ST. ANN'S COLLEGE of ENGINEERING & TECHNOLOGY: CHIRALA

DEPARTMENT of MECHANICAL ENGINEERING

ENGINEERING GRAPHICS

NAME of THE STUDENT : ……

CLASS / SEMESTER : ……

BRANCH / SECTION : ……

HALL TICKET NUMBER : ……..

ACADEMIC YEAR : ……..….

ENGINEERING GRAPHICS - SYLLABUS

UNIT - I

Polygons:

1.1 Geometrical Constructions and Constructing regular **polygons by general method**

Curves:

1.2 Construction of **Ellipse,Parabola and Hyperbola by General method (Eccentricity method) only**, Normal and Tangent to the curves

1.3 Construction of **Cycloid, Epi-Cycloid and Hypo-cycloid**, Normal and Tangent to the curves

1.4 Construction of an **involute of Triangle, Square and Circle**, Normal and Tangent to the curves

Scales:

1.5 Construction of **Plain Scales**

1.6 Construction of **Diagonal Scales**

1.7 Construction of **Vernier Scales**

UNIT - II

2.1 Projections of points in various quadrants

2.2 Projections of straight lines - Line parallel to both the planes

2.3 Projections of straight lines - Line perpendicular to one plane and parallel to another plane

2.4 Projections of straight lines - Line parallel to one plane and inclined to another plane

2.5 Projections of straight lines –

Line inclined to both the planes, determination of true lengths and true inclinations.

2.6 Projections of planes – Regular planes perpendicular / parallel to one reference plane and inclined to the other reference plane

2.7 Projections of planes – Regular planes inclined to both the reference planes

UNIT - III

3.1 Projections of solids – **Projections of solids in simple positions:** Axis perpendicular to H.P, Axis perpendicular to V.P and Axis parallel to both H.P and V.P.

3.2 Projections of Solids:

Projections of solids with axis inclined to one reference plane and parallel to another plane.

UNIT - IV

4.1 Sections of solids –

Sections of solids in simple position only. Sectional views and true shape of section

4.2 Development of Surfaces: Development of a cube, prism, cylinder, pyramid and cone

UNIT - V

5.1 Conversion of **isometric views to orthographic views (3D TO 2D CONVERSION)**

5.2 Conversion of **orthographic views to isometric views (2D TO 3D CONVERSION)**

TEXT BOOK: Engineering Drawing by N.D.Bhatt, Chariot Publications

REFERENCE BOOKS:

1. Engineering Drawing by K.L.Narayana & P.Kannaiah, Scitech Publishers

2. Engineering Drawing by M.B Shah and B.C Rana, Pearson Education Inc, 2009

3. Engineering Drawing with an introduction to AutoCAD, Dhananjay Jolhe, TMH, 2017

ENGINEERING GRAPHICS

INDEX

BRANCH / SECTION :…….. /……. HALL TICKET NUMBER :……..……

EG-SHEETS-SYLLABUS

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	2	**GEOMETRICAL CONSTRUCTIONS**	Geometrical Constructions and Constructing regular polygons by general method
	3	**CONIC SECTIONS**	Construction of Ellipse, Parabola and Hyperbola by General method only (Eccentricity method), Normal and Tangent to the curves
	4	**CYCLOIDS AND INVOLUTES**	**4.1** Construction of Cycloid, Epi-Cycloid and Hypo-cycloid, Normal and Tangent to the curves **4.2** Construction of an involute of Triangle, Square and Circle, Normal and Tangent to the curves
	5	**PLAIN SCALES**	Construction of Plain Scales
	6	**DIAGONAL SCALES**	Construction of Diagonal Scales
	7	**VERNIER SCALES**	Construction of Vernier Scales
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	9	**PROJECTIONS OF STRAIGHT LINES - I**	**9.1** Line parallel to both the planes **9.2** Line perpendicular to one plane and parallel to another plane
	10	**PROJECTIONS OF STRAIGHT LINES - II**	Line parallel to one plane and inclined to another plane
	11	**PROJECTIONS OF STRAIGHT LINES - III**	Line inclined to both the planes, determination of true lengths and true inclinations.
	12	**PROJECTIONS OF PLANES**	**12.1** Regular planes perpendicular / parallel to one reference plane and inclined to the other reference plane **12.2** Regular planes inclined to both the reference planes
III	13	**PROJECTIONS OF SOLIDS**	**13.1** Projections of solids in simple positions: Axis perpendicular to H.P, Axis perpendicular to V.P and Axis parallel to both H.P and V.P. **13.2** Projections of solids with axis inclined to one reference plane and parallel to another plane.
IV	14	**SECTIONS OF SOLIDS**	Sections of solids in simple position only. Sectional views and true shape of section
	15	**DEVELOPMENT OF SURFACES**	Development of a cube, prism, cylinder, pyramid and cone
V	16	**3D TO 2D CONVERSION**	Conversion of isometric views to orthographic views
	17	**2D TO 3D CONVERSION**	Conversion of orthographic views to isometric views

SHEET No.1 **TITLE: FREE HAND LETTERING**

1.1. PRINT, WITH HB PENCIL, VERTICAL CAPITAL ALPHABETS (FROM A TO Z) AT A HEIGHT OF 10 mm.

1.2. PRINT, WITH HB PENCIL, VERTICAL DIGITS (FROM 0 TO 9) AT A HEIGHT OF 10 mm.

1.3. PRINT THE FOLLOWING SENTENCES IN VERTICAL AT A HEIGHT OF 7 mm:

1.3.1. ALL DIMENSIONS ARE IN mm

1.3.2. SCALE 1:1

1.3.3. GEOMETRICAL CONSTRUCTIONS

1.3.4. CONIC SECTIONS

1.3.5. CYCLOIDS AND INVOLUTES

1.3.6. PLAIN SCALES

1.3.7. DIAGONAL SCALES

1.3.8. VERNIER SCALES

1.3.9. PROJECTIONS OF POINTS

1.3.10 PROJECTIONS OF STRAIGHT LINES

1.3.11 PROJECTIONS OF PLANES

1.3.12 PROJECTIONS OF SOLIDS

1.3.13 SECTIONS OF SOLIDS

1.3.14 DEVELOPMENT OF SURFACES

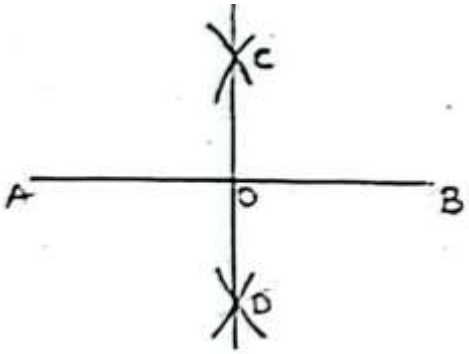
1.3.15 3D TO 2D CONVERSION

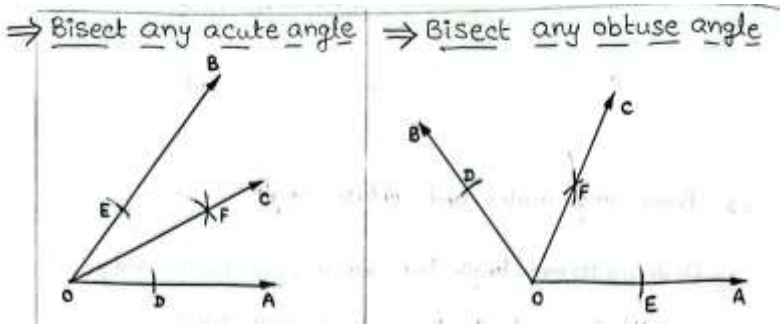
1.3.16 2D TO 3D CONVERSION

1.3.17 MY NAME IS ……

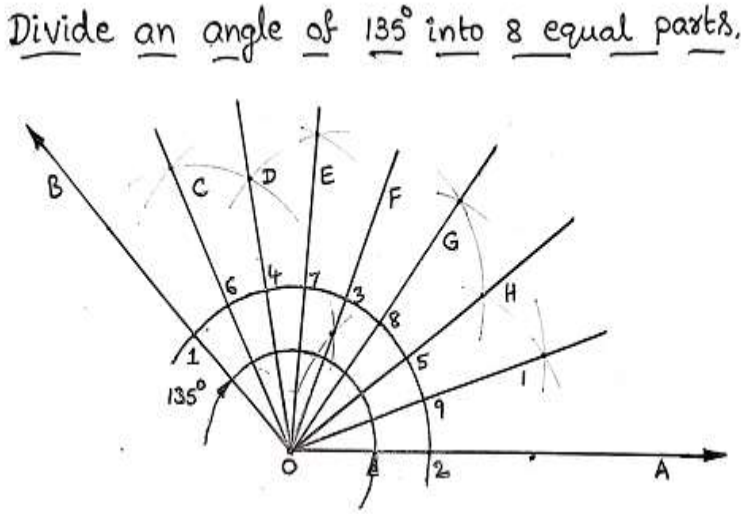
SHEET NO.2 **TITLE: GEOMETRICAL CONSTRUCTIONS** **UNIT - I**

2.1 Bisect a straight line of any length. **2.2**

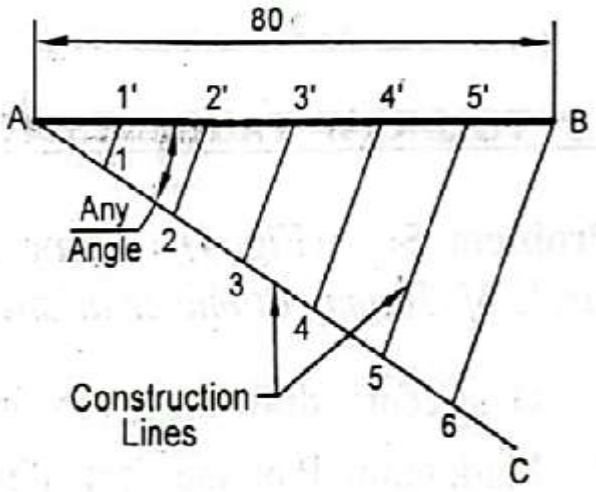




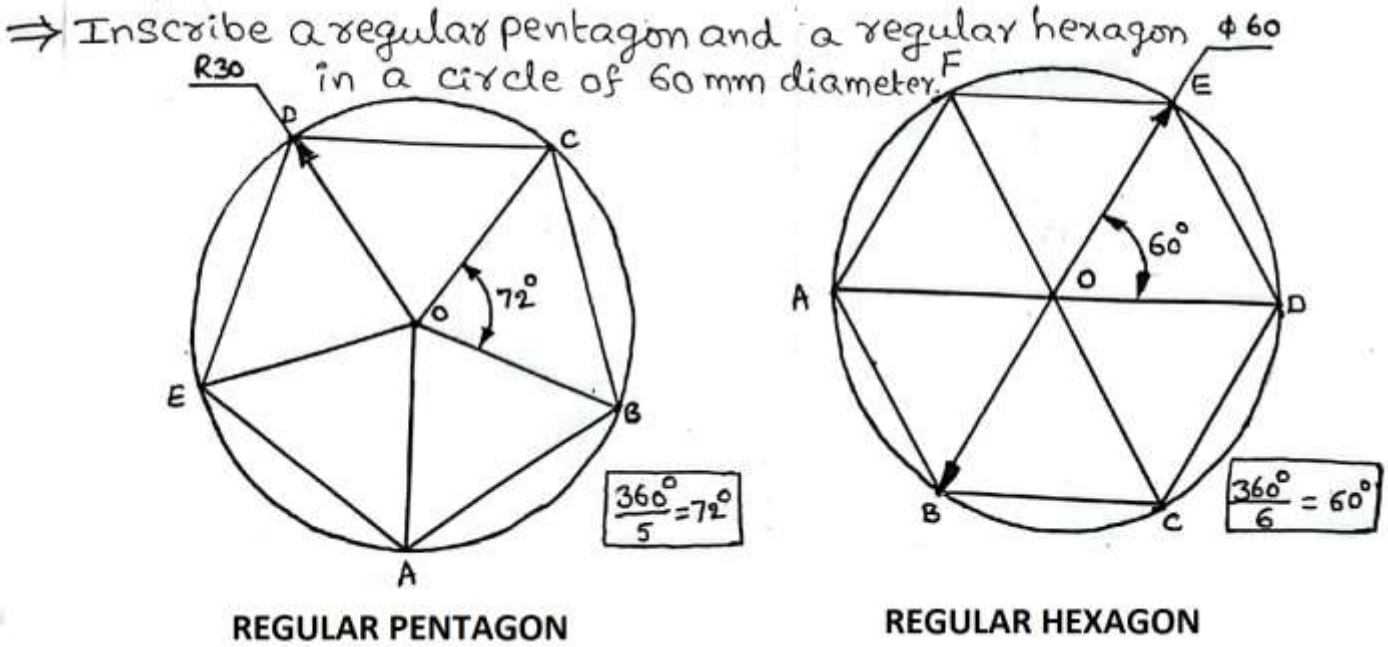
2.3



2.4 Divide a straight line of 80 mm length into six equal parts.

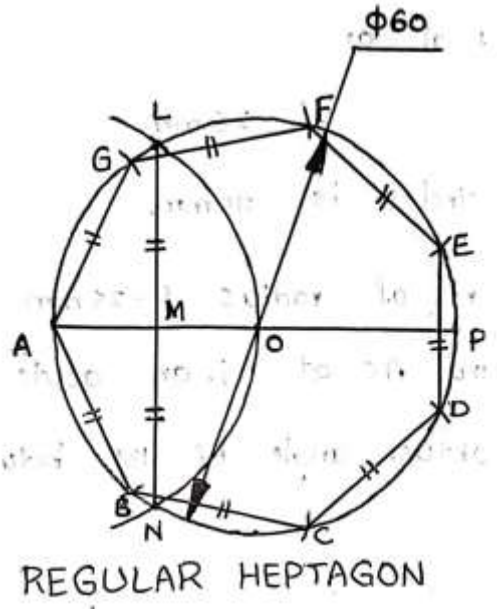


2.5



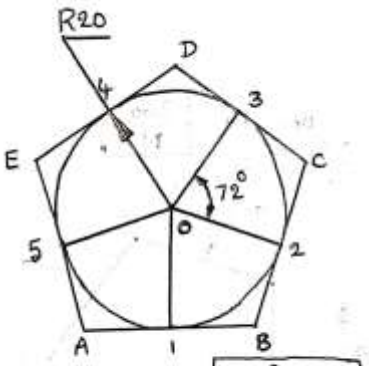
REGULAR PENTAGON **REGULAR HEXAGON**

2.6 Inscribe a regular heptagon in a circle of 60 mm diameter.



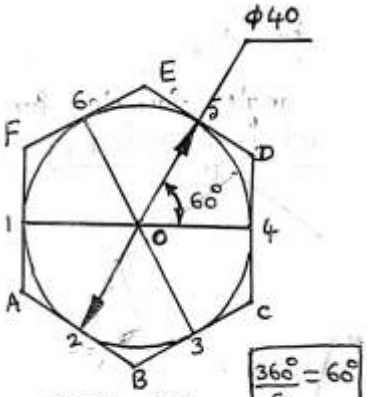
REGULAR HEPTAGON

2.7 Superscribe / Describe / Circumscribe a regular pentagon and a regular hexagon about a circle of 40 mm diameter.



REGULAR PENTAGON

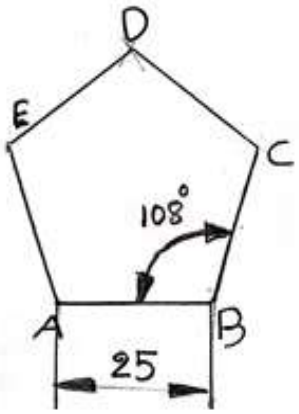
$\frac{360^\circ}{5} = 72^\circ$



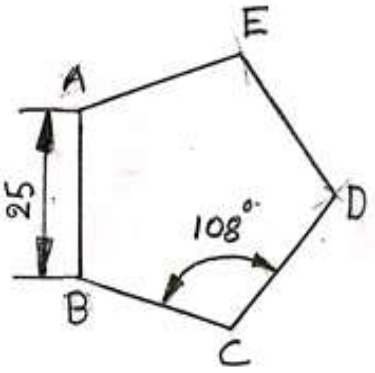
REGULAR HEXAGON

$\frac{360^\circ}{6} = 60^\circ$

2.8 Construct a regular pentagon of 25 mm side when one side is (i) horizontal and (ii) vertical.



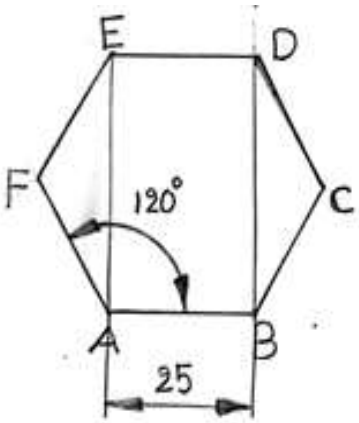
AB – HORIZONTAL



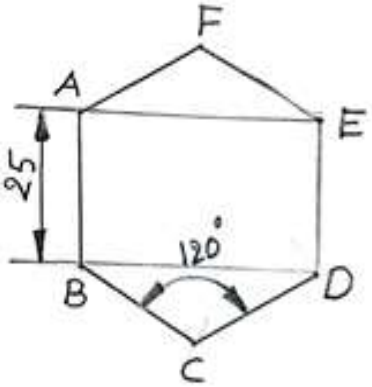
AB - VERTICAL

REGULAR PENTAGON

2.9 Construct a regular hexagon of 25 mm side when one side is (i) horizontal and (ii) vertical.



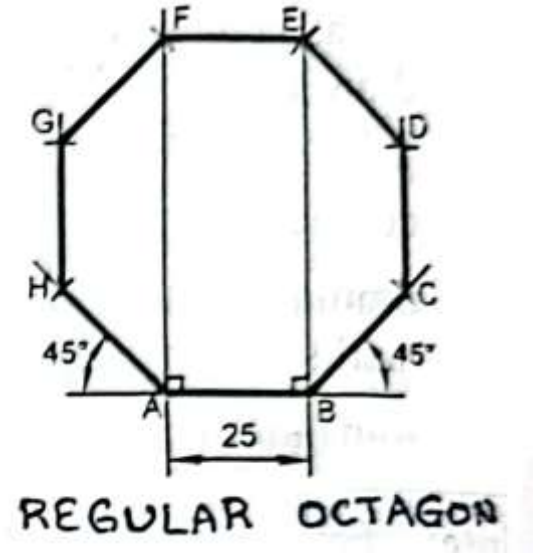
AB – HORIZONTAL



AB - VERTICAL

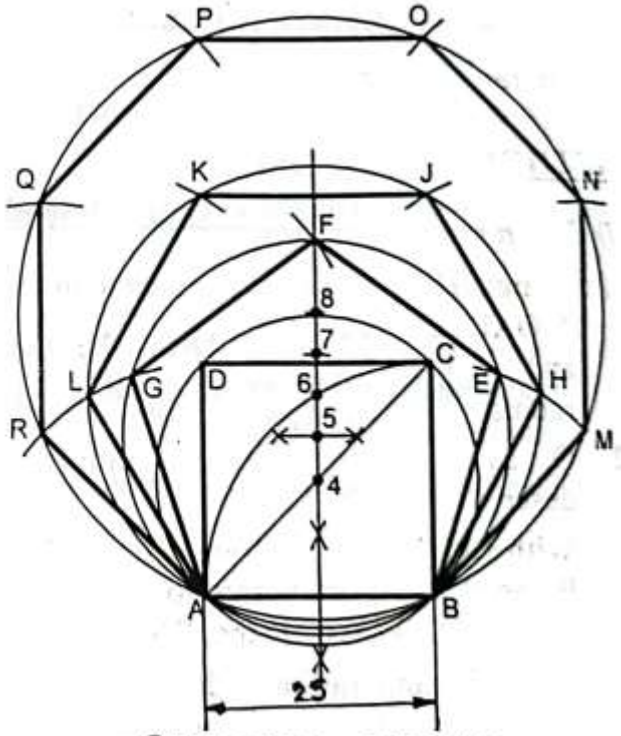
REGULAR HEXAGON

2.10 Draw an octagon given the length of side 25 mm.



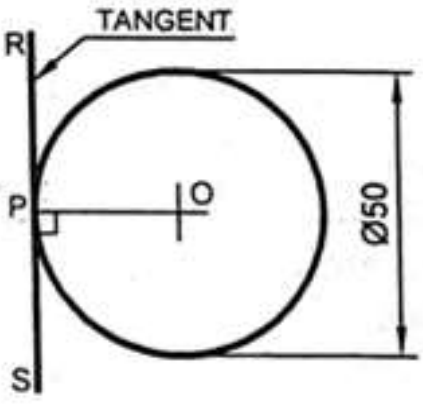
REGULAR OCTAGON

2.11 Construct a regular polygon of any number of sides by general method, given the length of its sides equal to 25 mm.



GENERAL METHOD

2.12 Draw a tangent to a given circle of 50 mm diameter at any point P on it.

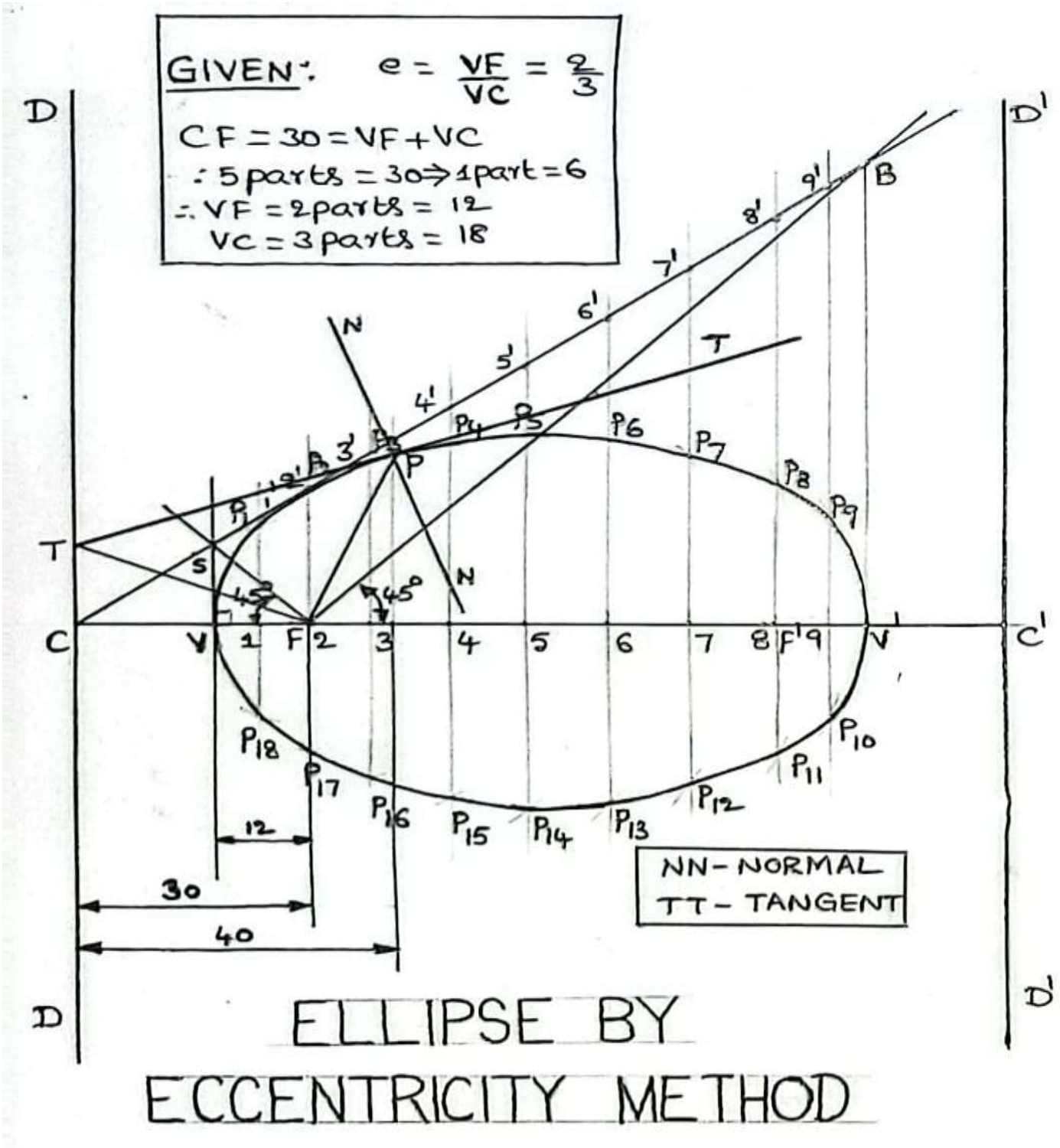


SHEET NO.3 **TITLE: CONIC SECTIONS** **UNIT - I**

3.1 Construct an ellipse, with distance of the focus from the directrix as 30 mm and eccentricity as 2/3. Also, draw a normal and a tangent to the curve at a point on it, 40 mm from the directrix.

(OR)

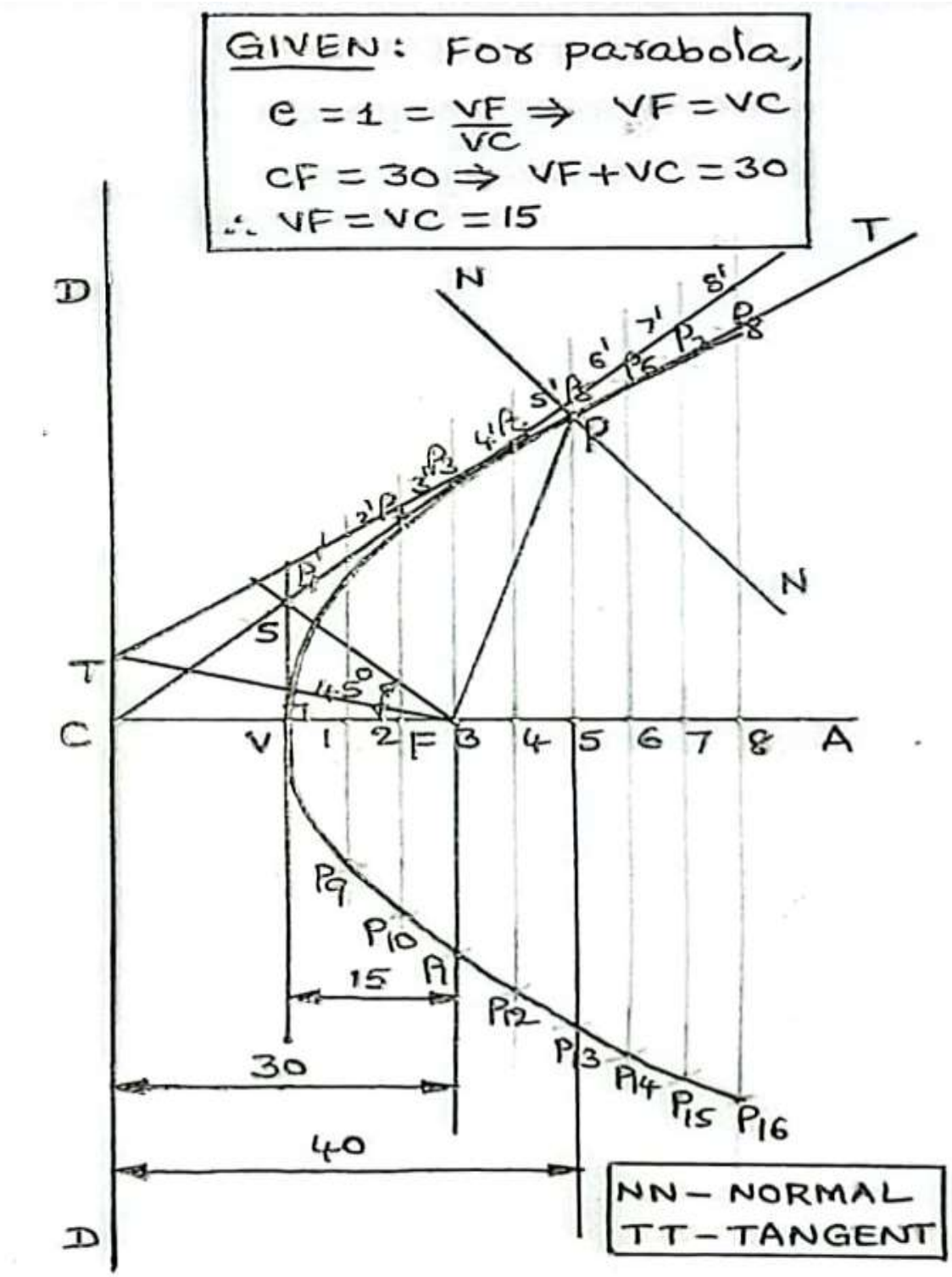
The distance between a fixed straight line and a fixed point is 3 cm. Trace the path of a point P moving in such a way that the ratio of its distance from the fixed point, to its distance from the fixed straight line is 2/3. Name the curve. Draw a normal and a tangent to the curve at a point on it, 4 cm from the directrix.



3.2 Construct a parabola when the distance between focus and directrix is 30 mm. Draw a normal and a tangent to the curve at a point 40 mm from the directrix.

(OR)

A fixed-point F is 3 cm from a fixed straight line. Draw the locus of a point P moving in such away that its distance from the fixed straight line is equal to its distance from F. Name the curve. Draw a normal and a tangent to the curve at a point 4 cm from the directrix.

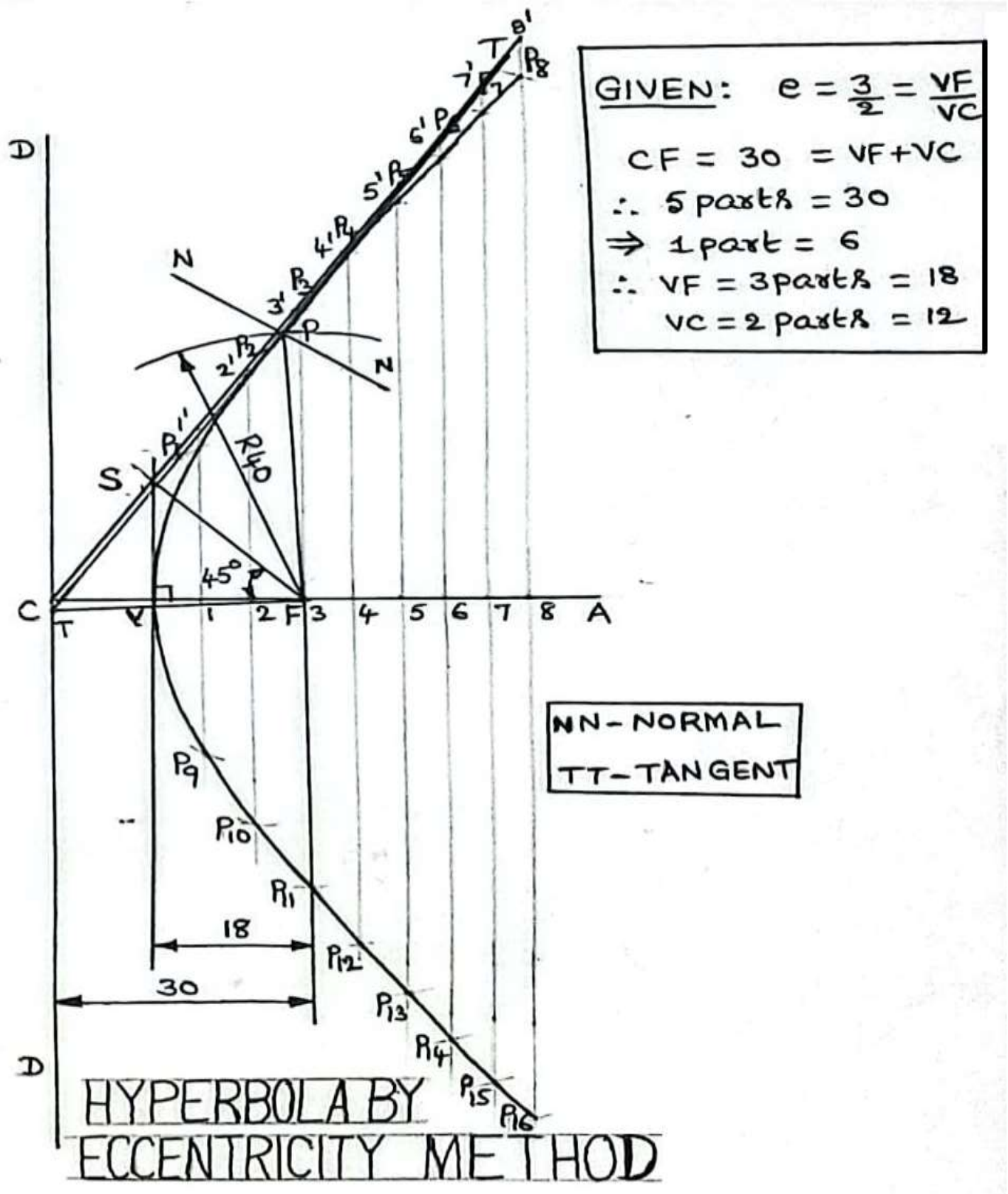


PARABOLA BY ECCENTRICITY METHOD

3.3 Construct a hyperbola, when the distance between its focus from the directrix is 30mm and eccentricity is 3/2. Also, draw a tangent and a normal to the curve at a point 40 mm from the focus.

(OR)

A fixed-point F is 3 cm from a fixed straight line. Draw the locus of a point P moving in such a way that its distance from the fixed straight line is 2/3 times its distance from F. Name the curve. Draw a normal and a tangent to the curve at a point on it, 4 cm from the focus.



SHEET NO.4 **TITLE: CYCLOIDS AND INVOLUTES** **UNIT - I**

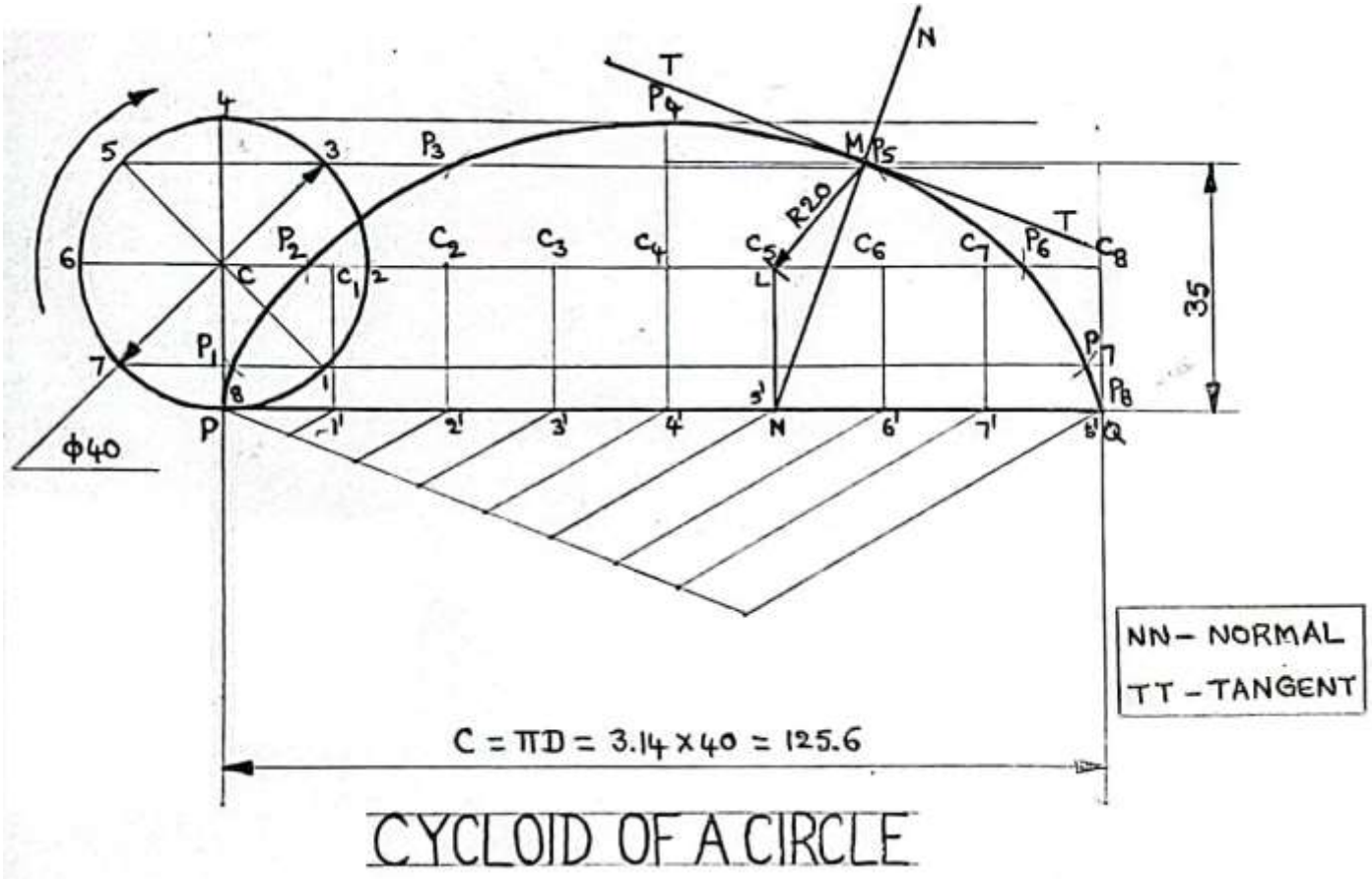
4.1 Draw a cycloid having a generating circle of 40 mm diameter and draw a tangent and a normal to the curve at a point, 35 mm above the base line.

(OR)

Construct a cycloid for one complete revolution of a circle having a 40 mm diameter. Draw a tangent and a normal to the curve at a point, 35 mm above the base line.

(OR)

A generating circle of 40 mm diameter rolls on a straight line without slipping. Trace the locus of a point "P" on the circumference of the circle rolling for one revolution. Name the curve. Draw a tangent and a normal to the curve at a point, 35 mm above the base line.

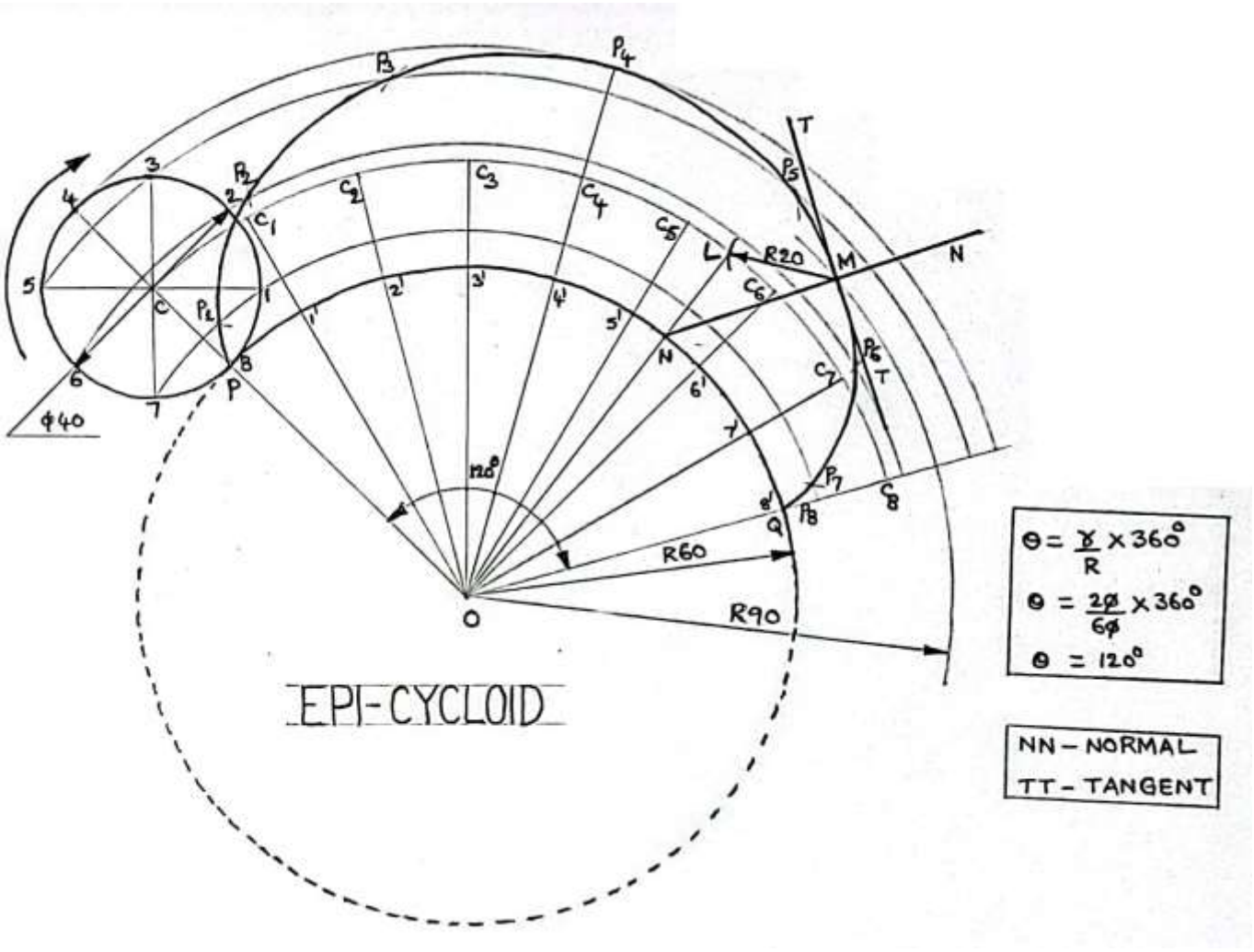


CYCLOID OF A CIRCLE

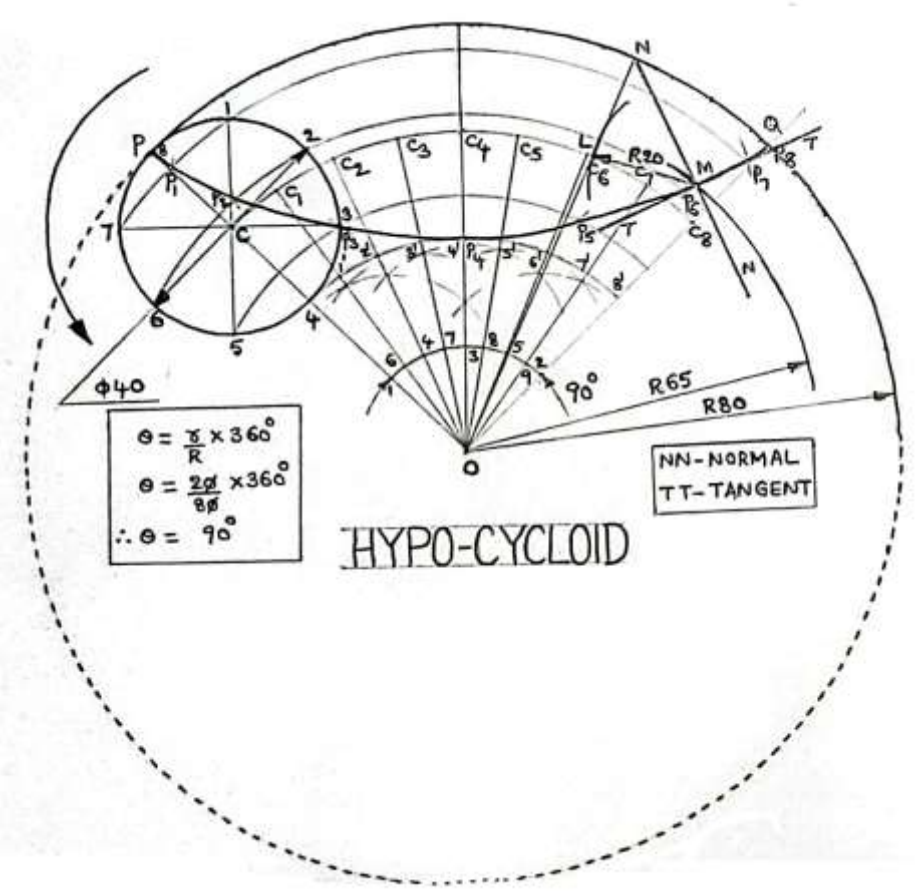
4.2 Draw an epicycloid having a generating circle of diameter 40 mm and a directing circle of diameter 120 mm. Draw a tangent and a normal to it at a point, 90 mm from the center of directing circle.

(OR)

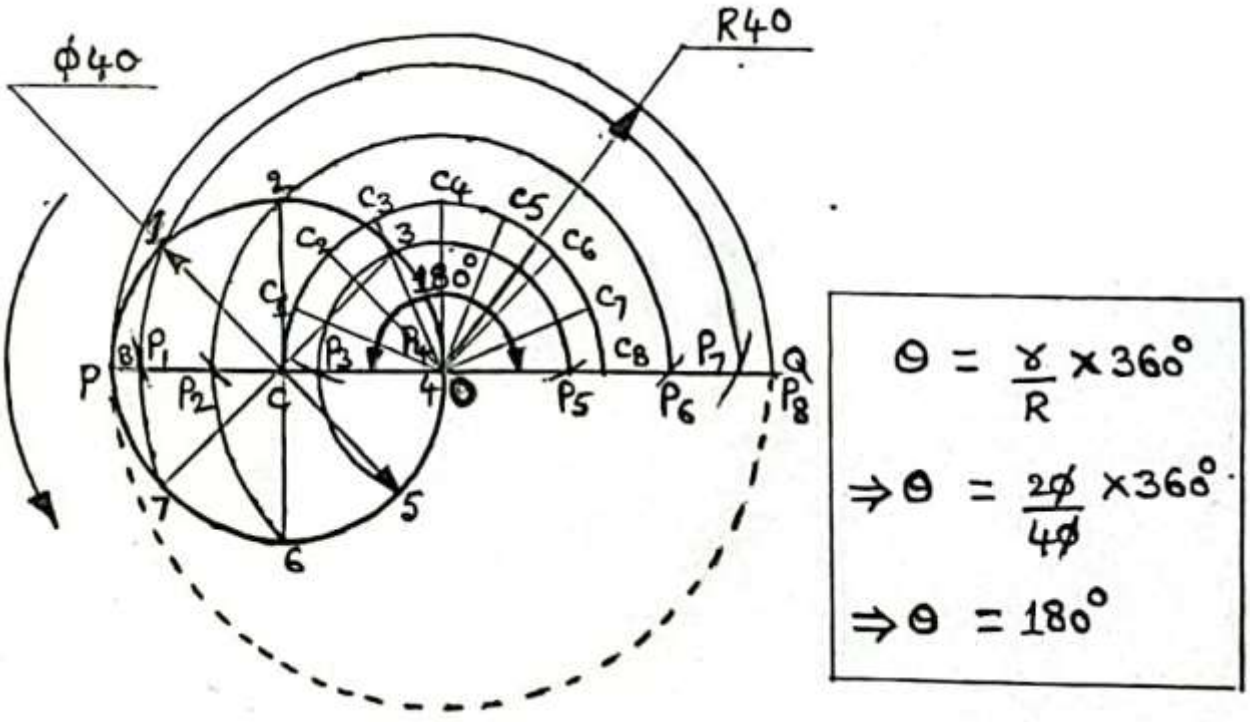
Draw an epicycloid of a circle of 40 mm diameter rolls outside another circle of 120 mm diameter for one revolution. Draw a tangent and a normal to it at a point, 90 mm from the center of directing circle.



4.3 Draw a hypocycloid of a circle of 40 mm diameter rolls inside another circle of 160 mm diameter for one revolution. Draw a tangent and a normal to it at a point, 65 mm from the center of directing circle.

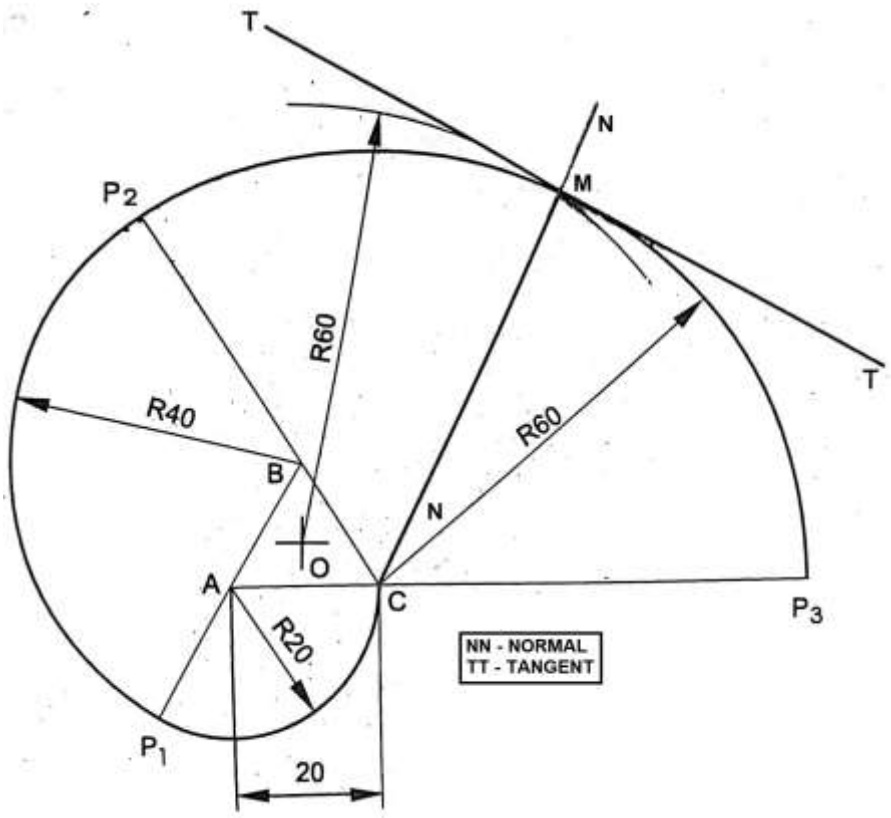


4.4 Show by means of a drawing that when the diameter of the directing circle is twice that of the generating circle, the hypo-cycloid is a straight line. Take the diameter of the generating circle equal to 40 mm.



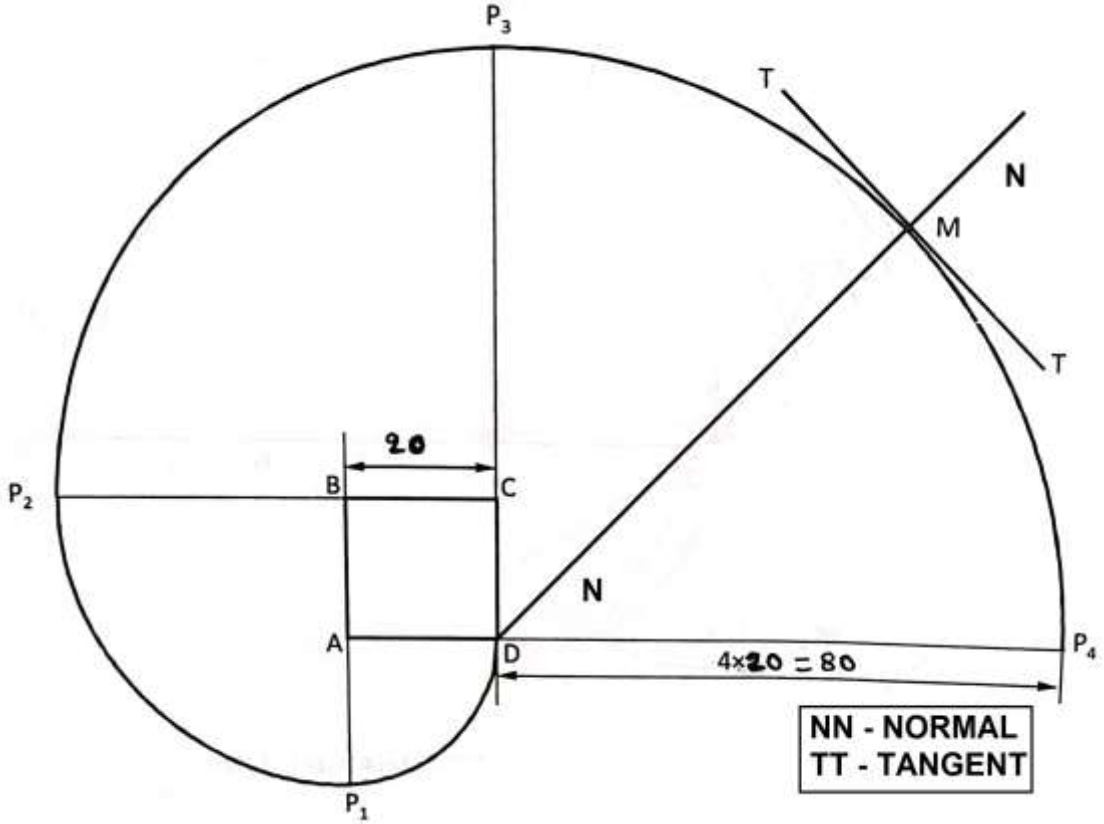
HYPO-CYCLOID – A STRAIGHT LINE

4.5 Draw an involute of an equilateral Triangle of 20 mm side. Draw a tangent and a normal to the curve at a distance 60 mm from the center of the triangle.



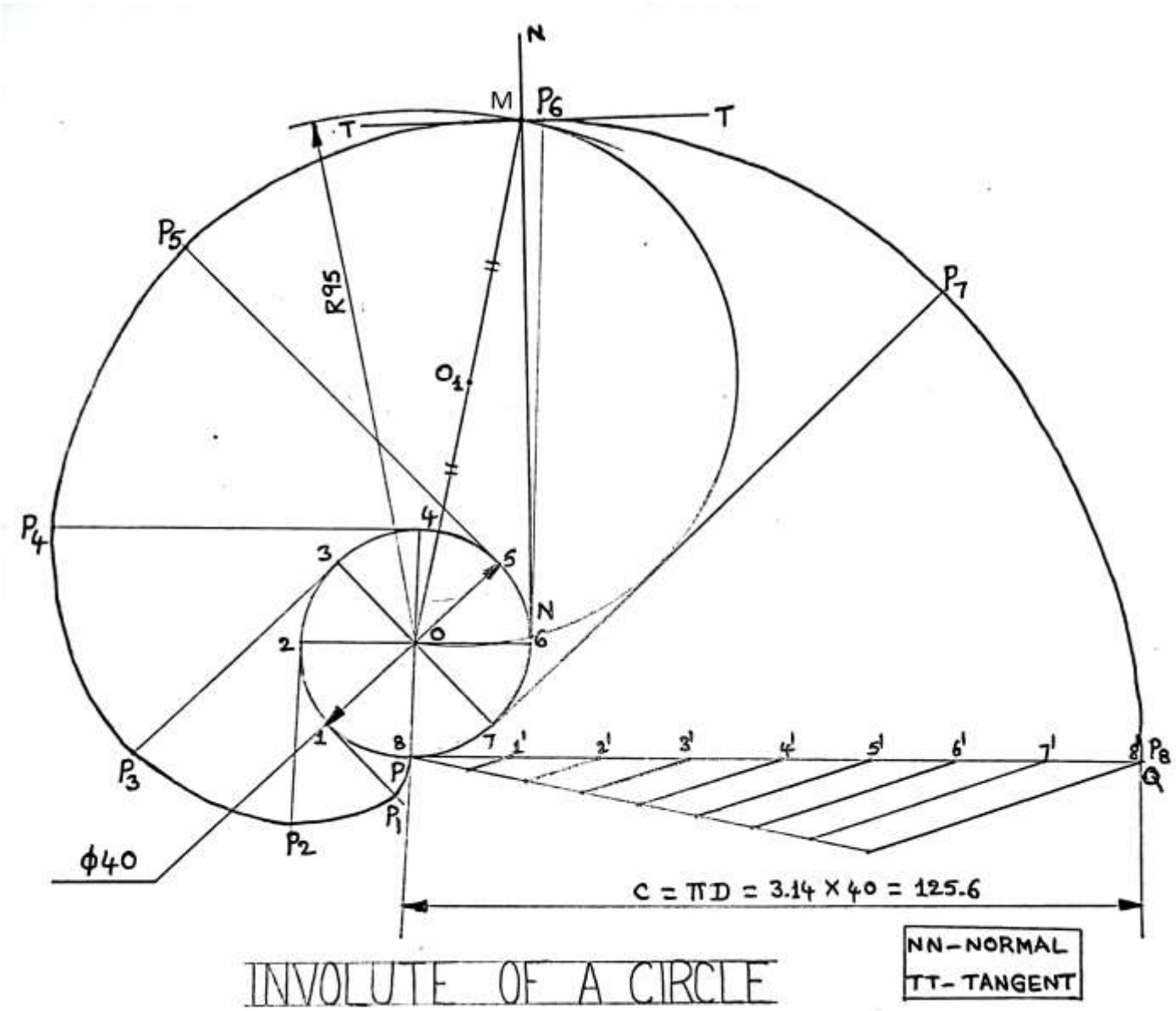
INVOLUTE OF AN EQUILATERAL TRIANGLE

4.6 Draw an involute of a square of side 20 mm. Draw a tangent and a normal at any point M on it.



INVOLUTE OF A SQUARE

4.7 Draw the involute of a circle of 40 mm diameter. Also, draw a tangent and a normal to the curve at a point 95 mm from the center of the circle.



INVOLUTE OF A CIRCLE

SHEET NO.5 **TITLE: PLAIN SCALES** **UNIT – I**

5.1 Construct a plain scale of 1:60 to read meters and decimeters, and long enough to measure up to 6 meters. Show on it a distance of 4.6m.

Sol:- Given: R.F = 1:60 = $\frac{1}{60}$

Maximum length to be measured = 6m

∴ LoS = R.F × Maximum Length to be measured

$= \frac{1}{60} \times 6m$

$= \frac{1}{60} \times 6 \times 10^3$ mm

∴ LoS = 100mm

UNITS → m and dm

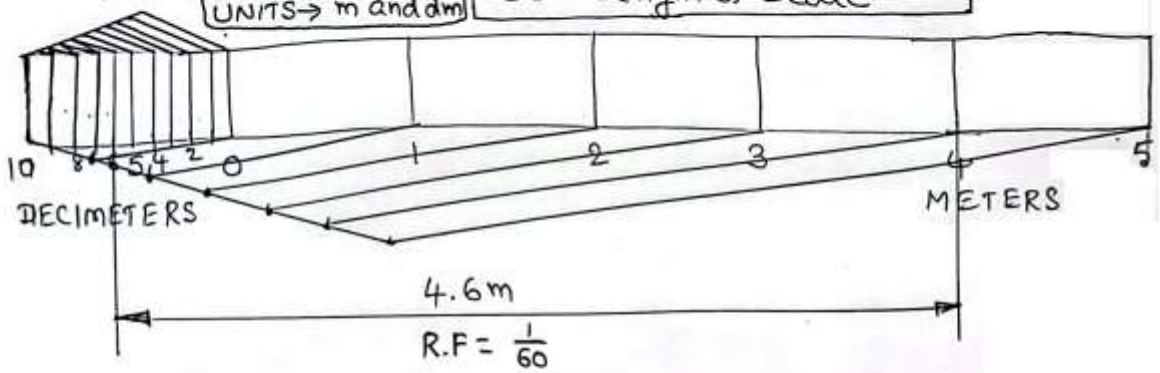
R.F – Representative Fraction

LoS – Length of Scale

✓max. = $\frac{6m}{6} = 1m$:

LoS = $\frac{100mm}{6} \approx 16.7mm$

mm
cm
dm
m
dam
hm
km



4.6m

R.F = $\frac{1}{60}$

LoS = 100mm

PLAIN SCALE

5.2 Construct a plain scale to show meters when 1 cm represents 4m and long enough to measure upto 50m. Find the R.F. and mark on your scale a distance of 36m.

Sol:- Given: 1 cm represents 4m. i.e 1 cm = 4m

∴ Drawing Size = 1cm

Actual Size = 4m

$\therefore R.F = \frac{\text{Drawing size}}{\text{Actual size}} = \frac{1\,cm}{4m} = \frac{1\,cm}{4 \times 10^2\,cm} = \frac{1}{400}$

mm
cm
dm
m
dam
hm
km

Maximum Length to be measured = 50m

∴ LoS = R.F × maximum Length to be measured

$= \frac{1}{400} \times 50m = \frac{1}{400} \times 50 \times 10^3$ mm

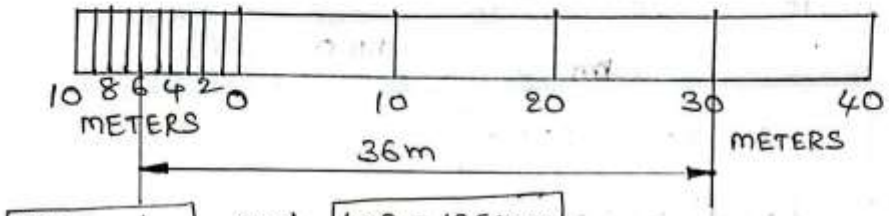
$= \frac{1}{400} \times 500 \text{ mm} = 125 \text{ mm}$

$\therefore$ LoS = 125 mm

UNITS ---> m and m

$\checkmark max. = \frac{50 m}{5} = 10 m$

$LoS = \frac{125 mm}{5} = 25 mm$



R.F = $\frac{1}{400}$ and LoS = 125 mm

PLAIN SCALE

5.3 A rectangular garden of area 16 km^2 is shown on a map by a similar rectangle of 1 cm^2. Construct a plain scale to show units of 10 km and 1 km and long enough to read upto 60 km. Find R.F. of the scale. Also, show a distance of 53 km on it.

Sol:- Given: 1 cm^2 represents 16 km^2. i.e. $1 cm^2 = 16 km^2$

$\Rightarrow$ 1 cm x 1 cm = 4 km x 4 km

$\Rightarrow$ $(1 cm)^2 = (4 km)^2$

$\Rightarrow$ 1 cm = 4 km

mm
cm
dm
m
dam
hm
km

$\therefore$ Drawing Size = 1 cm

Actual Size = 4 km

$\therefore$ R.F = $\frac{\text{Drawing Size}}{\text{Actual Size}} = \frac{1 cm}{4 km} = \frac{1 cm}{4 \times 10^5 cm} = \frac{1}{4 \times 10^5}$

Maximum length to be measured = 60 km

$\therefore$ LoS = R.F x maximum length to be measured

$= \frac{1}{4 \times 10^5} \times 60 km$

$= \frac{1}{4 \times 10^5} \times 60 \times 10^6 mm$

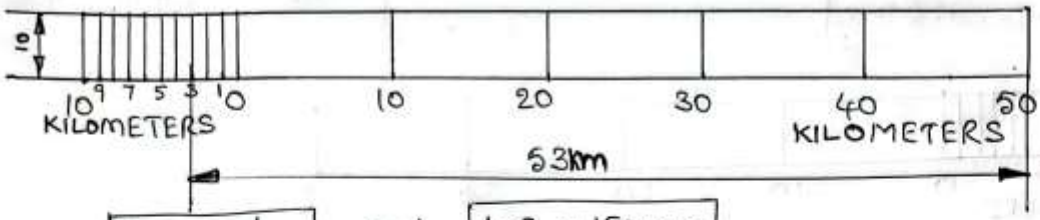
$= 150 mm$

$\checkmark Max. = \frac{60 km}{6} = 10 km$

$LoS = \frac{150 mm}{6} = 25 mm$

=> LoS = 150 mm

UNITS ---> km and km



$R.F = \frac{1}{4\times10^5}$ and LoS = 150 mm

PLAIN SCALE

5.4 A room of $1000\ m^3$ volume is represented by a block of $125\ cm^3$ volume. Find R.F. and construct a plain scale to measure upto 30 m. Mark a distance of 15 m on your scale.

Sol:- Given: $125\ cm^3$ represents $1000\ m^3$

i.e. $125\ cm^3 = 1000\ m^3$

$\Rightarrow 5cm \times 5cm \times 5cm = 10m \times 10m \times 10m$

$\Rightarrow (5cm)^3 = (10m)^3$

$\Rightarrow 5cm = 10m \Rightarrow 1cm = 2m$

Max. = $\frac{30}{3}m = 10m$

LoS = $\frac{150}{3}mm = 50mm$

mm
cm
dm
m
dam
hm
km

∴ Drawing Size = 1cm

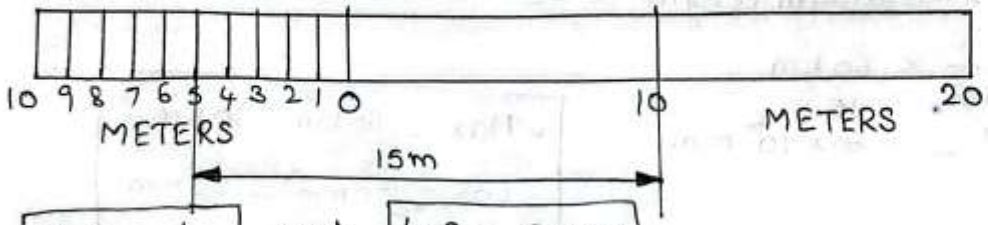
Actual size = 2m

$\therefore R.F = \frac{\text{Drawing Size}}{\text{Actual Size}} = \frac{1cm}{2m} = \frac{1cm}{2\times10^2 cm} = \frac{1}{200}$

maximum Length to be measured = 30m

∴ LoS = R.F × Maximum Length to be measured

$\therefore LoS = \frac{1}{200} \times 30m = \frac{1}{200} \times 30 \times 10^3\ mm = 150mm$



$R.F = \frac{1}{200}$ and LoS = 150 mm

PLAIN SCALE

5.5 Construct a scale of 1:36, to show yards and feet and long enough to measure 7 yards. Show a distance of 6 yards 2 feet.

Sol:- Given: R.F = 1:36 = $\frac{1}{36}$

maximum Length to be measured = 7 yards.

∴ LoS = R.F × maximum Length to be measured

$= \frac{1}{36} \times 7$ yards

$= \frac{1}{36} \times 7 \times 3 \times 12 \times 2.54 \times 10$ mm

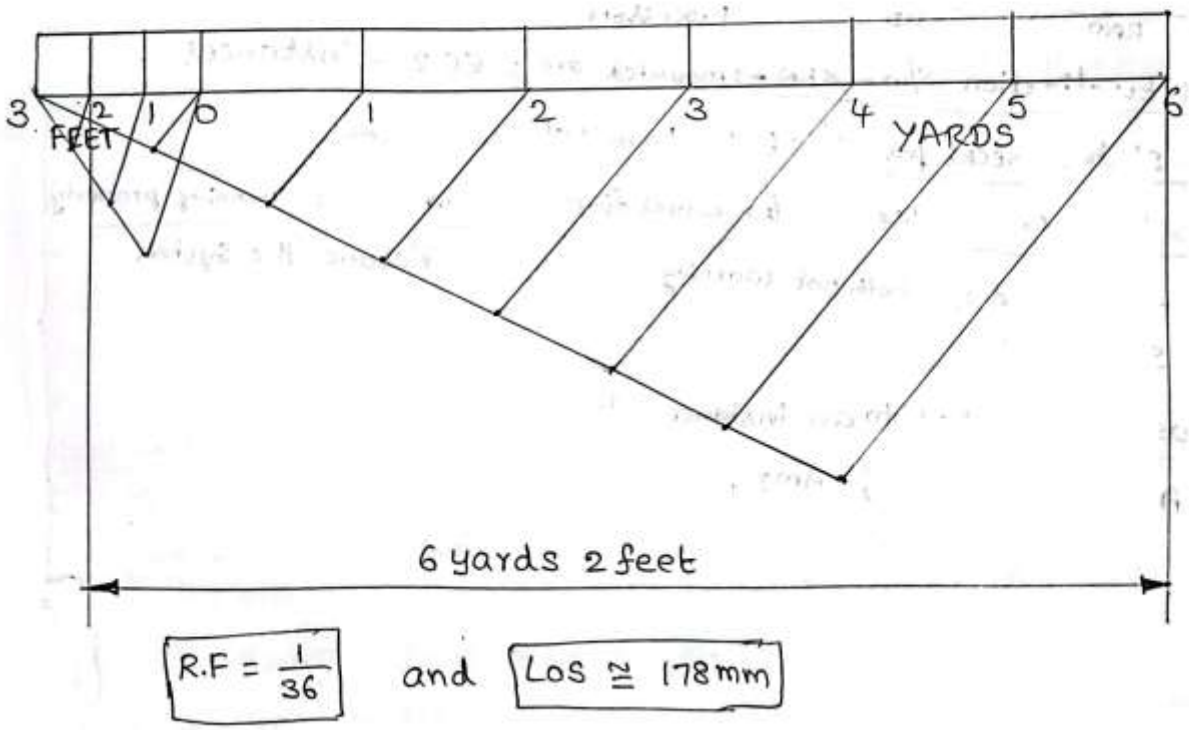
$= 177.8$ mm

∴ LoS ≅ 178 mm

1 yard = 3 feet
1 foot = 12 inches
1 inch = 2.54 cm
1 cm = 10 mm

✓ Max. = $\frac{7}{7}$ yards = 1 yard
LoS = $\frac{178}{7}$ mm

UNITS ---> yd and ft



R.F = $\frac{1}{36}$ and LoS ≅ 178 mm

PLAIN SCALE

SHEET NO.6 **TITLE: DIAGONAL SCALES** **UNIT – I**

6.1 On a map, the distance between two points is 14 cm. The real distance between them is 20 km. Draw a diagonal scale of this map to read kilometers and hectometers and to measure up to 25 km. Show a distance of 17.6 km on this scale.

Given data: **14 cm represents 20 km**

Drawing size = 14 cm

Actual size = 20 km

$\therefore$ R.F = $\frac{\text{Drawing Size}}{\text{Actual Size}} = \frac{14\text{ cm}}{20\text{ km}} = \frac{14\text{ cm}}{20 \times 10^5\text{ cm}} = \frac{7}{10^6}$

mm
cm
dm
m
dam
hm
km

Maximum length to be measured = 25 km

$\therefore$ LOS = R.F × Maximum length to be measured

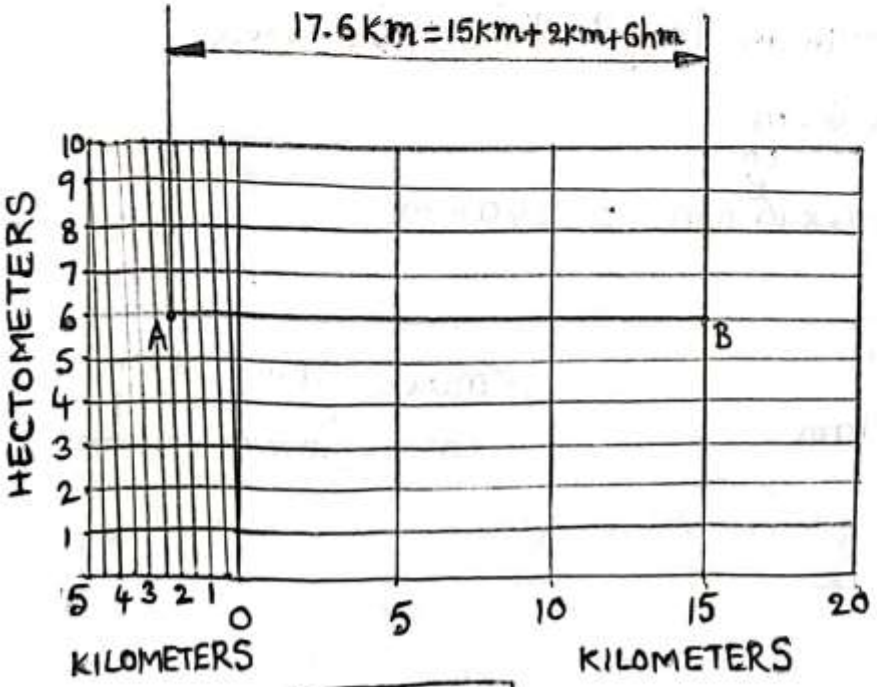
$= \frac{7}{10^6} \times 25\text{ km} = \frac{7}{10^6} \times 25 \times 10^6\text{ mm} = 175\text{ mm}$

$\therefore$ **LOS = 175 mm**

$\text{max} = \frac{25}{5}\text{ km} = 5\text{ km}$

$\text{LOS} = \frac{175\text{ mm}}{5} = 35\text{ mm}$

UNITS :- km, km & hm



AB = 17.6 km

$AB = \left(\frac{15}{V} + \frac{2.6}{D}\right)$ km

$AB = \left(\frac{15}{V} + \frac{2 + 0.6}{D}\right)$ km

R.F = $\frac{7}{10^6}$

LOS = 175 mm

DIAGONAL SCALE

6.2 A truck is moving at the rate of 1.2 km per min. Construct a diagonal scale with R.F value of $\frac{1}{25000}$, showing minutes and seconds. mark the distance moved by the truck in 4 minutes and 27 seconds.

Given data:

$R.F = \frac{1}{25000}$

Speed = 1.2 km/min

Time = 4 min. 27 Sec = $4\frac{27}{60} = 4\frac{9}{20}$ min. = $\frac{89}{20}$ min.

(mm) cm dm m dam hm (km)

we have, Speed = $\frac{\text{Distance}}{\text{Time}}$

$\Rightarrow$ Distance = Speed × Time

= 1.2 km/min × $\frac{89}{20}$ min

= 1.2 km × $\frac{89}{20}$ = 5.34 km

$\therefore$ Distance = 5.34 km

$\therefore$ Distance travelled by the truck = 5.34 km

maximum length to be measured = 6 km (Assume)

$\therefore$ LOS = R.F × maximum length to be measured

$\Rightarrow$ LOS = $\frac{1}{25000} \times 6\text{ km}$

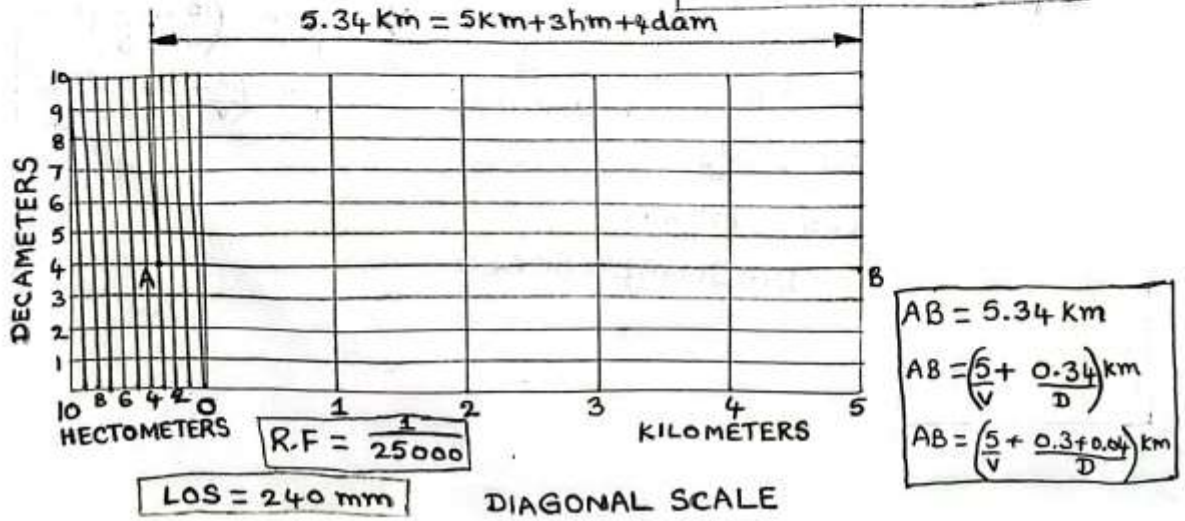
$\Rightarrow$ LOS = $\frac{1}{25000} \times 6 \times 10^{6}\text{ mm} = 240\text{ mm}$

$\therefore$ LOS = 240 mm

UNITS → km, hm & dam

$\checkmark max = \frac{6\text{ km}}{6} = 1\text{ km}$

$LOS = \frac{240\text{ mm}}{6} = 40\text{ mm}$



AB = 5.34 km

$AB = \left(\frac{5}{V} + \frac{0.34}{D}\right)\text{km}$

$AB = \left(\frac{5}{V} + \frac{0.3+0.04}{D}\right)\text{km}$

6.3 The area of a field is 50000 sq.m (m^2). Length and breadth of the field on the map are 10 cm and 8 cm respectively. Construct a diagonal scale, which can read up to 1 m. Mark a length of 235 m on the scale.

GIVEN:

Length of the field on the map = 10 cm

Breadth of the field on the map = 8 cm

$\therefore$ Area of the field on the map = Length × Breadth

$= 10cm \times 8cm$

$= 80cm^2$

Given Actual Area of the field = $50000m^2$

i.e. $80cm^2$ represents $50000m^2$

$\Rightarrow \overset{4}{\cancel{80}}cm^2 = \overset{2500}{\cancel{50000}}m^2 \Rightarrow 4cm^2 = 2500m^2 \Rightarrow (2cm)^2 = (50m)^2$

$\Rightarrow \overset{1}{\cancel{2}}cm = \overset{25}{\cancel{50}}m \Rightarrow$ **1 cm = 25 m**

$\therefore$ Drawing Size = 1 cm

Actual Size = 25 m

$\therefore$ R.F = $\frac{\text{Drawing Size}}{\text{Actual Size}} = \frac{1\,cm}{25\,m} = \frac{1\,cm}{25 \times 10^2\,cm} = \frac{1}{2500}$

mm
cm
dm
m
dam
hm
km

Maximum length to be measured = 300m (Assume)

$\therefore$ LOS = R.F × Maximum length to be measured

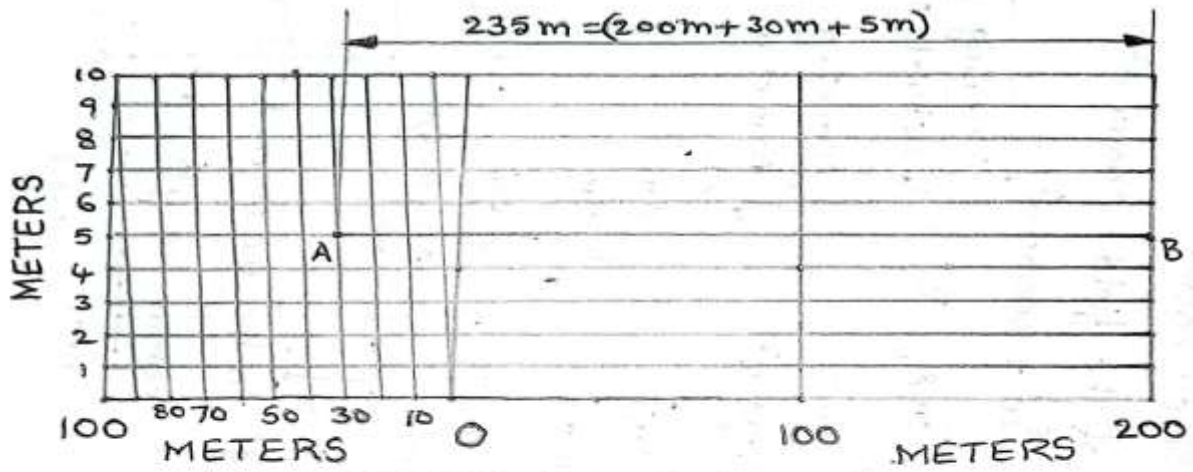
$= \frac{1}{2500} \times 300\,m = \frac{1}{\overset{12}{\cancel{2500}}} \times \overset{12}{\cancel{300}} \times 10^3\,mm = 120\,mm$

$\therefore$ **LOS = 120 mm**

UNITS → m, m and m

Max. = $\frac{300m}{3} = 100m$

LOS = $\frac{120mm}{3} = 40mm$



R.F = $\frac{1}{2500}$ **LOS = 120 mm**

DIAGONAL SCALE

6.4 An under-pass of a fly-over has a size of 270 m x 10 m x 10 m. It is represented on a model by a volume of 8 cu.cm (cm^3). What is the R.F? Construct a diagonal scale to read up to 300 m and mark the distances 199 m and 8 m on the scale.

GIVEN: $8cm^3$ represents $27000m^3$

i.e. $8cm^3 = 27000m^3$

$\Rightarrow (2cm)^3 = (30m)^3 \Rightarrow 2cm = 30m \Rightarrow$ **1 cm = 15 m**

mm, cm, dm, m, dam, hm, km

$\therefore$ Drawing Size = 1 cm

Actual Size = 15 m

$\therefore$ R.F = $\frac{\text{Drawing Size}}{\text{Actual Size}} = \frac{1\,cm}{15\,m} = \frac{1\,cm}{15 \times 10^2\,cm} = \frac{1}{1500}$

maximum length to be measured = 300 m

$\therefore$ LOS = R.F x maximum length to be measured

$= \frac{1}{1500} \times 300m = \frac{1}{1500} \times 300 \times 10^3\,mm = 200mm$

$\therefore$ **LOS = 200 mm**

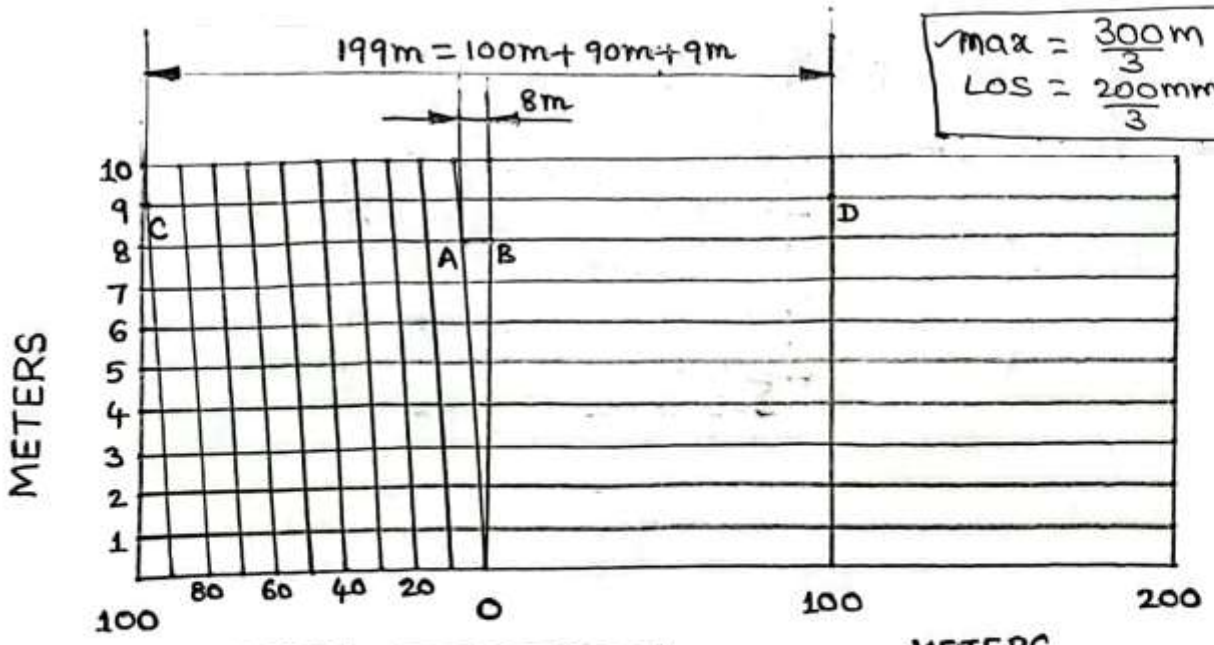
UNITS → m, m and m

199m = 100m + 90m + 9m

8m

max = $\frac{300m}{3} = 100m$

LOS = $\frac{200mm}{3}$



R.F = $\frac{1}{1500}$

LOS = 200 mm

DIAGONAL SCALE

AB = 8m = $\left(\frac{0}{V} + \frac{0+8}{D}\right)$ m

CD = 199m = $\left(\frac{100}{V} + \frac{90+9}{D}\right)$ m

6.5 Construct a diagonal scale showing yards, feet and inches in which 2 inches long line represents 1.25 yards and is long enough to measure up to 5 yards. Find R.F. Mark a distance of 4 yards 2 feet and 8 inches.

Given data:-

2 inches represent 1.25 yards.

∴ Drawing Size = 2 inches

Actual Size = 1.25 yards

1 yard = 3 feet
1 foot = 12 inches
1 inch = 2.54 cm
⇒ 1 inch = 25.4 mm

$$\therefore R.F = \frac{\text{Drawing Size}}{\text{Actual Size}} = \frac{2 \text{ inches}}{1.25 \text{ yards}} = \frac{2 \text{ inches}}{1.25 \times 3 \times 12 \text{ inches}} = \frac{1}{22.5} = \frac{10}{225} = \frac{2}{45}$$

$$\therefore \boxed{R.F = \frac{2}{45}}$$

maximum length to be measured = 5 yards

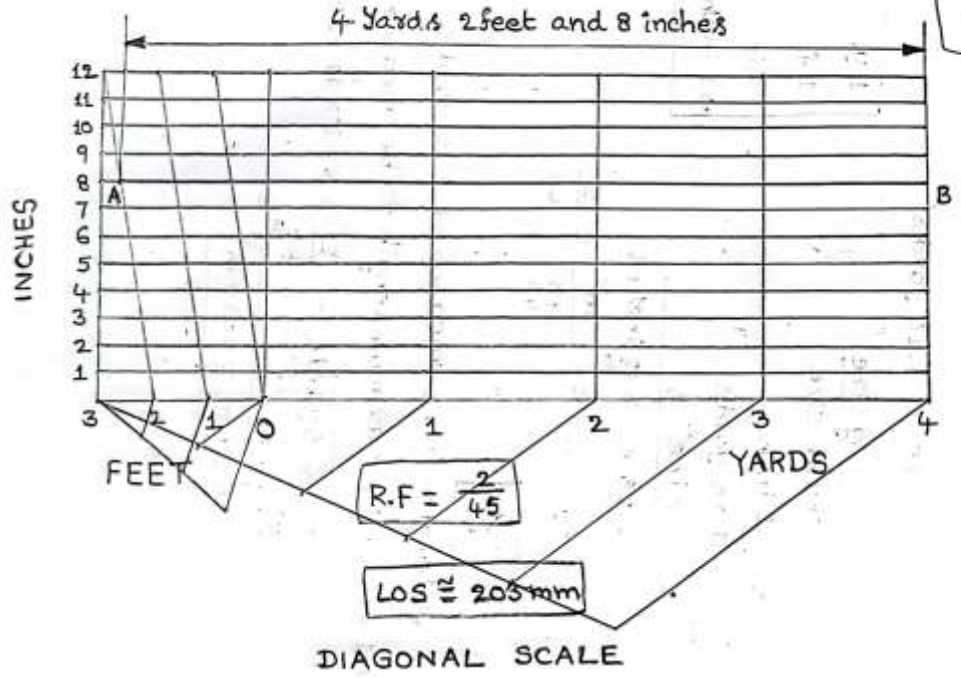
∴ LOS = R.F × maximum length to be measured

$$= \frac{2}{45} \times 5 \text{ yards} = \frac{2}{45} \times 8 \times 3 \times 12 \times 25.4 \text{ mm}$$

$$\therefore \boxed{LOS = 203.2 \text{ mm} \cong 203 \text{ mm}}$$

UNITS ⇒ yd, ft and in

Max. = $\frac{5 \text{ yards}}{5} = 1$ yard
LOS = $\frac{203 \text{ mm}}{5} = 40.6$ mm



SHEET NO.7 **TITLE: VERNIER SCALES** **UNIT – I**

7.1 Construct a vernier scale of R.F = 2 to show cm, $\frac{1}{10}^{th}$ of cm and $\frac{1}{100}^{th}$ of cm to read upto 9 cm. Mark on the scale the lengths 7.02 cm and 2.25 cm.

Given data:-

R.F = 2

maximum length to be measured = 9 cm

∴ LOS = R.F × maximum length to be measured

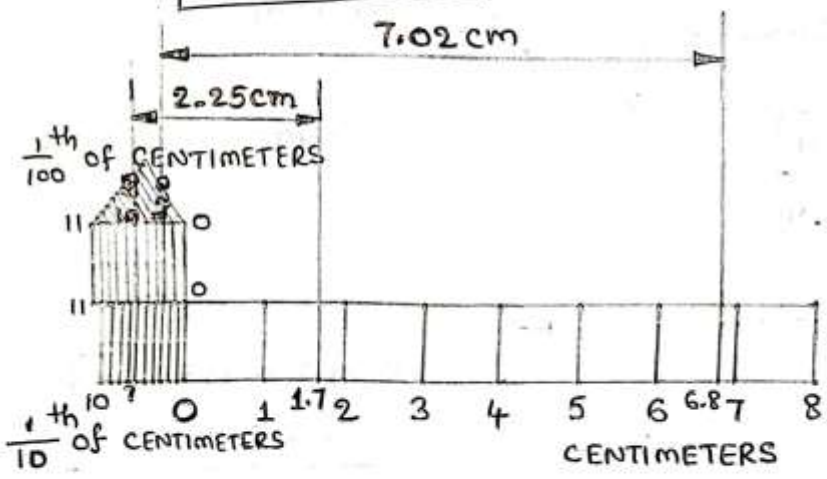
LOS = 2 × 9 cm = 18 cm = 180 mm

∴ LOS = 180 mm

UNITS → cm, $\frac{1}{10}^{th}$ of cm and $\frac{1}{100}^{th}$ of cm

max. = $\frac{9\text{cm}}{9}$ = 1 cm

LOS = $\frac{180\text{mm}}{9}$ = 20 mm



2.25 = 0.55 + 1.7

7.02 = 0.22 + 6.8

R.F = 2

LOS = 180 mm

VERNIER SCALE

7.2 Construct a vernier scale to show readings of $\frac{1}{10}^{th}$ of a meter when 3cm represents 10m.

Construct the scale to read upto 60m and mark the distances of 35.3m and 47.3m on your scale.

GIVEN: 3cm represents 10m.

∴ Drawing size = 3cm

Actual size = 10m

$\therefore R.F = \frac{\text{Drawing size}}{\text{Actual size}}$

$\Rightarrow R.F = \frac{3cm}{10m} = \frac{3cm}{10 \times 10^2 cm} = \frac{3}{1000}$

mm
cm
dm
m
dam
hm
km

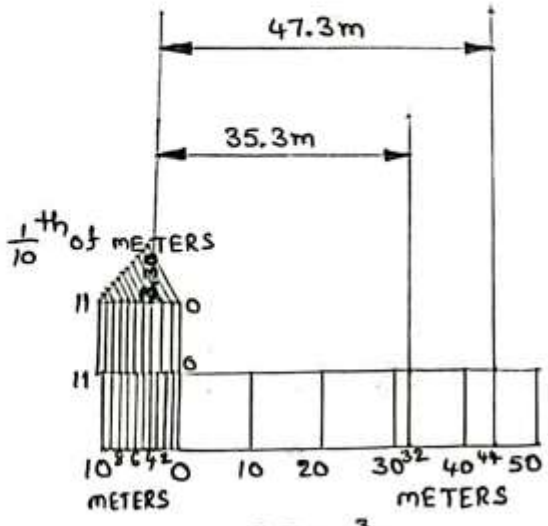
maximum length to be measured = 60m

∴ LOS = R.F × maximum length to be measured

$\Rightarrow LOS = \frac{3}{1000} \times 60m = \frac{3}{1000} \times 60 \times 10^3 mm = 180mm$

∴ LOS = 180mm

UNITS → m, m and $\frac{1}{10}^{th}$ of m



R.F = $\frac{3}{1000}$

LOS = 180 mm

VERNIER SCALE

$v_{max.} = \frac{60m}{6} = 10m$

$LOS = \frac{180mm}{6} = 30mm$

35.3 = 3.3 + 32

47.3 = 3.3 + 44

7.3 Construct a vernier scale to read distance correct to decameter on a map in which the actual distances are reduced in the ratio of 1:40000. The scale should be long enough to measure upto 6km. Mark on the scale a length of 3.34 km and 0.59 km.

mm
cm
dm
m
dam
hm
km

Given data:-

$$R.F = \frac{1}{40000}$$

maximum length to be measured = 6 km

$\therefore$ LoS = R.F x maximum length to be measured

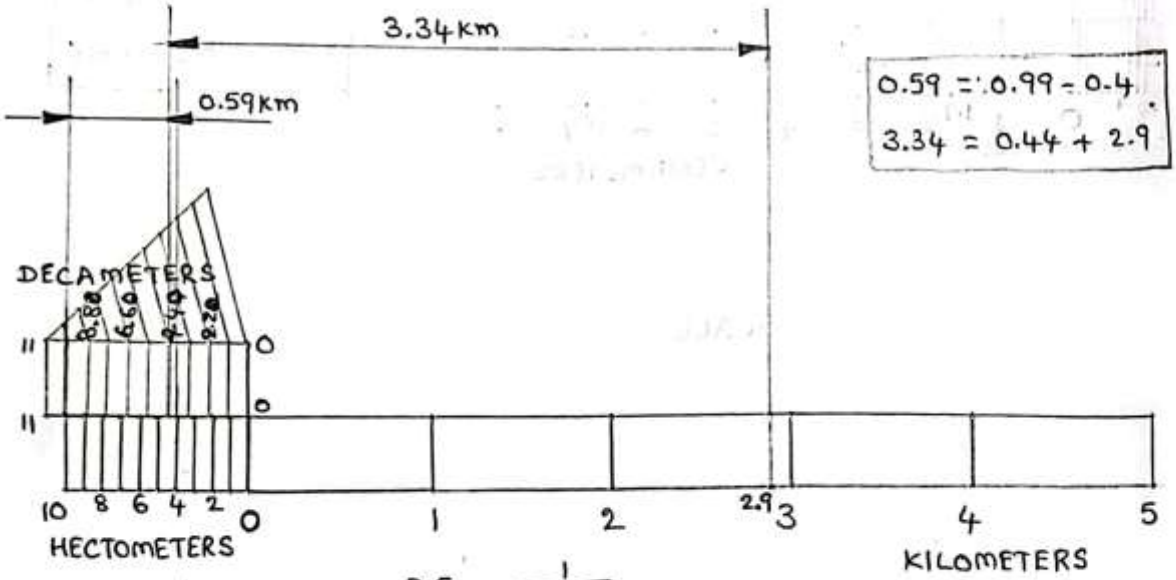
$$LoS = \frac{1}{40000} \times 6km = \frac{1}{40000} \times 6 \times 100000\ mm = 150\ mm$$

$\therefore$ **LoS = 150mm**

Max. = $\frac{6km}{6} = 1\ km$

LoS = $\frac{150mm}{6} = 25\ mm$

UNITS → km, hm and dam



R.F = $\frac{1}{40000}$

LoS = 150 mm

VERNIER SCALE

7.4 A wet land of 36 sq. km (km^2) in area is represented by an area of 144 sq. cm (cm^2) on a map. Find R.F. Construct a vernier scale to show kilometer, hectometer and decameter. With the above R.F, indicate on the scale a distance of 9 kilometers 5 hectometers and 6 decameters. (i.e. 9.56 km)

mm
cm
dm
m
dam
hm
km

Given data:- 144 cm^2 represents 36 km^2

Drawing Size = 144 cm^2

Actual Size = 36 km^2

For Area problems,

$$R.F = \sqrt{\frac{\text{Drawing Size}}{\text{Actual Size}}} = \sqrt{\frac{144\ cm^2}{36\ km^2}} = \sqrt{\frac{(12cm)^2}{(6km)^2}}$$

$$R.F = \sqrt{\left(\frac{12cm}{6km}\right)^2} = \frac{12\ cm}{6\ km} = \frac{12\ cm}{6\times10^5\ cm} = \frac{2}{10^5}$$

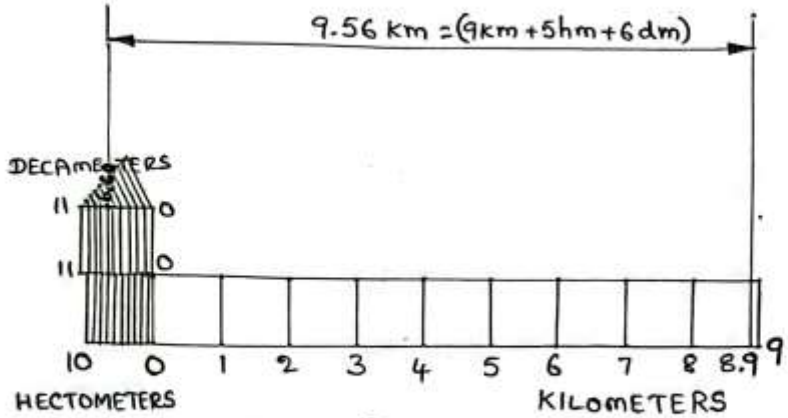
$$\therefore \boxed{R.F = \frac{2}{10^5}}$$

maximum length to be measured = 10 km (Assume)

$\therefore$ LOS = R.F x maximum length to be measured

$$= \frac{2}{10^5} \times 10\ km = \frac{2}{10^5} \times 10 \times 10^6\ mm = 200\ mm$$

$\therefore \boxed{LOS = 200mm}$ UNITS → km, hm and dam



R.F = $\frac{2}{10^5}$

LOS = 200 mm

VERNIER SCALE

$\checkmark$ max = $\frac{10km}{10}$ = 1 km

LOS = $\frac{200mm}{10}$ = 20mm

$\boxed{9.56 = 0.66 + 8.9}$

SHEET NO.8 **TITLE: PROJECTIONS OF POINTS** **UNIT – II**

8.1 Draw the projections of the following points

(i) A - 20 mm above H.P and 30 mm infront of V.P

(ii) B - 20 mm above H.P and 30 mm behind V.P

(iii) C - 20 mm below H.P. and 30 mm behind V.P

(iv) D - 20 mm below H.P and 30 mm infront of V.P.

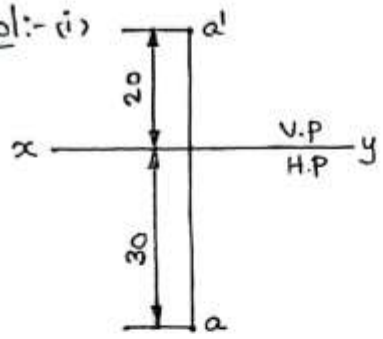
(v) E - on H.P and 30 mm in front of V.P

(vi) F - on V.P and 20 mm above H.P.

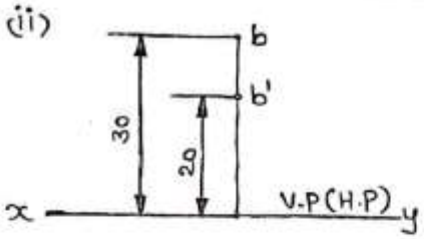
(vii) G - lying on both H.P and V.P

(viii) H - 40 mm from both the principal planes

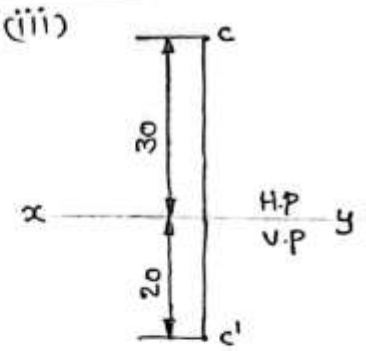
Sol:- (i)



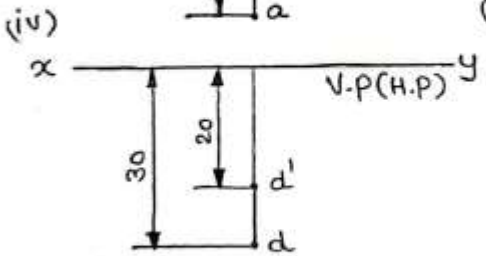
(ii)



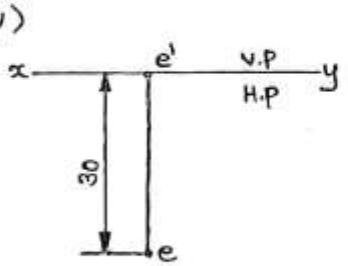
(iii)



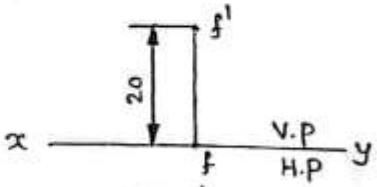
(iv)



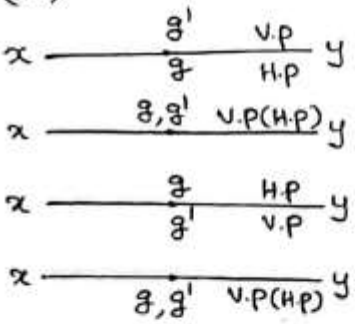
(v)



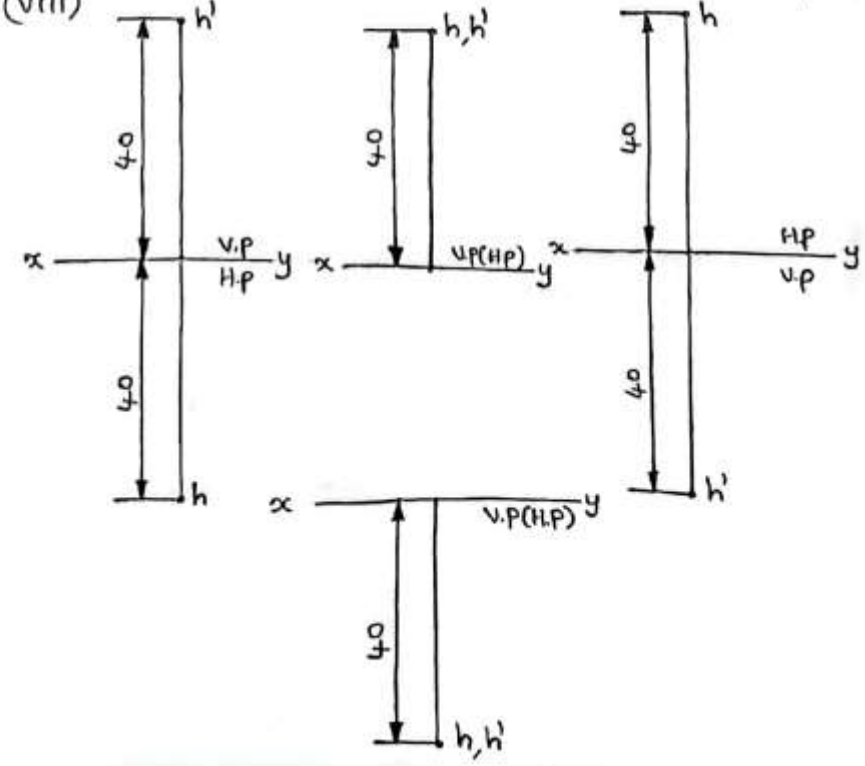
(vi)



(vii)



(viii)



8.2 mark the projections of the following points on a common reference line, keeping the projectors 35 mm apart.

(i) A, 25 mm above H.P and 35 mm infront of V.P

(ii) B, 25 mm above H.P and 40 mm behind V.P.

(iii) C, 30 mm below H.P. and 45 mm behind V.P.

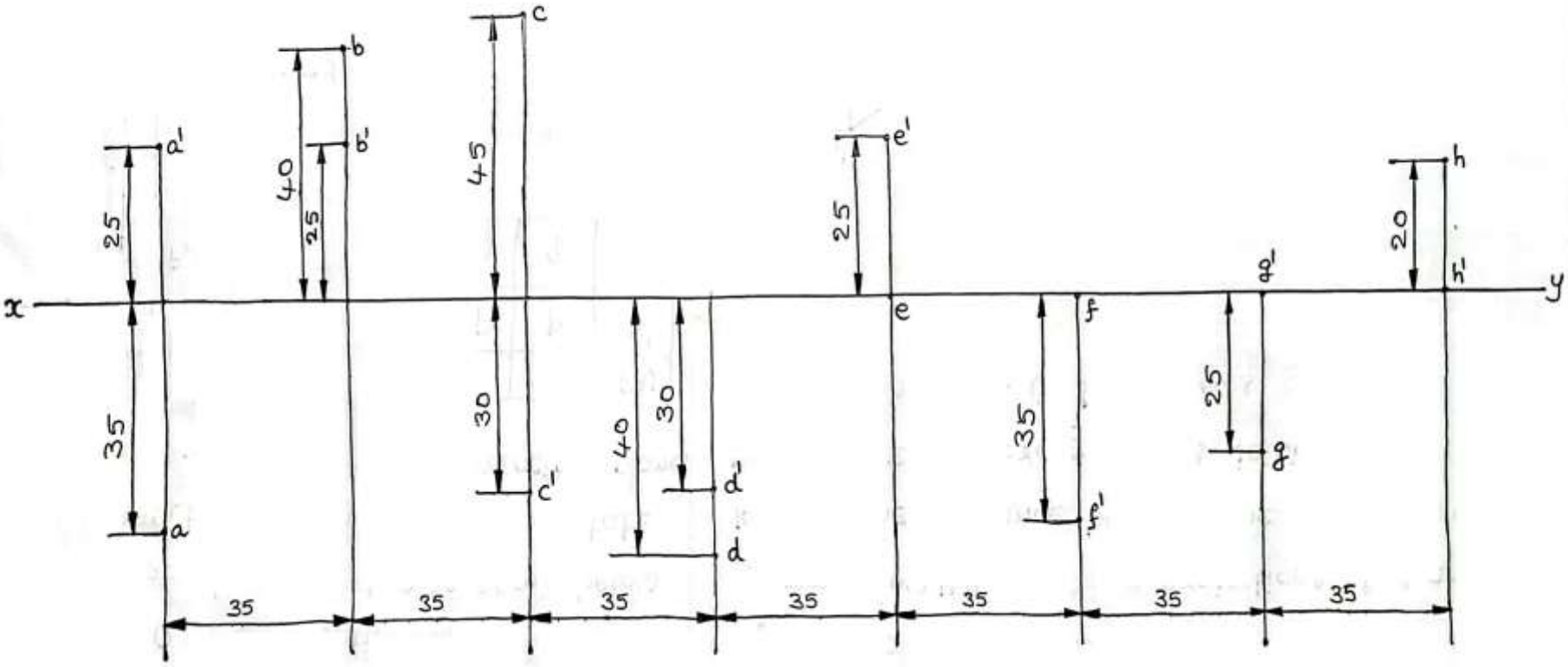
(iv) D, 30 mm below H.P. and 40 mm in front of V.P.

(v) E, 25 mm above H.P. and on V.P.

(vi) F, 35 mm below H.P. and on V.P.

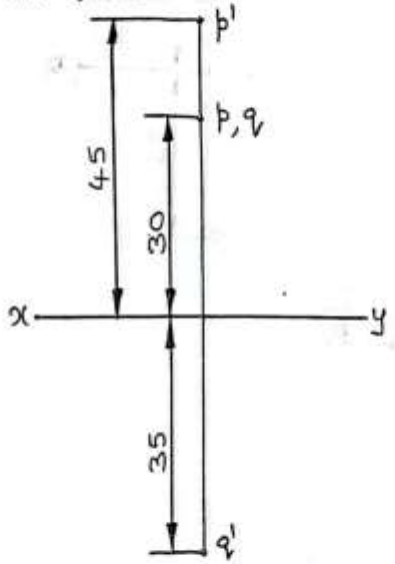
(vii) G, 25 mm in front of V.P and on H.P

(viii) H, 20 mm behind V.P. and on H.P.



8.3 A point, 30mm above XY line is the plan (T.V) of two points P and Q. The elevation (F.V) of P is 45 mm above H.P, while that of the point Q is 35 mm below H.P. Draw the projections of the points and state their position with reference to the principal planes and the quadrant in which they lie.

	T.V	F.V
P	p	p'
Q	q	q'



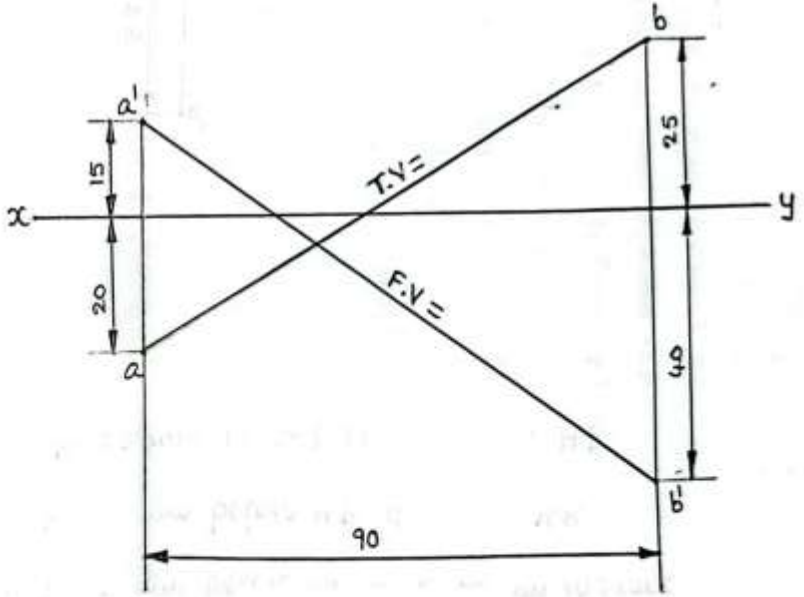
P IS 45 mm ABOVE H.P. AND 30 mm BEHIND V.P.

P LIES IN SECOND QUADRANT

Q IS 35 mm BELOW H.P. AND 30 mm BEHIND V.P.

Q LIES IN THIRD QUADRANT

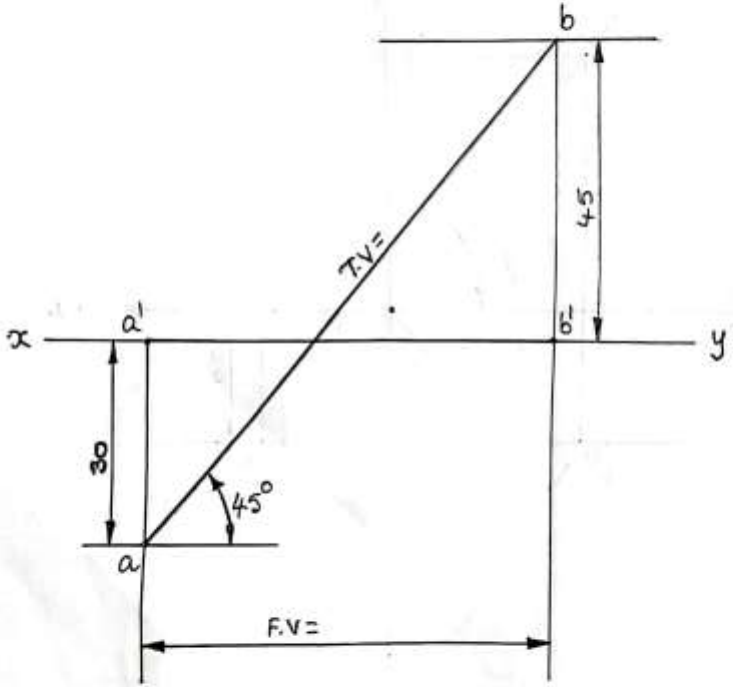
8.4 A point 'A' is 15mm above H.P. and 20mm in front of V.P. Another point B is 25 mm behind V.P. and 40 mm below H.P. Draw the projections of A and B, keeping the distance between the projectors equal to 90 mm. Draw straight lines joining their (i) top views and (ii) front views



TOP VIEW = ab = ___ mm

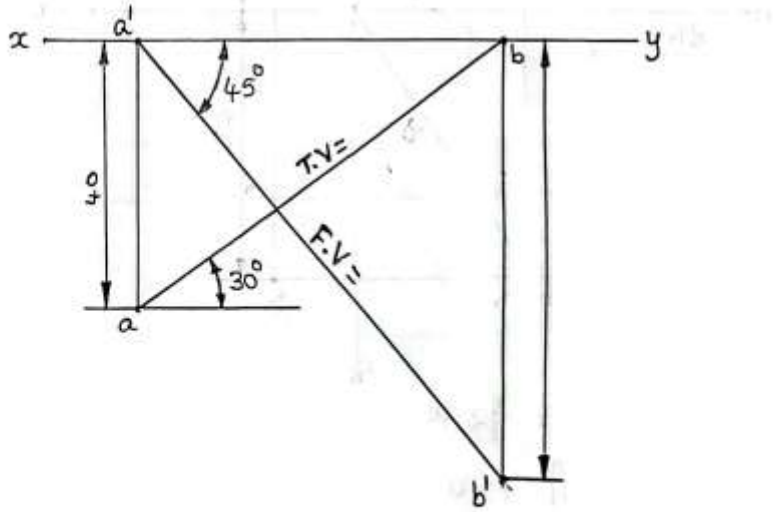
FRONT VIEW = a'b' = ___ mm

8.5 Two points A and B are on H.P. The point 'A' being 30 mm infront of V.P., while B is 45 mm behind V.P. The line joining their top view makes an angle of 45° with xy. Find the horizontal distance between two points.



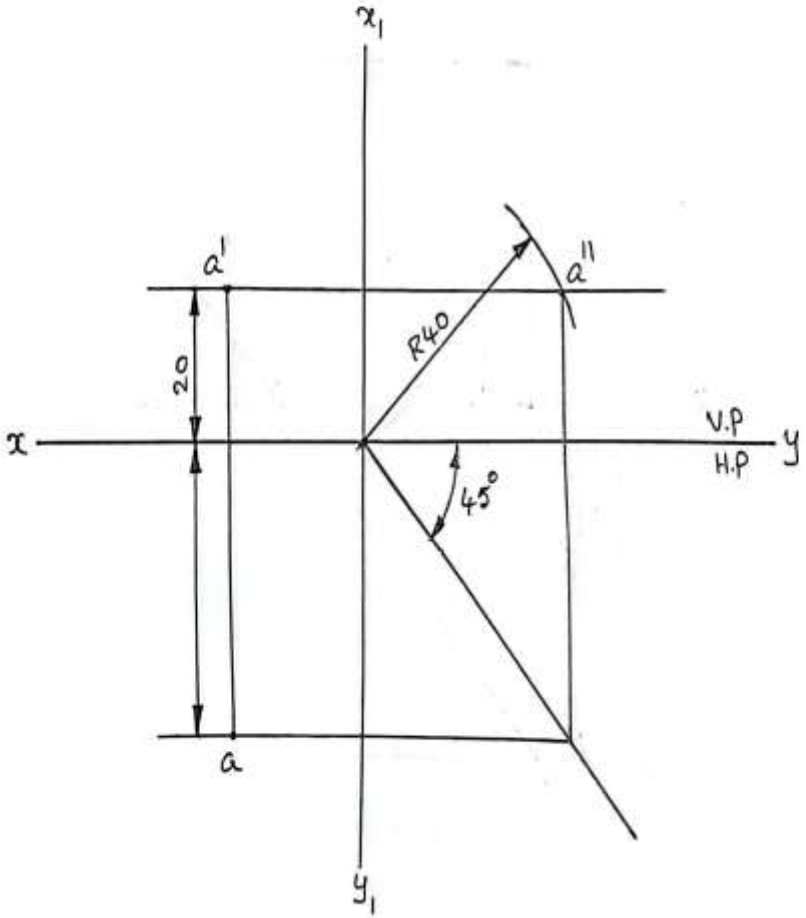
Top View = ab = ____ mm
Front View = a'b' = ____ mm

8.6 A point 'A' is on H.P. and 40 mm in front of V.P. Another point B is on V.P and below H.P. The line joining their front view makes an angle of 45° with xy, while the line joining their top view makes an angle of 30°. Find the distance of the point B from H.P.

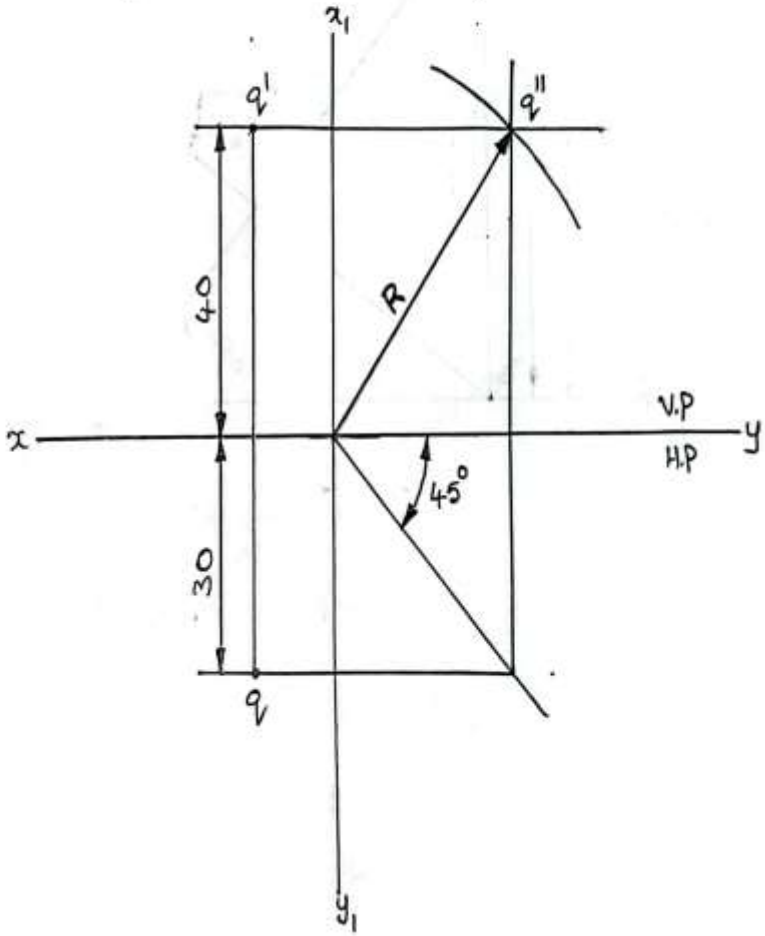


TOP VIEW = ab = ____ mm
FRONT VIEW = a'b' = ____ mm

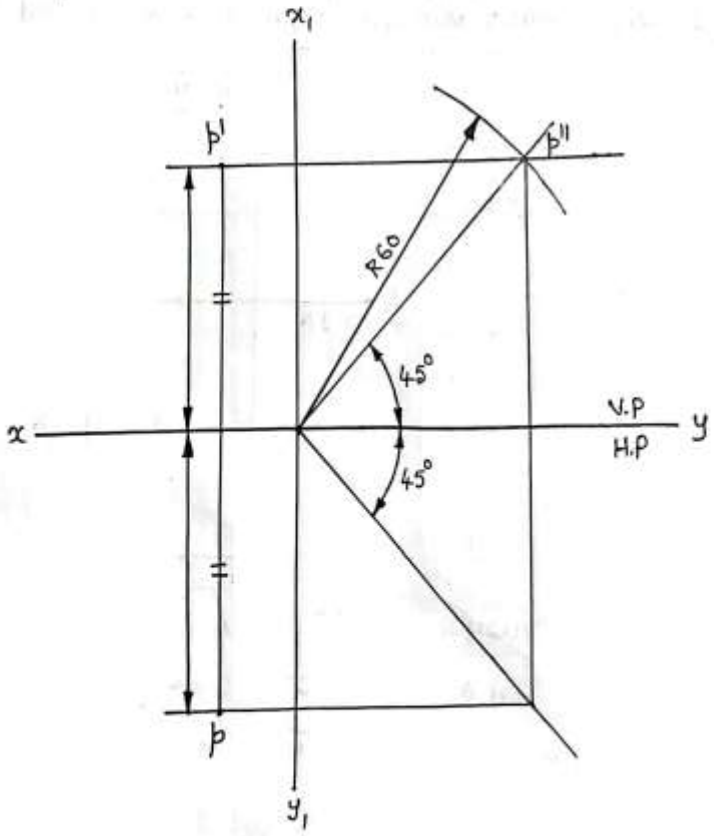
8.7 A point 'A' is 20 mm above H.P. and lies in the first quadrant. Its shortest distance from the reference line XY is 40mm. Draw its projections and determine its distance from V.P.



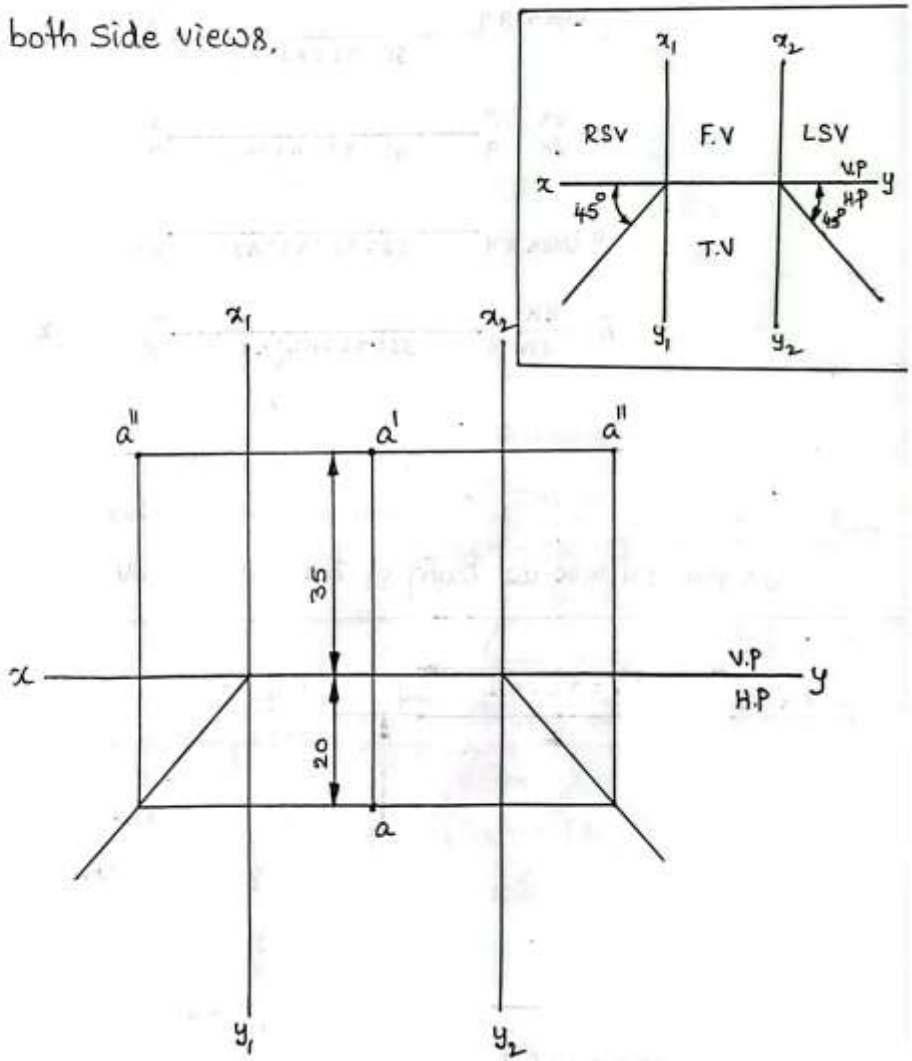
8.8 A point 'Q' is situated in first quadrant. It is 40 mm above H.P. and 30 mm infront of V.P. Draw its projections and find its shortest distance from intersection of H.P. and V.P.



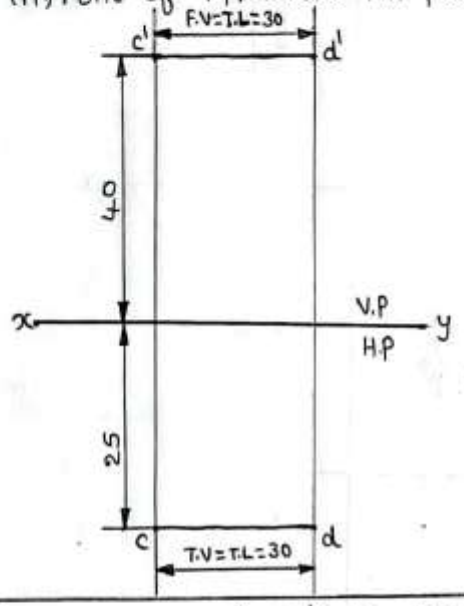
8.9 A point 'P' is situated in first quadrant and equidistant from the reference planes. Its shortest distance from the reference planes is 60 mm. Draw the projections of the point and determine its distance from the principal planes.



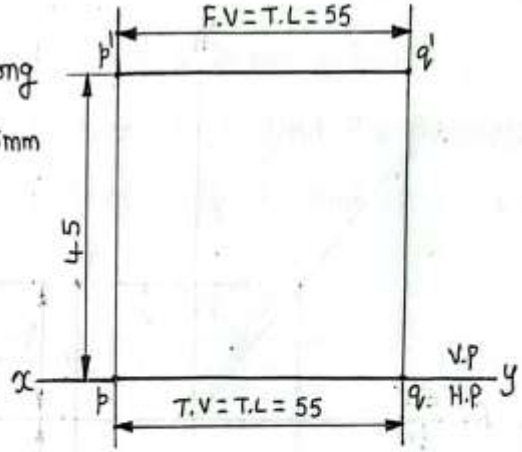
8.10 A point 'A' is 35 mm above H.P. and 20 mm infront of V.P. Draw Front view, Top view and both Side views.



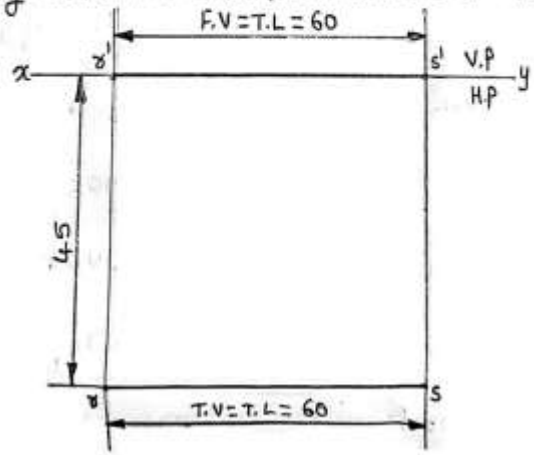
9.1 A line CD 30 mm long is parallel to both the planes. The line is 40 mm above H.P. and 25 mm infront of V.P. Draw its projections.



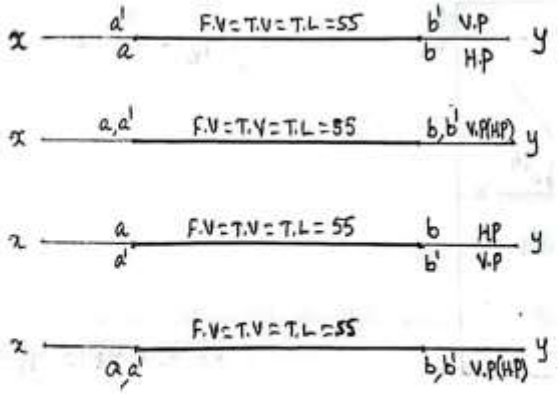
9.2 A line PQ 55 mm long is lying in V.P. and 45mm above H.P. Draw its Projections.



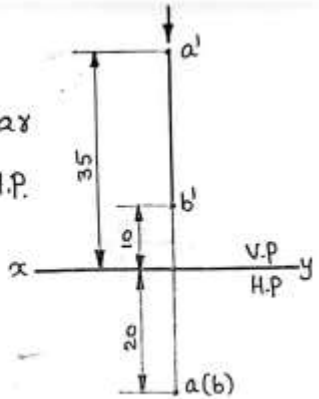
9.3 A line RS 60 mm long lies in H.P. and 45mm infront of V.P. Draw its projections.



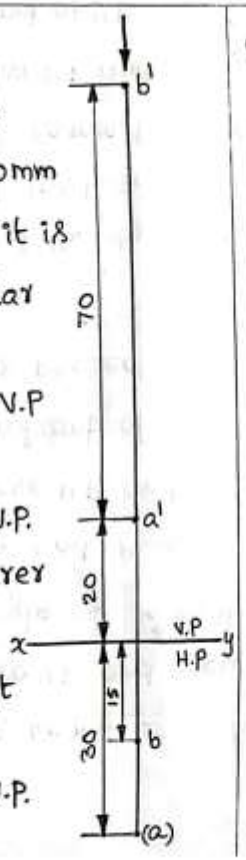
9.4 A line AB 55 mm long is lying on both H.P. and V.P. Draw its projections.



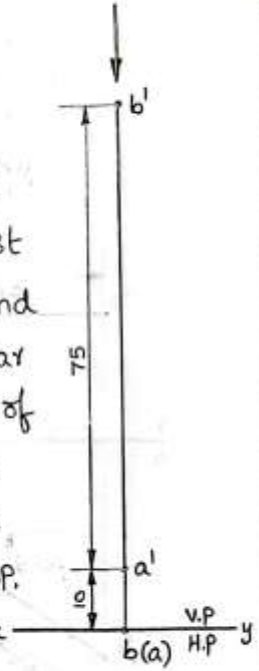
9.5 A line AB 25 mm long is parallel to V.P and perpendicular to H.P. Point A is 35 mm above H.P. and 20 mm in front of V.P. Point B is 10 mm above H.P. Draw its projections.



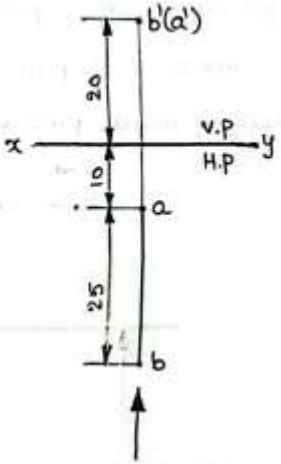
9.6 Draw the projections of a line 70 mm long, when it is perpendicular to H.P. and parallel to V.P and 15 mm in front of V.P. The end nearer to H.P. is 20 mm above it and 30 mm in front of V.P.



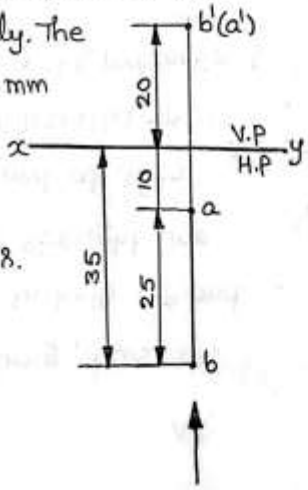
9.7 Draw the projections of a 75 mm long line AB lying in first quadrant and perpendicular to H.P. End A of the line is 10 mm above H.P. and in V.P.



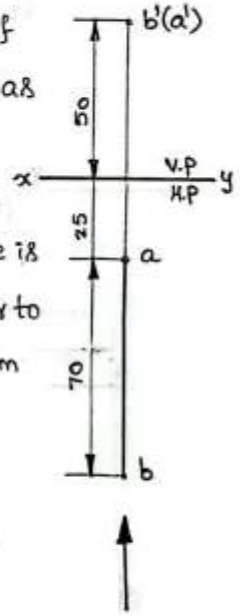
9.8 A line AB 25 mm long is perpendicular to V.P and parallel to H.P. Its end A is 10 mm in front of V.P and the line is 20 mm above H.P. Draw its projections.



9.9 A line AB of 25 mm length, is perpendicular to V.P and parallel to H.P. The end points A and B of the line are 10 mm and 35 mm in front of V.P. respectively. The line is 20 mm above H.P. Draw its Projections.

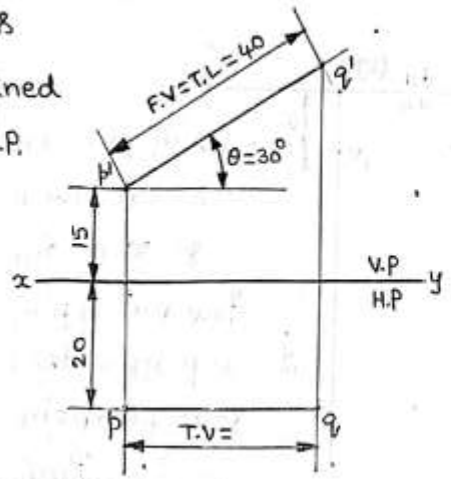


9.10 A line AB of 70 mm long has its end A 25 mm infront of V.P. The line is perpendicular to V.P. and 50 mm above H.P. Draw its Projections.



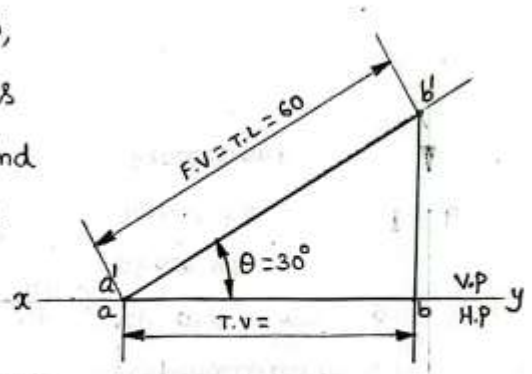
10.1

A line PQ 40 mm long is Parallel to V.P. and inclined at an angle of 30° to H.P. The lower end P is 15 mm above H.P. and 20 mm in front of V.P. Draw its projections.



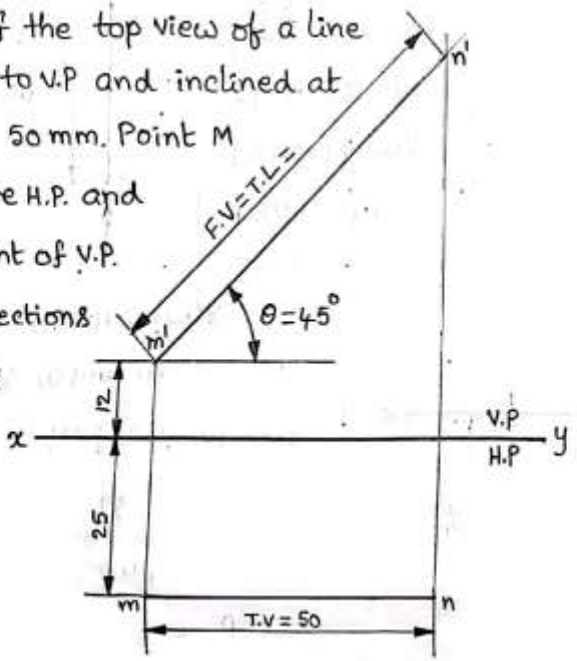
10.2

A Straight line AB, 60 mm long, has its end A in both H.P and V.P. The Straight line is inclined at 30° to H.P. and parallel to V.P. Draw its projections.



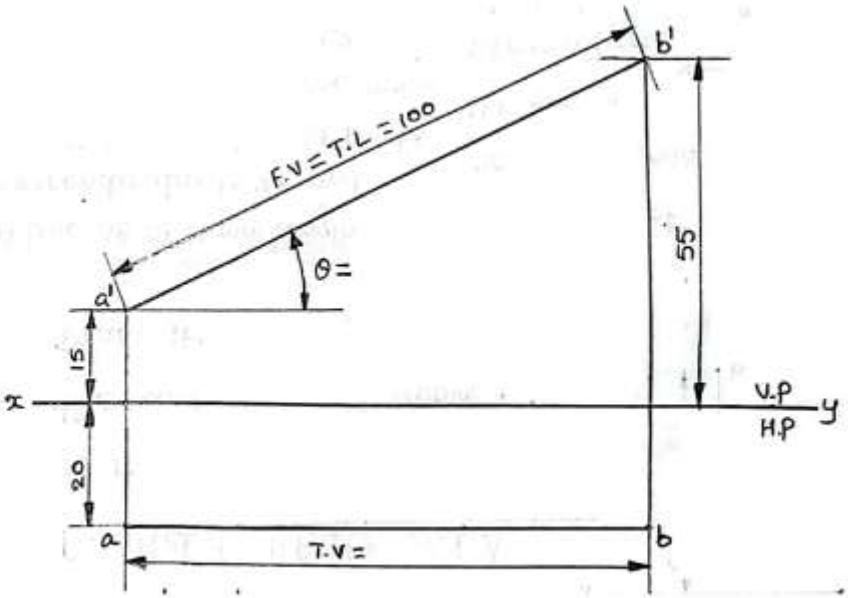
10.3

The length of the top view of a line MN parallel to V.P and inclined at 45° to H.P. is 50 mm. Point M is 12 mm above H.P. and 25 mm in front of V.P. Draw its projections and find its true length.



10.4

A 100 mm long line AB is parallel to and 20 mm in front of V.P. End A is 15 mm above H.P; while end B is 55 mm above H.P. Draw its projections and find its inclination wiith H.P.



10.5 Two pegs fixed on a wall are 4.5m apart. The distance between the pegs measured parallel to the floor is 3.6m. If one peg is 1.5m above the floor, find the height of the second peg and the inclination of the line joining the two pegs, with the floor.

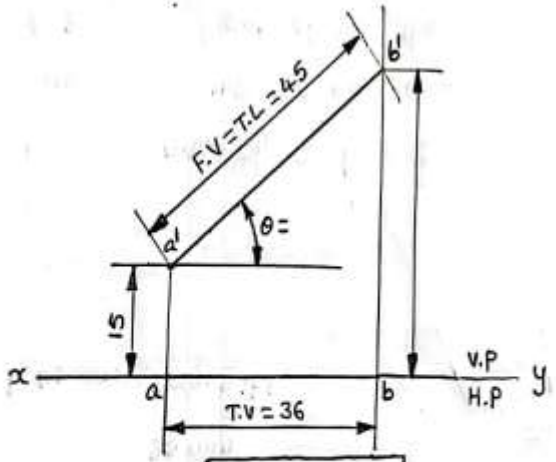
Sol:- We have, 1 m = 1000 mm

$\therefore$ 1.5 m = 1.5 x 1000 mm = 15 x 100 mm

3.6 m = 3.6 x 1000 mm = 36 x 100 mm

4.5 m = 4.5 x 1000 mm = 45 x 100 mm

$\therefore$ SCALE 1:100

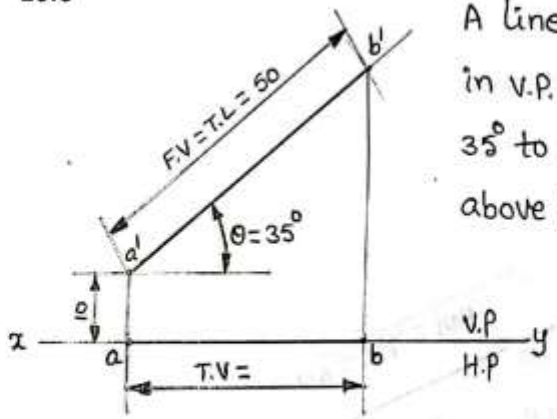


SCALE 1:100

HEIGHT OF THE SECOND PEG, bb' = ___ m

SLOPE WITH THE FLOOR, θ = ___

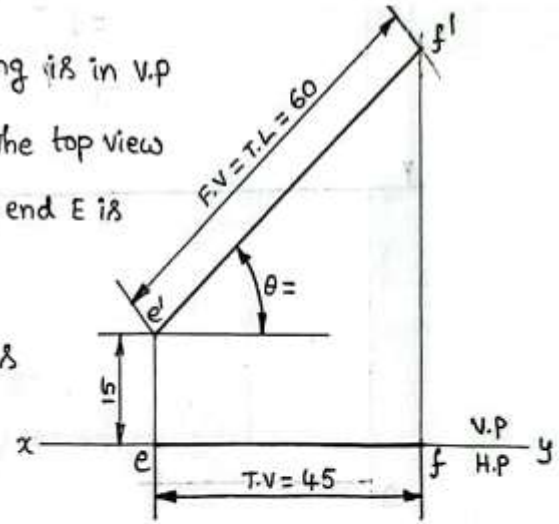
10.6



A line AB 50 mm long is in V.P. and inclined at 35° to H.P. End A is 10mm above H.P. Draw its projections.

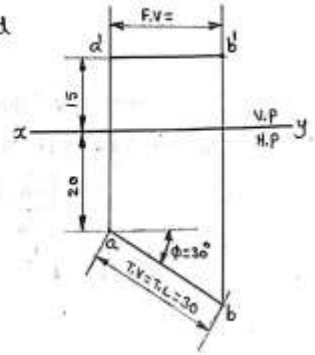
10.7

A line EF 60 mm long is in V.P and inclined to H.P. The top view measures 45 mm. The end E is 15 mm above H.P. Draw its projections and find its inclination with H.P.



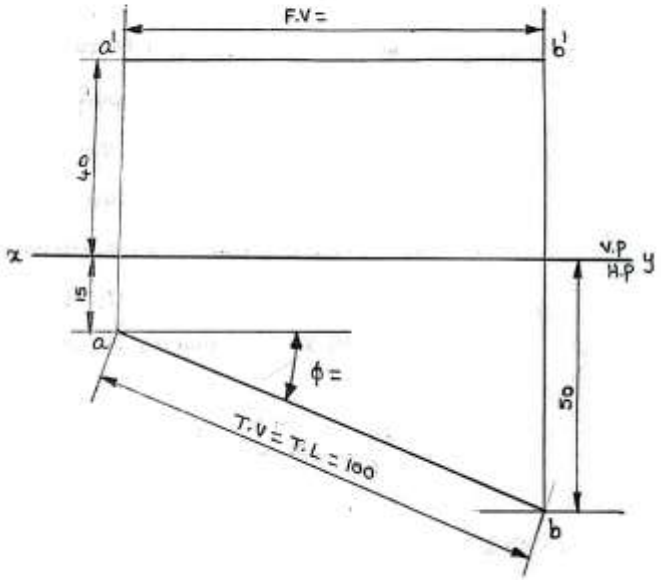
10.8

A line AB is 30 mm long and inclined at 30° to V.P. and Parallel to H.P. The end A of the line is 15mm above H.P. and 20 mm infront of V.P. Draw its projections.

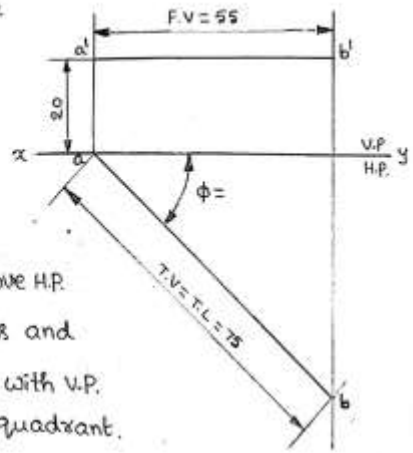


10.9

A 100mm long line AB is parallel to and 40mm above H.P. Its two ends are 15mm and 50mm infront of V.P. respectively. Draw its projections and find its inclination with V.P.

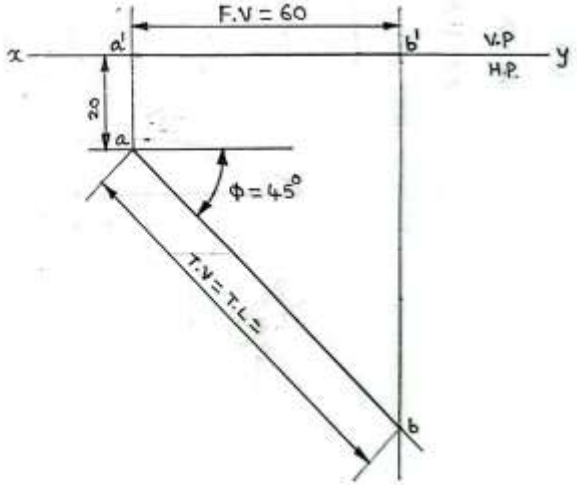


10.10 The elevation of a line AB 75 mm long measures 55mm. The line is parallel to H.P. and inclined to V.P. Its end A is in V.P and 20 mm above H.P. Draw its projections and find its inclination with V.P. Point A is in first quadrant.



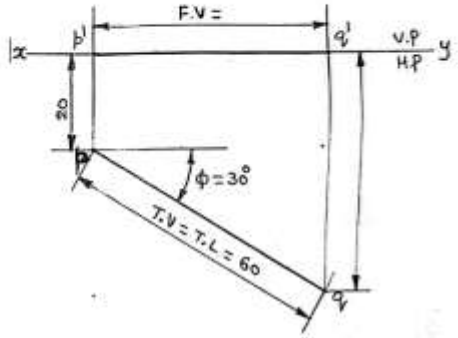
10.11

A line AB is on H.P. and its one end A is 20 mm infront of V.P. The line makes an angle of 45° with V.P. and its front view is 60mm long. Draw its projections and determine its true length.



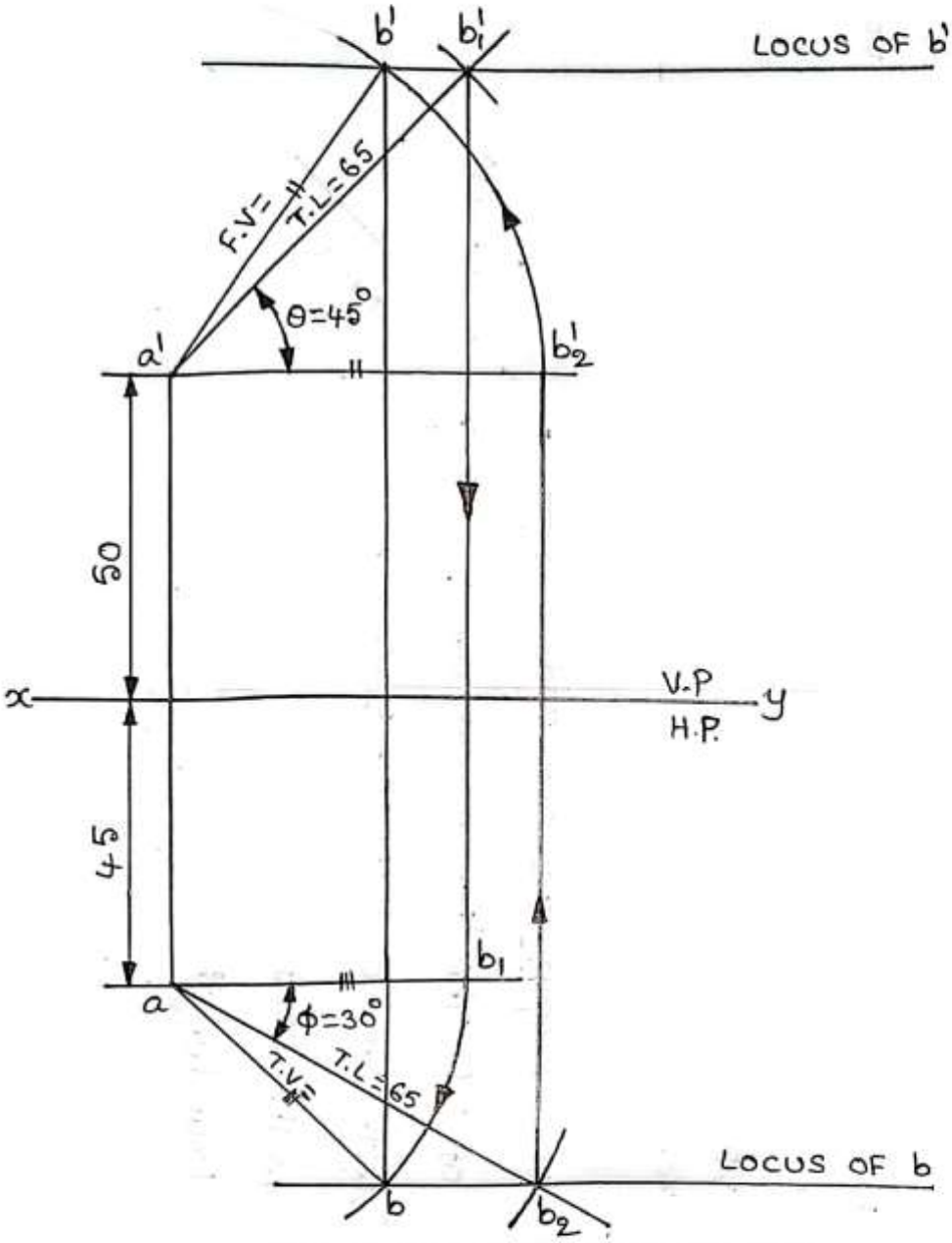
10.12

A 60mm long line PQ is in H.P. with end P, 20mm infront of V.P. and inclined at 30° to V.P. What is the distance of Q infront of V.P ?



SHEET NO.11 **TITLE: PROJECTIONS OF STRAIGHT LINES – III** **UNIT – II**

11.1 A line AB of length 65 mm is inclined at 45° to H.P. and 30° to V.P. The end A is 50 mm above H.P. and 45 mm infront of V.P. Draw its projections.



T.V = ab = ab_1 = ____ mm

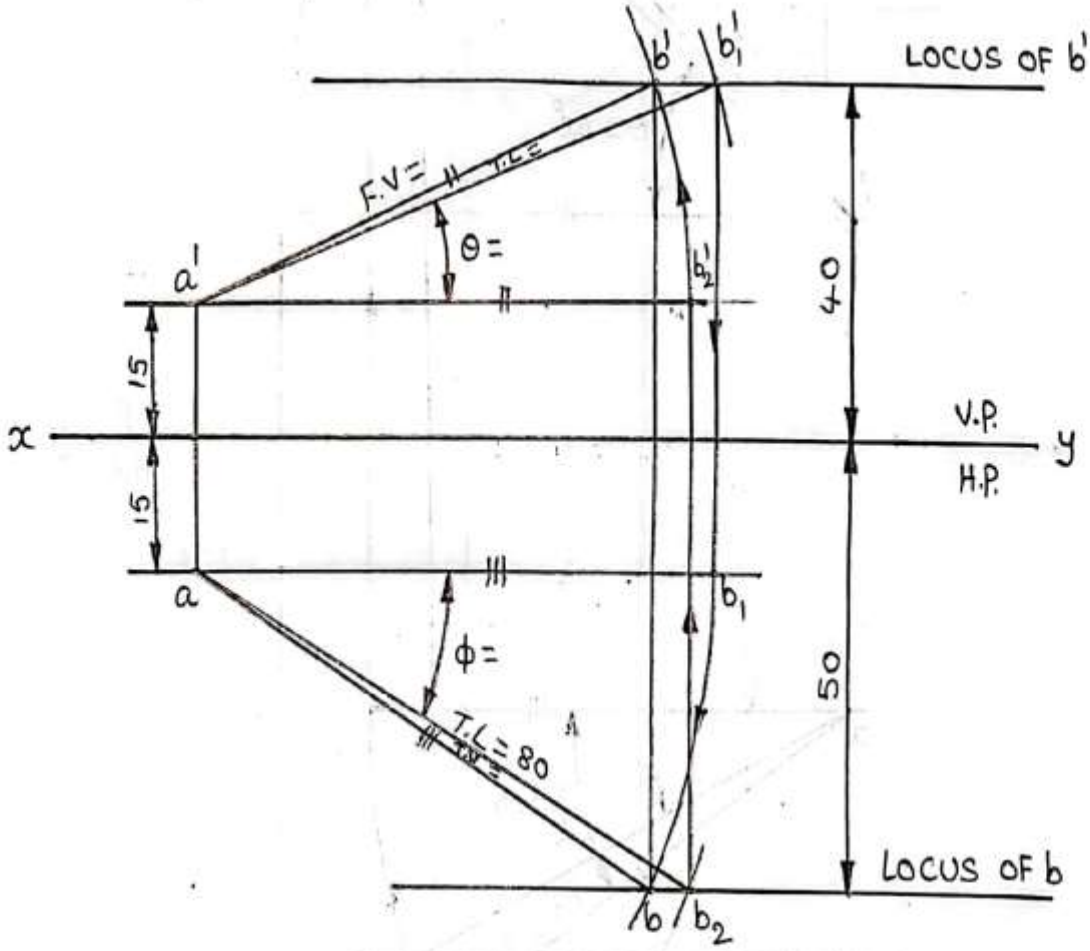
F.V = a'b' = $a'b'_2$ = ____ mm

T.L = $a'b'_1$ = ab_2 = 65 mm

θ = 45°

ϕ = 30°

11.2 A line AB of 80mm long, has its end A, 15mm from both H.P. and V.P. The other end B is 40mm above H.P. and 50mm infront of V.P. Draw its projections and find the inclinations of the line with H.P. and V.P.



T.V = ab = ab_1 = ____ mm

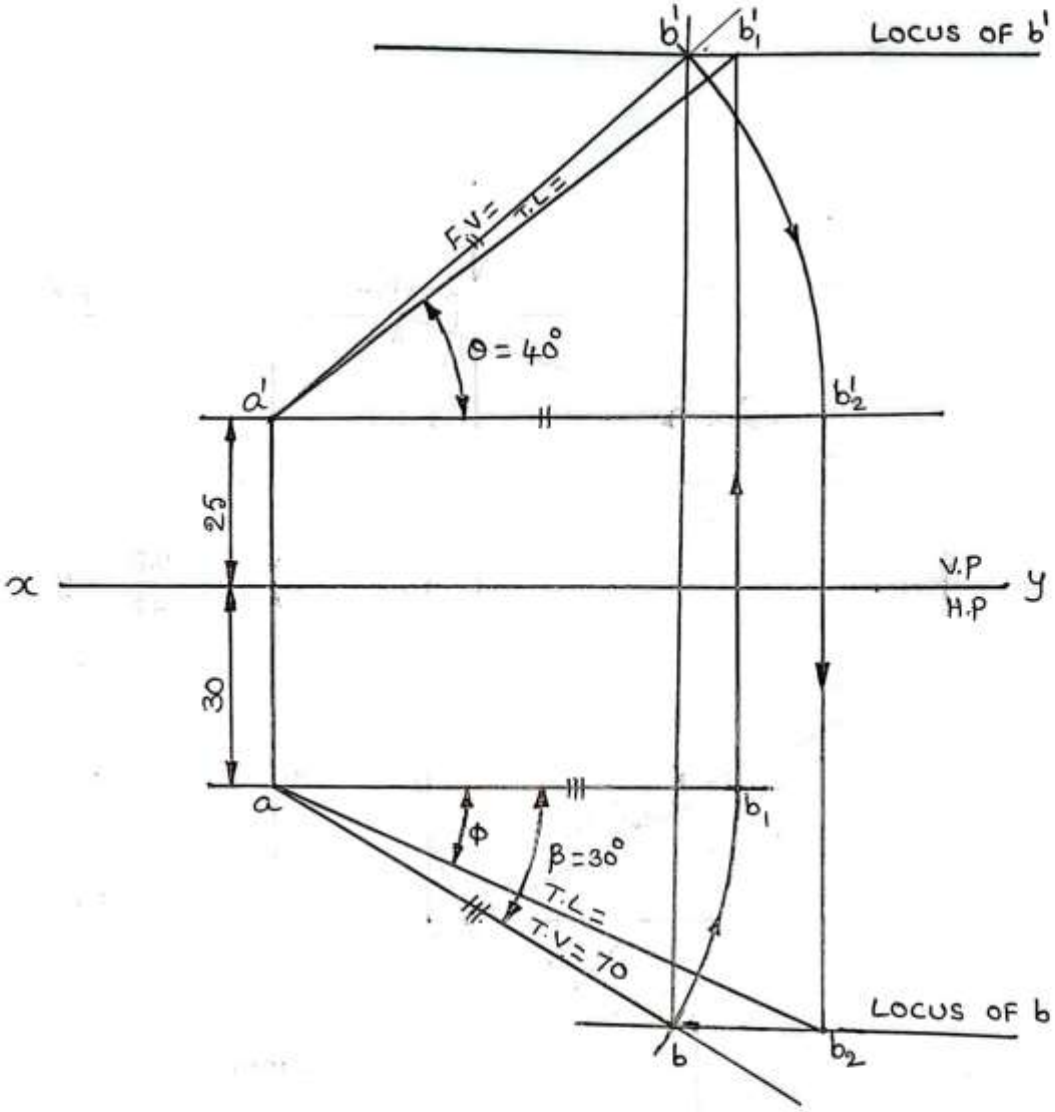
F.V = a'b' = $a'b_2'$ = ____ mm

T.L = $a'b_1'$ = ab_2 = 80 mm

θ = ____

ϕ = ____

11.3 A line AB is inclined at 40° to H.P. Its one end A is 25 mm above H.P. and 30 mm infront of V.P. The top view of the line is 70 mm and is inclined at 30° to XY. Draw its projections. Also, find its true length and inclination of the line with V.P.



T.V = ab = ab_1 = 70 mm

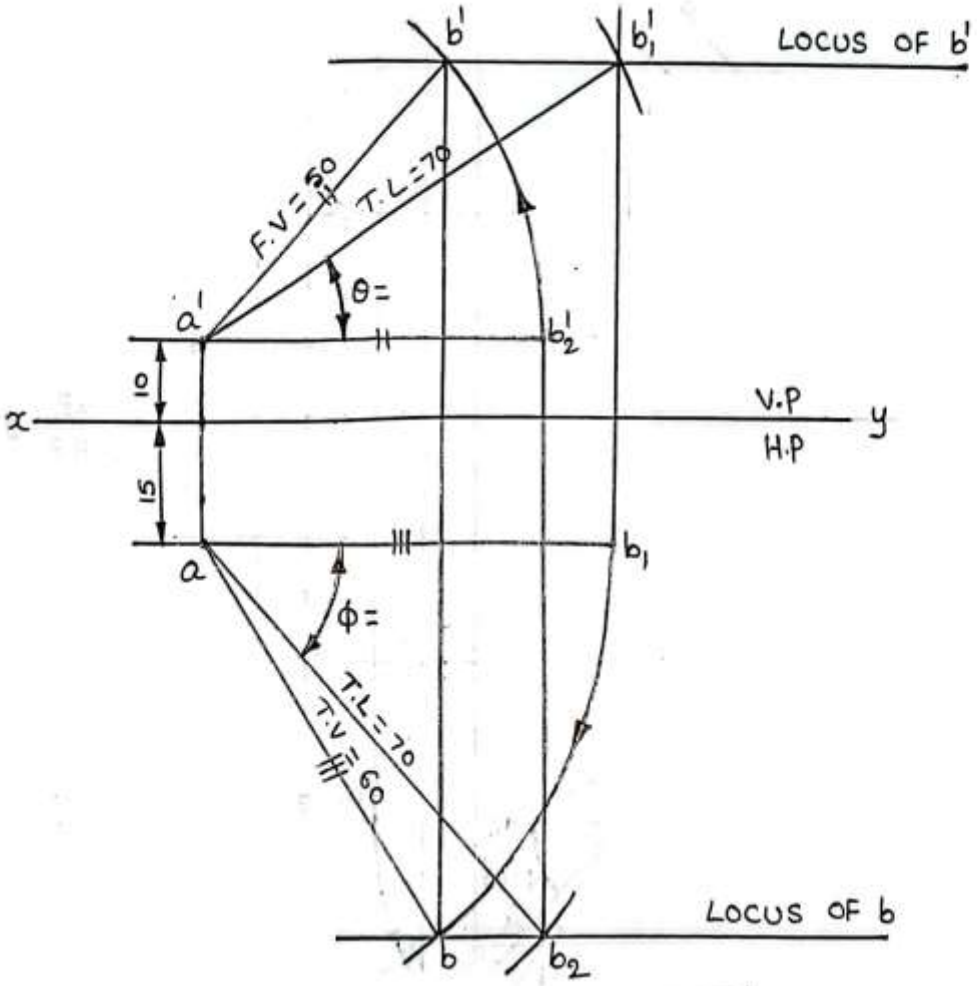
F.V = $a'b'$ = $a'b'_2$ = —— mm

T.L = $a'b'_1$ = ab_2 = —— mm

θ = 40°

ϕ = ——

11.4 A line AB of 70mm long has its end A, 10mm above H.P. and 15mm infront of V.P. Its front view and top view measure 50mm and 60mm respectively. Draw its projections. Also, find inclinations of the line with H.P. and V.P.



T.V = ab = ab_1 = 60 mm

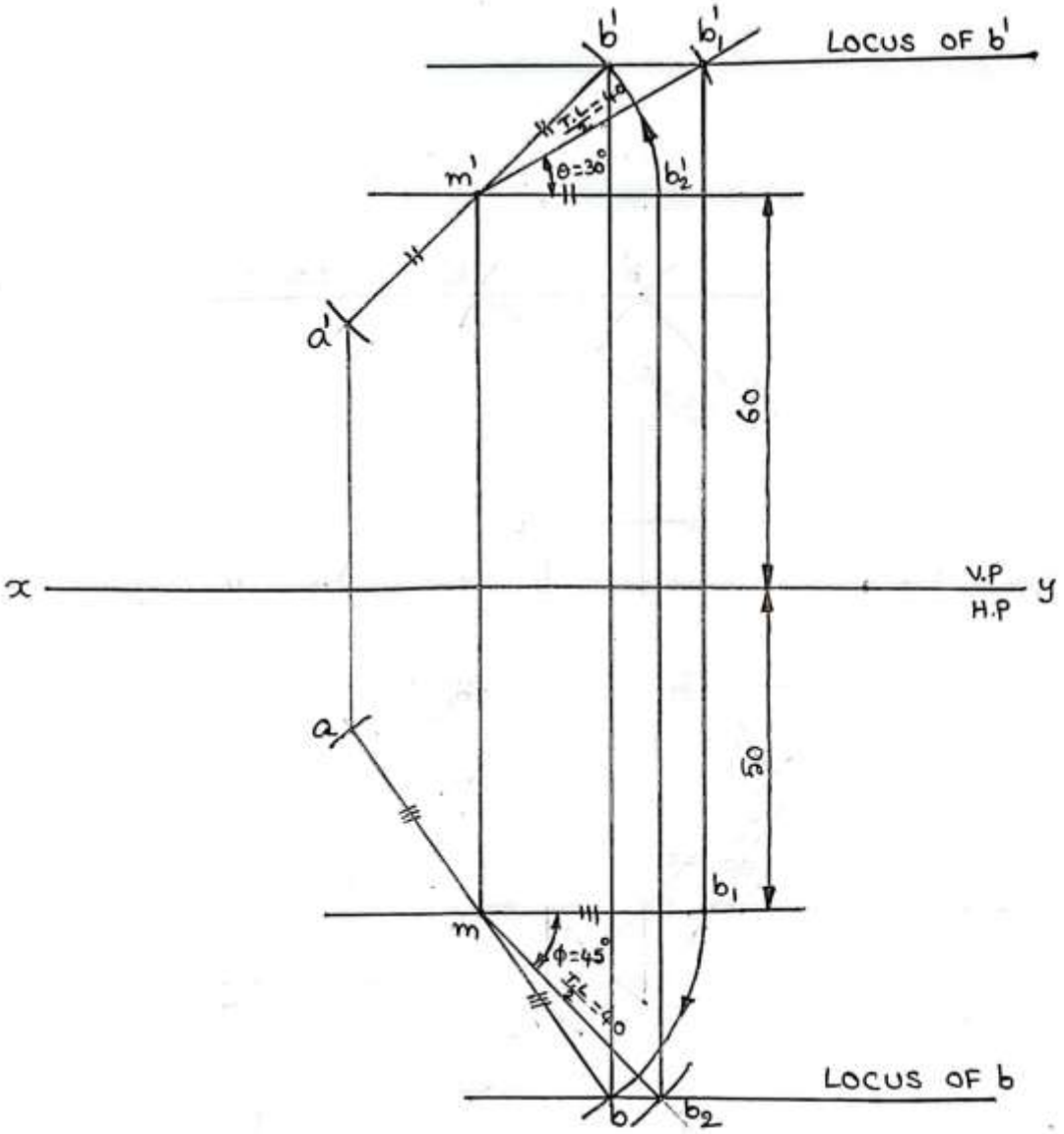
F.V = a'b' = $a'b'_2$ = 50 mm

T.L = $a'b'_1$ = ab_2 = 70 mm

θ = ——

ϕ = ——

11.5 The mid-point M of a straight line AB is 60mm above H.P. and 50mm infront of V.P. The line measures 80mm long and inclined at an angle of 30° with H.P and 45° with V.P. Draw its projections.



T.V = ab = 2(mb1) = 2(mb) = ____ mm

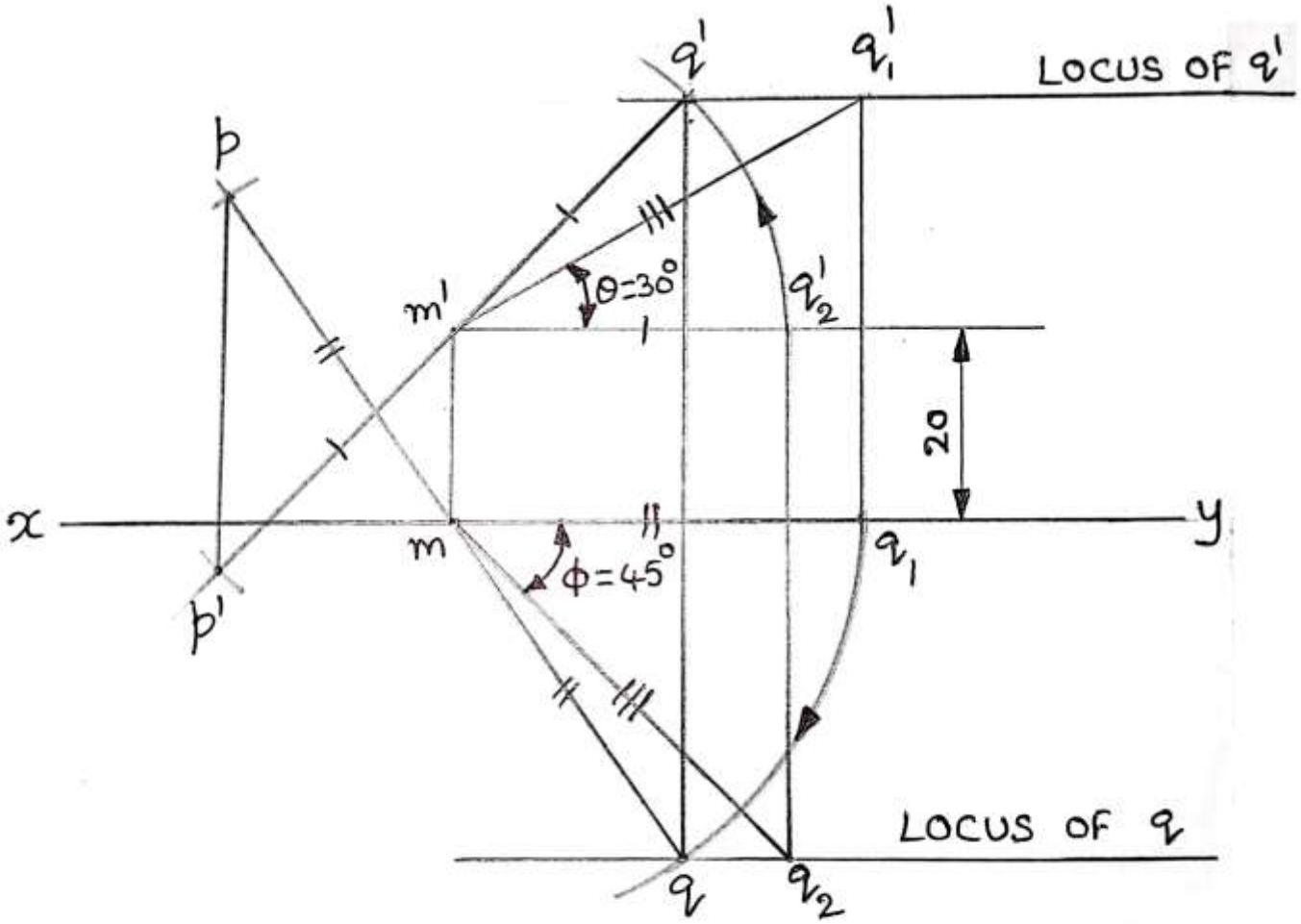
F.V = a'b' = 2(m'b'2) = 2(m'b') = ____ mm

T.L = 2(m'b'1) = 2(mb2) = 2(40) = 80 mm

θ = 30°

φ = 45°

11.6 A line PQ 100 mm long is inclined at 30^0 to the H.P and at 45^0 to the V.P. Its mid-point is in the V.P and 20 mm above the H.P. Draw its projections, if its end P is in the third quadrant and Q is in the first quadrant.



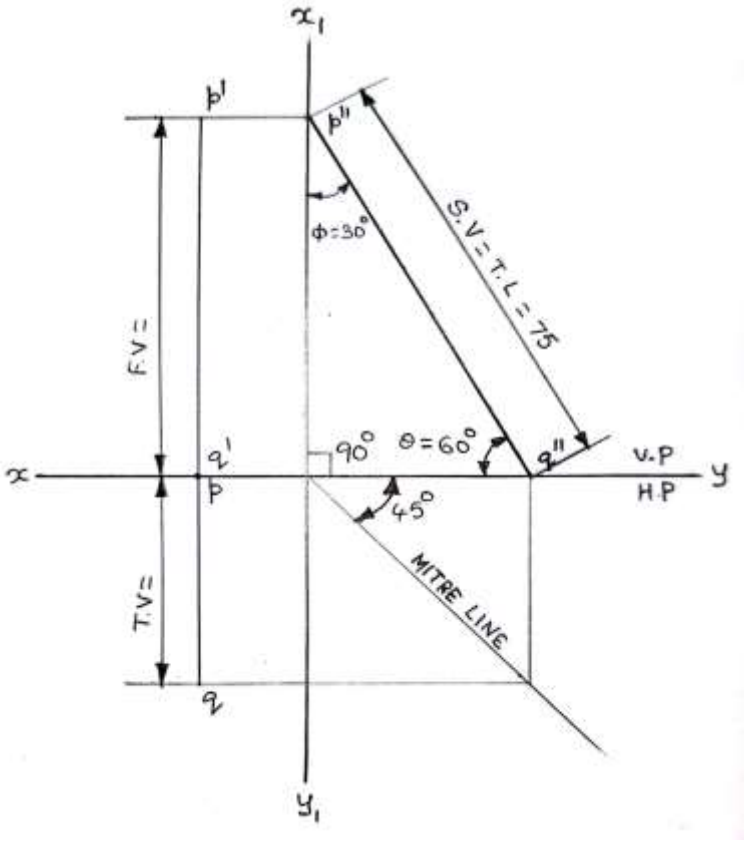
$m'q'_1 = mq_2 = \frac{T.L}{2} = \frac{100}{2} = \underline{50}$ mm

T.V = pq = ——— mm

F.V = p'q' = ——— mm

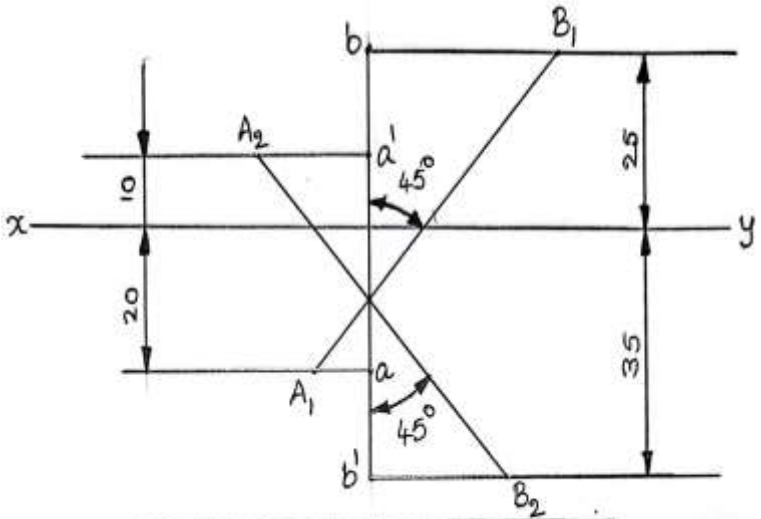
$\theta = 30^\circ$ and $\phi = 45^\circ$

11.7 A line PQ 75 mm long, has its end P in the V.P and the end Q in the H.P. The line is inclined at 60^0 to the H.P and at 30^0 to the V.P. Draw its projections.



11.8 The projections of a line AB are on the same projector. A is 10 mm above H.P and 20 mm in front of V.P. B is 35 mm below H.P and 25 mm behind V.P. Draw the projections of the line AB, find its true length and determine true inclinations with H.P and V.P.

<u>TRAPEZOIDAL METHOD</u>:

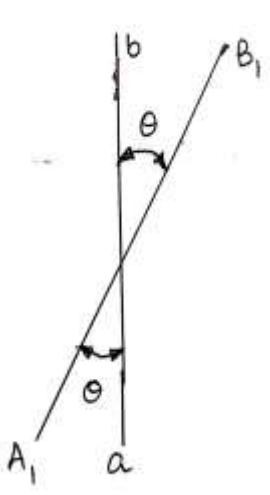


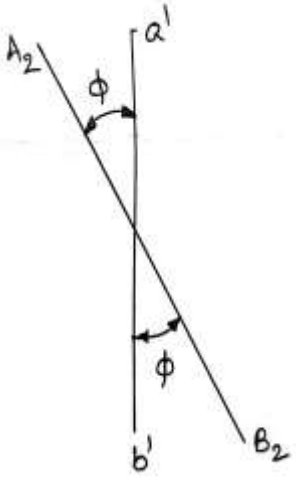
θ = 45° and Φ = 45°

T.V = ab = ____ mm

F.V = a'b' = ____ mm

T.L = $A_1B_1 = A_2B_2$ = ____ mm





11.9 Two oranges A and B on a tree are respectively at 1m and 2m above the ground and 0.3m and 1.5m from a 0.35m thick wall but on opposite sides of the wall. The distance between the oranges measured along the ground and parallel to the wall is 3m. Determine the true distance between the oranges.

We have: 1 m = 1000 mm = 10 x 100mm = 20 x 50 mm

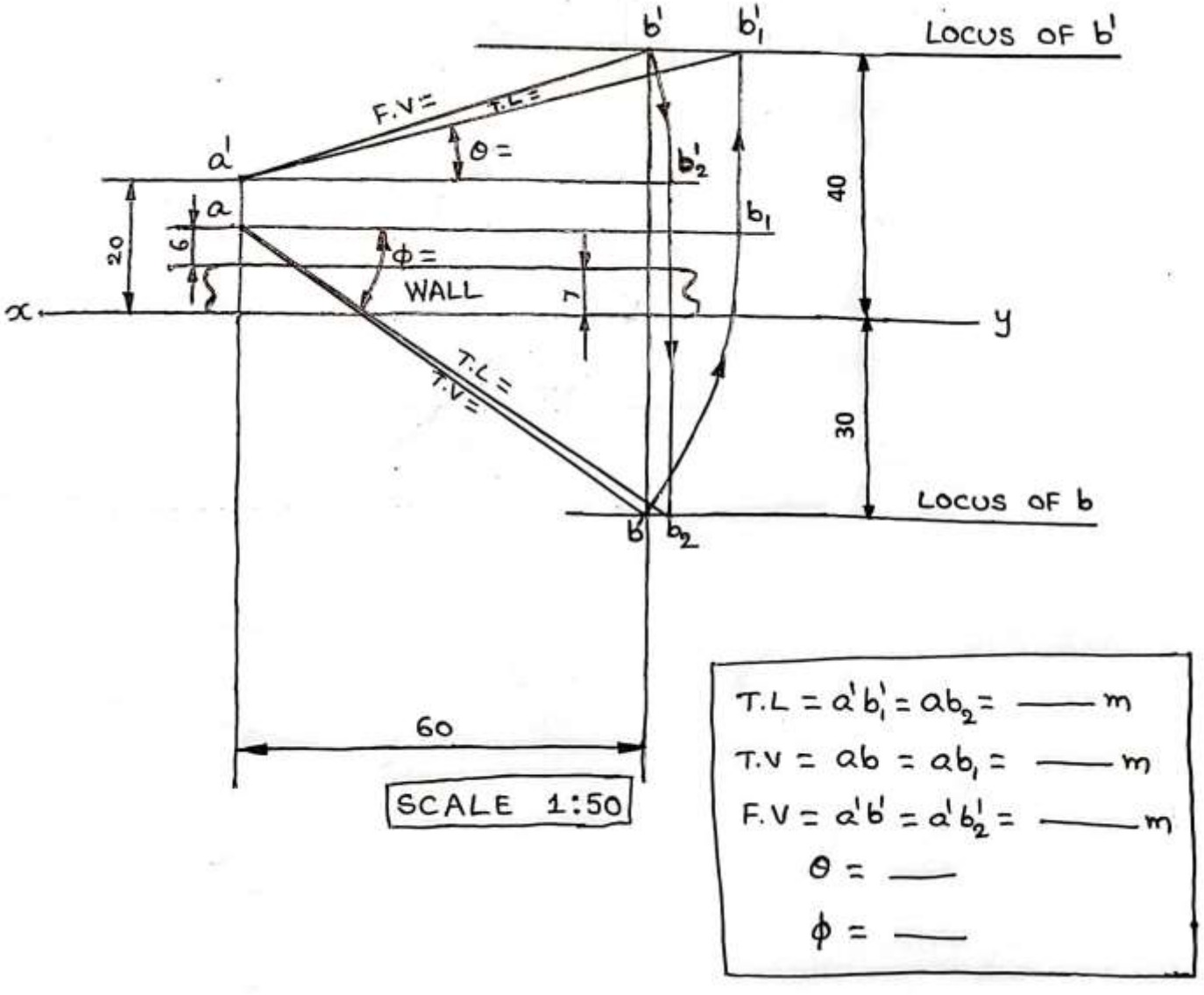
∴ 2 m = 40 x 50 mm

0.3m = 0.3 x20x50mm = 6 x50mm

1.5m = 1.5x 20 x50mm = 30 x 50 mm

0.35m = 0.35 x 20 x 50mm = 7 x50mm

3m = 3x20 x50mm = 60x50mm



T.L = $a'b_1' = ab_2$ = ____ m

T.V = $ab = ab_1$ = ____ m

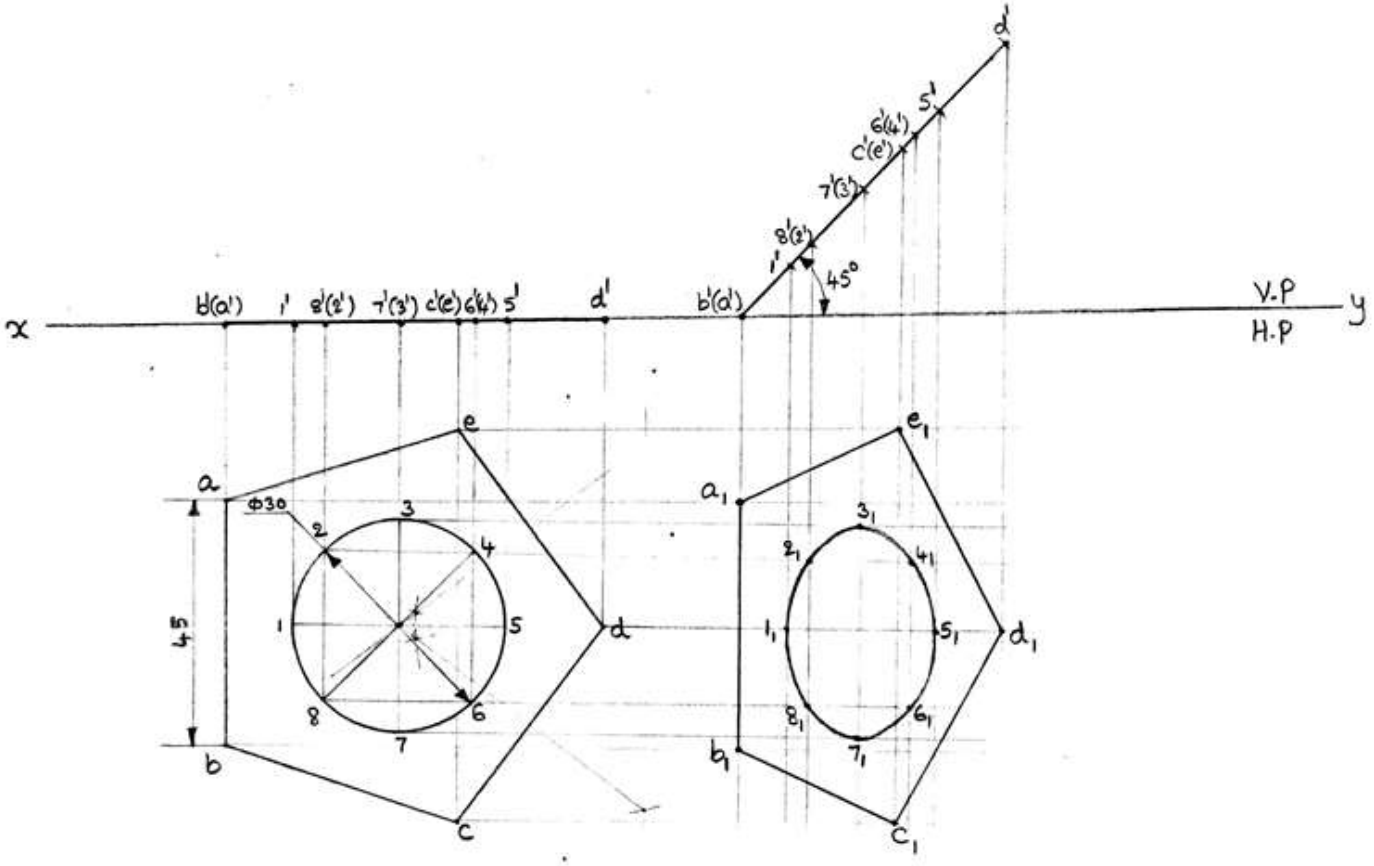
F.V = $a'b' = a'b_2'$ = ____ m

θ = ____

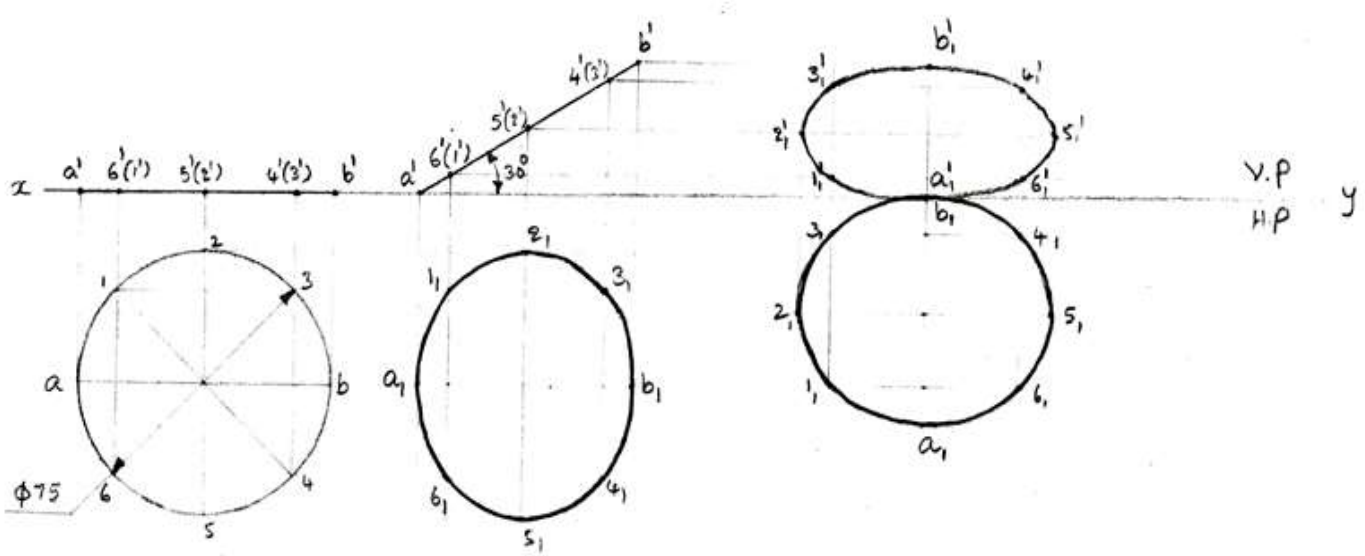
φ = ____

SHEET NO.12 **TITLE: PROJECTIONS OF PLANES** **UNIT - II**

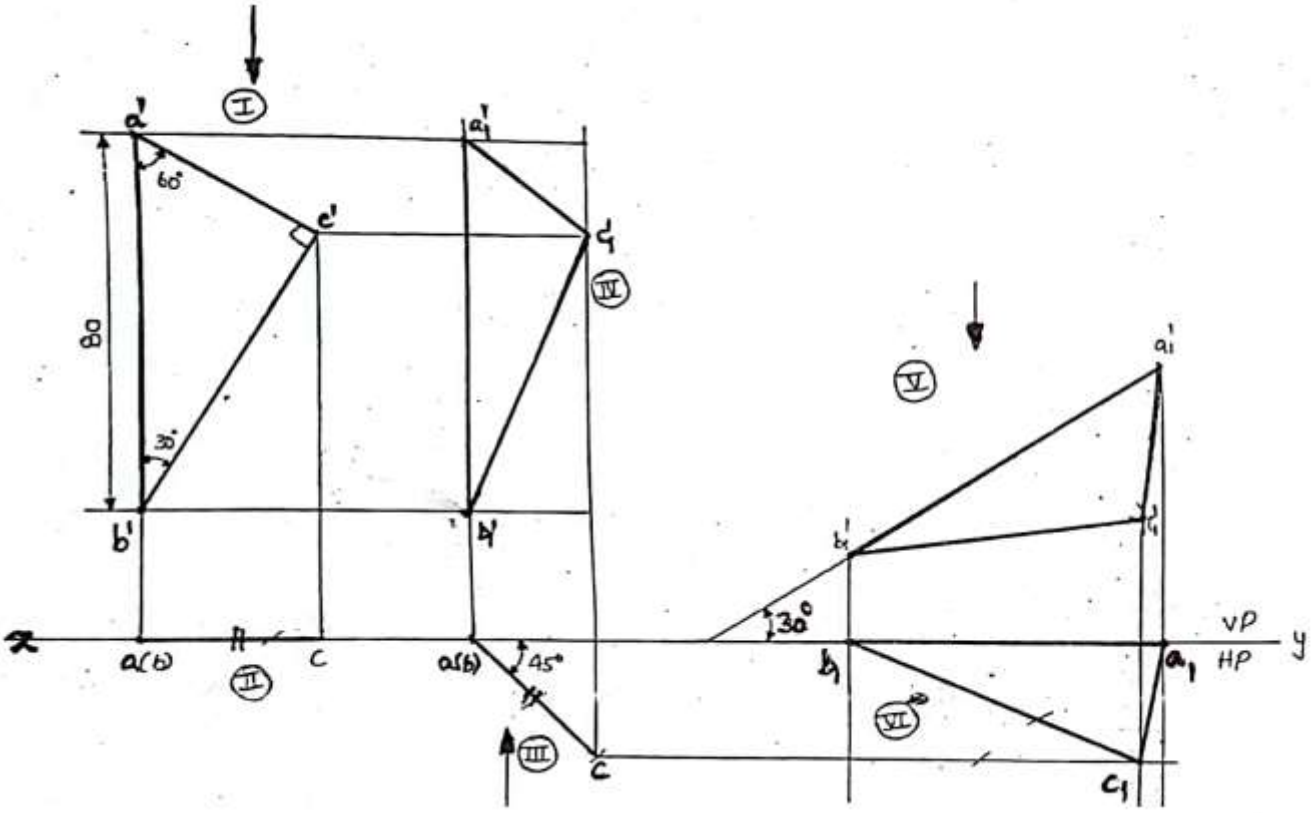
12.1 A pentagonal plate of 45 mm side has a circular hole of 30 mm diameter in its centre. The plane stands on one of its sides on the H.P with its plane perpendicular to V.P and 45^0 inclined to the H.P. Draw its projections.



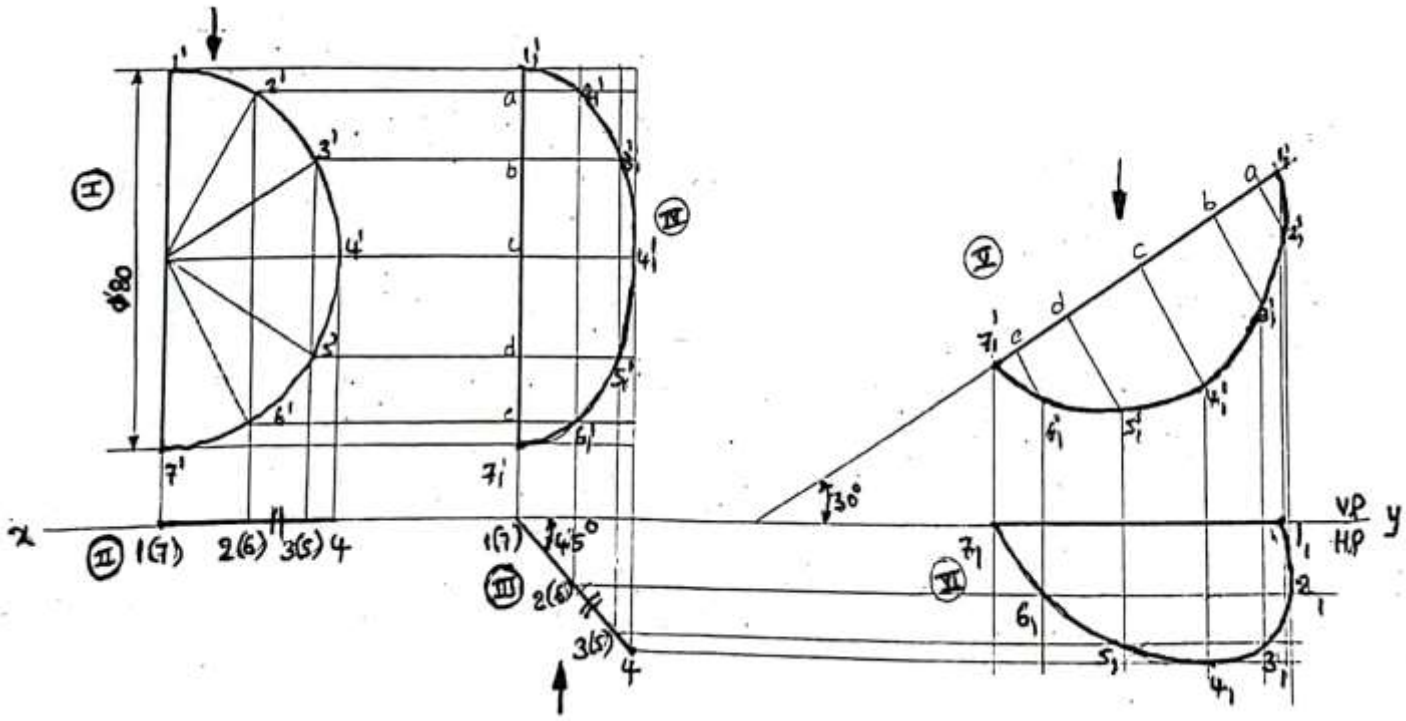
12.2 Draw the projections of a circle of 75 mm diameter having the end A of the diameter AB in H.P and the end B in V.P and the surface inclined at 30^0 to H.P and 60^0 to V.P.



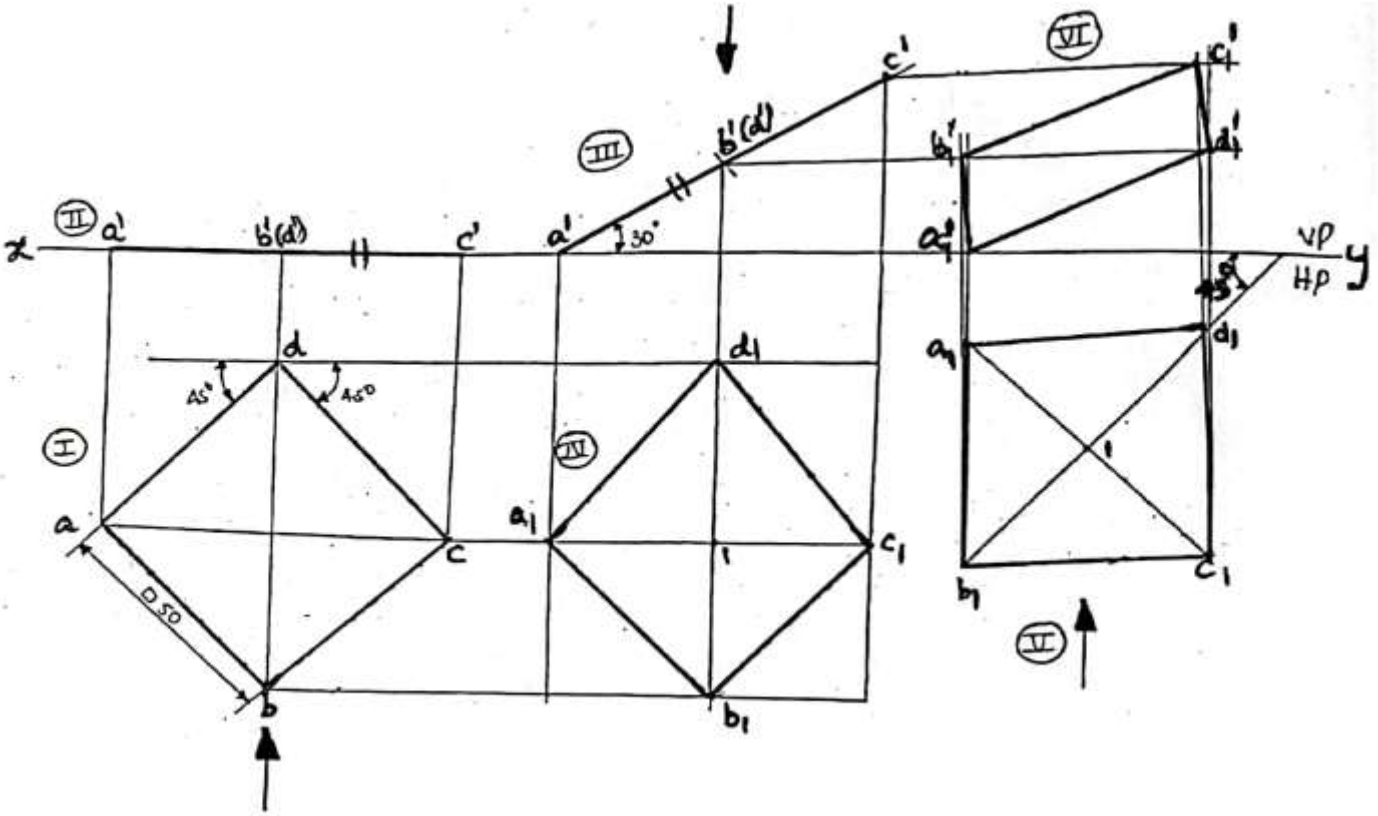
12.3 A thin 30^0 - 60^0 set-square has its longest edge of 80 mm in the V.P and inclined at 30^0 to the H.P. Its surface makes an angle of 45^0 with the V.P. Draw its projections.



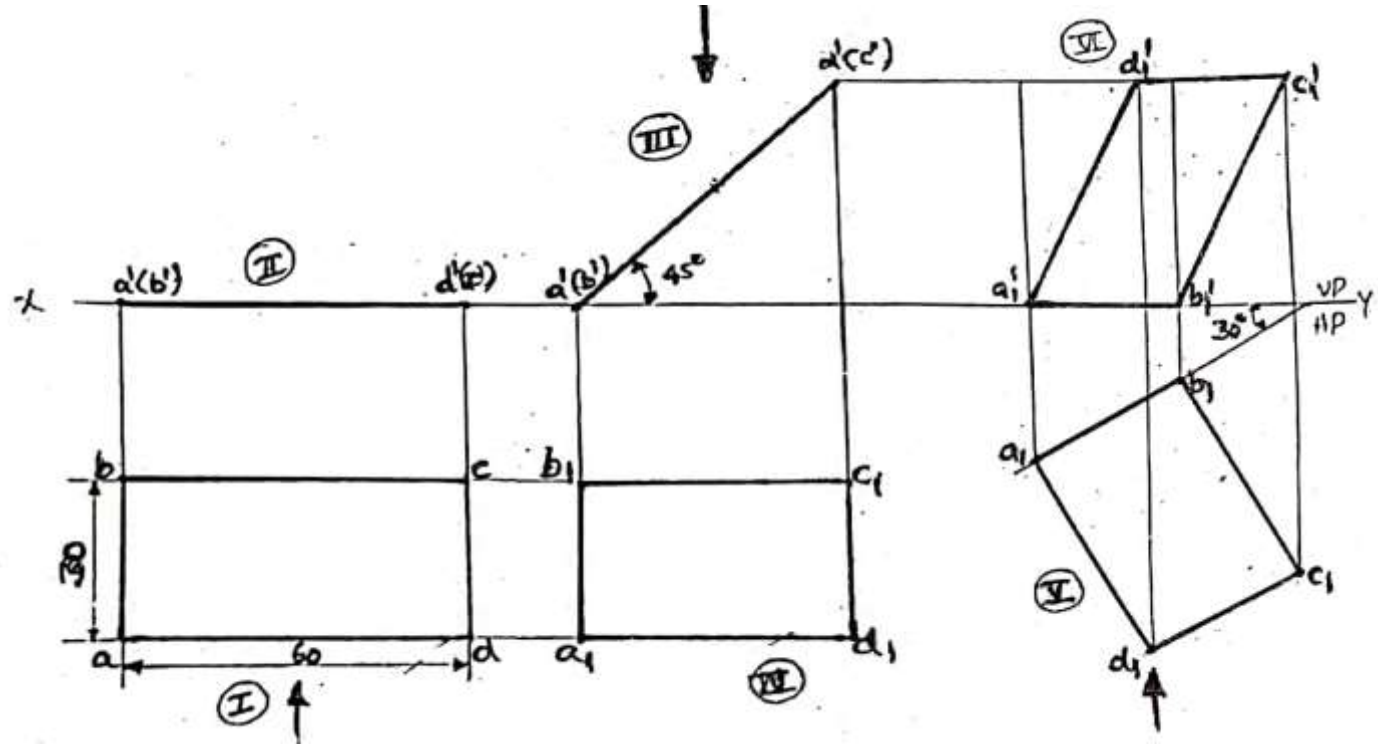
12.4 A semi-circular plate of 80 mm diameter, has its straight edge on V.P and inclined at 30^0 to H.P; while the surface of the plate is inclined at 45^0 to V.P. Draw its projections.



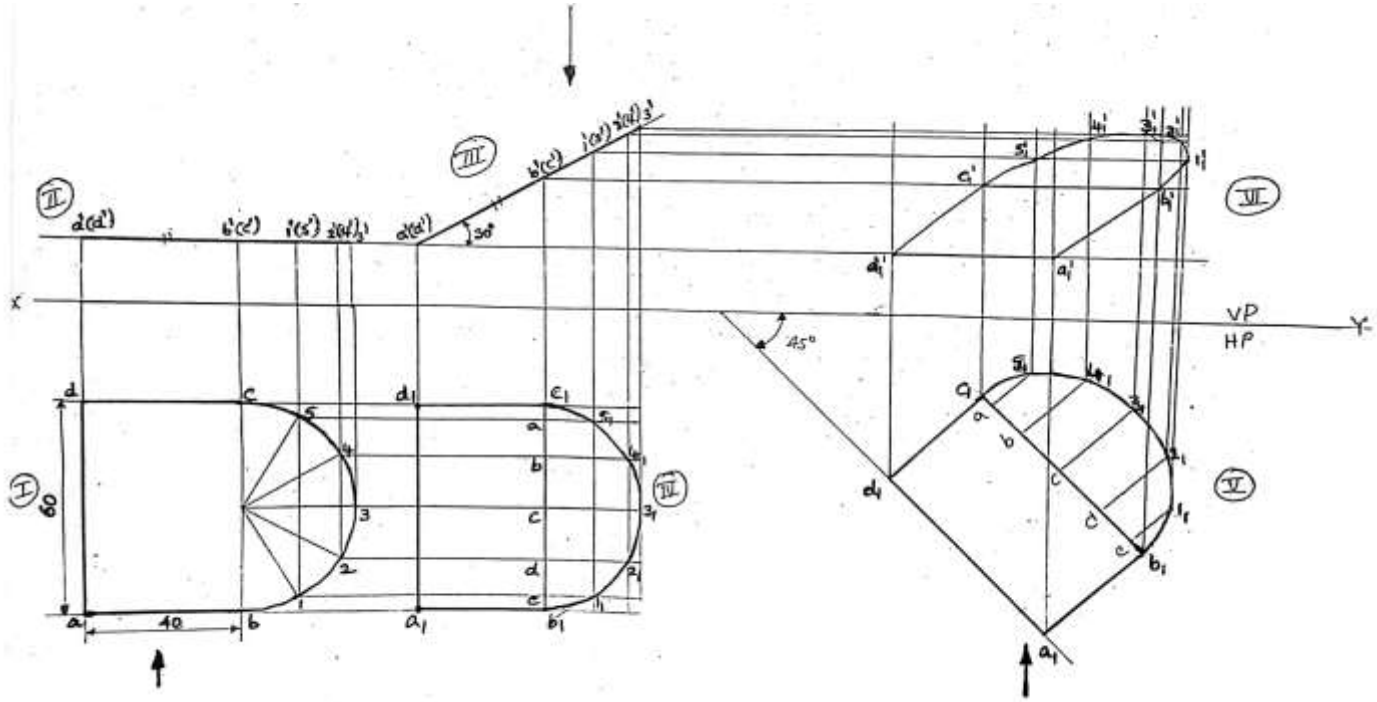
12.5 A square ABCD of 50 mm side has its corner A in the H.P, its diagonal AC inclined at 30^0 to H.P and the diagonal BD inclined at 45^0 to V.P and parallel to H.P. Draw its projections.



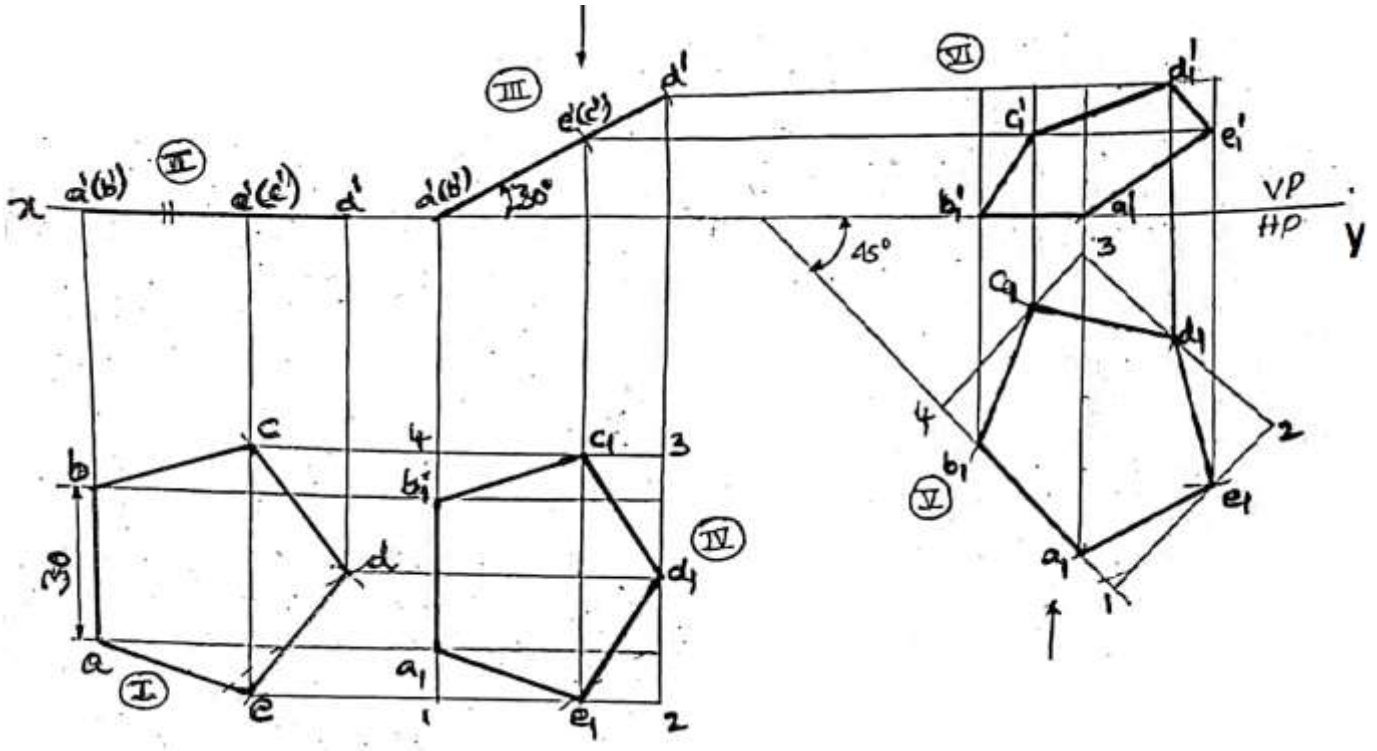
12.6 A rectangular plane of 60 mm x 30 mm size has its shorter side on H.P and inclined at 30^0 to V.P. Draw the projections of the plane, if its surface is inclined at 45^0 to H.P.



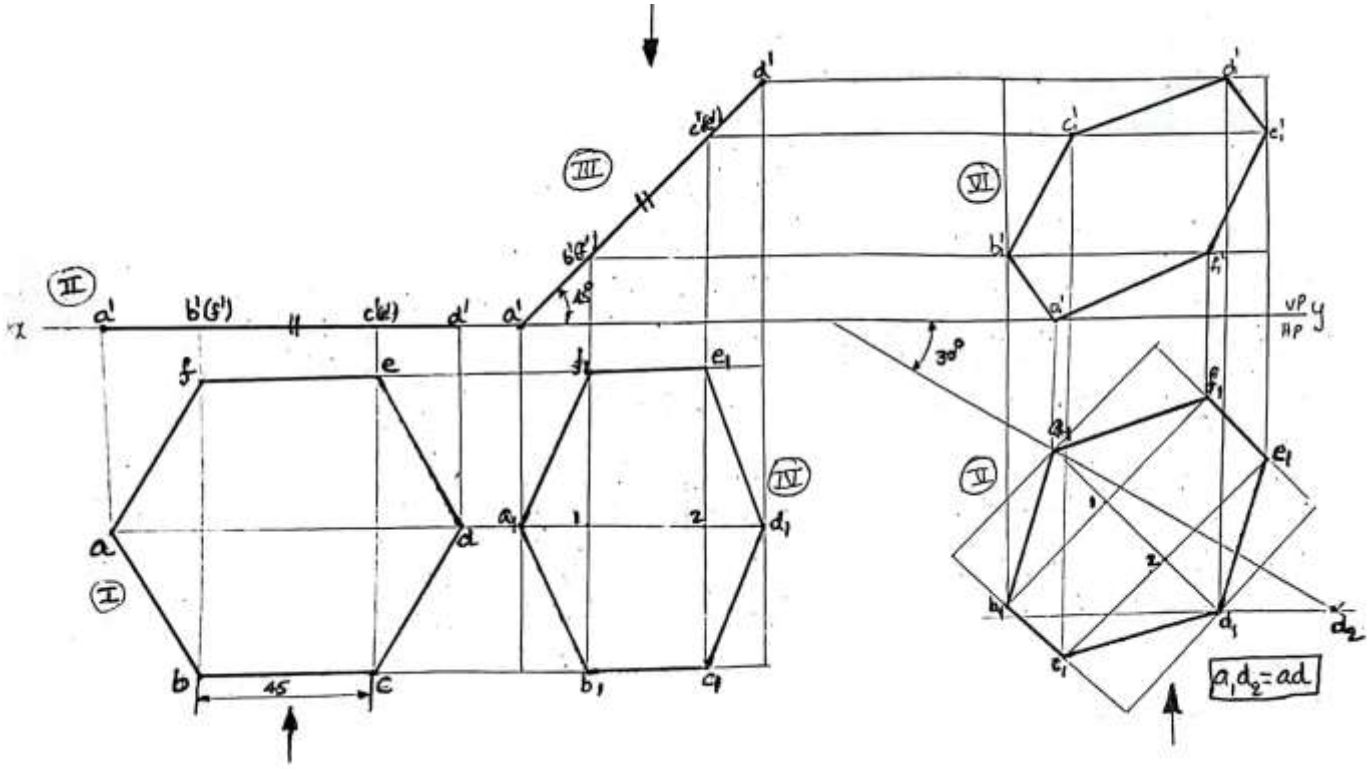
12.7 A composite plate of negligible thickness is made up of a rectangle 60 mm x 40 mm and a semi-circle on one of its longer sides. Draw its projections, when the longer side is parallel to H.P and inclined at 45^0 to V.P; the surface of the plate making 30^0 angle with H.P.



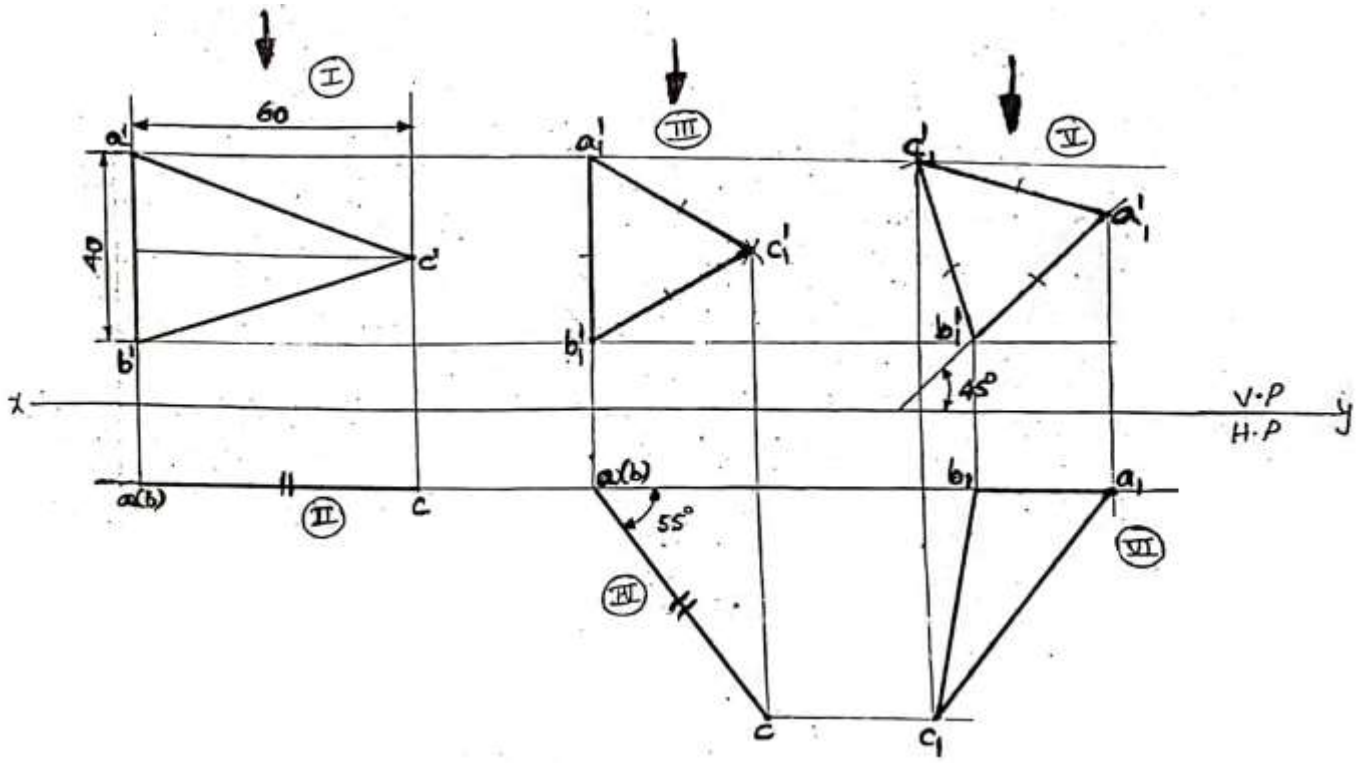
12.8 A regular pentagon of 30 mm side, is resting on one of its edges on H.P; which is inclined at 45^0 to V.P. Its surface is inclined at 30^0 to H.P. Draw its projections.



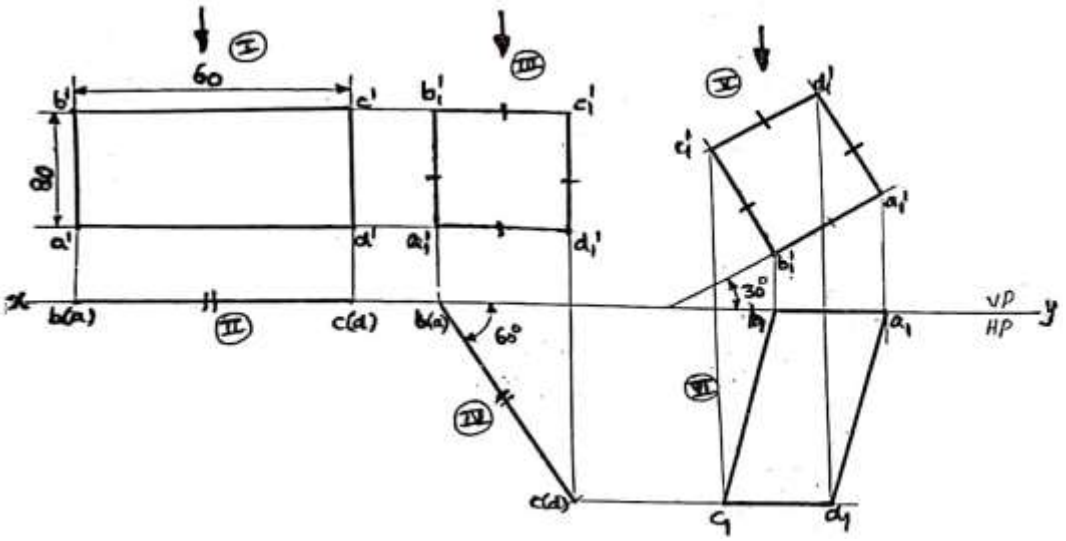
12.9 A regular hexagonal plane of 45 mm side has a corner on H.P and its surface is inclined at 45^0 to H.P. Draw projections, when the diagonal through the corner, which is on H.P, makes 30^0 with V.P.



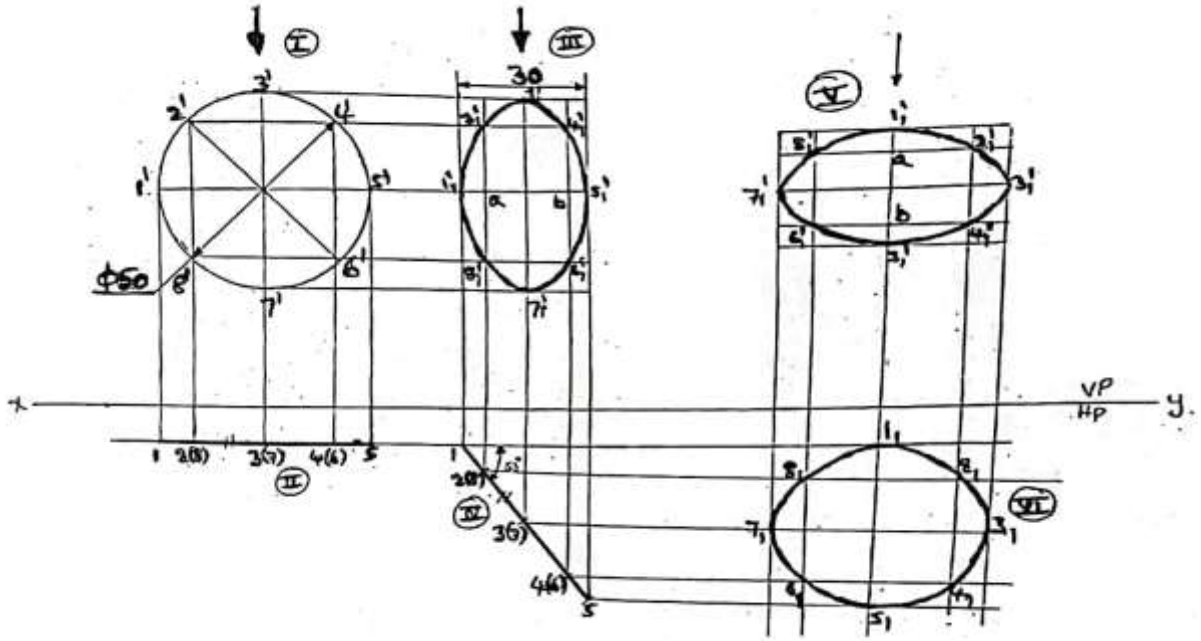
12.10 A plate is of the shape of an isosceles triangle of base 40 mm and altitude 60 mm. Draw the projections of the plate, when it is placed such that, the front view appears as an equilateral triangle of side 40 mm and one of the edges of the plate makes 45^0 with the H.P.



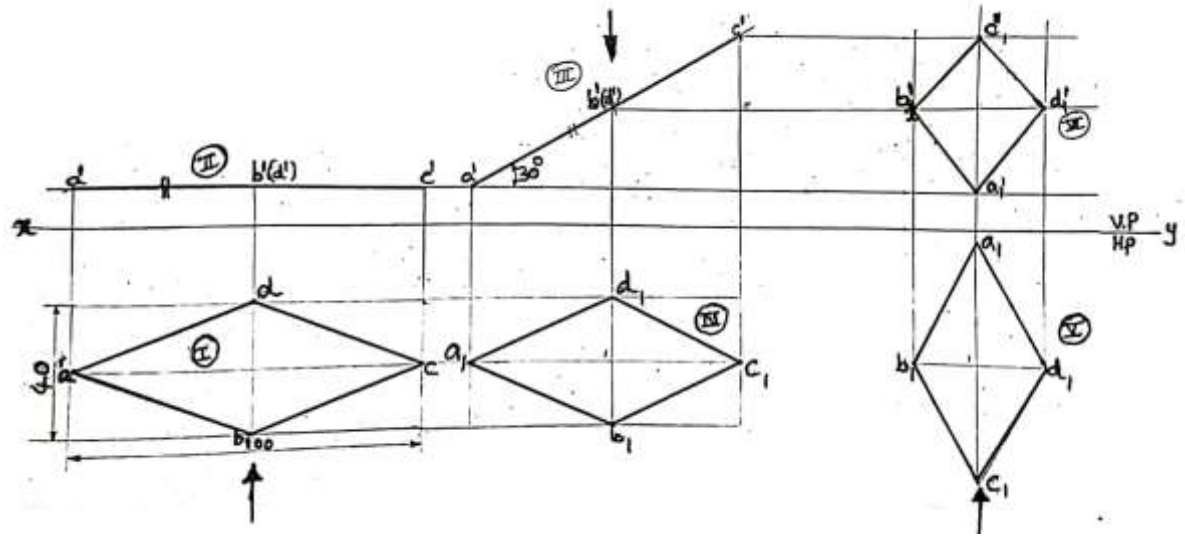
12.11 A thin rectangular plate of sides 60 mm x 30 mm has its shorter side in the V.P and inclined at 30^0 to H.P. Project its top view if its front view is a square of 30 mm long sides.



12.12 A circular plate of 50 mm diameter, appears as an ellipse in the front view, having its major axis 50mm long and minor axis 30 mm long. Draw the top view, when the major axis of the ellipse is horizontal.



12.13 The diagonals of a rhombus measure 100 mm and 40 mm. The longer diagonal is inclined at 30^0 to H.P and the smaller diagonal is parallel to both the principal planes. Draw its projections.



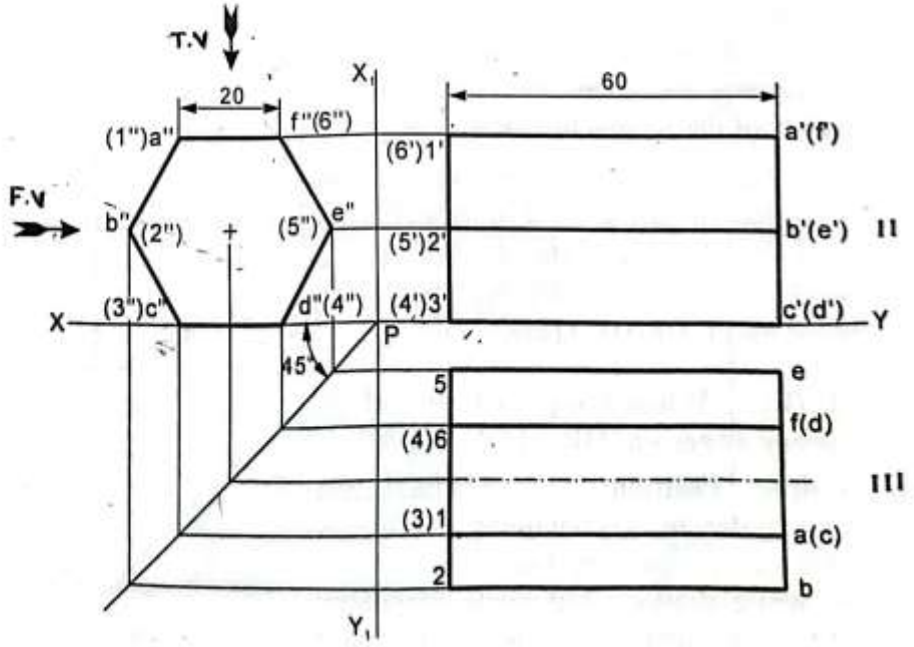
SHEET NO.13 **TITLE: PROJECTIONS OF SOLIDS** **UNIT - III**

AXIS PARALLEL TO BOTH HP AND VP (Simple Position)

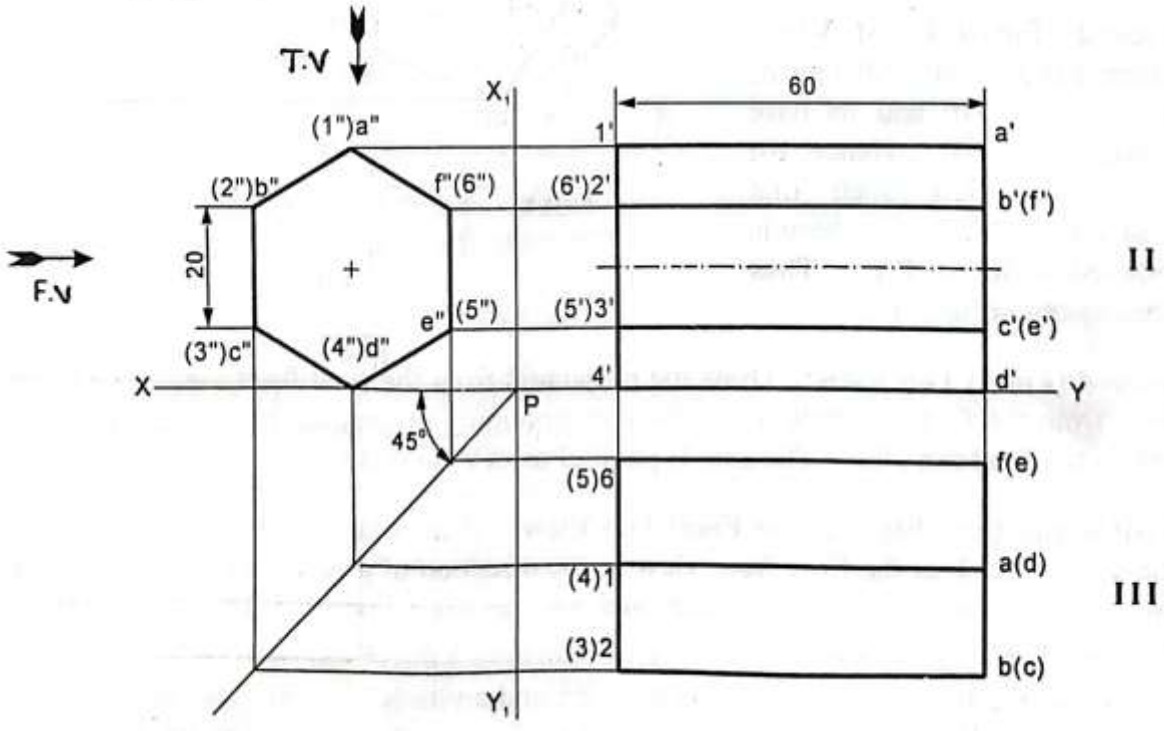
Rule: *As the axis is parallel to both HP and VP, begin with the Side View.*

Alternative Method (Side View Method)

13.1 *A **hexagonal prism**, side of base 20 mm and axis 60 mm long lies with one of its rectangular faces on HP such that its axis is parallel to both HP and VP. Draw its projections.*

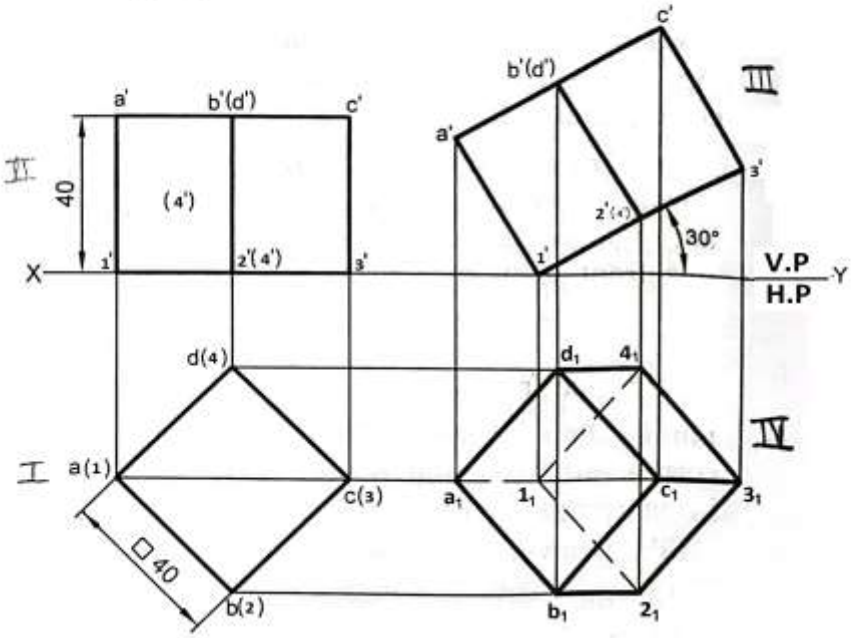


13.2 *A **hexagonal prism**, side of base 20 mm and axis 60 mm long lies with one of its longer edges on HP and its axis is parallel to both HP and VP. Draw its projections.*

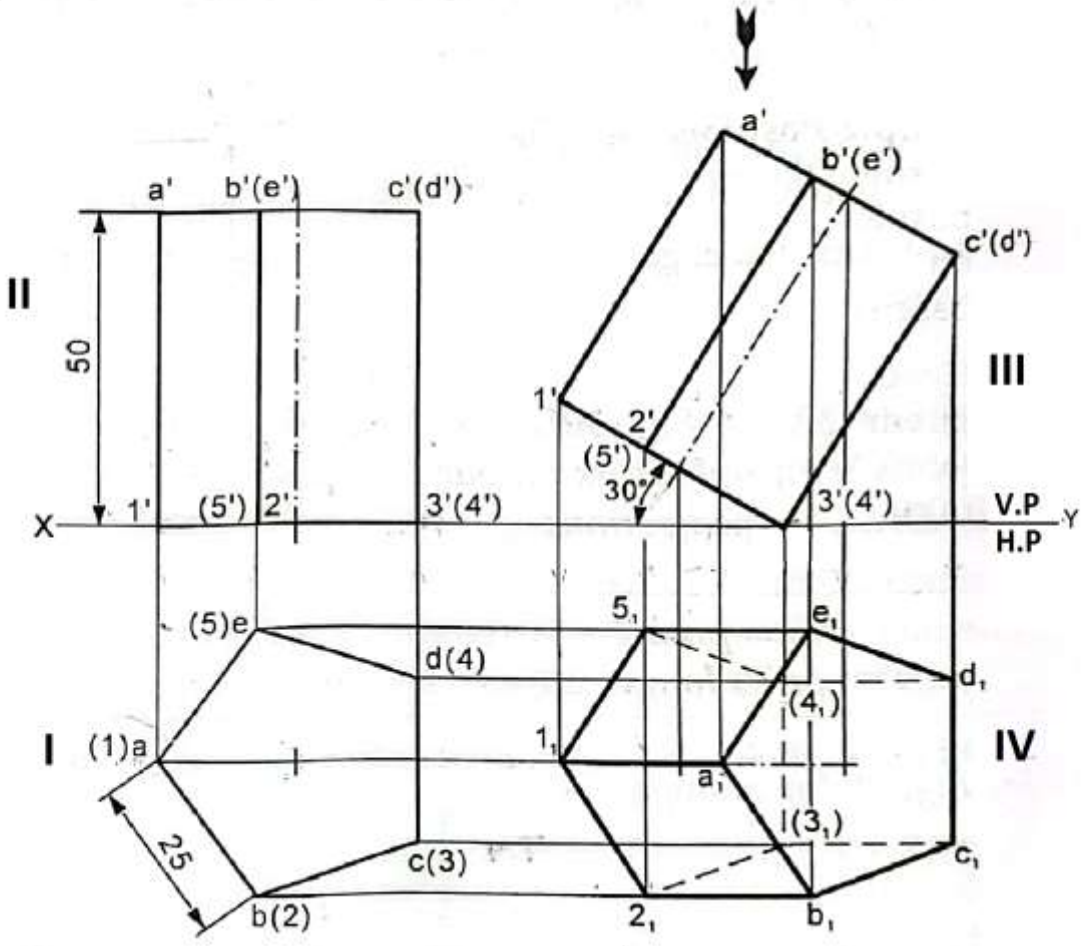


AXIS OF SOLID INCLINED TO HP AND PARALLEL TO VP

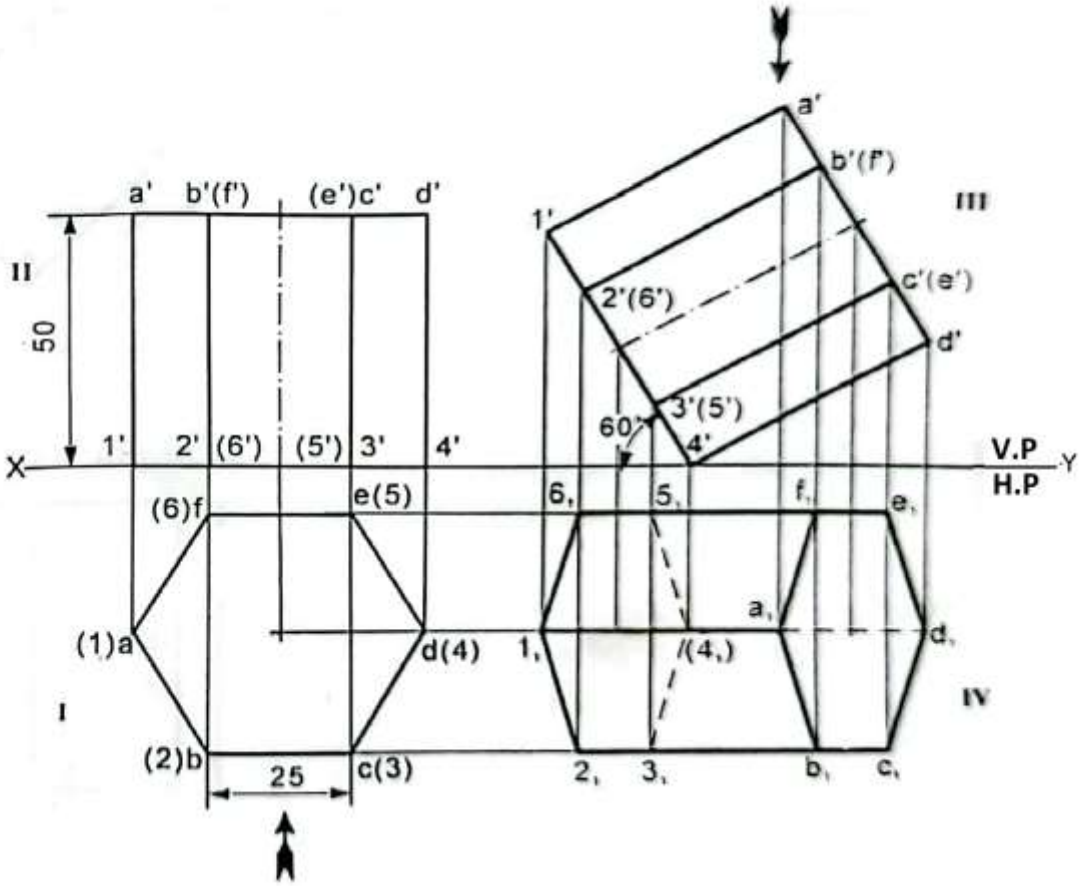
13.3 *Draw the projections of a* ***cube*** *of side 40 mm when it rests on the ground on one of its corners and a face containing that corner is inclined at 30° to the ground and perpendicular to VP.*



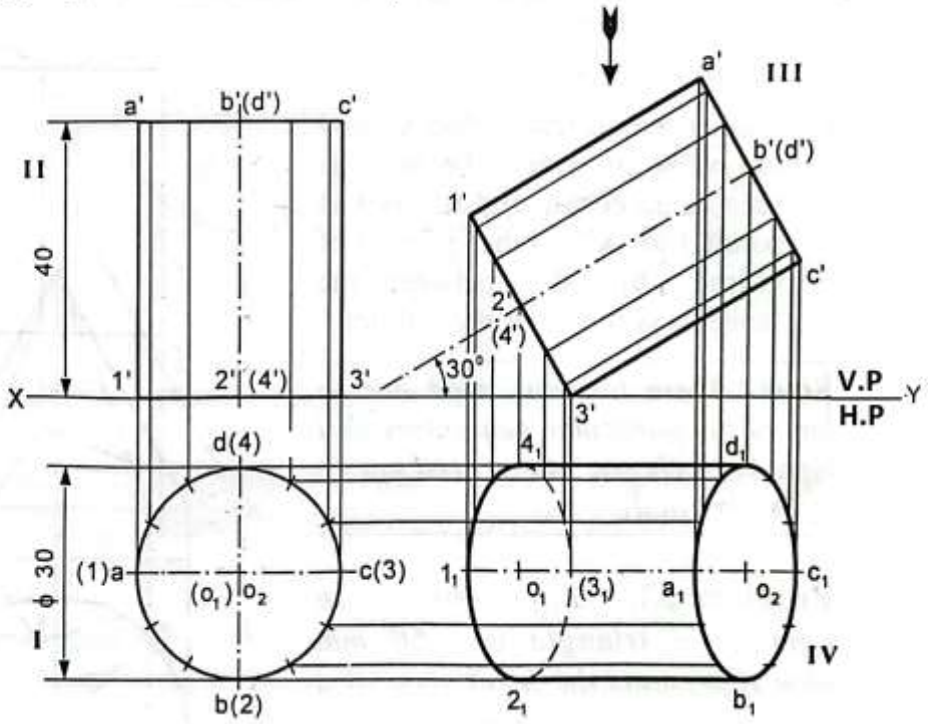
13.4 *A* ***pentagonal prism,*** *side of base 25 mm and axis 50 mm long, rests with one of its edges on HP such that the base containing that edge makes an angle of 30° to HP and its axis is parallel to VP. Draw its projections.*



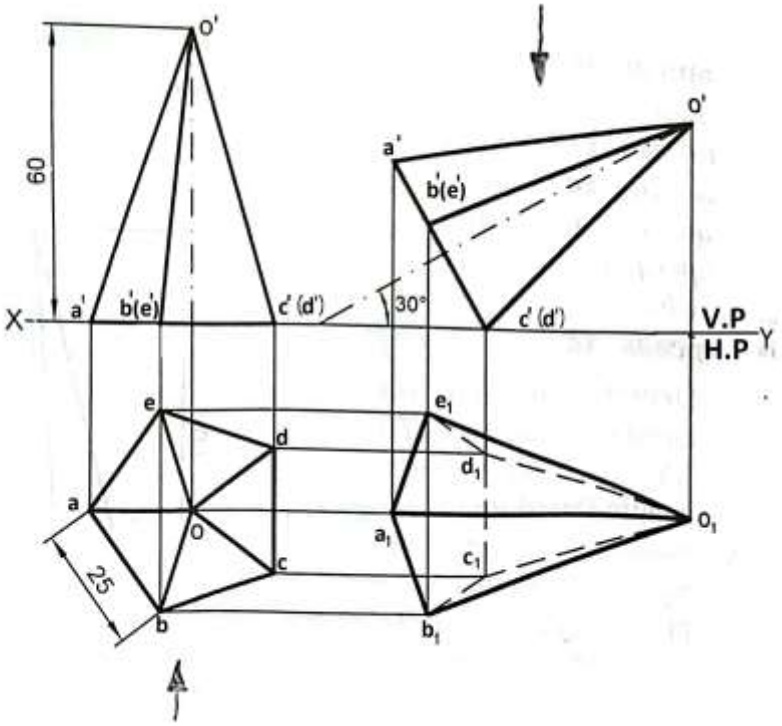
13.5 *A **hexagonal prism**, side of base 25 mm and axis 50 mm long rests with one of its base corners on HP such that its base makes an angle of 60° to HP and its axis is parallel to VP. Draw its projections.*



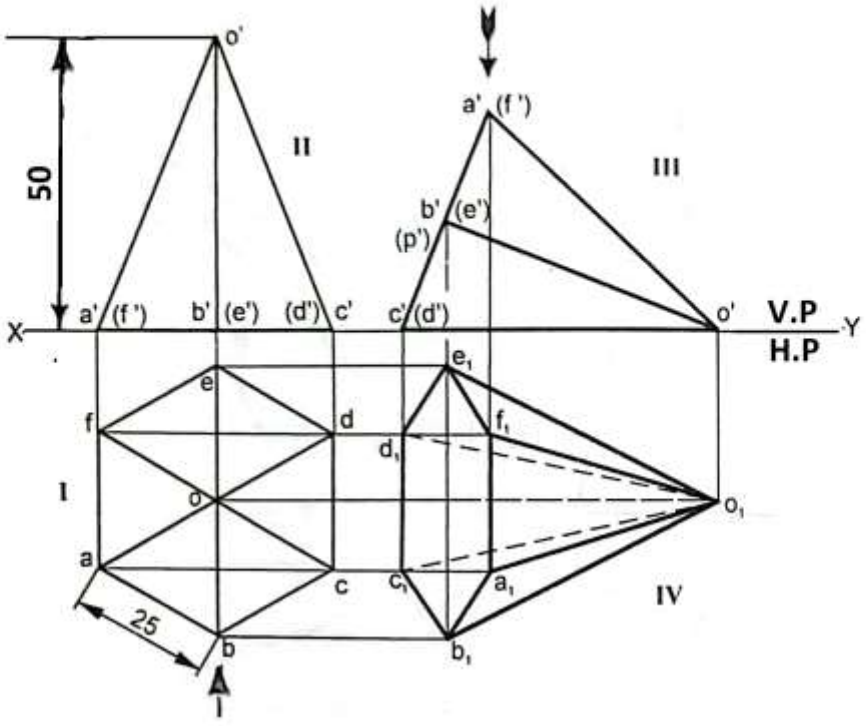
13.6 *Draw the projections of a **cylinder**, base 30 mm diameter and axis 40 mm long, resting with a point of its base circle on HP such that the axis is making an angle of 30° with HP and parallel to VP.*



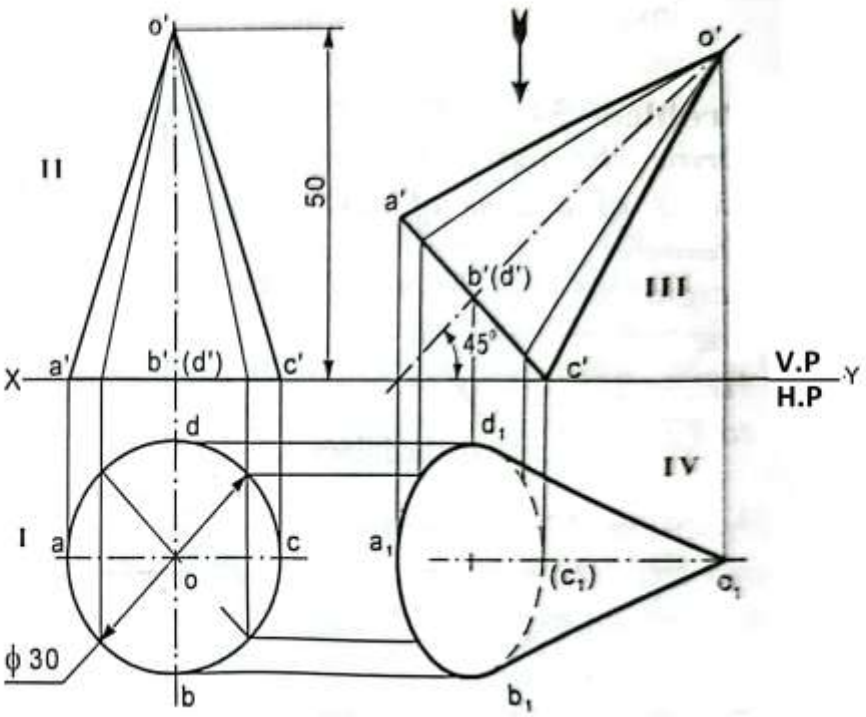
13.7 *Draw the projections of a* ***pentagonal pyramid*** *of base 25 mm side and axis 60 mm long when it is lying on HP on one of its base edges, such that the axis is parallel to VP and inclined at 30° to HP.*



13.8 *A* ***hexagonal pyramid*** *side of base 25 mm, axis 50 mm long lies with one of its triangular faces on the HP and its axis is parallel to the VP. Draw its projections.*

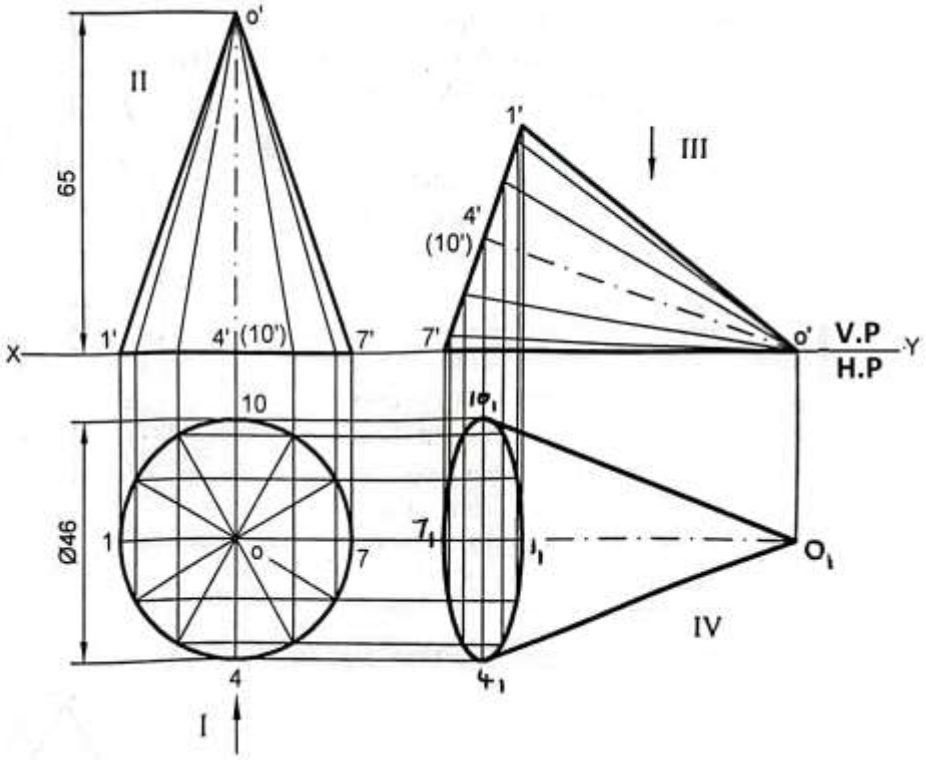


13.9 *Draw the projections of a cone, base 30 mm diameter and axis 50 mm long, resting on HP on a point of its base circle with the axis making an angle of 45° with HP and parallel to VP.*



13.10

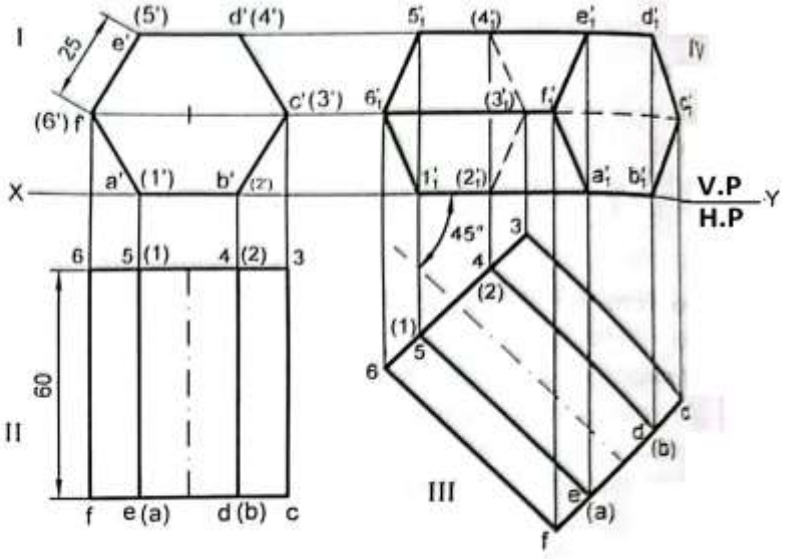
Draw the top and front views of a cone of base diameter 46 mm and height 65 mm lying with one of its generators on HP. The axis is parallel to VP.



AXIS INCLINED TO VP AND PARALLEL TO HP

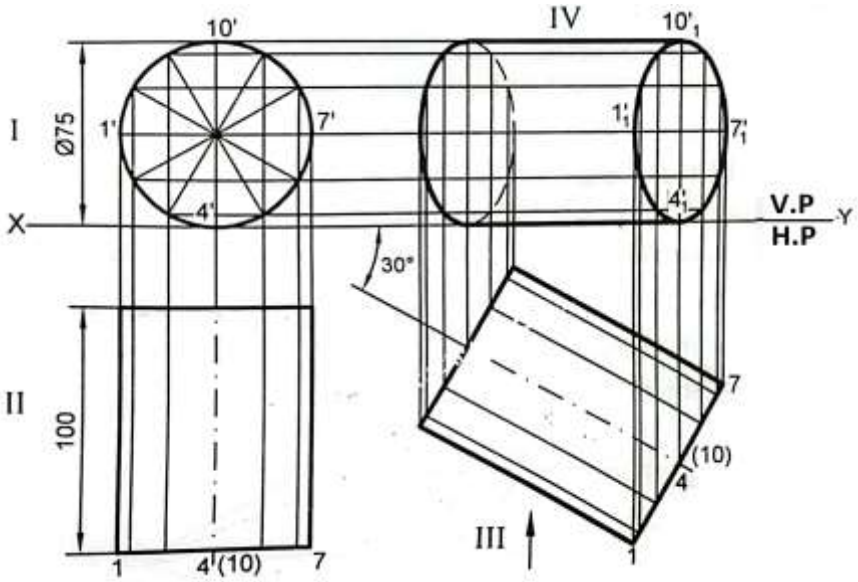
Note: *When the axis of a solid is inclined to VP and parallel to HP, assume the solid to be kept such that its axis is ⊥r to VP. Draw the projections in this* ***Simple Position****.*

13.11 *A* ***hexagonal prism****, side of base 25 mm and axis 60 mm long, lies with one of its rectangular faces on HP, such that the axis is inclined at 45° to VP. Draw its projections.*

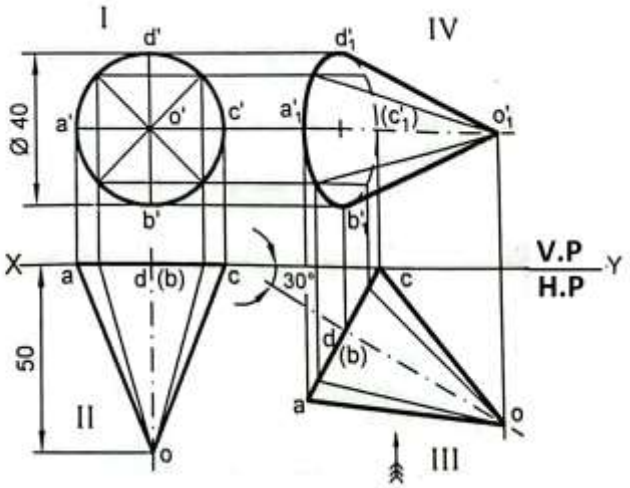


13.12

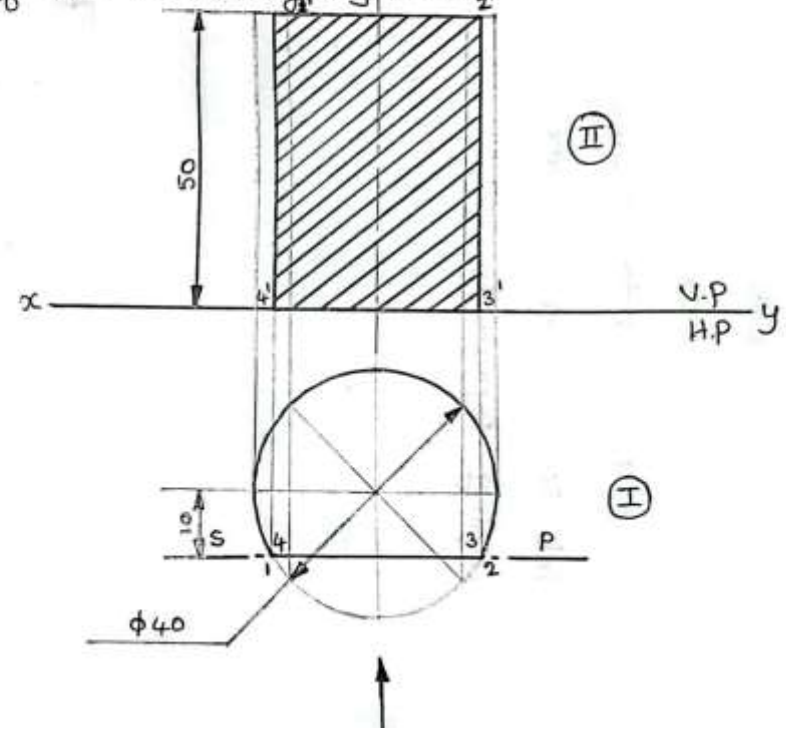
Draw the projections of a ***cylinder*** *75 mm diameter and 100 mm long, lying on the ground with its axis inclined at 30° to the vertical plane.*



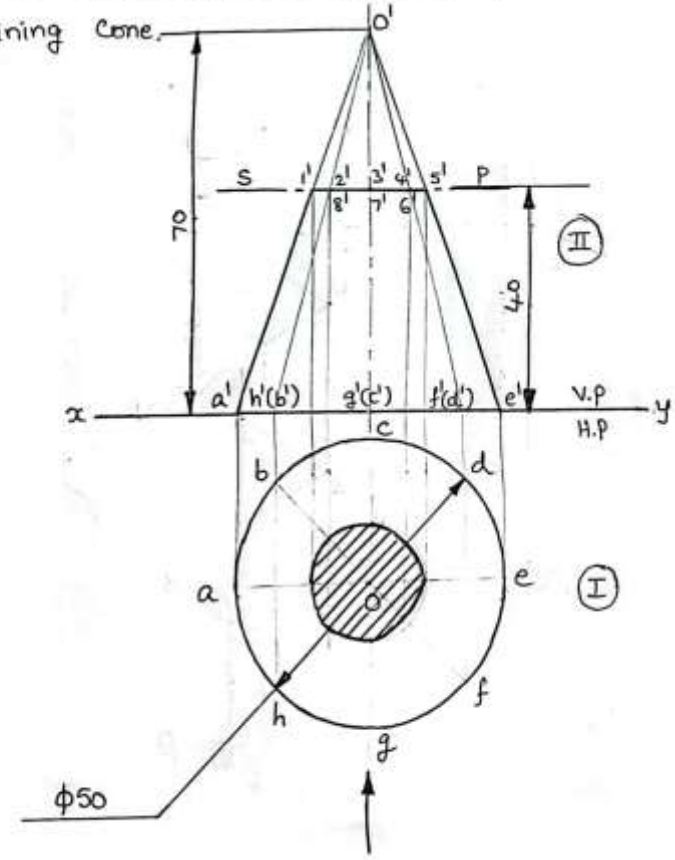
13.13 *A* ***cone*** *of base 40 mm diameter and axis 50 mm long touches VP on a point of its base circle. Its axis is inclined at 30° to VP and parallel to HP. Draw its projections.*



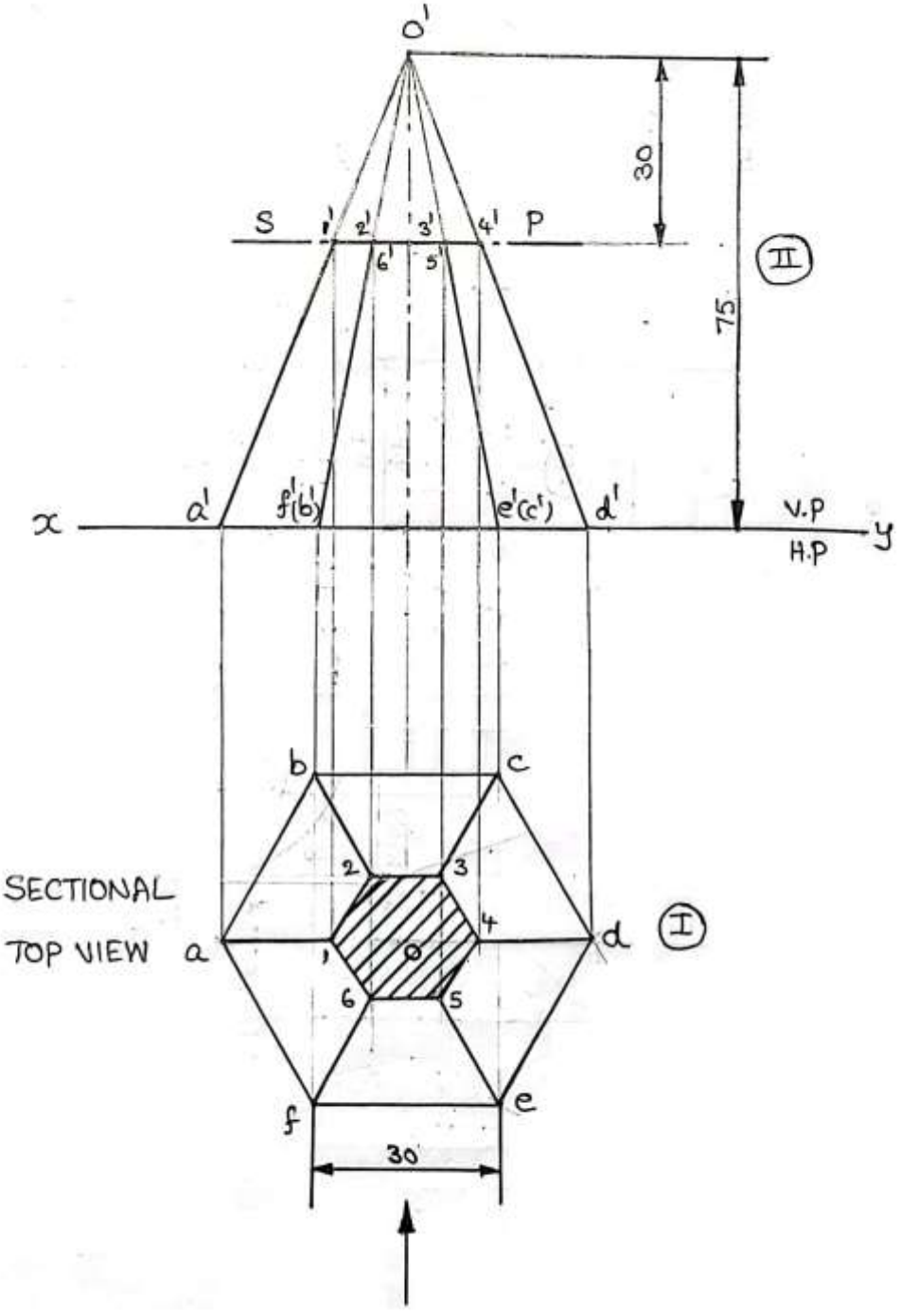
14.1 A cylinder of diameter 40mm and axis 50mm long, rests with its base on H.P. It is cut by a Section plane parallel to V.P. and passing through the solid at a distance 10 mm from the axis. Draw the projections of the remaining cylinder.



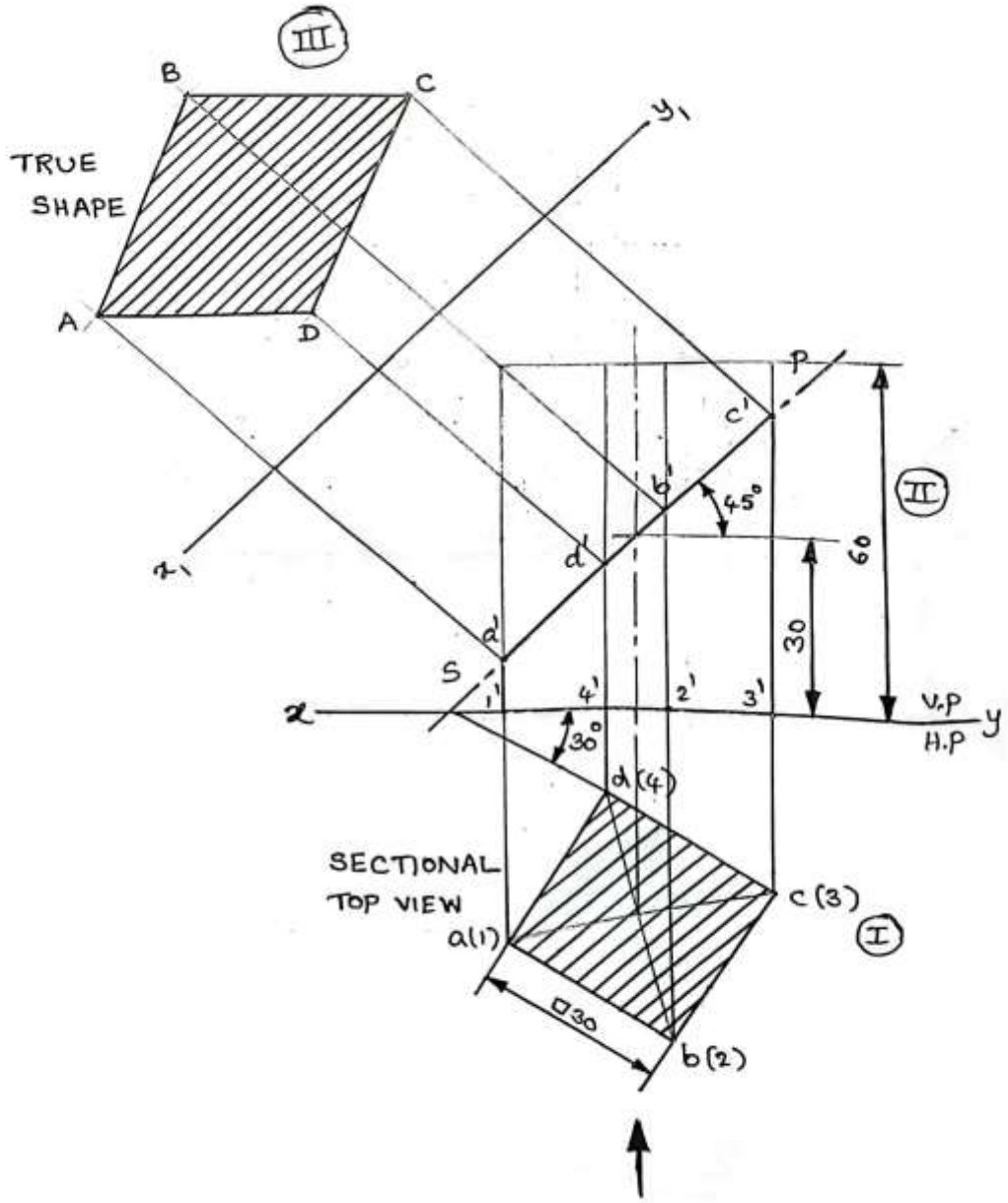
14.2 A Cone of base 50mm diameter and axis 70mm long, lies on its base on H.P. A Section plane parallel to H.P, passes through the axis at a point 40mm from the base. Draw the projections of the remaining Cone.



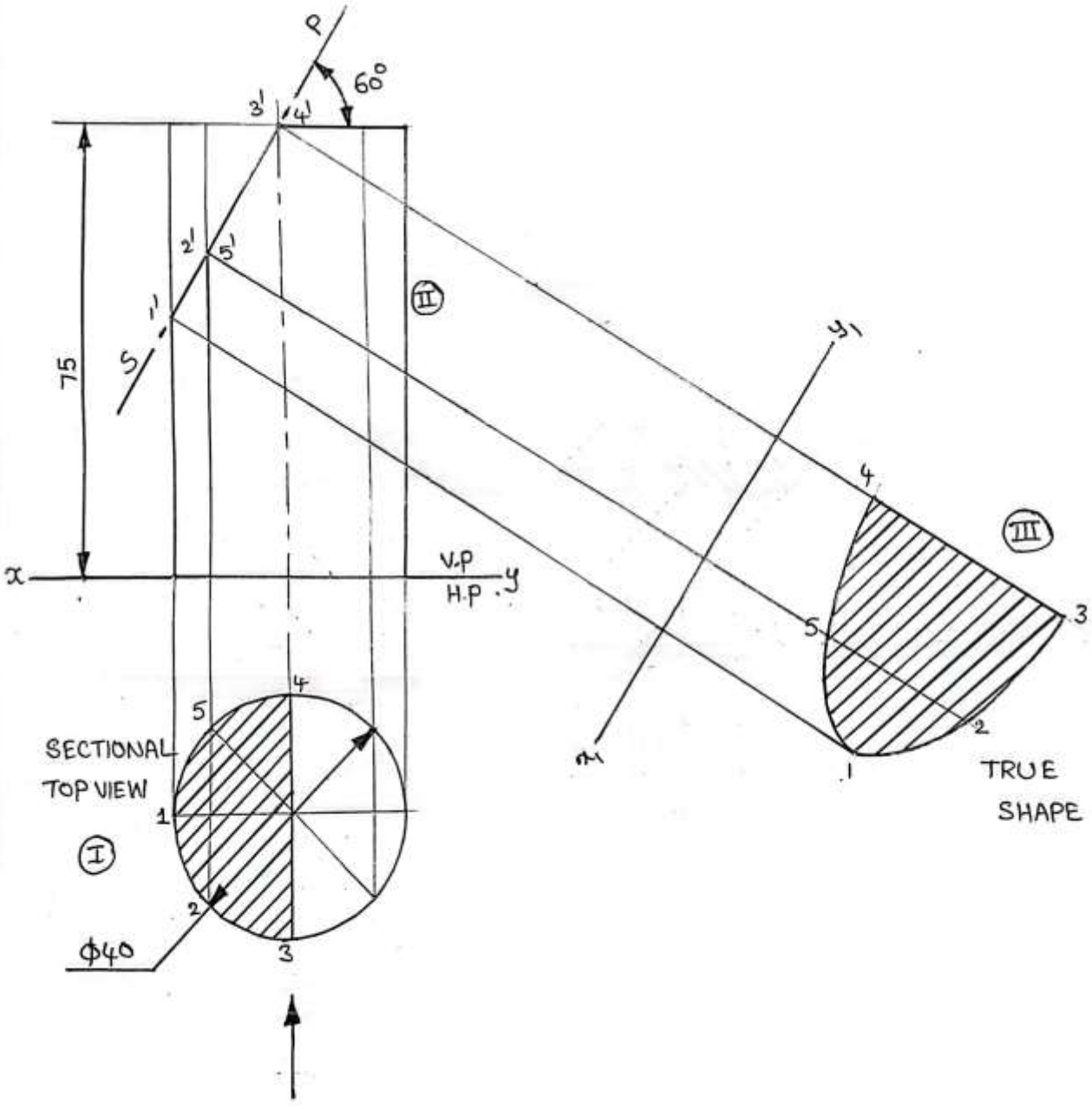
14.3 A hexagonal pyramid, with side of base 30mm and axis 75mm long, is resting with its base on H.P. and two edges of the base are parallel to V.P. It is cut by a section plane parallel to H.P. and passing through the axis at a point 30mm from the apex. Draw the projections of the remaining pyramid.



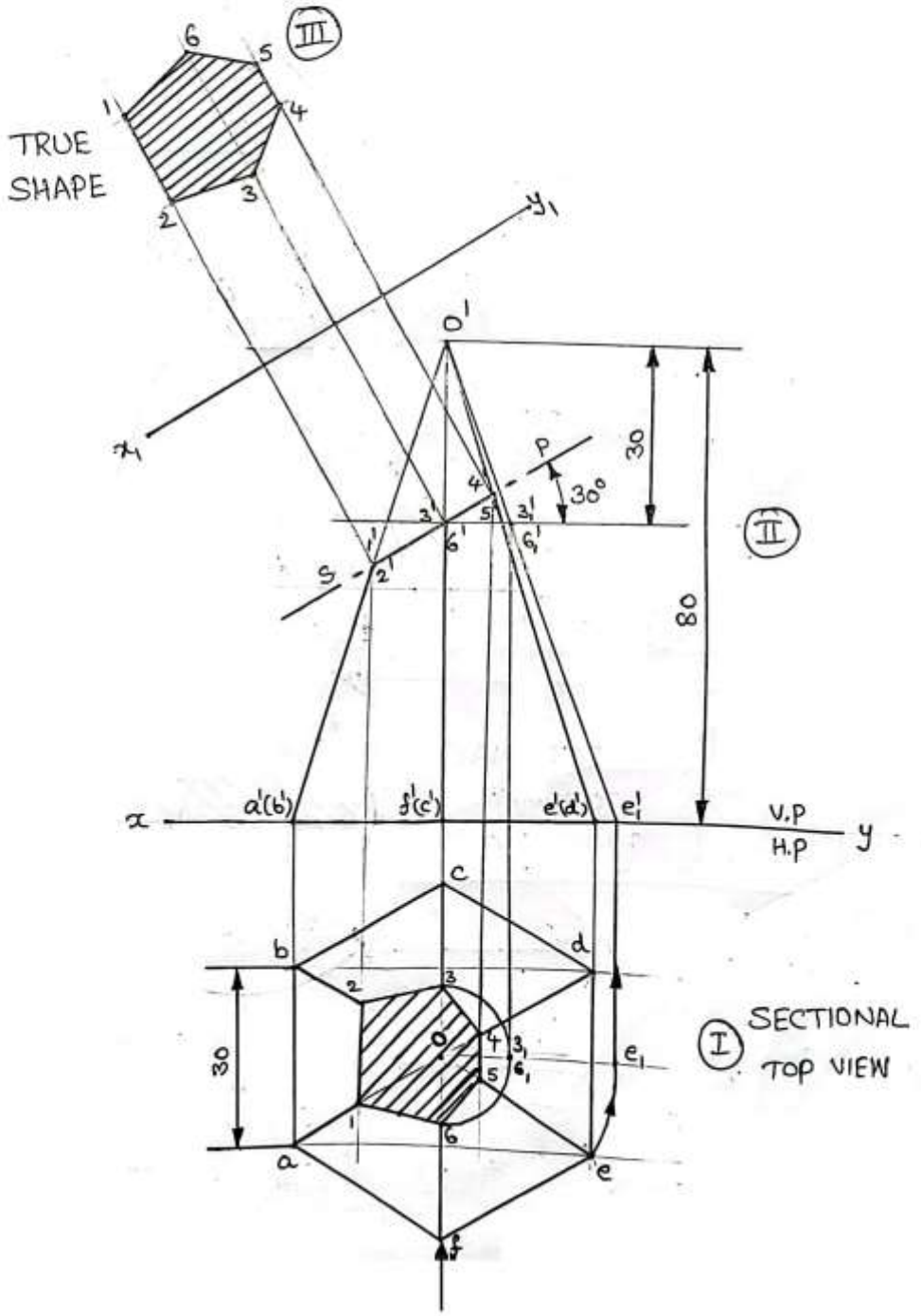
14.4 A square prism of base side of 30 mm and height 60 mm is resting on H.P on one of its bases, with a base side inclined at 30° to V.P. It is cut by a plane inclined at 45° to H.P. and perpendicular to V.P and is bisecting the axis of the prism. Draw the front view, sectional top view and true shape of the section.



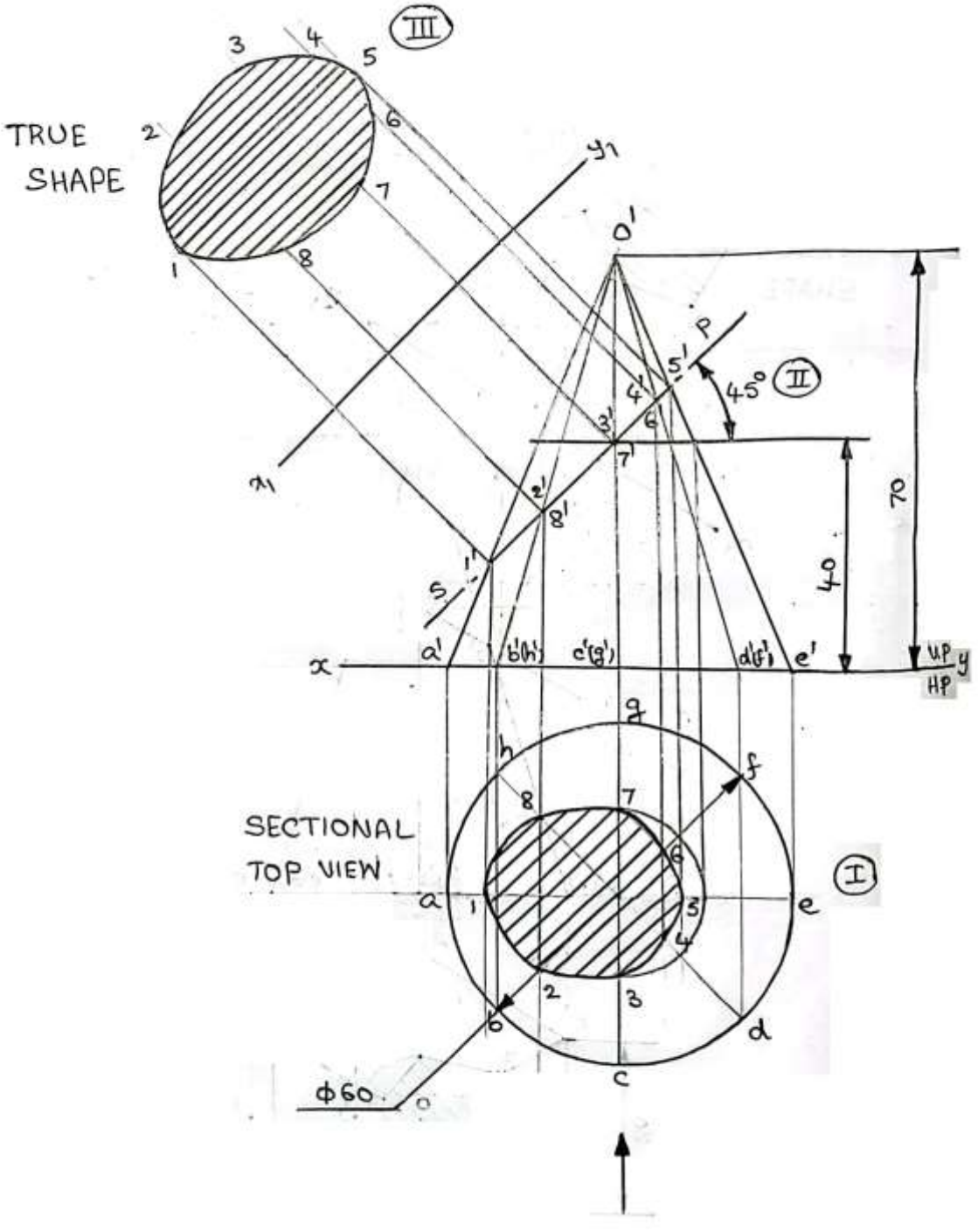
14.5 A cylinder of base diameter 40mm and height 75mm, standing on one of its ends, is cut by a plane which is perpendicular to V.P. and 60° to H.P and passing through the middle point of the top face. Draw the sectional top view and true shape of the section.



14.6 A regular hexagonal pyramid of base side 30mm and height 80mm is resting on the ground with its axis perpendicular to H.P. and parallel to V.P. Two of its base edges are perpendicular to V.P. A sectional plane perpendicular to V.P and inclined at 30° to H.P, passes through a point on the axis, 30mm from the vertex. Draw the front view, Sectional top view and true shape of the Section.

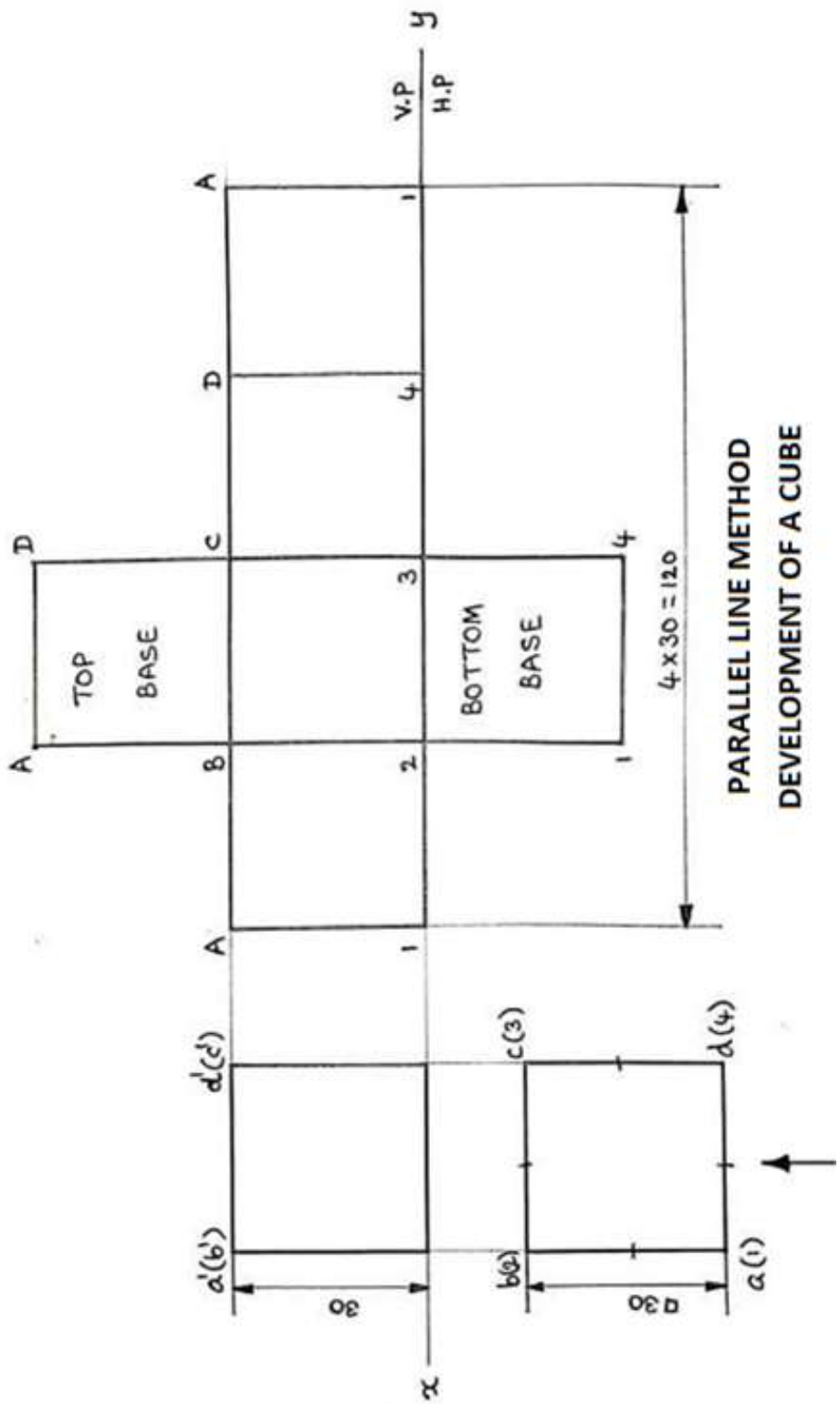


14.7 A Cone of base diameter 60 mm and height 70mm is resting on the ground on its base. It is cut by a section plane perpendicular to V.P, inclined at 45° to H.P and cutting the axis at a point 40mm from the bottom. Draw the front view, sectional top view and true shape of the section.

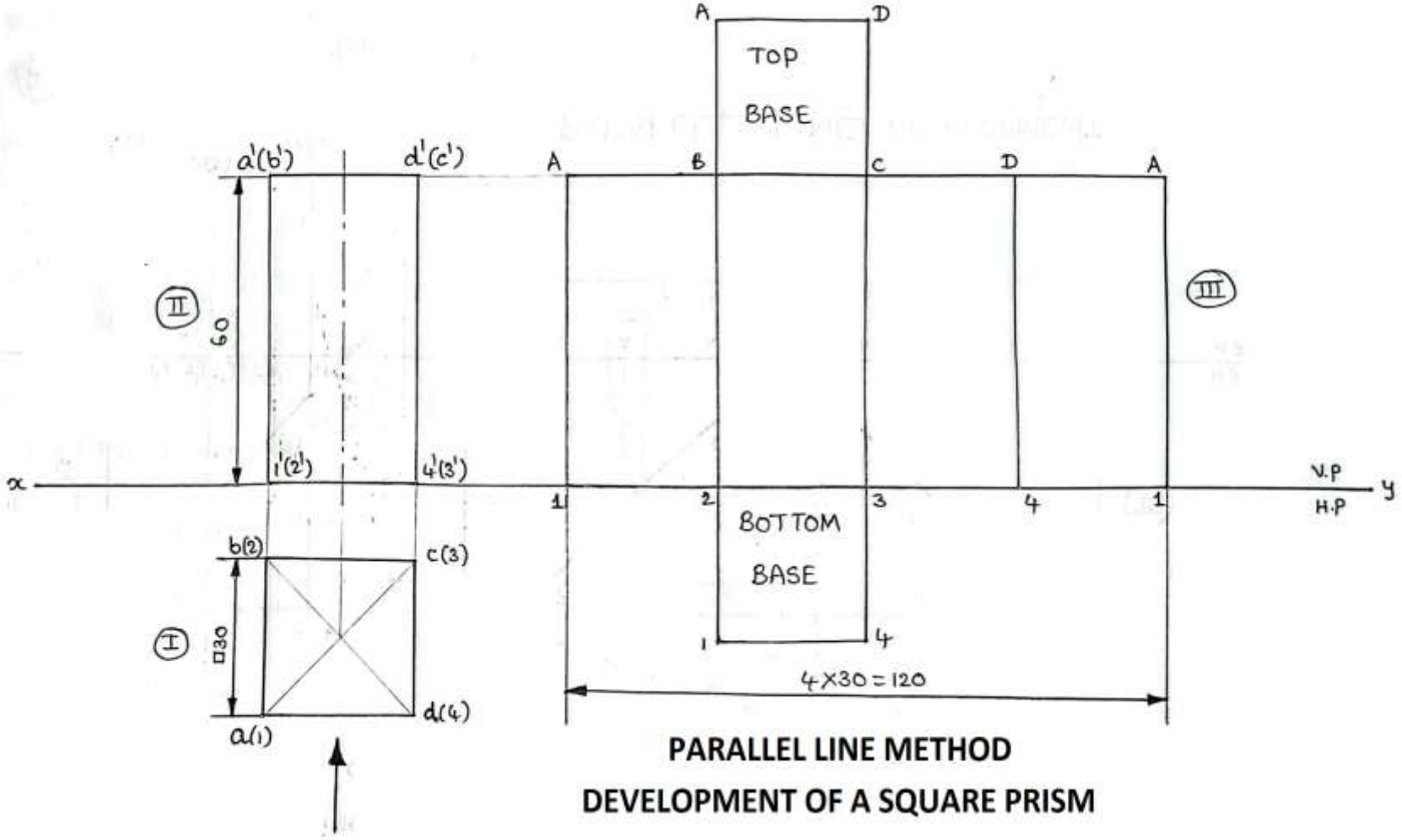


SHEET NO.15 **TITLE: DEVELOPMENT OF SURFACES** **UNIT - IV**

15.1 Draw the development of a cube of side 30mm. Assume that the cube is resting on its base on H.P. with an edge of the base parallel to V.P.



15.2 Draw the development of a square prism of side of base 30 mm and height 60mm, Assume that the prism is resting on its base on H.P. with an edge of the base parallel to V.P.

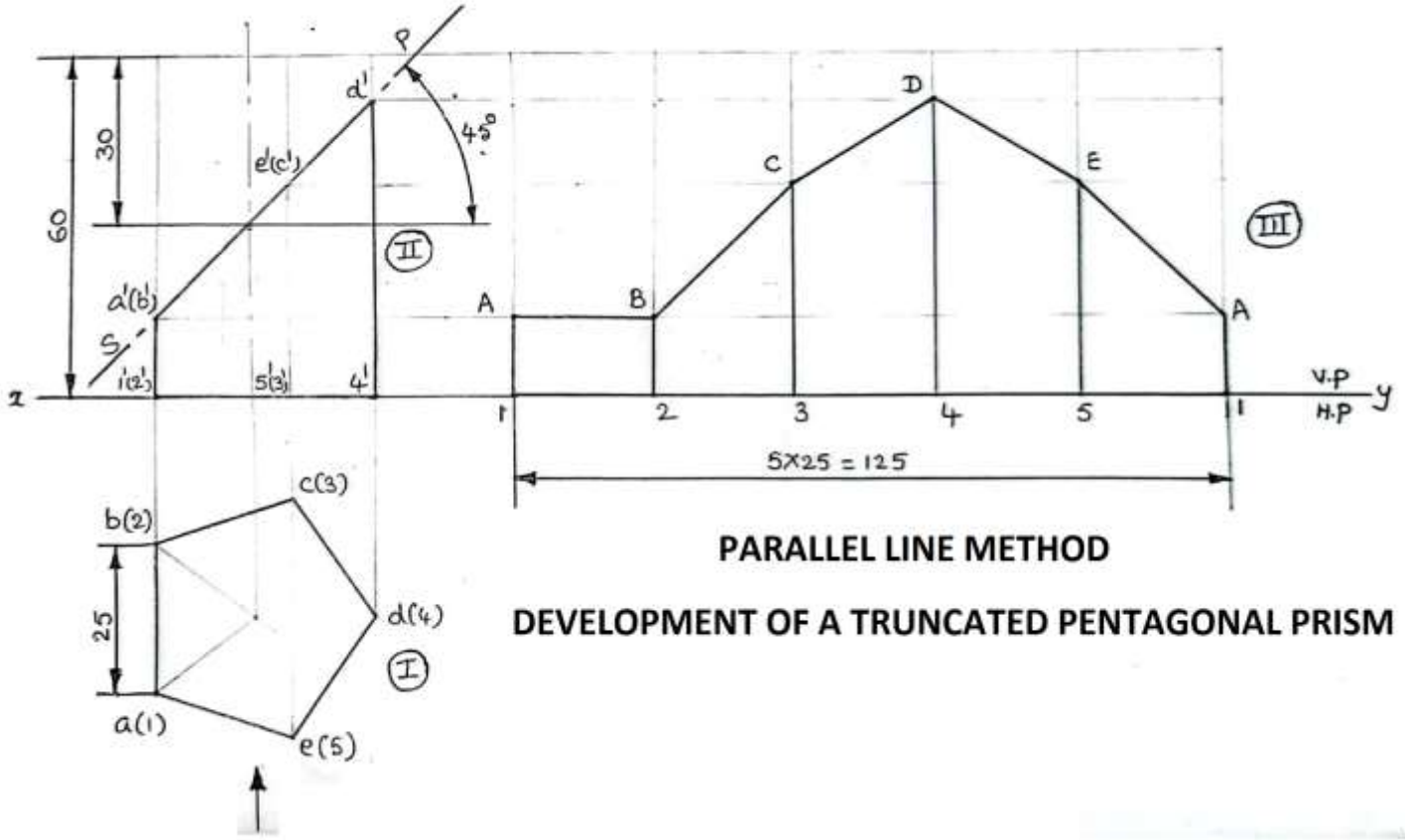


PARALLEL LINE METHOD

DEVELOPMENT OF A SQUARE PRISM

15.3

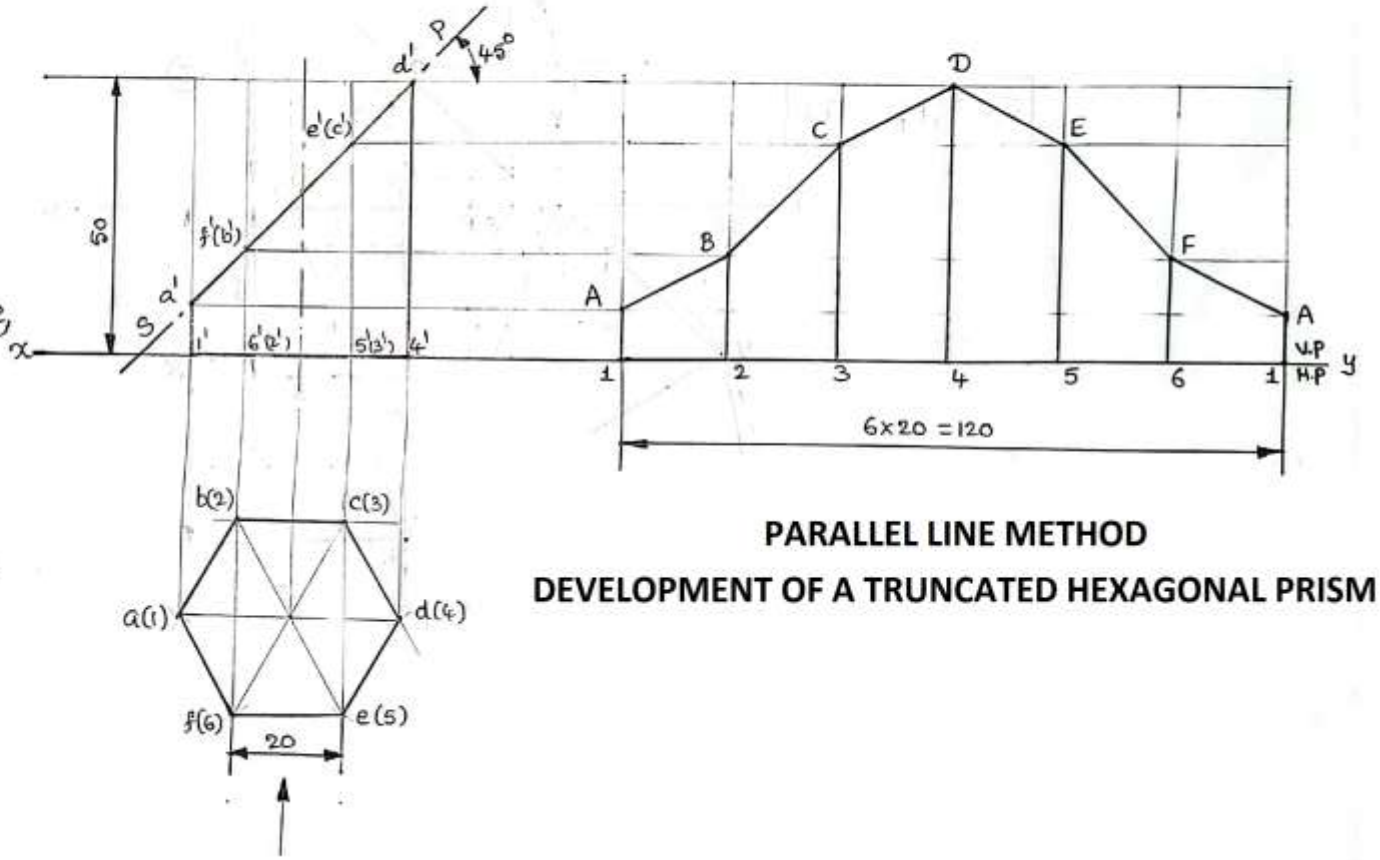
A pentagonal prism with side of base 25 mm and axis 60mm long, stands vertically on its base with one of the faces perpendicular to the V.P. The cutting plane is inclined at 45° to the axis of the prism and passing through the mid-point of the axis. Develop the lateral surface of the prism.



PARALLEL LINE METHOD

DEVELOPMENT OF A TRUNCATED PENTAGONAL PRISM

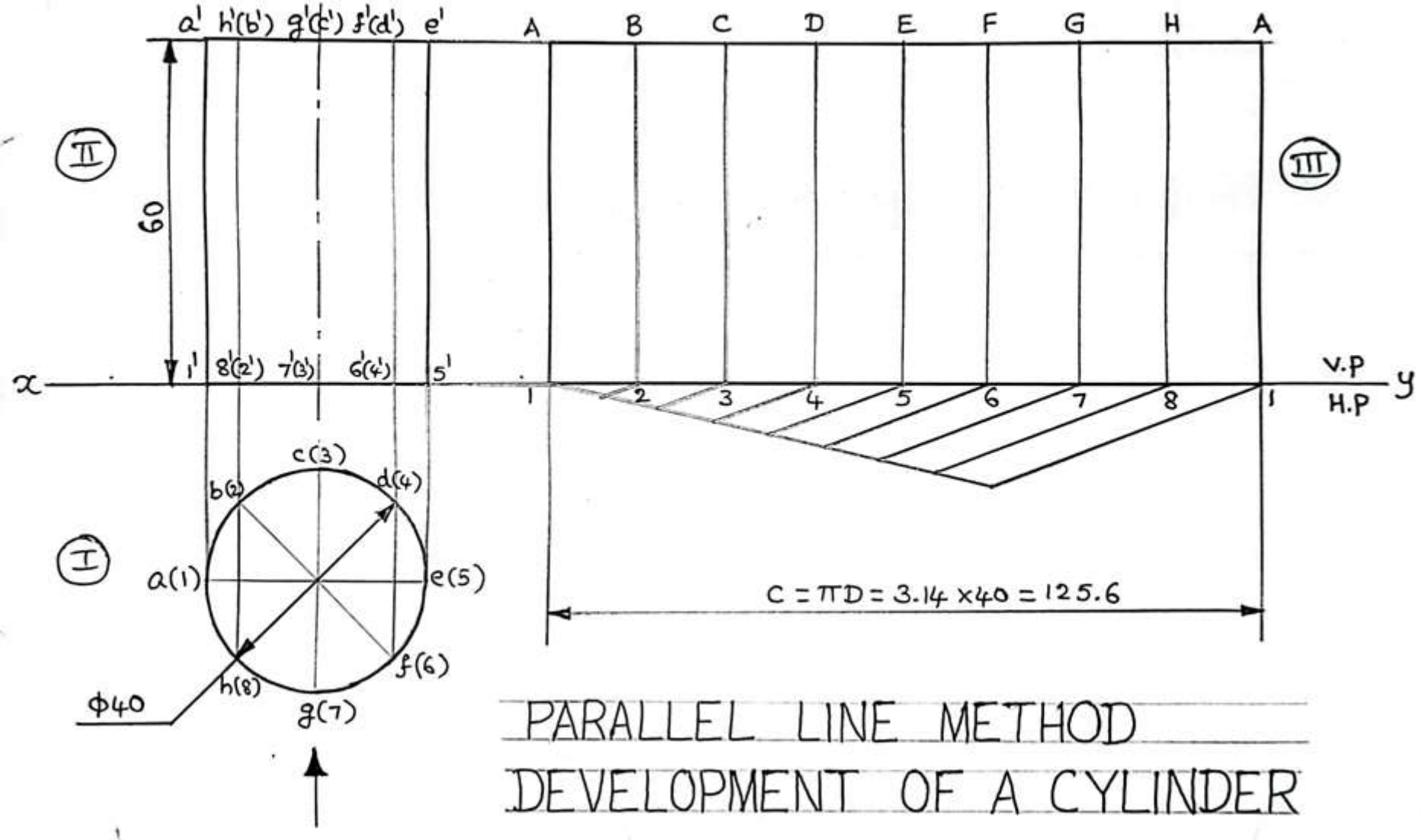
15.4 A hexagonal prism of base 20 mm and height 50 mm is standing vertically on ground with one of its base edges parallel to V.P. It is cut by a section plane, inclined at 45° to H.P, perpendicular to V.P and passing through one of the top corners of the prism. Draw the development of lateral part of the cut prism.



PARALLEL LINE METHOD

DEVELOPMENT OF A TRUNCATED HEXAGONAL PRISM

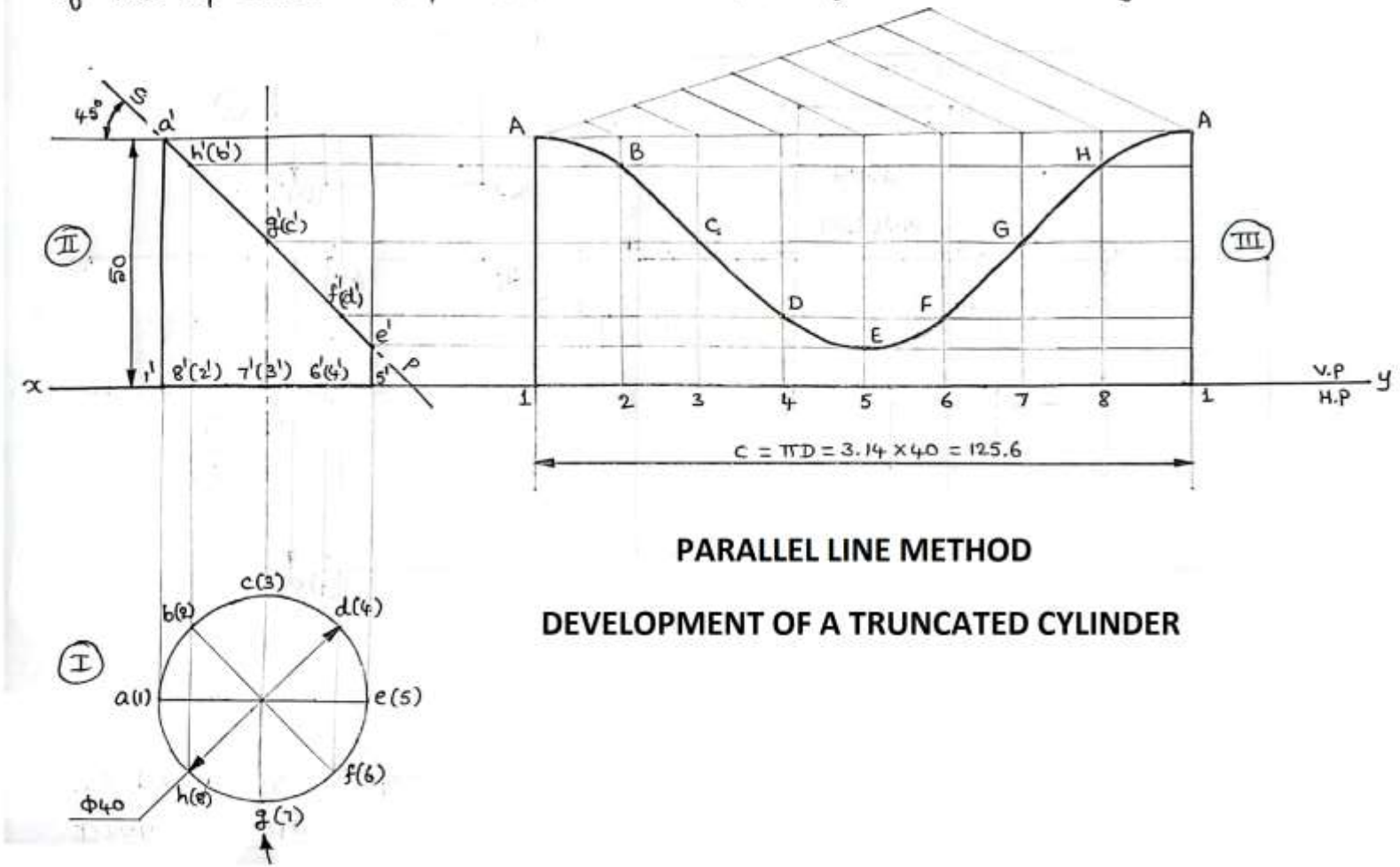
15.5 Draw the lateral development of a cylinder of base diameter 40 mm and height 60 mm, when it is standing on its base on H.P.



PARALLEL LINE METHOD

DEVELOPMENT OF A CYLINDER

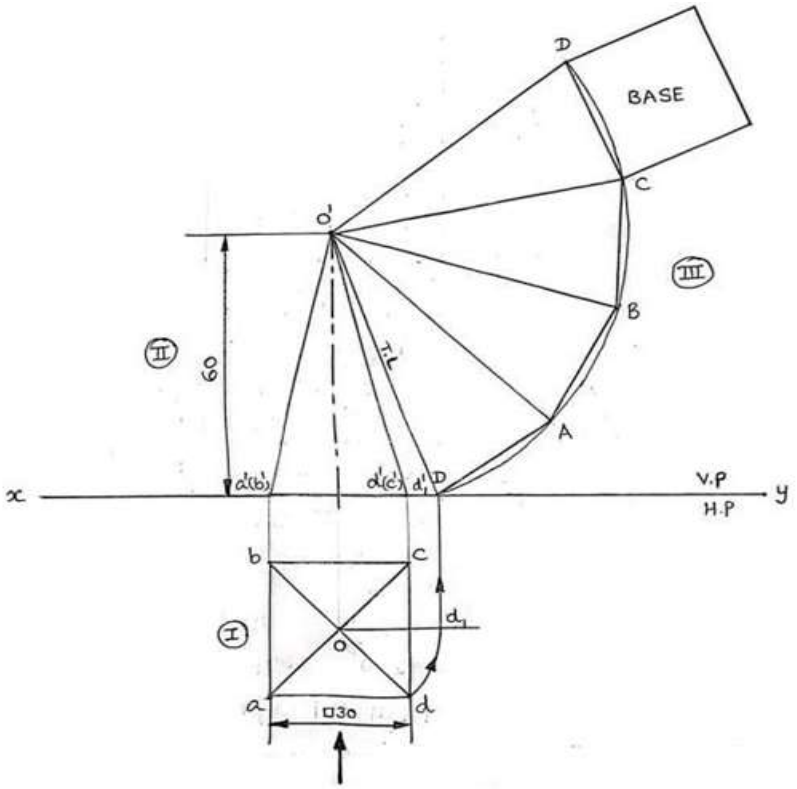
15.6 A cylinder of diameter of base 40mm and height 50mm, is standing on its base on H.P. A cutting plane inclined at 45° to the axis of the cylinder, passes through the left extreme point of the top base. Develop the lateral surface of the truncated cylinder.



PARALLEL LINE METHOD

DEVELOPMENT OF A TRUNCATED CYLINDER

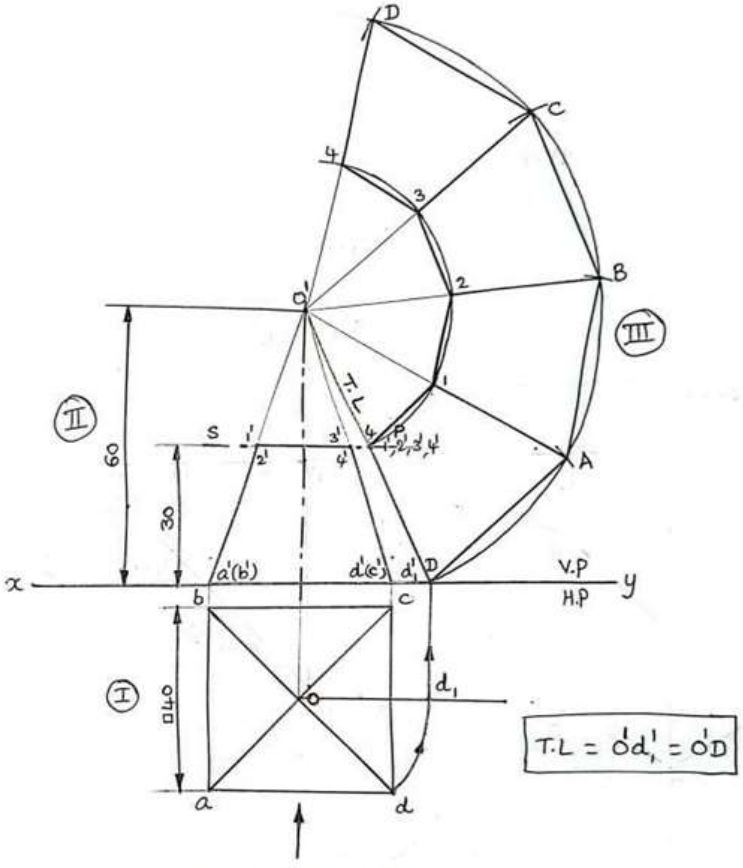
15.7 Draw the development of a Square Pyramid, with side of base 30 mm and height 60 mm, resting with its base on H.P and with an edge of the base parallel to V.P.



RADIAL LINE METHOD

DEVELOPMENT OF A SQUARE PYRAMID

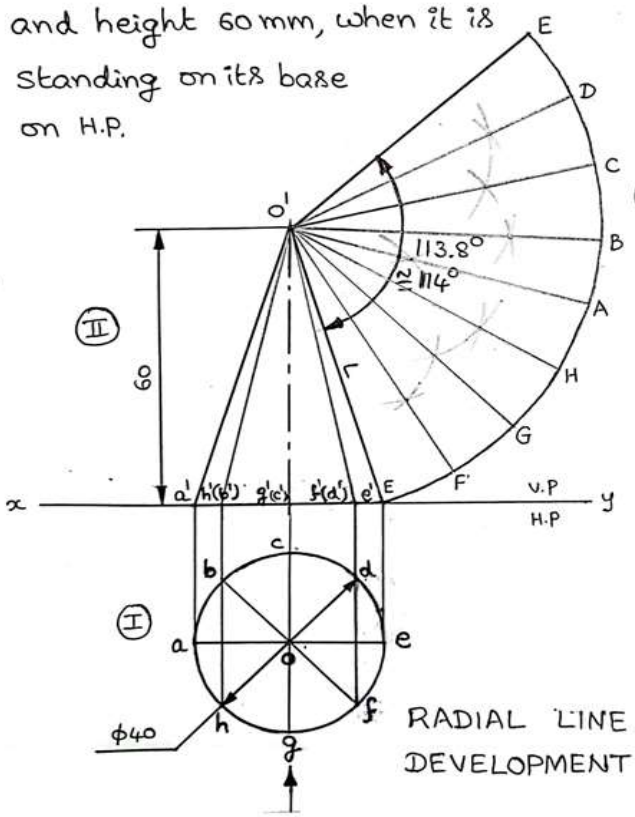
15.8 A Square pyramid of Side of base 40 mm and height 60mm, is standing vertically on its base with one of its base edges parallel to V.P. It is cut by a horizontal plane at a height of 30mm from the base. Develop the lateral surface of the truncated pyramid.



RADIAL LINE METHOD

DEVELOPMENT OF A TRUNCATED SQUARE PYRAMID

15.9 Draw the lateral development of a cone of base diameter 40 mm and height 60 mm, when it is standing on its base on H.P.



$\theta = \frac{r}{L} \times 360^\circ$, where,

$L = \sqrt{60^2 + 20^2} = 63.24$

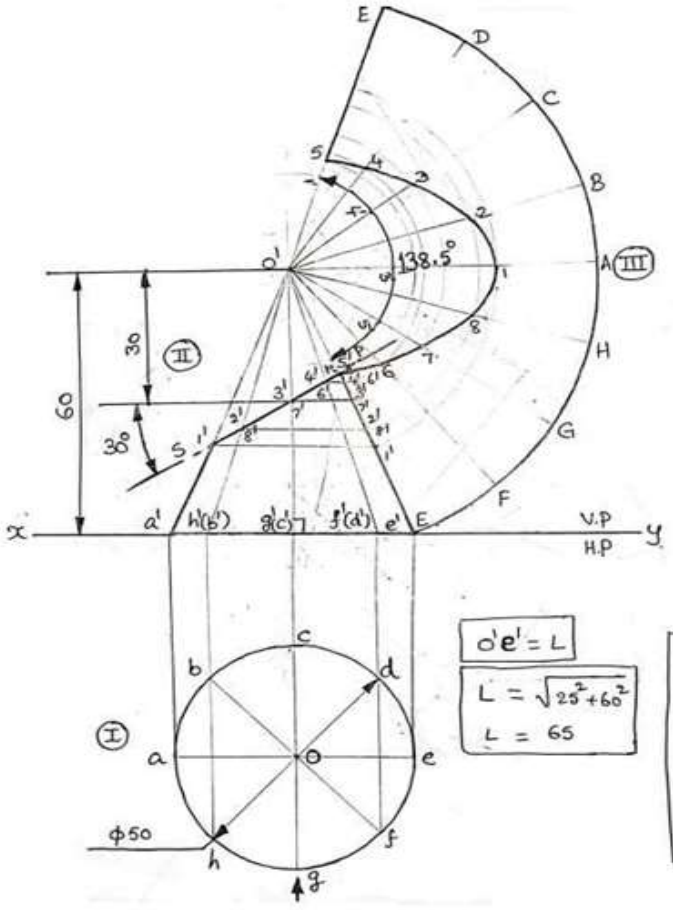
$\therefore \theta = \frac{20}{63.24} \times 360^\circ$

$= 113.8^\circ$

$\cong 114^\circ$

RADIAL LINE METHOD
DEVELOPMENT OF A CONE

15.10 A cone of base 50 mm diameter and height 60mm, rests with its base on H.P. A section plane perpendicular to V.P. and inclined at 30° to H.P, bisects the axis of the cone. Draw the development of the lateral surface of the truncated cone



$o'e' = L$

$L = \sqrt{25^2 + 60^2}$

$L = 65$

$\theta = \frac{r}{L} \times 360^\circ$

$= \frac{25}{65} \times 360^\circ$

$= 138.46^\circ$

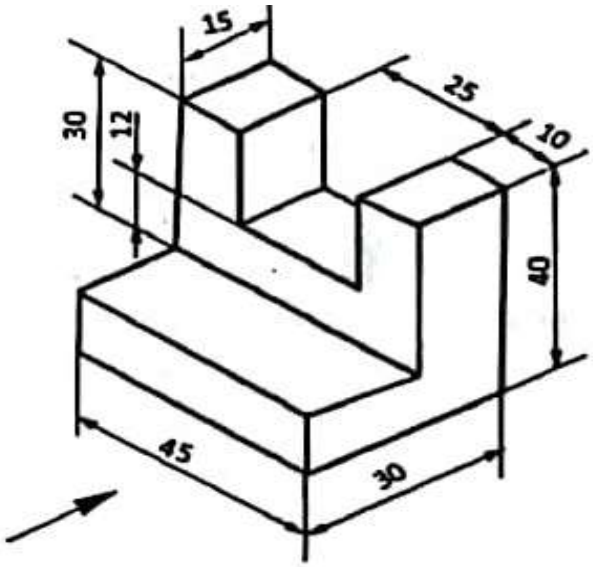
$\cong 138.5^\circ$

RADIAL LINE METHOD

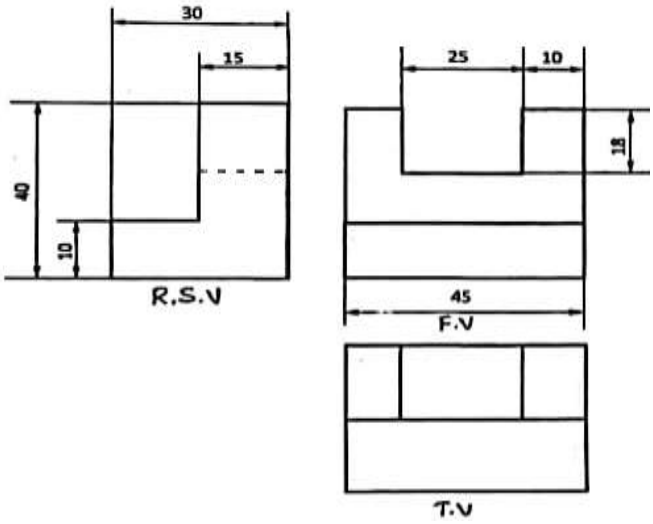
DEVELOPMENT OF A TRUNCATED CONE

SHEET NO.16 **TITLE: 3D TO 2D CONVERSION** **UNIT - V**

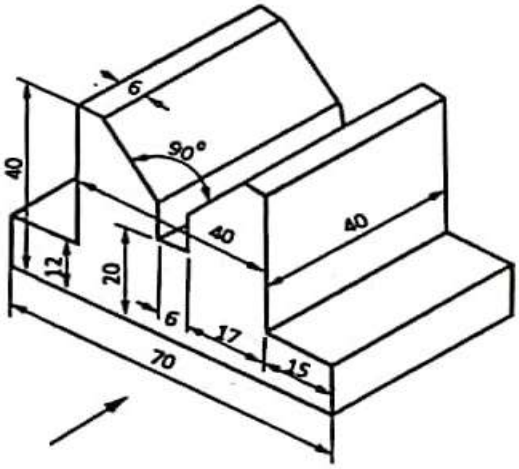
16.1 Draw Front View, Top View and Right-Side View for the following figure:



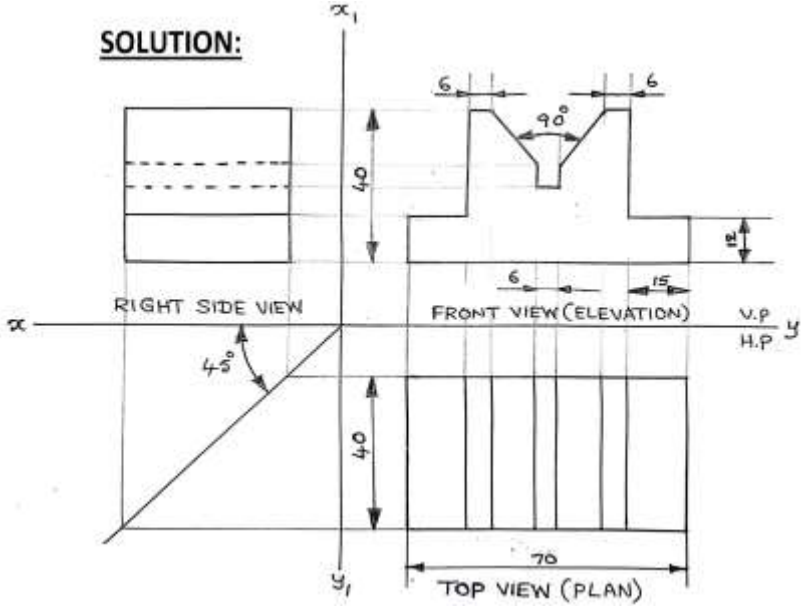
SOLUTION:



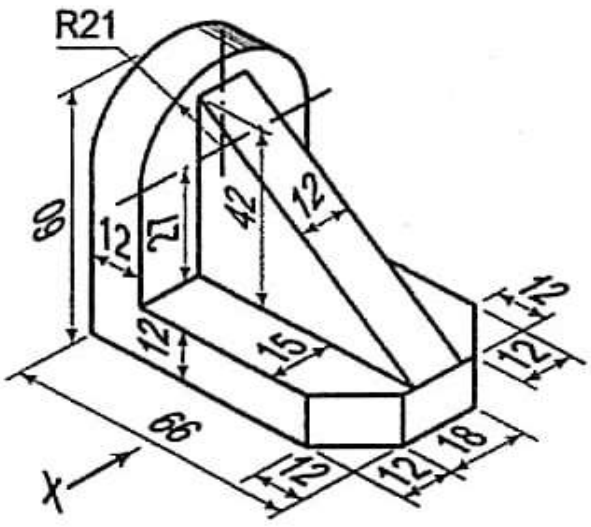
16.2 Draw Front View, Top View and Right-Side View for the following figure:



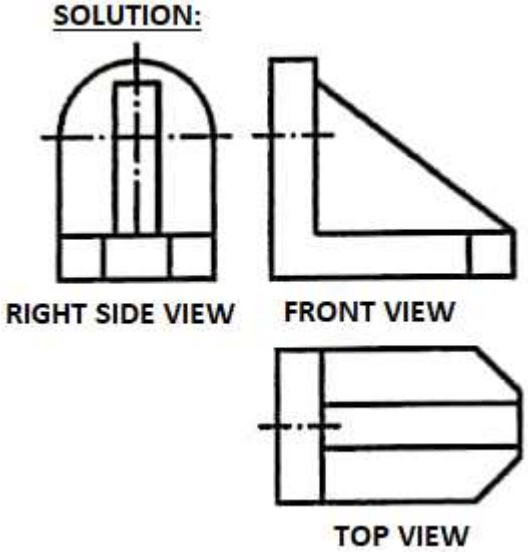
SOLUTION:



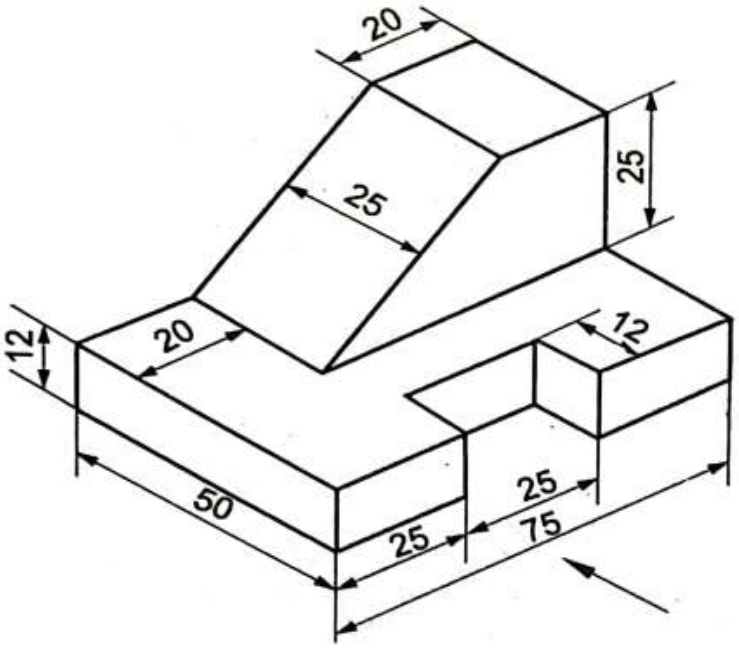
16.3 Draw Front View, Top View and Right Side View for the following figure:



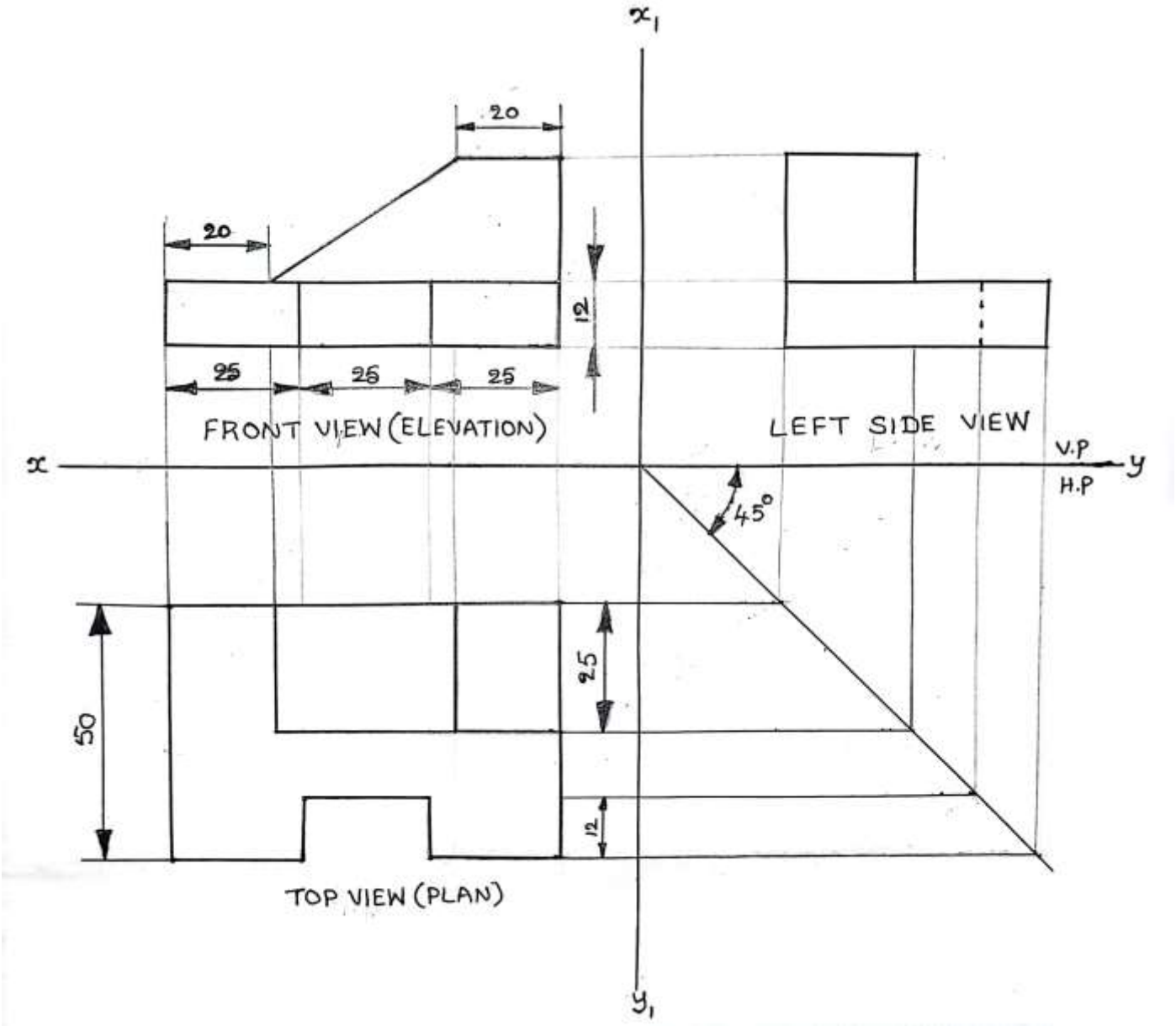
SOLUTION:



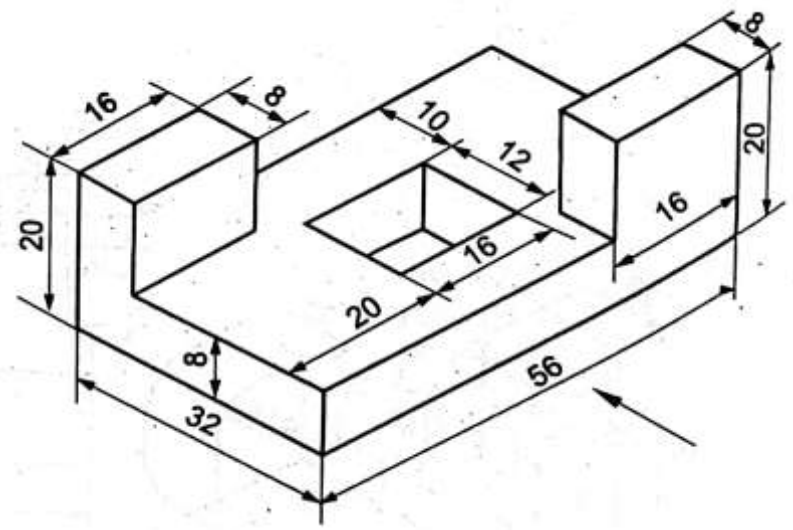
16.4 Draw Front View, Top View and Left Side View for the following figure:



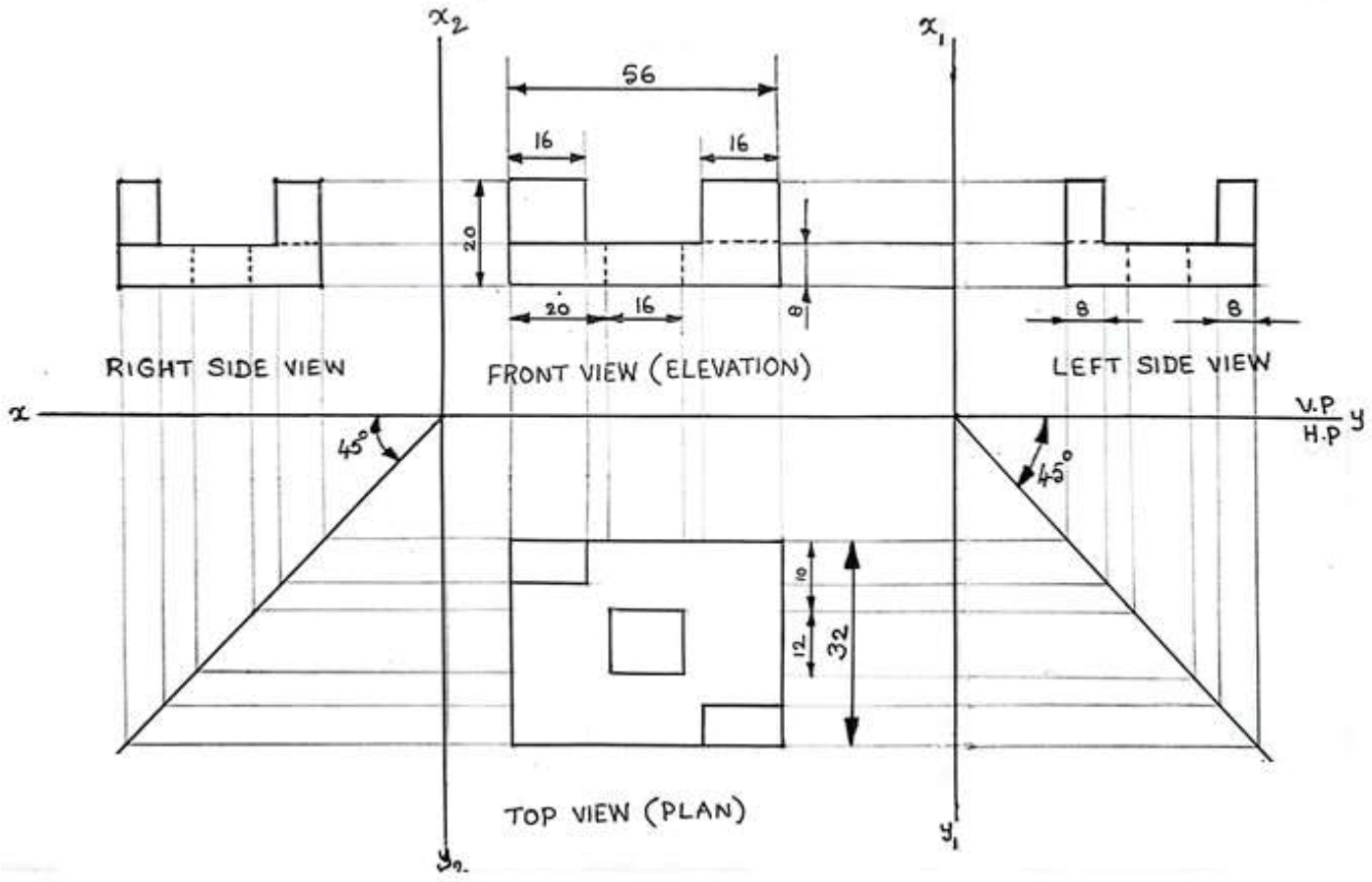
SOLUTION:



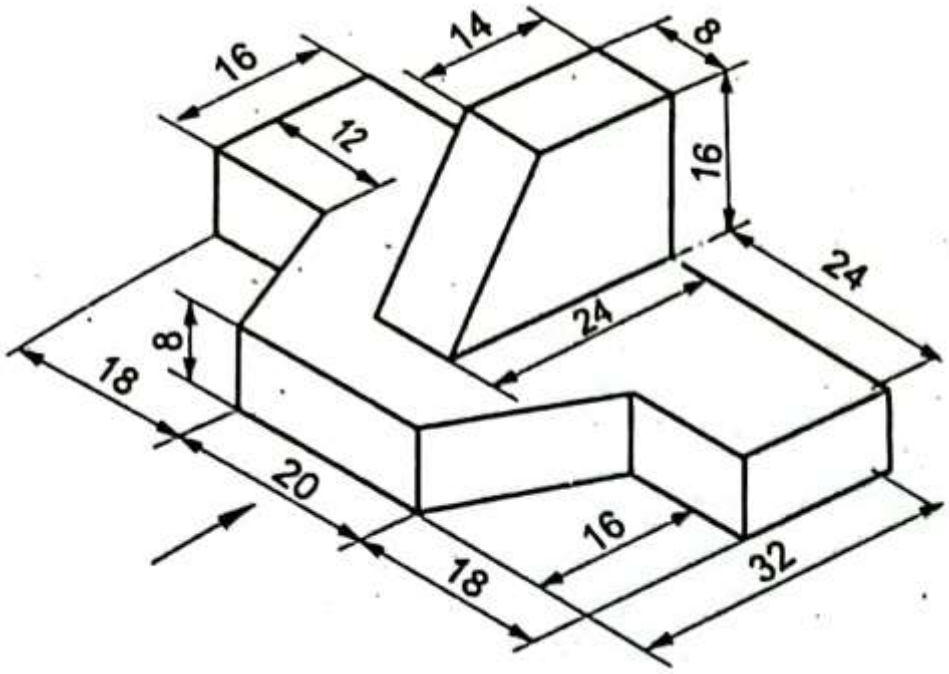
16.5 Draw Front View, Top View and Both Side Views for the following figure:



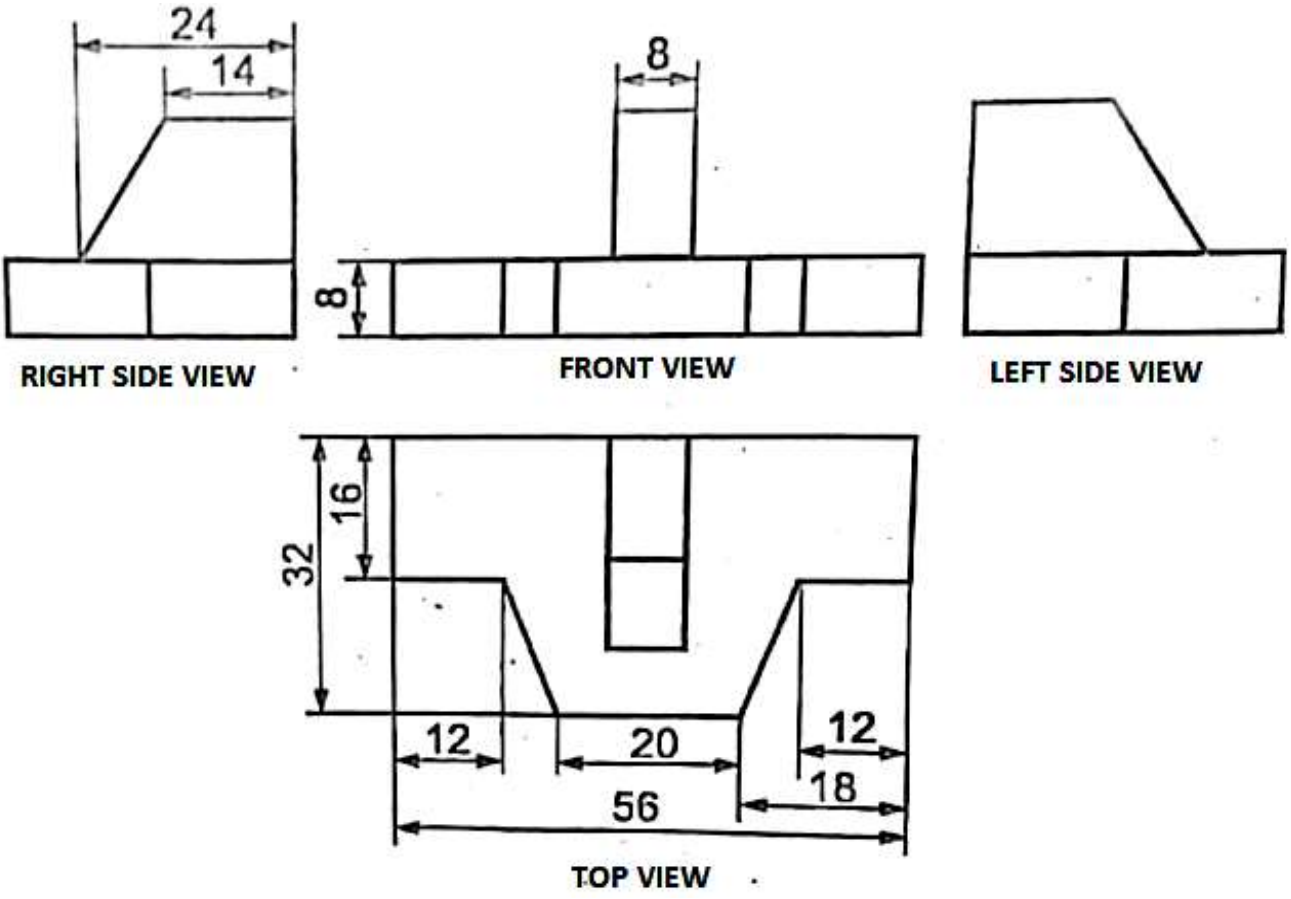
SOLUTION:



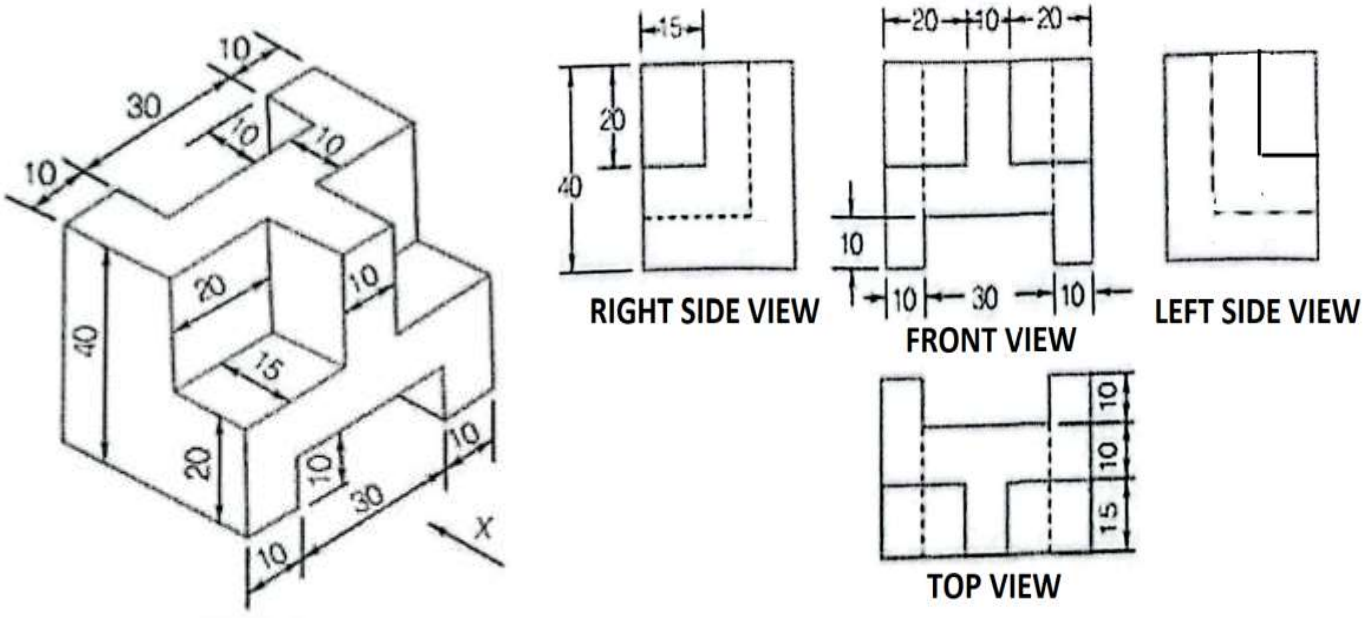
16.6 Draw Front View, Top View and Both Side Views for the following figure:



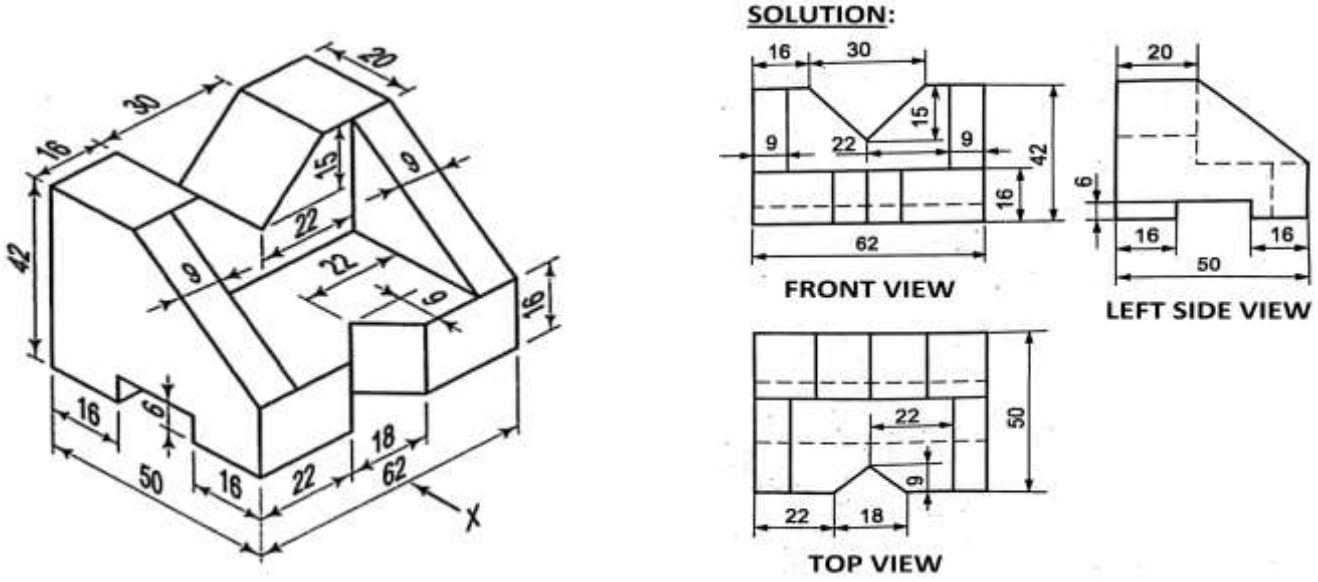
SOLUTION:



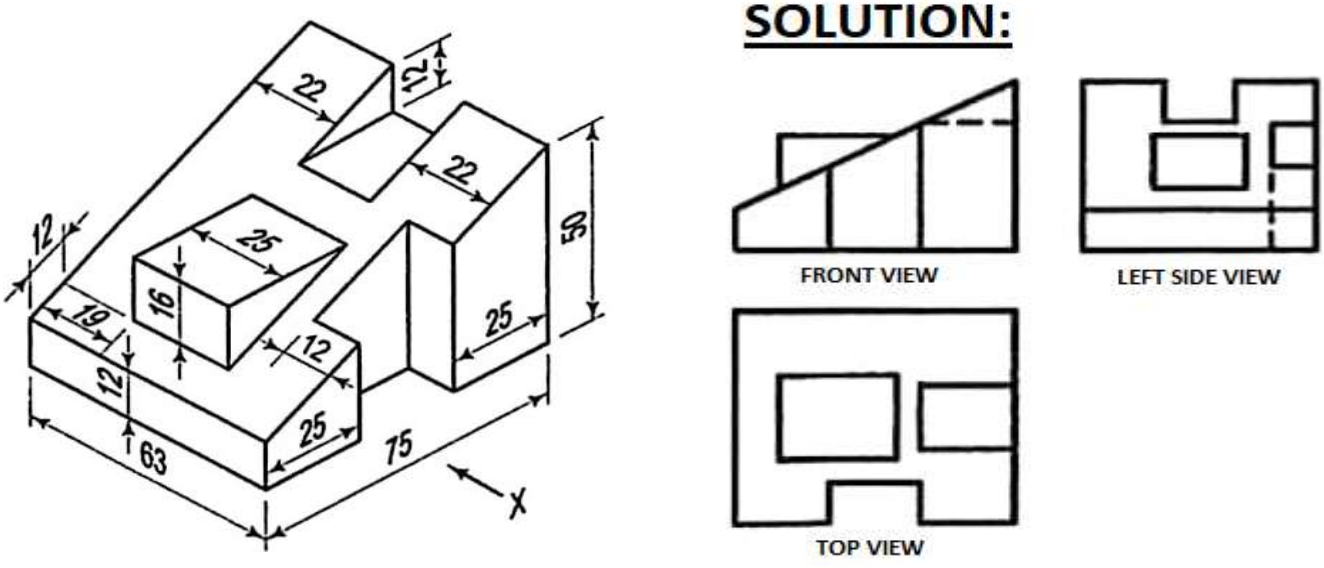
16.7 Draw Front View, Top View and both Side Views for the following figure:



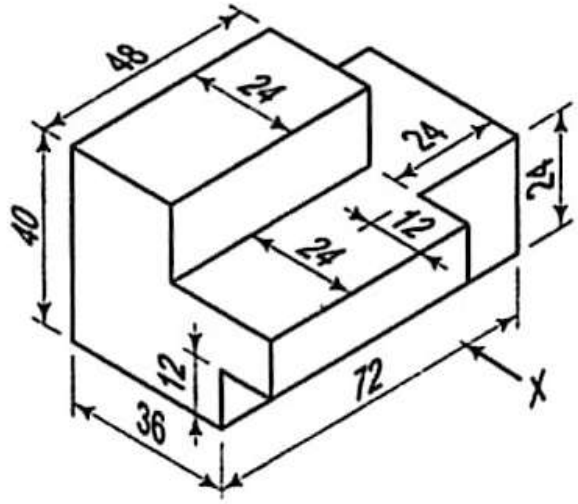
16.8 Draw Front View, Top View and Left Side View for the following figure:



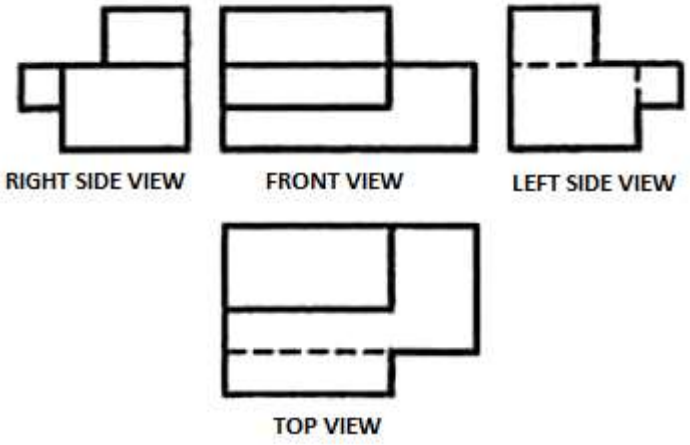
16.9 Draw Front View, Top View and Left Side View for the following figure:



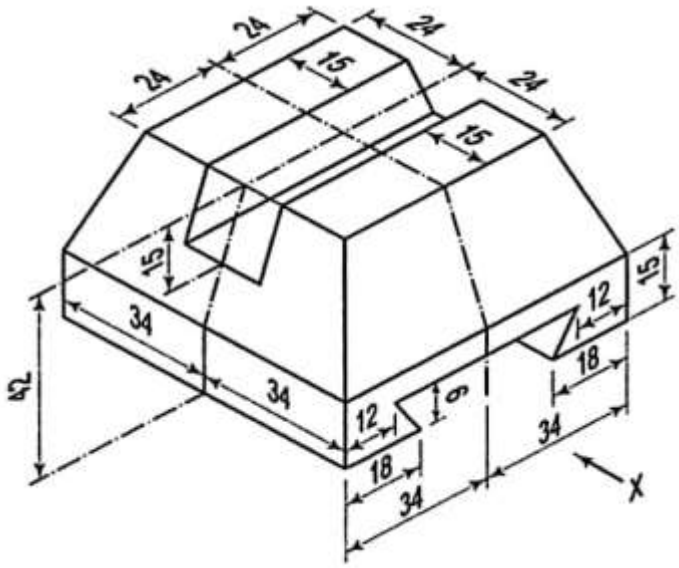
16.10 Draw Front View, Top View and both Side Views for the following figure:



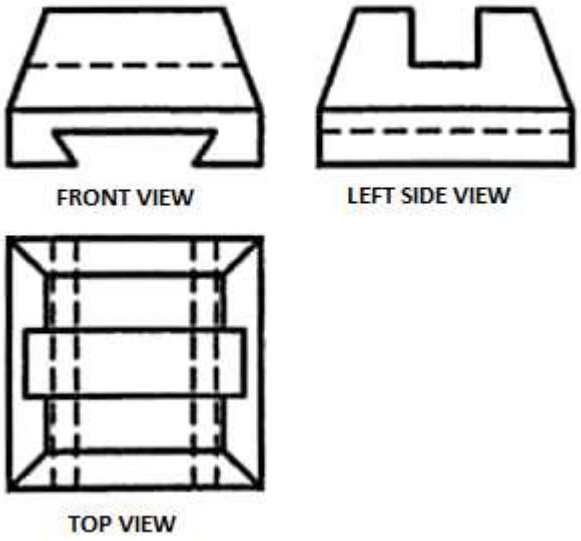
SOLUTION:



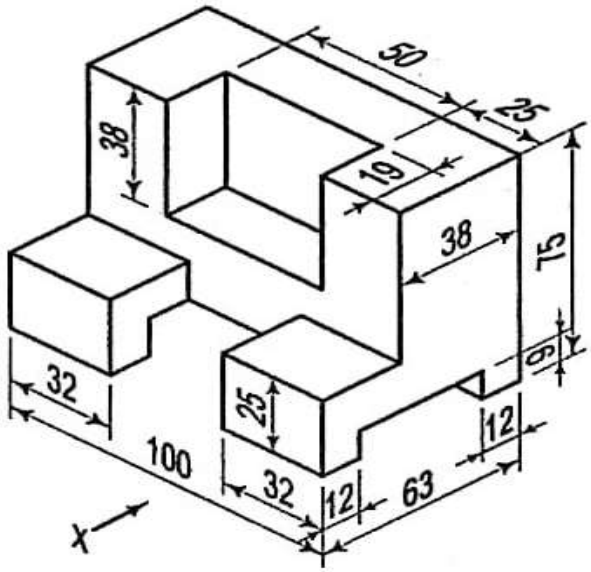
16.11 Draw Front View, Top View and Left Side View for the following figure:



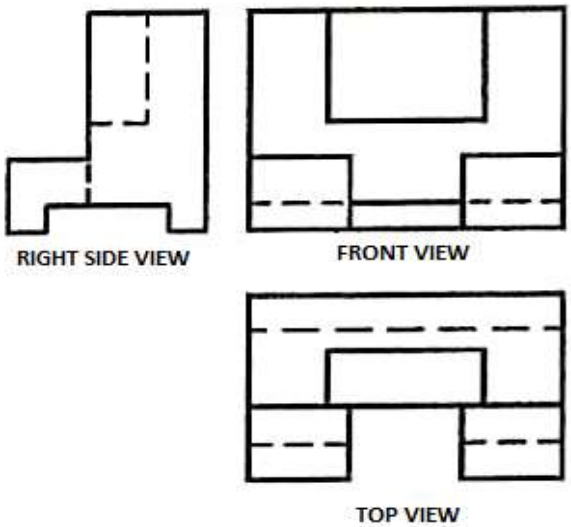
SOLUTION:



16.12 Draw Front View, Top View and Right Side View for the following figure:

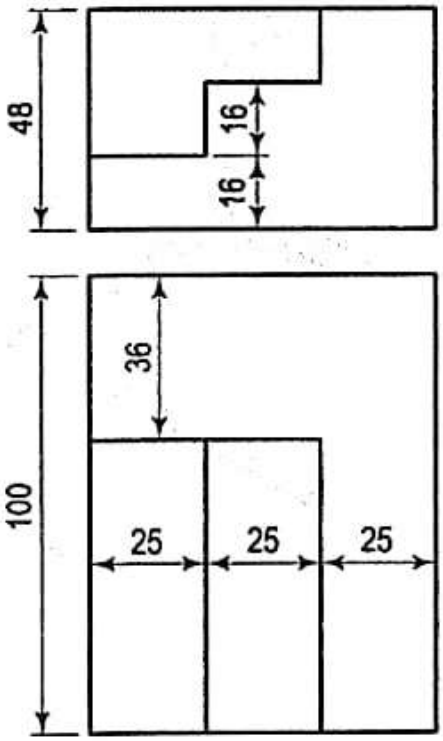


SOLUTION:

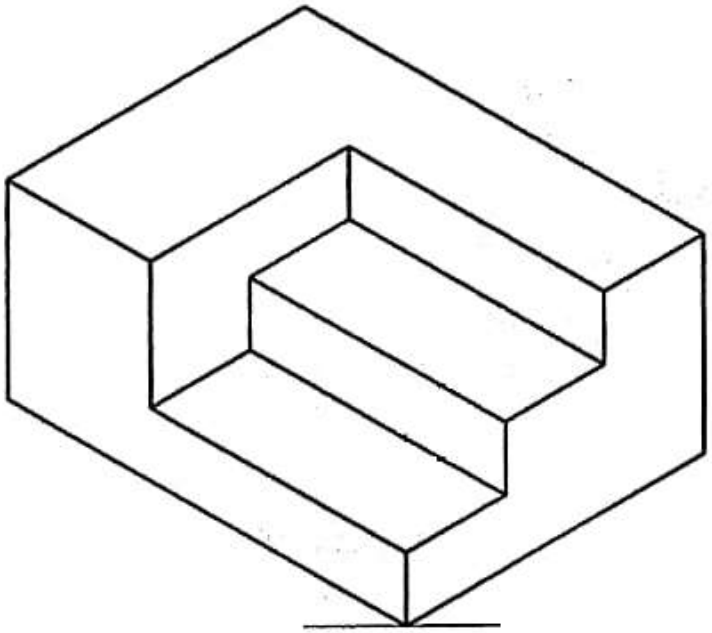


SHEET NO.17 **TITLE: 2D TO 3D CONVERSION** **UNIT - V**

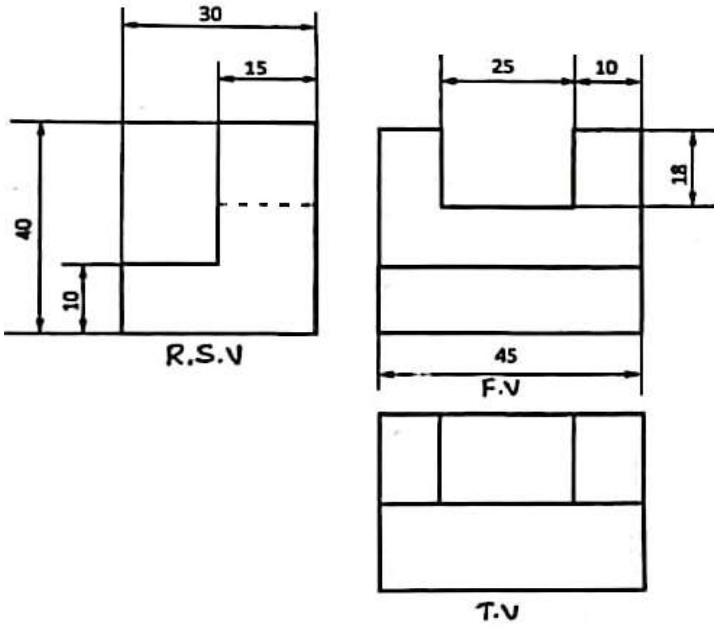
17.1 *Draw the isometric view of the model of steps, two views of which are shown in fig.*



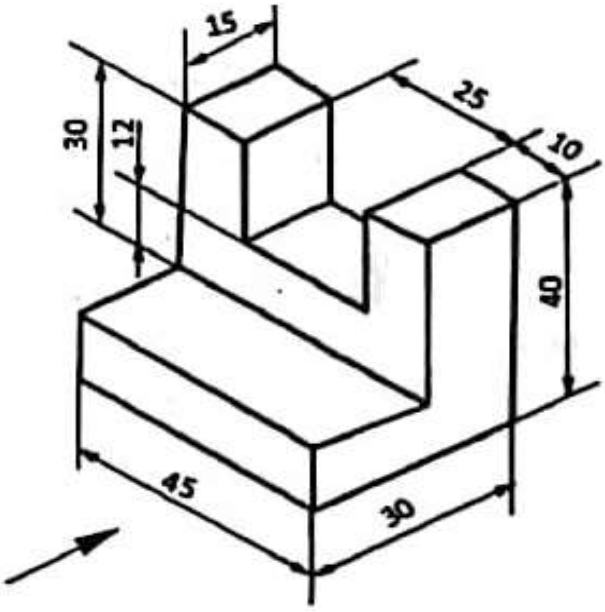
SOLUTION:



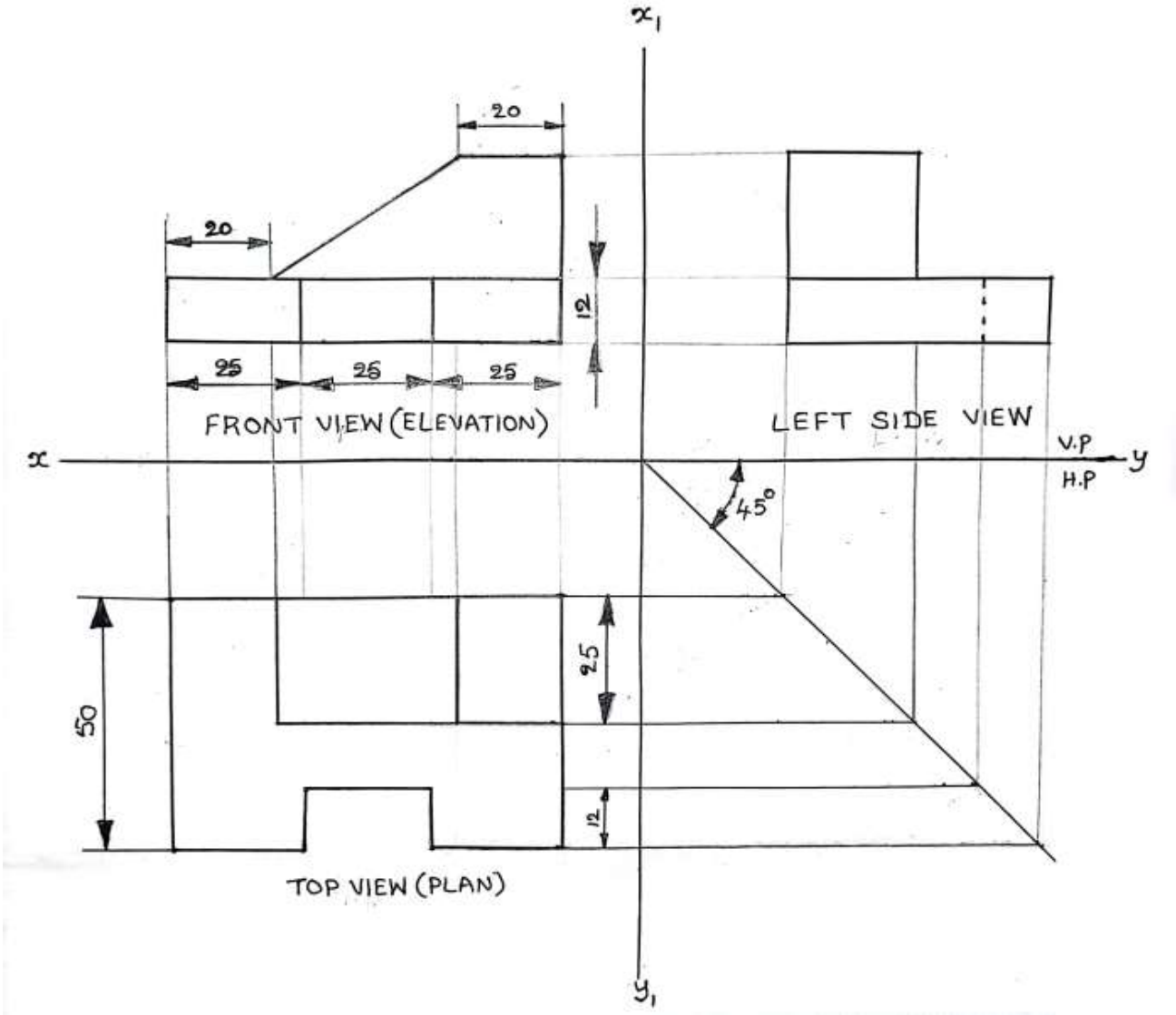
17.2 Draw isometric view from the given orthographic views:



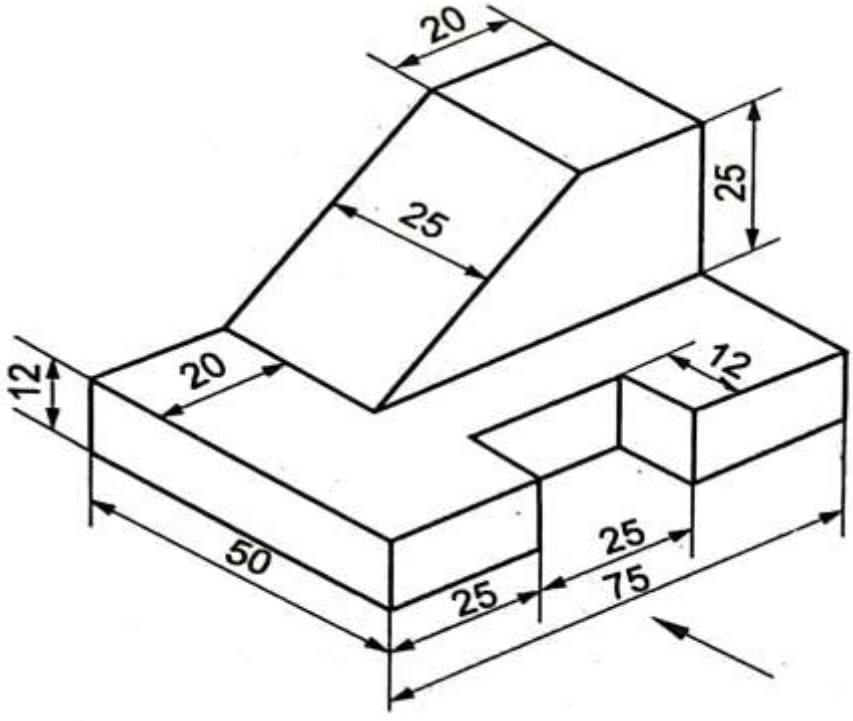
SOLUTION:



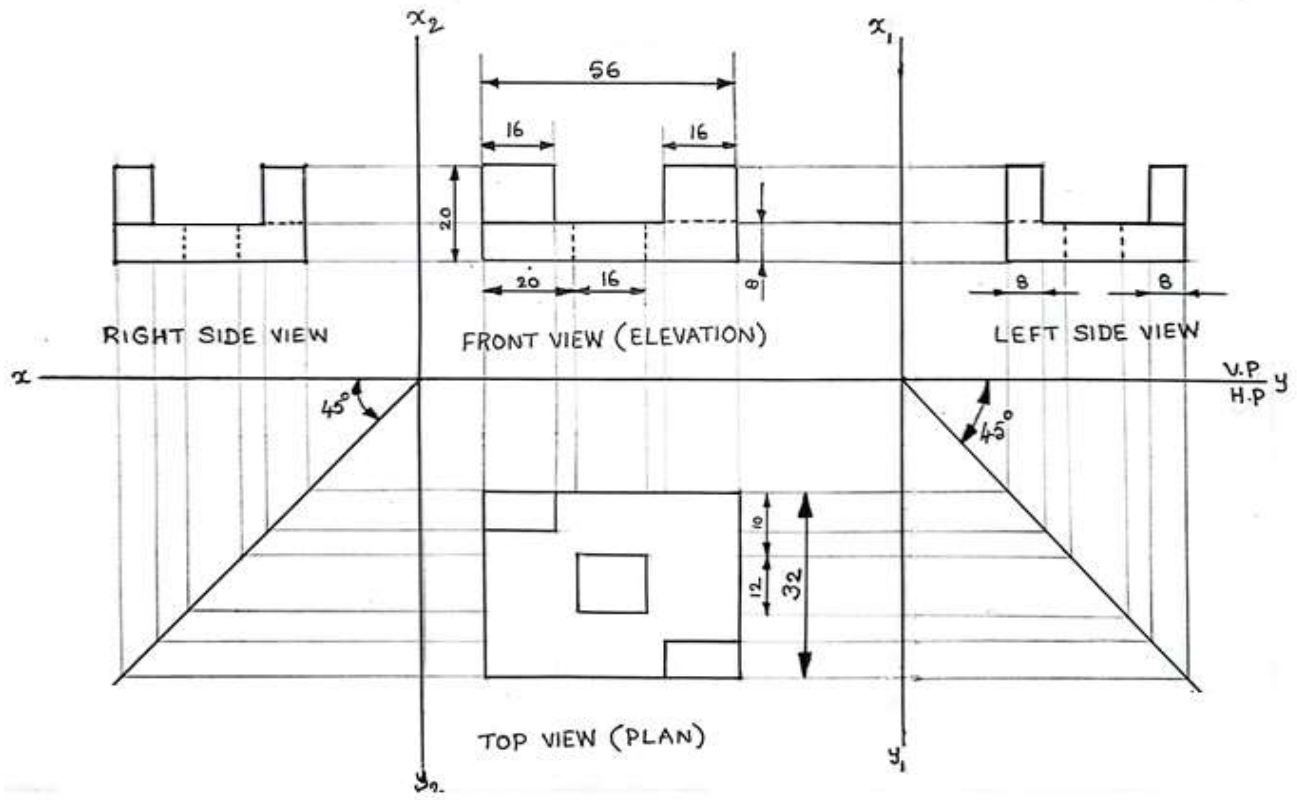
17.3 Draw isometric view from the given orthographic views:



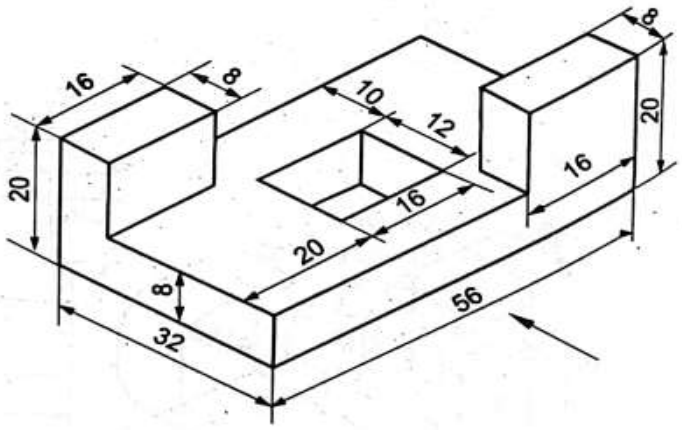
SOLUTION:



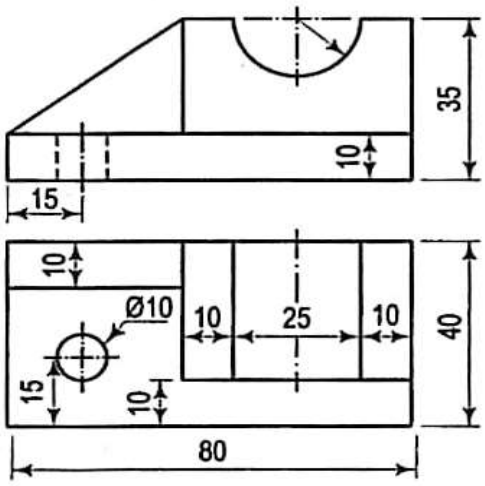
17.4 Draw isometric view from the given orthographic views:



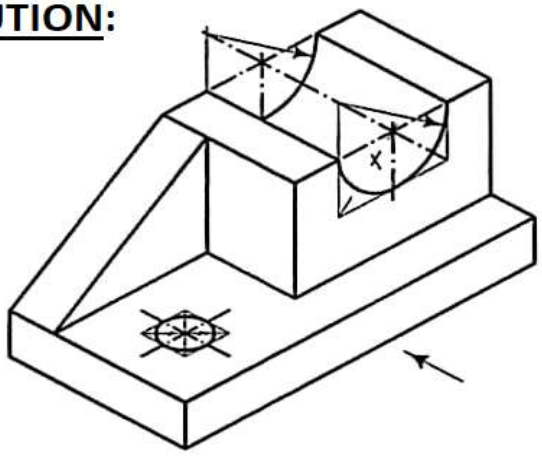
SOLUTION:



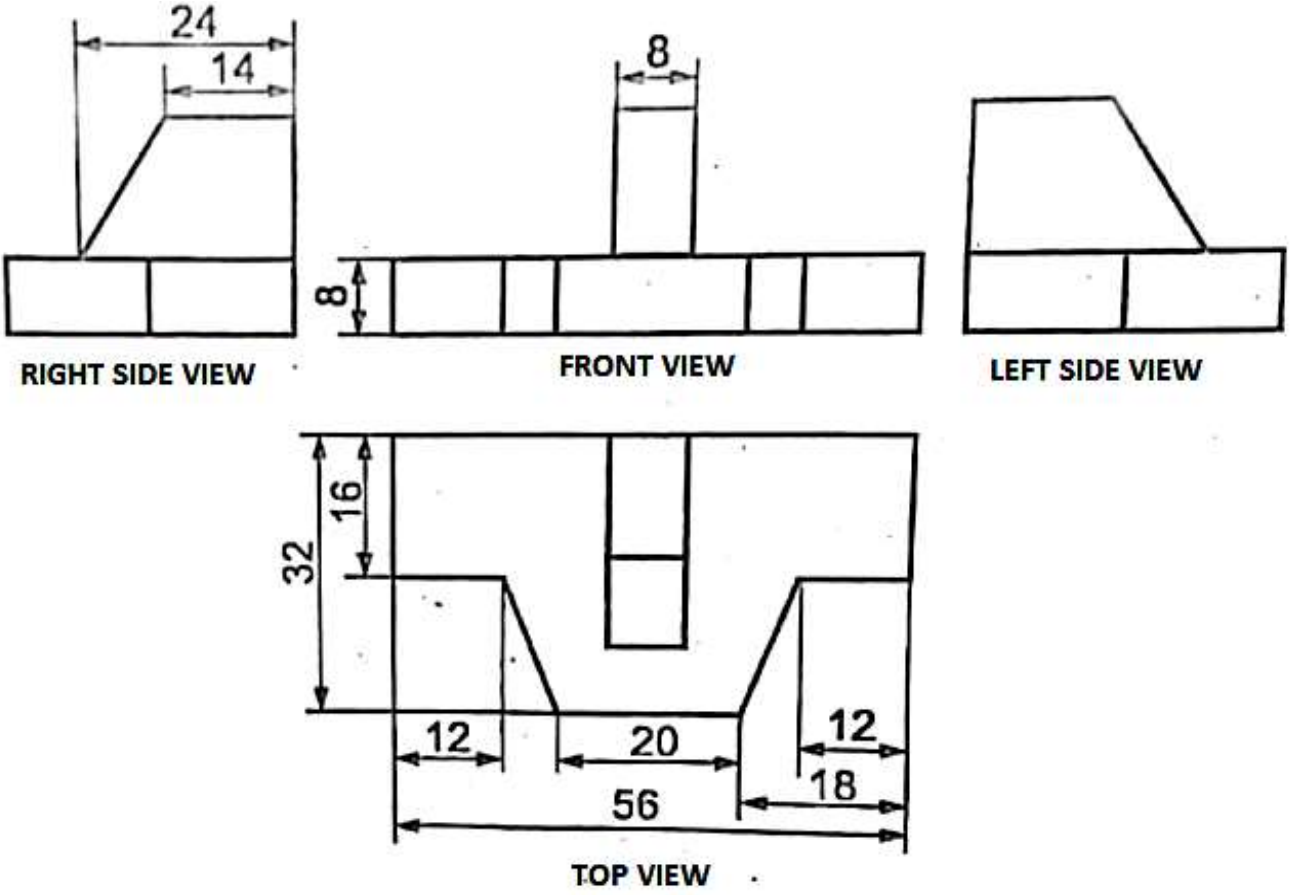
17.5 *Draw the isometric view of the casting shown in two views in fig.*



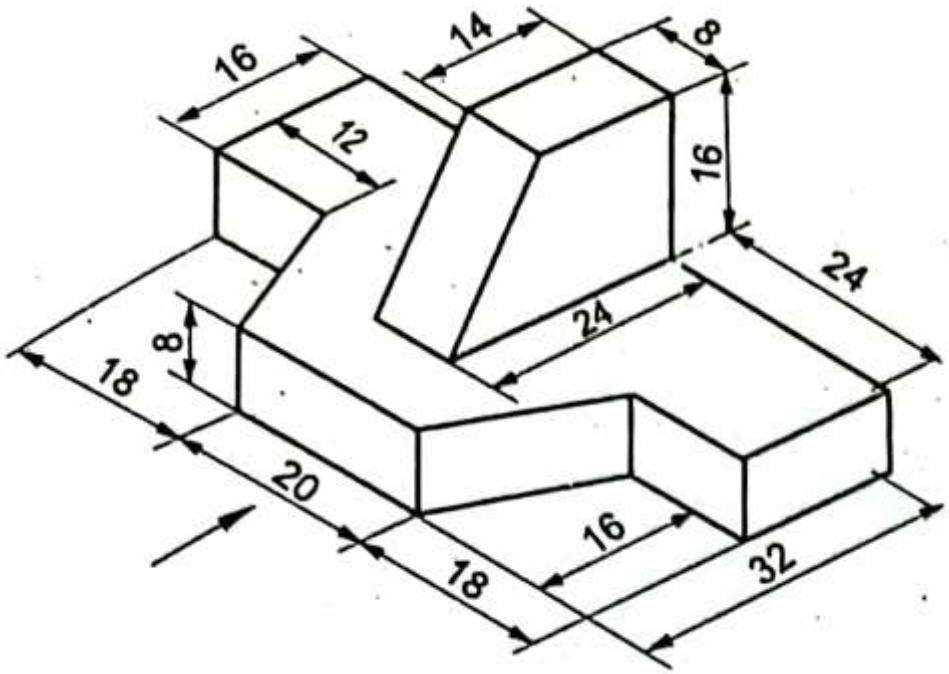
SOLUTION:



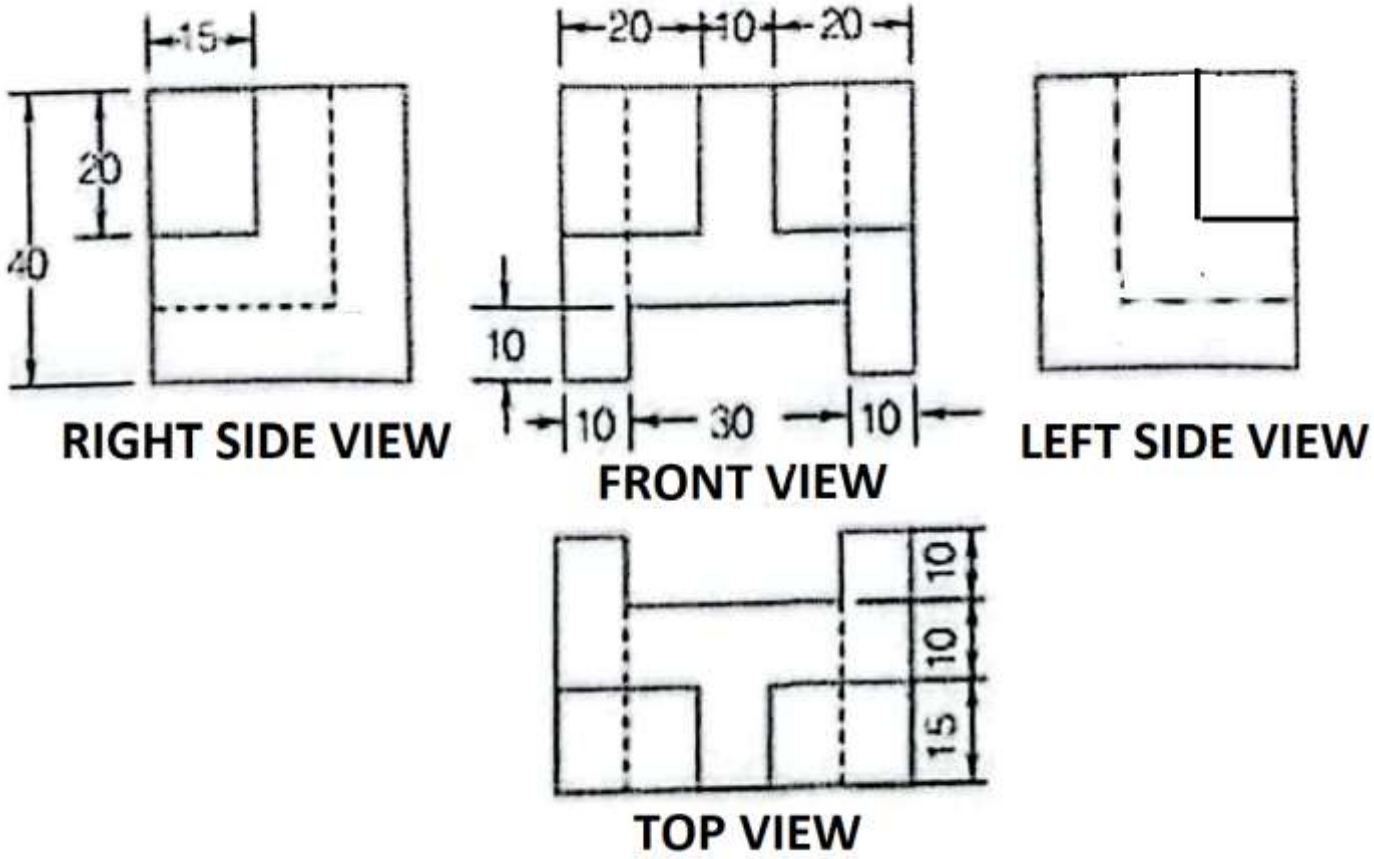
17.6 Draw isometric view from the given orthographic views:



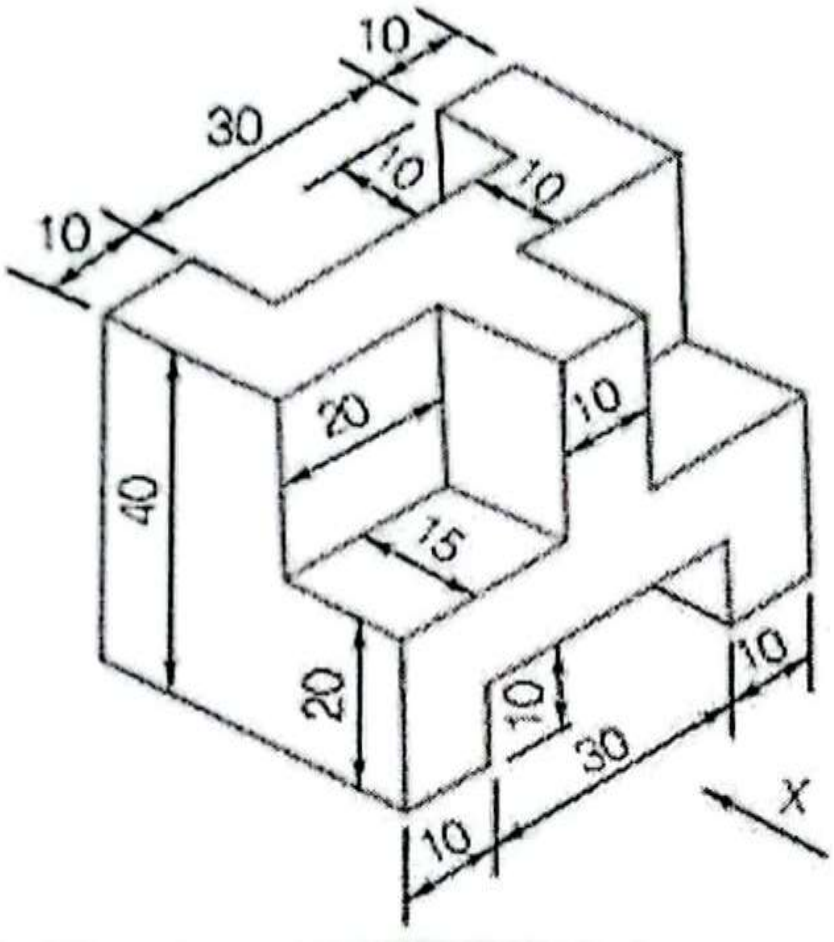
SOLUTION:



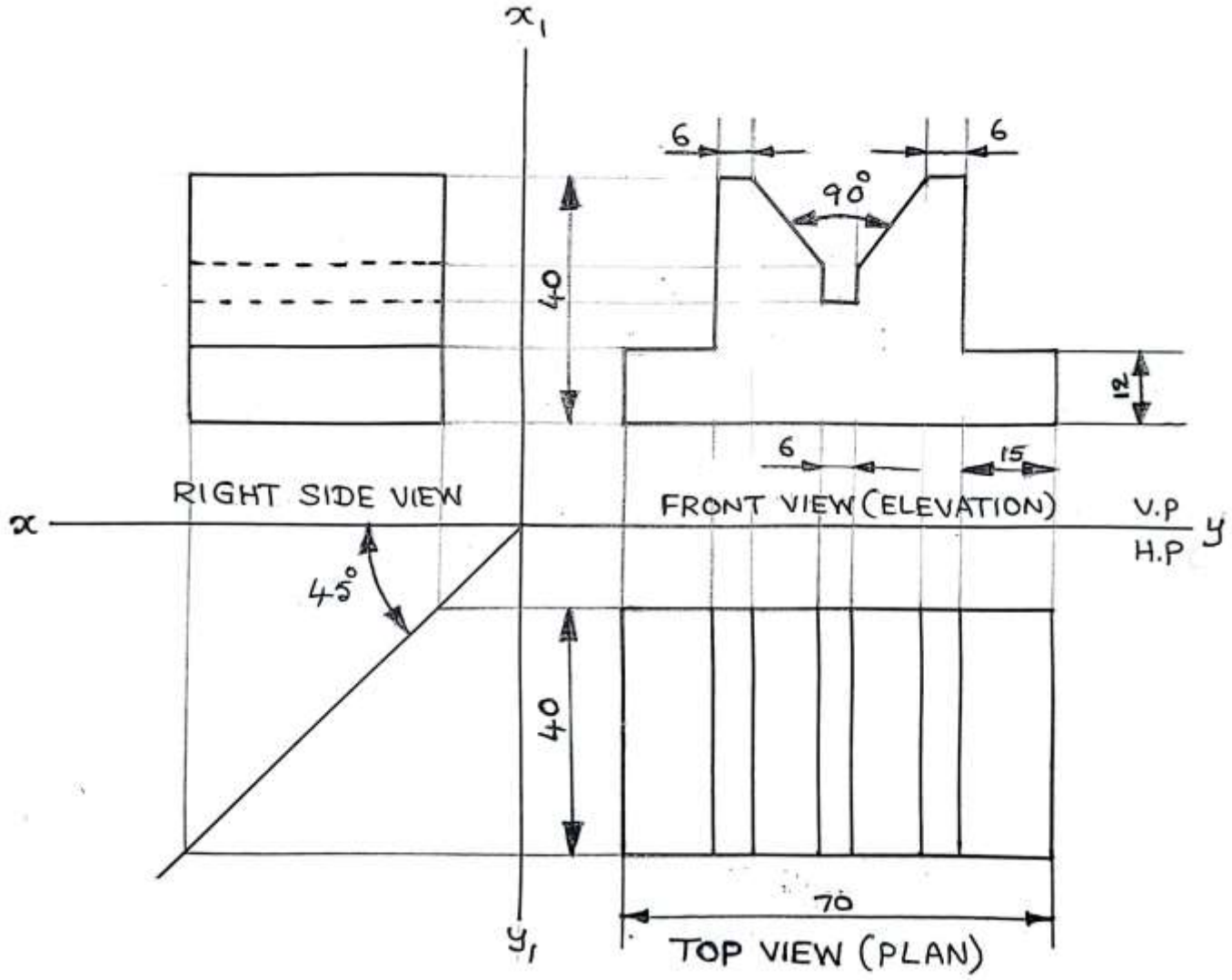
17.7 Draw isometric view from the given orthographic views:



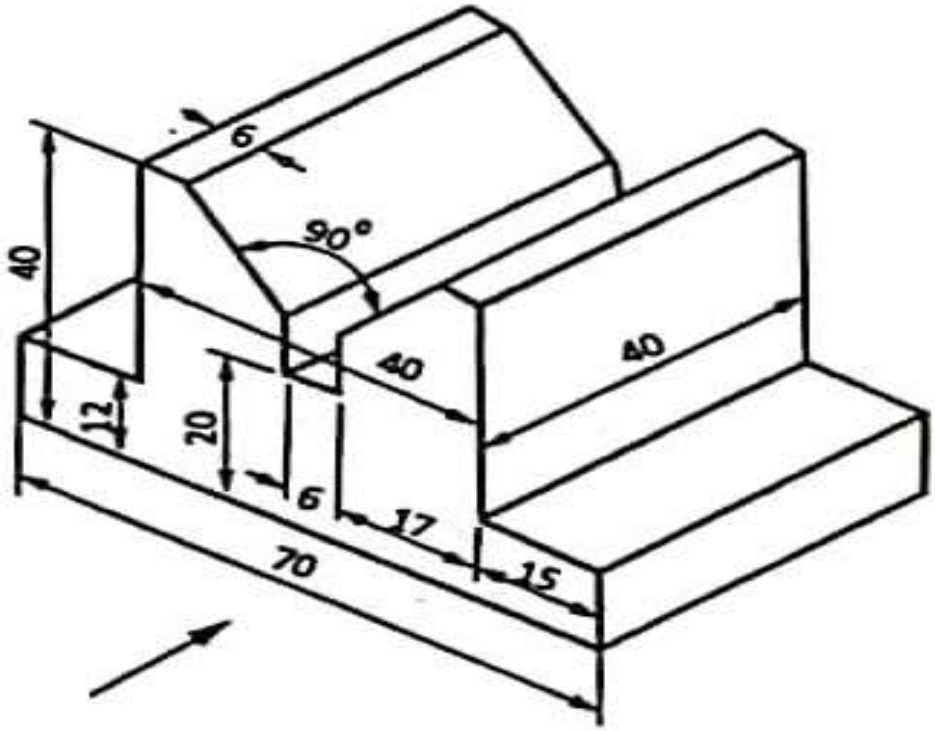
SOLUTION:



17.8 Draw isometric view from the given orthographic views:



SOLUTION:



ST.ANN'S COLLEGE OF ENGINEERING & TECHNOLOGY
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I B.Tech I Semester Regular Examinations, January - 2024

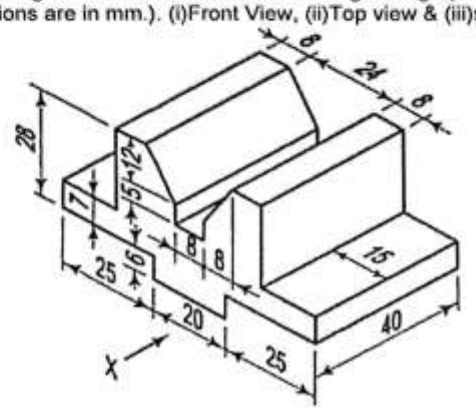
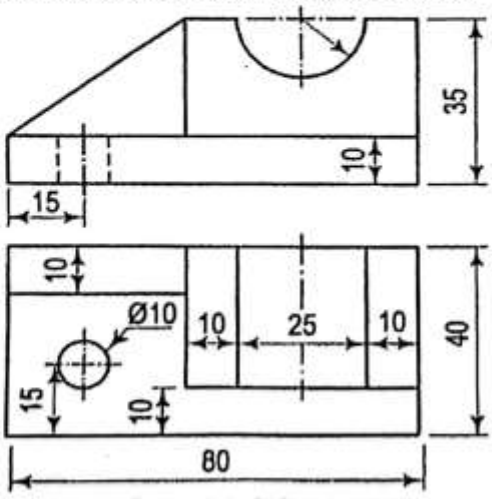
R-23

Branch : ECE,EEE,CE and ME
Year – Sem : I - I
Subject Name : ENGINEERING GRAPHICS
Subject Code : 23UME01

Max. Time: 3 hrs.
Max. Marks: 70 M

Note: Part – A is compulsory. Part – B answer any FIVE Questions ONE question from Each Unit

	QUESTION NUMBER		QUESTION	MARKS	BLOOMS LEVEL	CO	PO
	NOTE: ANSWER ANY ONE QUESTION FROM Q1 AND Q2						
Q1		(a)	Draw an ellipse if the distance of focus from the directrix is 70 mm and the eccentricity is 3/4.	14 M	L1	CO1	PO 1
	(OR)						
Q2		(a)	A length of I mm is enlarged 20 times in a drawing. What is the R.F of the scale? Draw a diagonal scale of 0.01mm least count and make a distance of 7.83 mm on it.	14 M	L1	CO 1	PO 1
	NOTE: ANSWER ANY ONE QUESTION FROM Q3 AND Q4						
Q3		(a)	A point P is 15 mm above the H.P. and 20 mm in front of V.P. Another point Q is 25 mm behind the V.P. and 40 mm above H.P. Draw the projections of P and Q keeping the distance between their projectors equal to 90 mm. Draw straight lines joining i) their top views ii) their front views	6 M	L2	CO 2	PO 2
		(b)	A line PQ 100 mm long is inclined at 30° to the H.P. and at 45° to the V.P. Its mid-point is in the V.P. and 20 mm above the H.P. Draw its projections, if its end P is in the third quadrant and Q in the first quadrant.	8 M	L2	CO 2	PO 2
	(OR)						
Q4		(a)	PQRS is a rhombus having diagonal PR = 60 mm and QS = 40 mm and they are perpendicular to each other. The plane of the rhombus is inclined with H.P. such that its top view appears to be square. The top view of PR makes 30° with the V.P. Draw its projections and determine inclination of the plane with the H.P.	14 M	L3	CO 2	PO 2
	NOTE: ANSWER ANY ONE QUESTION FROM Q5 AND Q6						
Q5		(a)	Draw the projections of a pentagonal prism, base 25 mm side and axis 50 mm long resting on one of its rectangular faces on the H.P. with the axis inclined at 45° to the V.P.	14 M	L1	CO 1	PO 1
	(OR)						
Q6		(a)	Draw the projections of a regular hexagon of 25 mm side, having one of its sides in the H.P. and inclined at 60° to the V.P., and its surface making an angle of 45° with the H.P.	14 M	L2	CO 2	PO 2

		NOTE: ANSWER ANY ONE QUESTION FROM Q7 AND Q8				
Q7	(a)	A regular hexagonal pyramid of base side 35 mm and height 75 mm is resting on the ground with its axis perpendicular to H.P and parallel to V.P. Two of its base edges are perpendicular to V.P. A sectional plane perpendicular to V.P and inclined at 45^0 to H.P, passes through a point on the axis, 30 mm from the vertex. Draw the front view, sectional top view and true shape of the section	14 M	L2	CO 2	PO 2
		(OR)				
Q8	(a)	Draw the development of a cube of side of base 30 mm. Assume that the cube is resting on its base on H.P, with an edge of the base parallel to V.P.	14 M	L2	CO 2	PO 2
		NOTE: ANSWER ANY ONE QUESTION FROM Q9 AND Q10				
Q9	(a)	Convert the given isometric view into following orthographic views (All dimensions are in mm.). (i)Front View, (ii)Top view & (iii)side views 	14 M	L2	CO 2	PO 2
		(OR)				
Q10	(a)	Draw isometric view from the given orthographic views: 	14 M	L2	CO 2	PO 2

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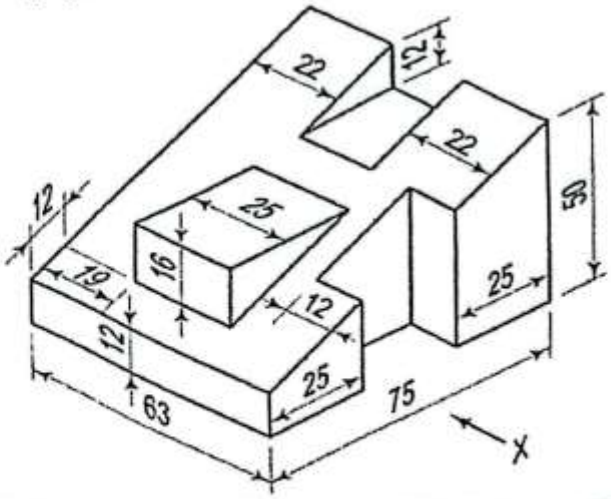
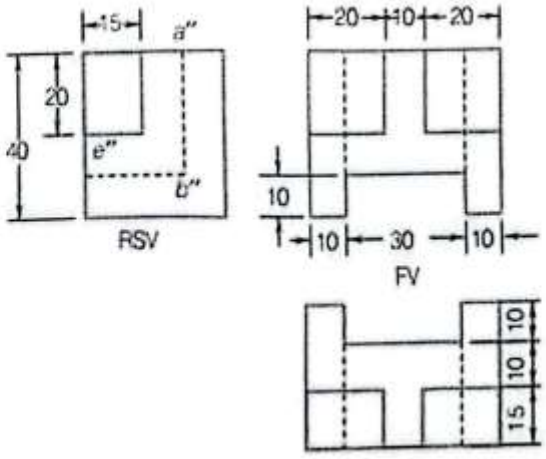
I B.Tech I Semester Regular Examinations, January - 2024

R-23

Branch : ECE
Year – Sem : I - I
Subject Name : ENGINEERING GRAPHICS
Subject Code : 23UME01

Max. Time: 3hrs
Max. Marks: 70 M

QUESTION NUMBER		QUESTION	MARKS	BLOOMS LEVEL	CO	PO
NOTE: ANSWER ANY ONE QUESTION FROM Q1 AND Q2						
Q1	(a)	Draw an epicycloid of a circle of diameter 50 mm, which rolls outside a circle of diameter 180 mm for one revolution. Also, draw a tangent and a normal to the epicycloid at a point 135 mm from the centre of the directing circle	14 M	L1	CO1	PO1
(OR)						
Q2	(a)	Draw an involute of a circle of diameter 50 mm. Also draw normal and tangent at a point 100 mm from the centre of the circle	14 M	L1	CO1	PO1
NOTE: ANSWER ANY ONE QUESTION FROM Q3 AND Q4						
Q3	(a)	A line AB, 65 mm long has its end A 20 mm above the H.P. and 25 mm in front of the V.P. The end B is 40 mm above the H.P. and 65 mm in front of the V.P. Draw the projections of AB and show its inclinations with the H.P. and the V.P.	7 M	L2	CO2	PO2
	(b)	A line PQ 75 mm long, has its end P in the V.P. and the end Q in the H.P. The line is inclined at 30° to the H.P. and at 60° to the V.P. Draw its projections.	7 M	L2	CO2	PO2
(OR)						
Q4	(a)	A pentagonal plate of 45 mm side has a circular hole of 40 mm diameter in its centre. The plane stands on one of its sides on the H.P. with its plane perpendicular to V.P. and 45° inclined to the H.P. Draw the projections.	14 M	L2	CO2	PO2
NOTE: ANSWER ANY ONE QUESTION FROM Q5 AND Q6						
Q5	(a)	A right regular pentagonal pyramid side of base 50 mm and height 80 mm, rests on one of the corners of its base on the H.P., the base being tilted up until the apex is 60 mm above H.P. Draw the projections of the pyramid with the edge of base opposite to the corner on which it is resting, is made parallel to V.P.	14 M	L2	CO3	PO1
(OR)						
Q6	(a)	A hexagonal prism, with the side of the hexagon 30 mm and height of 70 mm is resting on the H.P. on one of the edges of its hexagonal base in such a way that, the edge is at 60° to the V.P. and the base is at 30° to the H.P. Draw to scale 1 :1, the view from the front and the view from the top.	14 M	L2	CO3	PO2
NOTE: ANSWER ANY ONE QUESTION FROM Q7 AND Q8						

Q7	(a)	A pentagonal prism, base 28 mm side and height 65 mm has an edge of its base on the H.P. and the axis parallel to the V.P. and inclined at 60 degree to the H.P. A section plane, having its H. T. perpendicular to XY, and the V. T. inclined at 60 degree to XY and passing through the highest corner, cuts the prism. Draw the sectional top view and true shape of the section.	14 M	L3	CO4	PO2
		(OR)				
Q8	(a)	A hexagonal pyramid, base 30 mm side and axis 65 mm Jong, is resting on its base on the H.P. with two edges parallel to the V.P. It is cut by a section plane, perpendicular to the V.P. inclined at 45° to the H.P. and intersecting the axis at a point 25 mm above the base. Draw the front view, sectional top view, sectional side view and true shape of the section.	14 M	L3	CO4	PO2
		NOTE: ANSWER ANY ONE QUESTION FROM Q9 AND Q10				
Q9	(a)	Draw Front View, Top View and Left Side View for the following figure: 	14 M	L3	CO5	PO2
		(OR)				
Q10	(a)	Draw isometric view from the given orthographic views: 	14 M	L3	CO5	PO2

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I B.Tech I Semester Regular Examinations, January - 2024

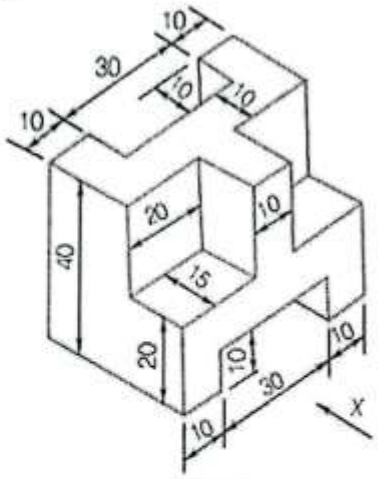
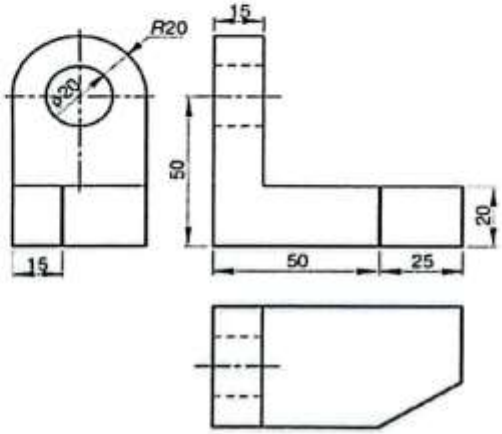
R-23

Branch : ME
Year – Sem : I - I
Subject Name : ENGINEERING GRAPHICS
Subject Code : 23UME01

Max. Time: 3hrs
Max. Marks: 70 M

Note: Answer any FIVE Questions ONE question from Each Unit

QUESTION NUMBER		QUESTION	MARKS	BLOOMS LEVEL	CO	PO
NOTE: ANSWER ANY ONE QUESTION FROM Q1 AND Q2						
Q1	(a)	Construct an ellipse, with distance of the focus from the directrix as 30mm and eccentricity is 2/3. Also draw a normal and a tangent to the curve at any point on the curve.	14 M	L1	CO1	PO1
(OR)						
Q2	(a)	On a map, the distance between two points is 14cm. The real distance between them is 20km. Draw a diagonal scale of this map to read KM and HM and to measure upto 25KM. Show a distance of 17.6KM on this scale.	14 M	L1	CO1	PO1
NOTE: ANSWER ANY ONE QUESTION FROM Q3 AND Q4						
Q3	(a)	A line AB is inclined at 40^0 to HP. Its one end A is 25mm above HP and 30mm in front of VP. The Top view of the line is 70mm and is inclined at 30^0 to XY. Draw its projections. Also find its true length and inclination of the line with VP.	14 M	L2	CO2	PO2
(OR)						
Q4	(a)	A semi circular thin plate of 60 mm diameter, rests on the H.P on its diameter, which inclined at 45 degree to the V.P. and the surface is inclined at 30 degree to the H.P. Draw the projections of the plate.	14 M	L2	CO2	PO2
NOTE: ANSWER ANY ONE QUESTION FROM Q5 AND Q6						
Q5	(a)	Draw the projections of a cone of base diameter 50 mm and axis 60 mm resting on a point of the base circle on the ground with axis inclined at 30° to the H.P. and (a) 45° to the V.P., and (b) the top view of the axis inclined at 45° to the V.P.	14 M	L2	CO3	PO1
(OR)						
Q6	(a)	A pentagonal pyramid edge of base 50 mm and height 75 mm, is resting on a corner of its base on H.P. in such a way that the slant edge containg that corner makes an angle of 60 degree with the H.P. Draw its projections.	14 M	L2	CO3	PO2
NOTE: ANSWER ANY ONE QUESTION FROM Q7 AND Q8						
Q7	(a)	A cone of base diameter 50 mm and axis 60 mm rests on its base in the H.P. It is cut by a section plane perpendicular to V.P. such that the true shape of the section is a parabola of base 40 mm. Draw its three views and obtain the true shape of the section.	14 M	L3	CO4	PO2
(OR)						

Q8	(a)	Draw a Development of a cube of side of base 30mm. Assume the cube is resting on its base on HP with an edge of the base parallel to V.P.	14 M	L3	CO4	PO2
NOTE: ANSWER ANY ONE QUESTION FROM Q9 AND Q10						
Q9	(a)	Draw Front View, Top View and Left Side View for the following figure: 	14 M	L3	CO5	PO2
(OR)						
Q10	(a)	Draw isometric view from the given orthographic views: 	14 M	L3	CO5	PO2

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I B.Tech II Semester Regular Examinations, JUNE - 2024

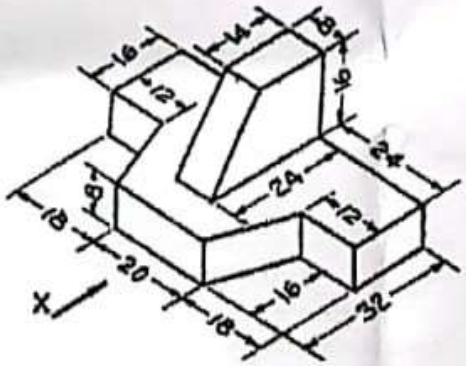
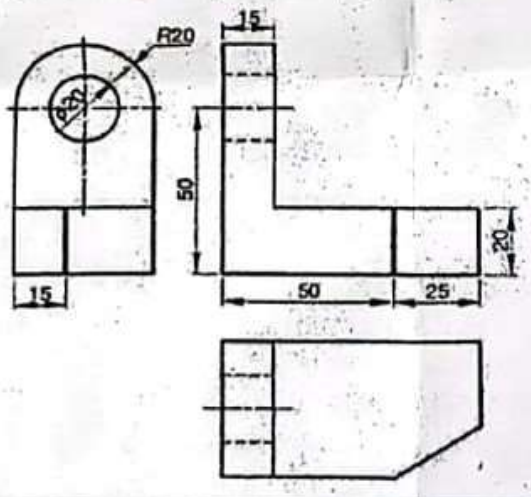
R-23

Branch : CSE
Year – Sem : I - II
Subject Name : ENGINEERING GRAPHICS
Subject Code : 23UME01

Max. Time: 3hrs
Max. Marks: 70 M

Note: Answer any FIVE Questions ONE question from Each Unit

QUESTION NUMBER		QUESTION	MARKS	BLOOMS LEVEL	CO	PO
NOTE: ANSWER ANY ONE QUESTION FROM Q1 AND Q2						
Q1	(a)	The major and minor axis of the ellipse are 125mm and 75 mm respectively. Construct an ellipse by any method of your choice.	14 M	L1	CO1	PO1
(OR)						
Q2	(a)	The distance between a fixed point and a fixed straight line is 60mm. Draw the locus of the point P such that its distance from the fixed point is equal to its distance from a fixed straight line. Name the curve.	14 M	L1	CO1	PO1
NOTE: ANSWER ANY ONE QUESTION FROM Q3 AND Q4						
Q3	(a)	A line AB, 80mm long, is inclined at 45° to the H.P. and its top view makes an angle of 60° with the V.P. The end A is in the H.P. and 15mm in front of V.P. Draw its front view and find its true inclination with the V.P.	14 M	L2	CO2	PO2
(OR)						
Q4	(a)	Draw a regular hexagon of 30mm side with its two sides vertical. Draw a circle of 30 mm diameter in its centre. The figure represents a hexagonal plate with a hole in it and having its surface parallel to the V.P. Draw its projections when the surface is vertical and inclined at 45° to the V.P. Assume the thickness of the plate to be equal to that of a line.	14 M	L2	CO2	PO2
NOTE: ANSWER ANY ONE QUESTION FROM Q5 AND Q6						
Q5	(a)	A hexagonal pyramid of base side 30mm and axis length 60mm is resting on HP on one of its base corner with the base sides containing the corner equally inclined to HP and its axis parallel to both HP and VP. Draw the projections.	14 M	L2	CO3	PO1
(OR)						
Q6	(a)	Draw the projection of a square prism, with base side 50mm and axis 70 mm long with all edges of the base equally inclined to the H.P. and the axis parallel to and 40 mm away from both the H.P. and V.P.	14 M	L2	CO3	PO2
NOTE: ANSWER ANY ONE QUESTION FROM Q7 AND Q8						
Q7	(a)	Draw the isometric view of a pentagonal prism of base 40 mm sides & height 70 mm when its axis is in vertical and horizontal position.	14 M	L3	CO4	PO2

		(OR)				
Q8	(a)	Draw the isometric view of a hexagonal pyramid with side of base 30mm and axis 60mm long. When its axis is horizontal and vertical.	14 M	L3	CO4	PO2
		NOTE: ANSWER ANY ONE QUESTION FROM Q9 AND Q10				
Q9	(a)	Draw Front View, Top View and Left Side View for the following figure: 	14 M	L3	CO5	PO2
		(OR)				
Q10	(a)	Draw isometric view from the given orthographic views: 	14 M	L3	CO5	PO2

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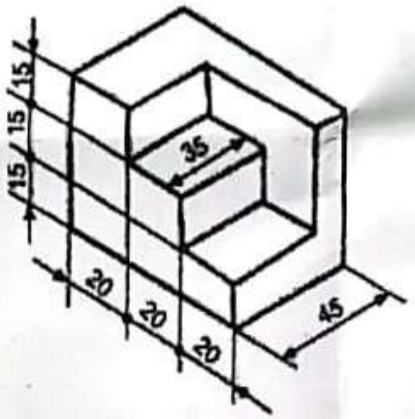
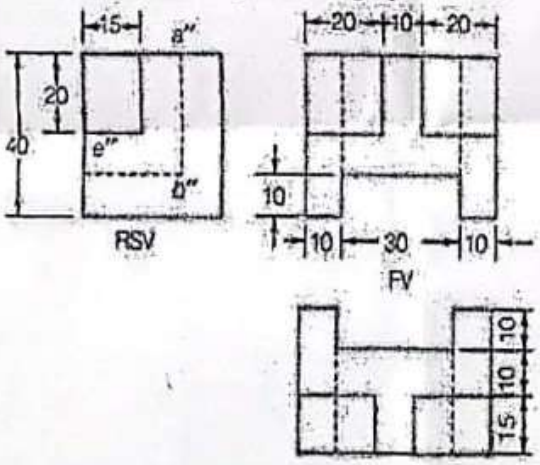
I B.Tech II Semester Regular Examinations, June - 2024

R-23

Branch : AIML/DS/CS
Year – Sem : I - II
Subject Name : ENGINEERING GRAPHICS
Subject Code : 23UME01

Max. Time: 3hrs
Max. Marks: 70 M

QUESTION NUMBER		QUESTION	MARKS	BLOOMS LEVEL	CO	PO
NOTE: ANSWER ANY ONE QUESTION FROM Q1 AND Q2						
Q1	(a)	Construct a parabola when the distance between focus and the directrix is 40 mm. Draw tangent and normal at any point P on the curve.	14 M	L1	CO1	PO1
(OR)						
Q2	(a)	The distance between a fixed point and a fixed straight line is 60mm. Draw the locus of the point P such that its distance from the fixed point is twice its distance from a fixed straight line. Name the curve.	14 M	L1	CO1	PO1
NOTE: ANSWER ANY ONE QUESTION FROM Q3 AND Q4						
Q3	(a)	The length of the top view of a line parallel to the V.P. and inclined at 30° to the H.P. is 5 cm. One end of the line is 15mm above the H.P. and 25 mm in front of the V.P. Draw the projections of the line and find its true length.	7 M	L2	CO2	PO2
(OR)						
Q4	(a)	A composite plate of negligible thickness is made-up of a rectangle 60mm by 40mm, and a semi-circle on its longer side. Draw its projections when the smaller side is parallel to H.P. and inclined at 30° to the V.P., the surface of the plate making 45° with the H.P.	14 M	L2	CO2	PO2
NOTE: ANSWER ANY ONE QUESTION FROM Q5 AND Q6						
Q5	(a)	Draw the projection of a hexagonal prism, base 30 mm side and axis 60mm long, resting on one of its rectangular faces on the ground with the axis inclined at 30° to the VP.	14 M	L2	CO3	PO1
(OR)						
Q6	(a)	Draw the projection of a square pyramid, with base side 40mm and axis 70 mm long with all edges of the base equally inclined to the H.P. and the axis parallel to and 50 mm away from both the H.P. and V.P.	14 M	L2	CO3	PO2
NOTE: ANSWER ANY ONE QUESTION FROM Q7 AND Q8						
Q7	(a)	Draw the isometric view of a hexagonal prism with side of base 40mm and axis 70mm long. When its axis is horizontal and vertical.	14 M	L3	CO4	PO2
(OR)						

Q8	(a)	A hexagonal pyramid, base 30 mm side and axis 65 mm Jong, is resting on its base on the H.P. with two edges parallel to the V.P. It is cut by a section plane, perpendicular to the V.P. inclined at 45° to the H.P. and intersecting the axis at a point 25 mm above the base. Draw the front view, sectional top view, sectional side view and true shape of the section.	14 M	L3	CO4	PO2
NOTE: ANSWER ANY ONE QUESTION FROM Q9 AND Q10						
Q9	(a)	Draw Front View, Top View and Left Side View for the following figure: 	14 M	L3	CO5	PO2
(OR)						
Q10	(a)	Draw isometric view from the given orthographic views: 	14 M	L3	CO5	PO2

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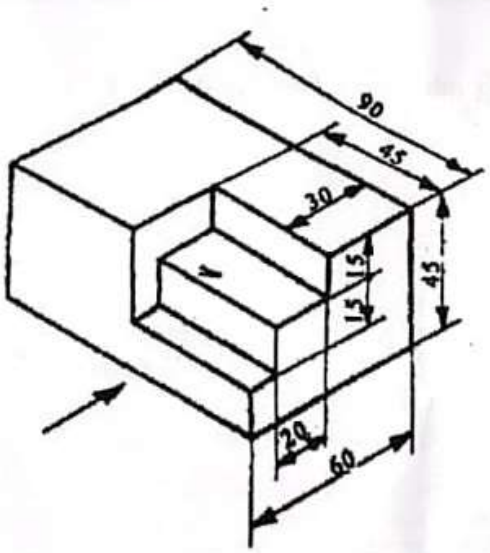
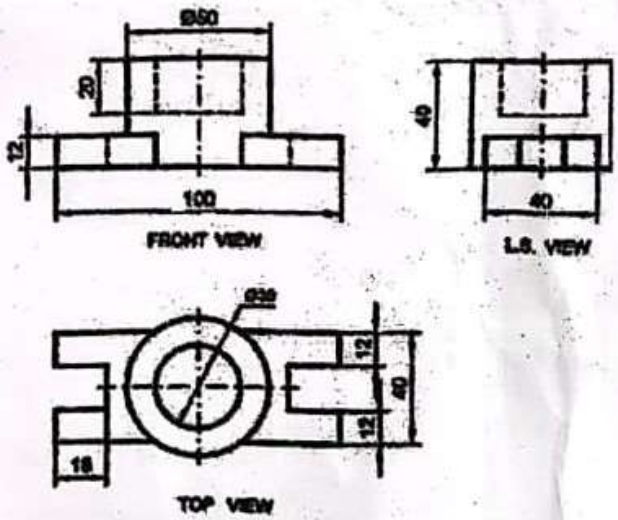
I B.Tech II Semester Regular Examinations, June - 2024

R-23

Branch : IoT
Year – Sem : I - II
Subject Name : ENGINEERING GRAPHICS
Subject Code : 23UME01

Max. Time: 3hrs
Max. Marks: 70 M

QUESTION NUMBER		QUESTION	MARKS	BLOOMS LEVEL	CO	PO
NOTE: ANSWER ANY ONE QUESTION FROM Q1 AND Q2						
Q1	(a)	The distance between Delhi and Agra is 200 km. In a railway map it is represented by a line 5 cm long. Find its R.F. Draw a diagonal scale to show single km. And maximum 600 km. Indicate on it following distances. 1) 222 km 2) 336 km 3) 459 km 4) 569 km	14 M	L2	CO1	PO1
(OR)						
Q2	(a)	The vertex of a hyperbola is 5cms from directrix. Draw the curve if the eccentricity is 3/2. Draw the normal and tangent at a point 50mm from axis.	14 M	L3	CO1	PO1
NOTE: ANSWER ANY ONE QUESTION FROM Q3 AND Q4						
Q3	(a)	A line AB, 90mm long, is inclined at 45° to the H.P. and its top view makes an angle of 60° with the V.P. The end A is in the H.P. and 12mm in front of V.P. Draw its front view and find its true inclination with the V.P.	14 M	L3	CO2	PO2
(OR)						
Q4	(a)	A Square plane with a 40mm side has its surface parallel to and 20mm above the HP. Draw its Projections, when (a) A side is parallel to VP (b) A side is inclined at 30^0 to VP and (c) All sides are equally inclined to VP	14 M	L3	CO2	PO2
NOTE: ANSWER ANY ONE QUESTION FROM Q5 AND Q6						
Q5	(a)	A pentagonal Prism having a base with a 30 mm side and 60mm long axis, is resting on one of its rectangular faces on the HP, with axis parallel to the VP. Draw its projections.	14 M	L3	CO3	PO1
(OR)						
Q6	(a)	A cone 40 mm diameter and 50 mm axis is resting on one of its generator on HP which makes 30^0 inclinations with VP. Draw it's projections?	14 M	L3	CO3	PO2
NOTE: ANSWER ANY ONE QUESTION FROM Q7 AND Q8						
Q7	(a)	A cylinder of 45 mm diameter and 70 mm long, is resting on one of its bases on H.P. It is cut by a section plane, inclined at 60^0 with H.P and passing through a point on the axis at 15 mm from one end. Draw the three views of the solid and also obtain the true shape of the section.	14 M	L3	CO4	PO2
(OR)						

Q8	(a)	A square pyramid, base 40 mm side and axis 65 mm long, has its base on the HP with two edges of the base perpendicular to the VP. It is cut by a section plane, perpendicular to the VP, inclined at 45° to the HP and bisecting the axis. Draw its sectional top view and true shape of the section. Also draw its development.	14 M	L3	CO4	PO2
NOTE: ANSWER ANY ONE QUESTION FROM Q9 AND Q10						
Q9	(a)	Draw Front View, Top View and Left Side View for the following figure: 	14 M	L3	CO5	PO2
(OR)						
Q10	(a)	Draw isometric view from the given orthographic views: 	14 M	L3	CO5	PO2

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I B.Tech I Semester Supply Examinations, June - 2024

R-23

Branch : ECE,EEE,CE and ME
Year – Sem : I - I
Subject Name : ENGINEERING GRAPHICS
Subject Code : 23UME01

Max. Time: 3 hr
Max. Marks: 70

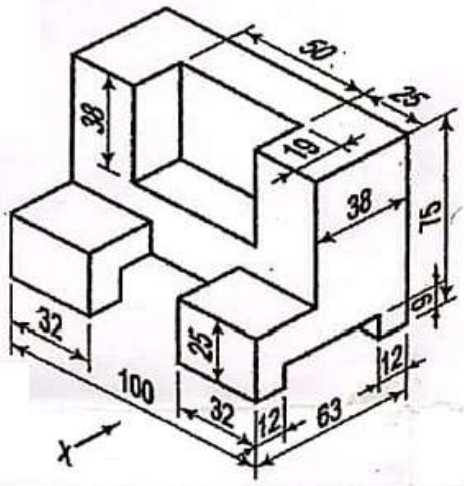
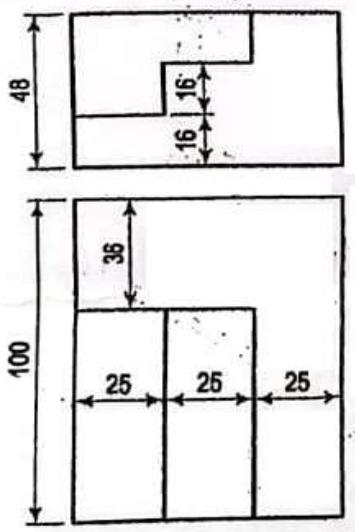
FIVE Questions ONE question from Each Unit

QUESTION NUMBER		QUESTION	MARKS	BLOOMS LEVEL	CO	PO
NOTE: ANSWER ANY ONE QUESTION FROM Q1 AND Q2						
Q1	(a)	The vertex of a hyperbola is 65 mm from its focus. Draw the curve if the eccentricity is $\frac{3}{2}$. Draw a normal and a tangent at a point on the curve, 75 mm from the directrix	14 M	L2	CO1	PO1
(OR)						
Q2	(a)	Construct a Diagonal scale of RF = 3:200 showing meters, decimeters and centimeters. The scale should measure up to 6 meters. Show a distance of 4.56 meters	14 M	L1	CO1	PO1
NOTE: ANSWER ANY ONE QUESTION FROM Q3 AND Q4						
Q3	(a)	Draw the projections of the following points on the same ground line, keeping the projectors 25 mm apart. 1. A, in the H.P. and 20 mm behind the V.P. 2. B, 40 mm above the H.P. and 25 mm in front of the V.P. 3. C, in the V.P. and 40 mm above the H.P. 4. D, 25 mm below the H.P. and 25 mm behind the V.P. 5. E, 15 mm above the H.P. and 50 mm behind the V.P. 6. F, 40 mm below the H.P. and 25 mm in front of the V.P. 7. G, in both the H.P. and the V.P.	6 M	L2	CO2	PO2
	(b)	A line AB, inclined at 40° to the V.P., has its ends 50 mm and 20 mm above the H.P. The length of its front view is 65 mm and its V.T. is 10 mm above the H.P. Determine the true length of AB, its inclination with the H.P. and its H. T.	8 M	L2	CO2	PO2
(OR)						
Q4	(a)	A thin circular plate of 70 mm diameter is resting on its circumference such that its plane is inclined 60° to the H.P. and 30° to the V.P. Draw the projections of the plate.	14 M	L2	CO2	PO2
NOTE: ANSWER ANY ONE QUESTION FROM Q5 AND Q6						
Q5	(a)	Draw the projections of a cylinder 75 mm diameter and 100 mm long, lying on the ground with its axis inclined at 30° to the V.P. and parallel to the ground.	14 M	L1	CO1	PO1
(OR)						
Q6	(a)	Draw the projections of a hexagonal pyramid, base 30 mm side and axis 60 mm long, having its base on the H.P. and one of the edges of the base inclined at 45° to the V.P	14 M	L2	CO2	PO2

NOTE: ANSWER ANY ONE QUESTION FROM Q7 AND Q8

Q7	(a)	A cone of base diameter 55 mm and height 75 mm is resting on the ground on its base. It is cut by a section plane perpendicular to V.P, inclined at 45⁰ to H.P and cutting the axis at a point 40 mm from the bottom. Draw the front view, sectional top view and true shape of the section.	14 M	L2	CO2	PO2
		(OR)				
Q8	(a)	Draw the development of a square pyramid, with side of base 35 mm and height 70 mm, resting with its base on H.P and with an edge of the base parallel to V.P.I	14 M	L2	CO2	PO2

NOTE: ANSWER ANY ONE QUESTION FROM Q9 AND Q10

Q9	(a)	Convert the given isometric view into following orthographic views (All dimensions are in mm.). (i)Front View, (ii)Top view & (iii)side views 	14 M	L2	CO2	PO2
		(OR)				
Q10	(a)	**Draw isometric view from the given orthographic views:** 	14 M	L2	CO2	PO2