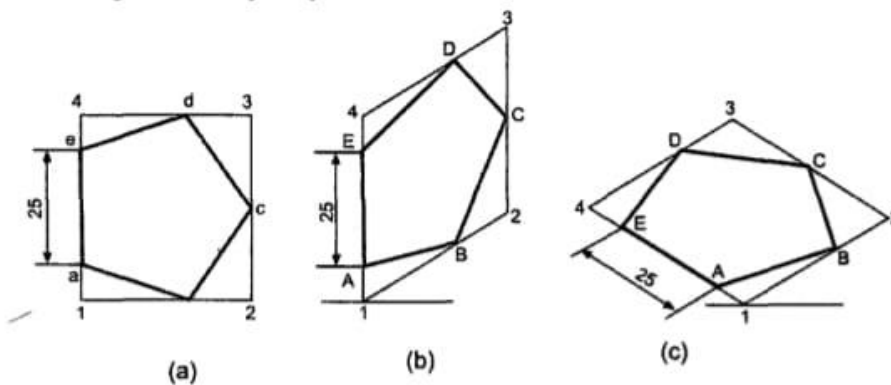1. Enclose the given pentagon in a rectangle 1234.
2. Make the isometric drawing of the rectangle 1234 by using true lengths.
3. Locate the points A and B such that 1a = 1A and 1b = 1B.

4. Similarly locate point C, D and E such that 2c = 2C, 3d = 3D and e4 = E4.
5. ABCDE is the isometric drawing of the pentagon.
6. Following the above princple of construction 9.12c can be


(a)   (b)   (c)

Fig. 9.12

Problem : *Draw the isometric view of a pentagonal plane of 30mm side when one of its sides is parallel to H.P, (a)When it is horizontal and (b)vertical.*

Construction (9.13)

1. Draw the pentagon ABCDE and enclose it in a rectangle 1-2-3-4 as shown in Fig.9.13a.
   (a) When it is horizontal the isometric view of the pentagon can be represented by ABCDE as shown in Fig.9.13b.
   (b) When the plane is vertical it can be represented by ABCDE as shown in Fig.9.13c or d.

Note : It may be noted that the point A on the isometric view can be marked after drawing the isometric view of the rectangle 1-2-3-4 for this, mark 1A' = 1A and so on.

(a)   (b)   (c)
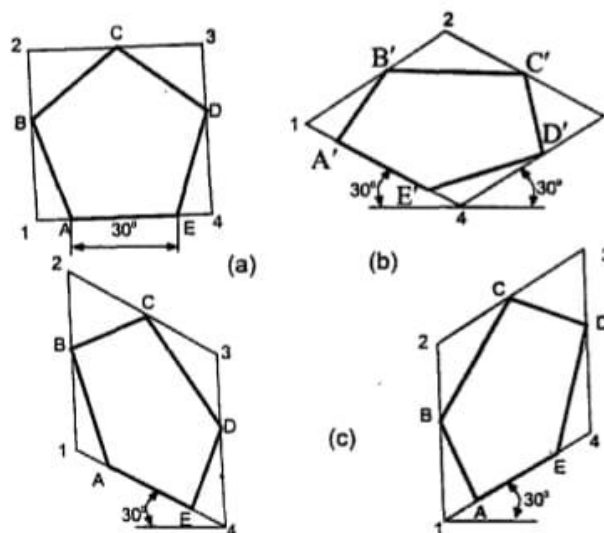
Fig. 9.13

1. Enclose the circle in a square 1-2-3-4 and draw diagonals, as shown in Fig. 9.15a. Also draw lines YA horizontallly and XA vertically.

   To draw the isometeric view of the square 1-2-3-4 as shown in Fig.9.15b.

2. Mark the mid points of the sides of the square as B D F and H.

3. Locate the points X and Y on lines 1-4 and 1-2 respectively.

4. Through the point X, draw A X parallel to line 1-2 to get point A on the diagonal 1-3. The point A can be obtained also by drawing Y A through the point Y and parallel to the line 1-4.

5. Similarly obtain other points C, E and G.

6. Draw a smooth curve passing through all the points to obtain the required isometric view of the horizontal circular plane.

7. Similarly obtain isometric view of the vertical circular plane as shown in Fig.9.15c and d.

Problem : *Draw the isometric projection of a circular plane of diameter 60mm whose surface is (a) Horizontal and (b) Vertical-use four-centre method.*
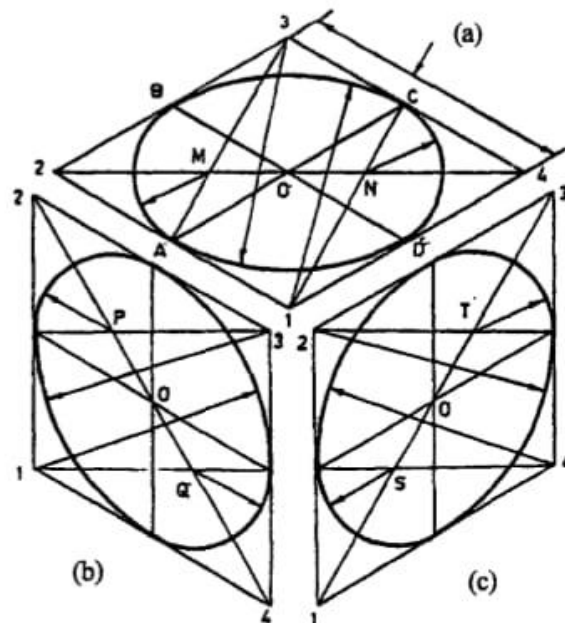
Construction (Fig.9.16)

Fig. 9.16

1. Draw the isometric projection of the square 1-2-3-4 (rhombus) whose length of side is equal to the isometric length of the diameter of the circle = 0.82 x 60.

2. Mark the mid points A$^!$, B$^!$, C$^!$ and D$^!$ of the four sides of the rhombus. Join the points 3 and A$^!$. This line intersects the line 2-4 joining the point 2 and 4 at M$^!$. Similarly obtain the intersecting point N.

3. With centre M and radius = MA draw an arc A B. Also draw an arc C D with centre N.

intersecting point N.

3. With centre M and radius = MA draw an arc A B. Also draw an arc C D with centre N.

4. With centre 1 and radius = 1C, draw an ace B C. Also draw the arc A D.

5. The ellipse A B C D is the required isometric projection of the horizontal circular plane (Fig.9.16a).

6. Similarly obtain the isometric projection in the vertical plane as shown in Fig.9.16b & c.

roblem : _Draw the isometric view of square prism with a side of base 30mm and axis 50mm ng when the axis is (a) vertical and (b)horizontal._
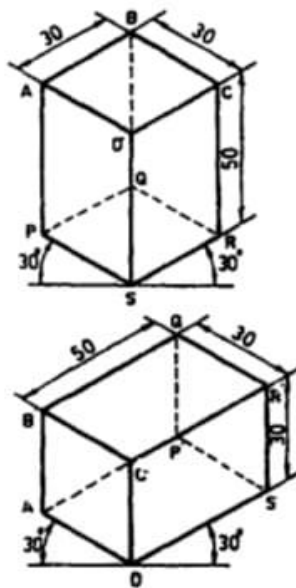
:onstruction (Fig.9.17)

Fig. 9.17 Isometric drawing of a square prism

(a) **Case 1 when the axis is vertical**

1. When the axis of the prism is vertical, the ends of the prism which is square will be horizontal.

2. In an isometric view, the horizontal top end of the prism is represented by a rhombus ABCD as shown in Fig.9.17a. The vertical edges of the prism are vetical but its horizontal edges will be inclined at 30° to the base.

(b) **Case II when the axis is horizontal**

When the axis of the prism is horizontal, the end faces of the prism which are square, will be vertical. In the isometric view, the vertical end face of prism is represented by a rhombus ABCD. The isometric view of the prism is shown in Fig.9.17b.

.5 Isometric Projection of Prisms

'roblem : _Draw the isometric view of a pentagonal prism of base 60mm side, axis 100mm ng and resting on its base with a vertical face perpendicular to V.P._
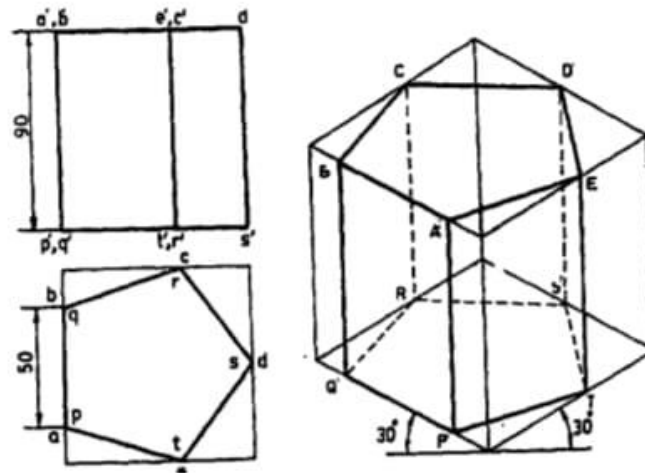
Construction (Fig. 9.18)

Fig. 9.18 Isometric Drawing of a Pentogonal Prism

1. The front and top views of the prism are shown in Fig.9.18a.
2. Enclose the prism in a rectangular box and draw the isometric view as shown in Fig.9.18b using the box method.

Problem : *A hexagonal prism of base of side 30mm and height 60mm is resting on its base on H.P. Draw the isometric drawing of the prism.*

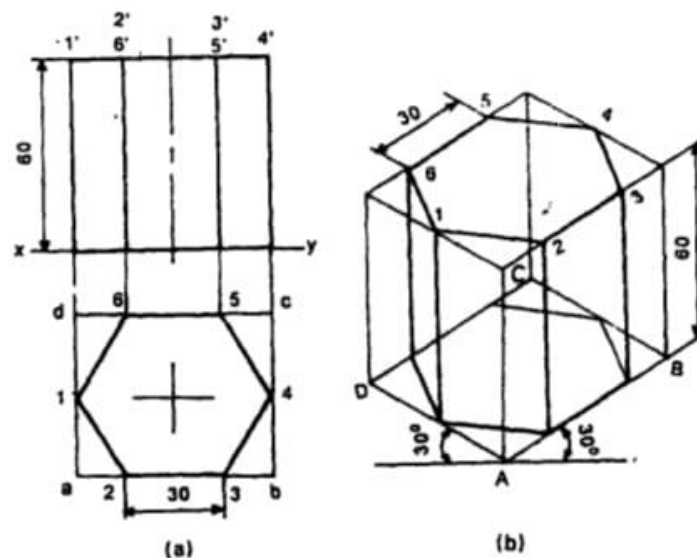## Construction (Fig.9.19)

(a)   (b)

Fig. 9.19 Isometric Drawing of a Hexagonal Prism

1. Draw the orthographic views of the prism as shown in Fig.9.19a.
2. Enclose the views in a rectangle (ie the top view -base- and front views).
3. Determine the distances (off-sets) of the corners of the base from the edges of the box.
4. Join the points and danken the visible edges to get the isometric view.

9.6 Isometric Projection of Cylinder

Problem : _Make the isometric drawing of a cylinder of base diameter 20mm and axis 35mm long._
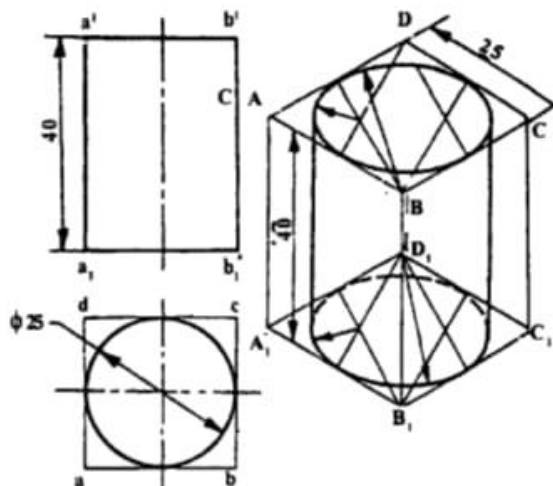
Constructon (Fig. 9.20)

Fig. 9.20 Isometric Drawing of a Cylinder

1. Enclose the cylinder in a box and draw its isometric drawing.
2. Draw ellipses corresponding to the bottom and top bases by four centre method.
3. Join the bases by two common tangents.

9.7 Isometric Projection of Pyramid

Problem : _A pentagonal pyramid of side of base 30mm and height 70mm is resting with its base on H.P. Draw the isometric drawing of the pyramid._

Construction (Fig. 9.21)

1. Draw the projections of the pyramind (Fig.9.21a).
2. Enclose the top view in a rectangle **abcde** and measure the off-sets of all the corners of the base and the vertex.
3. Draw the isometric view of the rectangle ABCD.
4. Using the off-sets locate the corners of the base 1,2, etc. and the vertex o.
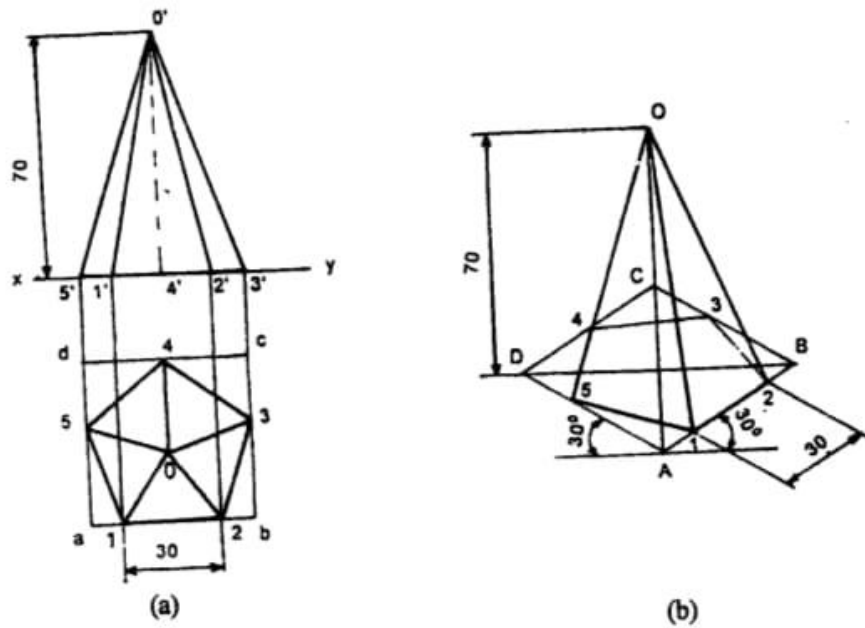5. Join o-1, o-2, o-3, etc. and draken the visible edges and obtain the required view.

Fig. 9.21

9.8 Isometric Projection of Cone

Problem : *Draw the isometric drawing of a cone of base diameter 30mm and axis 50r long.*
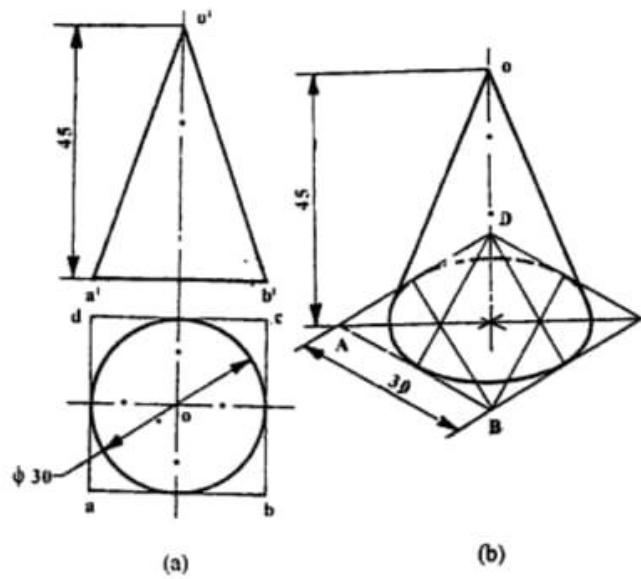
Construction (Fig.9.22) off-set method.

Fig. 9.22 Isometric Drawing of a Cone