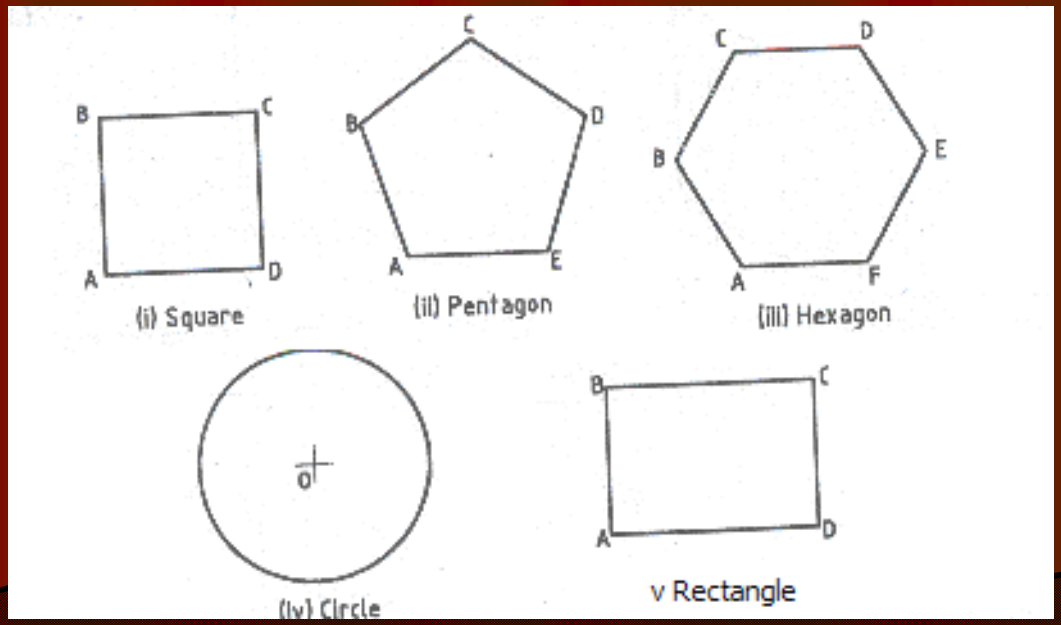
Projections of Planes

PROJECTIONS OF PLANES

- A plane is a two dimensional object having length and breadth only. Thickness is negligible.



Types of planes

1. Perpendicular plane which have their surface perpendicular to any one of the reference planes and parallel or inclined to the other reference plane.

2. Oblique plane which have their surface inclined to both the reference planes.

POSITIONS OF A PLANE

1. Surface of the plane kept perpendicular to HP and parallel to VP
2. Surface of the plane kept perpendicular to VP and parallel to HP
3. Surface of the plane kept perpendicular to both HP and VP
4. Surface of the plane kept inclined to HP and perpendicular to VP
5. Surface of the plane kept inclined to VP and perpendicular to HP
6. Surface of the plane kept inclined to both HP & VP

PLANE SURFACES INCLINED TO BOTH HP AND VP

Change of position method:-

- Orthographic projections of a plane surface inclined to one reference plane are drawn by changing the position of the plane surface from simple position to the required position in two stages known as the change of position method.

Three stages are given below:

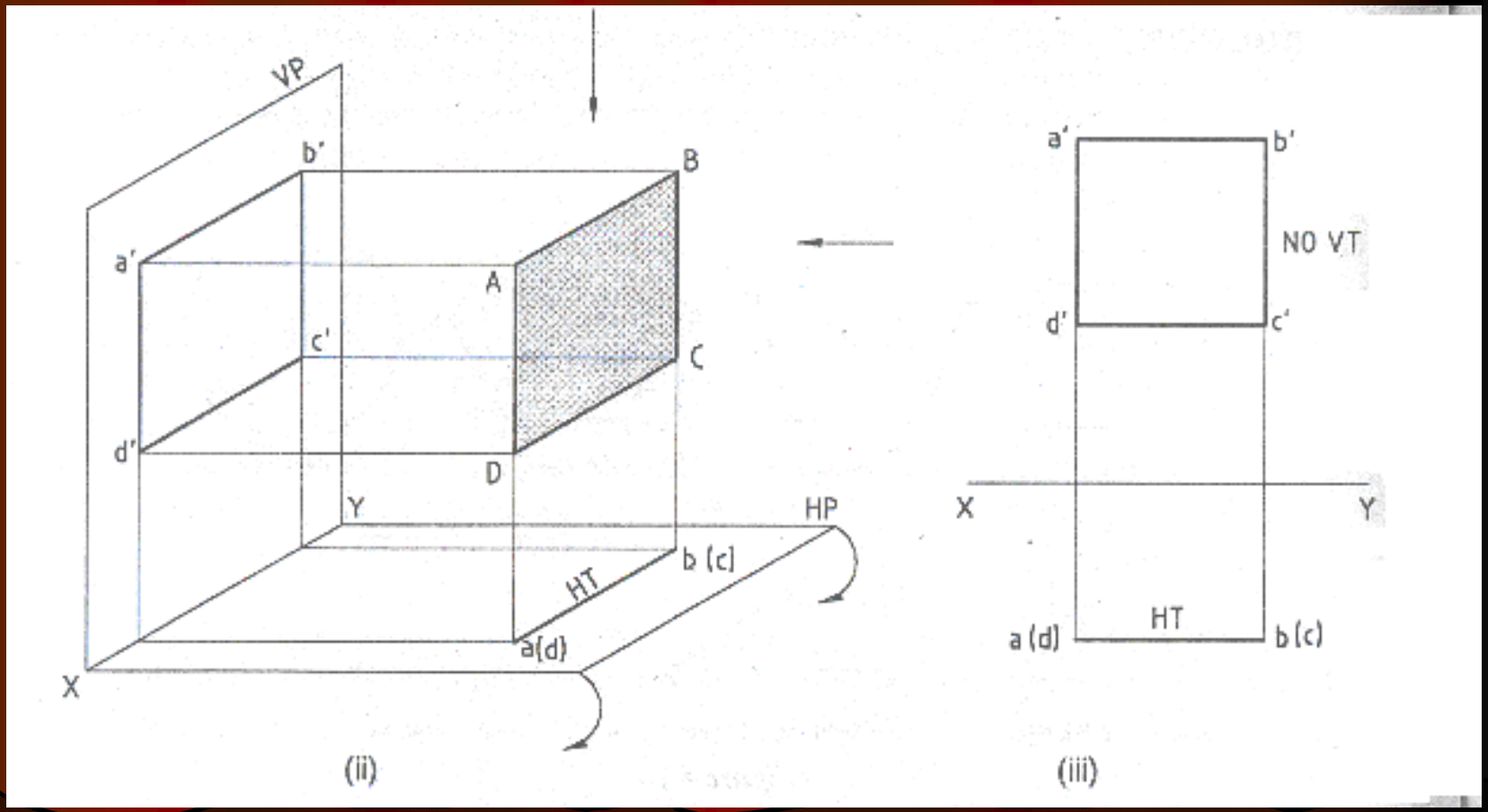
1. Simple position
2. Second position
3. Final position

SIMPLE POSITION

Rule:-

- When a plane surface is parallel to HP, top view shows its true shape & size. Therefore, draw the top view first . Project the front view from it.
- When a plane surface is parallel to VP, front view shows its true shape & size. Therefore, draw the front view first . Project the top view from it.

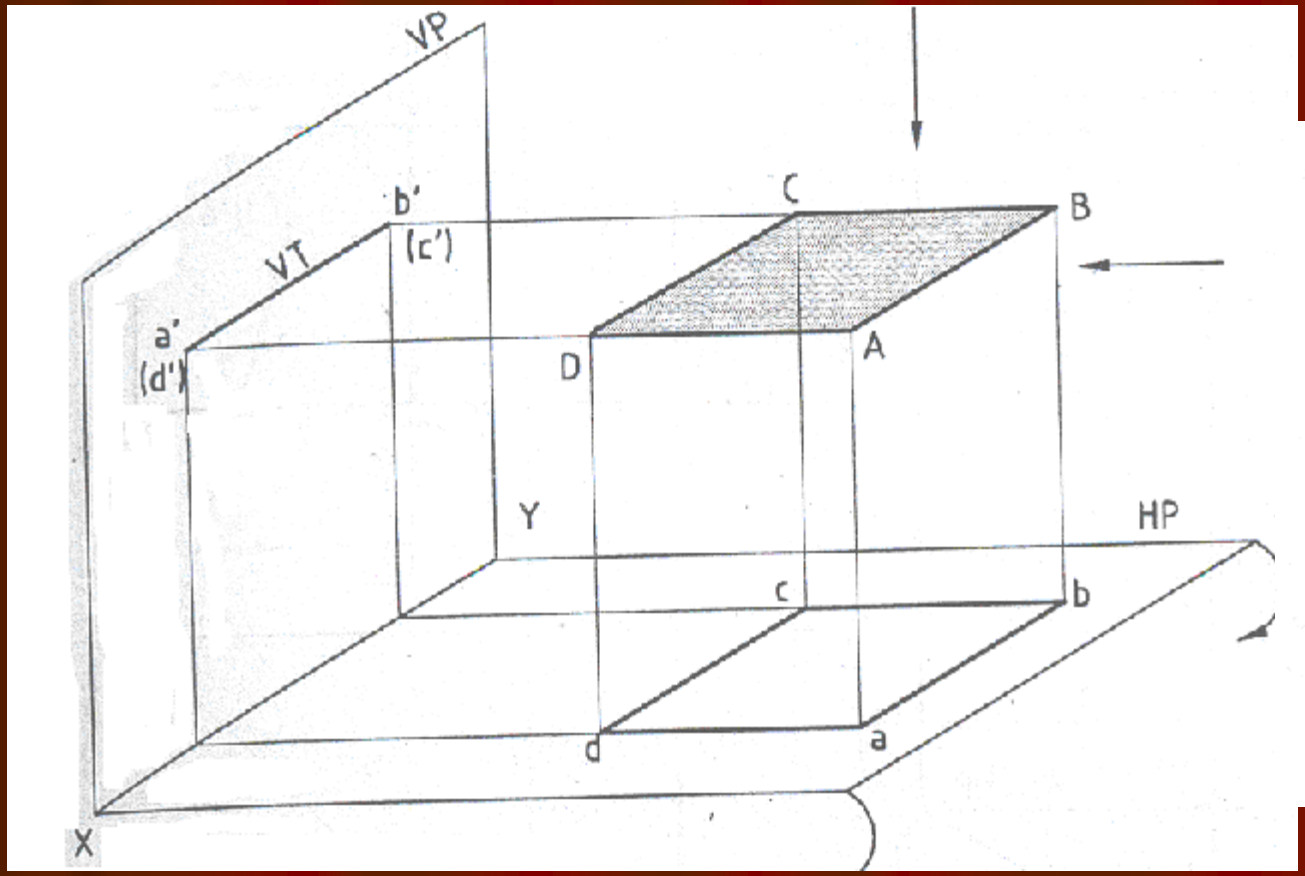
Projections of Plane with its surface Perpendicular to HP and Parallel to VP

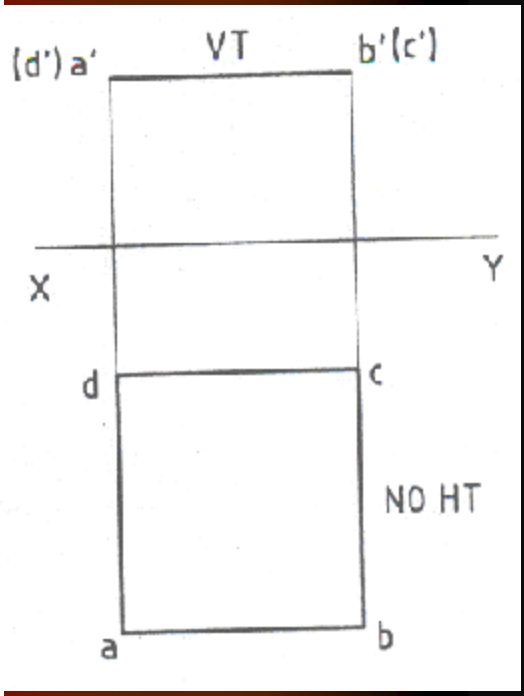


Problem 1:

- A square lamina ABCD of side 40mm is perpendicular to HP and parallel to VP. Draw its projections

Projections of Plane with its surface Perpendicular to VP and Parallel to HP

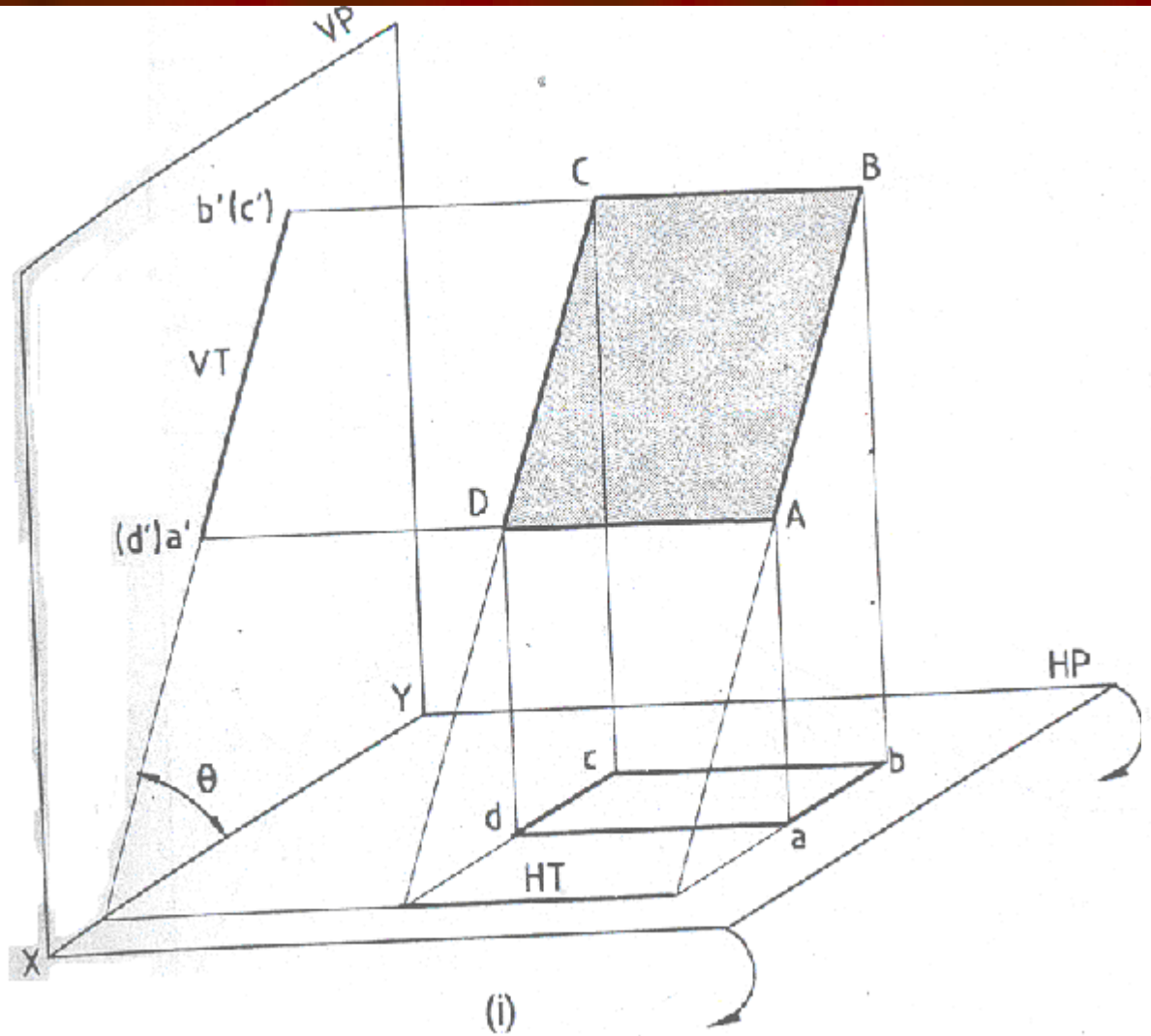


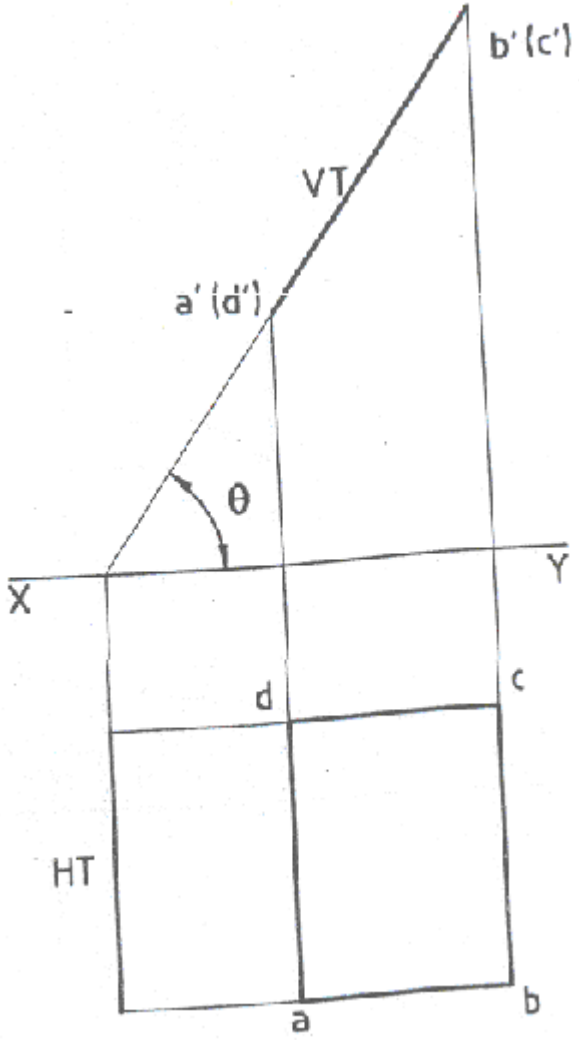


Problem 2:

- A square lamina of side 40mm is perpendicular to VP and parallel to HP. Draw its projections.

Projections of a Plane with its surface Inclined to HP and Perpendicular to VP

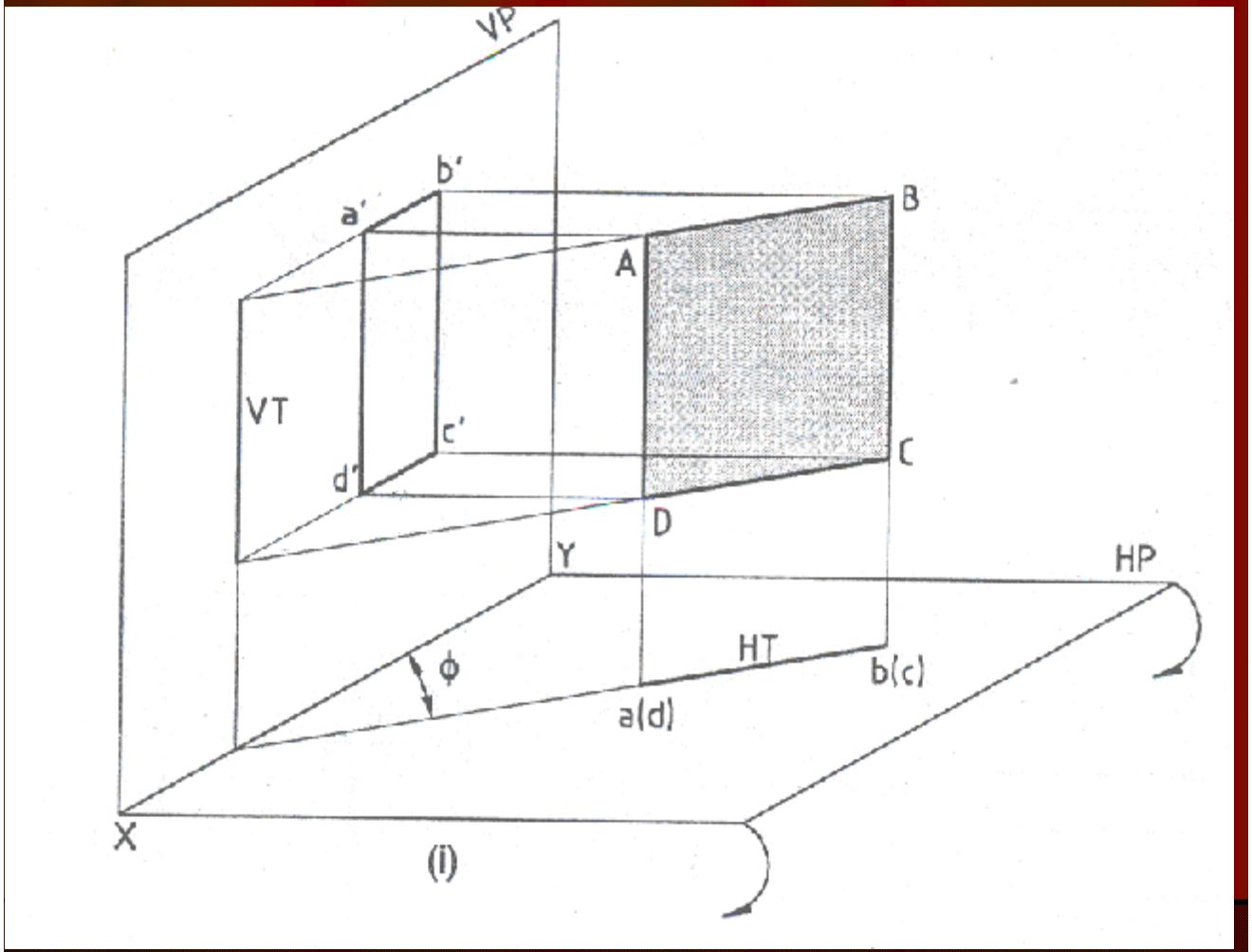


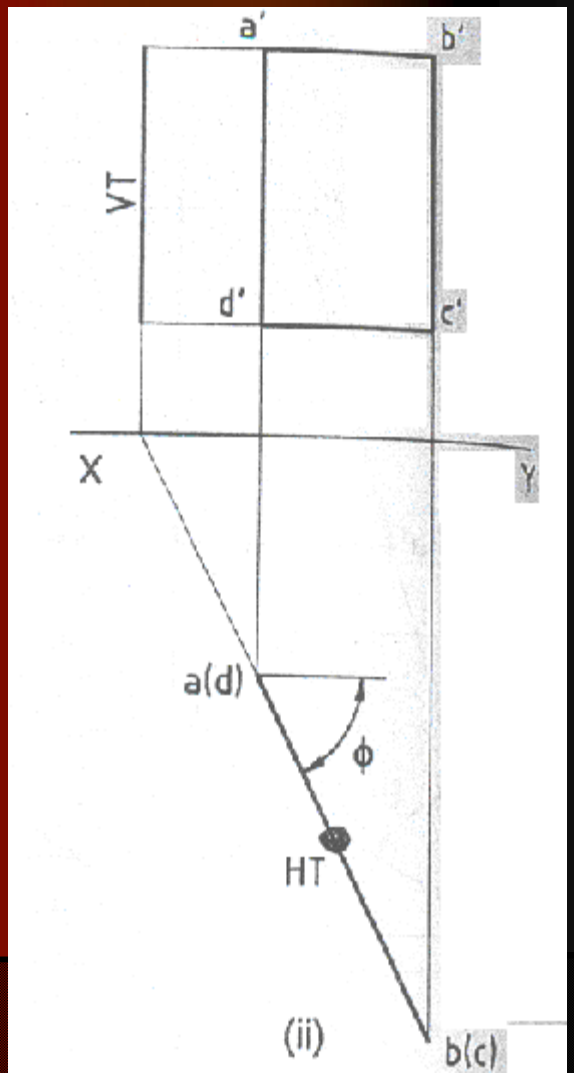


Problem 3:

- A rectangular lamina of sides 30mm ×40mm is perpendicular to VP and inclined at 30° to HP. Draw its projections.

Projections of a Plane Inclined to VP and Perpendicular to HP





Problem 4:

- A rectangular lamina of sides 30mm ×40mm is perpendicular to HP and inclined at 30° to VP. Draw its projections.

Perpendicular to VP and Inclined to HP (change of position method)

- A regular pentagonal plate of side 28mm is placed with one side on HP such that the surface is inclined at 45° to HP and perpendicular to VP. Draw its projections.

Perpendicular to HP and Inclined to VP

- A thin circular metal plate of 48mm diameter, having its plane vertical and inclined at 40° to VP. Its center is 33mm above HP and 25mm in front of VP. Draw its projections.

Problems

- A hexagonal plate of size 30mm is placed with a side on VP and surface and surface inclined at 45° to VP and perpendicular to HP. Draw the projections.

- A circular plate of diameter 50mm is resting on HP on a point on the circumference with its surface inclined at 45° to HP and perpendicular to VP. Draw its projections.

Projections of a plane inclined to both HP and VP (problem from TJ)

- A rectangular plate of side 50×25mm is resting on its shorter die on HP and inclined at 30° to VP. Its surface is inclined at 60° to HP. Draw its projections.
- A hexagonal plate of side 30mm is resting on one of its sides on VP and inclined at 40° to HP. Its surface is inclined at 35° to VP. Draw its projections.

Problem from venugopal Cont…

- A hexagonal lamina of 24mm side has its surface inclined at 30º to HP. Its one side is parallel to HP and inclined at 45º to VP. Draw its projections.(UQ)

- Draw the projections of a pentagonal sheet of 26mm side, having its surface inclined at 30º to VP. Its one side is parallel to VP and inclined at 45º to HP.(UQ)

Problem from venugopal

- A thin rectangular plate of sides 50mm X 25mm has its shorter side in the HP & inclined at an angle of 30º to the VP. Project its front view when its top view is a perfect square of 25mm side.(UQ)
- A hexagonal lamina of 20mm side rests on one of its corners on the HP. The diagonal passing through this corner is inclined at 45º to the HP. The lamina is then rotated through 90º such that the top view of this diagonal is perpendicular to the VP and the surface is still inclined at 45º to the HP. Draw the projections of the lamina.(UQ)

Problem from venugopal Cont…

- A circular lamina of 60mm diameter rests on HP on a point 1 an the circumference. The lamina is inclined to HP such that the top view of it is an ellipse of minor axis 35mm. The top view of the diameter through the point 1 makes an angle of 45º with VP. (i) Draw the projections. (ii) Determine the angle made by the lamina with the HP.(UQ)
- A thin square plate EFGH of 40mm side is having its corner G on HP. Diagonal GE is inclined at 40º to HP and diagonal FH inclined at 40º to VP and parallel to HP . Draw its projections.(UQ)

- A pentagonal plate of side 30mm is resting on HP on one of its corners with its surface inclined at 45° to HP. The side opposite to the resting corner is parallel to VP and farther away from it. Draw its projections.

- A Pentagonal lamina of side 30mm is resting on HP with one of its corner. The surface is at 60º to HP. The edge opposite to this corner is parallel to VP and further nearer to it. Draw its projections.

- A hexagonal plate of side 30mm has one of its corners on HP and the opposite corner on VP. The plate makes an angle of 60º with HP and 30º with VP. Draw the projections of the plate.

Practice:-

- A circular lamina of diameter 70mm has the one end A of the circular lamina on HP and the opposite end on VP. Draw its projections when its surface is inclined at 50º to HP and 40º to VP.
- A circular plate of 50mm diameter, appears as an ellipse the front view, having its major axis 50mm long and minor axis 30mm long. Draw the top view, when the major axis of the ellipse is horizontal.

- A pentagon of side 30mm rests on the ground on one of its corners with the sides containing the corner being equally inclined to the ground. The side opposite to the corner on which it rests is inclined at 30° to the VP and is parallel to the HP. The surface of the pentagon makes 50° with the ground. Draw the top and front views of the pentagon.
- A hexagonal lamina of side 30mm rests on one of its edges on HP. This edge is parallel to VP. The surface of the lamina is 60º to HP. Draw its projections.

Problem from venugopal Cont…

- A square lamina ABCD of 60mm side with one of its edge on HP. And lamina inclined at an angle 45° to HP. And one of its edge inclined at an angle 30° to VP.
- A semi-circular lamina of 64mm diameter has its straight edge in VP and inclined at an angle of 45º to HP. The surface of the lamina makes an angle of 30º with VP. Draw the projections.

END

Continue…(problem from RB)

- A square lamina ABCD of 60mm side with one of its edge on HP and lamina inclined at an angle 45° to HP and one of its edge inclined at an angle 30° to VP.
- A regular hexagonal lamina of 40mm side is resting on one of its corner on HP. Its surface is inclined at 45° to HP. The plan of the diagonal through the corner which on HP makes an angle of 45° with XY. Draw its projections.