Syllabus

ENGG. GRAPHICS

Unit 1:- Basic Introduction

Unit 2:- Orthographic Projection

Unit 3:- Isometric Projection

Unit 4:- Free hand Sketching

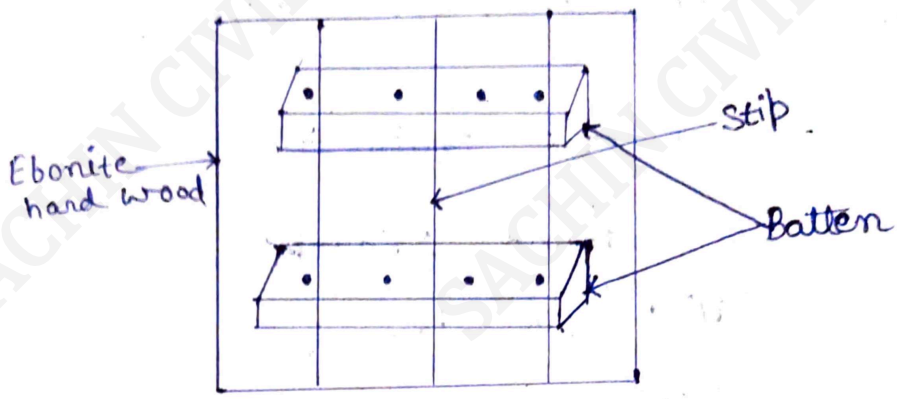
Unit 5:- Auto cad interface

Unit 6:- Auto cad

Unit-1 :- Basic Introduction

Drawing Instruments & their uses

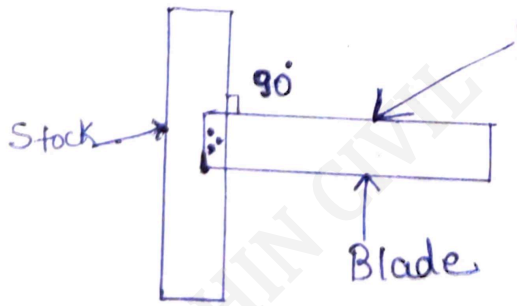
(a) Drawing board :-



*Make it Soft Wood

B0/D0 — 1000 mm x 1500 mm x 25 mm
B1/D1 — 700 mm x 1000 mm x 25 mm
B2/D2 — 500 mm x 700 mm x 15 mm
B3/D3 — 350 mm x 500 mm x 15 mm

(b) T-Square :-

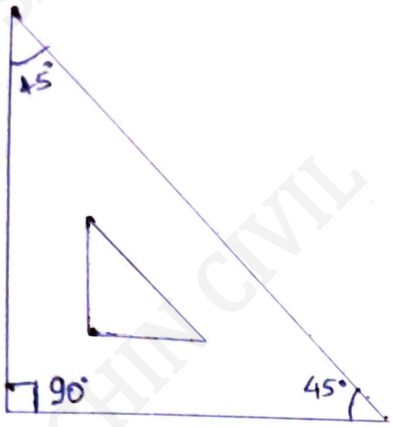


→ Horizontal line

Size

T0 — 1500 mm
T1 — 1000 mm
T2 — 700 mm
T3 — 500 mm

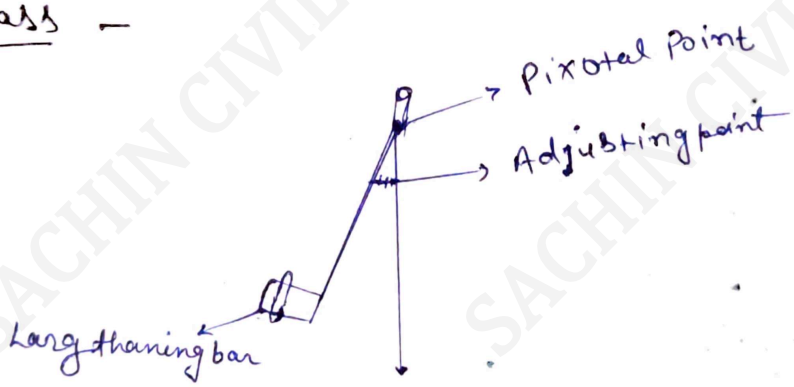
(C) Set Square



→ Make it celloloid

→ Horizontal line
→ Vertical line
→ Inclined line (15x multiple of 15)

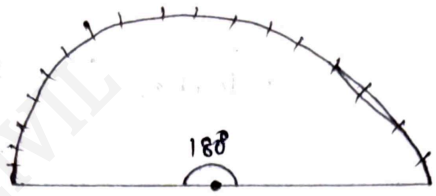
(D) Compass –



→ 200mm से ज्यादा बड़ा Circle बनाने के use किया जाता है।
→ 25mm से कम का circle बनाने के लिए bow compass का use किया जाता है।

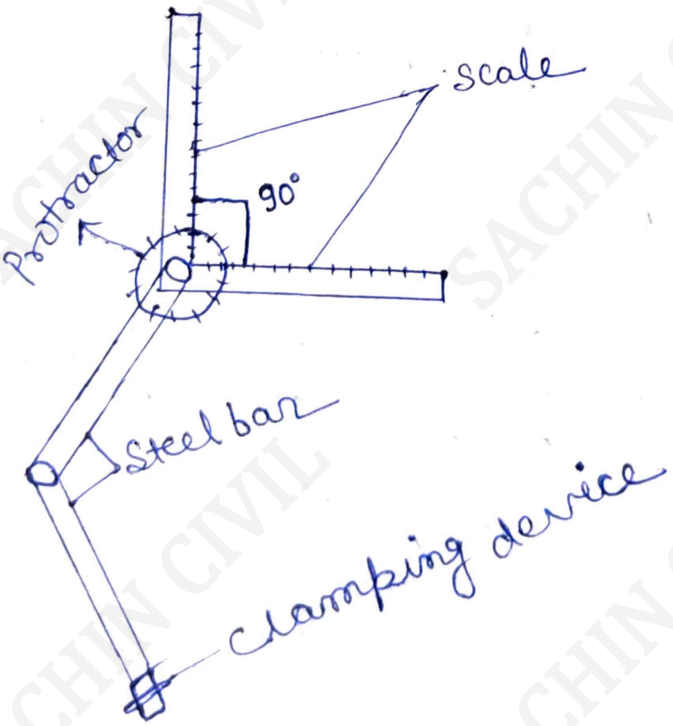
(E) Divider :-

(F) Protractor :-



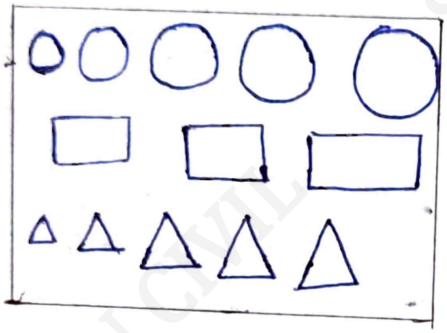
(G) Mini Drafter (Drafter machine) :-

T-Square, Set Square, Protractor, Scale



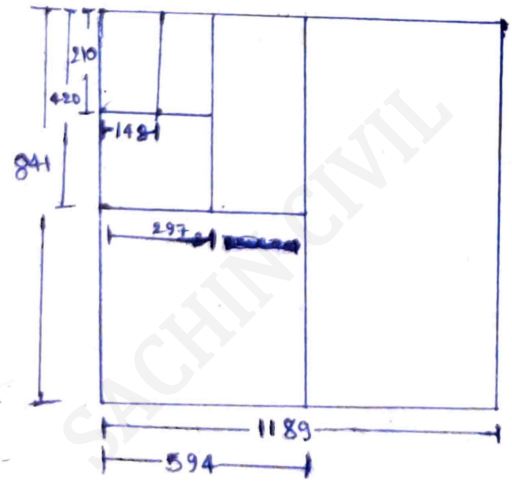
(H) French curve :-

(I) Template :-



(J) Drawing Sheet

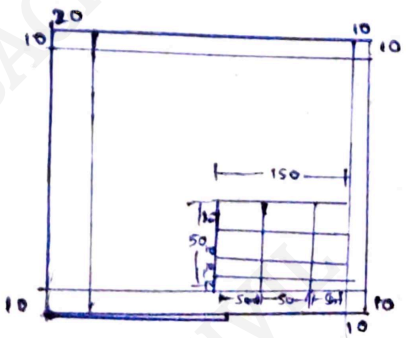
uses :- (i) Mill Made
(ii) Man Made



MILE METRE

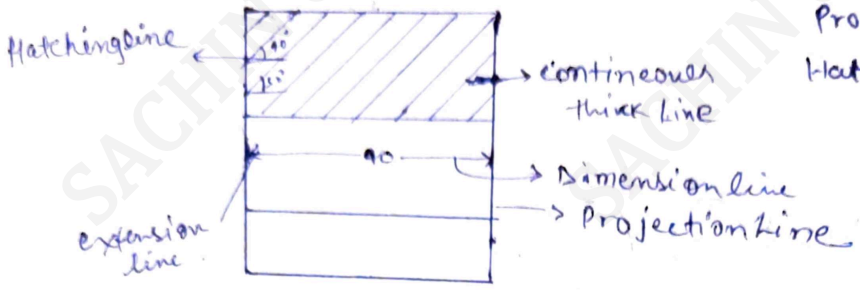
→ Area = $1m^2$

A0 = 841 mm x 1189 mm
A1 = 594 x 841
A2 = 420 x 594
A3 = 297 x 420
A4 = 210 x 297
A5 = 148 x 210

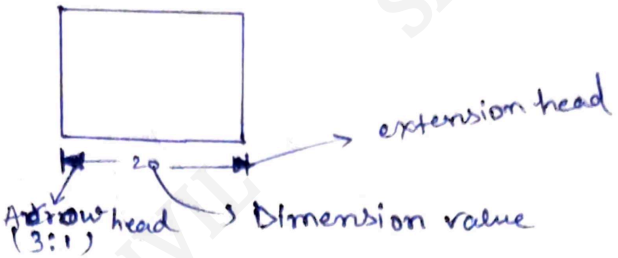


Convention of lines and their applications

Description	Line	Application
(i) Continuous thick line	——— H ———	Outer visible line, visible edge, map, flow chart.
(ii) Continuous thin line	2H/3H/4H	Extension Line (2H), Dimension Line (2H), Projection Line (4H), Hatching or section Line (3H),
(iii) Continuous thin Line (Free hand	~~~ 2H ~~~	Interrupted view / Section
(iv) Dashed thick Line	- - - -	Surface treatment
(v) Dashed thin Line	- - - - -	Hidden Outline, Hidden edge.
(vi) Chain thin Line or Long dashed dotted lie.	—·—·—	Centre line, line of Symmetry
(vii) Continuous thin with thick	—·—·—	cutting plane
(viii) Continuous thin with Zig-Zag	—/\/\—	Long break line
(ix) Chain thin double dashed line	—··—··—	Centroidal line

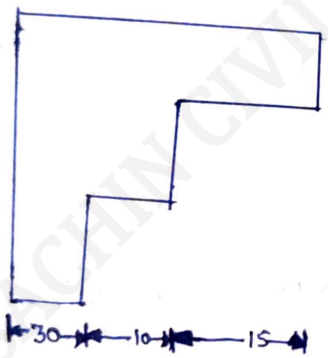


Dimension technique

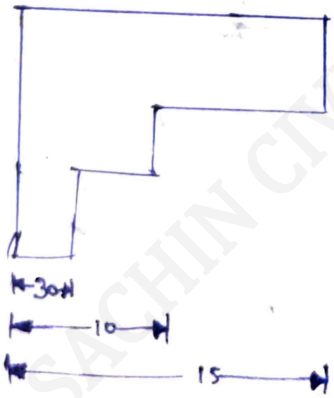


* There are four types of Dimension technique
  (i) Chain Dimension technique
  (ii) Parallel Dimension technique
  (iii) co-ordinate Dimension technique
  (iv) combined Dimension technique

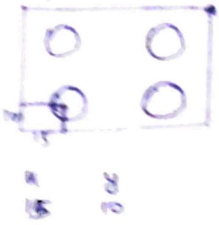
(i) Chain Dimension



(ii) Parallel Dimension



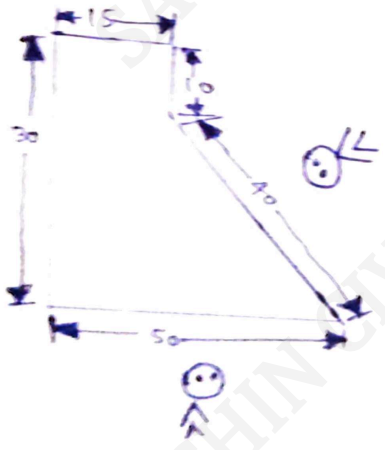
(iii) Co-ordinate Dimension



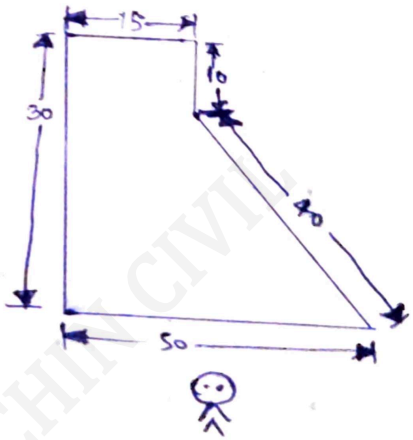
(iv) Combined Dimension

Placing Dimensions

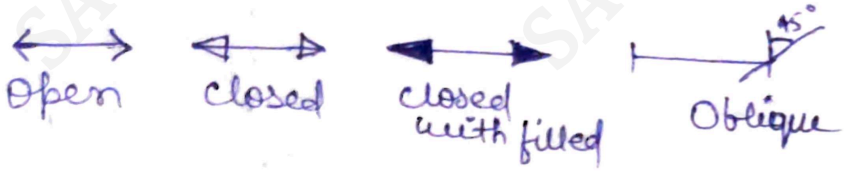
(a) Aligned System



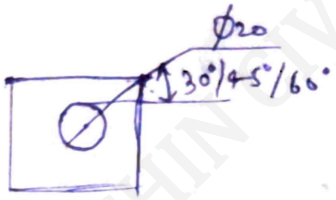
(b) Uni-directional System



(C) Arrow Head



(D) Leader line



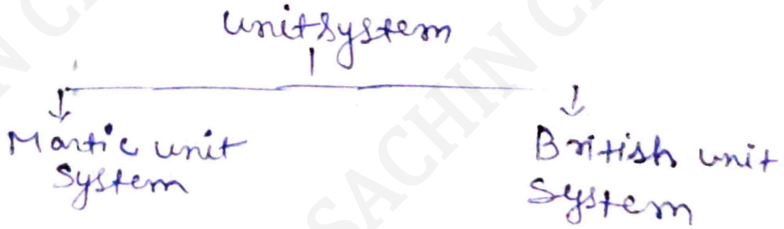
Scale

(i) Plane Scale
(ii) Diagonal Scale
(iii) Vernier Scale
(iv) Comprative Scale
(v) Chord of Scale

(i) Plane Scale

→ Plane Scale consist of a line divided into suitable number of equal parts or units The first of which is sub divided into smaller Plane Scale represent either two units or units and its subdivide.

NOTE :-



Scale

$$R.F = \frac{\text{Drawing size of an object}}{\text{Actual size of same object}}$$

* On the basis of R.F, Scale are 3 types.

ⓐ Full ~~Sc~~ Scale ⟶ (1:1)

ⓑ Reducing Scale ⟶ (1:n) $n > 1$

ⓒ Enlarging Scale ⟶ (n:1) $n > 1$

* Engineer's Scale are 5 types.

ⓐ Plain Scale.

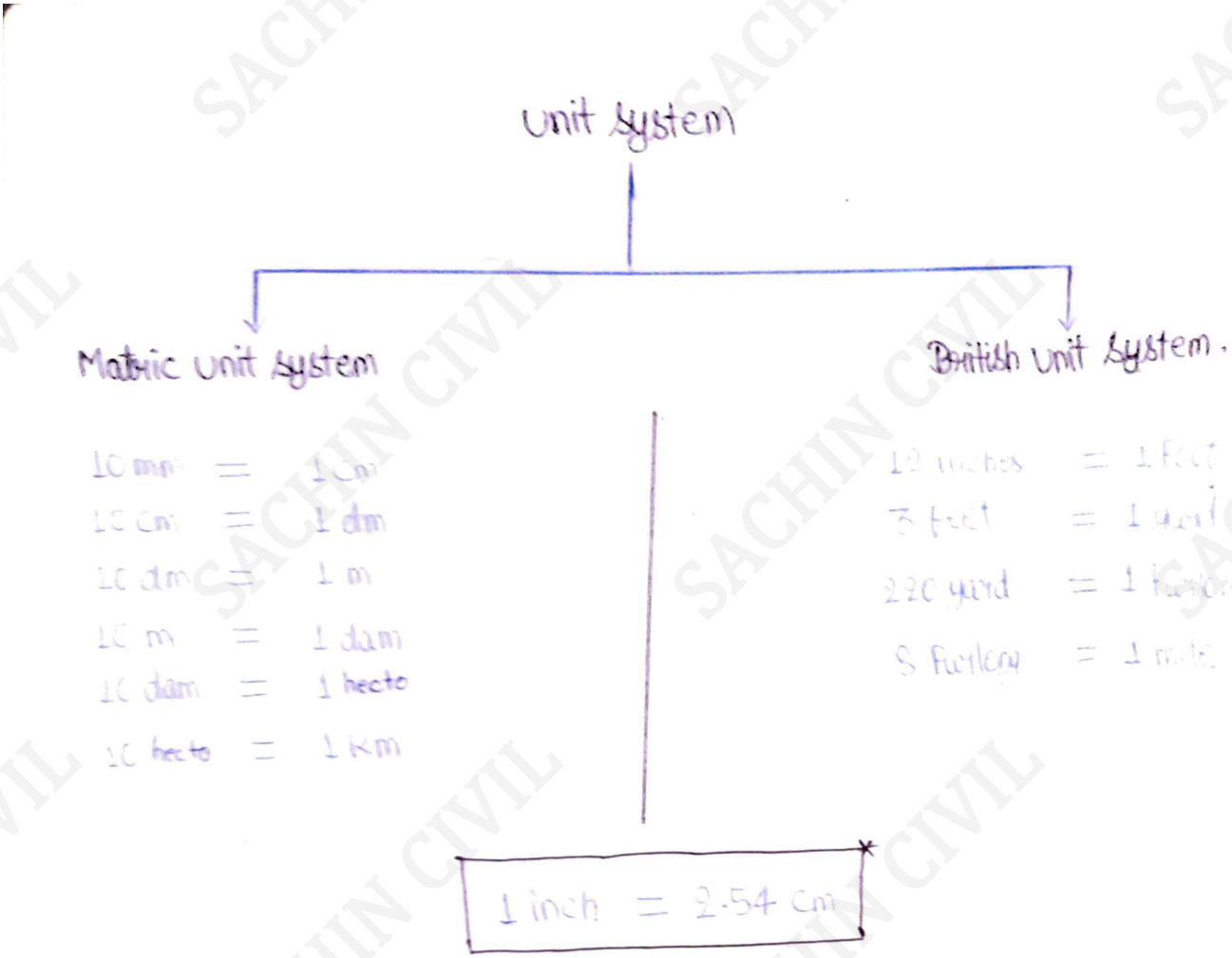
ⓑ Diagonal Scale.

ⓒ Vernier Scale.

ⓓ Comparative Scale.

ⓔ Chord of Scale.

* Plain Scale



* Data required

1. R.F. $\left(\frac{3}{4}, \frac{1}{4}\right)$
2. Max. length
   - Long enough to measure.
   - Read up to
   - measure up to
3. Length of scale = R.F × Max length

Q Construct a plain scale to show meter when 1 cm represents 4m and long enough to measure up to 50m. Find the R.F and mark on it a distance of 36 m.

A> Drawing size = 1 cm

Actual size = 4 m = 4 x 100 cm = 400 cm

Max. length = 50 m = 50 x 100 cm = 5000 cm

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

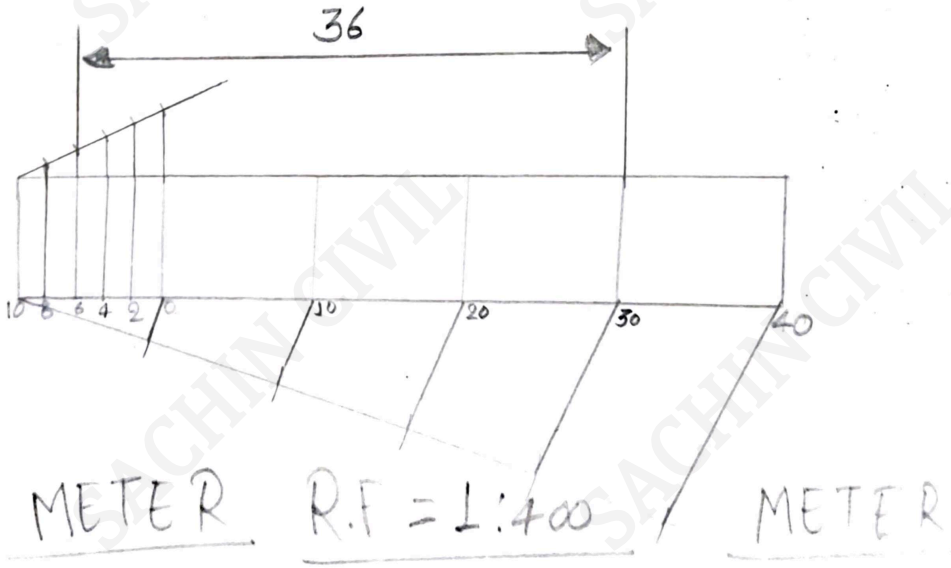
$$= \frac{1\text{ cm}}{400\text{ cm}} = \frac{1}{400}$$

Length of scale = R.F x Max-length

$$= \frac{1}{400} \times 5000\text{ cm}$$

$$= \frac{50}{4} = 12.5\text{ cm}$$

50 m
5 x 10 m
5 x 2 m



Q Construct a scale of 1.5 inches = 1 feet to show inches and long enough to measure up to 4 feet.

Ans: R.F = $\frac{\text{Drawing Size}}{\text{Actual Size}}$

$= \frac{1.5 \text{ inches}}{1 \times 12 \text{ inches} \times 10 \times 2} = \frac{1}{8}$

Length of Scale = R.F × Max-length

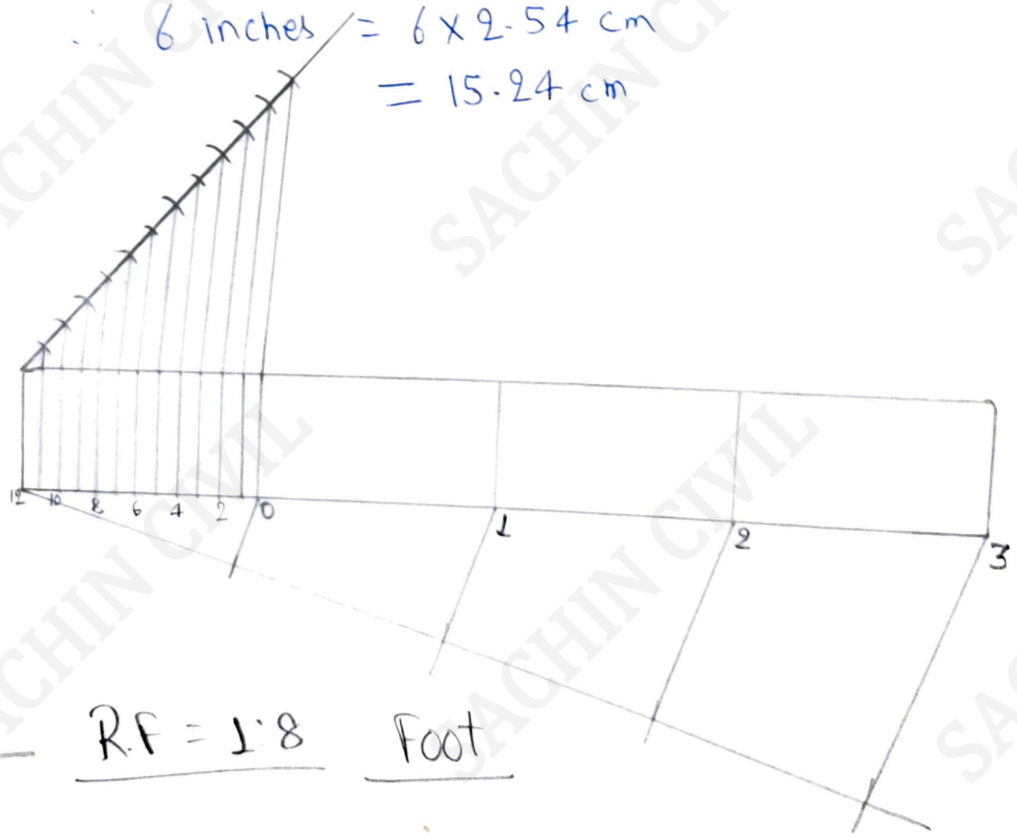
$= \frac{1}{8} \times 4 \times 12$ inches

$= 6$ inches.

∵ 1 inches = 2.54 cm

∴ 6 inches = 6 × 2.54 cm

= 15.24 cm



Inches R.F = 1.8 Foot

Diagonal Scale

Q. Construct a diagonal scale of R.F = $\frac{1}{32}$ showing yards, Feet and inches and to measure up to 4 yards.

Ans R.F = $\frac{1}{32}$

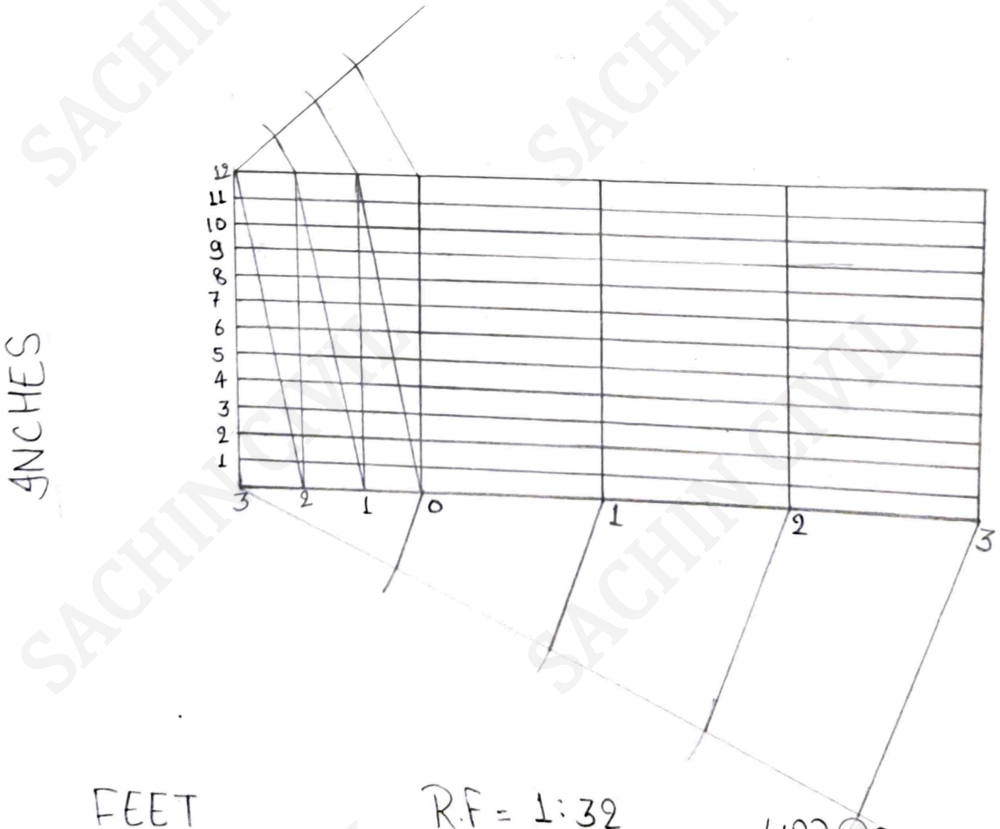
Max length = 4 yards

Length of Scale = R.F x Max-length.

$= \frac{1}{32} \times 4 \times 3 \times 12 \times 2.54$ cm

$= \frac{1}{32} \times 365.76$ cm

$= 11.43$ cm



Q. Area of $49\,cm^2$ on a map represents an area of $16\,m^2$ on a field. Draw a scale long enough to measure 8m. Mark a distance of 6m 9dm on the scale.

A) $R.F = \sqrt{\frac{\text{Drawing size}}{\text{Actual size}}}$

$= \sqrt{\frac{49\,cm^2}{16\,m^2}}$ $\quad \frac{49}{1600} = \frac{7}{4 \times 100\,cm} = \frac{7}{400}$

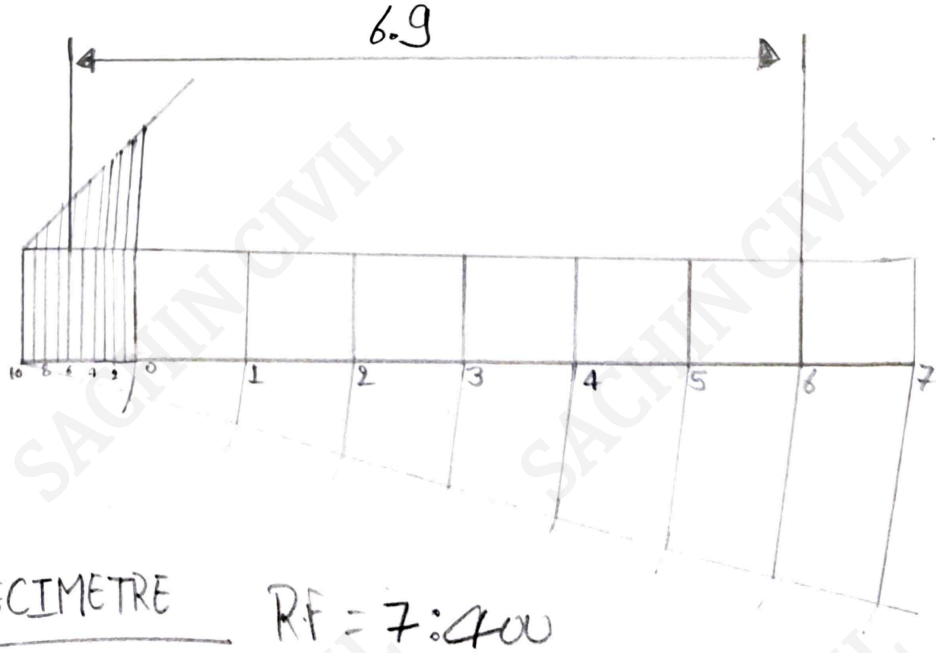
∴ Length of scale = R.F × Max-length.

$= \frac{49}{2} \times 8 \times 100\,cm$

$= \frac{49}{2} = 24.5\,cm$

$= \frac{7}{400} \times 8 \times 100$

$= 14\,cm$



DECIMETRE RF = 7:400

METRE

Q A room of building of 512 m^3 volume is represented by a similar block of 64 cm^3 volume. Find true R.F and construct a plain scale to measure up to 30 m. Measure a distance of 24 m on the scale.

A) $\therefore$ R.F $= \sqrt[3]{\frac{\text{Drawing size}}{\text{Actual size}}}$

$= \sqrt[3]{\frac{64\ cm^3}{512\ m^3}} = \frac{4\ cm}{8\ m} =$

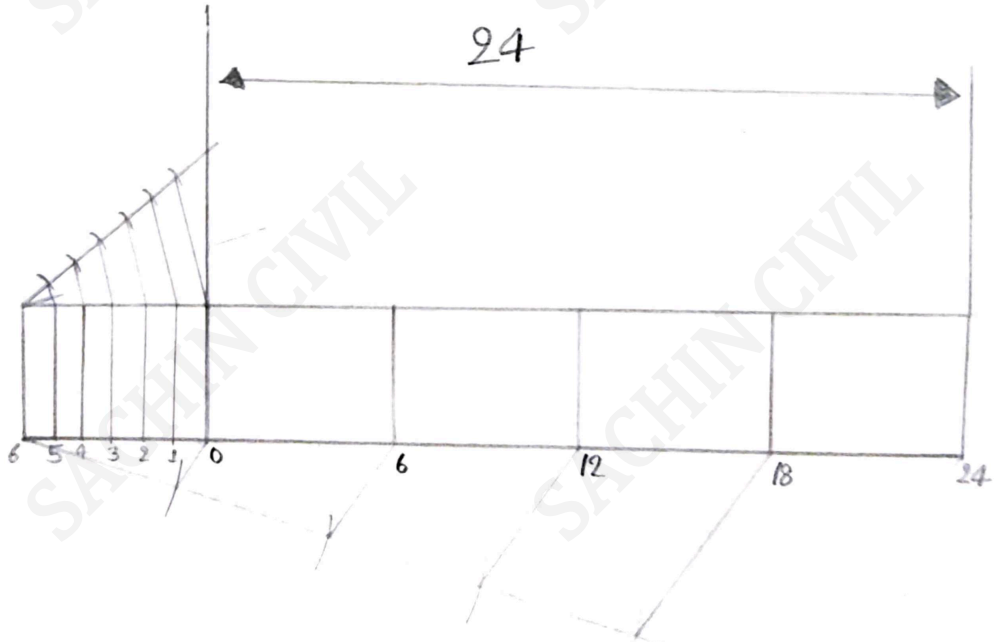
$= \frac{4\ \cancel{cm}}{8 \times 100\ \cancel{cm}} = \frac{1}{200}$

$\therefore$ Length of scale = R.F $\times$ Max-length

$= \frac{1}{\cancel{200}} \times \cancel{30} \times \cancel{100}\ cm$

$= 15\ cm.$

30
5 x 6 m



METRE R.F = 1:200 METRES

Diagonal Scale

* Diagonal Scale are used to represent either three units of measurements such as m, dm and cm or two units and a fraction of its second.

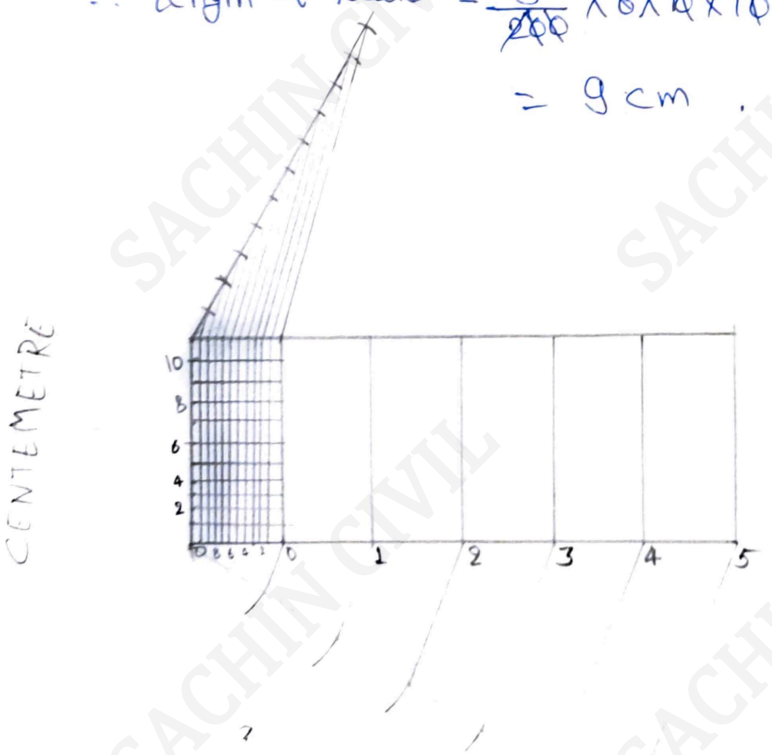
Q. Draw a diagonal scale of 3:200 showing m, dm and cm and measure up to 6 m. Mark 4.65 m on scale.

Ans. R.F = 3:200 = $\frac{3}{200}$

Max-length = 6m

∴ Length of scale = $\frac{3}{200} \times 6 \times 10 \times 10$ cm

= 9 cm.



DECIMETRE R.F = 3:200 METRE

Q. Construct a diagonal scale of R.F = $\frac{1}{32}$. Showing yard, feet and inches and to measure up to ~~4~~ yards.

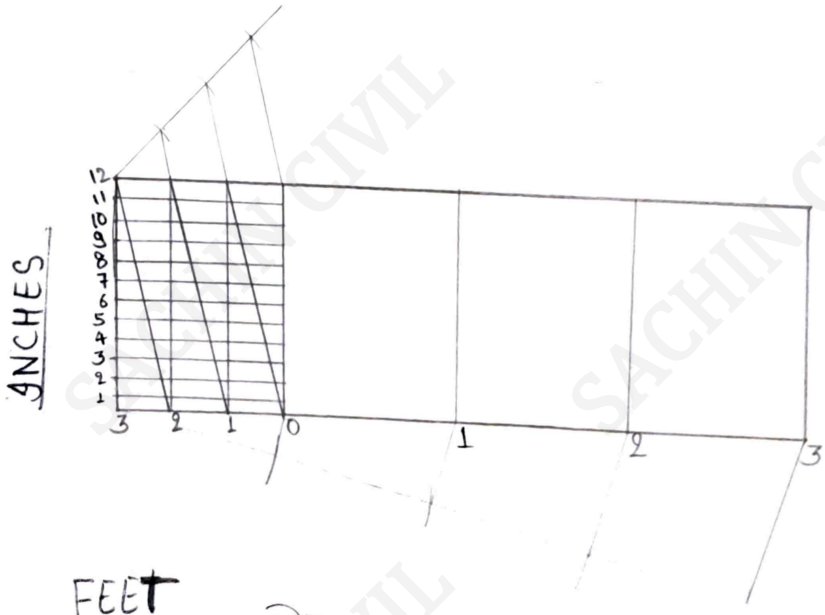
A> ∴ R.F = $\frac{1}{32}$

Max. length = 4 yards.

∴ Length of Scale = R.F × Max. length

$= \frac{1}{32} \times 4 \times 3 \times 12 \times 2.54$ cm

$= 3 \times 3 \times 1.27 = 11.43$ cm



Q/ Construct a diagonal scale of R.F $\frac{1}{4000}$ to show metres and long enough to measure up to 500 metres.

A→ R.F = $\frac{1}{4000}$

Max. length = 500 m

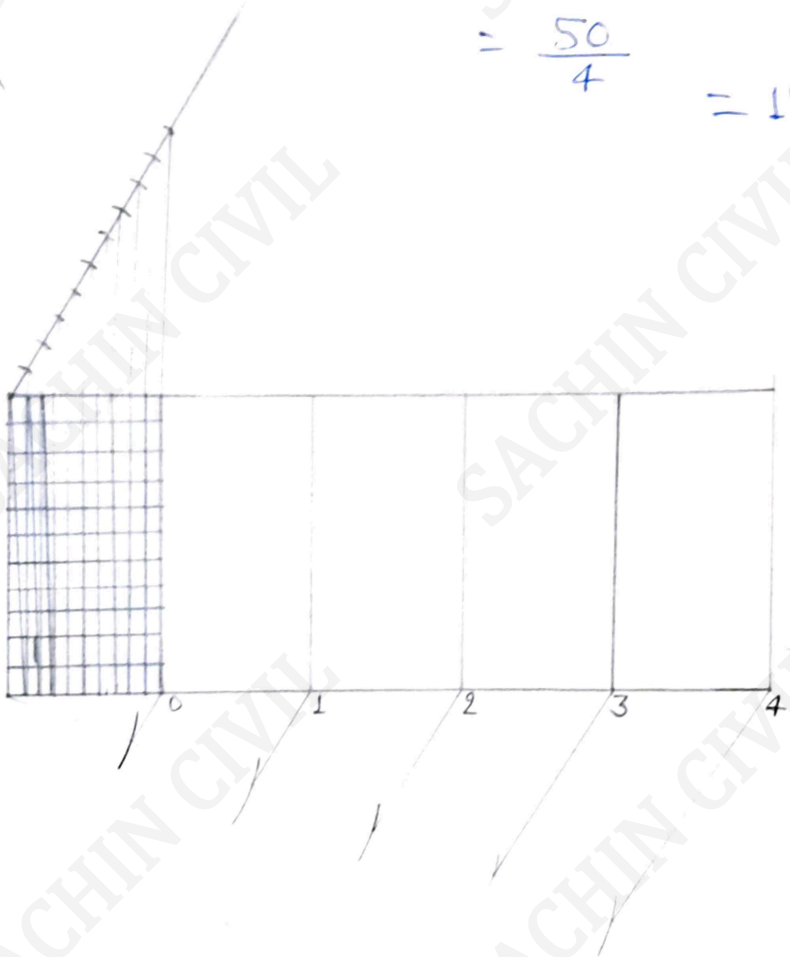
∴ Length of scale = R.F × Max. length

= $\frac{1}{4000} \times 500 \times 100 \times 10$

= $\frac{50}{4}$

= 12.5 cm

500
5 × 100 m



METRES - R.F = 1:4000 METRES

Q. Construct a diagonal scale of R.F 1:32 showing yard, feet and inches and to measure up to 4 yards.

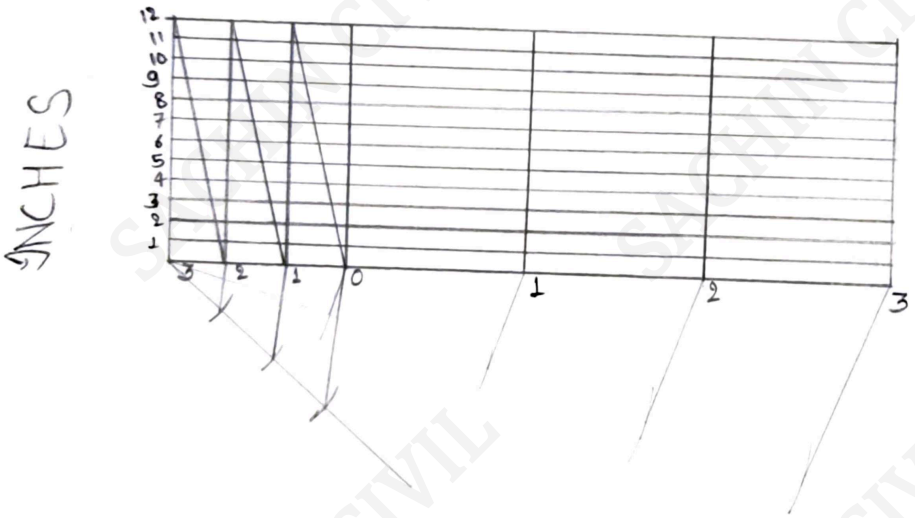
A> $R.F = \frac{1}{32}$

Max-Length = 4 yards.

Length of Scale = R.F × Max-length

$= \frac{1}{32} \times 4 \times 3 \times 12 \times 2.54$ cm

$= 11.43$ cm.



FEET R.F = 1:32 YARD

Diagonal Scale

Q/

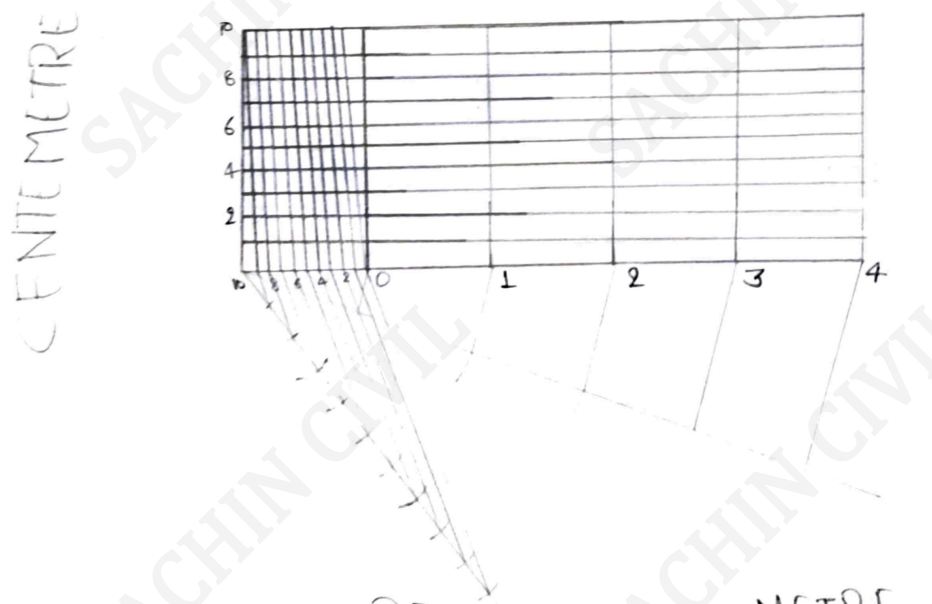
A> R.F = $\frac{1}{50}$

Max-length = 5m

Leng of Scale = R.F x Max-length

$\frac{1}{50} \times 5 \times 100$ cm

= 10 cm



DECIMETRE RF = 1:50 METRE

Q Draw a diagonal scale of

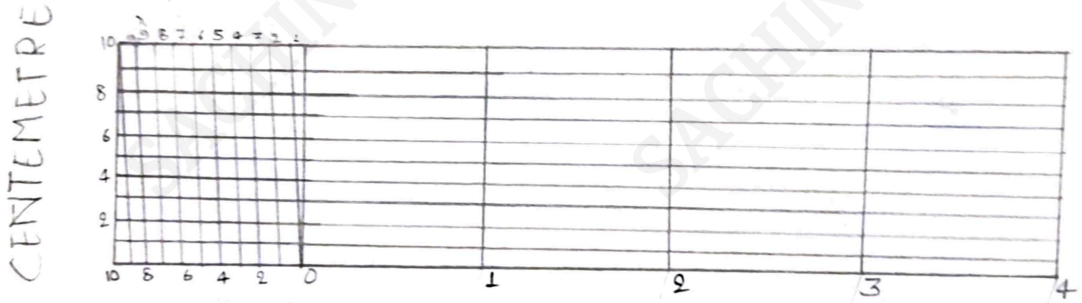
Ans RF $= \frac{3}{100}$

Max length = 5 m

Length of scale = RF × Max. length

$= \frac{3}{100} \times 5 \times 100$

$= 15$ cm



DECIMETRE RF = 3:100 METRE

Q A Square of 50 x 50 cm represent an area of 625 km^2. Construct a diagonal scale to measure km Hm and dam indicate on this scale a distance of 4 km, 5 km 6 dam.

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

$= \sqrt{\frac{50 \times 50\ cm^2}{625\ km^2}} = \frac{50\ cm}{25\ km} = \frac{50}{25 \times 1000 \times 100}\ \frac{cm}{cm}$

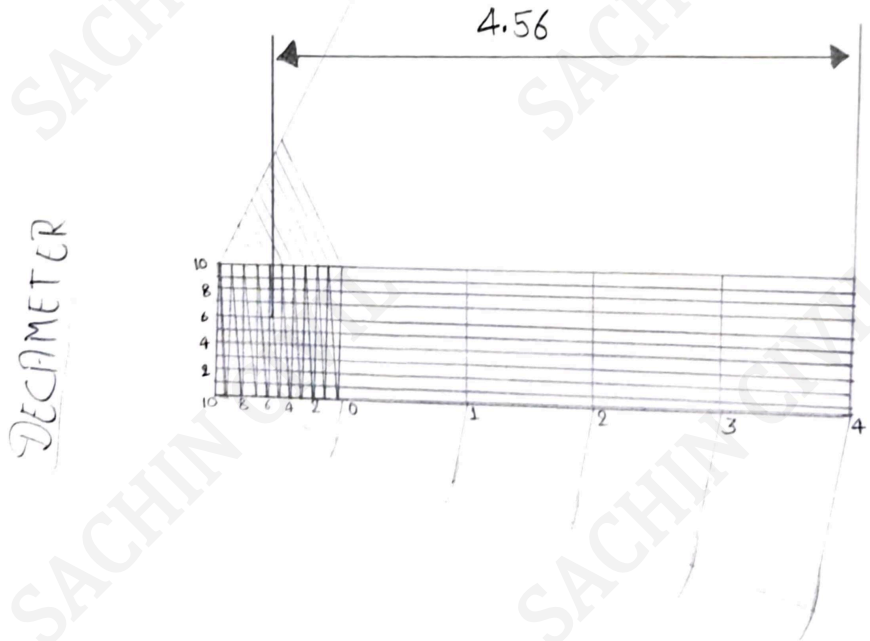
$= \frac{1}{50000}$

∴ Let, Max. length = 5 km.

∴ Length of Scale = R.F x Max. length

$= \frac{1}{50000} \times 5 \times 1000 \times 100$ cm

= 10 cm.



Q. 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 1km and hm and to measure up to 25 km. Show a distance of 17.6 km on the scale.

Ans → R.F = $\frac{14 \text{ cm}}{20 \text{ km}} = \frac{14^{7}}{20 \times 1000 \times 100} \frac{\text{cm}}{\text{cm}}$

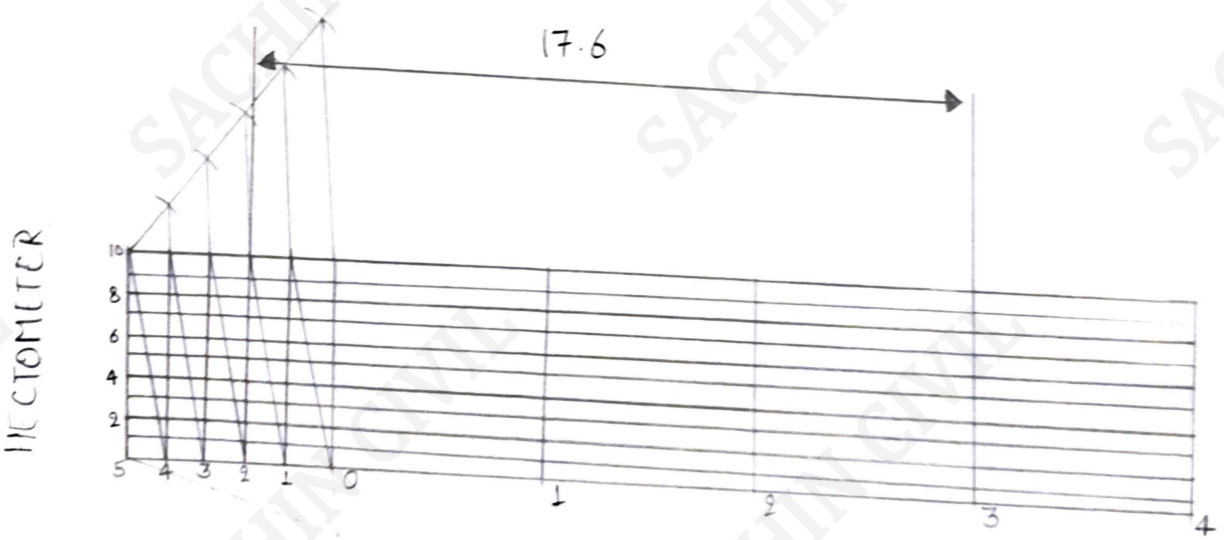
$= \frac{7}{1000000}$

Man- Length = 25 km

Length of Scale = $\frac{7}{1000000} \times 25 \times 100000^{5}$ cm

$= \frac{35}{2} = 17.5$ cm

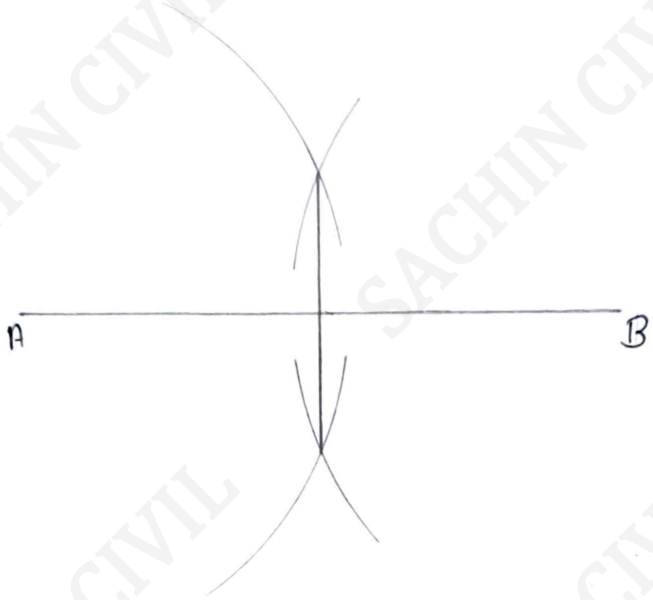
25 km
5 x 5 km

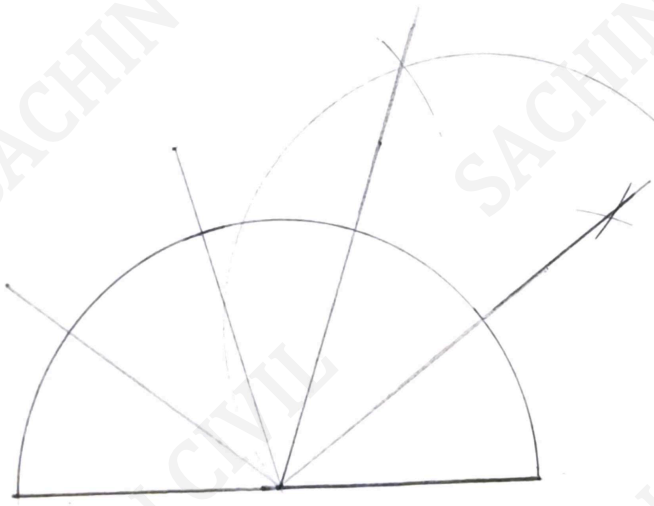


KILOMETER

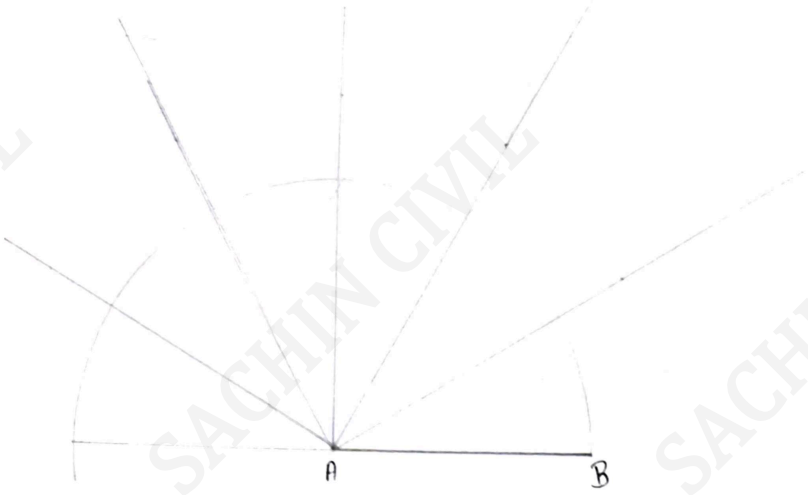
R.F = 7:1000000

KILOMETRES

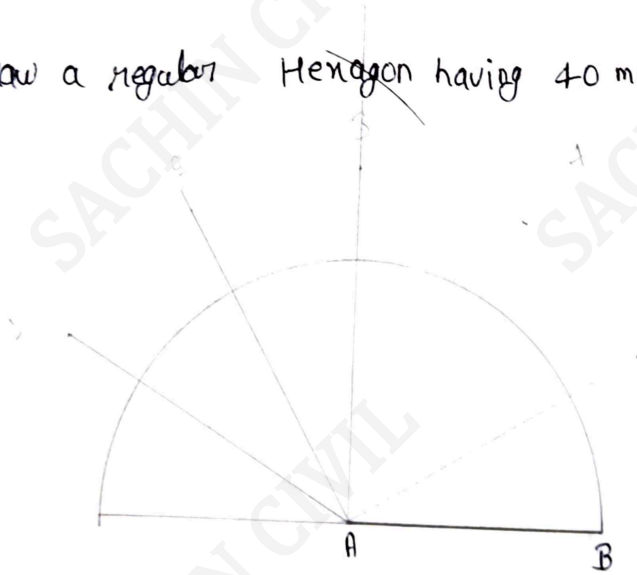

A
B



Q. Draw a regular Pantagon having 40 mm long side using general method.

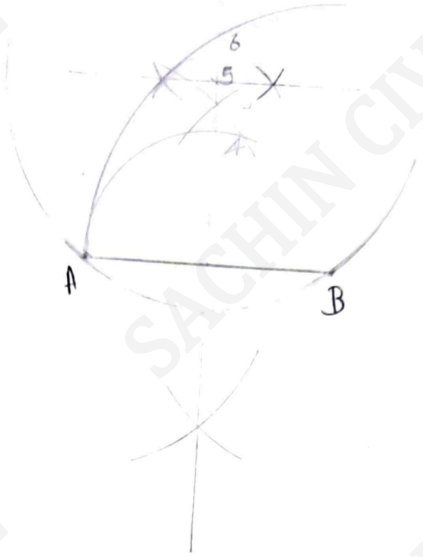


Q. Draw a regular Hexagon having 40 mm

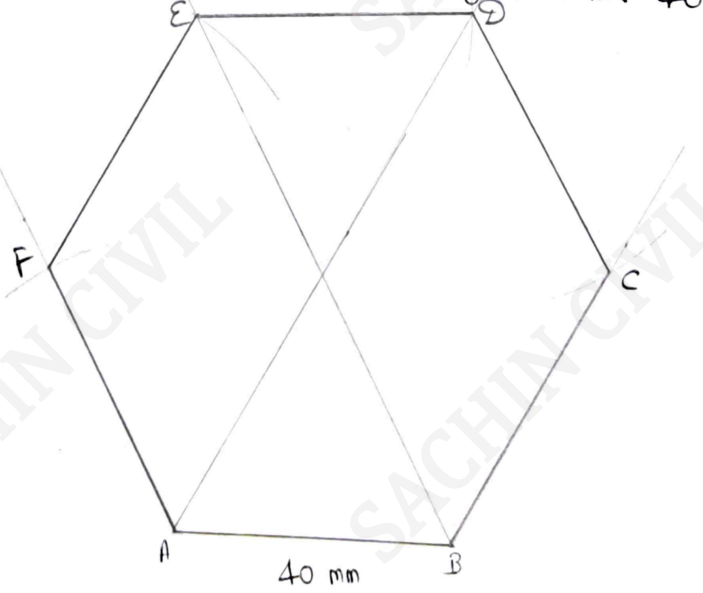


$\frac{180}{6} = 30°$

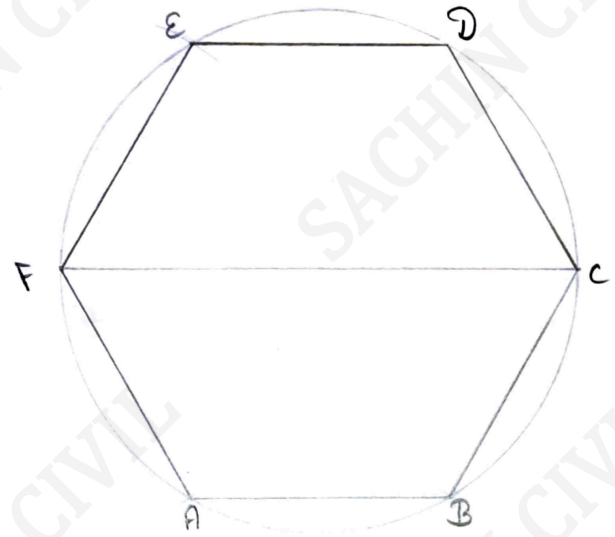
Q/ Special method for the construction of Pentagon side 40 mm



Q/ A Spacial method for construction of hexagone side 40 mm.



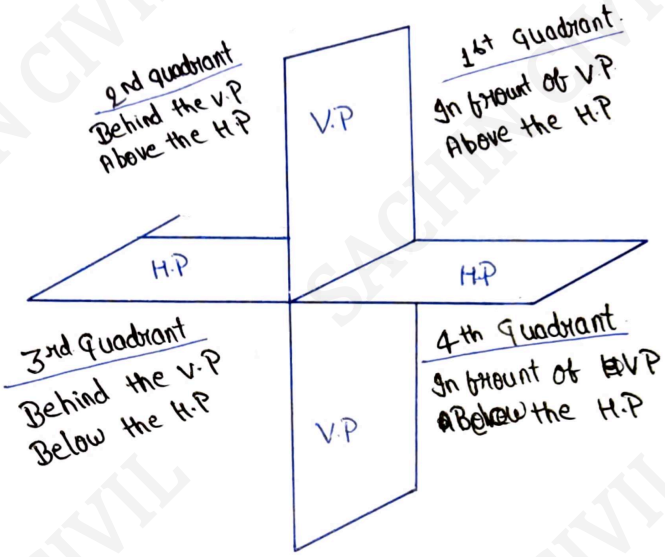
Q// Draw a regular hexagon having a 40 mm side.



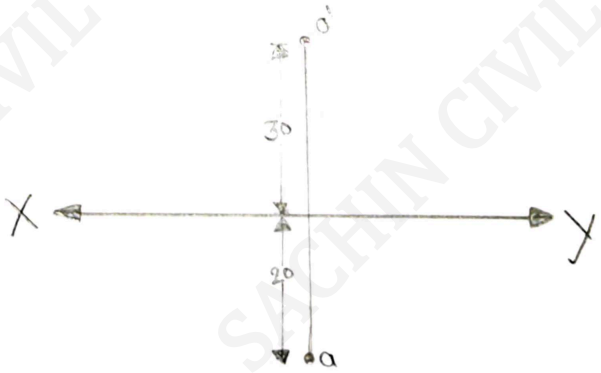
UNIT - 2

ORTHOGRAPHIC PROJECTION

* Projection of Point :-

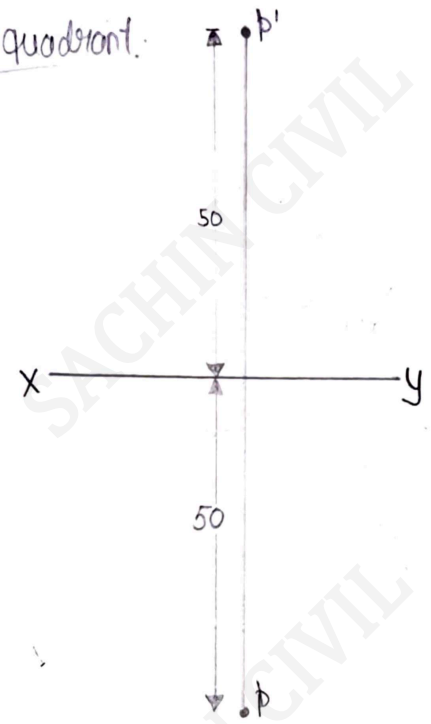


Q// A Point 'A' is 30 mm above the HP and 20 mm in front of VP. Draw its Projection.

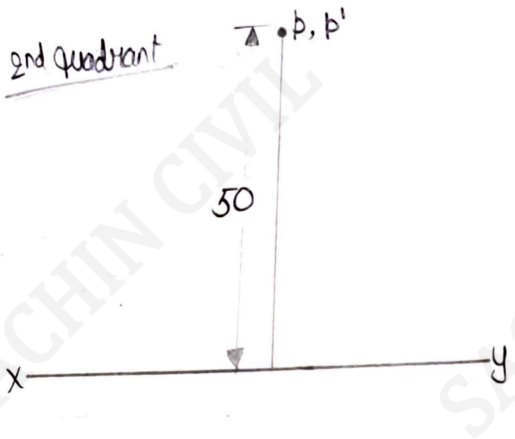


Q// A point P is 50mm from both the reference planes. Draw its projections in all possible positions.

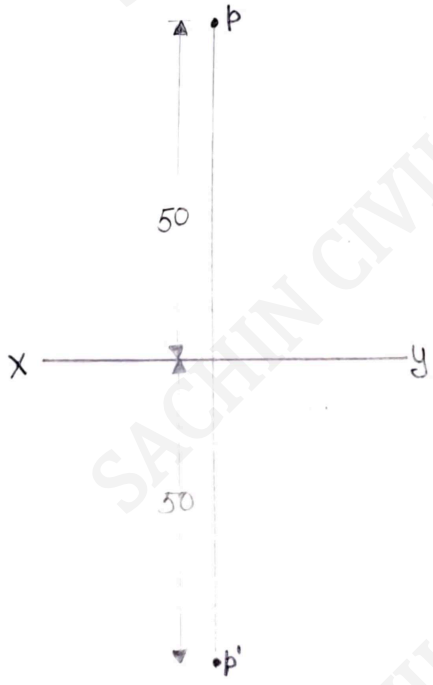
1st quadrant:

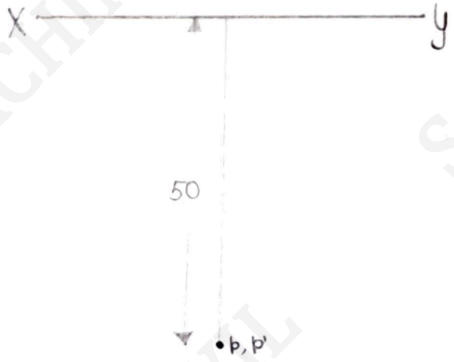


2nd quadrant



3rd quadrant





* Importants notes :-

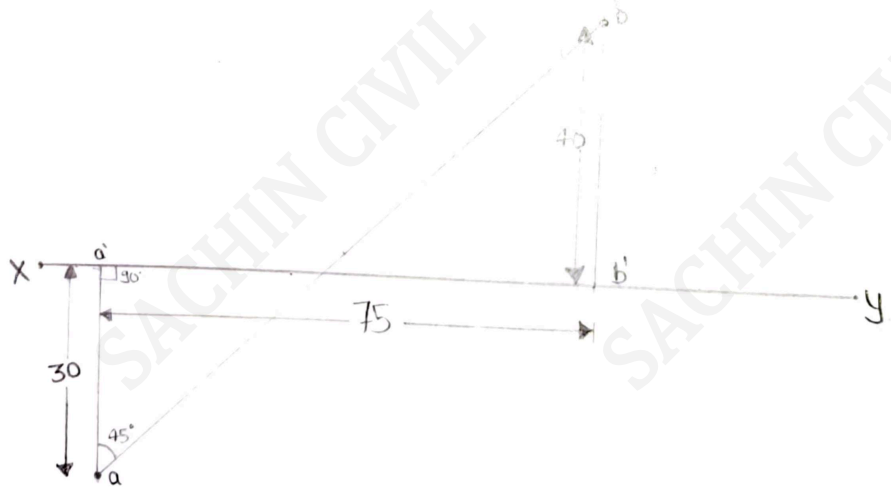
HP ⟶ FV (a' b' c' . . . .)

1. Above the HP ⟶ Above the xy line.
2. Below the HP ⟶ Below the xy line.
3. On the HP ⟶ On the xy line.

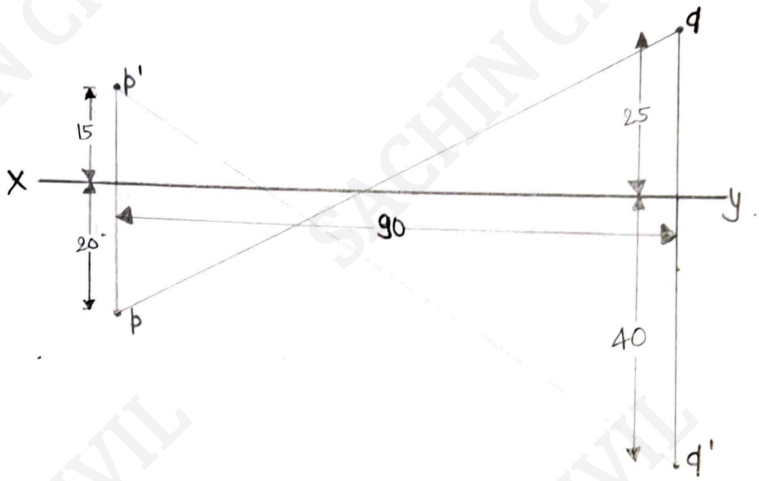
VP ⟶ T.V (a, b, c . . . .)

1. In front of VP ⟶ Below the xy line.
2. Behind the VP ⟶ Above the xy line.
3. On the VP ⟶ On the xy line.

Q/ Two points A and B are in the H.P. The point A is 30mm in front of the VP, while B is behind the V.P. The distance between their projections is 75mm and the line joining their top views makes an Angle of 45° with xy. Find the distance of the point B from the V.P.



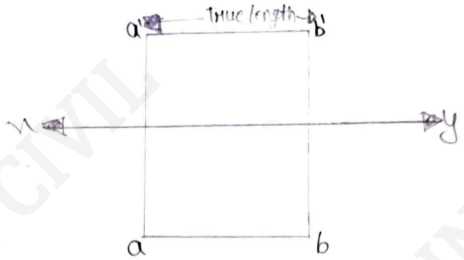
Q/ A point P is 15 mm above the HP and 20 mm in front of the VP. Another point Q is 25 mm behind the V.P and 40 mm below the H.P. Draw projections of P and Q keeping the distance between their projectors equal to 90 mm. Draw straight lines joining (i) their top views and (ii) their front views.



Q/ A point 'Q' is 30 mm above the HP and 25 mm behind the V.P Draw its Projection.

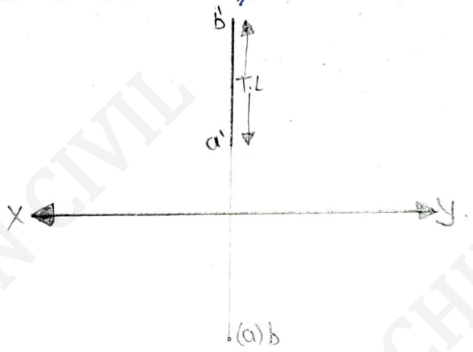
* Projection of line :—

Case :- (i) Line parallel to both Reference plane (xy Line).

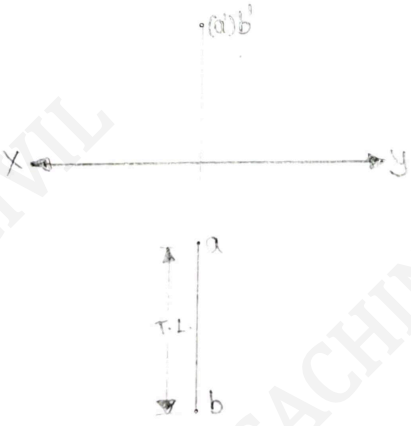


(ii) Line perpendicular (⊥) to one and parallel (//) to other reference plane.

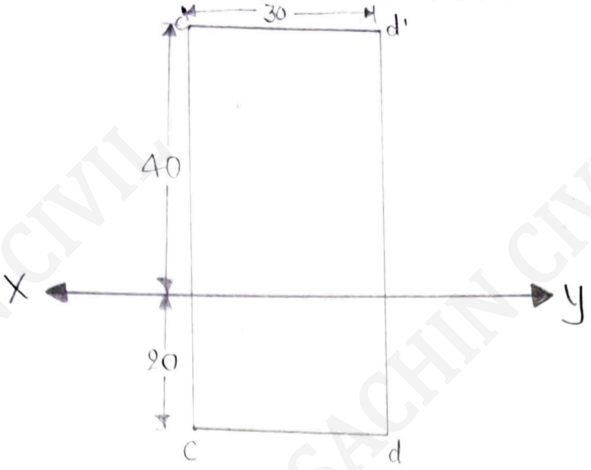
(a) Line ⊥ to HP and // to VP.



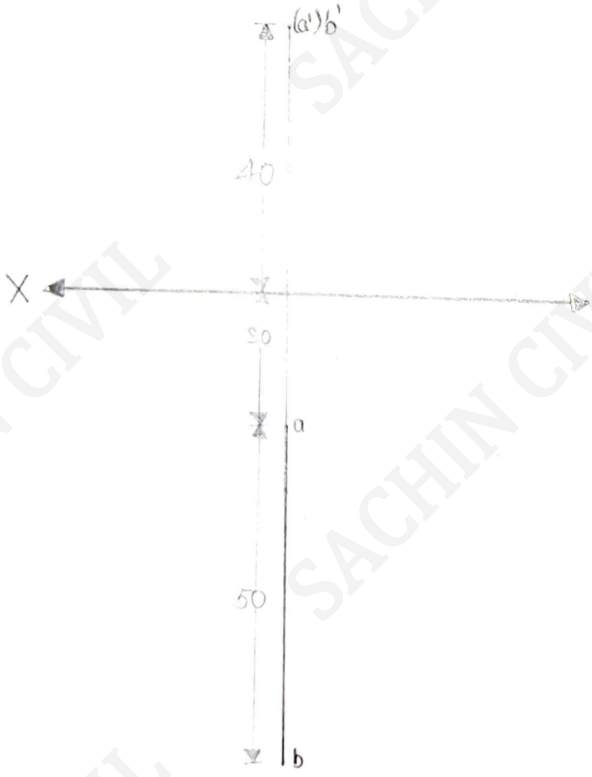
(b) Line ⊥ to VP and // to HP.



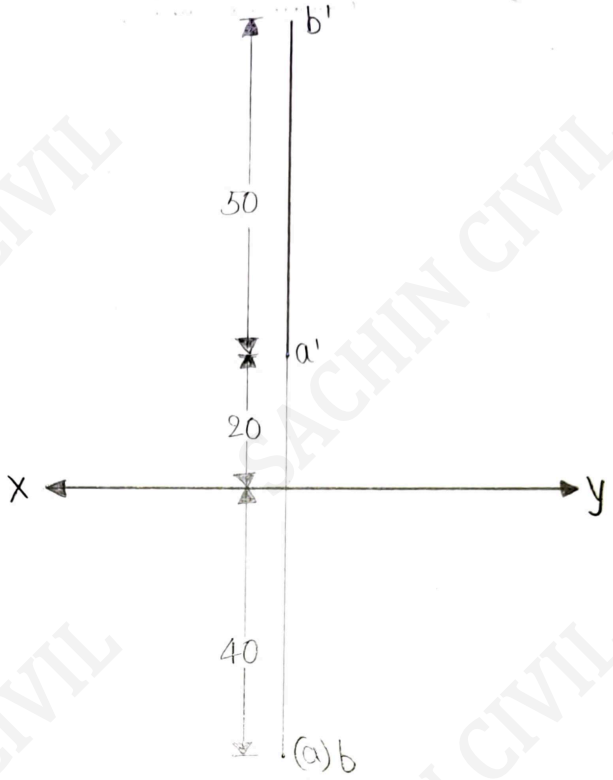
Q// A line CD 30mm long is parallel to both the plane. The line is 40mm above H.P and 20mm in front of V.P. Draw its projection.



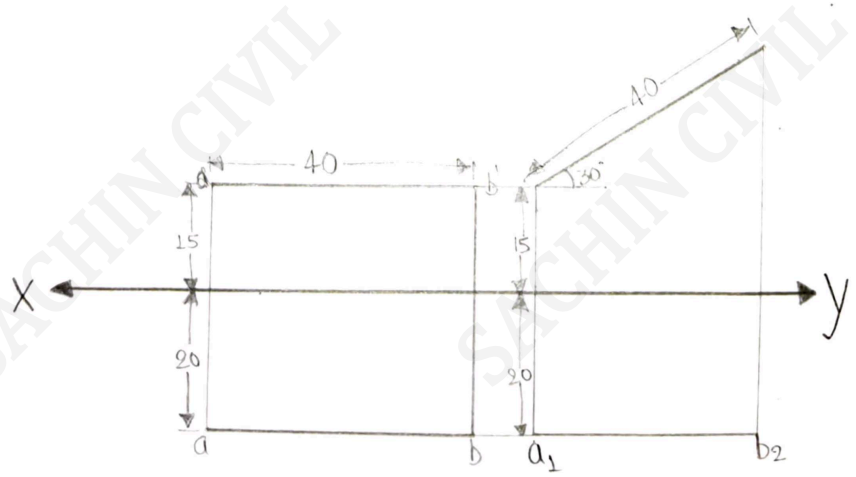
Q// A line AB 50mm long in perpendicular to V.P and parallel to H.P. Its end A is 20mm in front of V.P and the line in 40mm above H.P Draw the projections of the line.



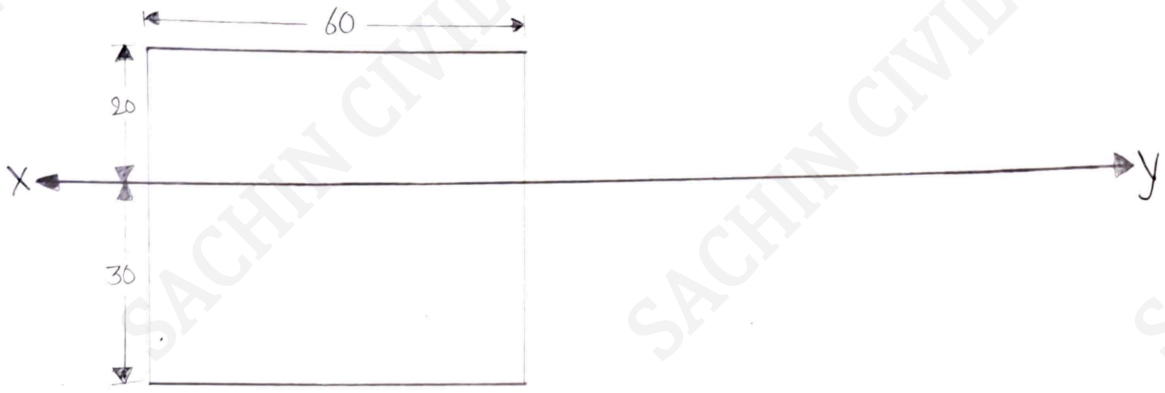
Q// A line AB 50mm long is perpendicular to H.P and Parallel to V.P. Its end A is 20 mm above the H.P and the line in 40 mm in front of V.P. Draw the projection of the line.



Q// A line AB 40 mm long is parallel to V.P and inclined at an angle of 30° to H.P. The end A is 15 mm above H.P and 20mm in front of V.P. Draw the projections of the line.

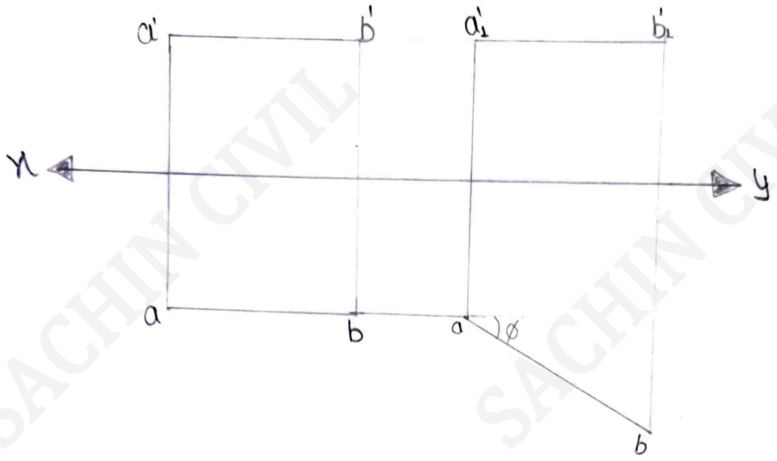


Q// Draw the projections of straight line AB 60 mm long parallel to H.P and inclined at an angle of 40° to V.P. The end A is 20 mm above H.P and 30 mm in-front of V.P.

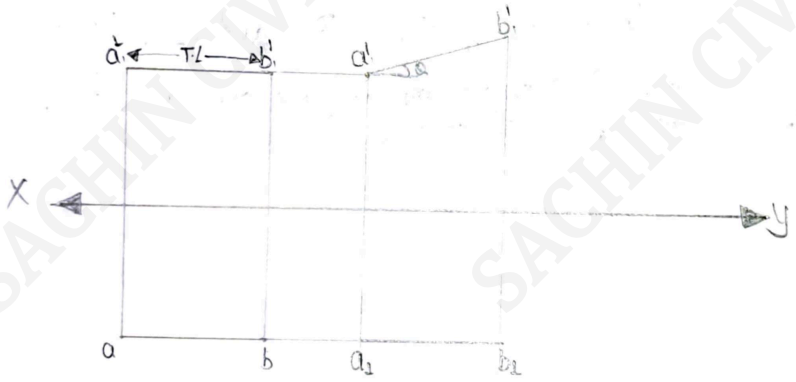


Case:-> (iii) Line parallel (//) to one and inclined to other ref-plane

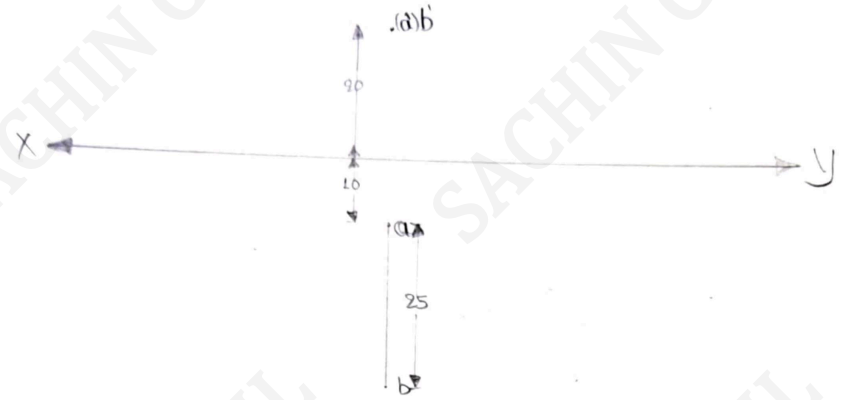
(a) Line // to HP and $\angle\phi$ to V.P.



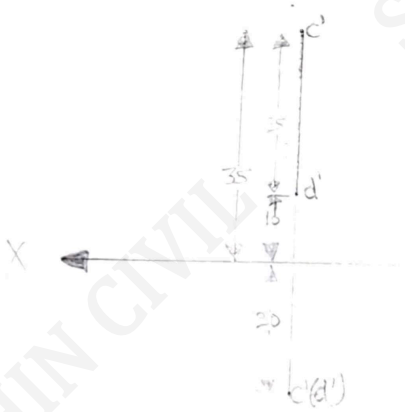
(b) Line // to V.P and $\angle\theta$ to H.P.



Q// A line AB 25 mm long is parallel to H.P and ⊥ to V.P. The end is 10 mm infront of V.P and the line is 20 mm above the H.P Draw its Projection.

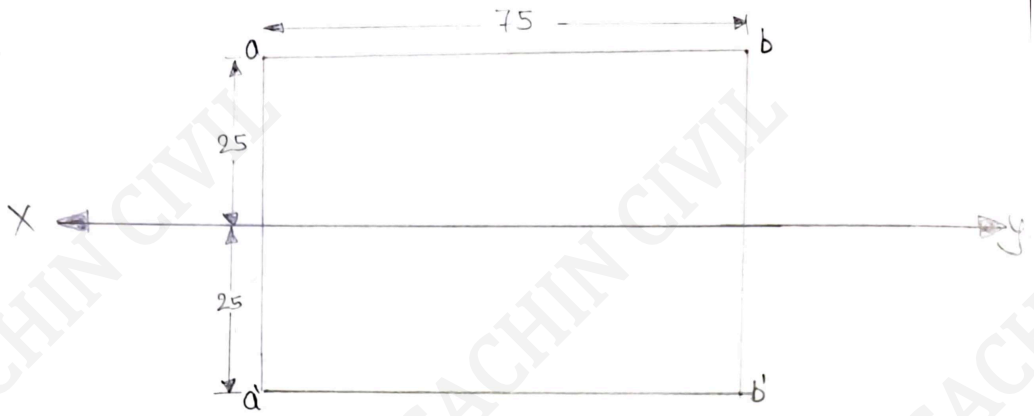


Q// A line CD 25 mm long is // to VP and ⊥ to HP. End C is 35 mm above the H.P and 20 mm infront of V.P. end D is 10 mm above the H.P. Draw its Projection.

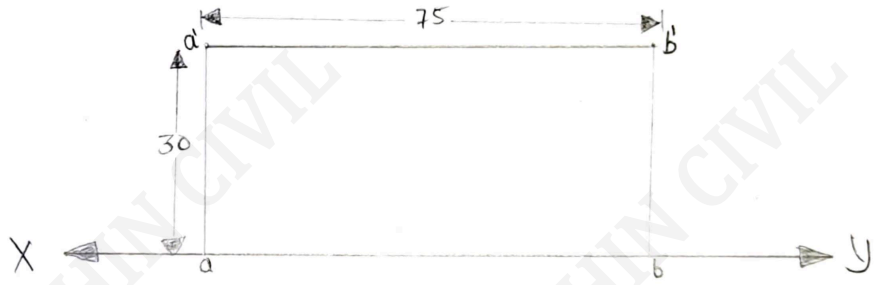


Q) Draw the projections of a 75 mm long straight line, in the following positions

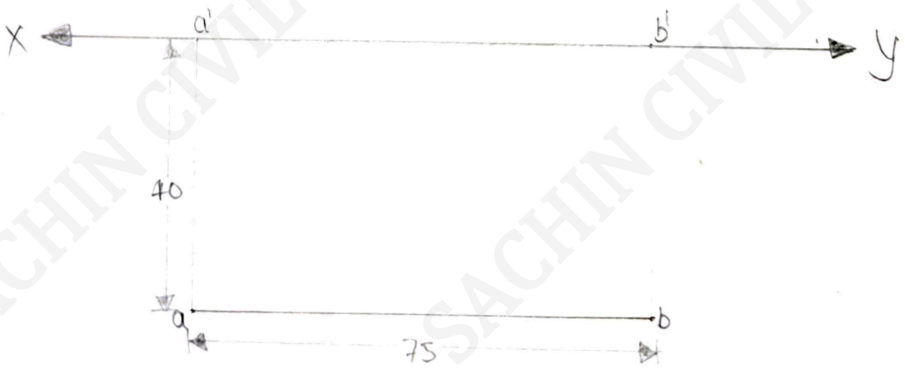
ⓐ Parallel to both the H.P and V.P and 25 mm from each.



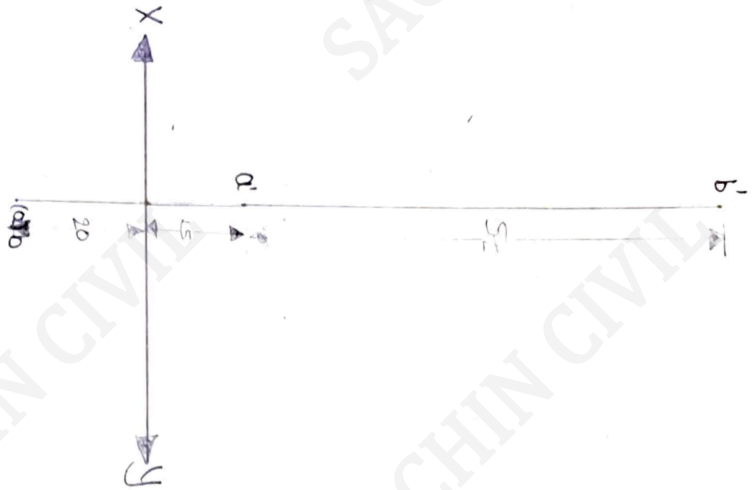
ⓑ // to and 30 mm above the H.P and in the V.P.



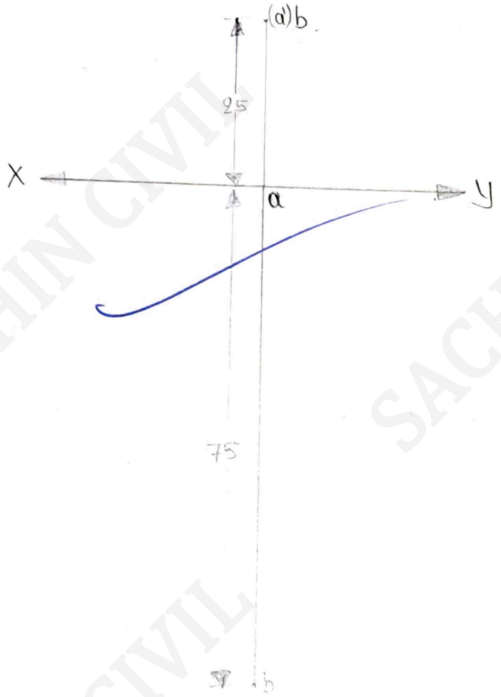
ⓒ // to and 40 mm in front of the VP and in the H.P.



(d) ⊥ to H.P 20mm infront of the V.P and its one end 15mm above the H.P.

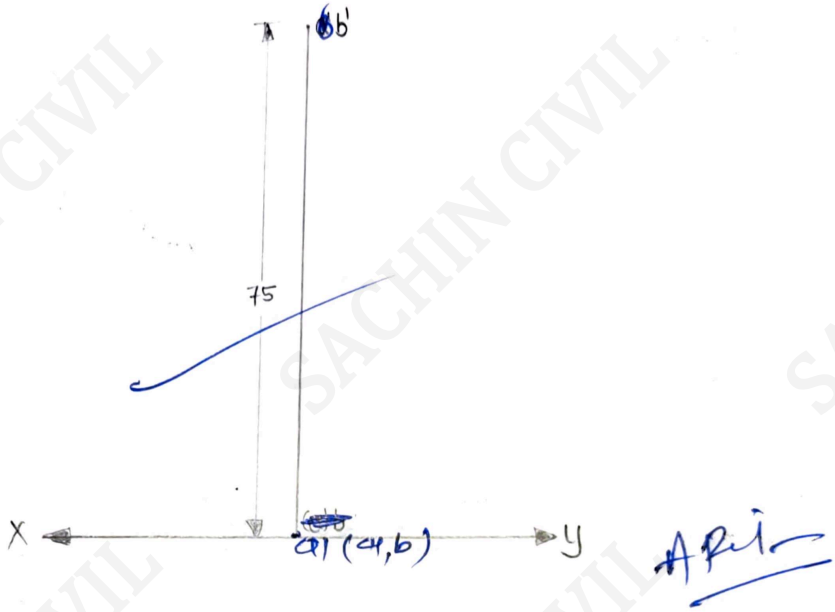


(e) ⊥ to V.P and 25mm above the H.P and its one end in the V.P.

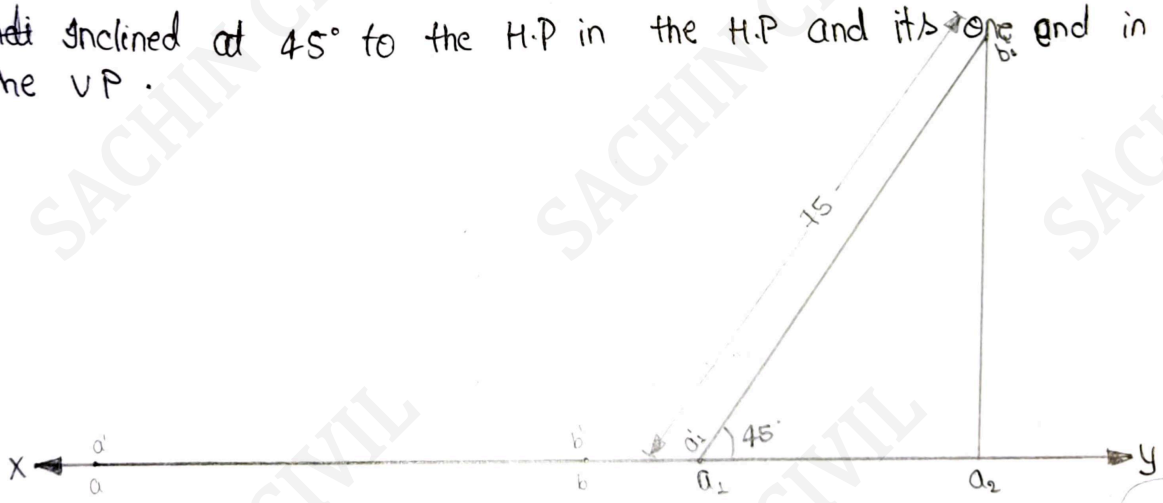


(f) ~~⊥ to the H.P in the VP and its one end in the H.P.~~

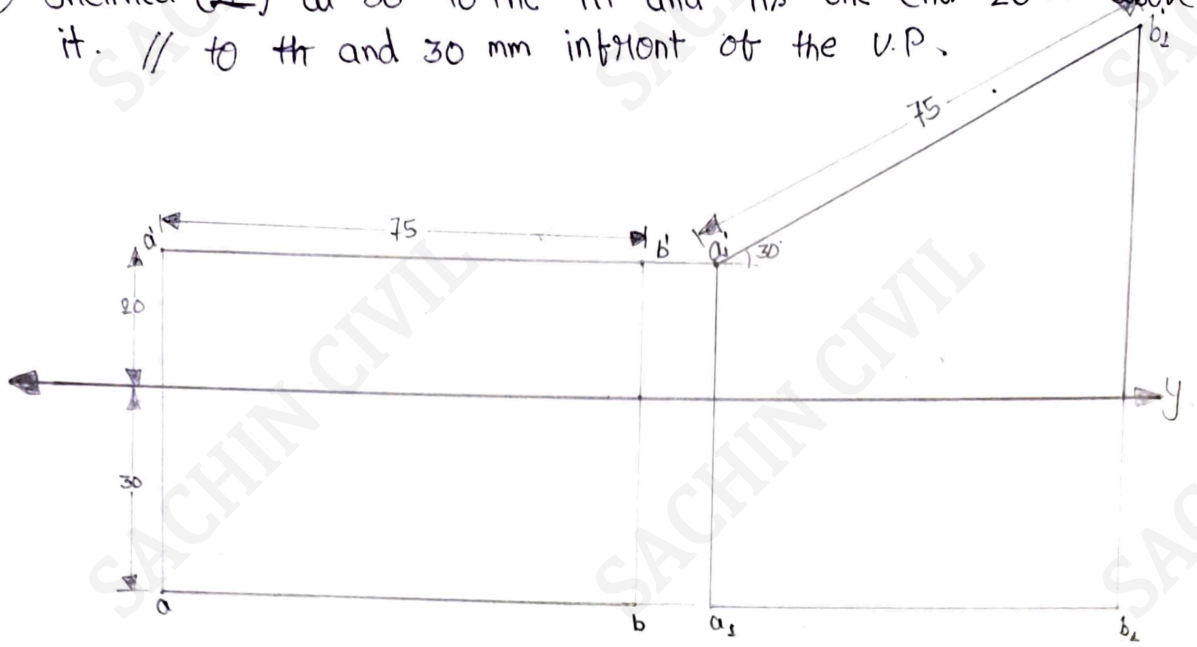
(f) ⊥ to the H.P in the V.P and its one end in the H.P.



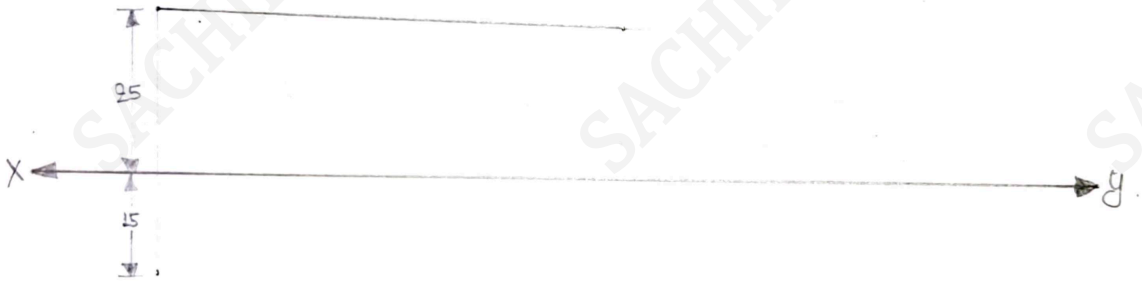
(g) ~~indi~~ Inclined at 45° to the H.P in the H.P and its one end in the V.P.



(h) Inclined (∠) at 30° to the HP and its one end 20 mm above it. // to th and 30 mm infront of the V.P.



(i) ∠ at 60° to the VP and its one end its one end 15 mm infront of it. Parallel (//) to and 25 ram above the H.P.



Case-4

Line inclined to both H.P and V.P.

* Master Diagram.

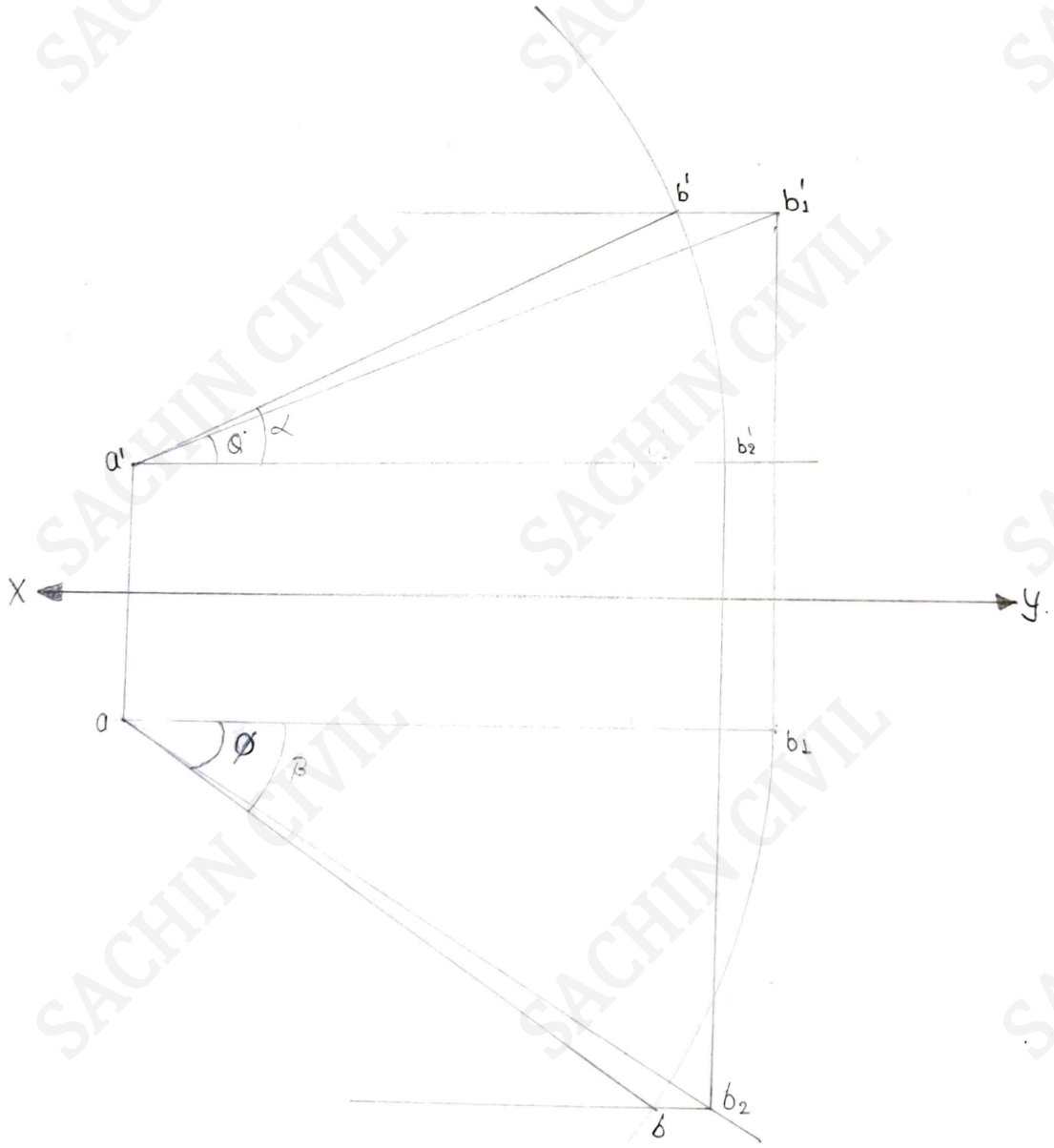
$H.P = \theta$

$V.P = \phi$

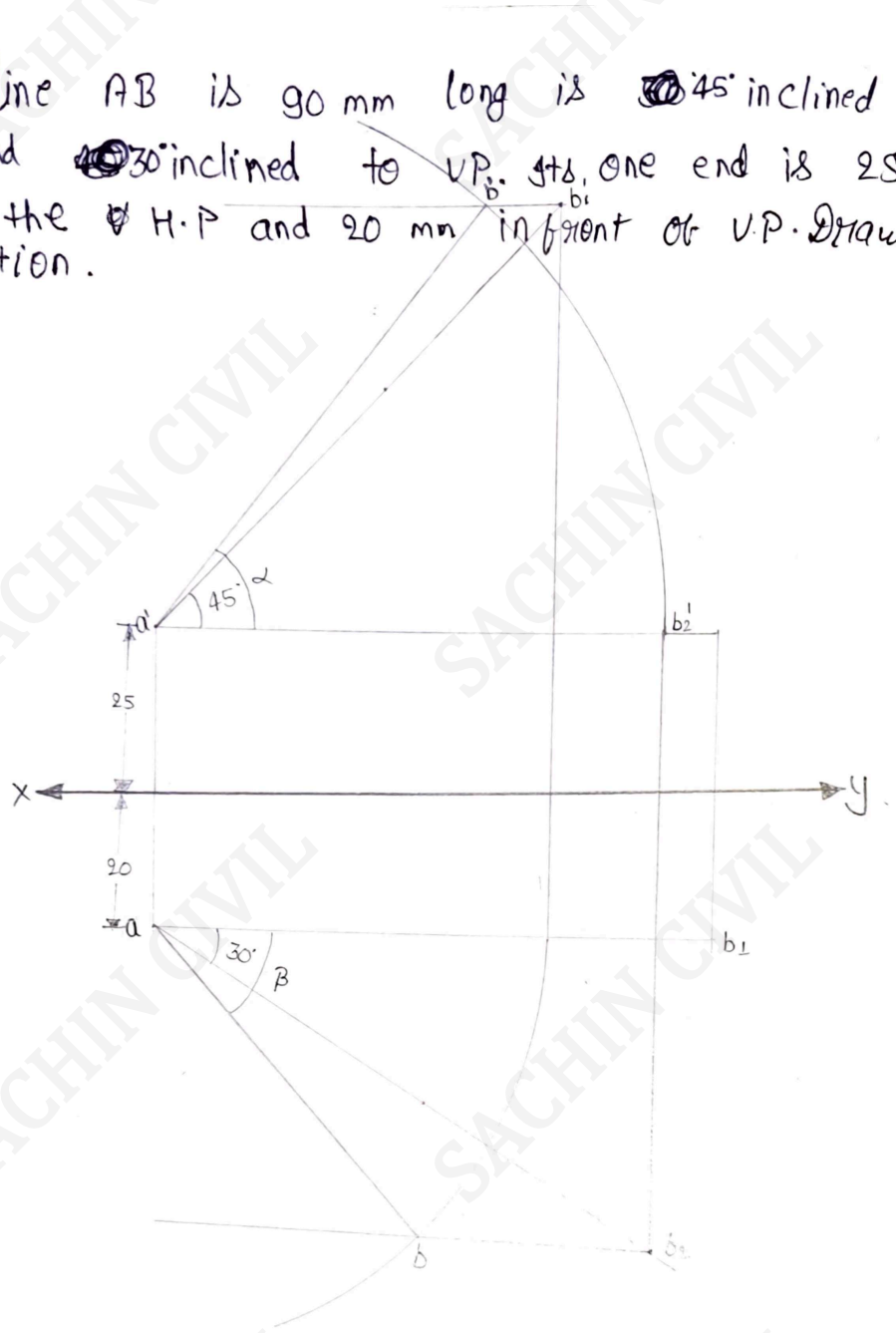
$\alpha \geq \theta$

$\beta \geq \phi$

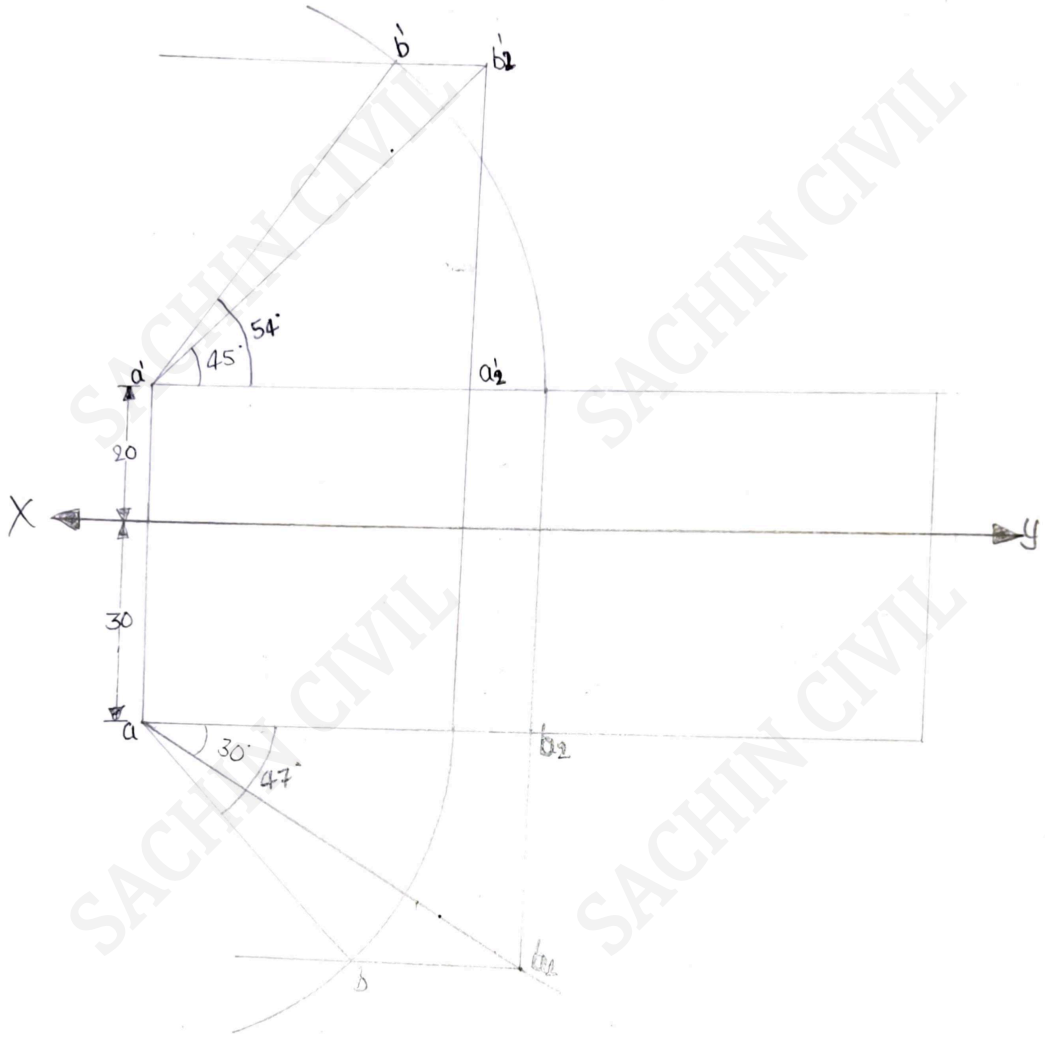
$\theta + \phi \leq 90^\circ$



Q// A line AB is 90 mm long is 45° inclined to HP and 30° inclined to VP. Its one end is 25 mm above the H.P and 20 mm in front of V.P. Draw its Projection.



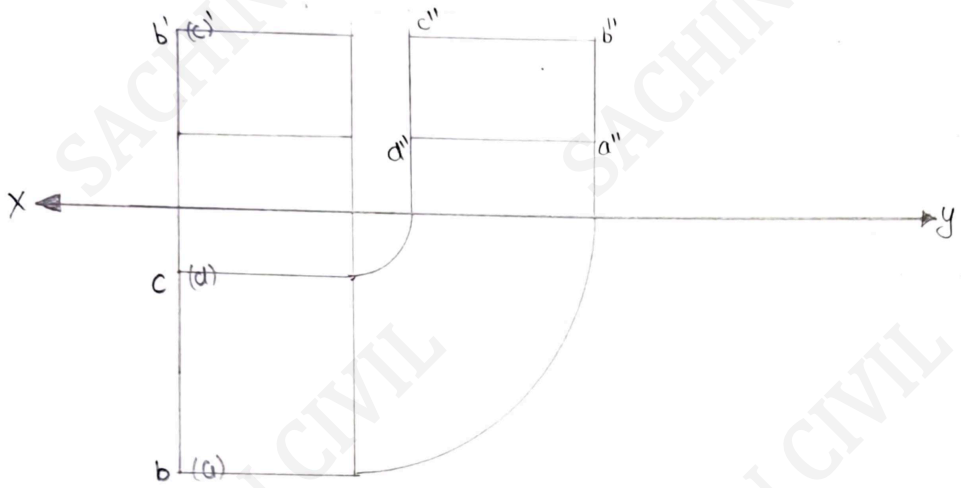
Q// A 70 mm long line AB has its end P 20 mm above the H.P and 30 mm infront of the V.P. The line inclined at 45° to the H.P and 30° to the V.P. Draw its projection.



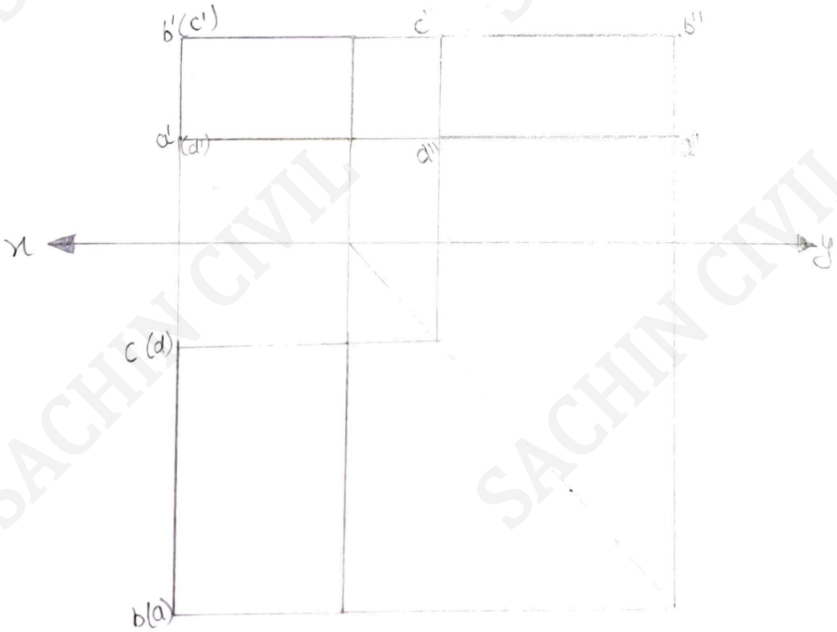
Projection of Plane

Case 1 . Plane perpendicular to both.

1st method

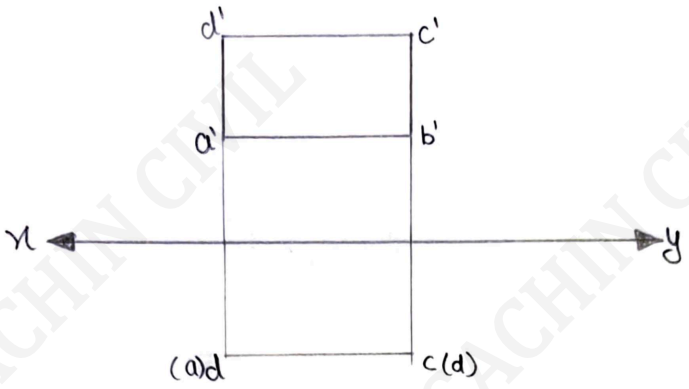


2nd method

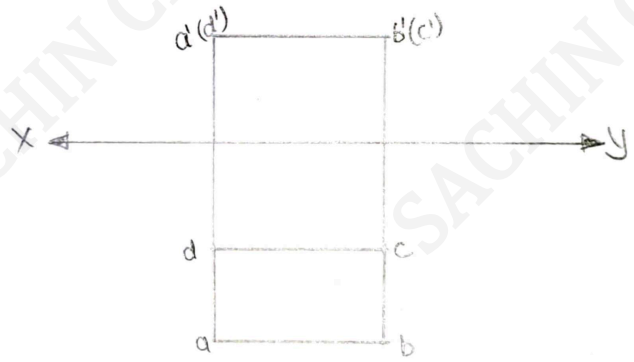


Case-2 → Plane perpendicular to one and // to other.

(a) Plane ⊥ to H.P and // to V.P.

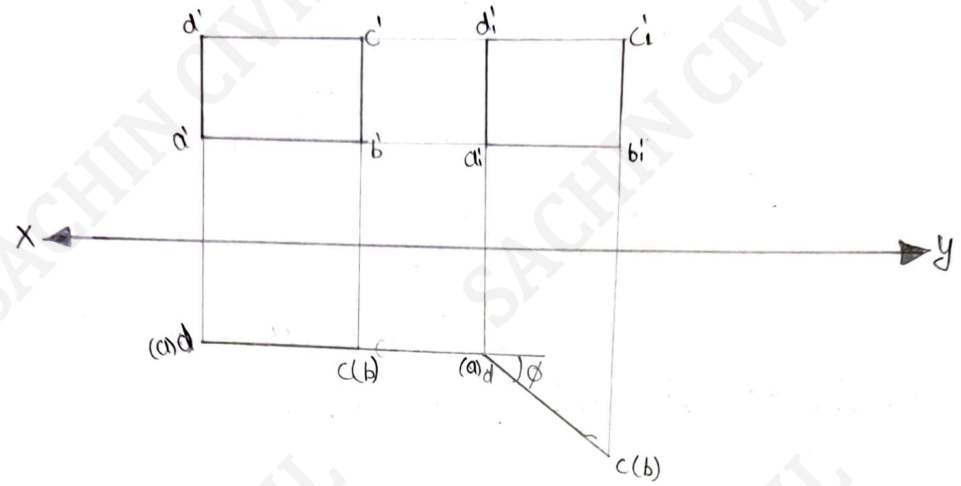


(b) Plane ⊥ to VP and // to H.P.

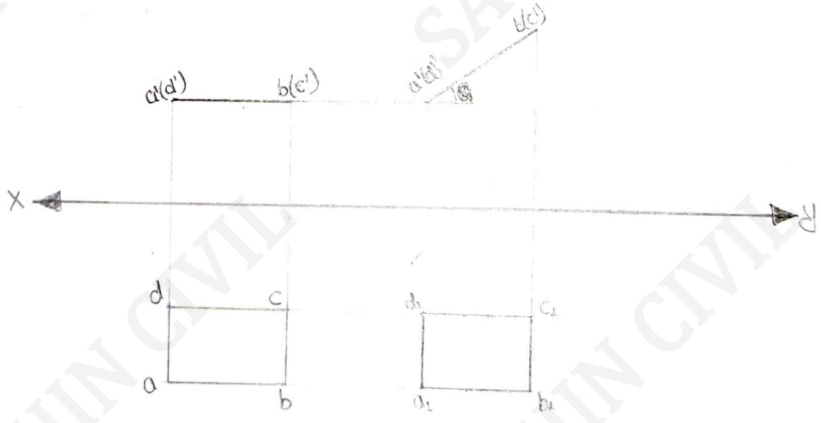


Case-3 → Plane ⊥ to one and inclined to other.

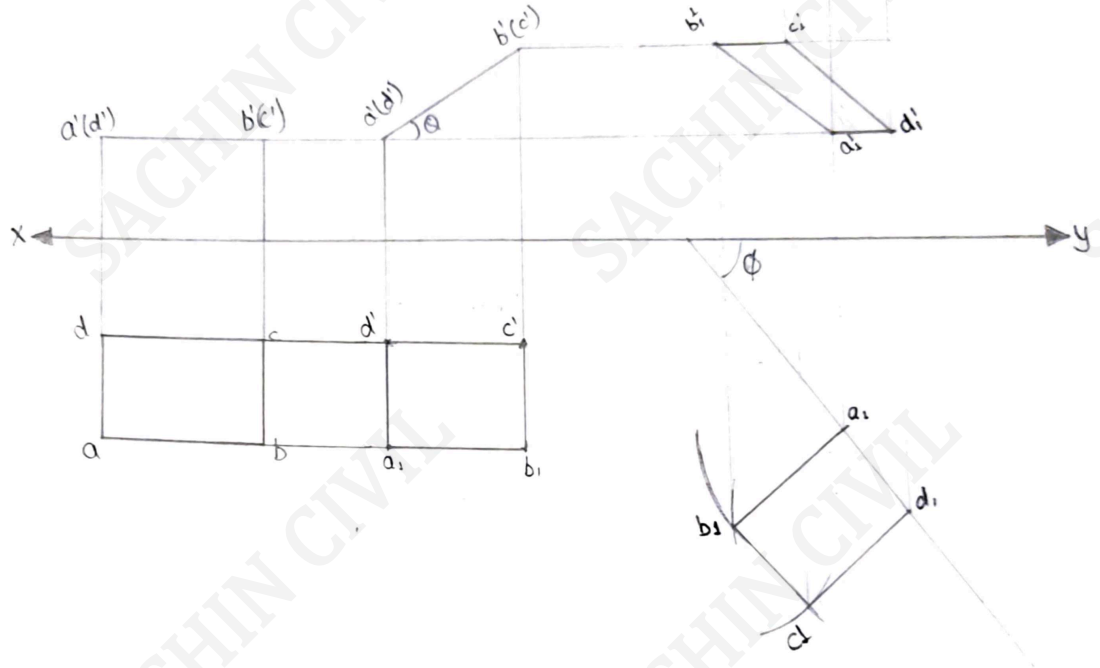
(a) Plane ⊥ to H.P and ∠ø to V.P.



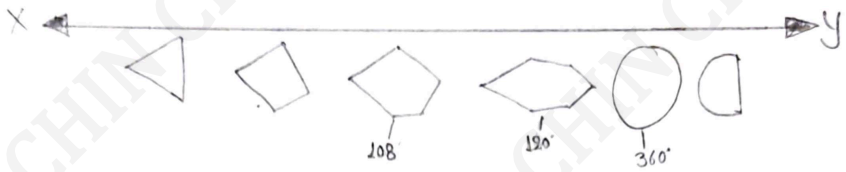
(b) Plane ⊥ to V.P and ∠ø to H.P.



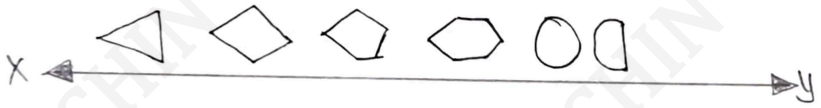
Case - 4 → Plane inclined to both H.P and V.P.



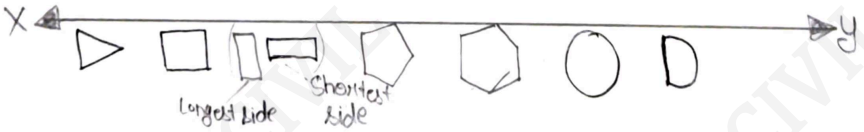
* 1. If it is given that corner or point is in the H.P then the starting diagram will be :—



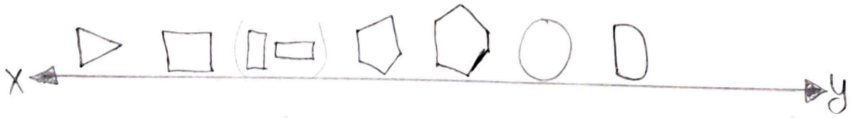
* 2. If it is given that corner or point is in the H.P then the starting diagram will be :—



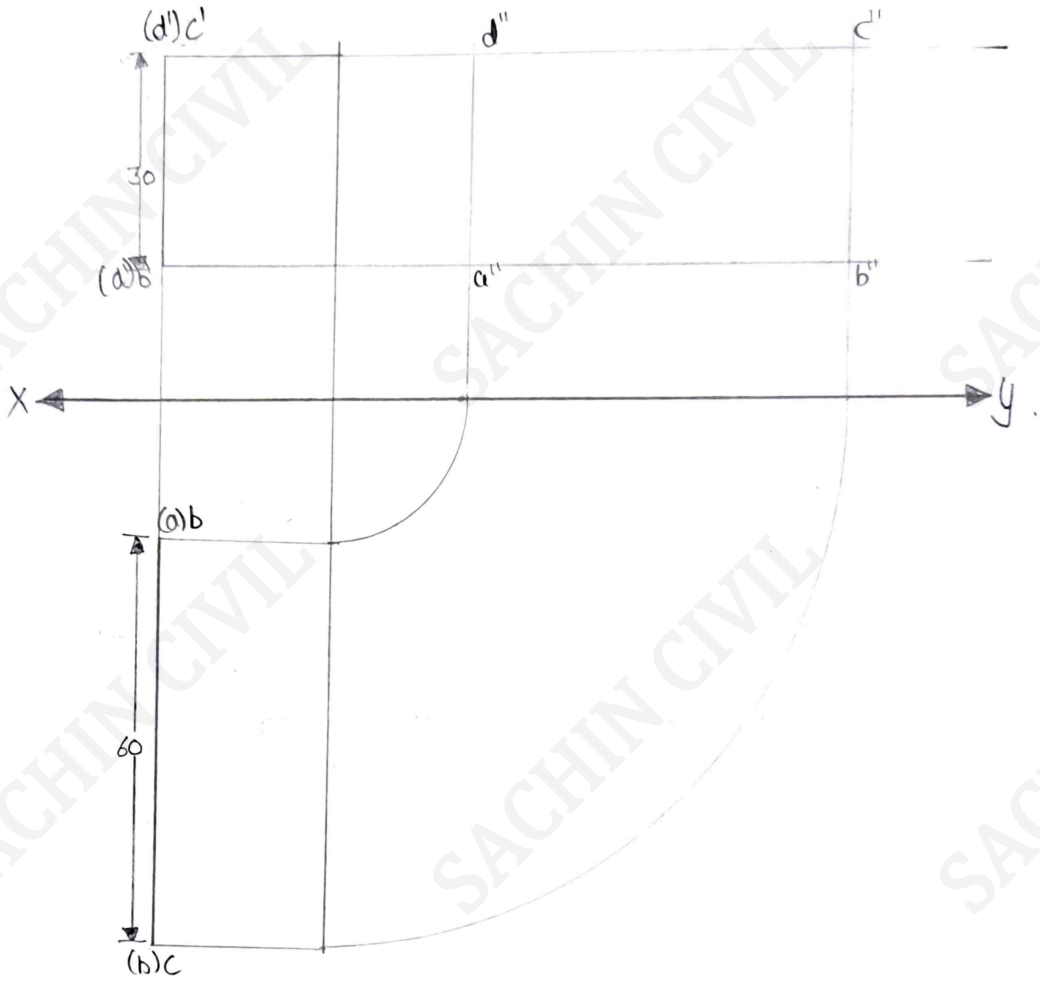
* 3. If it is given that side, face, and line on the H.P then the starting diagram will be.



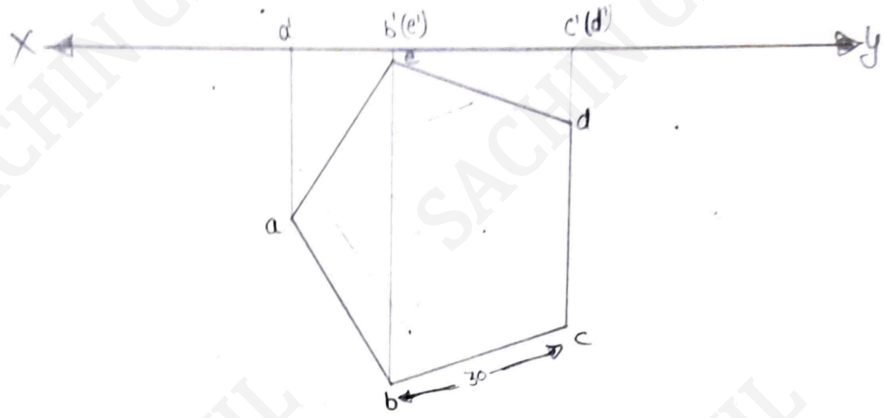
* 4. If it is given that side, face and line on the V.P then the starting diagram will be.



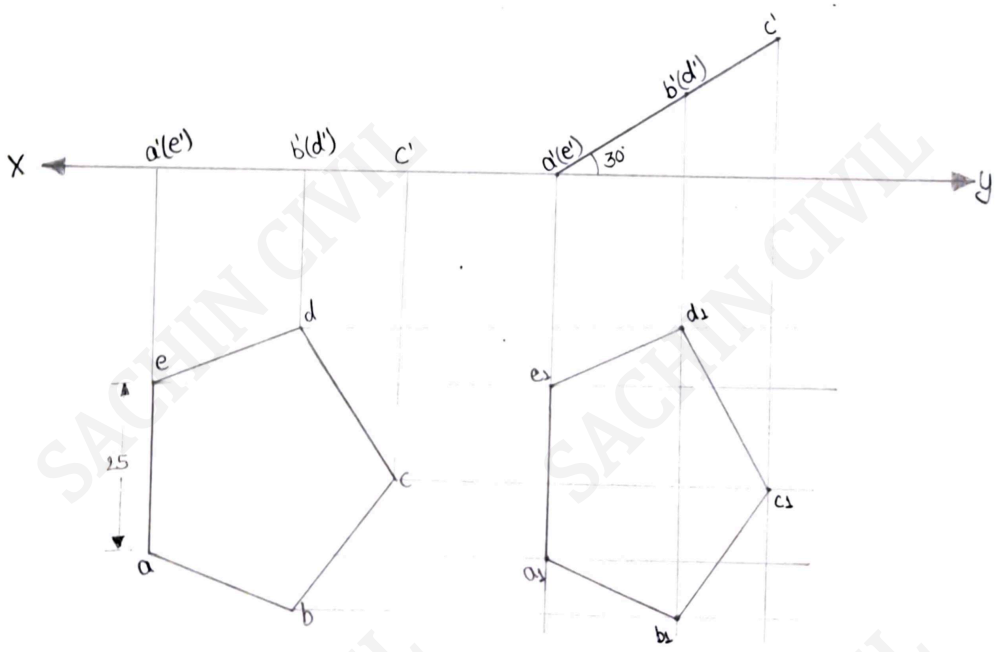
Q// A Rectangle of 60 mm x 30 mm is ~~per~~ ⊥ to both HP and V.P. Draw its projection.



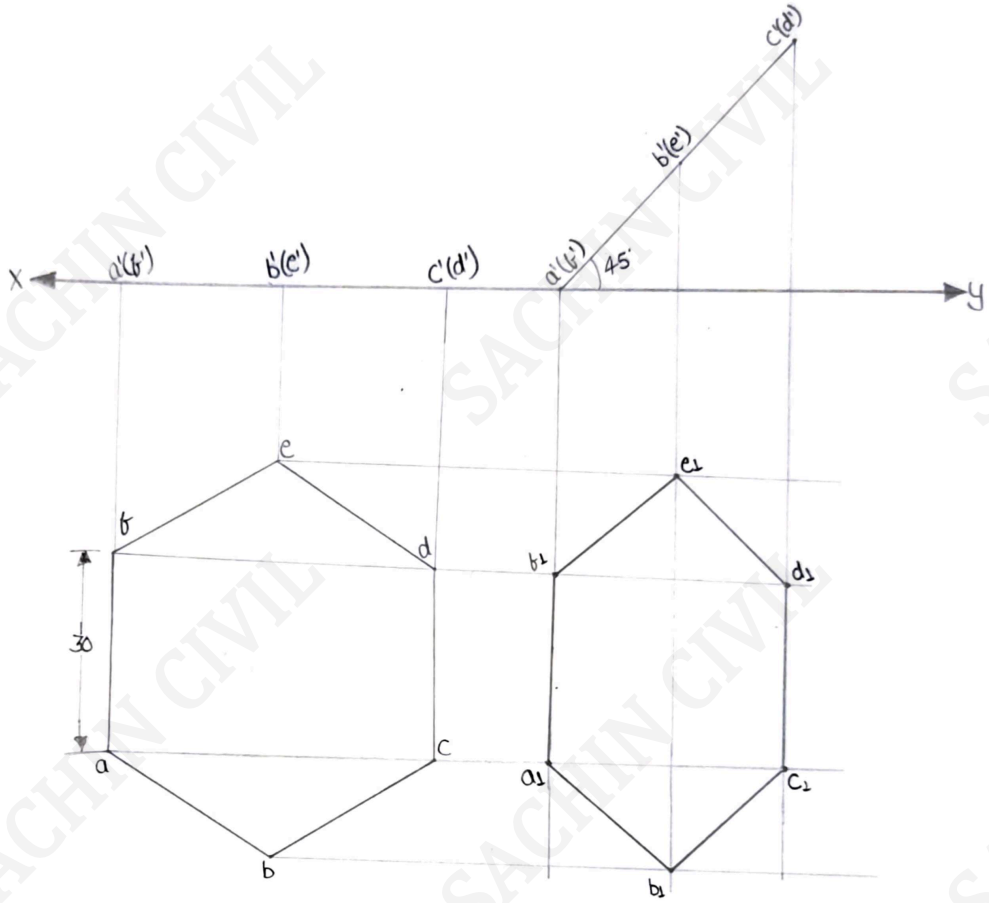
Q// A pentagone of side 30 mm, in its corner on the H.P ⊥ to V.P and // to H.P. Draw its Projection.



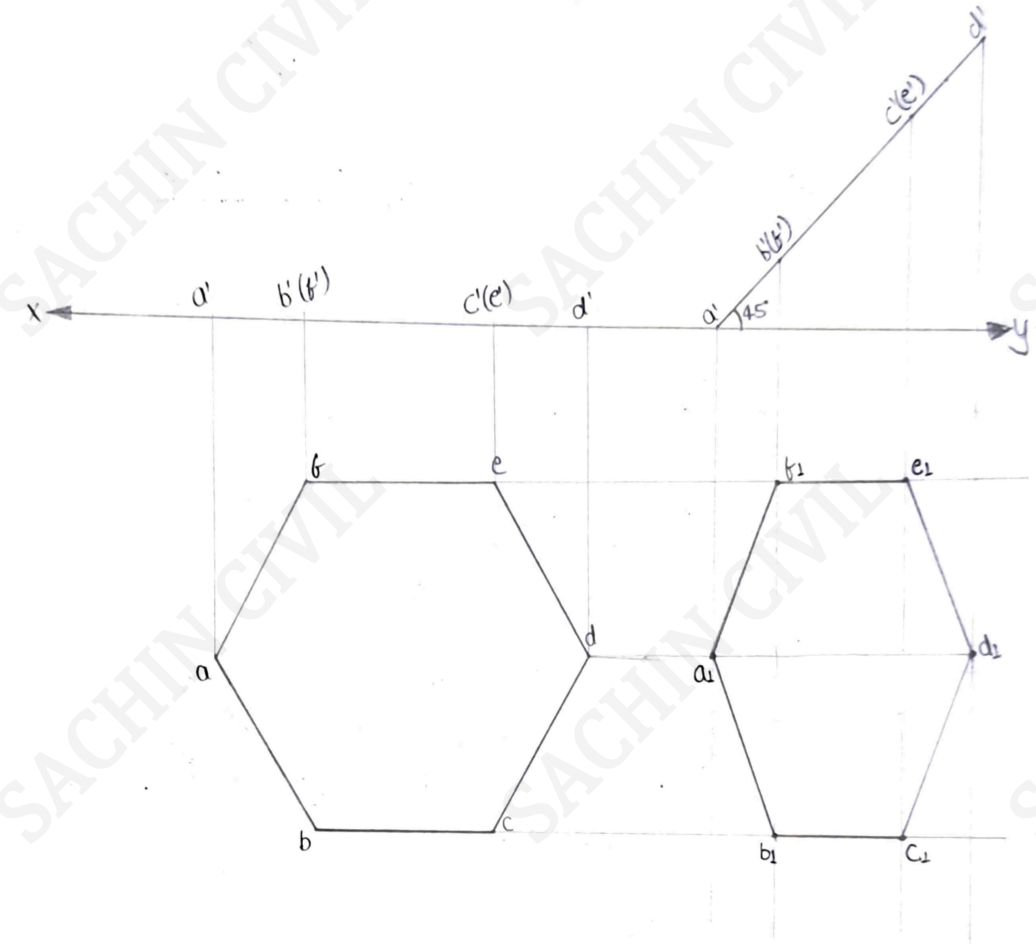
Q// A regular pentagon of 25 mm side, has one side in the H.P its plane is inclined at an angle of 30° to the H.P ⊥r to V.P. Draw its projection.



Q// A hexagonal plane of side 30mm has an edge on the H.P The surface is inclined at 45° to the H.P and ⊥ to the V.P Draw its projection.

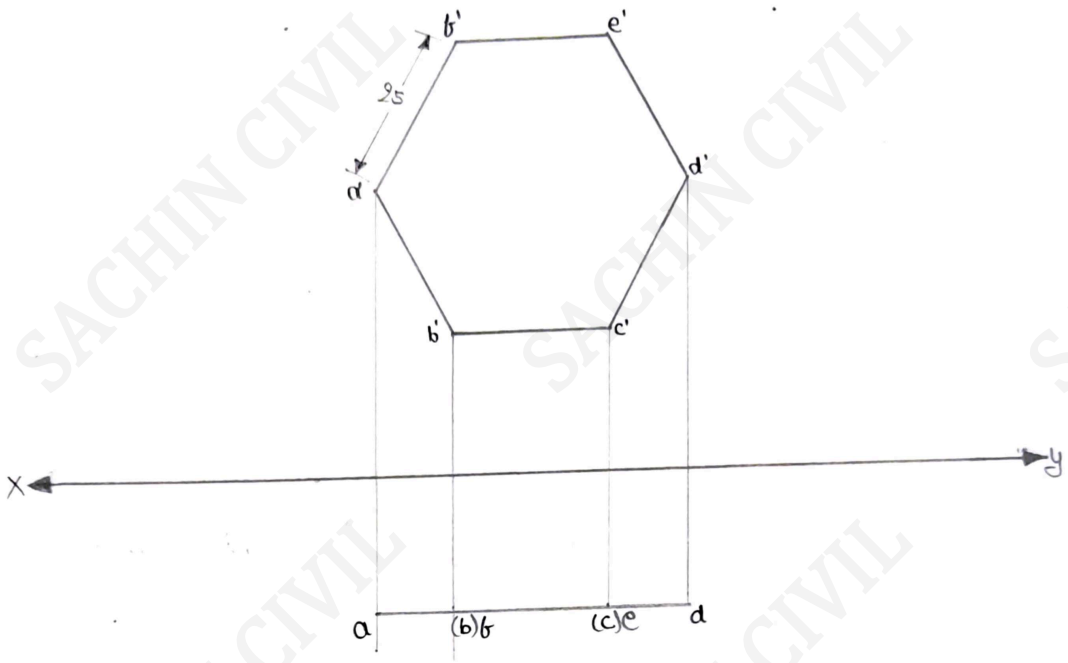


Q// A hexagonal plane of side 30 mm has a corner on the H.P its surface is inclined at 45° to the H.P and ⊥ to the V.P. Draw its projection.

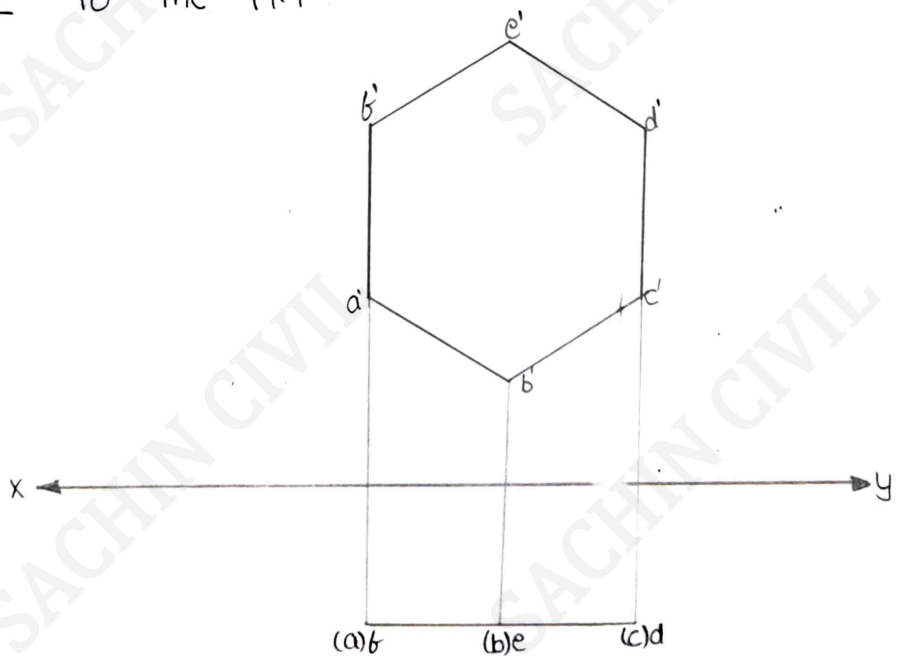


Q// A hexagonal plane of side 25 mm has its surface // to and 20 mm infront of V.P Draw its projections, when a side is ...

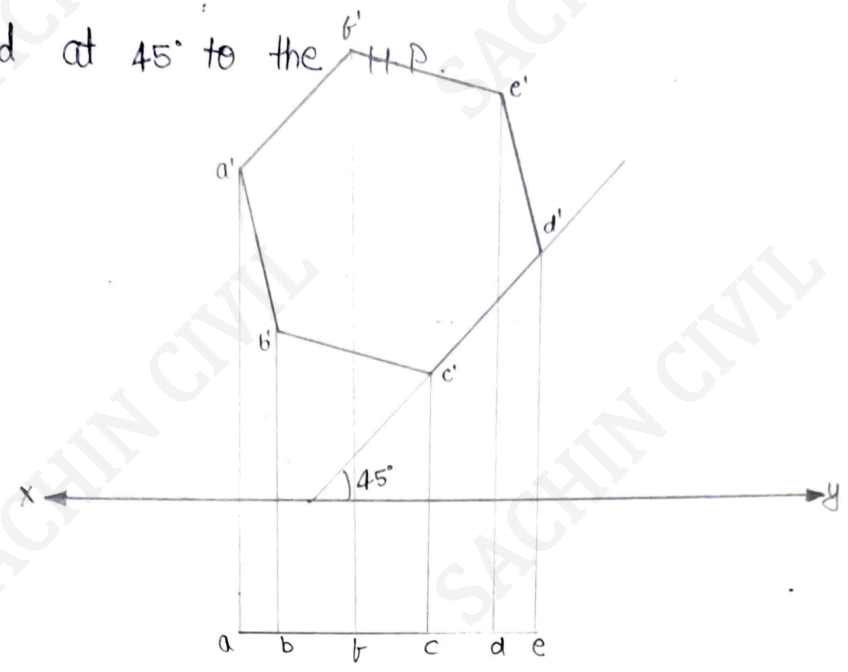
(a) // to H.P.



(b) ⊥ to the H.P

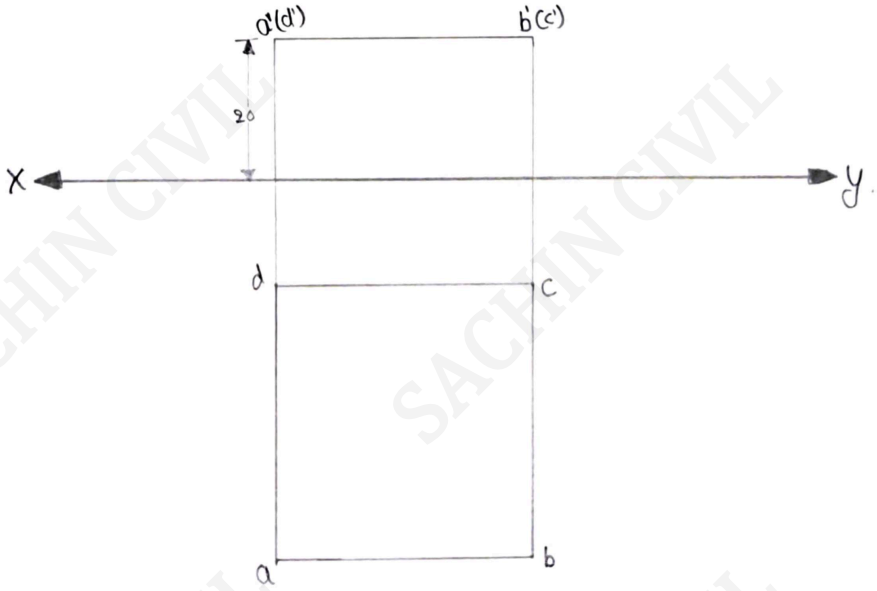


© Inclined at 45° to the H.P.

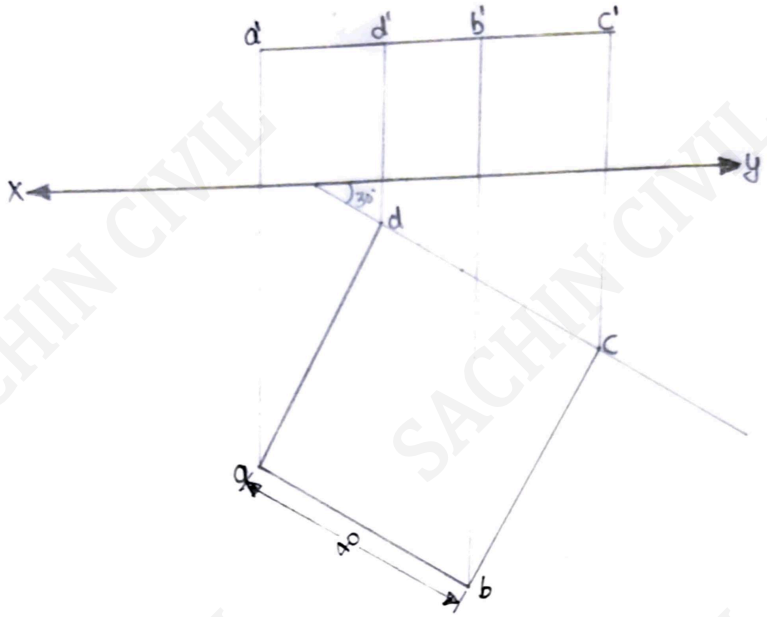


Q// A square plane of side 40mm has its surface // to and 20 mm above the H.P. Draw its projection when a side is.

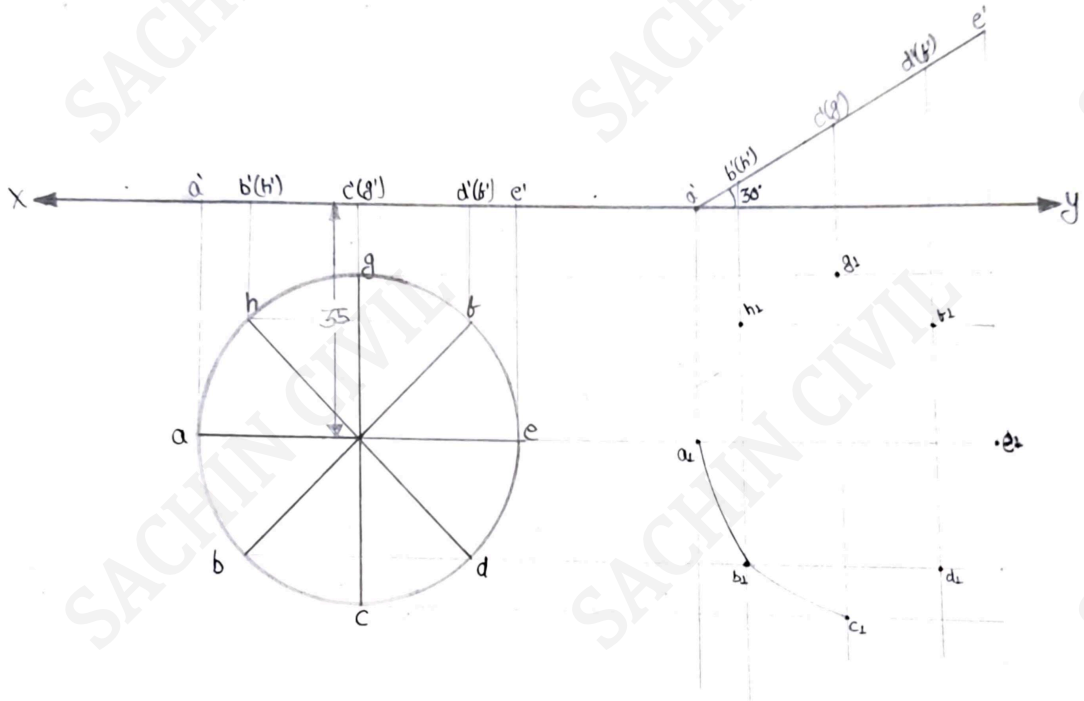
(a) // to the V.P.



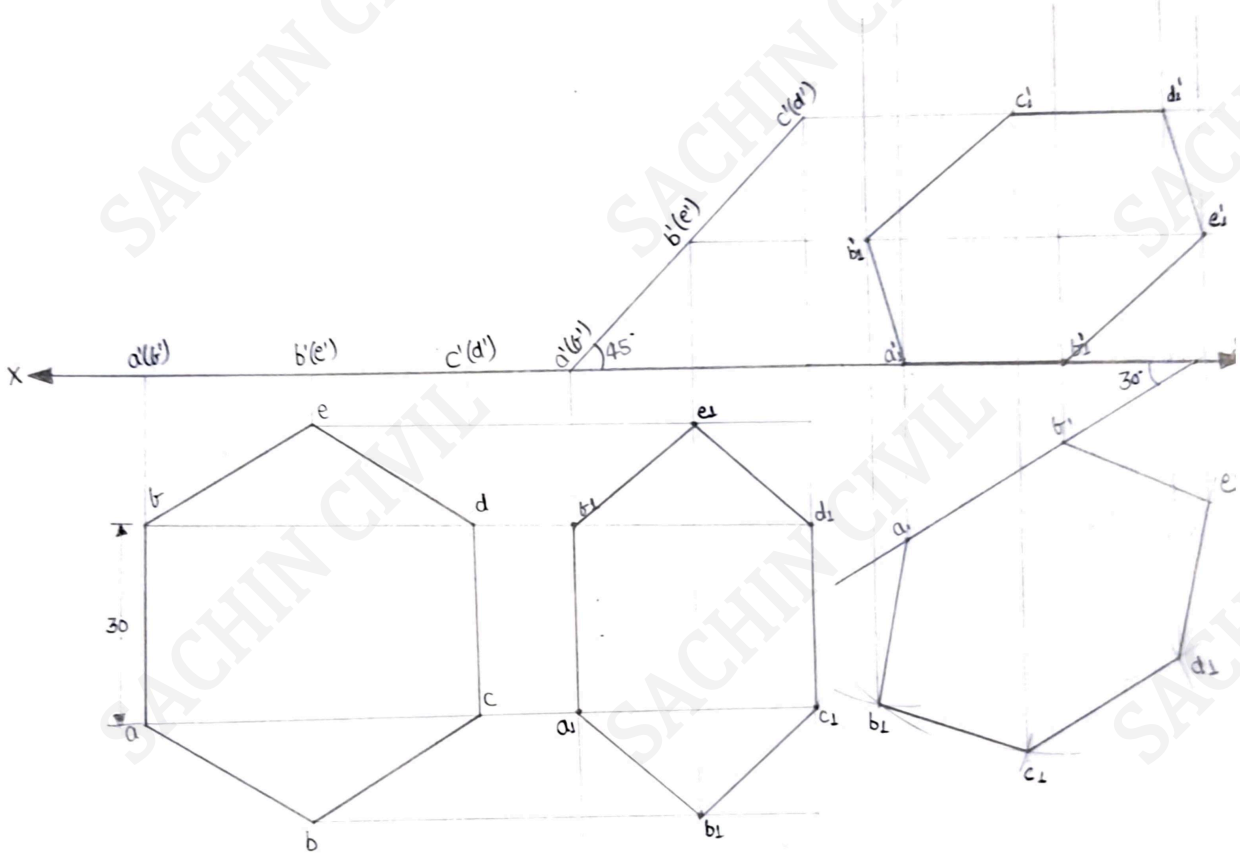
(b) one side is inclined at 30° to the V.P.



Q/ A circular plane of dia 50 mm is resting on a point of the circumference on the H.P the plane is inclined at 30° to the H.P and its centre is 35 mm infront of the V.P Draw its projections.



Q// A hexagonal plane of side 30 mm has an edge on the H.P its surface is inclined at 45° to the H.P and the edge on which the plane rests is inclined at 30° to the V.P. Draw its Projections.



Projection of Solid

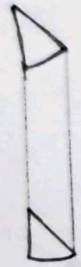
Solid :→ 3D (L. B. H)

- Poly
  - (i) Prism
  - (ii) Pyramid.
- Revolution of Plane

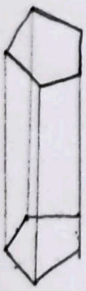
(i) Prism

(a)

(b)



(c)



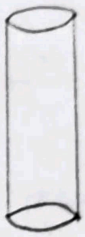
(ii) Pyramid.

(a)

(b)

(c)

Revolution of Plane



Cylinder

Cone
(Frustum of cone)

Sphere

* Orientation of solid :-

(i) Axis ⊥ to H.P

(ii) Axis ⊥ to V.P

(iii) Axis // to H.P and V.P (i.e. Axis ⊥ to Profile Plane)

(iv) Axis ∠θ to H.P and // to V.P.

(v) Axis ∠ϕ to V.P and // to H.P.

(vi) Axis inclined to both H.P and V.P.

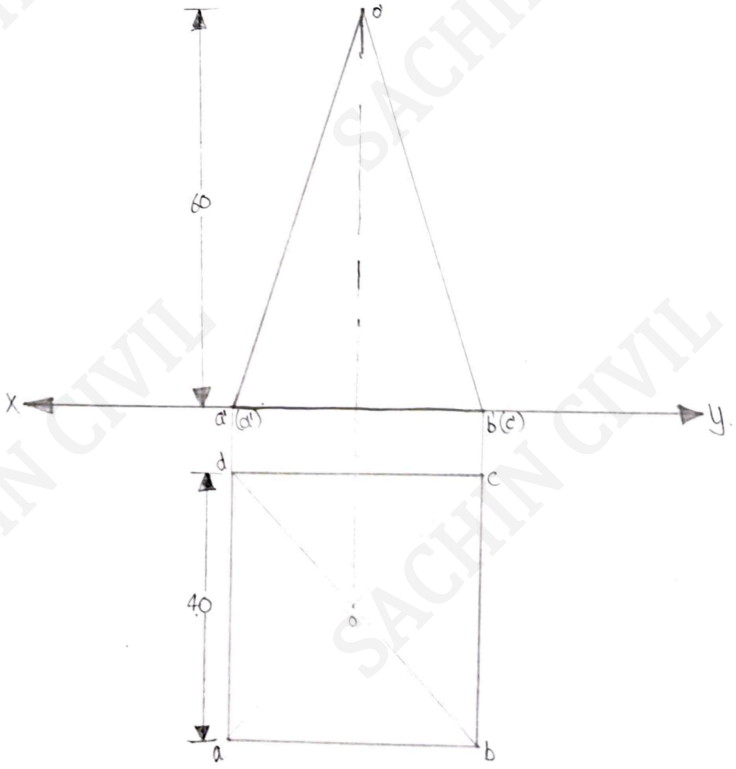
Q/ A square pyramid of base side 40 mm and axis 60 mm is resting on its base on the H.P. Draw its Projection where,

(a) A side of the base is // to the V.P.

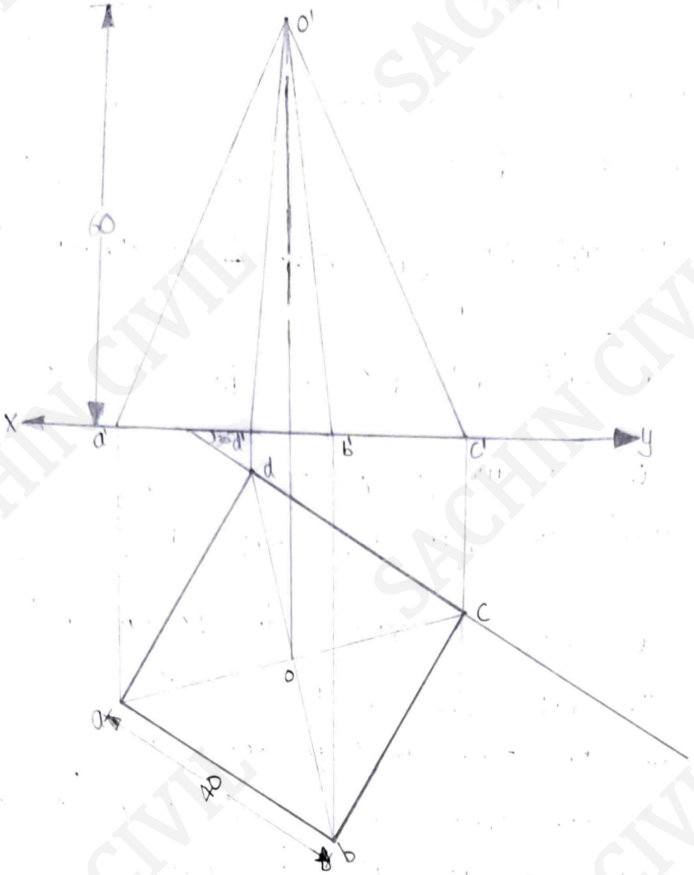
(b) A side of the base is inclined at 30° to the V.P.

(c) All the sides of the base are equally inclined to the V.P.

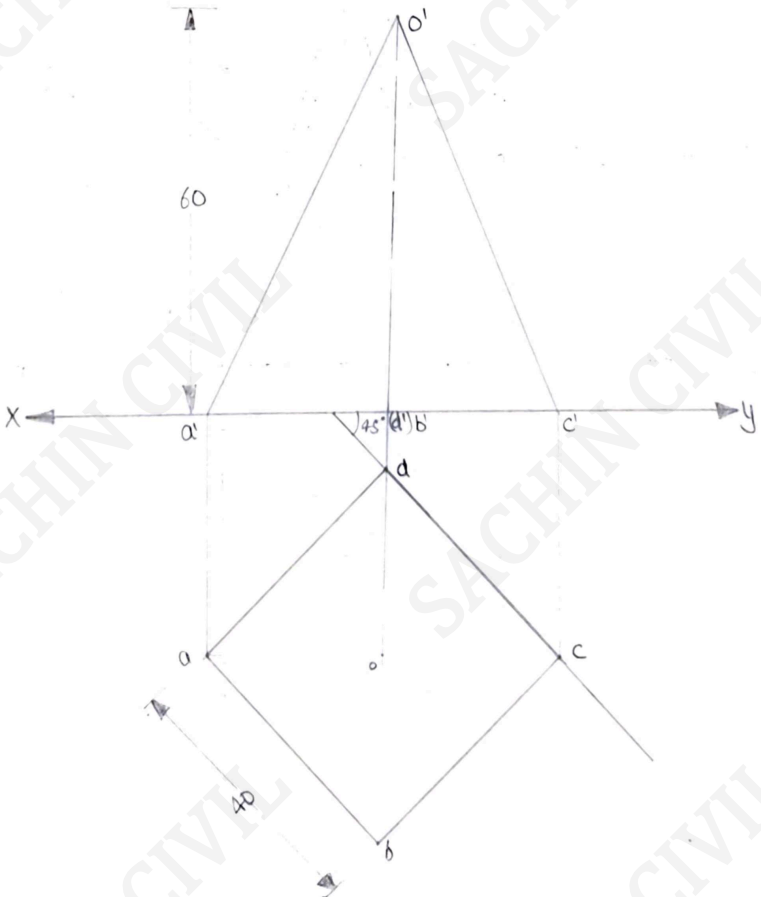
(a) Ans



b

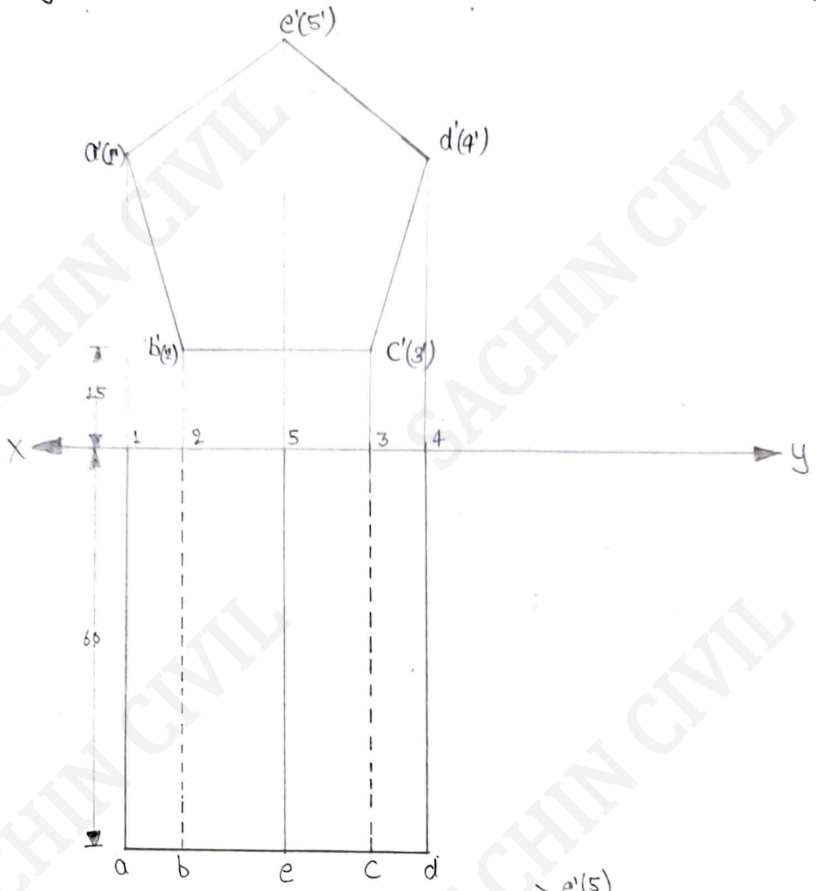


c

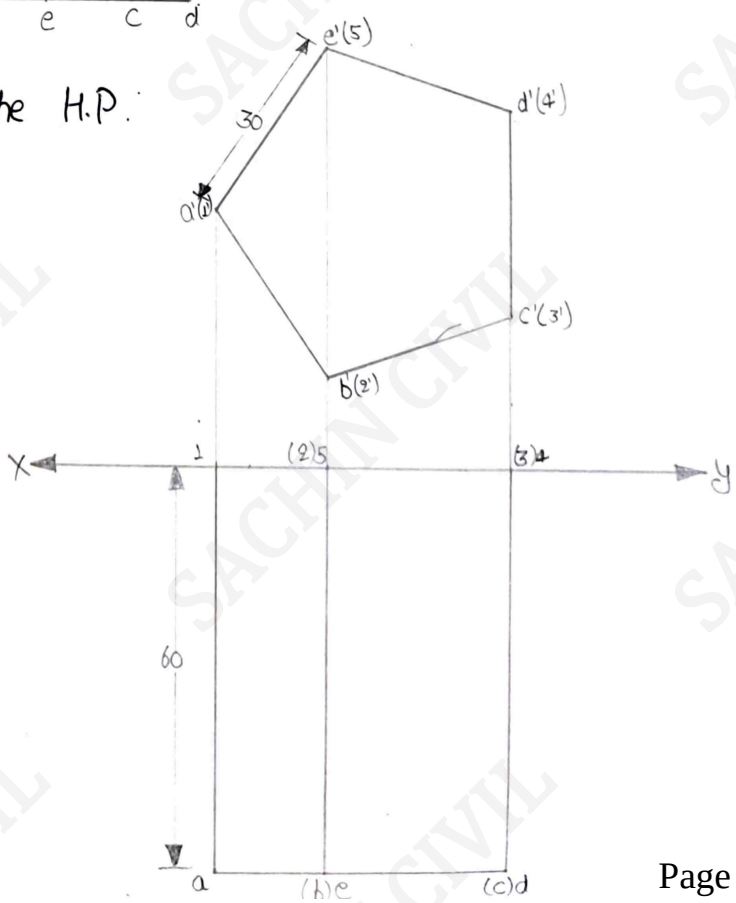


Q A pentagonal Prism of base side 30 mm and axis 60 mm has one of its bases in the V.P Draw its Projections when.

ⓐ A Rectangular face is // to and 15 mm above the H.P.

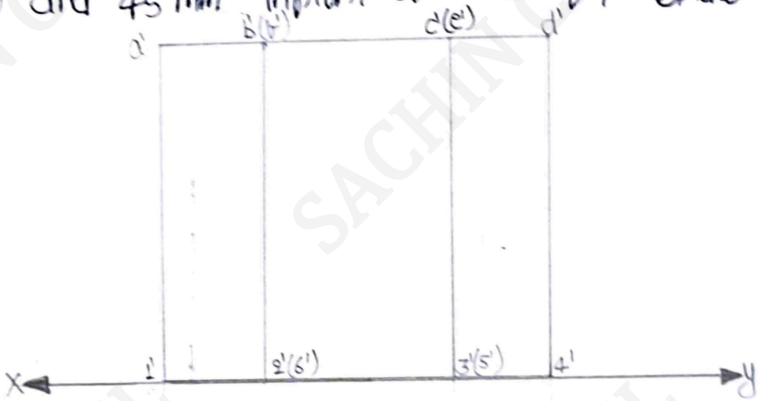


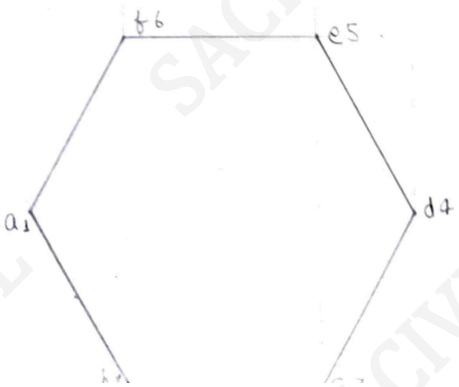
ⓑ A face is ⊥ to the H.P.



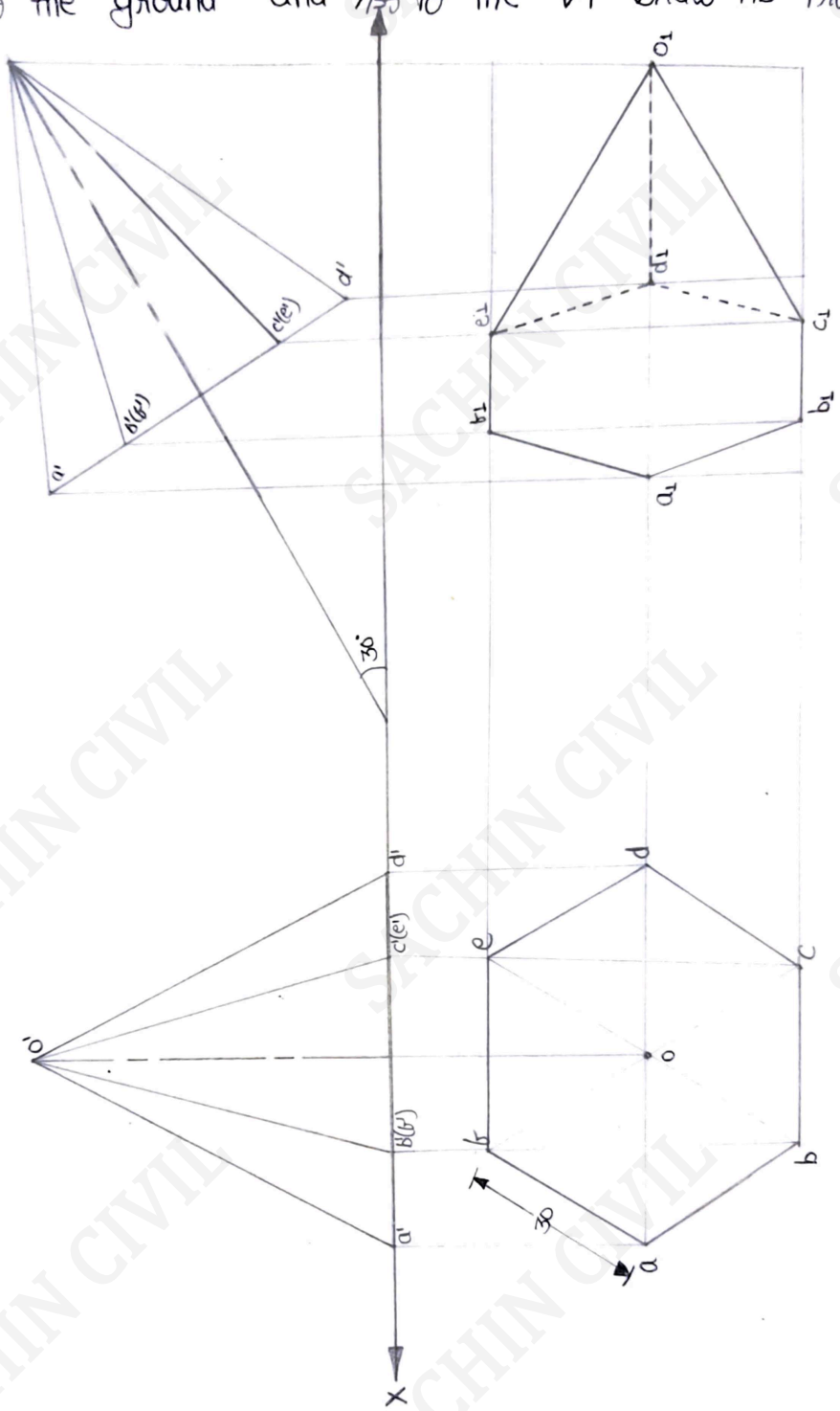
(c) A face is inclined at 45° to the H.P.

Q) A hexagonal prism of base side 30 mm and axis 50 mm, rests on a rectangular face on the H.P such that the axis is // to and 45 mm infront of the V.P Draw its projections.

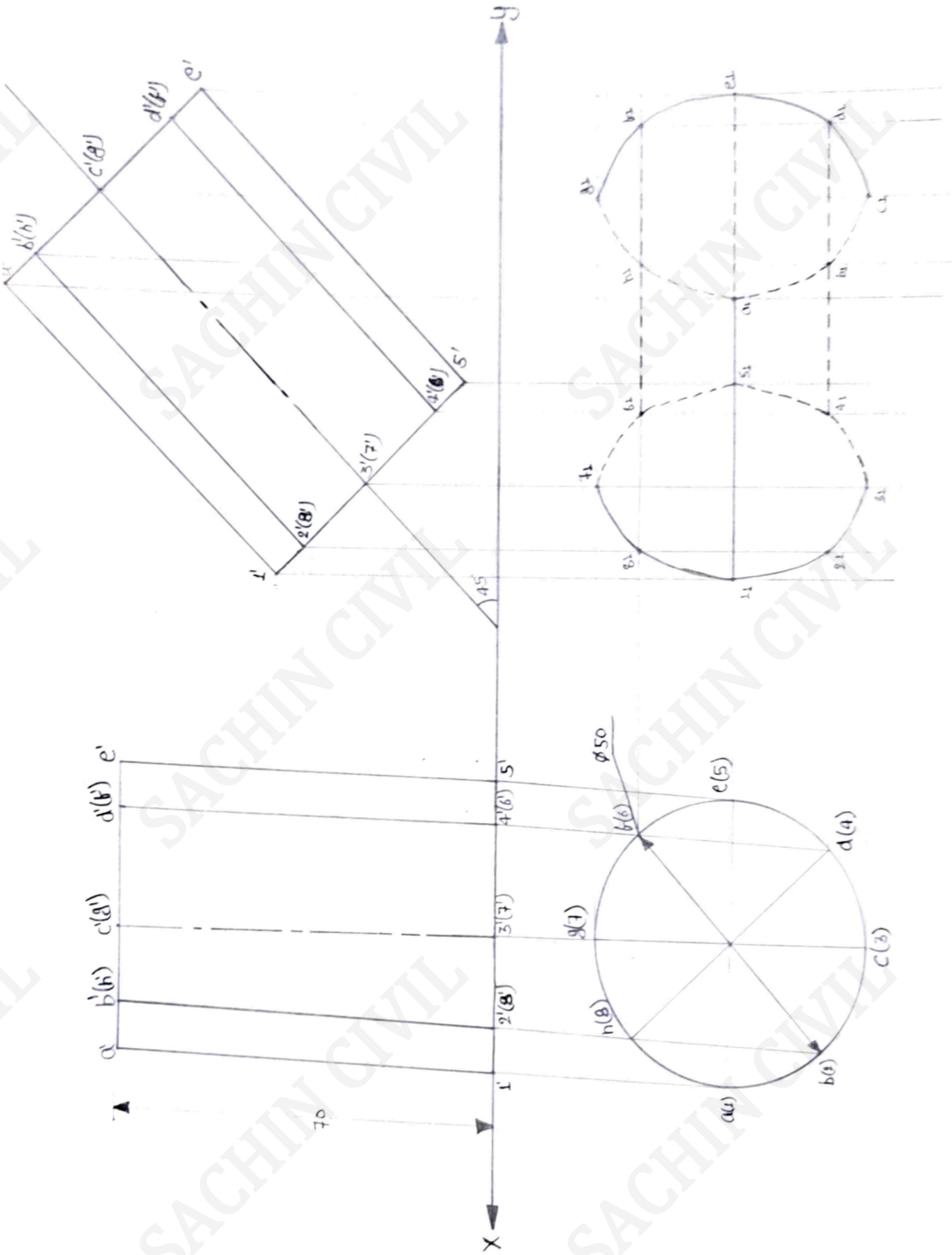




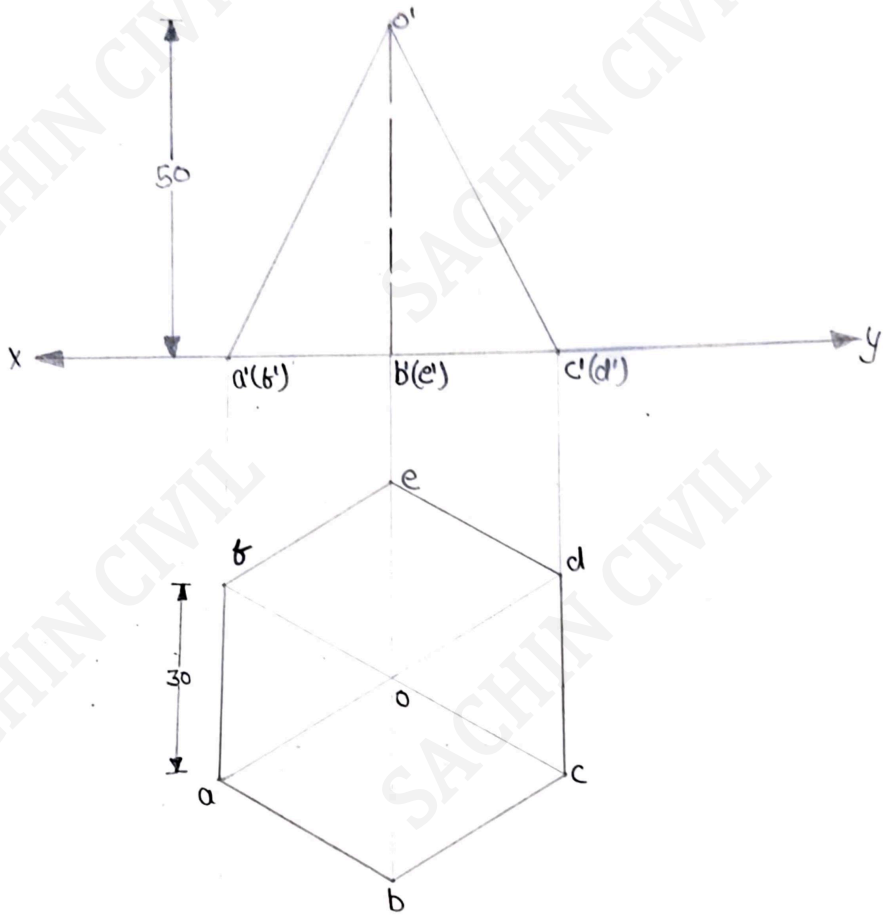
Q// A hexagonal pyramid base side 30 mm and axis 60 mm has an edge of its base on the ground. Its axis is inclined at 30° to the ground and // to the V.P Draw its Projection



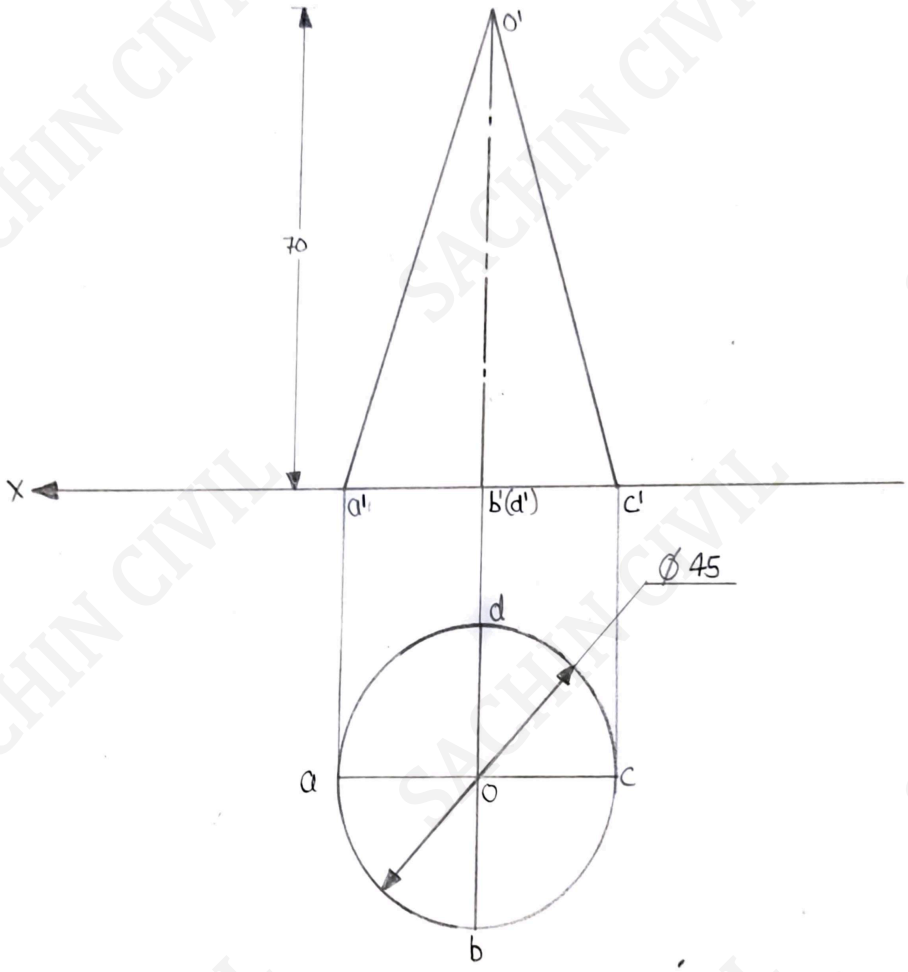
Q/ A cylinder of base dia 50mm and axis 70 mm has a generator in the V.P and inclined at 45° to the H.P Draw its Projection.



Q/ Draw the projection of hexagonal pyramid base 30 mm side and axis 50 mm long having its base in the H.P and one of the edge of its base ⊥ to the V.P.

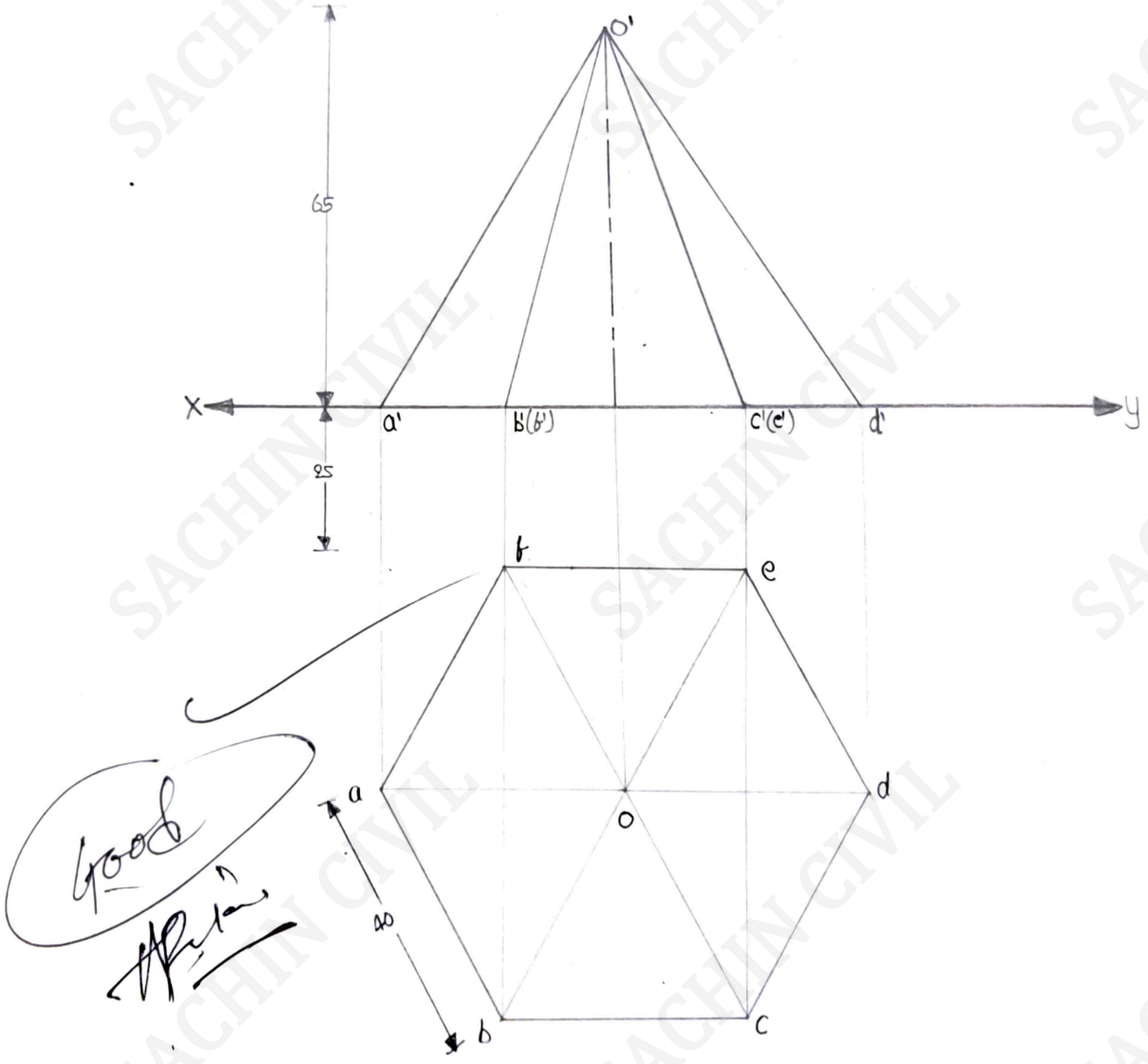


Q// A cone, dia of base 45mm and axis 70mm long is resting with its base on H.P. Draw the projection of the cone.



Axis length = 65 mm
Side of base = 40mm.

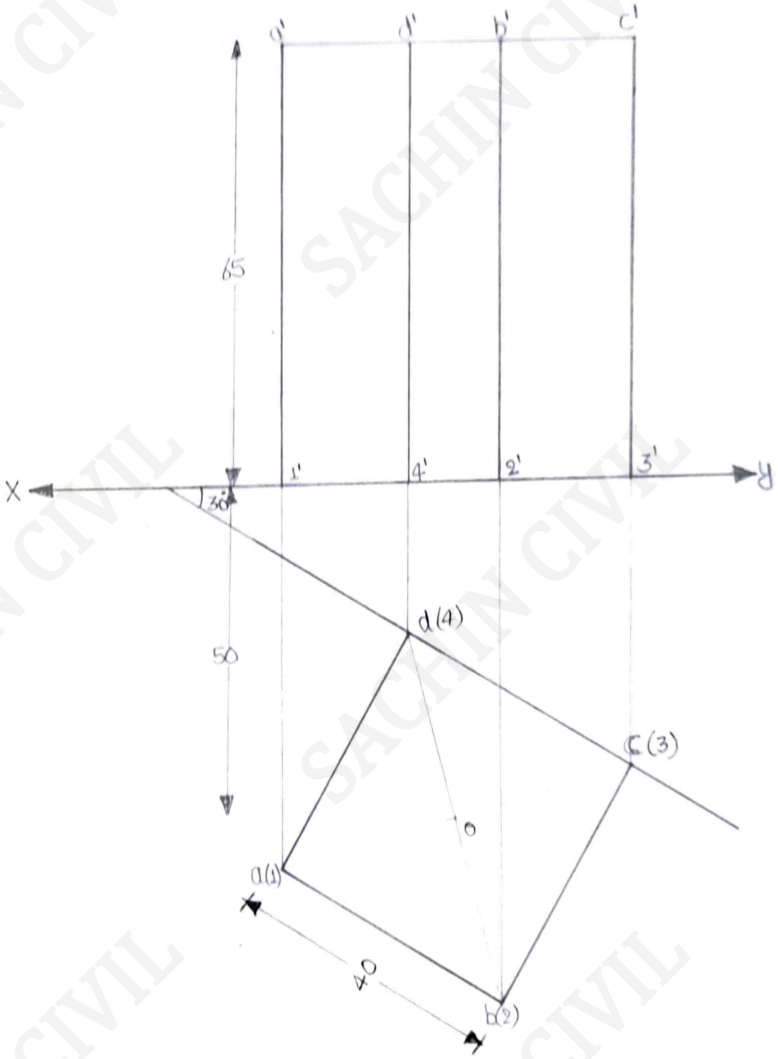
Q//1) A hexagonal Pyramid, base on the H.P and a side of the base // to and 25 mm infront of the V.P Draw its Projection.



Good

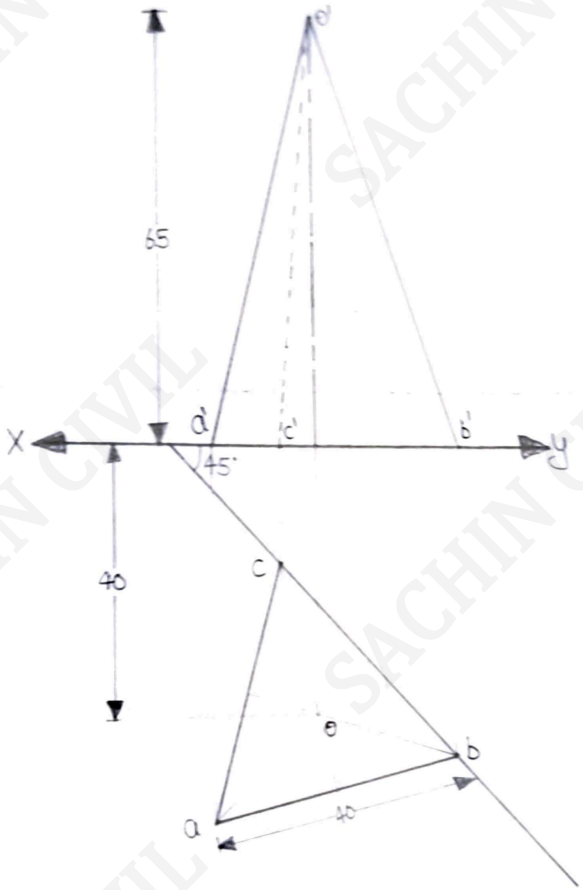
Q/2) Axis Length = 65 mm
Side of the base = 40 mm

A square prism, base on the H.P. a side of the base inclined at 30° to the V.P and the axis 50 mm in front of the V.P.



Q/3) Side of the base = 40 mm
Axis length = 65 mm.

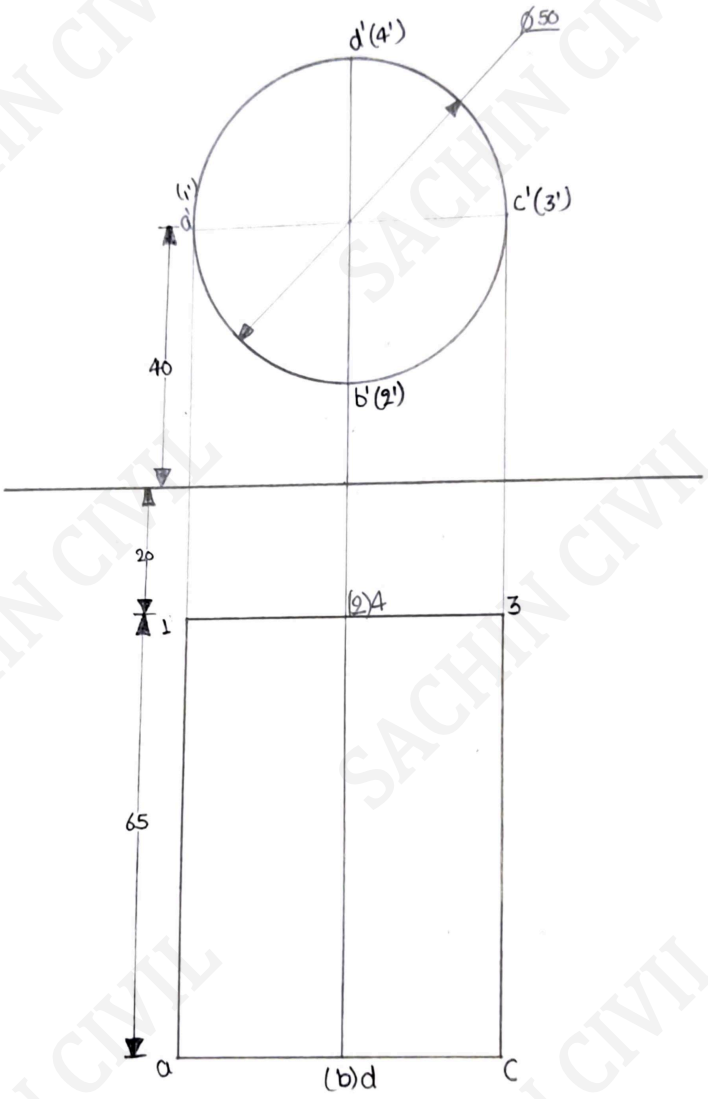
A triangular pyramid, base on the H.P and an edge of the base inclined at 45° to the V.P, the apex 40 mm in front of the V.P.



Q/4)

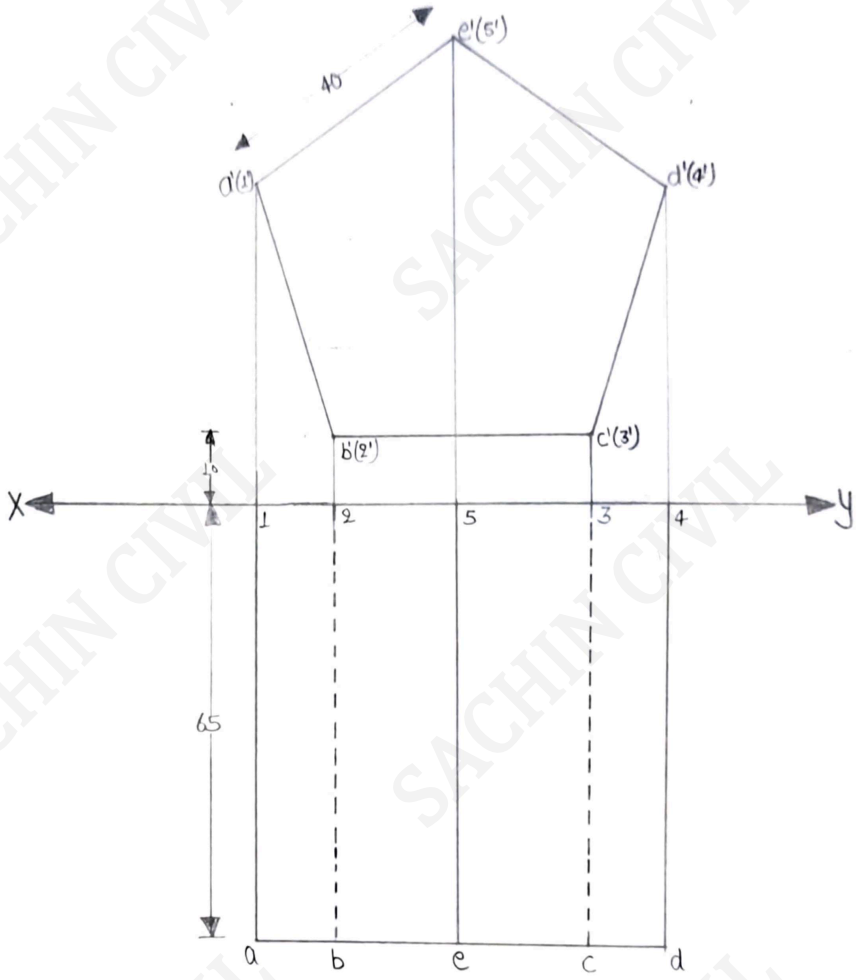
Axis Length = 65 mm
Diameter = 50 mm

A cylinder, ~~pyramid~~, ~~base~~ axis ⊥r to the V.P and 40mm above the H.P, one end 20mm in front of the V.P.



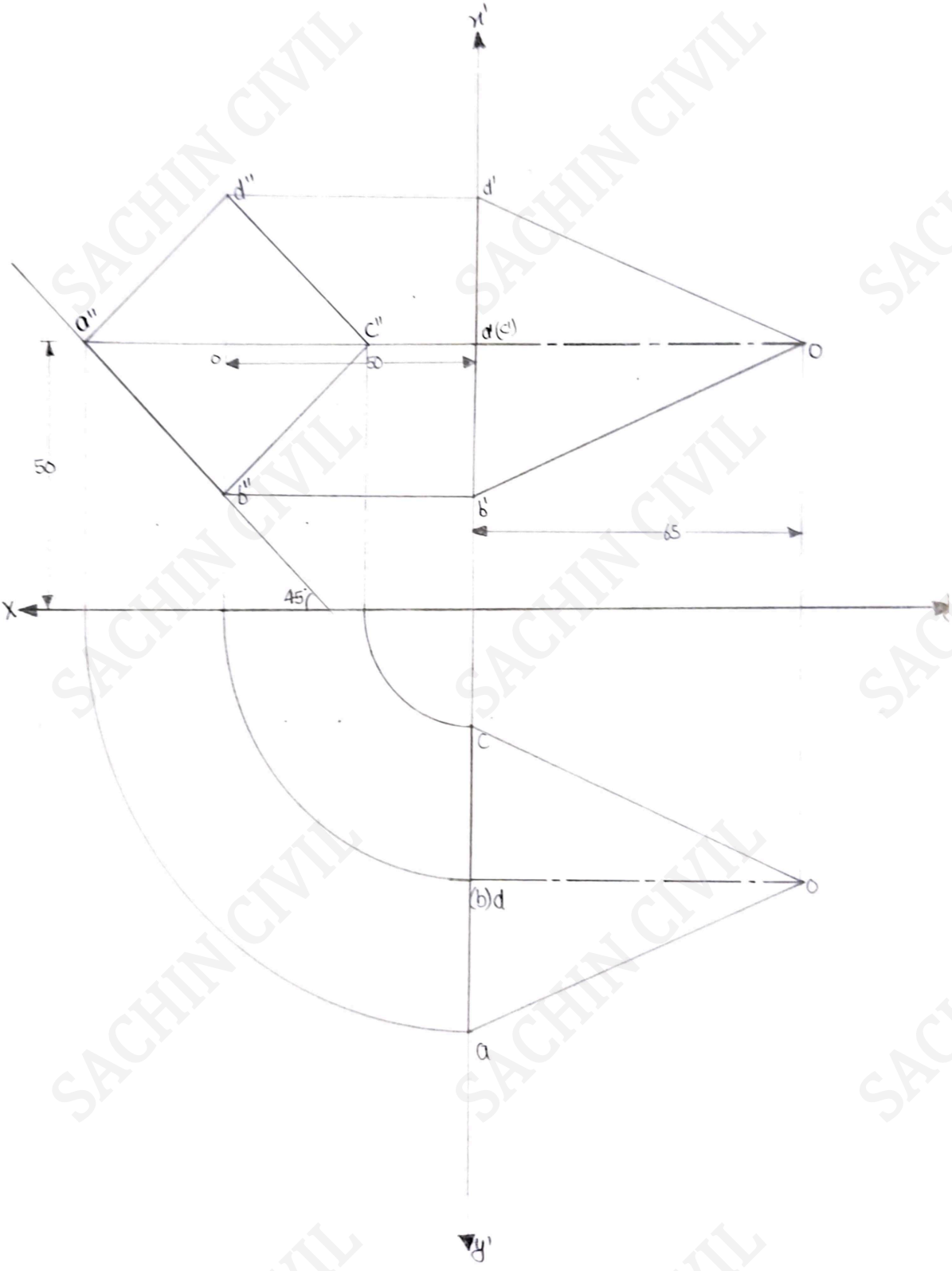
Q//5] Axis Length = 65 mm
Side of the base = 40 mm

A Pentagonal Prism, a rectangular face // to ⊕ and 10 mm above the H.P., axis ⊥r to the V.P and one base in the V.P.



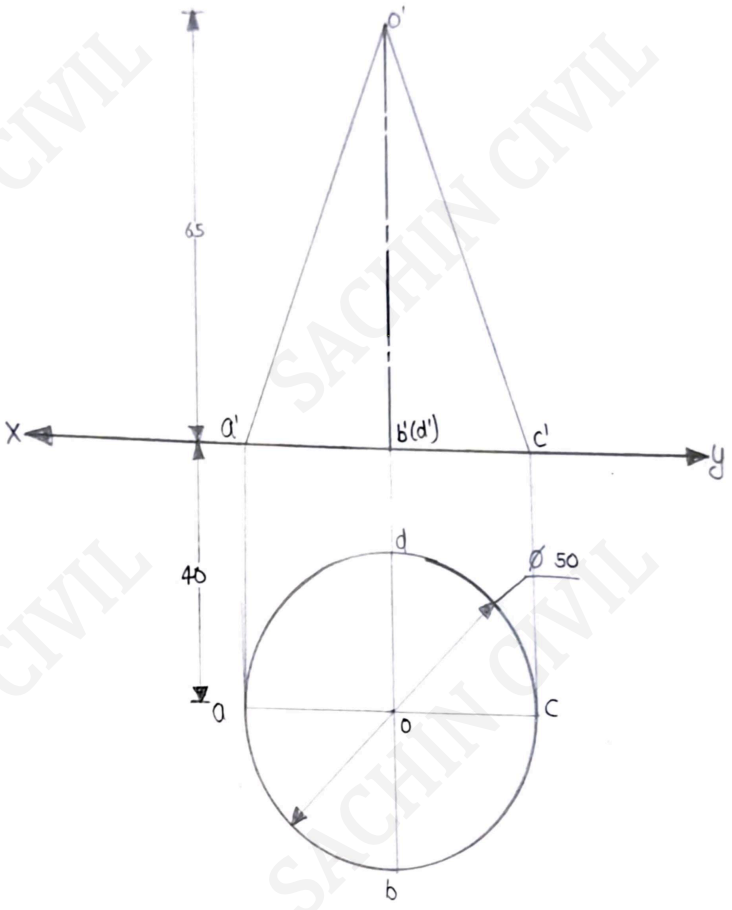
Axis length = 65 mm
Side of the base = 40mm

Q) A square pyramid, all edges of the base equally inclined to the H.P and the axis // to and 50mm away from both the H.P and the V.P.



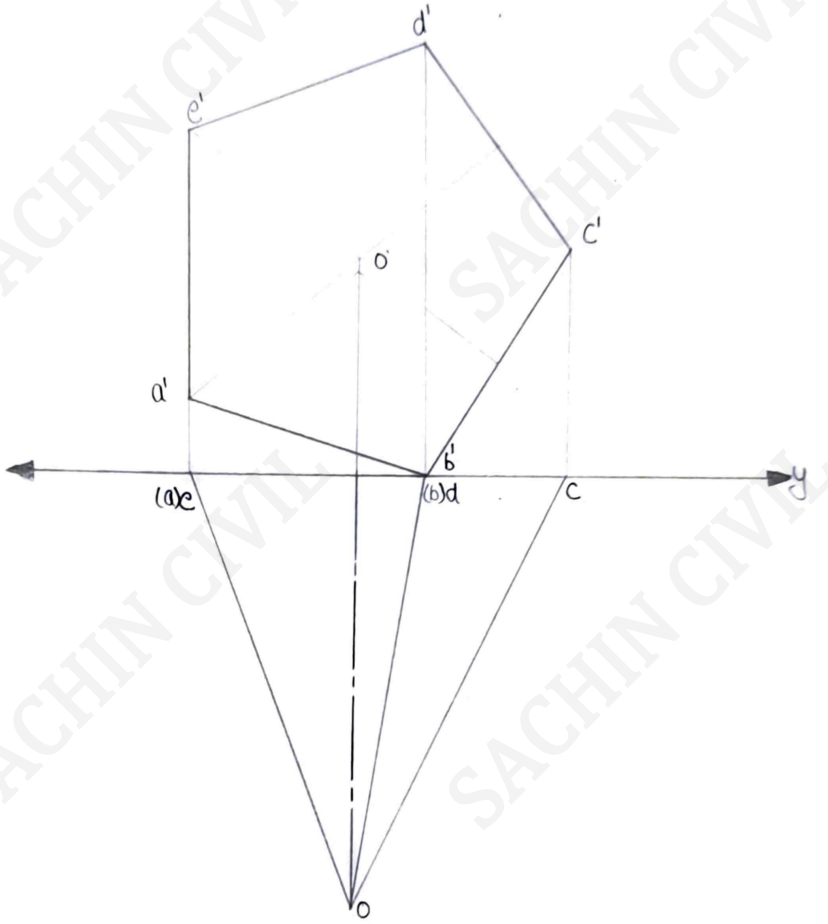
Q/7)

A cone, apex in the H.P. axis vertical and 40 mm in front of the V.P.



Axis length = 65mm
Side of the base = 40mm

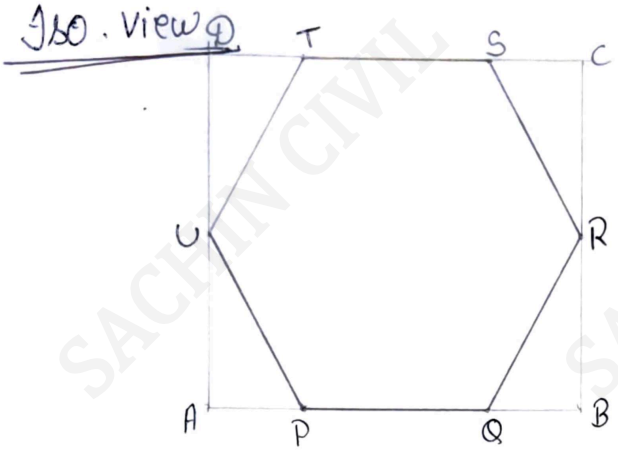
Q//8) A pentagonal Pyramid, base in the V.P and an edge of the base in the H.P.

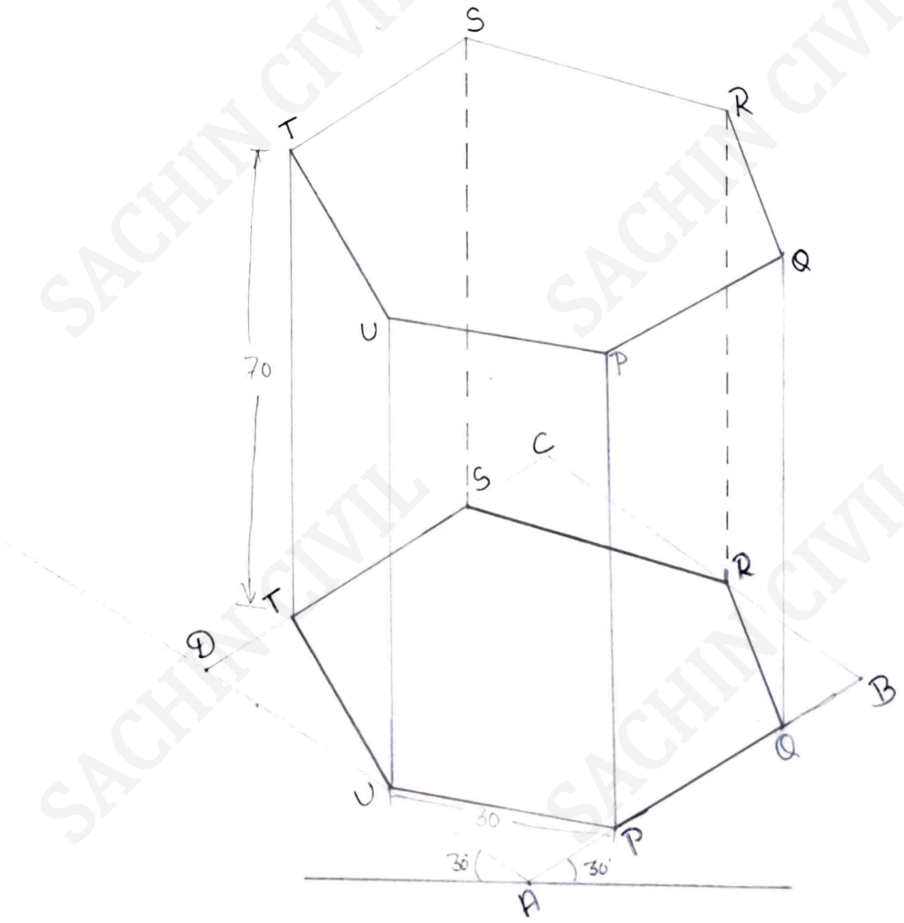


*Q/ Hexagonal Prism (Isometric Projection)

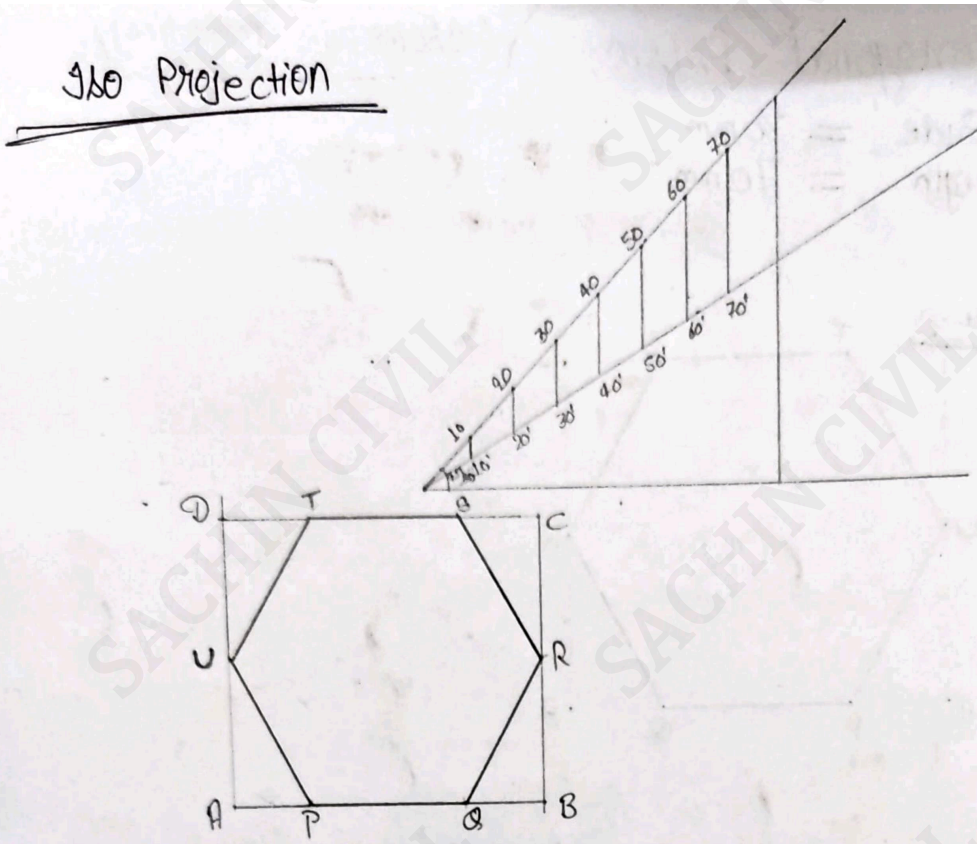
Side = 30mm
Length = 70mm

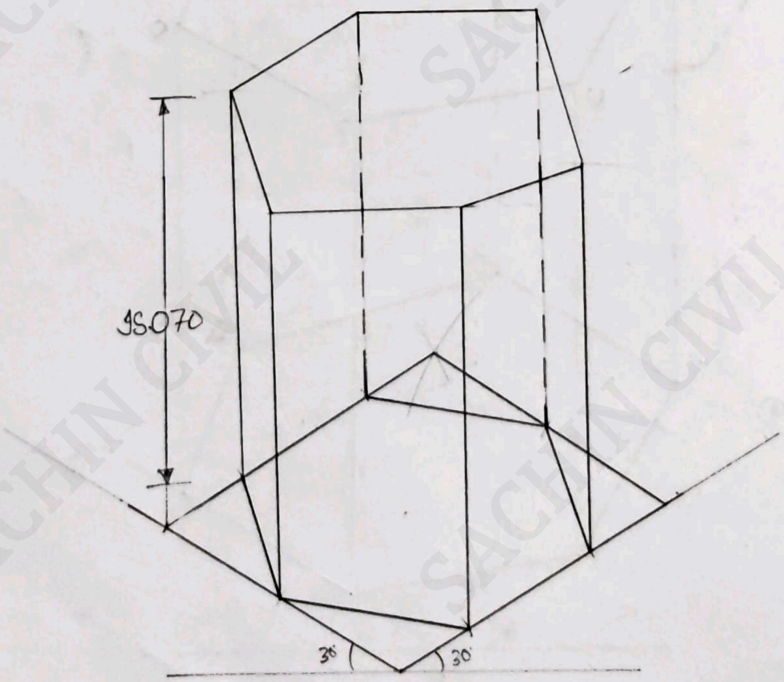
Iso. view





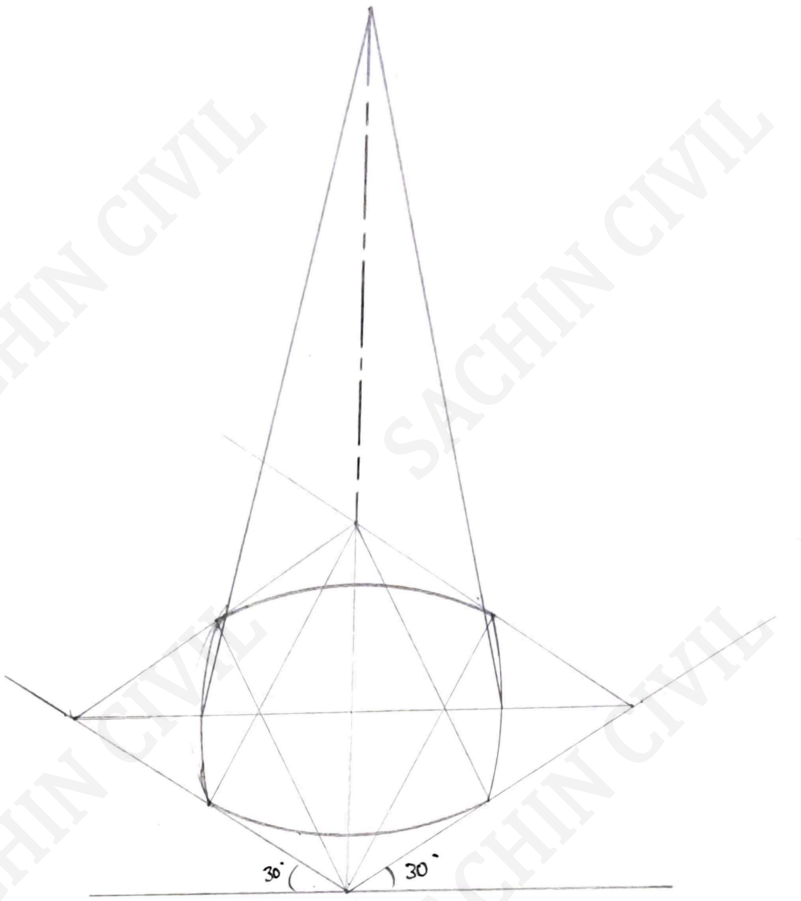
9so Projection

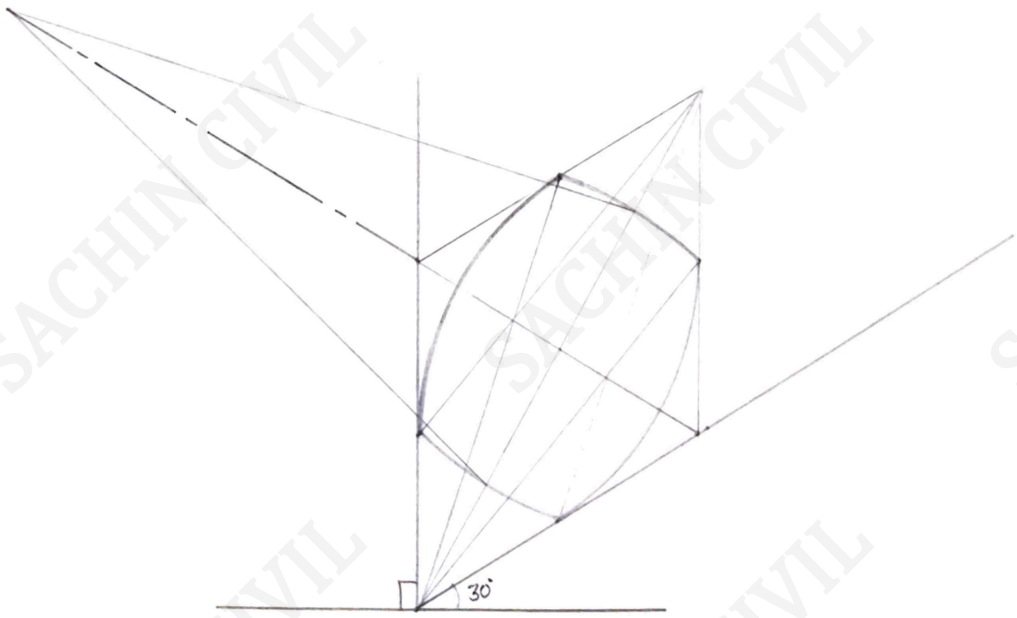




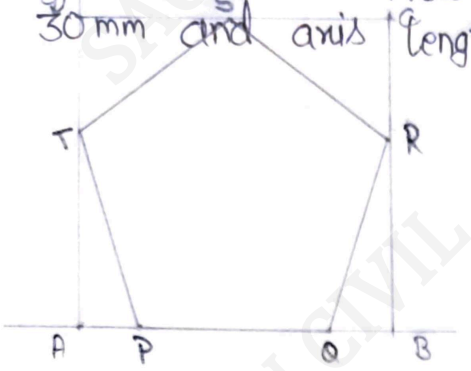
Pyramid

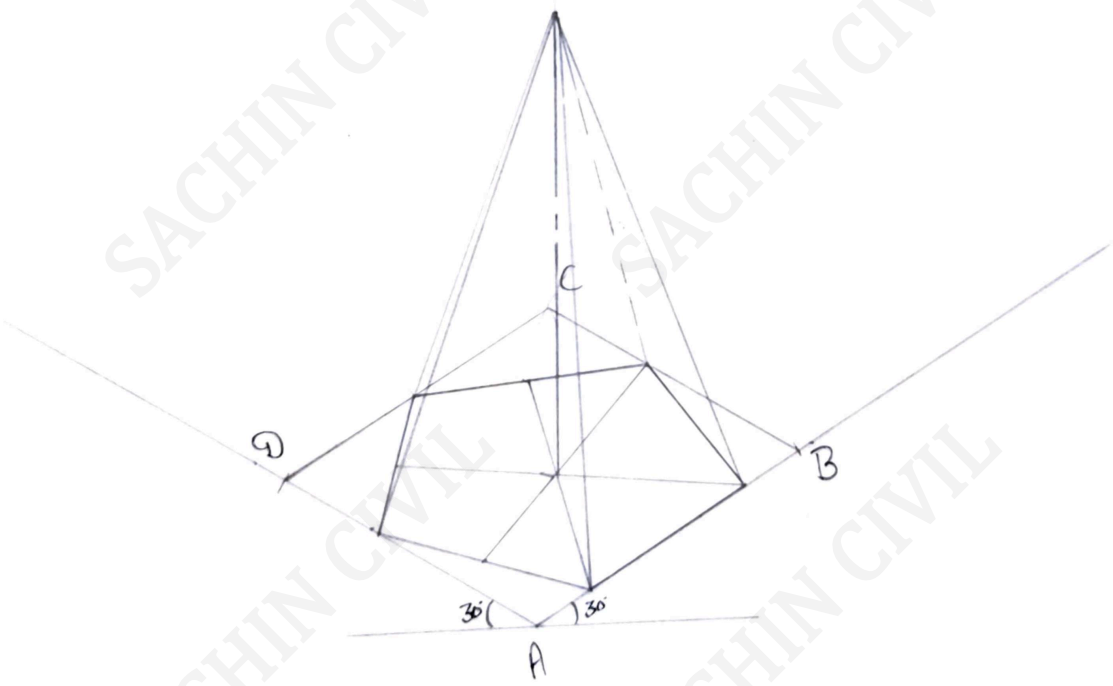
Cone Dia = 50 mm , length = 100 mm



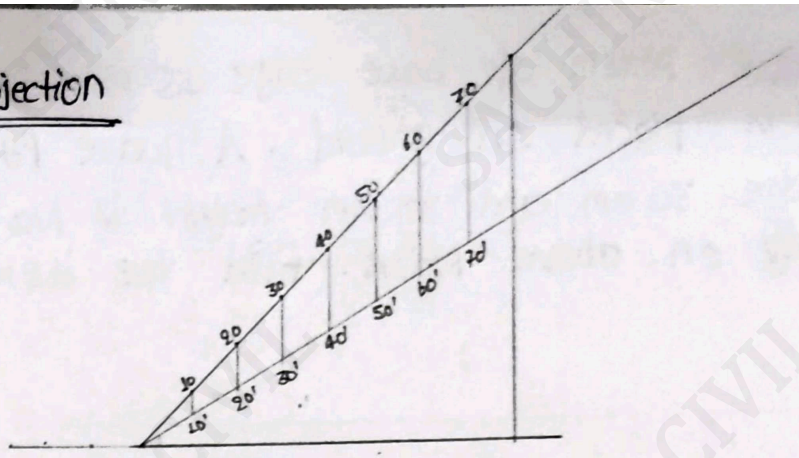


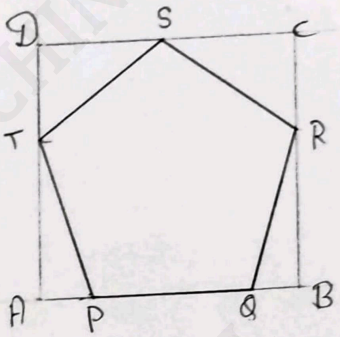
Q) Draw isometric view of a pentagonal pyramid of side 30 mm and axis length 70mm. rest in vertical position.

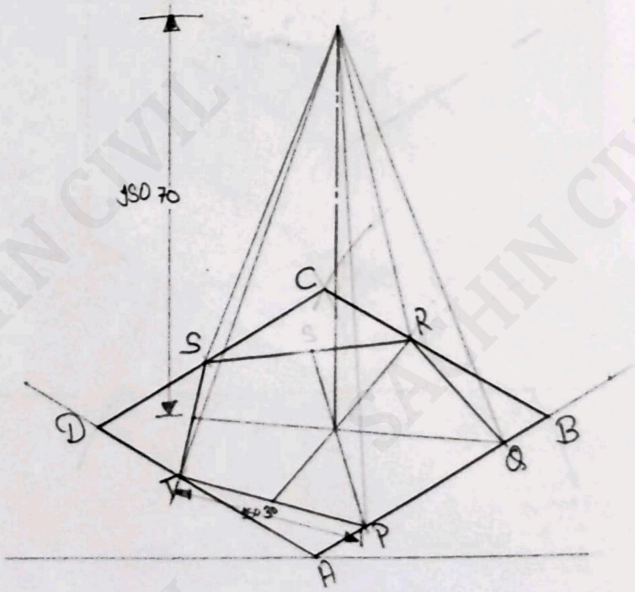




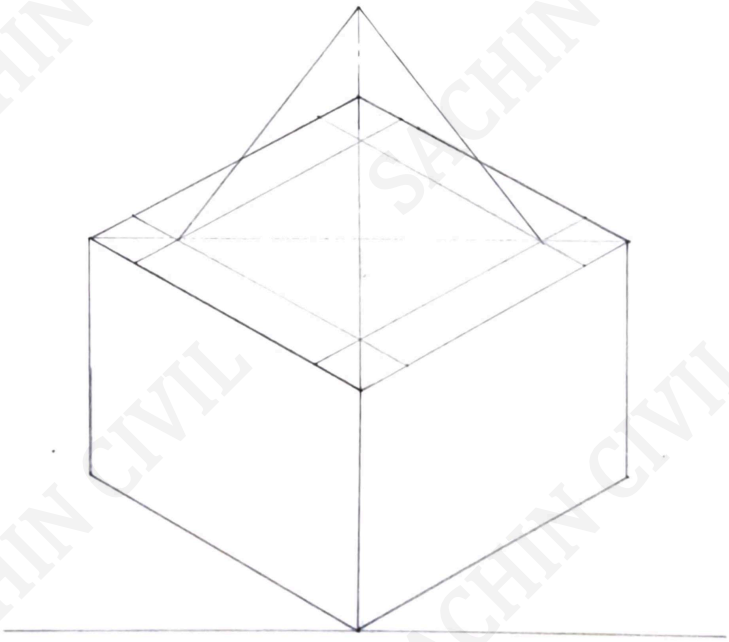
ISO Projection



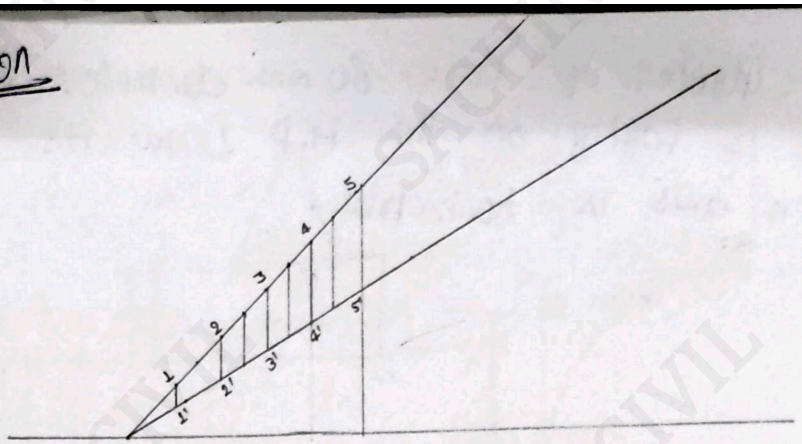


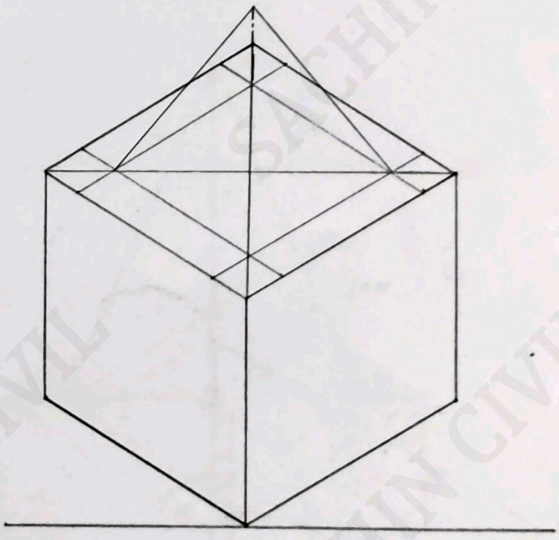


Q) A square prism of base edge 45 mm and height 35 mm is placed on ground. A square pyramid of base edge 30 mm and 35 mm height is placed on centrally on above prism. Find the isometric view.

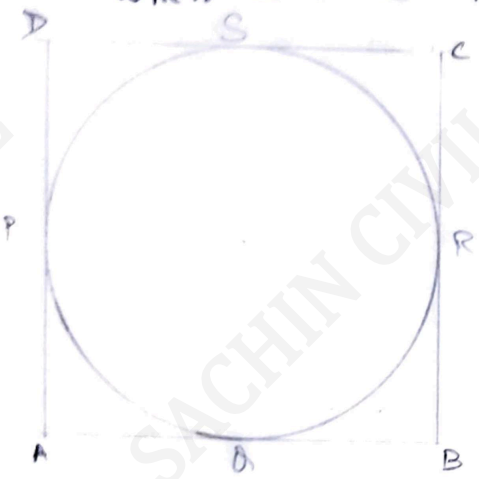


ISO Projection

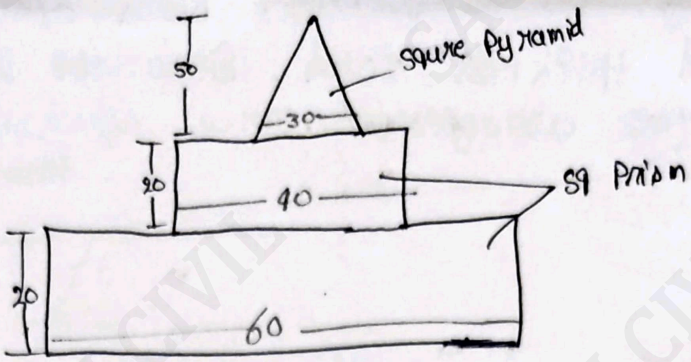


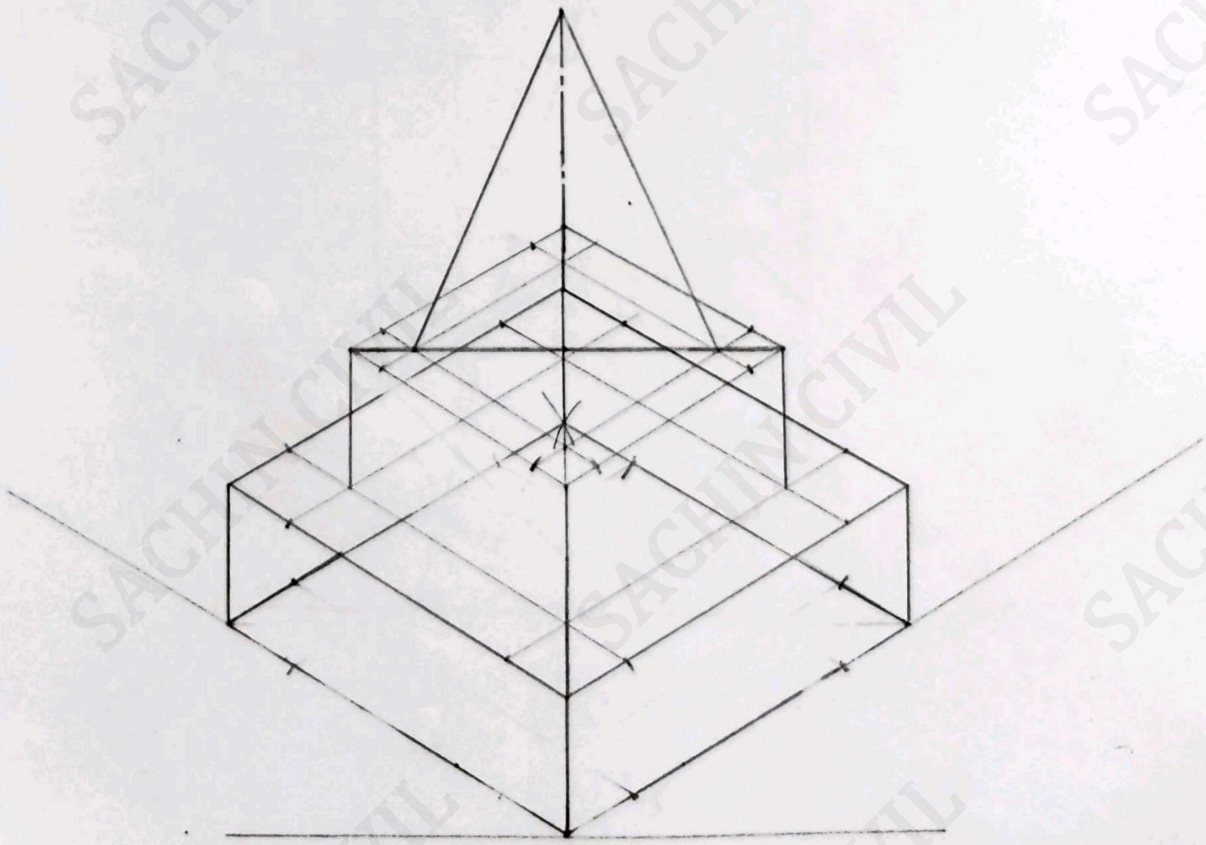


Q1 A cylinder of base 60 mm diameter and axis 80 mm long is laying on the H.P Draw its isometric view when axis is horizontal.



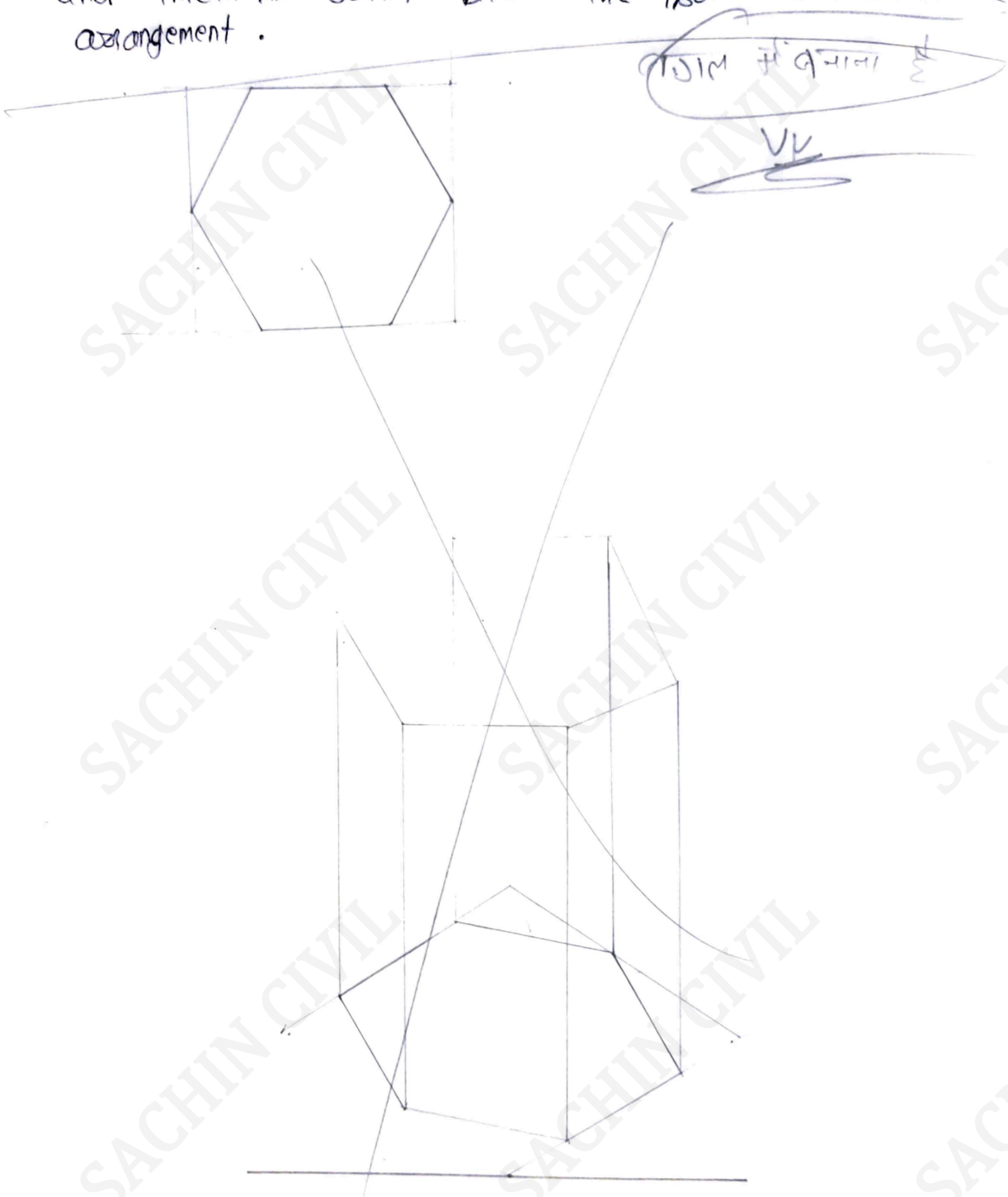
Q1 Draw the isometric view of given fig. —



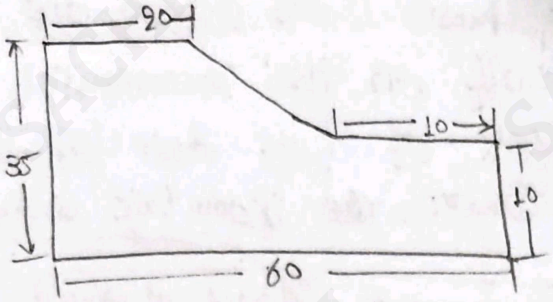


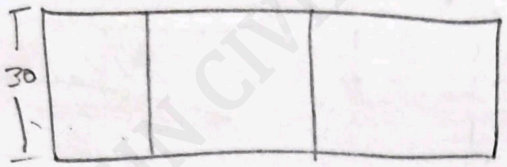
Q/ A SQ. Pyramid of base side 25 mm and axis 40 mm rests centrally over a cylindrical block of base diameter 50 mm and thickness 20 mm. Draw the isometric view of the arrangement.

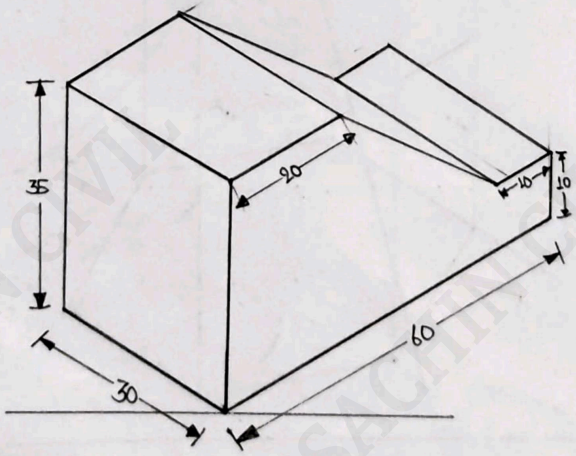
Q A hexagonal prism of base side 25 mm and axis 70 mm is placed centrally on its rectangular face over a cylindrical block of base diameter 80 mm and thickness 30 mm. Draw the isometric view of the arrangement.



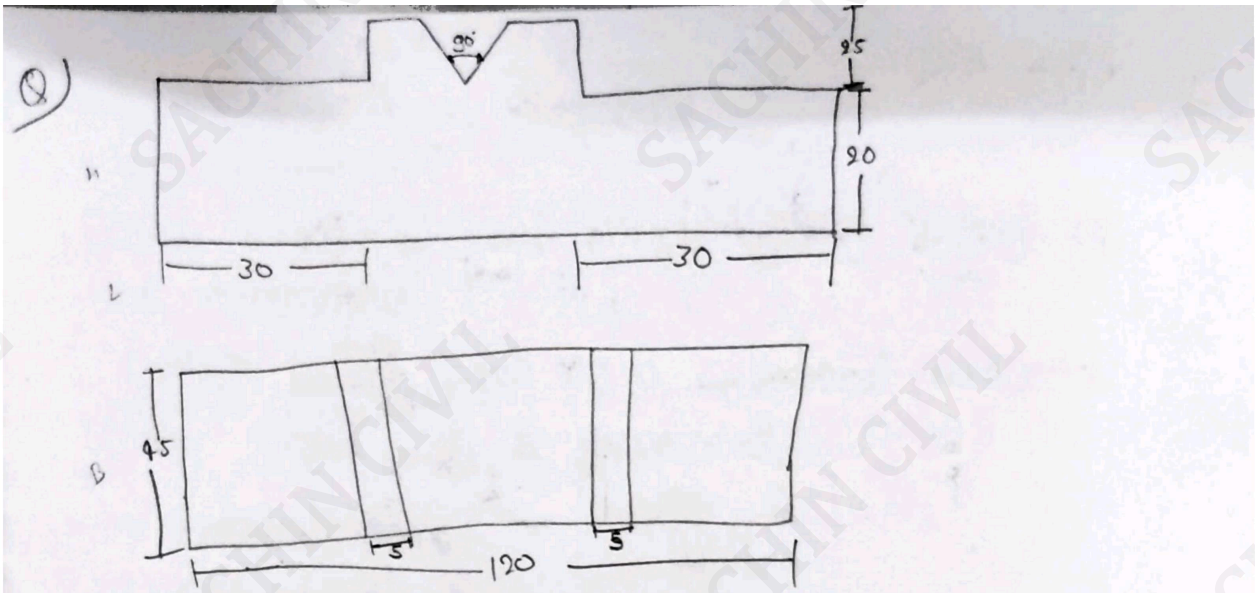
Q)

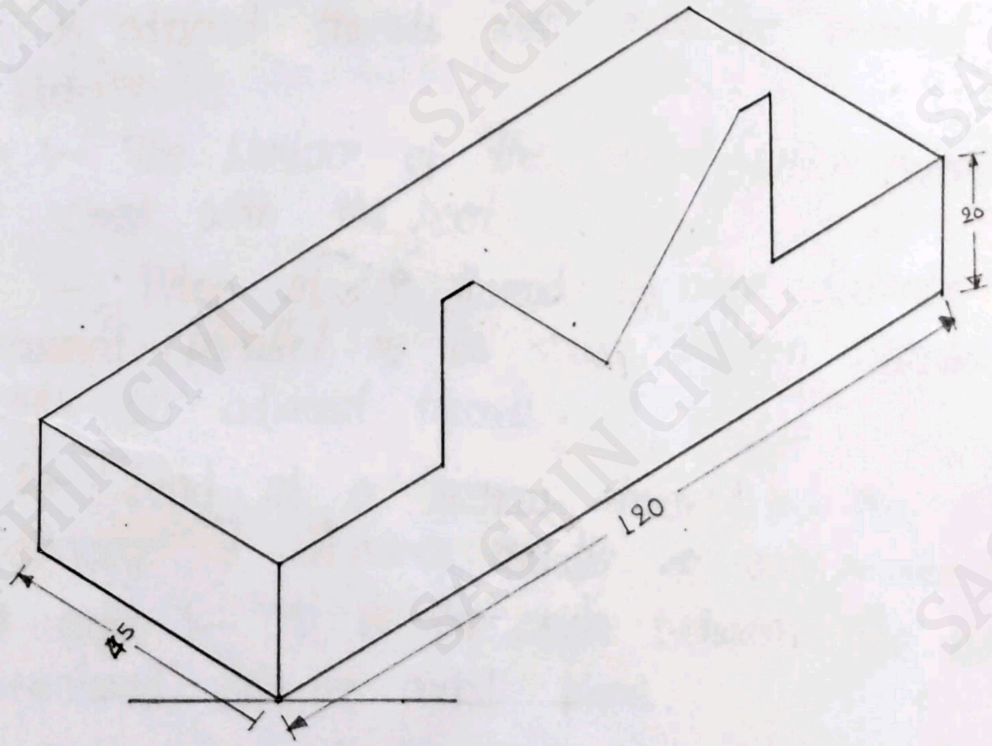






Q)





UNIT - 4
Free hand Sketching

- Screw thread is used for temporary locking of two components.
- Cutting helical group on a cylindrical surface, screw thread can be generated.

→ External thread. ____ Bolt
→ Internal thread ____ Nut.

(i) Crest :- It is the top surface joining the two sides of a thread. Crest may be rounded or flat.

(ii) Root :- It is the bottom surface joining the sides of adjacent threads. Root may be rounded or flat.

(iii) Flank :- The surface of the thread which connects the crest with the root.

(iv) Pitch :- Pitch of a thread is the distance measured parallel to its axis, between corresponding points on adjacent threads.

(v) Lead :- Lead of a screw thread is the distance it advances axially in one revolution.

(vi) Thread angle :- It is the angle between the sides, measured on an axial plane.

(vii) Flank angle :- It is the angle between flank of thread and a plane ⊥r to the axis, measured in axial plane.

(viii) Major diameter :— Major diameter is the largest diameter of a screw thread on a screw or nut.

(ix) Minor diameter :— It is the smallest diameter on the screw or nut.

(x) Effective or pitch diameter :— Effective diameter is the diameter of an imaginary cylinder which would pass through the threads at such points as to make the width of the spaces between the threads at these points equal.

(xi) Thread depth :— It is half the difference between major diameter and minor diameter.

* Thread forms

(A) V– Thread.

- British standard withworth thread (BSW). 55°
- British association thread (BA). 47.5°
- Sellers thread. 60°
- Unified standard thread 60°
- Iso metric thread 60°
- Iso metric trapezoidal thread. 30°

(B) Square thread

- Square thread.
- Acme thread 29°
- Knuckle thread
- Buttress thread. 45°

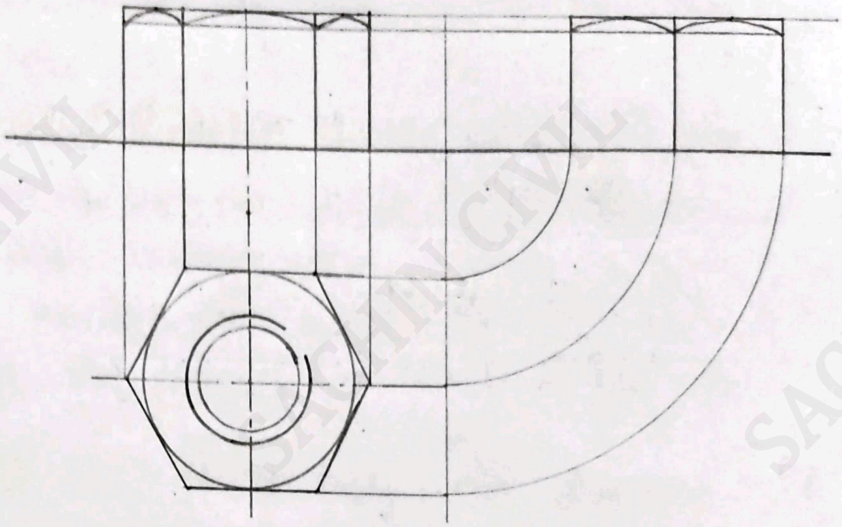
Q) Hexagonal Nut

D = 20 mm

$t = W = 1.5 \times D + 3$ mm

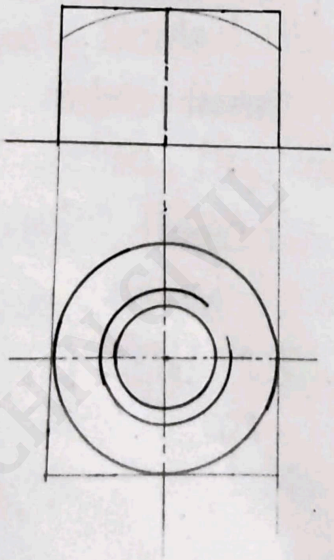
D = 20 mm

$= 0.8 \times 9$ mm



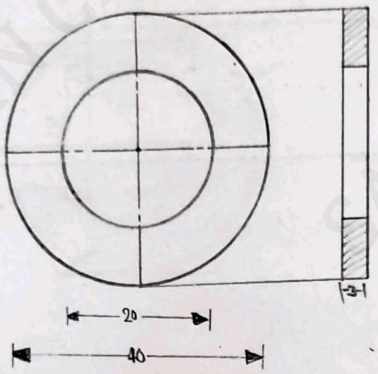
Q) Square Nut

Draw front view top views and side of the square nut of Dia. 20mm.

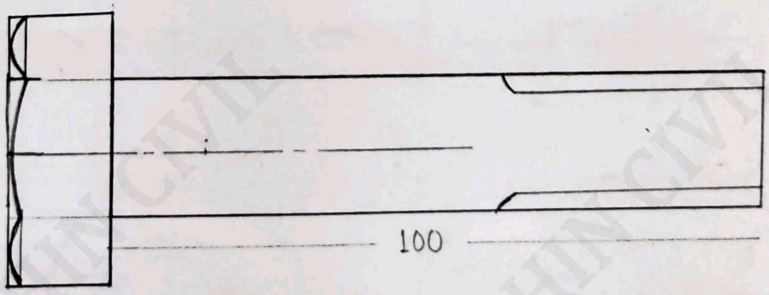


(8) Washer

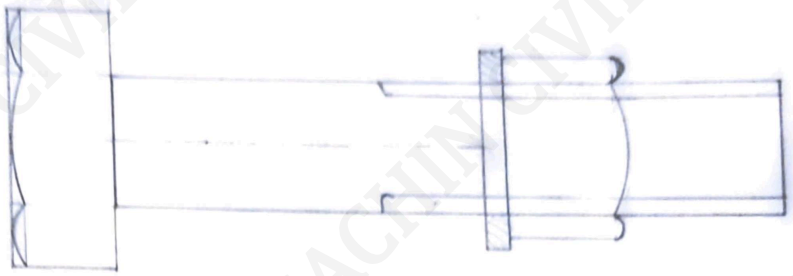
D = 20mm



9) Hexagonal headed bolt of length 100mm and dia.. 20mm



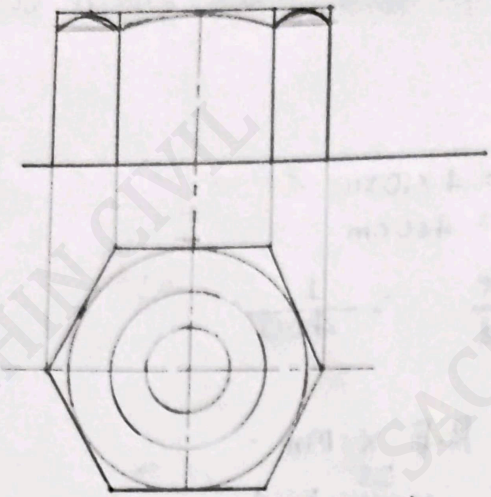
Q) Hexagonal headed bolt of length 100mm and Dia 20mm with nut and washer



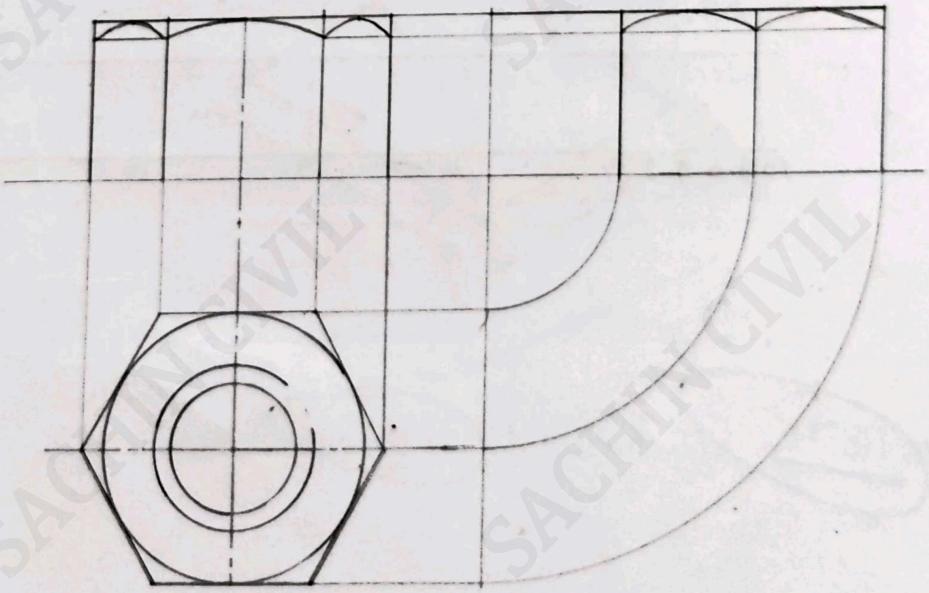
(1) Draw the free hand sketch of a hexagonal nut

D = 24 mm.

$\therefore W = 1.5 \times D + 3$
$= 1.5 \times 24 + 3$
$= 39$
$R_1 = 1.5 \times D$
$= 1.5 \times 24$
$= 36.$



Same Question, with Side View



Q) Construct a plain scale to show metres when 1 cm represents 4 metres and long enough to measure upto 50 metres. Find the R.F and mark on it a distance of 36 metres.

☆ Drawing size = 1 cm

Actual size = 4 m = 4 × 10 × 10

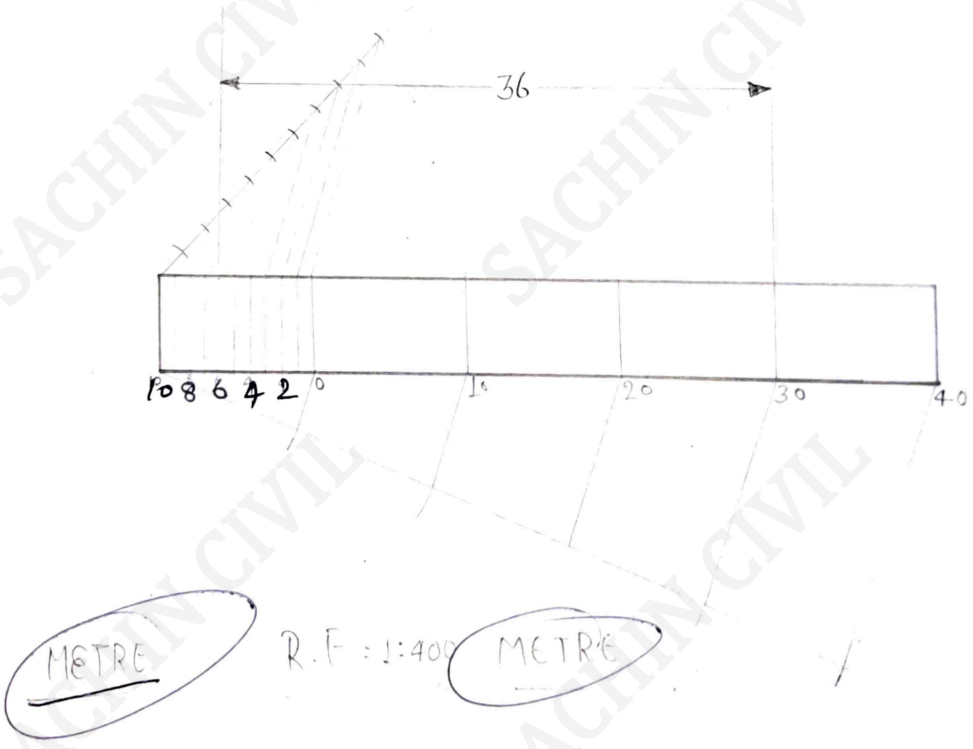
= 400 cm

$\therefore$ R.F = $\frac{\text{Drawing size}}{\text{Actual size}} = \frac{1}{400}$

$\because$ Length of scale = R.F × mn

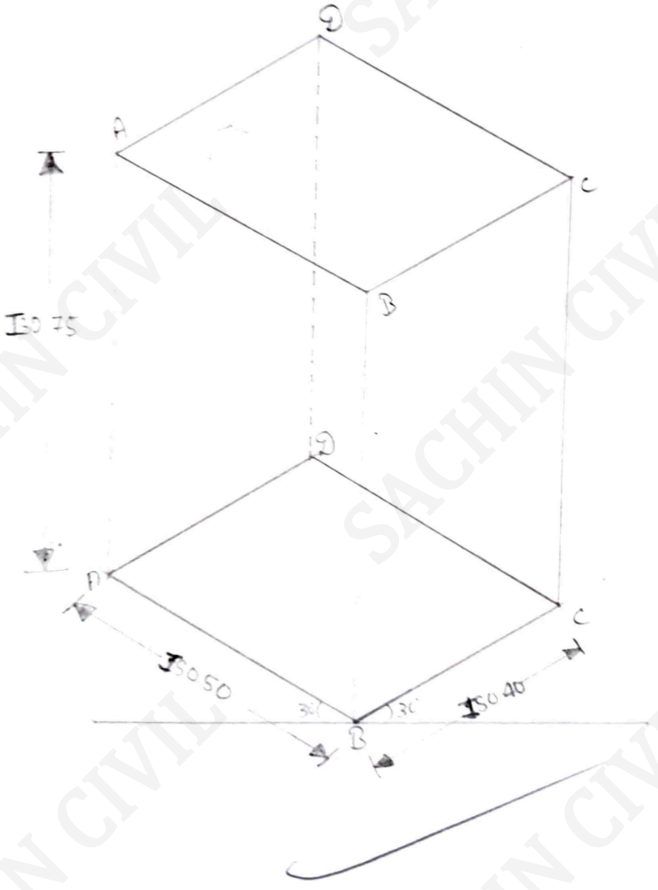
$= \frac{1}{400} \times 50 \times 10 \times 10$

$= \frac{25}{2} = 12.5$ cm.

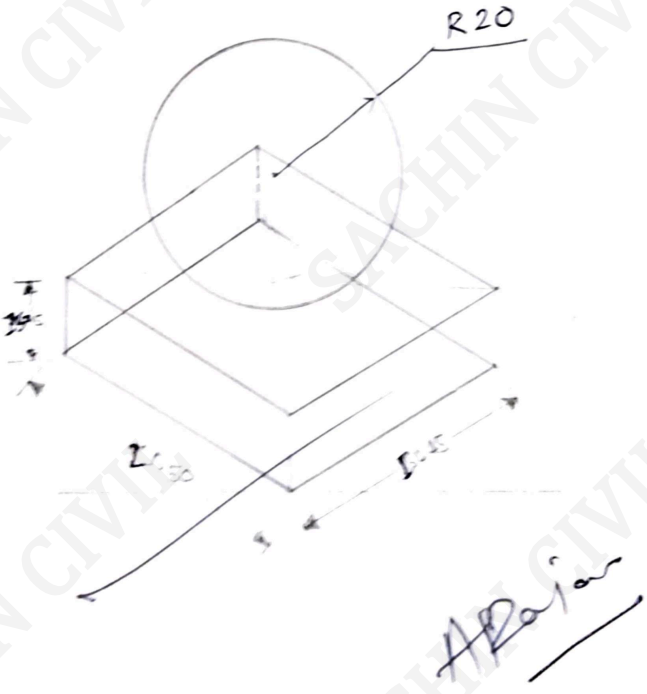


Q) Draw the Isometric Projection of a rectangular Prism of base base 50 mm x 40 mm and height 75 mm when it rests with its base on H.P. and one of its rectangular face is Parallel to V.P.

ISO Scale.



Q) Draw isometric projection of a sphere of Radius 20 mm resting centrally on the top surface of a rectangular Prism of length, width and height 50 mm 45 mm and 15 mm respectively.



Q) Pictorial view of an object is shown draw.

ⓐ Elevation (Front View)

ⓑ Plan (Top View)