GPCET
Pioneering Innovative Education

I B.TECH- I SEMESTER

DEPARTMENT OF MECHANICAL ENGINEERING

ENGINEERING DRAWING

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UNIT-II

DEFINITIONS:

Scales	A scale is defined as the ratio of the length of a line in the drawing to the actual length of the edge of the object.
Projection	A projection is defined as a representation of an object on a two dimension plane. It is known as image of an object. Technical people often call it as view of an object.
Principles Plane (Planes of Projection)	A POP is a plane on which particular view is projected. In orthographic projection we need different projection different POP's to draw different views of an object. Three mutually perpendicular planes are called Principal Planes or Reference Planes (RP's).
Horizontal Plane	A plane parallel to the ground is known as Horizontal Plane (HP)/Horizontal Reference Plane (HRP)
Vertical Plane	A plane perpendicular to the ground & intersecting the Horizontal Plane is called Vertical Plane (VP)/Vertical Reference Plane (VRP)
Profile Plane	A plane perpendicular to the both HP & VP & intersecting both HP & VP is called Profile Plane (PP)/Profile Reference Plane (PRP)

CONCEPTS:

I. Scales:

It is not always possible to prepare drawings to the exact dimensions of the object. This is because we may have to represent objects of both bigger sizes (like building, engine etc.,) and smaller size (like parts of a wrist watch, electronic gadgets etc.,). Then we have to go with scales.

A scale is defined as the ratio of the length of a line in the drawing to the actual length of the edge of the object.

$$\text{Scale} = \frac{\textit{Length of line in the drawing}}{\textit{Actual length fo the edge on the object}}$$

Scales are classified into three types. They are.

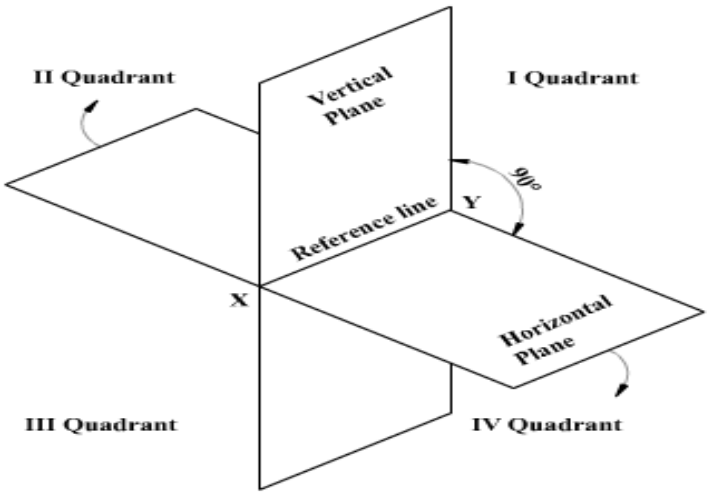
A) If the S.F is <1, then the scale is known as Reducing scale.

B) If the S.F is =1, then the scale is known as Full size scale

C) If the S.F is >1, then the scale is known as Enlarging scale

II. Principles Planes of Projection:

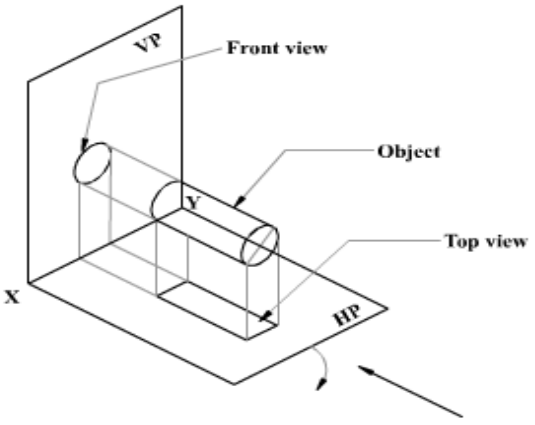
The projections may be performed in 4 different angles of projections. i.e. 1st, 2nd, 3rd& 4th angle of projections. Only 2 systems i.e first angle & third angle projections are followed. The Bureau of Indian standards first angle projection

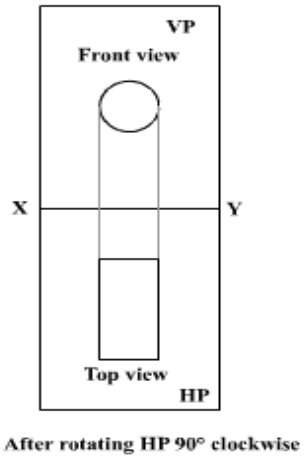


To obtain projections on a drawing sheet, it is convenient to rotate the HP through 90^0in the clock direction about the reference line XY, so that it coincides with the VP.

III. First Angle of Projection

1. The object lies between the observer and the plane of projection.
2. The object is above HP & in front of VP.
3. The front view of the object is above XY & top view is below XY.

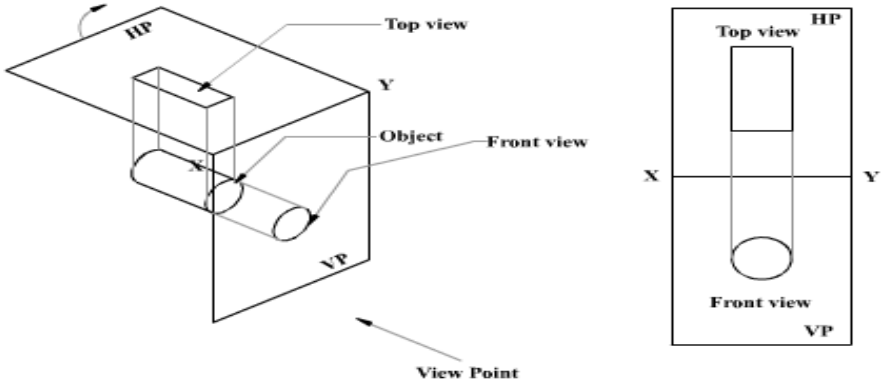




After rotating HP 90° clockwise

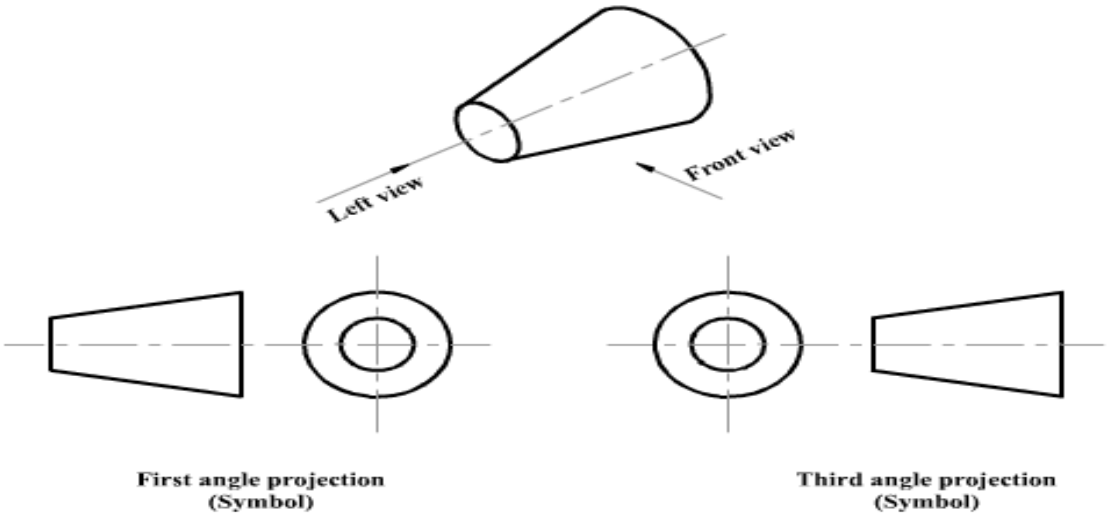
IV. Third Angle of Projection:

1. The plane of projection lies between the observer and the object.
2. The object is below HP & behind of VP.
3. The front view of the object is below XY & top view is above XY.



V. Projection Symbol:

It is mandatory that the system of projection used, namely first angle/third angle, should be symbolically specified in the title block. These symbols are the two views of a frustum of a cone whose axis is horizontal.



VI. Notations:

The actual points located in space are denoted by capital letters like A, B, C, D, etc.,
1. The front views are denoted by a', b', c', d', etc.,
2. The top views are denoted by a, b, c, d, etc.,
3. The side views are denoted by a", b", c", d", etc.

IMPORTANT QUESTIONS:

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

2) The Marina beach at Chennai is 2.5km long. On inspection of the road map, its equivalent distance measures 5cm. draw a diagonal scale to read 50m minimum. Mark on the scale a distance of 6350m.

3) Construct a vernier scale to read meters, decimeters and Centimeters and long enough to measure up to 4m. R.F of the scale is 1/20. Mark on your scale a distance of 2.28m.

4) Draw the projections of the following points when the
A) A point A is 2.5 cm above H.P. and 3 cm in front of V.P. Draw its Projections.
B) A point A is 2 cm below H.P and 4 cm behind V.P Draw its Projections.

5) Draw the projections of the following points when the
a) Point A lies in the H.P and 22mm away from V.P.
b) Point B lies in the V.P and 32mm away from H.P.
c) Point C lies 32mm from the H.P and 22mm from V.P

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