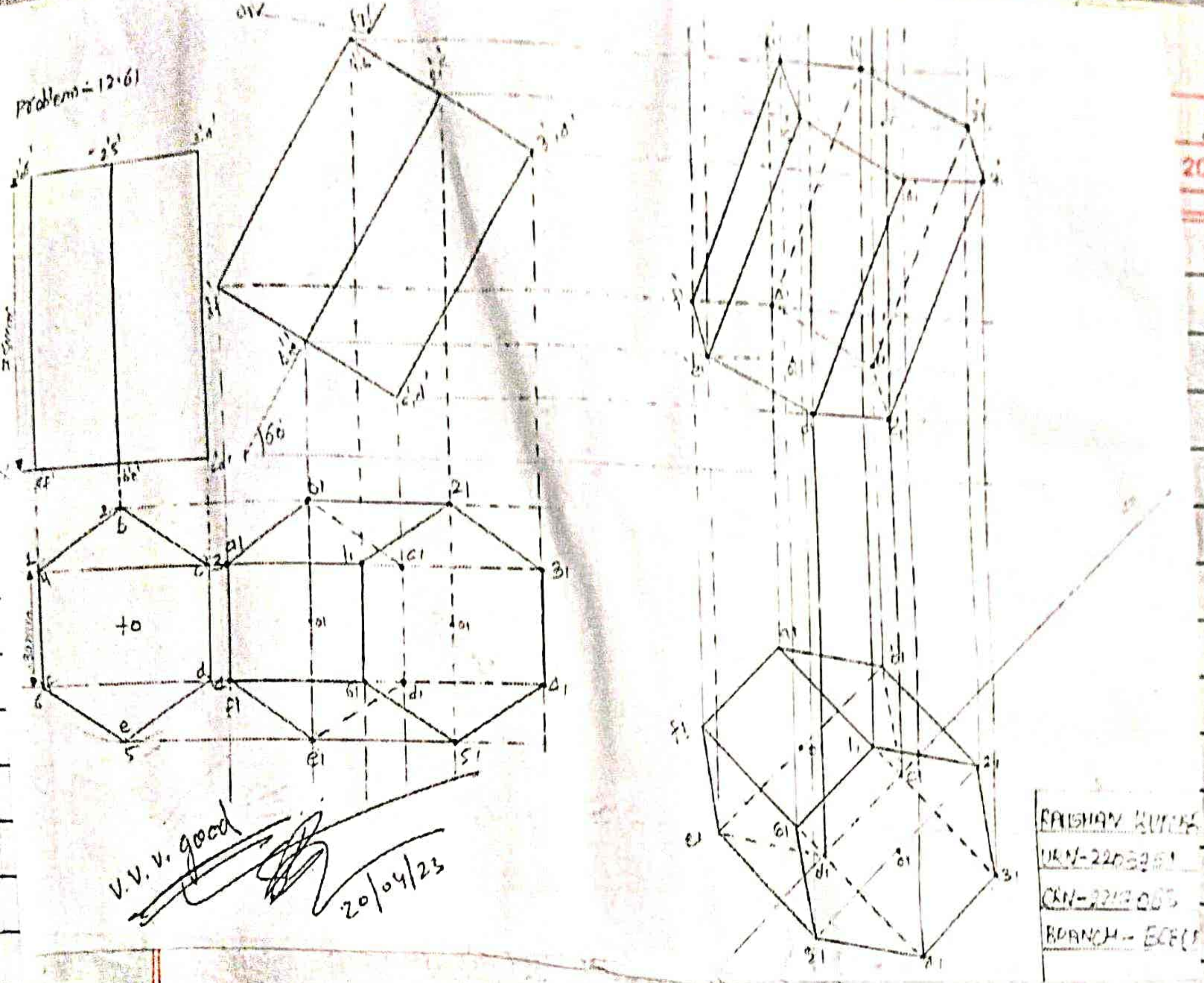
problem 12.58 → A right regular pentagonal prism 70mm height with each side of the base 30mm is resting on one of the base edges on the horizontal plane and inclined at 30° to HP and the face containing that edge is inclined at 45° to the HP. Draw the projections of the pentagonal prism.



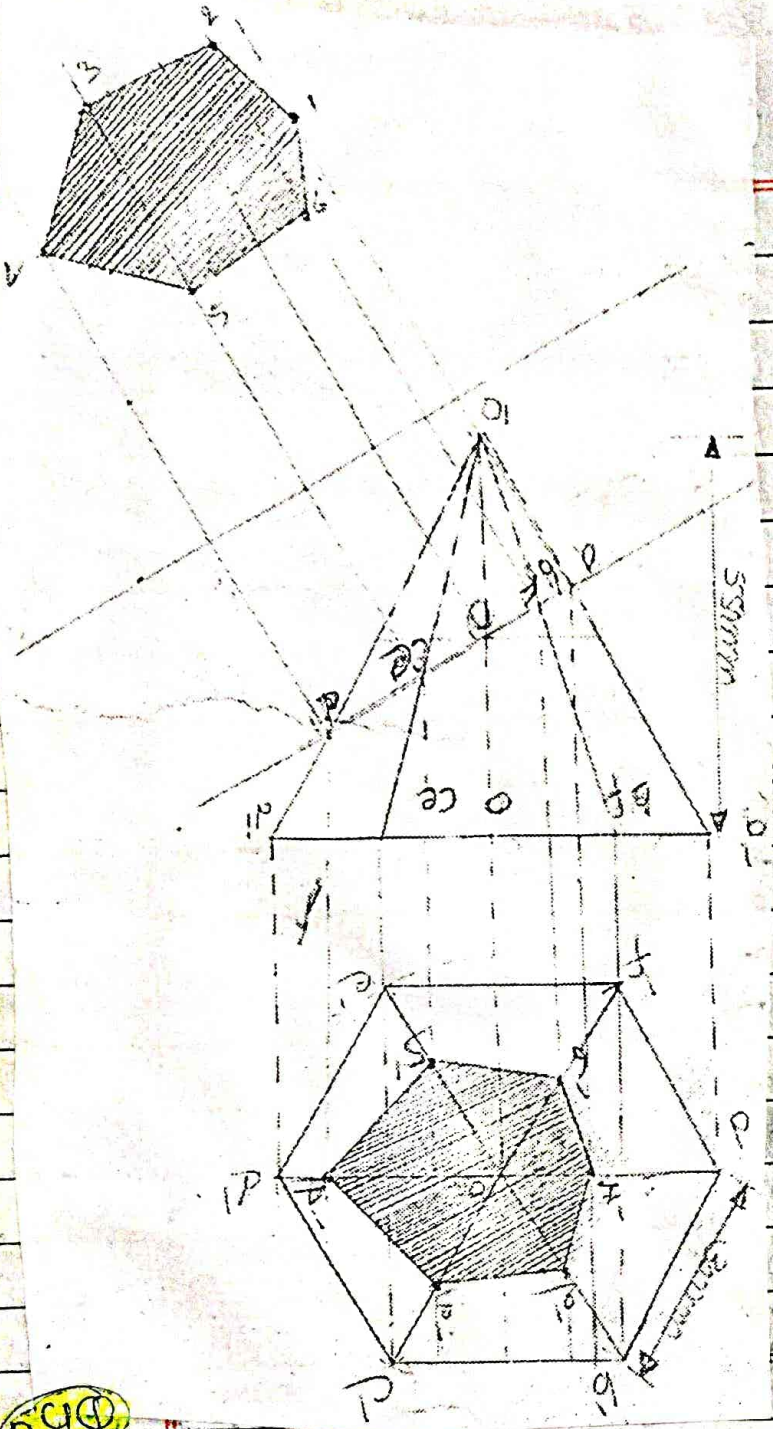
problem - 12.59 → A right regular pentagonal pyramid of base 30 mm sides and height 60 mm rests on one of its slant edges on HP. The plan of the axis is inclined at 30° to VP. Its apex is nearer to VP. Draw the projections of the pyramid.

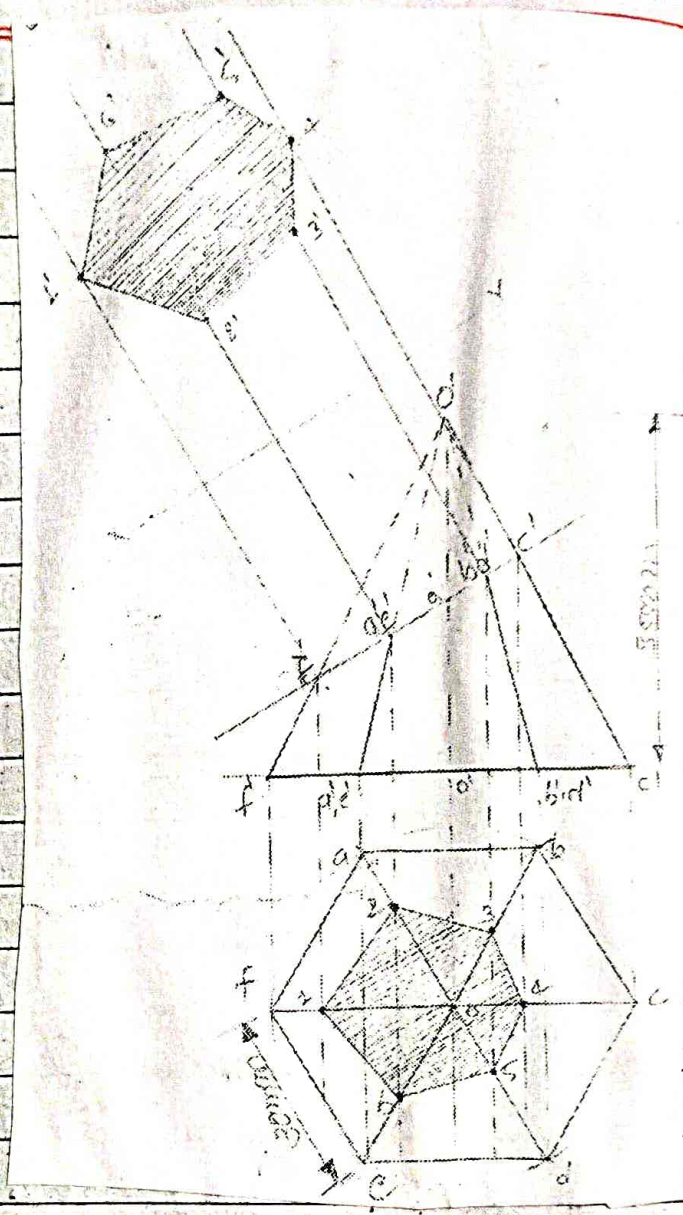


problem - 12.61 → A hexagonal prism, base 30 mm side and axis 75 mm long, has an edge of the base parallel to the HP and inclined at 45° to the VP. Its axis makes an angle of 60° with the HP. Draw the projections.

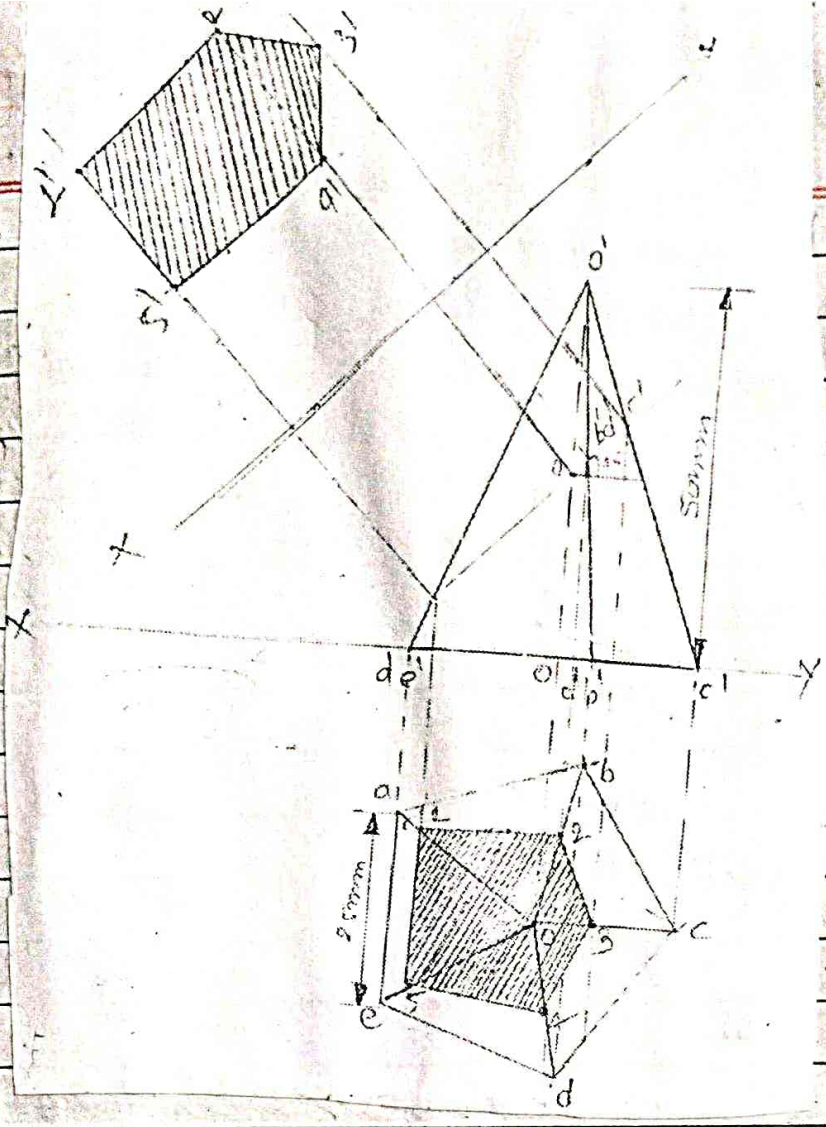


problem-14 → A right regular hexagonal pyramid, edge of base 25 mm and height 55 mm, rests on its base: ① on ground plane ② on Hp with one of its base edges parallel to vp. A section plane perpendicular to vp and inclined to Hp at 30° cuts the pyramid and passes through the centre of its axis. Draw its front view and sectional top view.

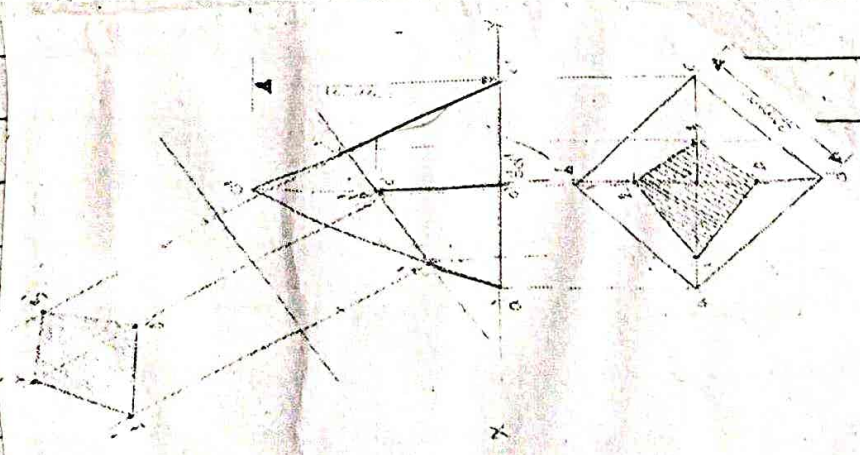




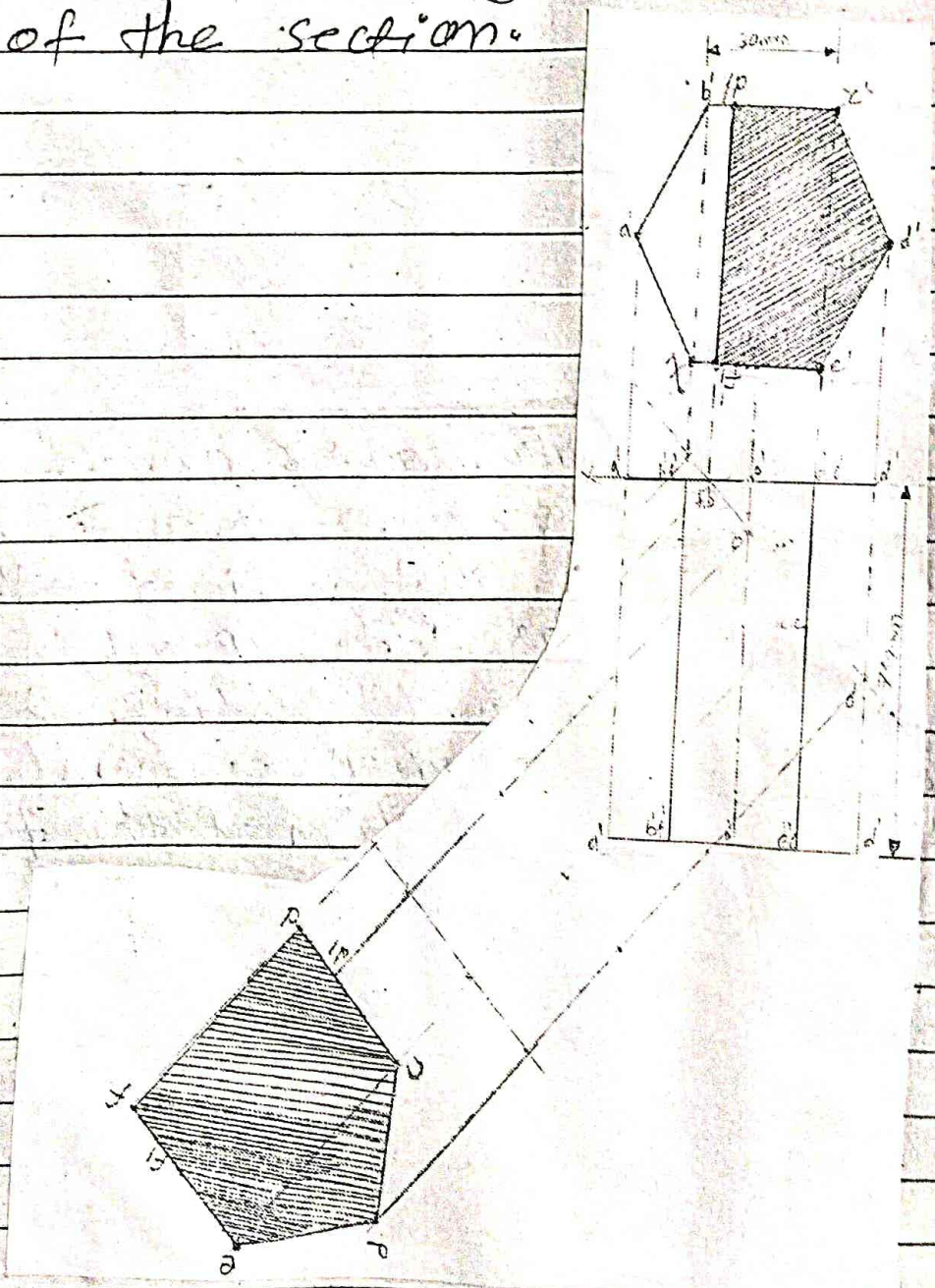
Problem – 15 → A pentagonal pyramid side of base 25mm and height 50 mm, rests on its base on Hp with one of its base edges perpendicular to VP. An auxiliary inclined plan (AIP), inclined to Hp at 45° cuts the pyramid, bisecting its axis. Draw its front view, sectional top view and true shape of the section.



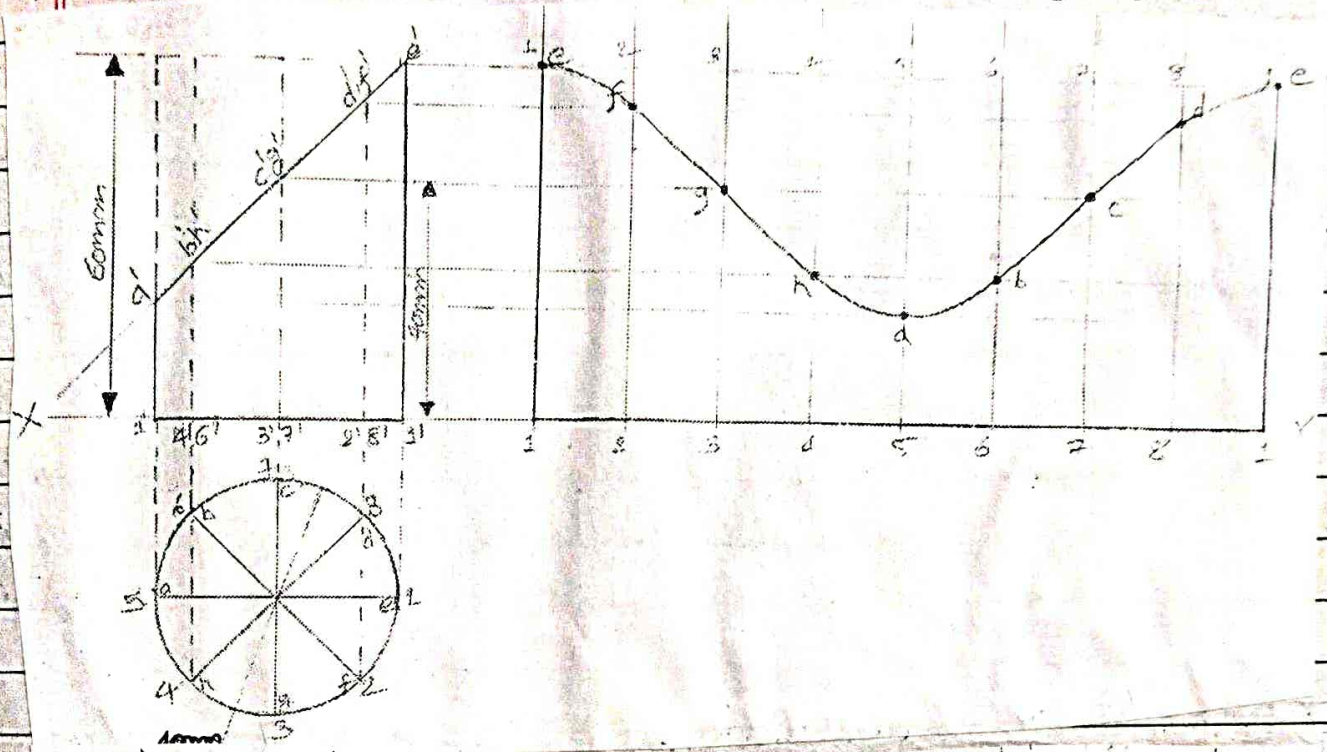
problem →19→ A right regular square pyramid edge of base 35 mm and height 50mm rests on its base on HP with its base edges equally inclined to VP. A section plane perpendicular to the VP and inclined to the HP at 32°, cuts the pyramid bisecting its axis. Draw the front view, sectional top view, sectional left side view and true shape of section of the truncated pyramid.



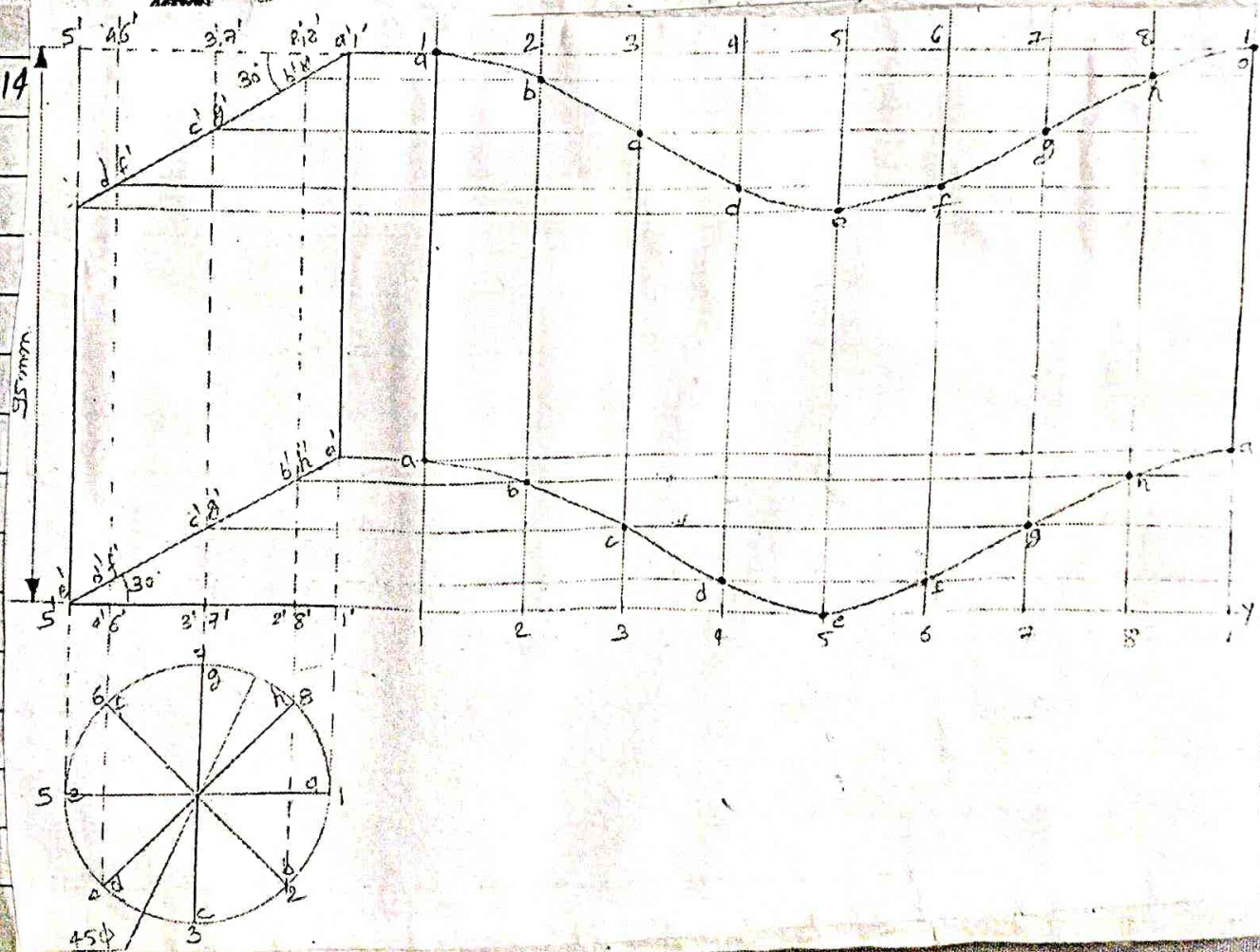
problem-20 → A right regular hexagonal prism, edge of base 30mm and height 75mm, is resting on its base on auxiliary horizontal plane (ground plane) such that one of its base edges is parallel to VP. A cutting plane perpendicular to the VP and inclined to HP at 45° meets its axis at a distance of 10mm from its top end. Draw its front view, sectional top view, sectional right side view and true shape of the section.



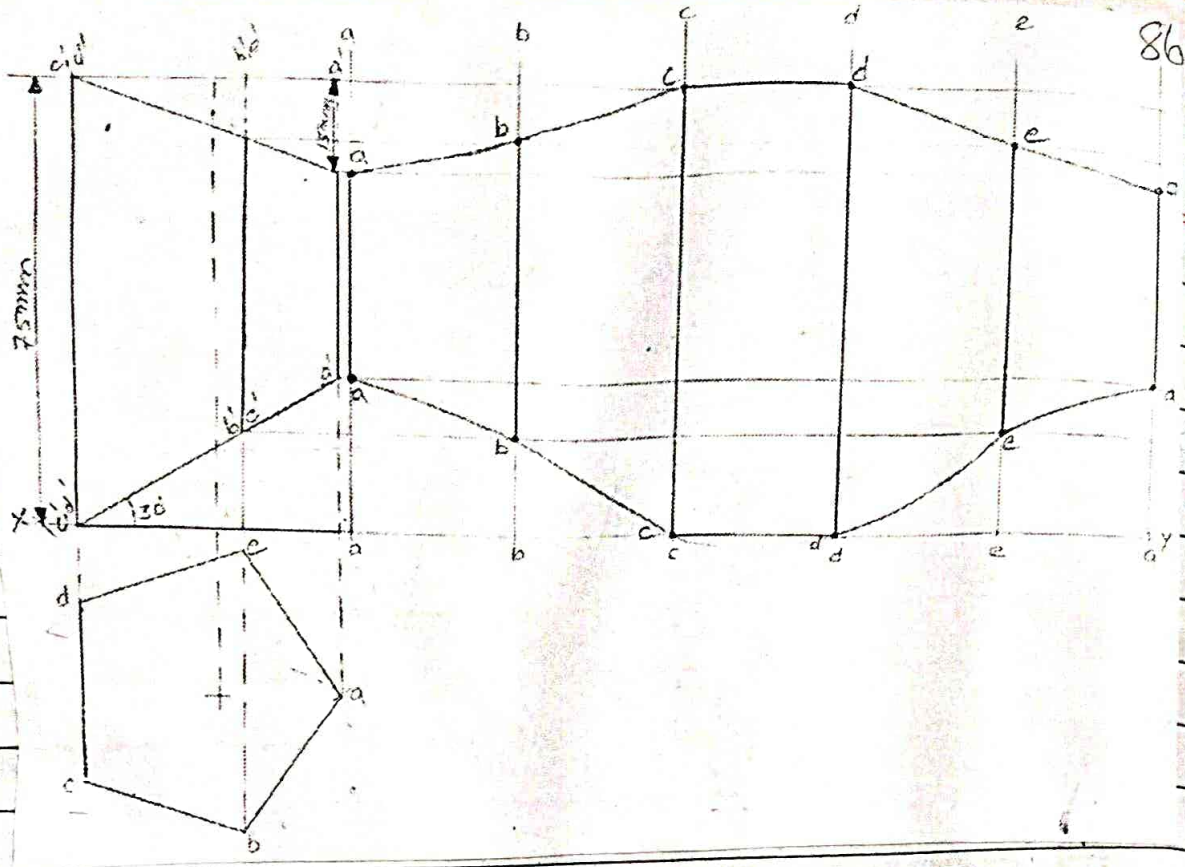
problem → 14.12 → A cylinder of base 40mm and height 60 is cut by a section plane which makes 45° with the axis at a distance of 40mm from lower base. Draw the development for the lower part of the cylinder.



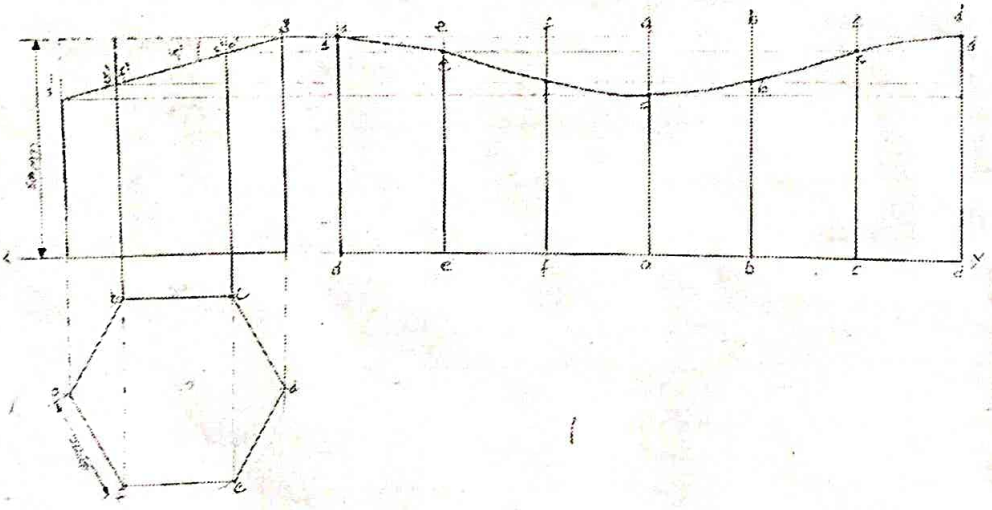
problem-14
14.13



problem 14.2

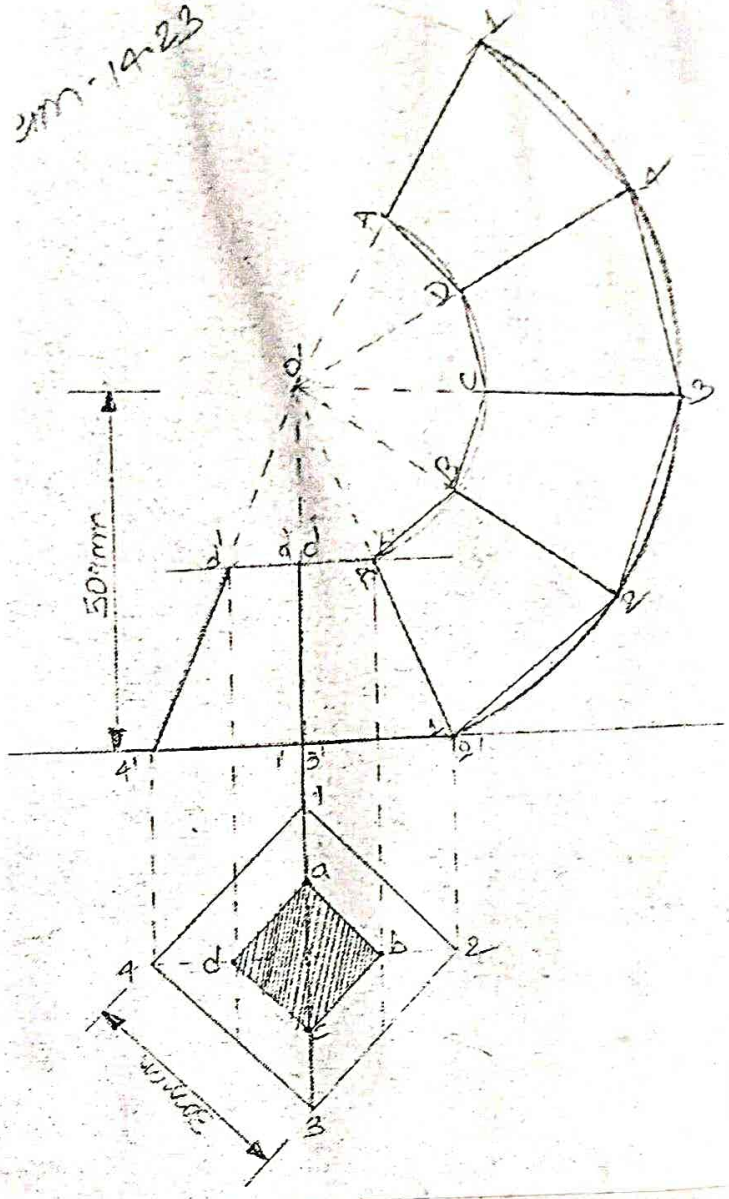


problem - 14.3 → A right regular hexagonal prism, side of base 30mm and height 60mm, is truncated at the top as ③ Develop the lateral surface of the remaining prism.

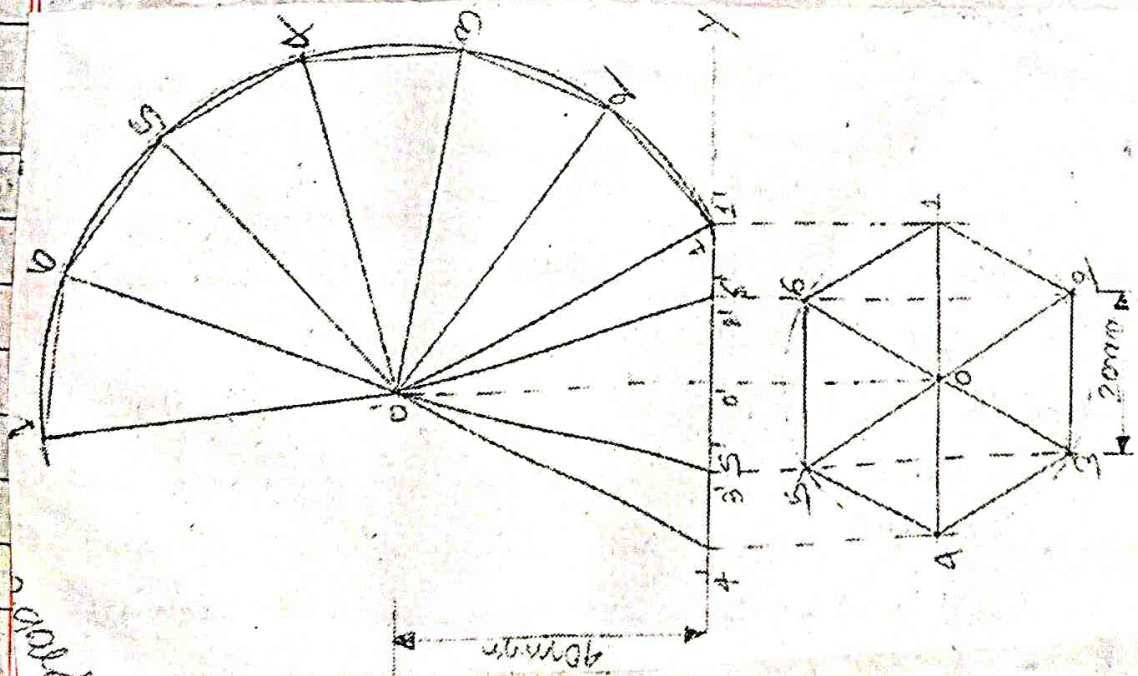


problem - 14.23 → A square pyramid edge of base 30mm and height 50mm rests on its base in HP such that all of its base edges are equally inclined to VP. A section plane parallel the HP cuts the pyramid bisecting its axis. Draw its front view, section top view and develop the lateral the ~~lateral~~ surface of the pyramid.

Eg. 14.23



Problem - 14.24 → A right regular hexagonal pyramid edge of 20mm and height 40mm, rests on its base in HP such that one of its base edge parallel to the VP draw its projections and develop its lateral surf



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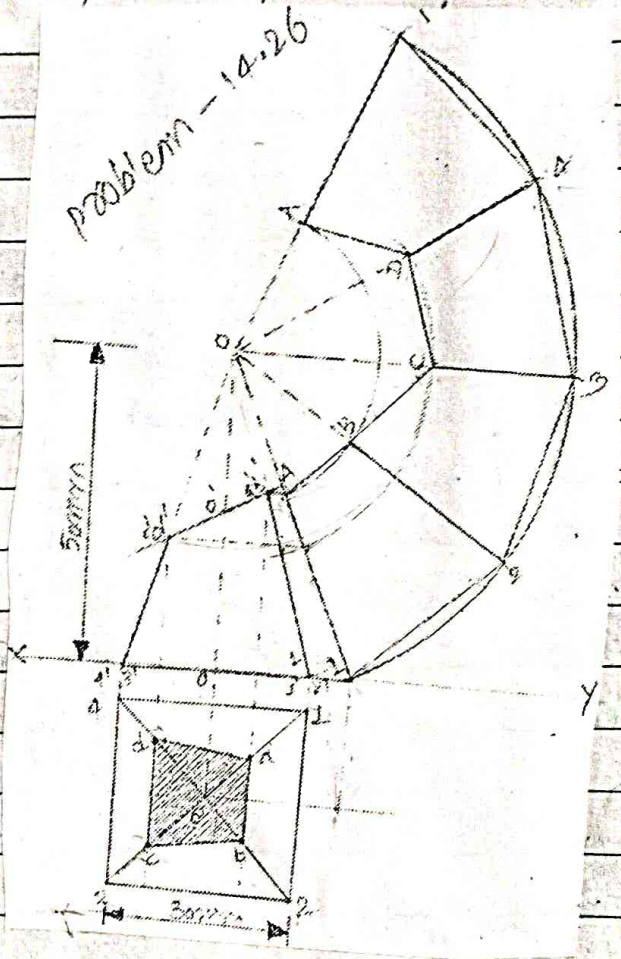
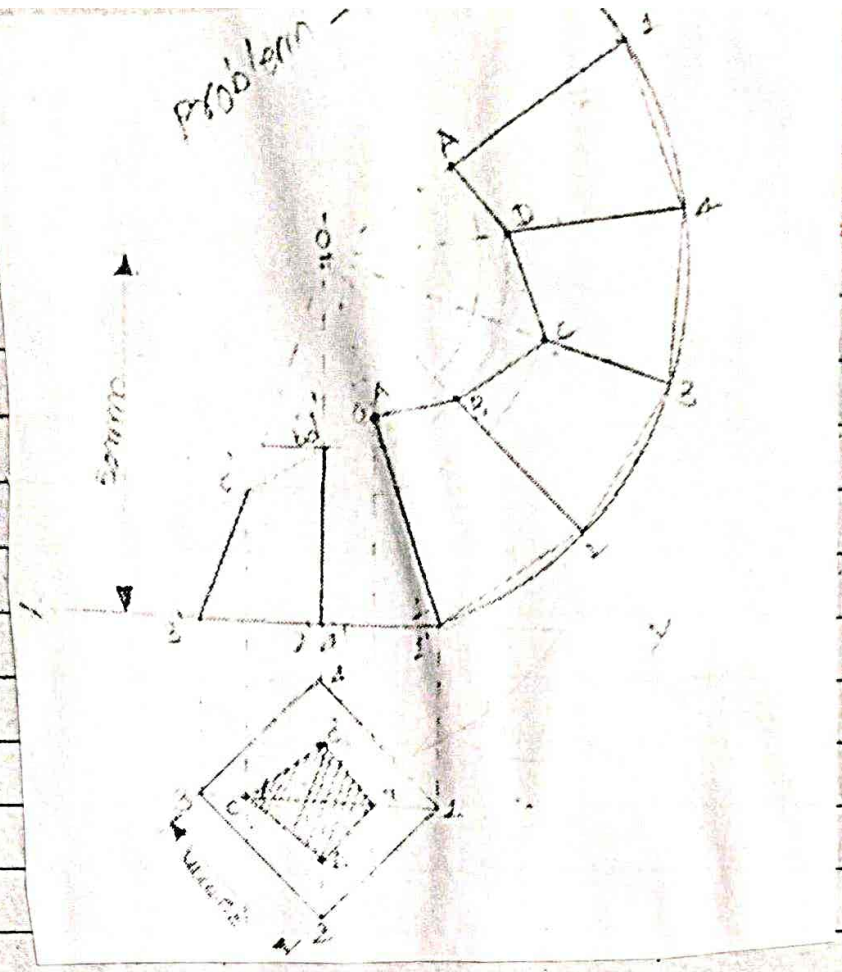
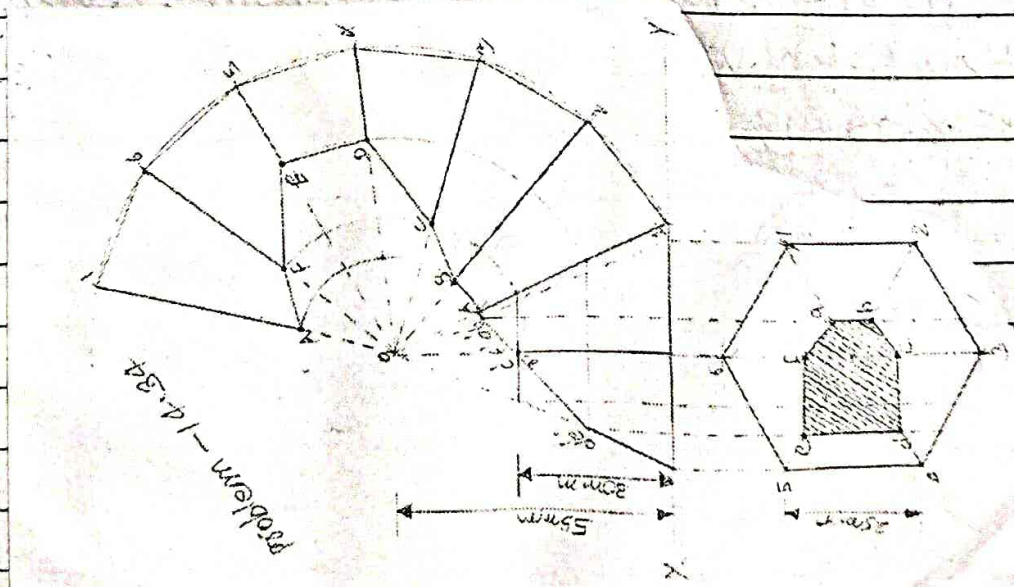
(P48) problem-14.26 → A square pyramid, edge of base 30 mm and height 50 mm, rests on its base in HP such that one of its base edge is parallel to the VP. A section plane perpendicular to the VP and inclined to the HP at 30° cuts the pyramid bisecting its axis. Draw its front view, sectional top view and develop the lateral surface of the frustated pyramid.



problem-14.28 → A square pyramid, edge of base 30mm height 50 mm, resting on its base in HP such that all of the base edges are equally inclined to the VP. A section plane perpendicular to the VP and inclined to the HP at 36° cuts the pyramid, bisecting its axis. Draw its front view sectional top view and develop the lateral surface of the frustated pyramid.

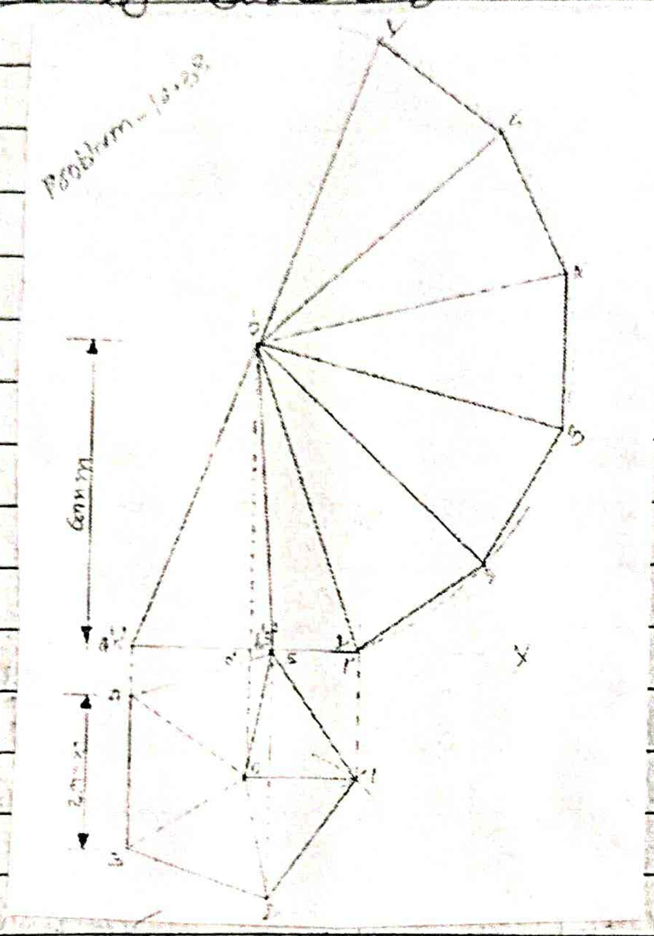


problem-14.34 → A right regular hexagonal pyramid edge of base 25 mm and height 55 mm is resting on its base in HP with one of its base edges perpendicular to the VP. It is cut by a plane, which is inclined at 45° to the HP and perpendicular to the VP, at a distance of 30mm from its base. Draw its projections and develop its lateral surface.

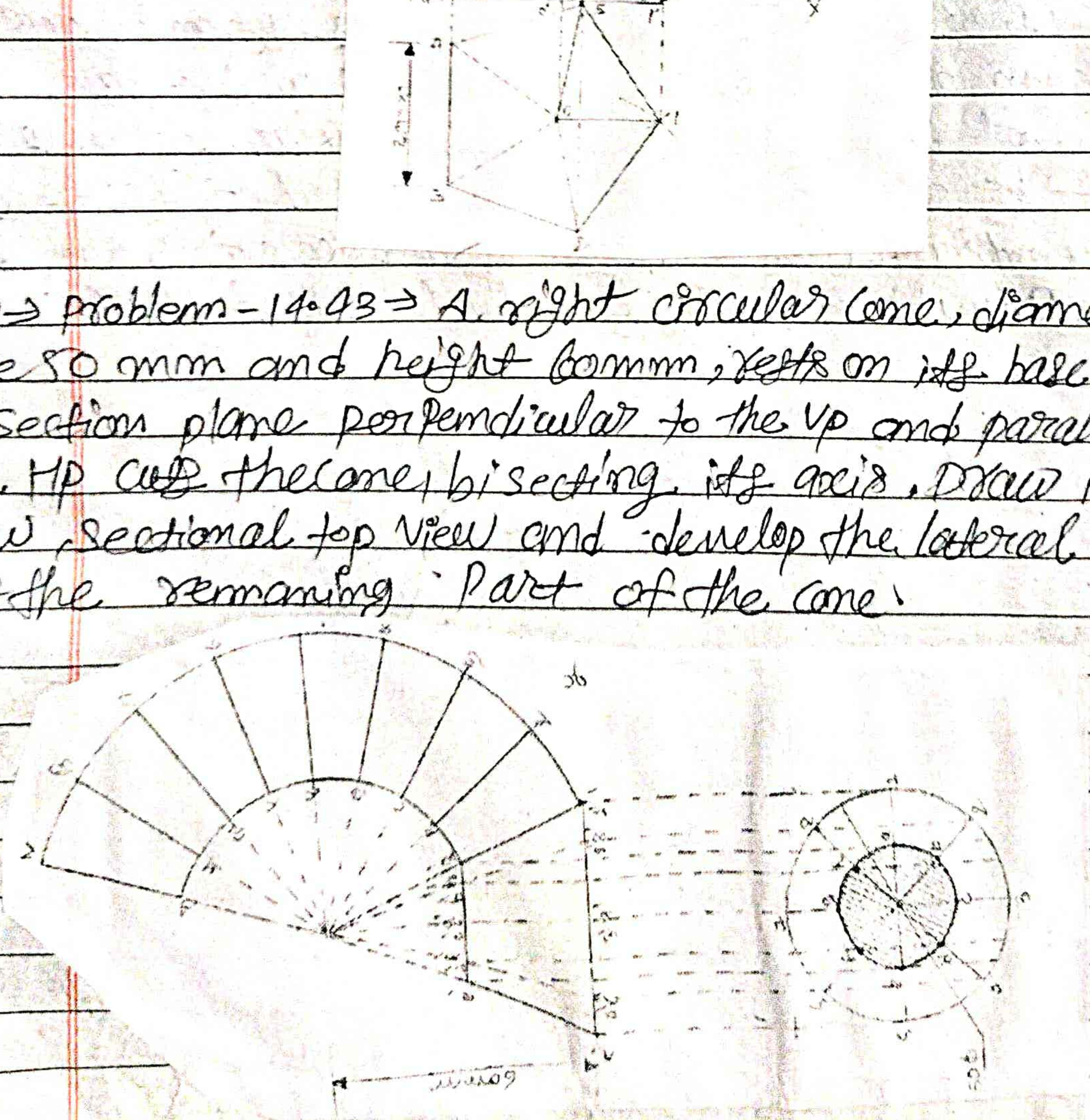


Note → अगर prism हो तो, तो T.P/F.V के बगल में development करेंगे। या अगर pyramid दिया हो, तो आर्क वाला development करेंगे।

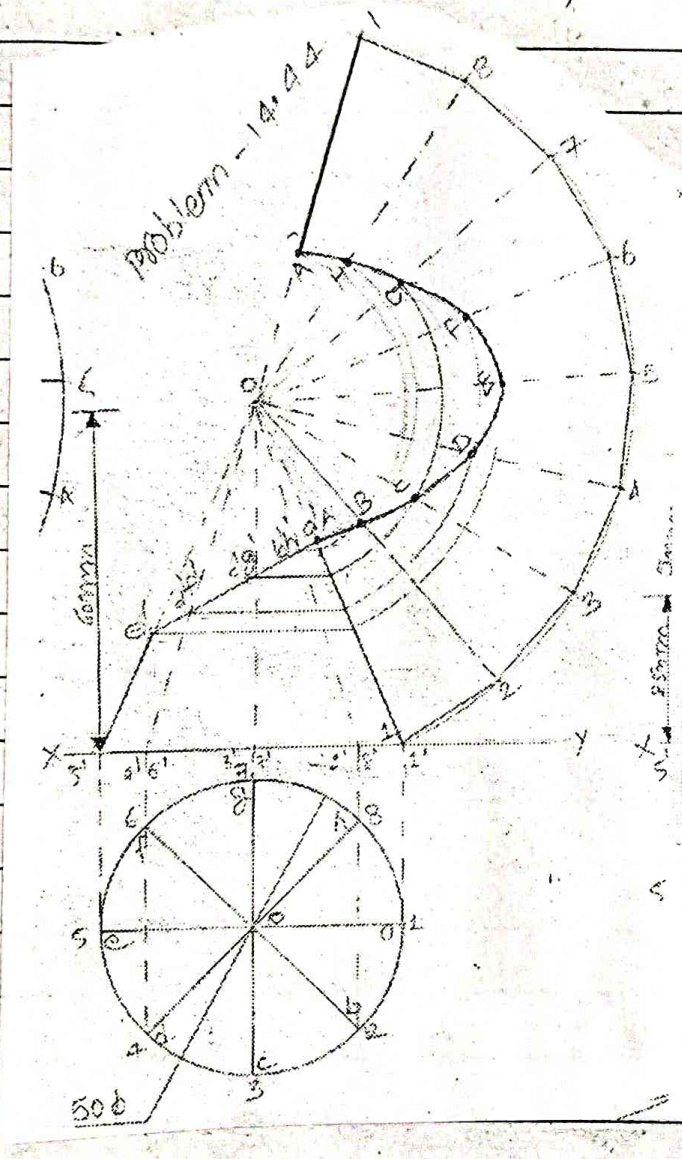
Problem - 14.38 → Develop the surface of a pentagonal pyramid having its base edge 30 mm and axis 60 mm long.



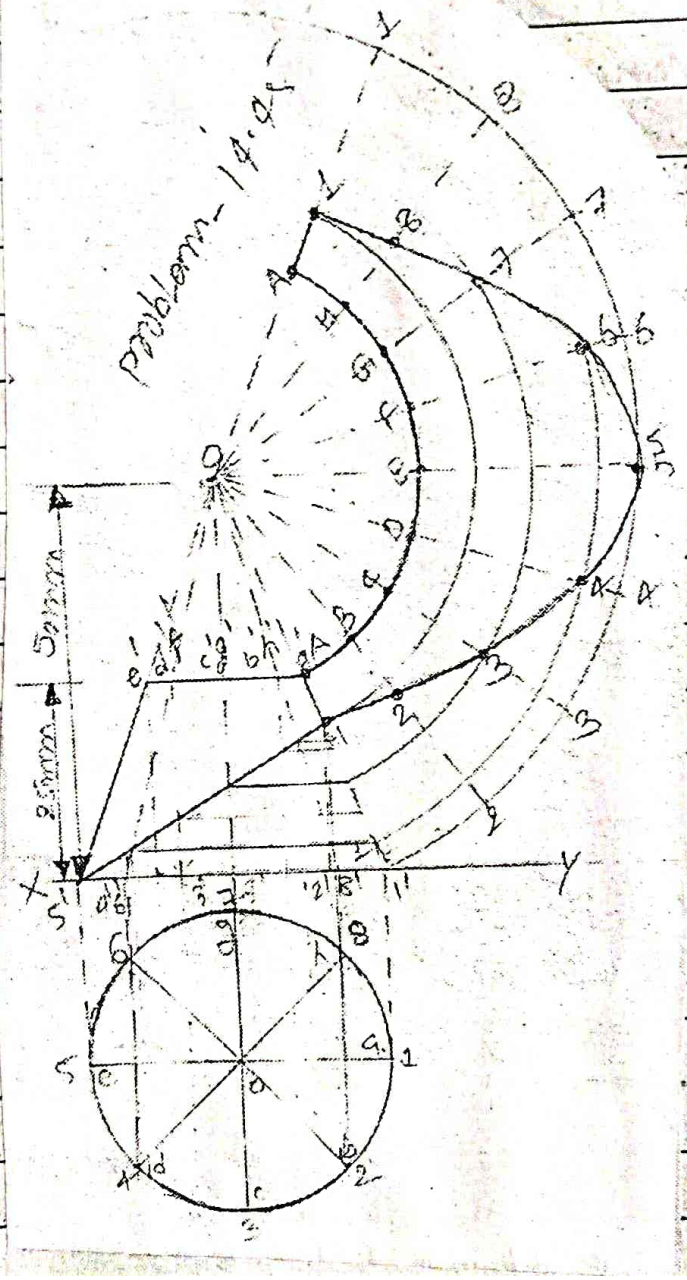
199 → Problem - 14.43 → A right circular cone, diameter of base 50 mm and height 60 mm, rests on its base in HP. A section plane perpendicular to the VP and parallel to the HP cuts the cone, bisecting its axis. Draw its front view, sectional top view and develop the lateral surface of the remaining part of the cone.



problem = 14.44 → A right circular cone, diameter of base 50mm and height 60mm, rests on its base in HP. A section plane perpendicular to the VP and inclined to the HP at 30° cuts the cone, bisecting its axis. Draw projections of the truncated cone and develop its lateral surface.

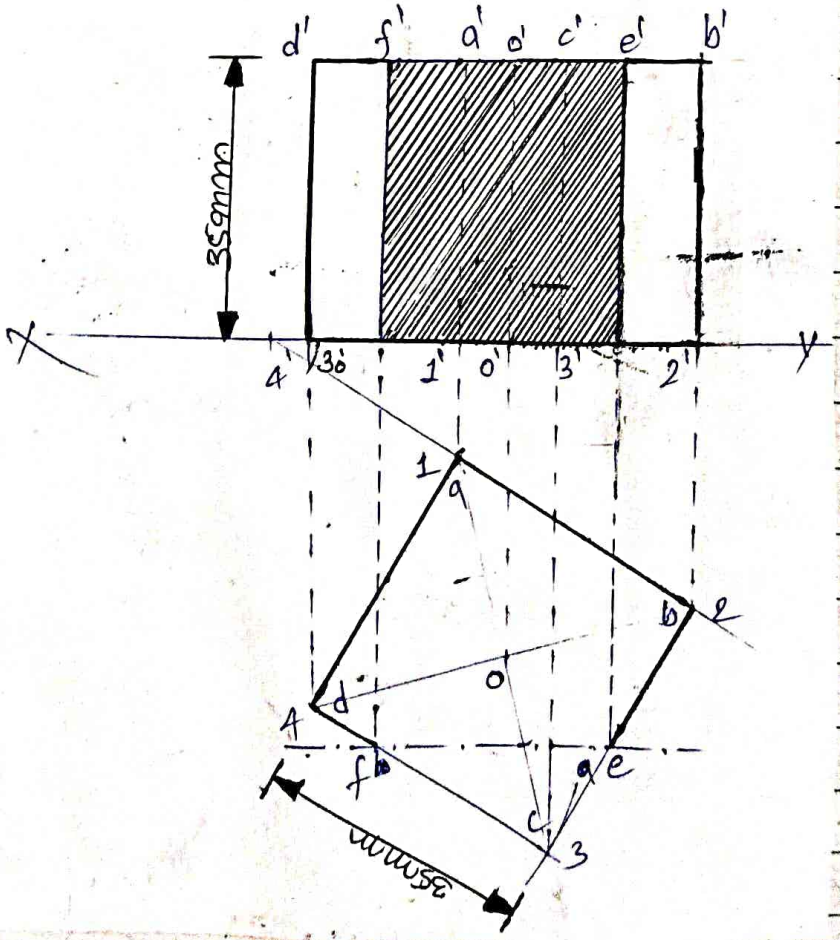


problem → 14.45 → Develop the lateral surface of a right circular cone as shown.



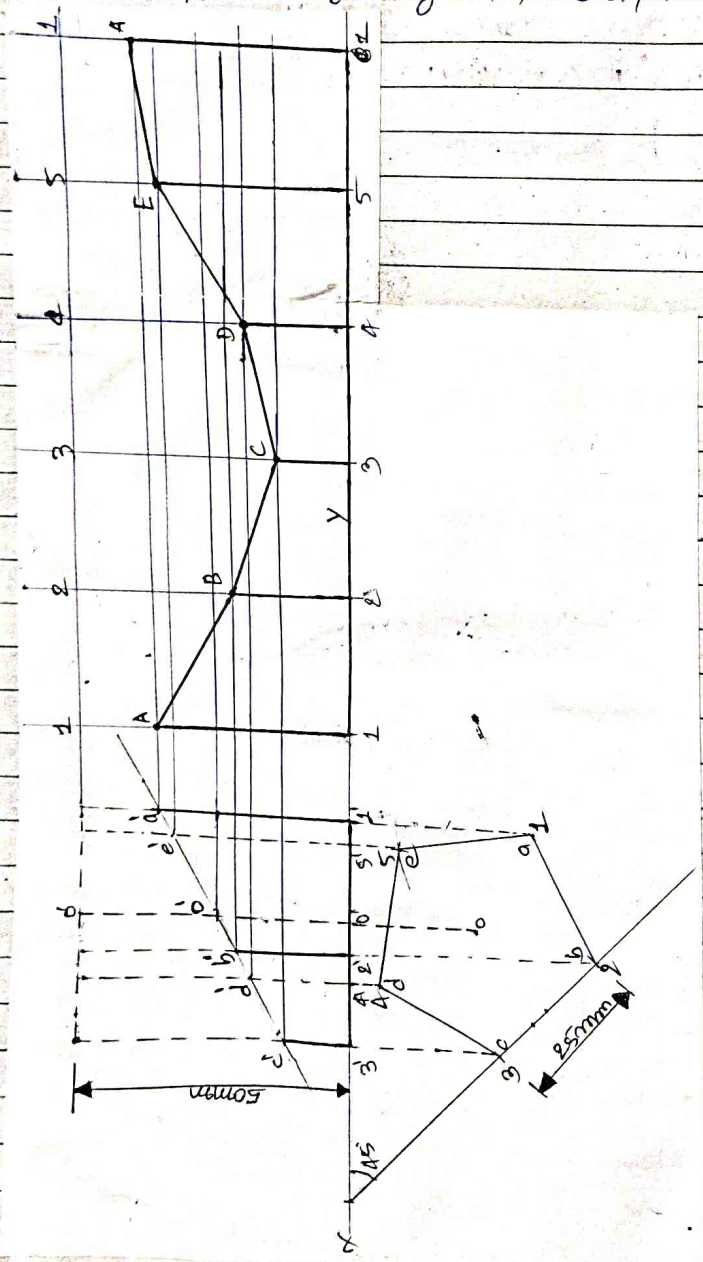
53.16

Q90. A square prism of base edge 35mm is resting on the HP on one of its base with one of its vertical face inclined at 30° to the VP. It is cut by a section plane parallel to the VP and 10 mm away from the axis. Draw its sectional front view and top view.



P98

A Pentagonal prism of 25mm base edge and 50mm long is resting on its base with an edge of base at 45° to VP. The prism is cut by a sectional plane inclined at 30° to HP and passes through a point 25mm from the base along its axis. Develop the truncated prism.

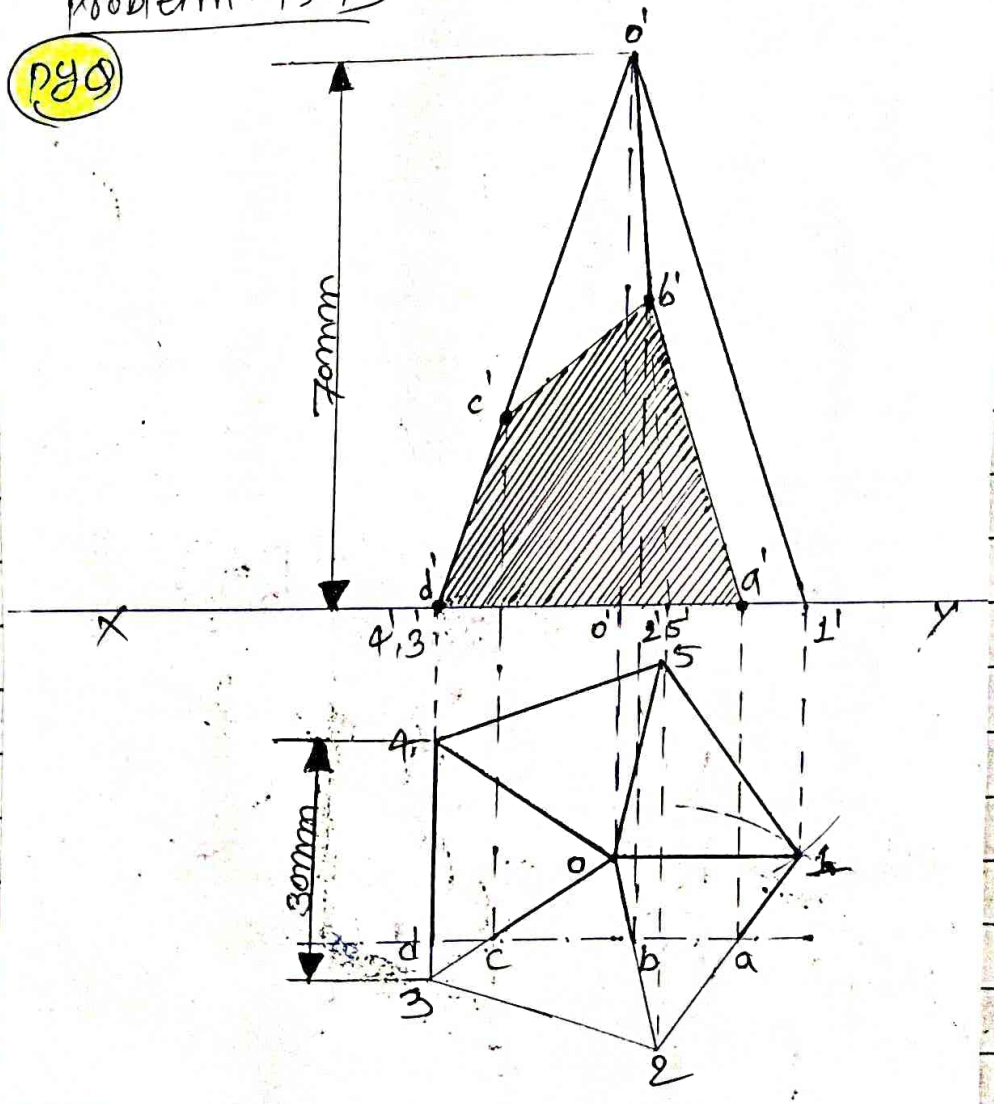


pyd 3 times pyd

problem - 13.13 → A right regular pentagonal pyramid edge of base 30mm and height 70mm rests on its base on HP, such that one of its base edge is perpendicular to the VP. A section plane parallel to the VP cuts the pyramid at a distance of 10mm from the axis. Draw its top view and sectional front view.

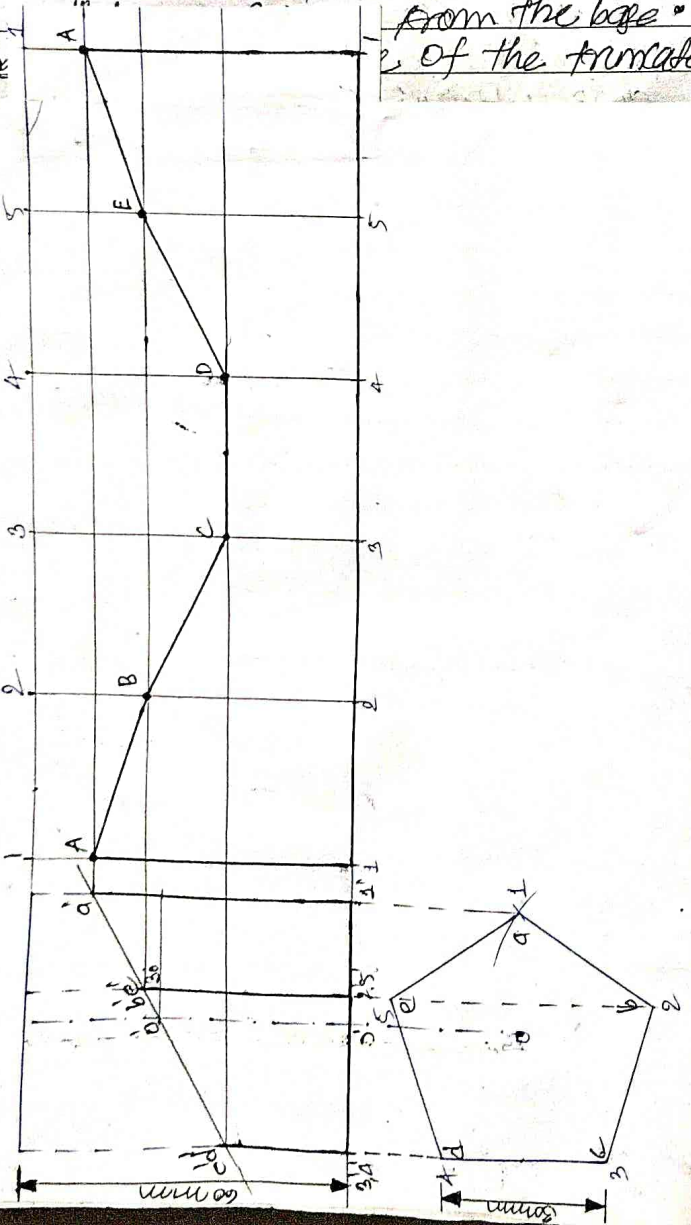
problem - 13.13

pyd



f

Pb8 → A right regular pentagon prism of side 30mm and 60mm height is resting on its base on HP having one of its base edges perpendicular to the VP. A section plane inclined to HP at 30° and perpendicular to the VP cuts its axis at from the base. Develop the , of the truncated prism prism.



Isometric Projection

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* orthographic projection :- 2D view of a 3D object on 2D sheet is called orthographic projectio.

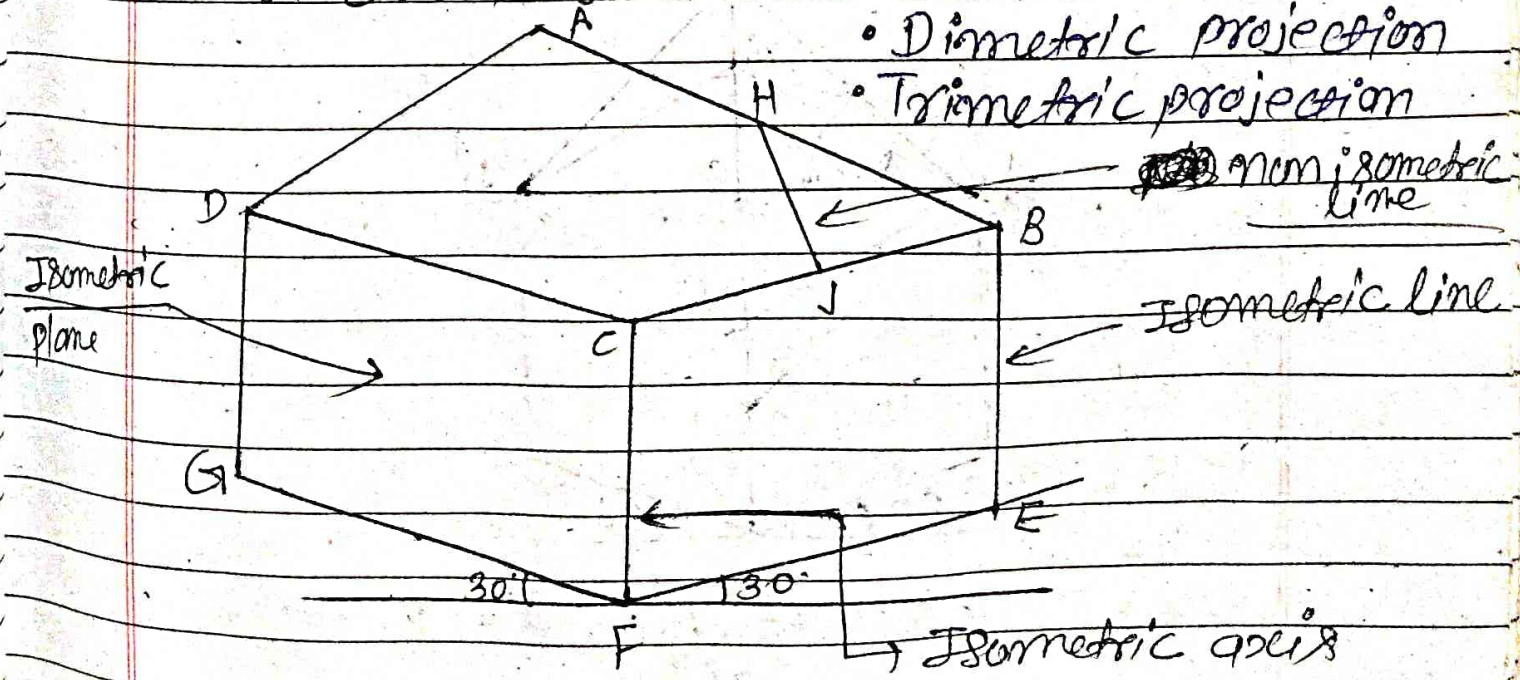
* Isometric projection :- 3D view of a 3D object on 2D sheet is called isometric projection.

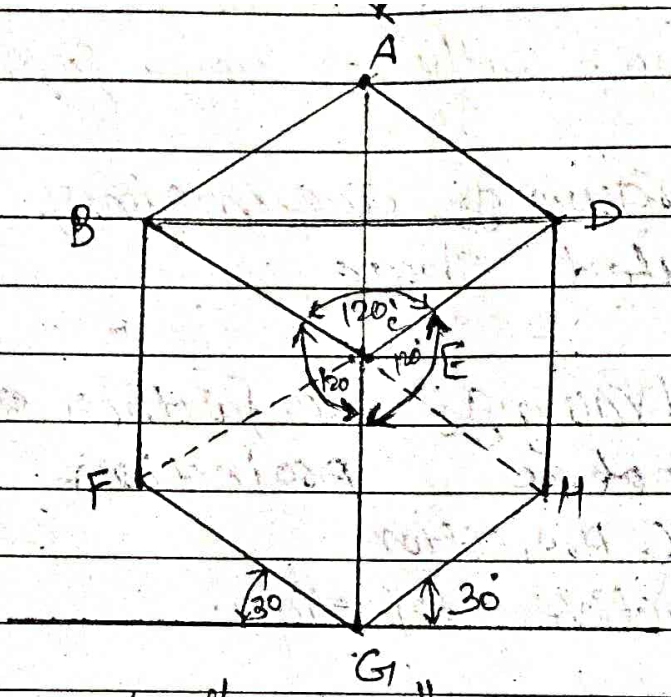
→ pictorial drawings which can be understood by everyone without any formal training

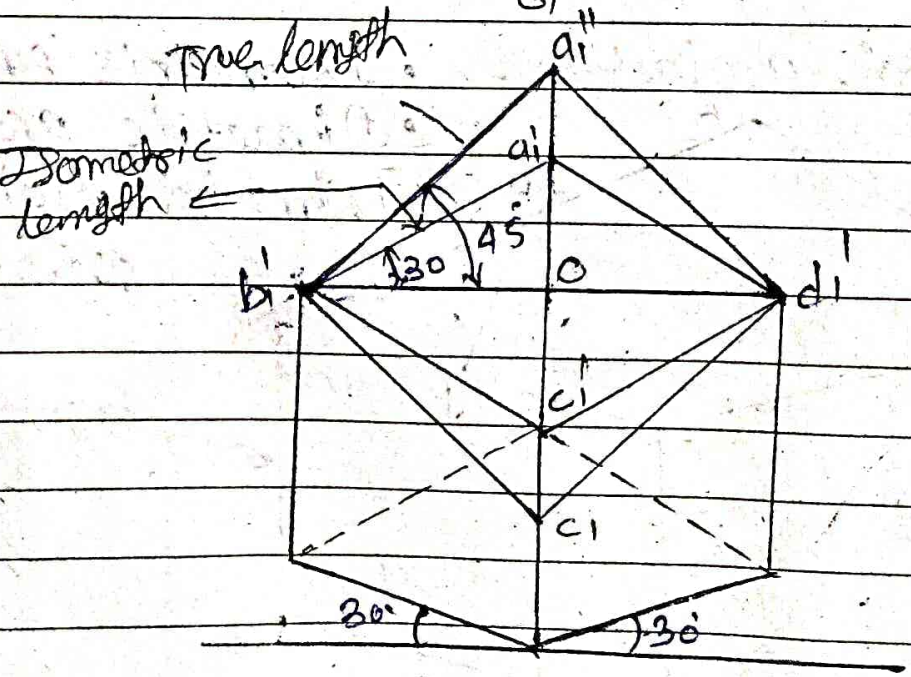
→ pictorial drawings are mainly used to show complicated shapes.

→ pictorial drawings are further of three types:
(i) Axonometric projection
(ii) Oblique projection
(iii) Perspective projection.

(1) Axonometric projection → • Isometric projection
• Dimetric projection
• Trimetric projection







$$\cos 30^\circ = \frac{b_1'o}{b_1'a_1''} = \frac{\sqrt{3}}{2} \quad \text{— (1)}$$

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$\frac{1}{\sqrt{2}} = \cos 45° = \frac{b_i o}{b_i a_i''}$ — (2)

dividing (1) & (2)

$$b_i a_i' = 0.8165 \times b_i a_i''$$

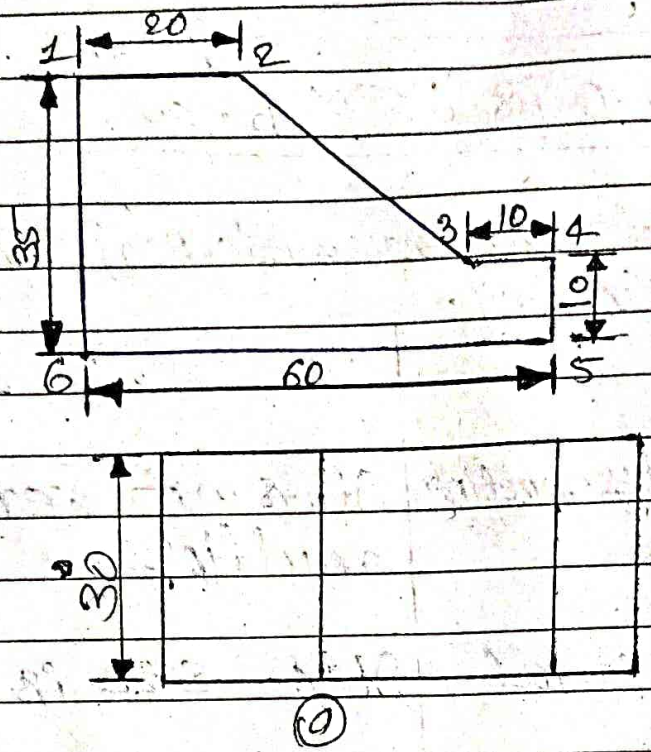
(4) Differenc between Isometric projection and isometric Drawing.

Iso-Projection	Iso-Drawing
(i) It is reduce by multiply by 0.82	It is not reduce by multiply.
(ii) It's size is small	It's size is large.

Note ⇒ Question में Isometric projection दिया हो, तो question को reduce करना है (Multiply by 0.82) और Isometric drawing वोले तो without reduce बनाना है।

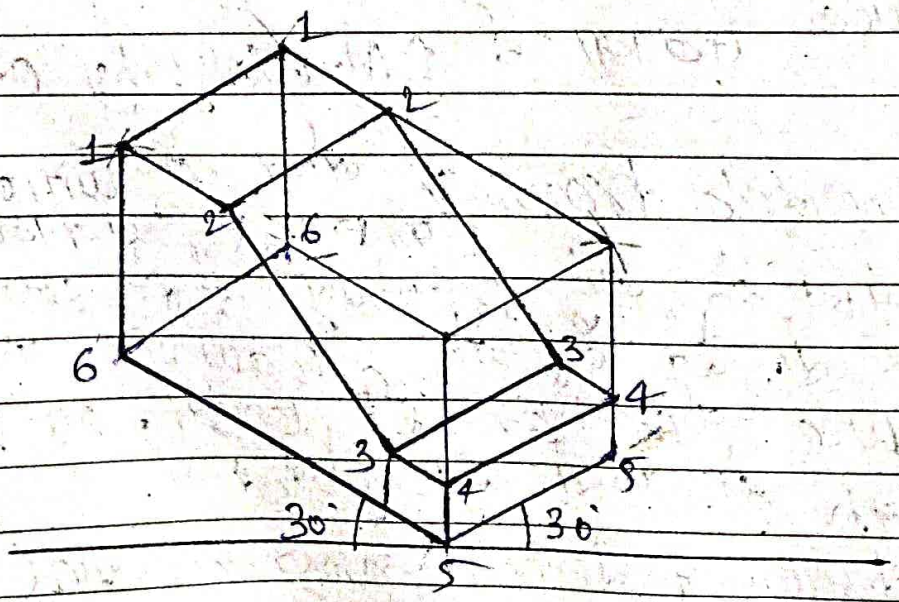
ध्यान रहे की drawing में तो हमलोग reduce कर तो देते है, और draw भी करते है तो reduce किया हुआ ही length, breight and height से करते है। लेकिन drawing dimensing original वाला ही लिखते है।

problem - 16.7 → Two views of a block are given
(a) draw its isometric drawing

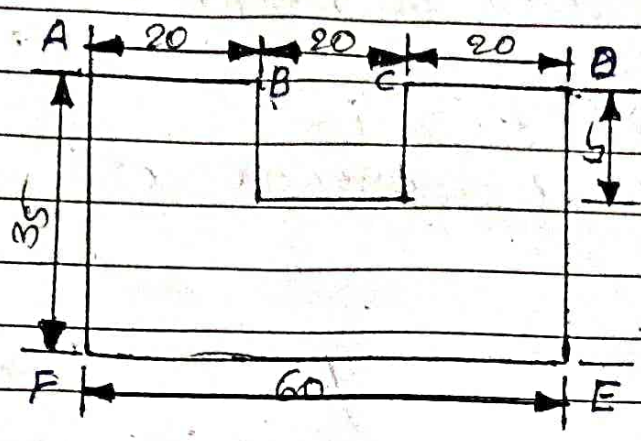


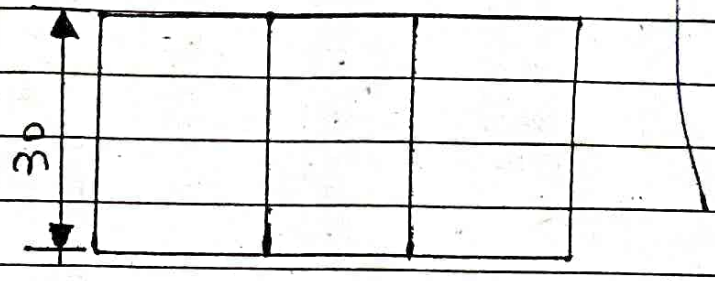
(a)

ans → $L = 60 \times 0.81 = 48.99$
$B = 30 \times 0.81 = 24.495$
$H = 35 \times 0.81 = 28.5775$
$20 = 20 \times 0.81 = 16.33$
$10 = 10 \times 0.81 = 8.165$



problem - 16.14 → Draw the isometric projection of an object shown fig.:





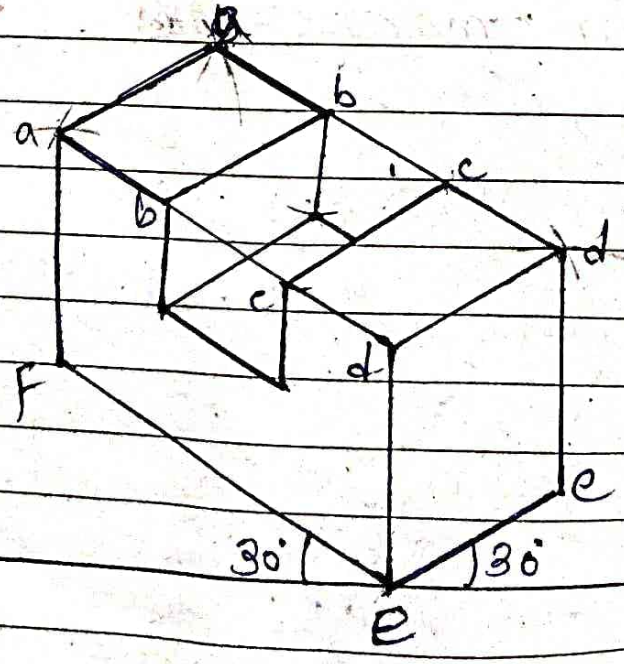
Sol $L = 60 \times 0.8165 = 48.99$

$B = 30 \times 0.8165 = 24.495$

$H = 35 \times 0.8165 = 28.5775$

$20 = 20 \times 0.8165 = 16.33$

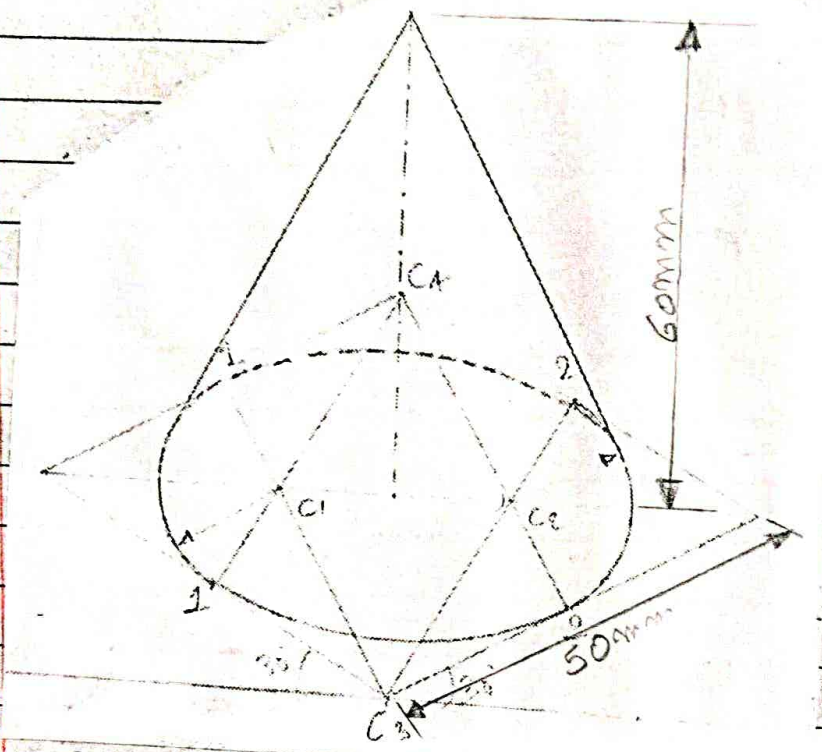
$15 = 15 \times 0.8165 = 12.24$



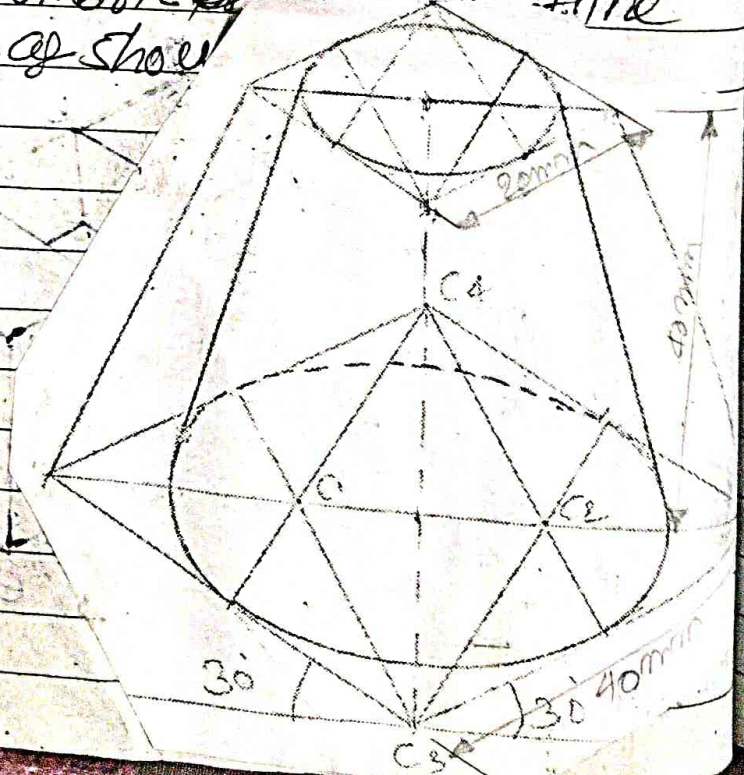
problem – 16.10 → Draw the isometric projection of a cone base 50 mm diameter and axis 60 mm long when its axis is vertical.

$\phi = 50 \times 0.82 = 41$

$L = 60 \times 0.82 = 49.2 \approx 50$



problem – 16.11 → Draw the isometric [illegible] of the frustum of a cone as shown



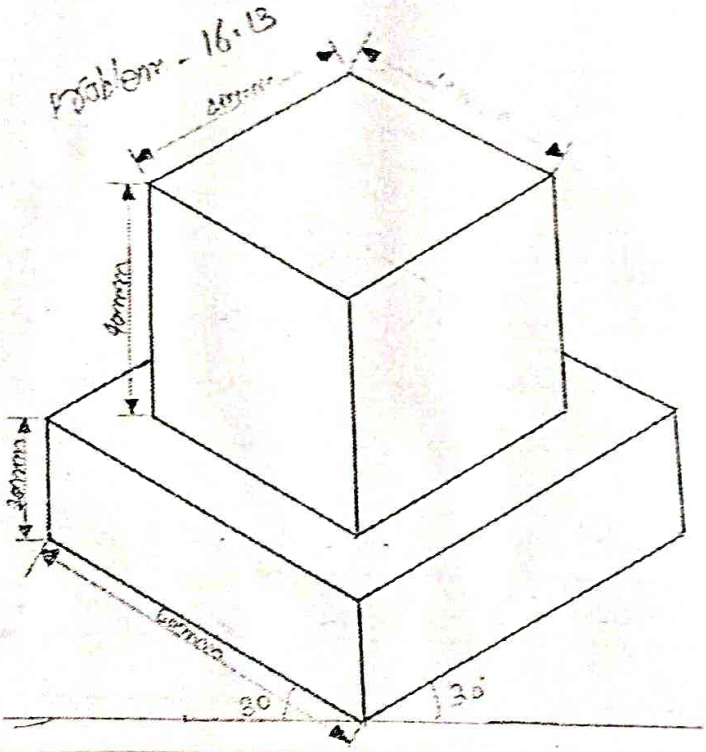
problem -16.13 → A cube of 40mm edge is placed centrally on the top of a square block of 60mm edge and 20 mm thick. Draw the isometric projection of the two solids with the edges of the two block mutually parallel to each other.

→

$l = 60 \times 0.82 = 49.2 = 50$

$thick = 20 \times 0.82 = 16.4$

$L = b = h = 40 \times 0.82 = 32.8$



problem - 16.15

problem :- A right circular cone of ϕ30 mm base and height 40 mm rests centrally on the top of a square block of 40mm side and 15 mm thick. Draw the isometric projections of the solids.

→

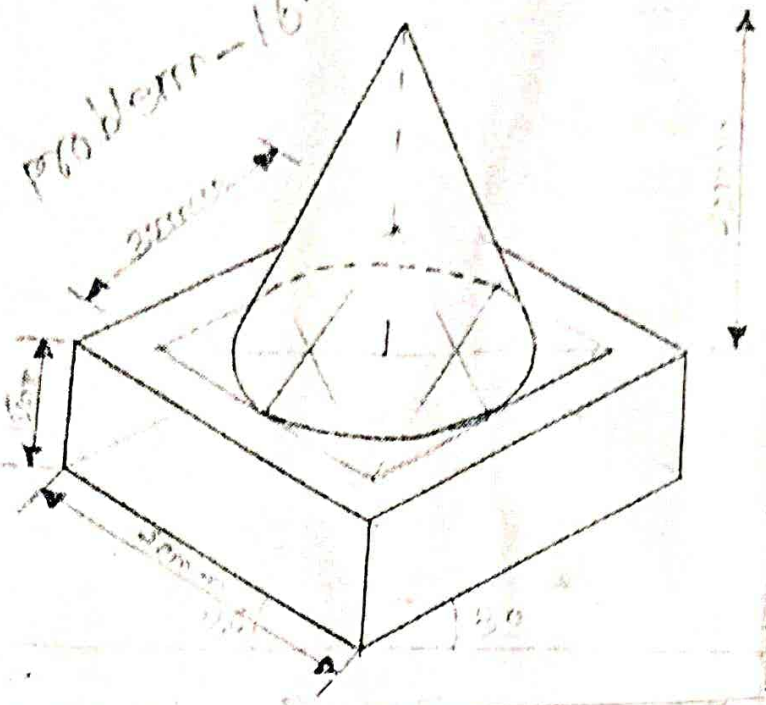
$\phi = 30 \times 0.82 = 24.6$

$h = 40 \times 0.82 = 32.8$

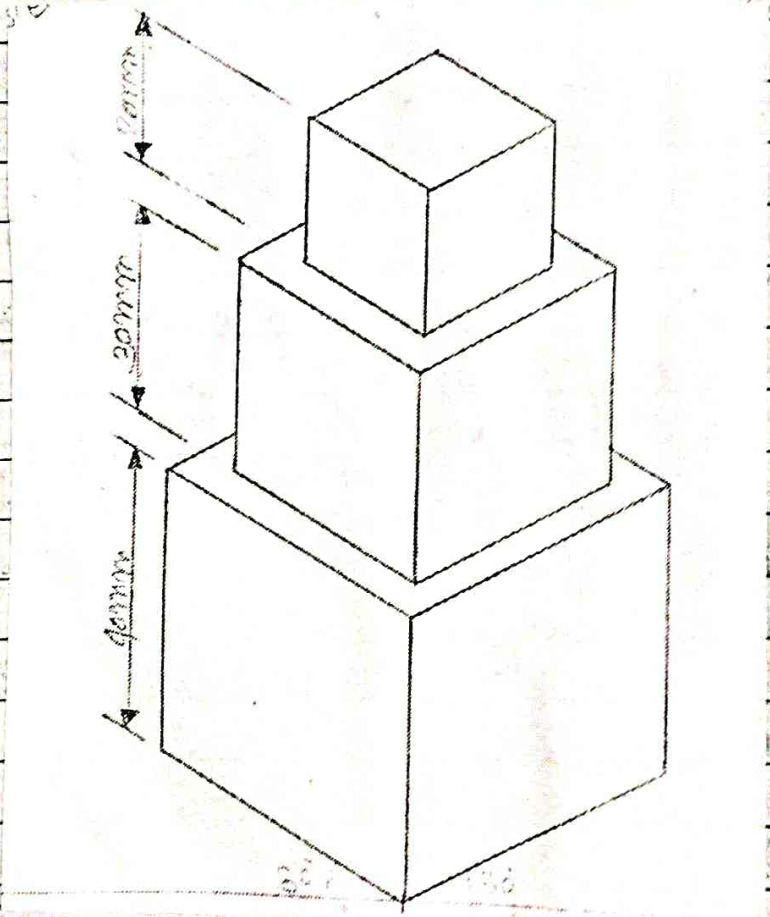
$side = 40 \times 0.82 = 32.8$

$thick = 15 \times 0.82 = 12.3$

problem-16.15



problem-16.18 → Three cubes of 40mm, 30mm and 20mm are placed centrally such that the biggest cube at the bottom whereas the smallest on the top. Draw the isometric drawing of the solids.



problem-16.20 → A cube of 30mm side rests on the top of a cylindrical slab of 60mm diameter and 25 mm thick; The axis of the solids are in same straight line.

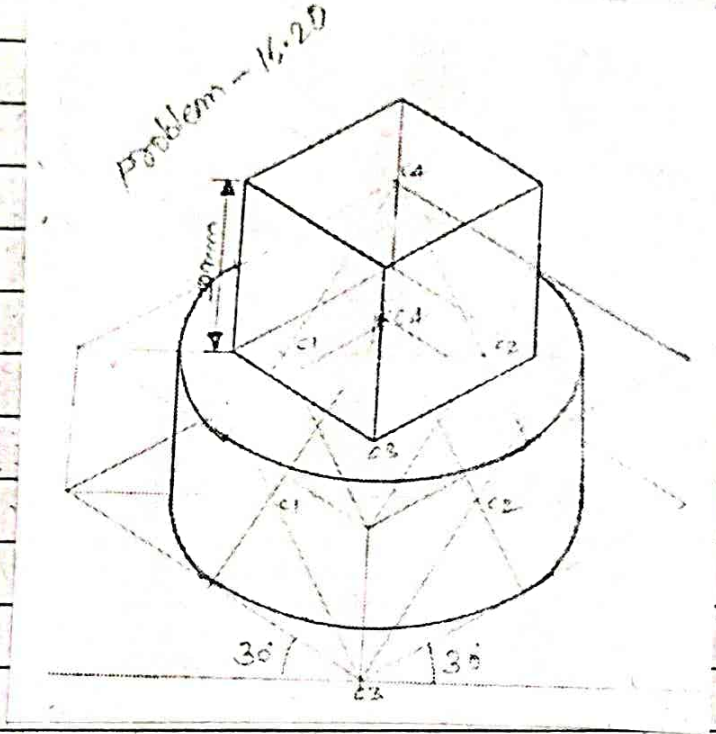
Draw an isometric projection of the solid.

Sol:-

side = 30 × 0.82 = 24.6

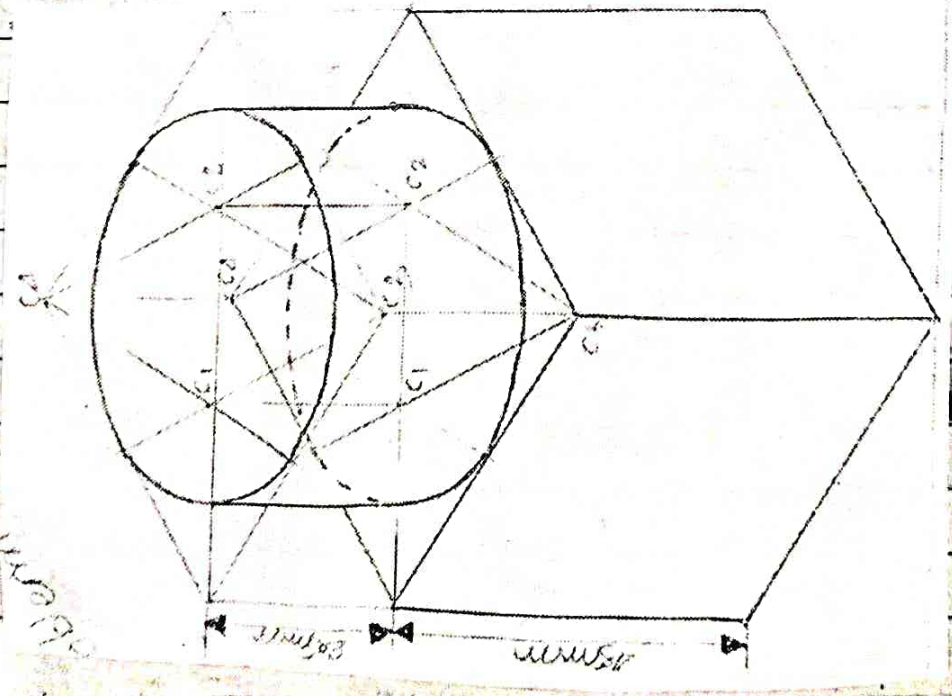
ϕ = 60 × 0.82 = 49.2

thick = 25 × 0.82 = 20.5



problem - 16.21 → A cylindrical block of 45 mm diameter and 65 mm height is placed centrally on a cube of 95 mm side. The axes of the two solids are in the same straight line. Draw the isometric drawing of the solid.

Sol ⇒



Sphere

① sphere के iso. radius को center draw करते हैं पहले
② फिर sphere के radius को center से sphere draw करते हैं।

(pyq)

problem-16.16 → A sphere of ϕ 30mm rests centrally on the top of a cube of 30 mm side. Draw the isometric projection of the solids.

Solⁿ:

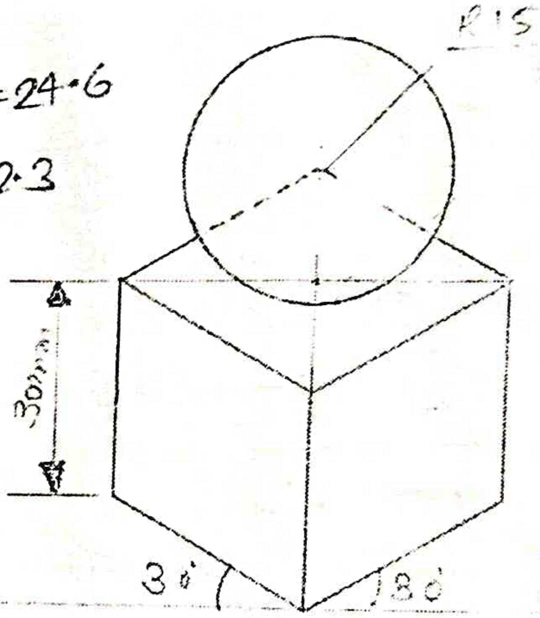
$\phi = 30 \times 0.82 = 24.6$

$\text{side} = 30 \times 0.82 = 24.6$

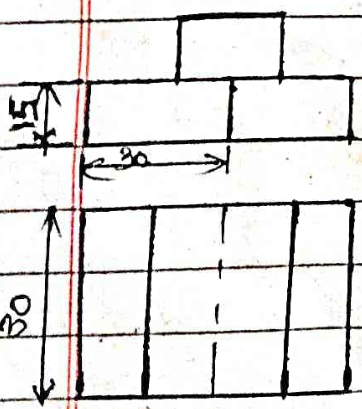
$r = 15 \times 0.82 = 12.3$

$L = B = H = 30 \times 0.82 = 24.6$

$r = 15 = 15 \times 0.82 = 12.3$

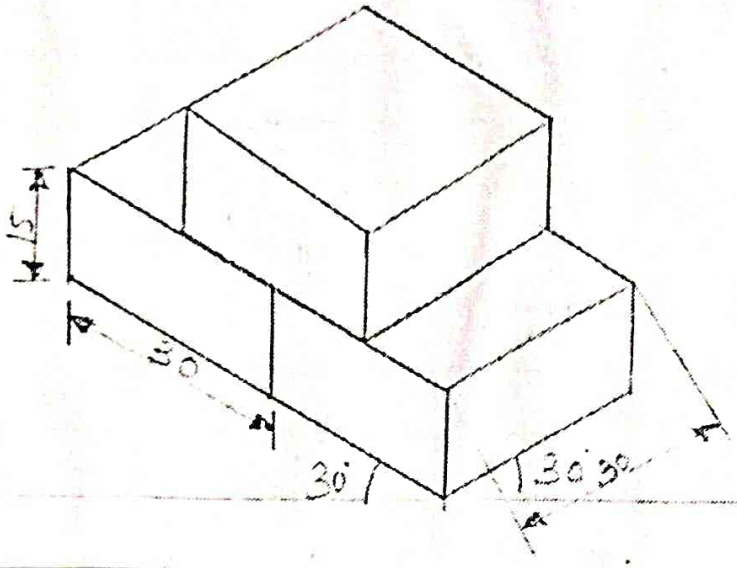


problem → 16.26 → Draw the isometric projection of the three bricks of size 30mm × 30mm × 15mm from the given front and top view as shown in fig.



problem - 16.26

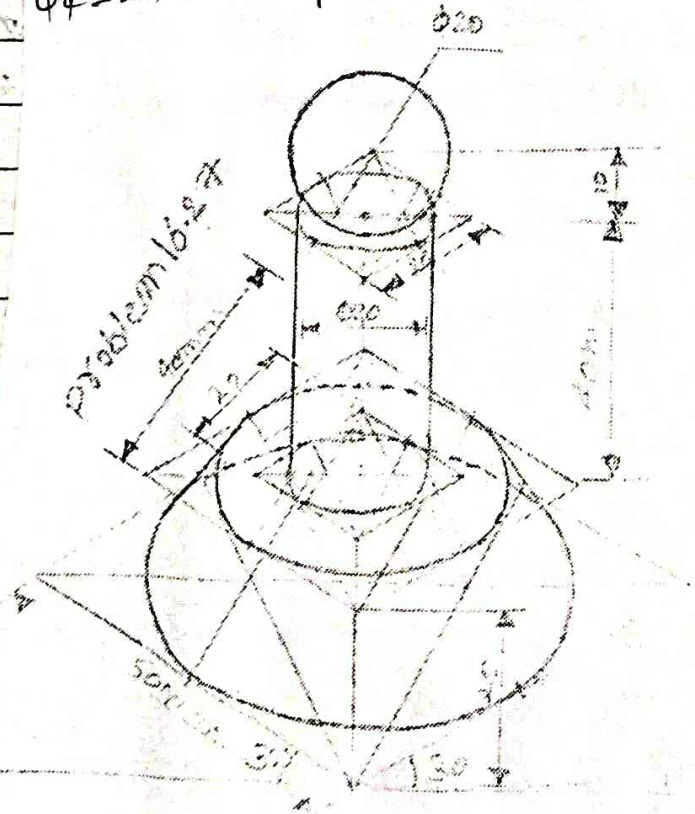
$l = 30 \times 0.82 = 24.6$
$b = 30 \times 0.82 = 24.6$
$h = 15 \times 0.82 = 12.3$



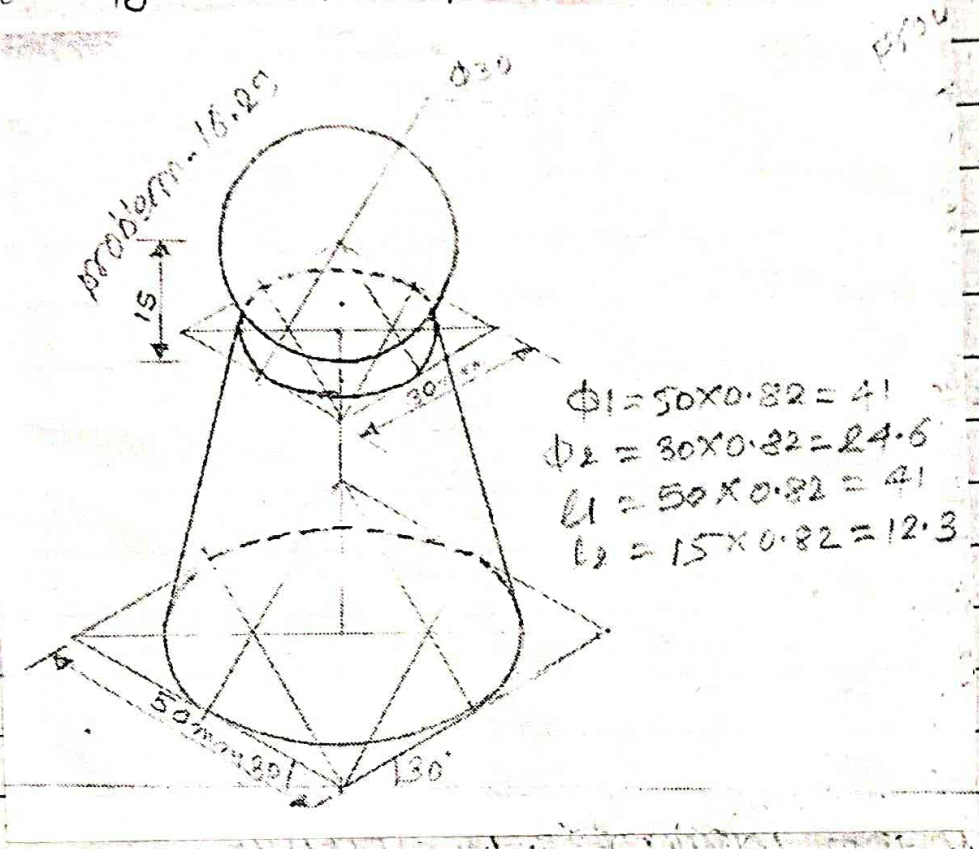
problem - 16.27 → front view of a given fig ② is shown draw its isometric projections

ans ⇒

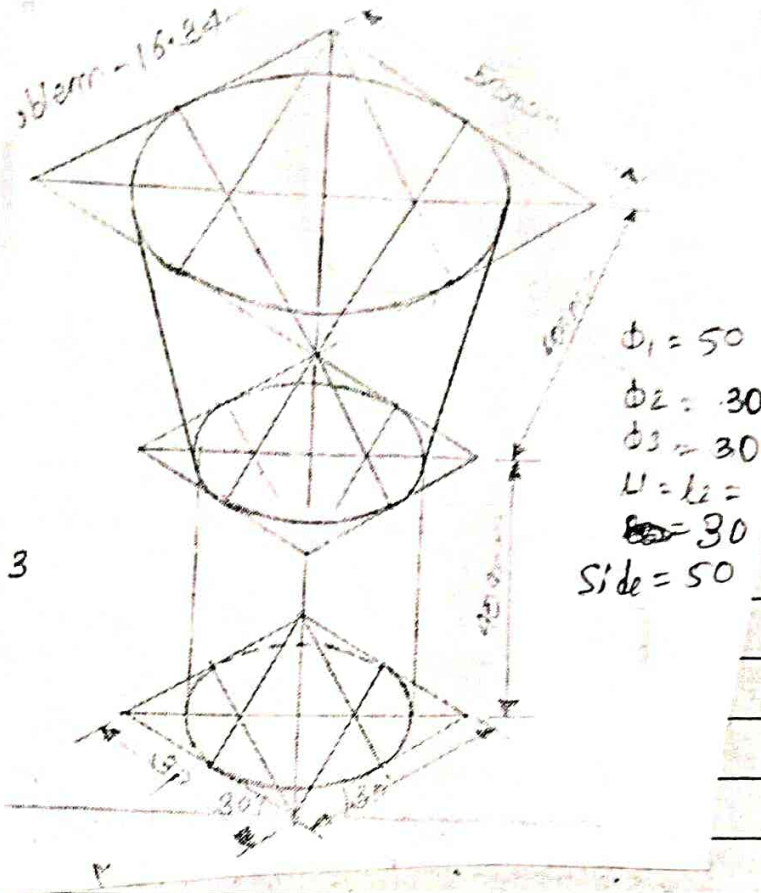
$\phi_1 = 60 \times 0.82 = 49.2$ | $h_1 = 25 \times 0.82 = 20.5$
$\phi_2 = 40 \times 0.82 = 32.8$ | $h_2 = 40 \times 0.82 = 32.8$
$\phi_3 = 20 \times 0.82 = 16.4$ | $h_3 = 10 \times 0.82 = 8.2$
$\phi_4 = 20 \times 0.82 = 16.4$



problem-16.29 → front view of a given fig 16.39 (a) in th Draw its isometric projection.

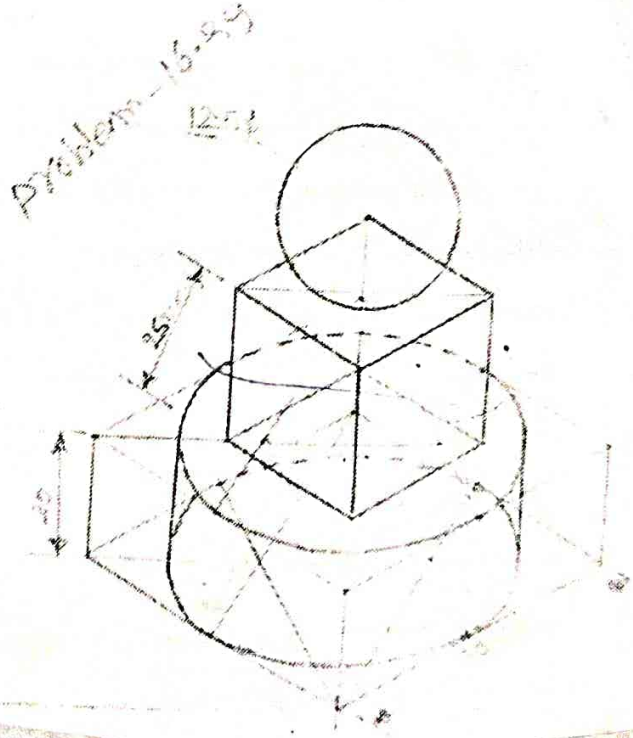


projection → 16.34 → Draw isometric drawings of a funnel consisting of a cylinder and a frustum of a cone. The diameter of the cylinder is 30 mm and top diameter of the frustum is 50mm. The height of frustum of a cone and cylinder are both equal to 40 mm.



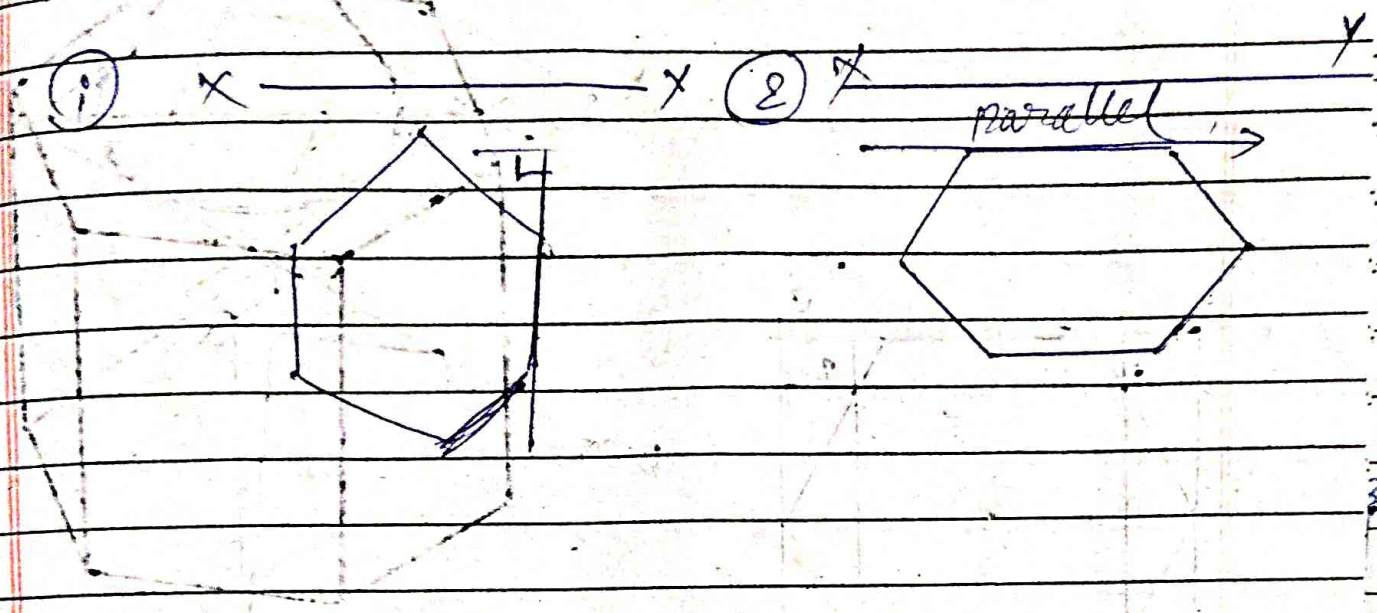
problem - 16.39 → Draw isometric projections of a cylindrical block of 50mm diameter and 20mm thickness having a cube of 25 mm side resting centrally on top of it, which in turn in having a sphere of 25mm diameter resting centrally on top of it.

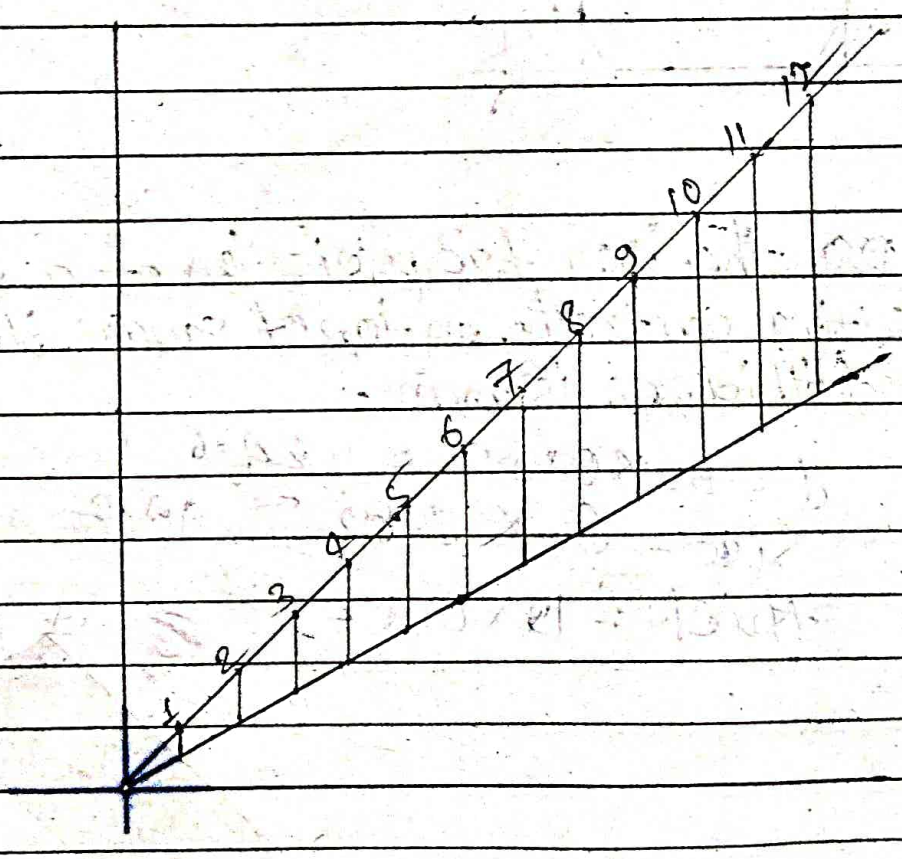
$\phi_1 = 50 \times 0.82 = 41$
$\phi_2 = 50 \times 0.82 = 41$
$l = b = h = 25 \times 0.82 = 20.5$
$r = 12.5 \times 0.82 = 10.25$
thickness $= 20 \times 0.82 = 16.4$



Hexagon/Pentagon ISO projection

1. base edge perpendicular to VP →
2. base edge parallel to VP





Pg 9) A right circular cone of base radius 20 mm and axis 30 mm resting centrally on a right regular hexagonal prism having base edge 30 mm and 50 mm long. Draw its isometric projections.

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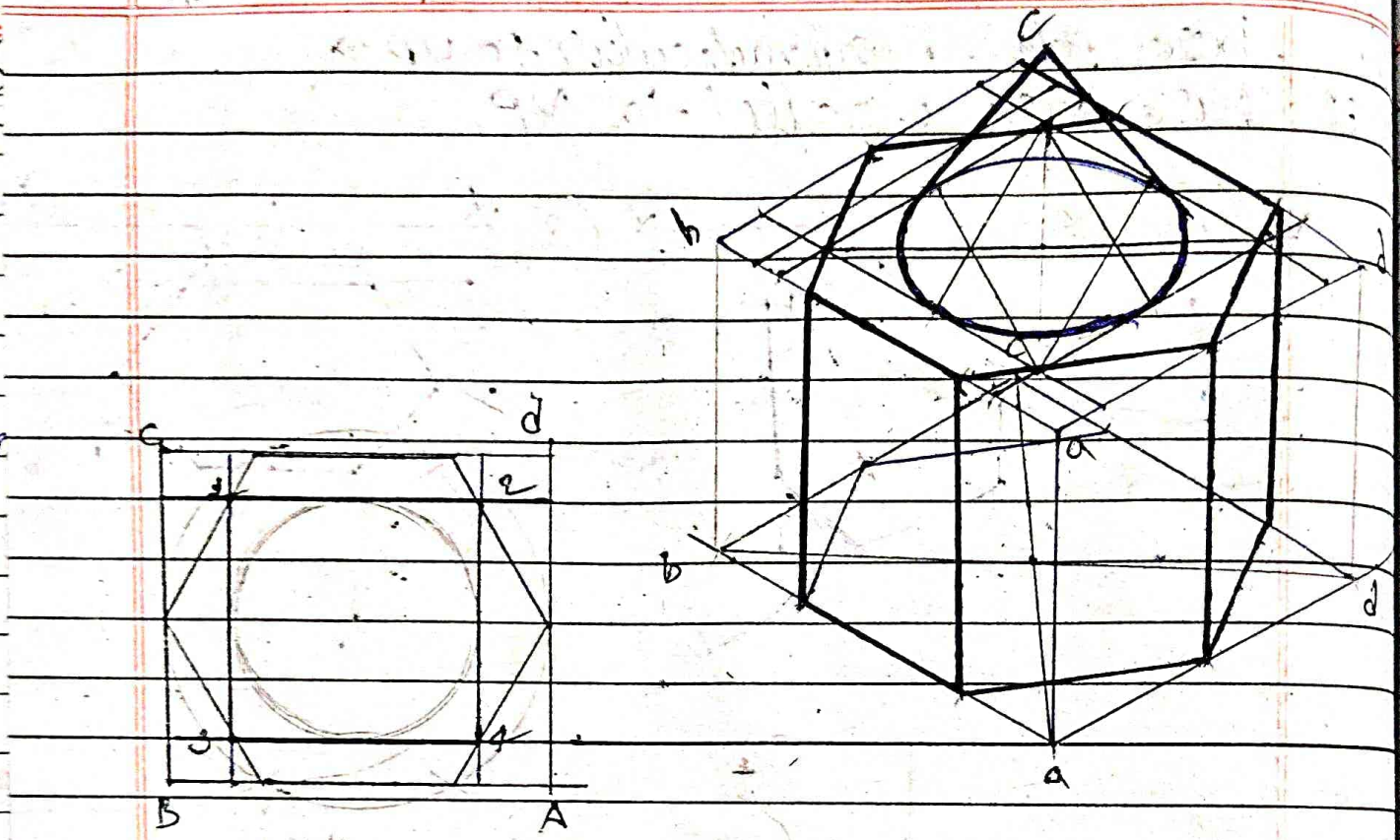
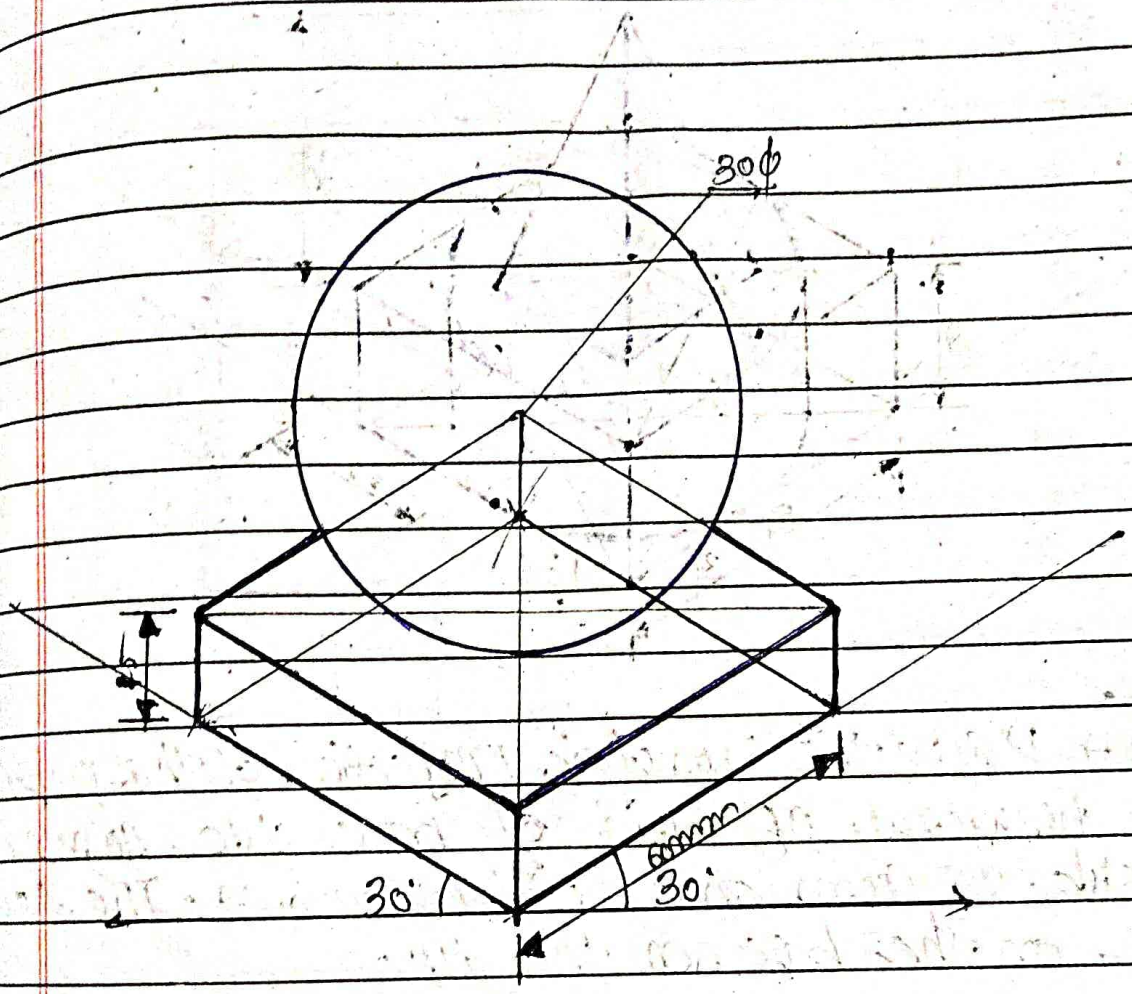


Pg 8) Draw the isometric projection of a sphere of diameter 30 mm resting centrally on top of square block having side mm and thickness 15 mm.

$d = 30 \times 0.82 = 24.6$

$side = 60 \times 0.82 = 49.2$

$thick = 15 \times 0.82 = 12.3$



(Q8) A square pyramid of base side 25 mm and axis 40 mm rests centrally over a cylindrical block of base diameter 50 mm and thickness 20mm. Draw the isometric projection of the arrangement.

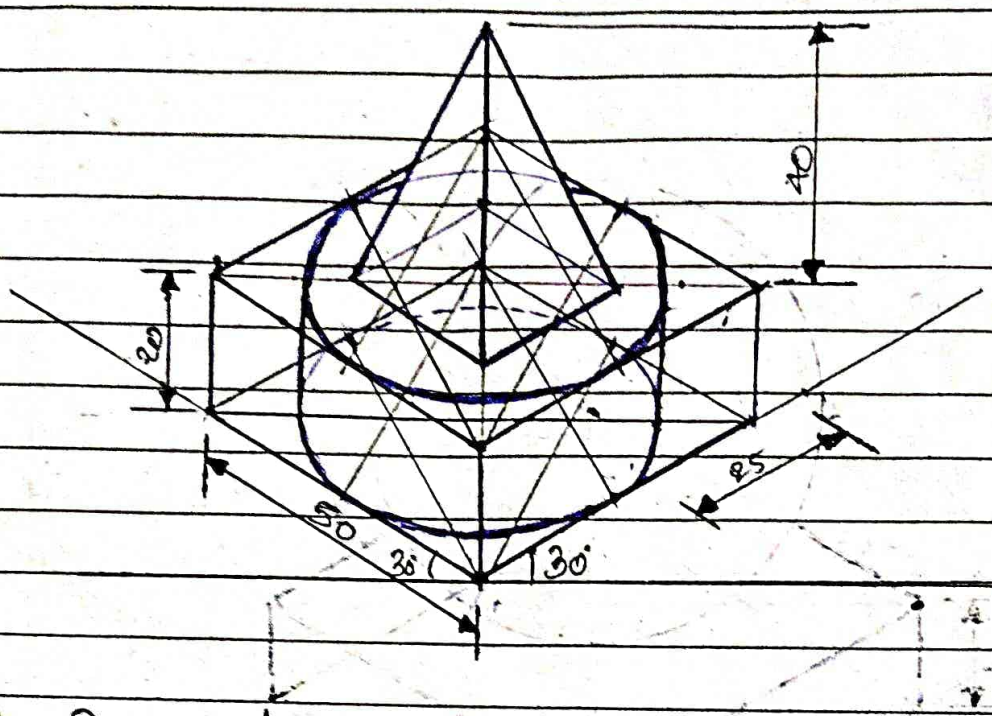
Sol :-

$$\text{side} = 25 \times 0.82 = 20.5$$

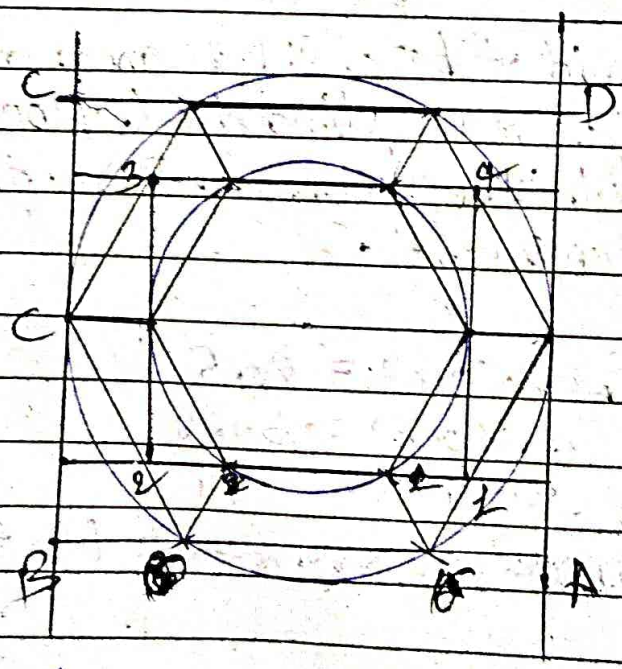
$$h = 40 \times 0.82 = 32.8$$

$$d = 50 \times 0.82 = 41$$

$$\text{thick} = 20 \times 0.82 = 16.4$$



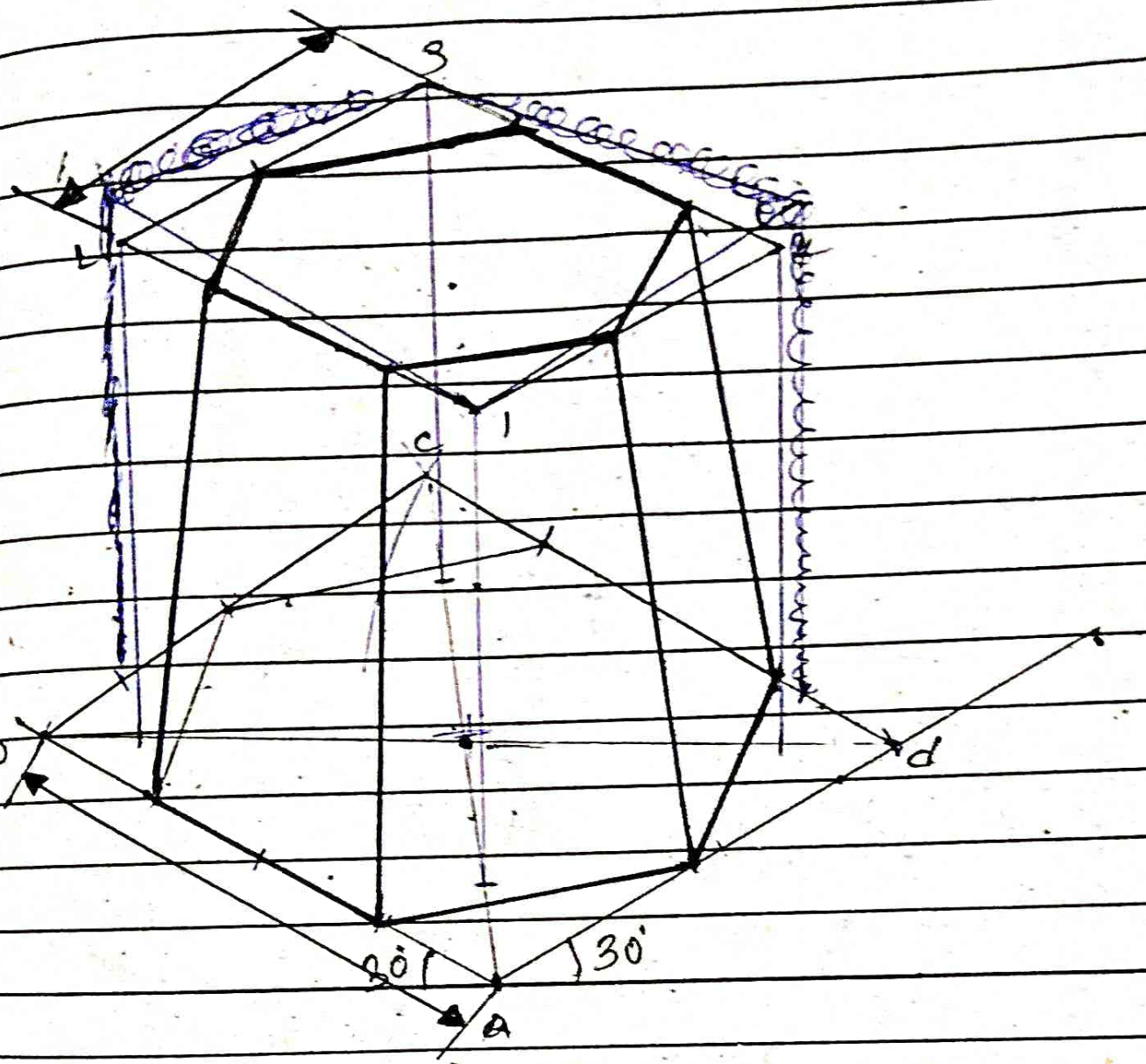
Eg → Draw the isometric projection of the frustum of a hexagonal pyramid of base side 40mm, top side 25 mm and height 70 mm, The frustum rests on the base on the HP.



base = $40 \times 0.82 = 32.8$

side = $25 \times 0.82 = 20.5$

h = $70 \times 0.82 = 57.4$


g
h
c
1
b
d
30°
30°
a

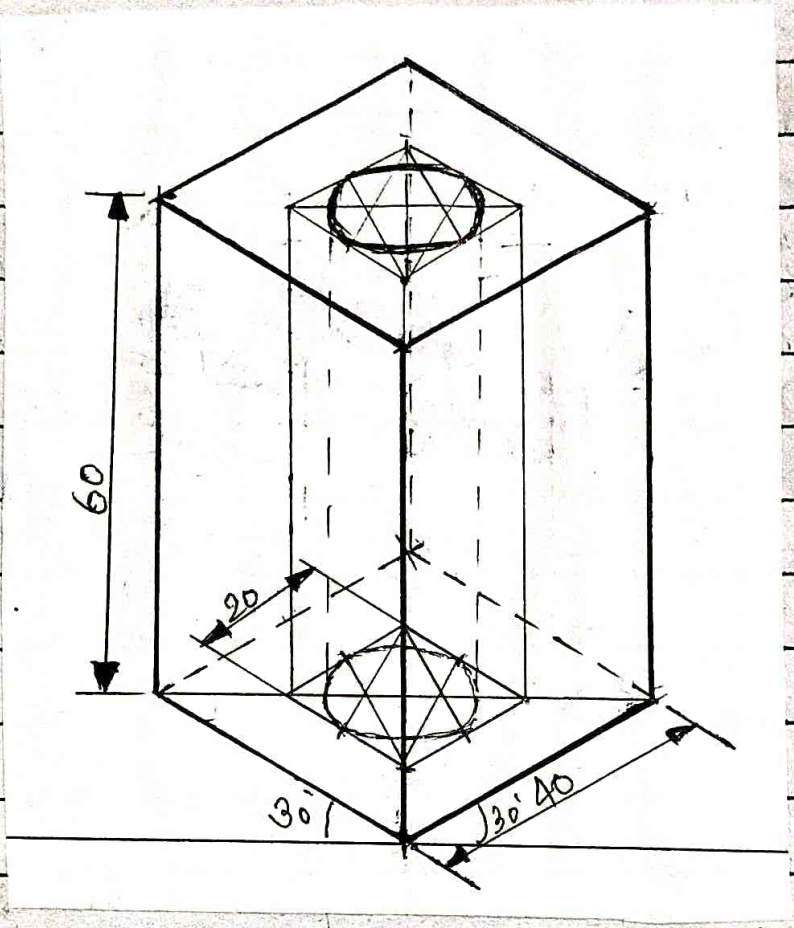
Q.2 A square prism of side 40mm and height 65mm is resting on ground. A vertical hole of diameter 20mm is cut through from the top face & reaching bottom face of the prism. Draw the isometric projection of the prism.

→ Sol:

$h = 65 \times 0.82 = 53.5$

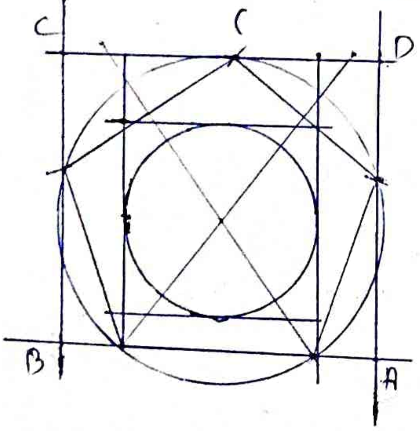
$Side = 40 \times 0.82 = 32.8$

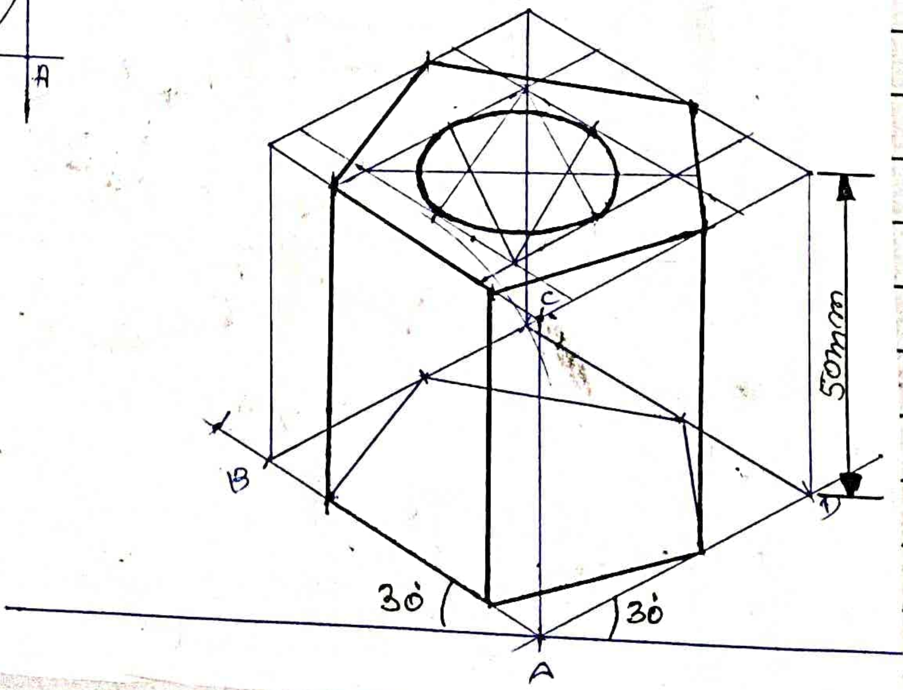
$d = 20 \times 0.82 = 16.4$


60
20
30
30
40

~~A square prism of side 40mm and height 65mm~~ ~~[illegible] A vert~~

(PYQ) A right regular pentagonal prism, edge of base 30mm height 50mm, has a circular hole of diameter 25mm, drilled centrally through it, along its axis, Draw its isometric projection.





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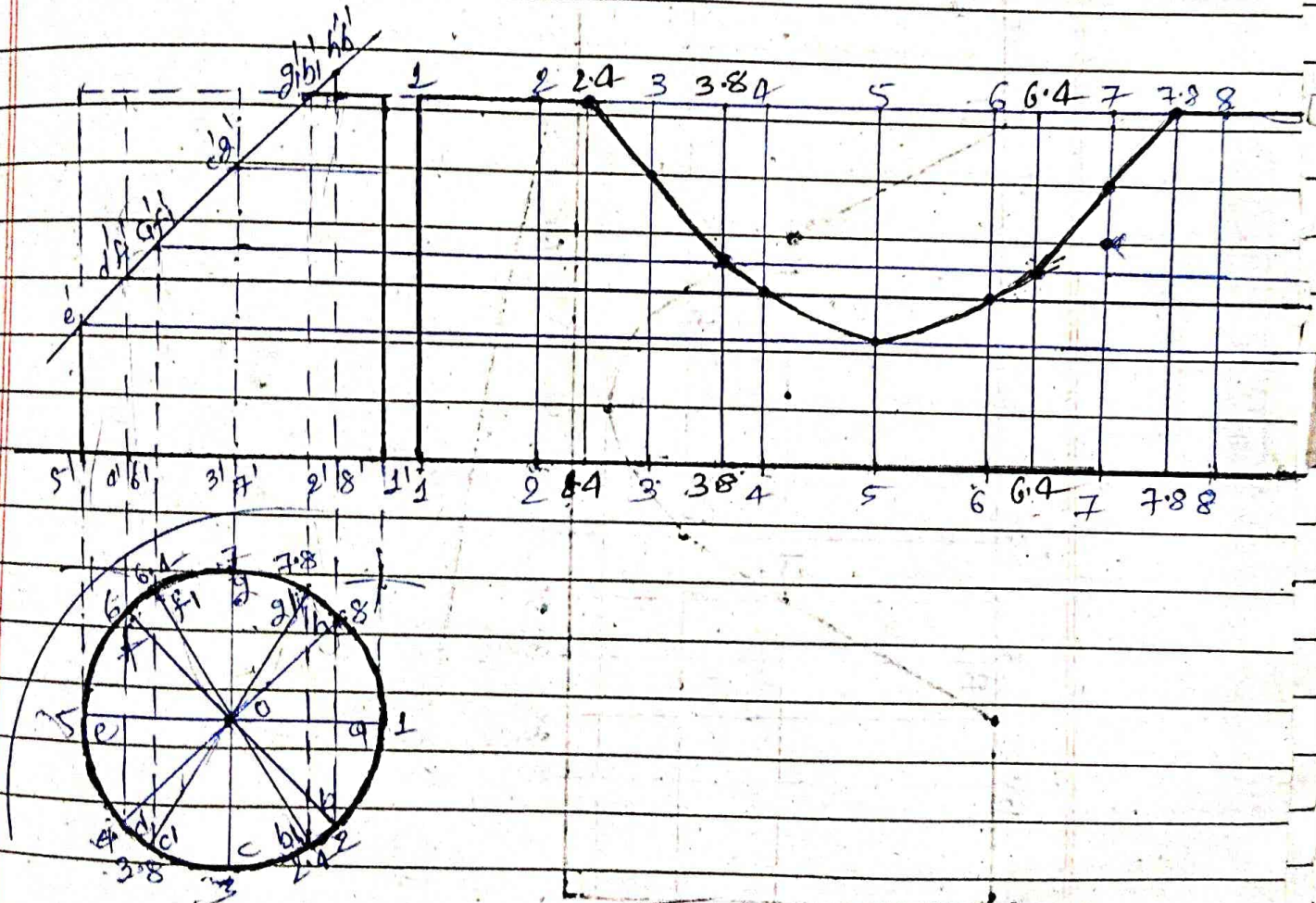
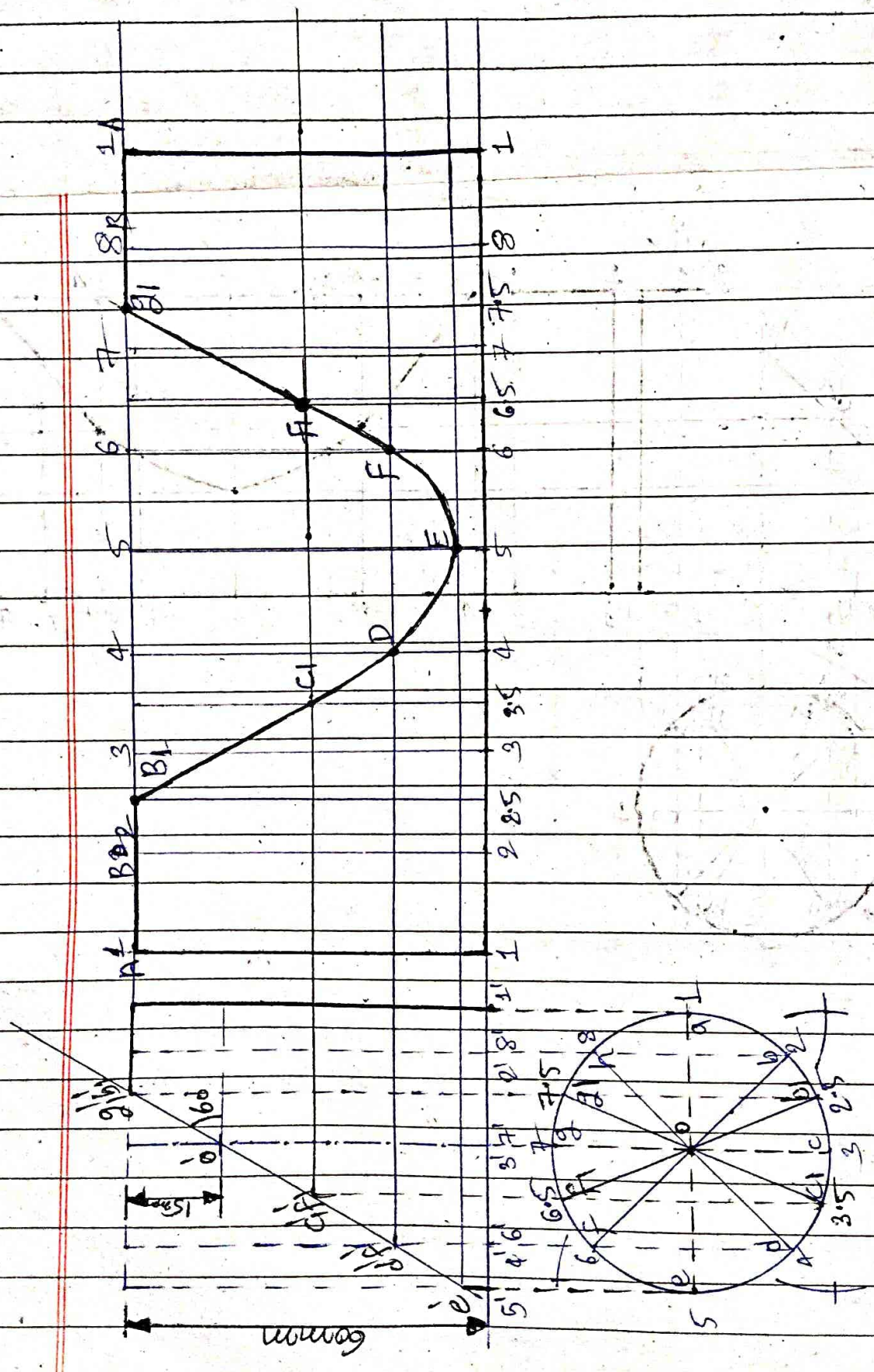
(Q) A cylinder of base 40mm and height 50mm is cut by a section plane which makes 45° with the HP at a distance of 40mm from lower base. Draw the development for the lower part of the cylinder.



(Pyp) A cylinder of 45 diameter and 60mm long is resting on one of its bases on HP. It is cut by a Section plane inclined at 60° with HP and



Computer graphics

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(pg 8) Enlist the advantage of computer aided drafting over manual drafting.

ans ⇒ Computer aided drafting (CAD) has many advantages over manual drafting including

(1) Accuracy :- CAD systems provide extremely high accuracy so that designs are more precise than created by hand. This helps to improve the quality of the final product.

(2) Speed :- CAD software allows designers to create and modify designs quickly and easily. This helps to reduce the time required to complete a project.

(3) Consistency :- CAD System allows designers to create consistent designs. This helps to ensure that project are consistent and uniform.

(4) Improved Communication :- CAD Software allows designers to share designs with others, including team members. This helps to improve communication and collaboration.

Q5) explain the diff-coordinate system used in CG with example

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Q6) use → The polar array command is useful in many design applications, such as creating decorative patterns, radial array, circular feature.

Q7) what is user-coordinate system? Discuss its various types by considering an example for construction of rectangle with dimension 60mm x 40mm.

ans ⇒ A user-coordinate system is a system that defines the position of objects within a computer graphics program.

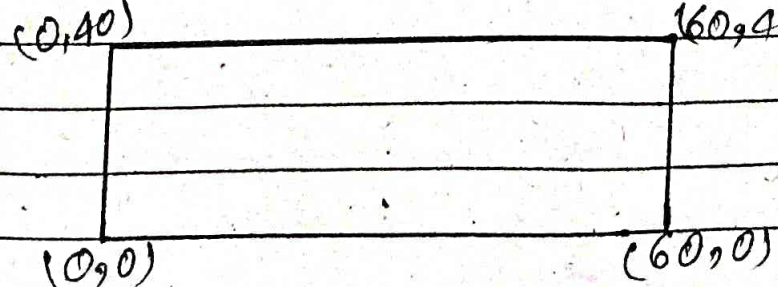
or → This is a system through which user communicates with software.

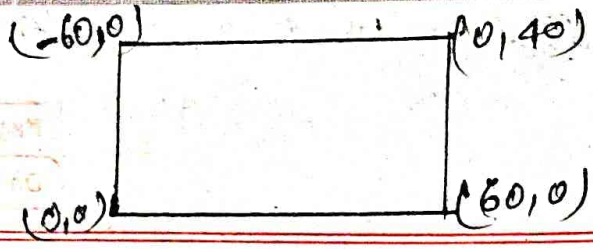
Various types

1. Absolute Mode
2. Relative Mode
3. polar Mode

① Absolute Mode :-

Command : Line (press enter)
Specify first point : 0,0 (Press enter)
Specify Next point : 60,0 (Press enter)
Specify Next point : 60,40 (Press enter)
Specify Next point : 0,40 (Press enter)
Specify Next point : 0,0 (press enter)





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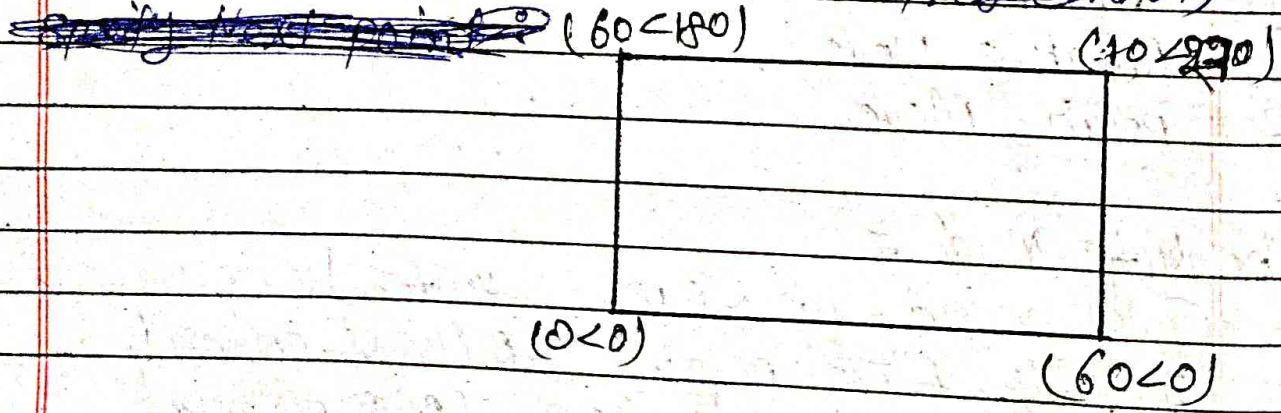
(2) Relative Mode

Command: line (press enter)
Specify first point: @(0,0) (press enter)
Specify Next point: @(60,0) (press enter)
Specify Next point: @(0,40) (press enter)
Specify Next point: @(-60,0) (press enter)
Specify Next point: @(0,0) (press enter)

(3) polar mode:

Command: line (press enter)
Specify first point: @(0<0) (press enter)
Specify Next point: @(60<0) (press enter)
Specify Next point: @(40<90) (press enter)
Specify Next point: @(60<180) (press enter)
Specify Next point: @(40<270) (press enter)



Q5) what is the difference between absolute and incremental mode of drawing?

absolute	incremental
① In absolute coordinates the position of a point is given with respect to a fixed origin.	In incremental coordinates the position of a point is given with respect to its ~~previous~~ current positions.
② It is used in technical drawings such as engineering designs, architectural plans	It is used in computer graphics and animation
③ An Absolute movement moves to a coordinate.	An incremental movement moves a distance.

Q6) what is the use of fillet, chamfer, array and trim in Computer graphics?

⇒ fillet: fillet is used to create smooth curves and make objects look more polished.

→ chamfer: chamfer is a tool used to cut off the sharp corners of an object.

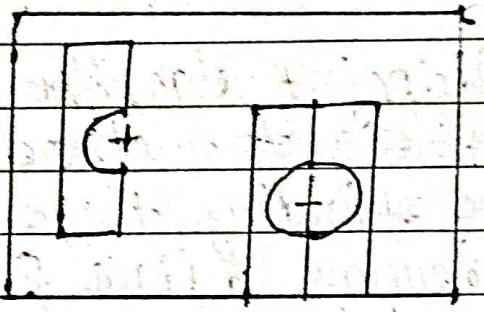
→ Array: Array is a tool used to create multiple copies of an object in a precise pattern or arrangement.

→ Trim: Trim is a tool used to remove unwanted portions of an object.

Q9 Explain any four modify commands along with suitable sketches used in computer graphics.

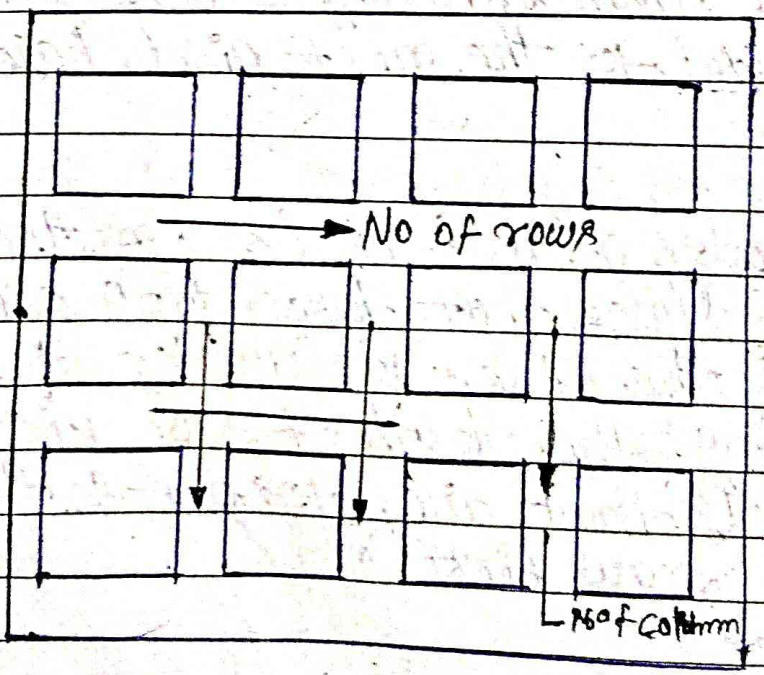
any ⇒

(i) Mirror :- This command is very useful to draw symmetrical objects. only half of the object need to be drawn. The second half can be created using the mirror command.

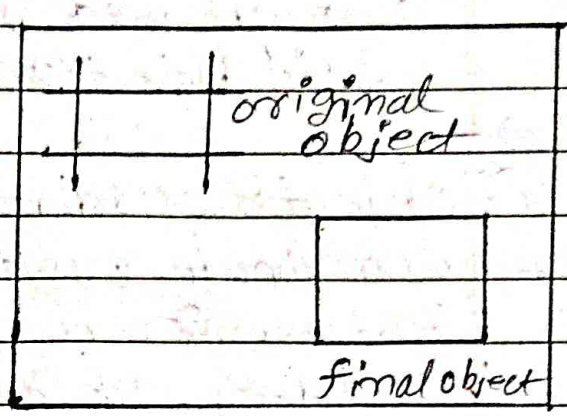


sketch

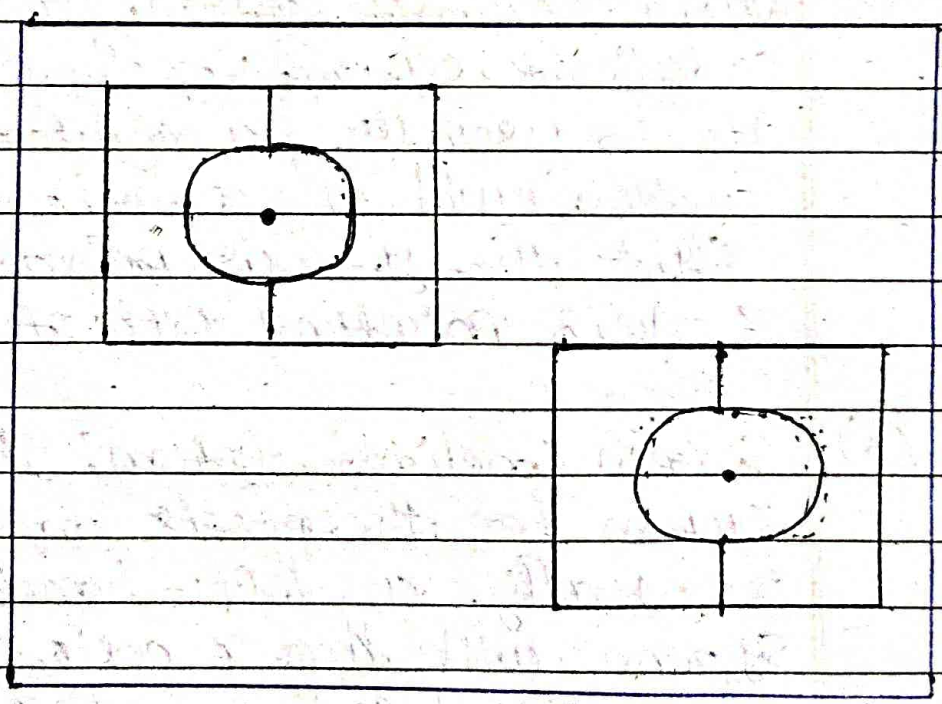
(ii) Array :- This command provides multiple copies of selected objects arranged in a rectangular or polar pattern.



(iii) Trim: This command is used to cut away excessively long lines.



(iv) Move: This command is used to move a line or object to a new position on the drawing.



(v) Describe the line which will be used to show the cutting plane.

Ans Cutting plane line: Cutting plane lines are imaginary line which is used to cut 3D objects and allow to show internal & interior part of an object.

PYQ Discuss diff types of 'Array' commands.

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PYQ Enlist different types of array command. Discuss in detail stepwise procedure of polar array along with its use.

array → The array is the command used to draw multiple copies of an object in a particular pattern or order.

Types of array

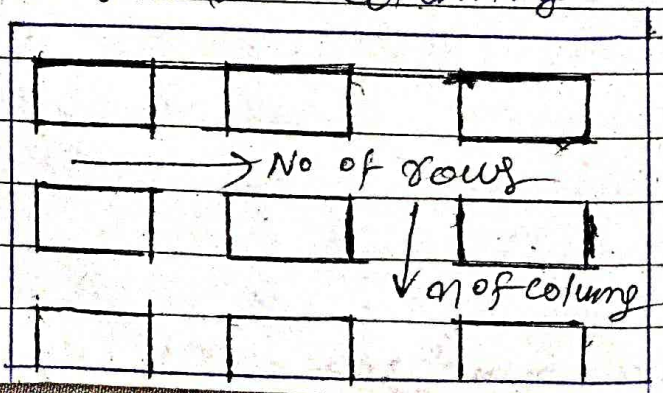
(i) Rectangular array
(ii) Polar array
(iii) Path array

(1) Rectangular array :- The Rectangular array is defined as the arrangement of the object into rows, columns and levels that form a rectangle (matrix).

procedure

(i) Enter array command in command window.
(ii) Select array from modify toolbar
(iii) Select array: rectangular/path/polar
(iv) Select the object.
(v) Enter number of rows & columns.
(vi) Select distance btw rows & columns.
(vii) Press enter.

Uses → grid layout structural components



Polar array is also called circular array the arrangement of copies of an objects in a circular form.

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(2) polar array :-

(i) Enter array command in command window.

(ii) select array from modify toolbar.

(iii) select array : rectangular / path / polar.

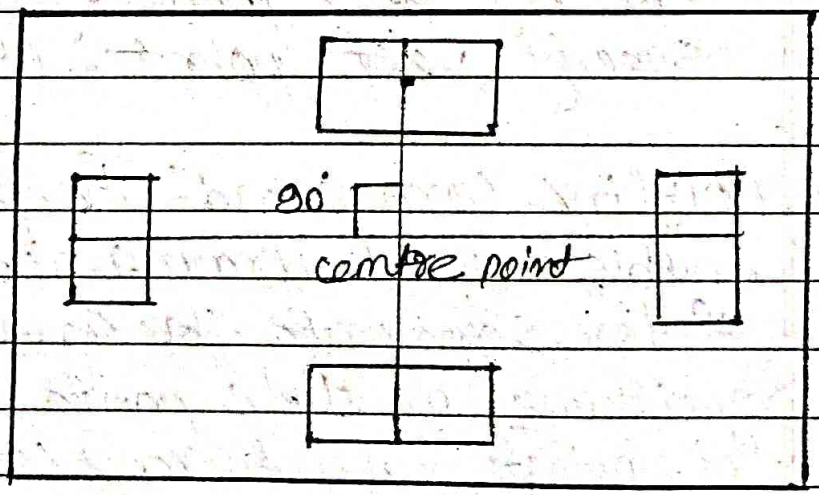
(iii) select the object

(iv) Enter number of objects to be created.

(v) Enter angle of array

(vi) Enter centre of array

(vii) Press enter.



Uses → circular pattern, radial pattern, geometric pattern.

9 gana

leave with id

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(10) Describe the various methods of drawing line in computer graphics.

(i) line command
(ii) polyline command

(1) line command: The line is drawn by specifying the starting and ending point through the cursor. Select the line icon from the ribbon panel or type L or line and press Enter on the command line.

(i) Command: Line (press enter)
(ii) Specify first point: (0,0)
(iii) Specify next point: (50,0)

(2) polyline command: The polyline command enables you to draw a connected sequence of line segments. You can create a polyline by specifying multiple points, and the lines b/w the points will form a continuous object. Polyline objects in autocad can have different widths and properties, making them useful.

(i) Type "PLINE" in the command.
(ii) click on the "polyline" button
(iii) Specify the start point of the polyline.
(iv) Specify the end point of the.
(v) press Enter to close shape.

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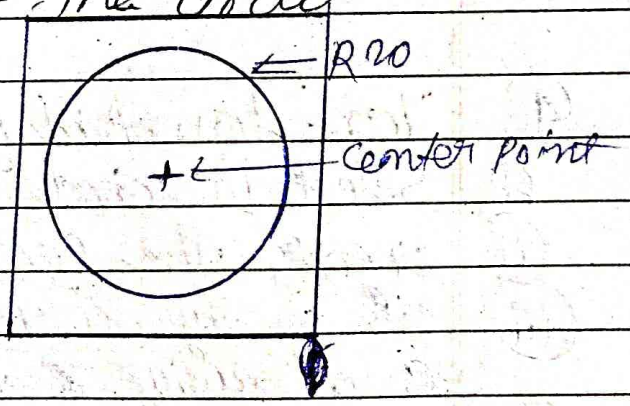
(Q9) Describe the methods to make a circle (Any four).

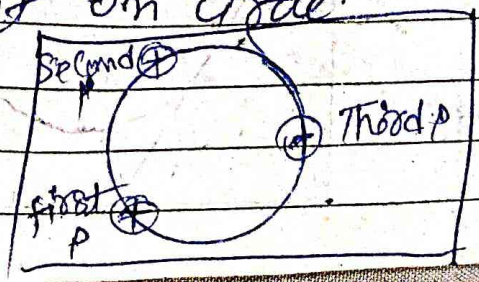
ans → (i) circle command
(ii) 2 point method.
(iii) 3 point method.
(iv) Tan, tan, radius method.

(1) circle Command: The circle command is used to draw a circle by specifying the center point and radius.

(i) click on the circle icon on the draw toolbar.
(ii) Type C on the command line
(iii) Press enter.
(iv) specify the center point of a circle.
(v) Specify the radius of the circle
(vi) Press enter.



(2) 3 point method:-
(i) Select the circle tool from the draw toolbar.
(ii) Specify the center point for circle.
(iii) Type 3P:
(iv) enter
(v) Specify the first point of a circle
(vi) Specify the second point on circle.
(vii) specify the third point
(viii) Press enter.



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③ 2 point method:

(i) Select the circle from the tool-bar.

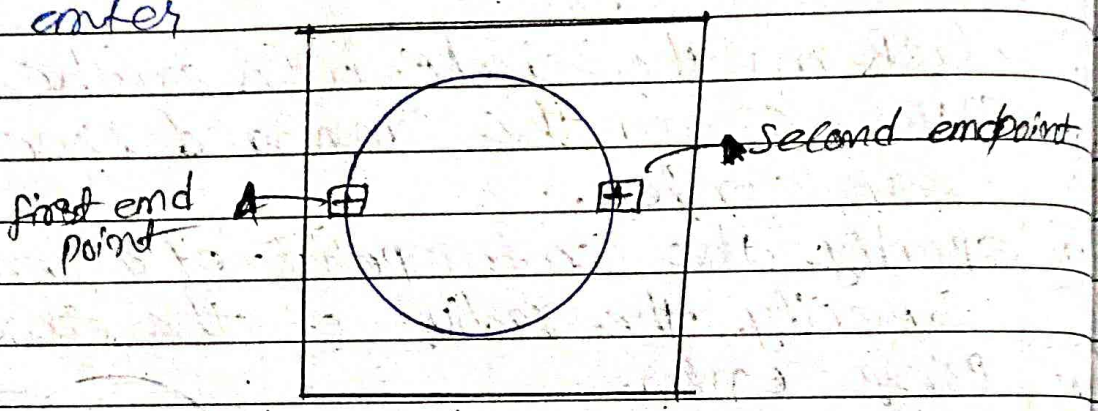
(ii) Specify the center of the circle.

(iii) Type - 2P enter

(v) Specify the first end-point on diameter.

(vi) Specify the second endpoint on diameter.

(vii) press enter



④ Tan, tan, Radius method:

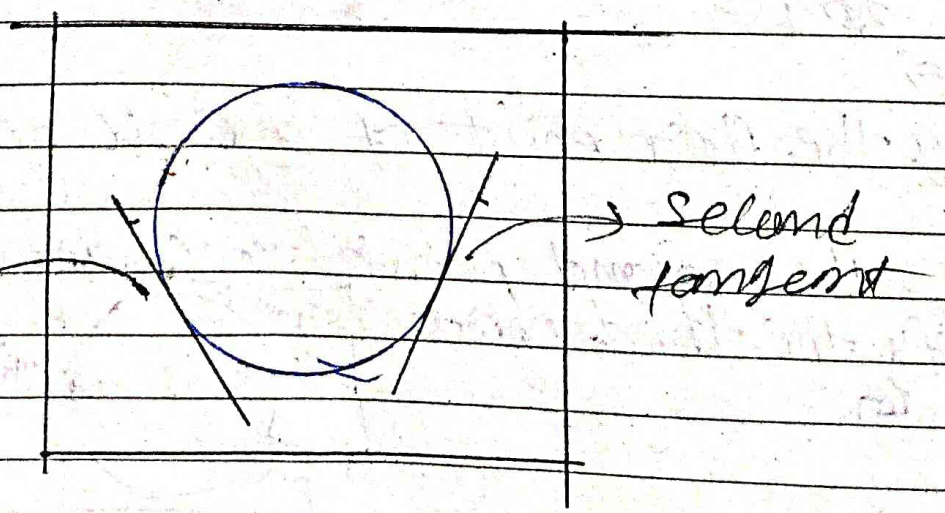
(i) Select the circle from the toolbar.

(ii) Specify the center of the circle.

(iii) Specify first tangents to the circle and radius enclosing them.

(iv) specify second tangents to the circle.

(v) press enter.



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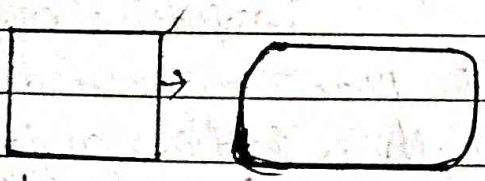
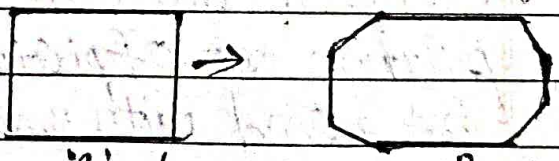
(Q7) Describe the extrusion command.

(Q8) What is the utility of extrude command?

ans⇒ The extrude command in autoCAD is used to create a 3D solid from an object. The object can be a closed shape such as a rectangle or circle.
Utility → logo design, Manufacturing.

(Q9) Difference between 'fillet' and 'chamfer' command.

ans⇒

fillet	chamfer
(i) This command is used to connect two existing lines, circles or arcs.	(i) This command is similar to the fillet except that in chamfer, the corners with a straight edge which intersects the two objects at a specified distance from their point of intersection.
(ii)  original → final	(ii)  original final

(Q10) Elaborate the function of array command in computer graphics.

ans⇒ The function of array command in computer graphics is to create multiple copies of an object in a regular pattern. This can be used to create a variety of effects such as a flower petal pattern.

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(pg8) How extrude and revolve commands are used as constructional tool?

ans ⇒

both are used to create 3D objects from 2D sketches.

The Extrude command creates a 3D object by extruding a 2D sketch along a specific path. Ex ⇒ Boxes, cylinders

The Revolve command creates a 3D object by revolving a 2D sketch around a specified axis. The axis can be a line, a circle.
Ex ⇒ Spheres, cones.

(pg8)

	manual drafting	Computer aided drafting
(i)	manual drafting is creation and manipulation of pictures by hand with pencil & ink.	computer-aided drafting is the creation and manipulation of pictures on a computers.
(ii)	Skill is required in the design.	less skill is required in the design.
(iii)	It consumes more time than CAD.	It consumes less time than manual drafting.
(iv)	It does not provide high accuracy.	It provides high accuracy.