ENGINEERING GRAPHICS (BITS F110)

BITS Pilani
K K Birla Goa Campus

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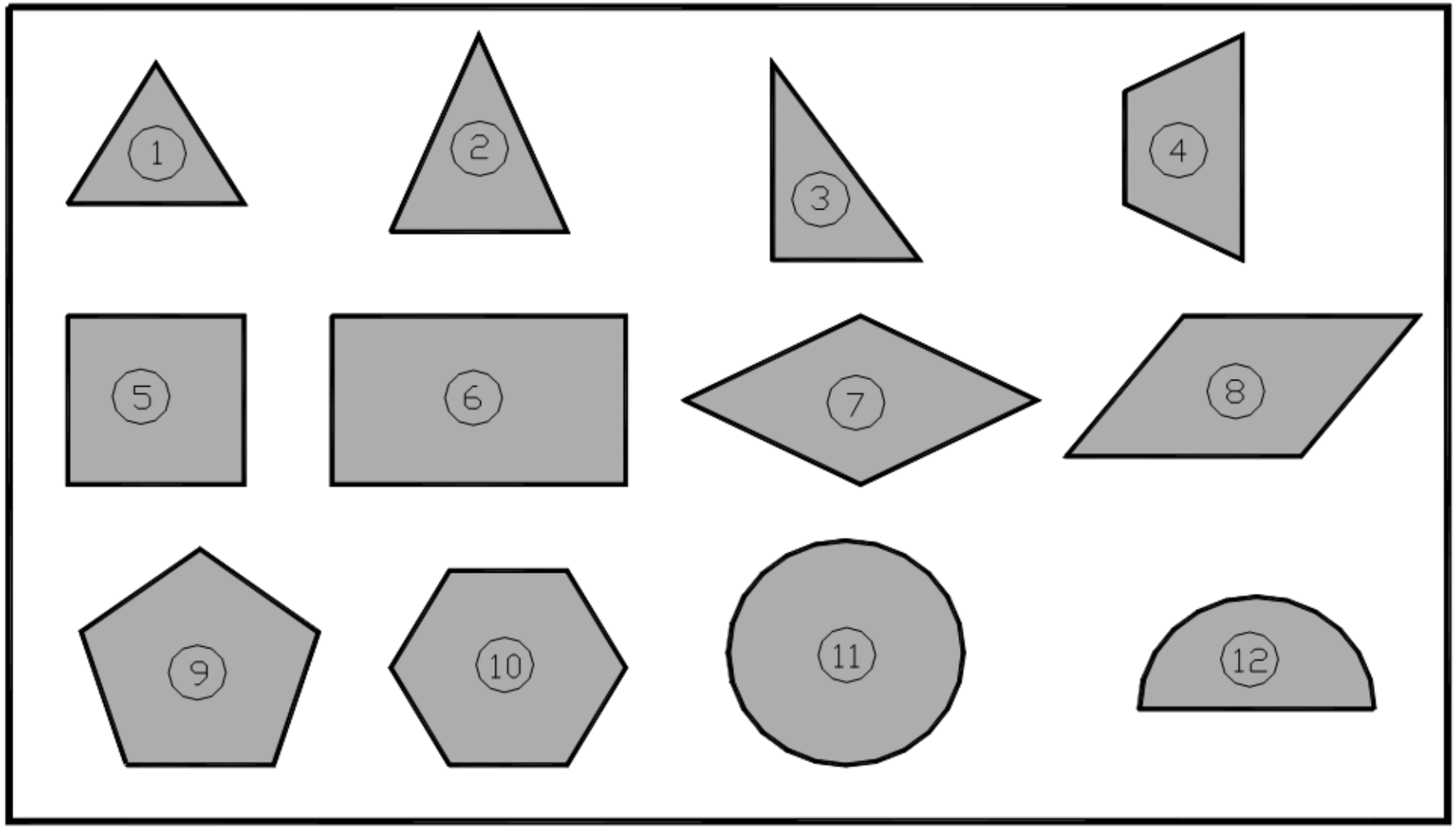
CHAPTER- 10
PROJECTIONS OF PLANAR SURFACES

Learning Objectives

- Learn the projection of planes in a 3-D space
- Learn the projection of intersection of planes and with the principal planes

Plane Surface under Study



Classification of Planar Surface

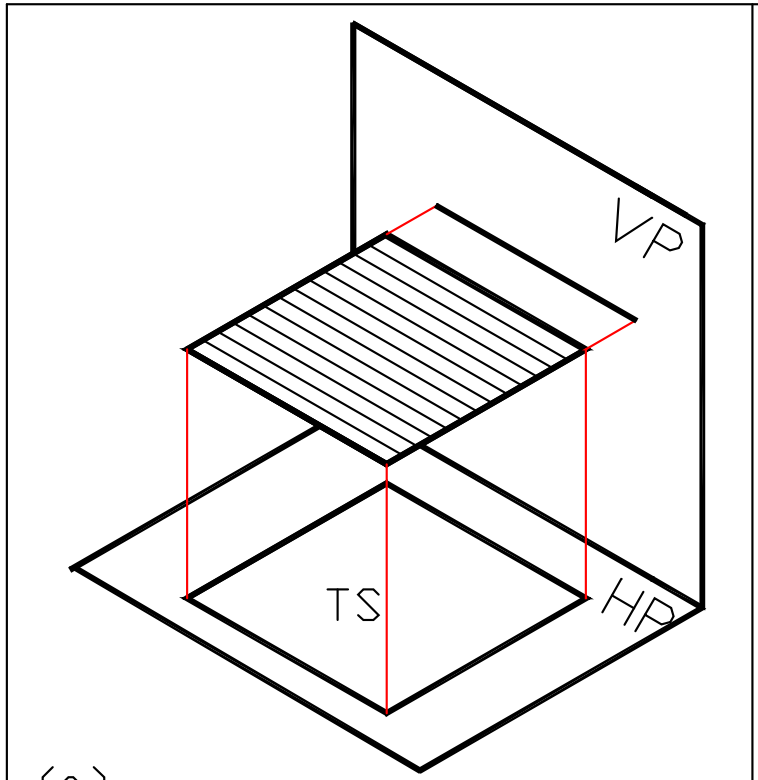
(A) Perpendicular Planes

(a) Perpendicular to one reference plane and parallel to the other

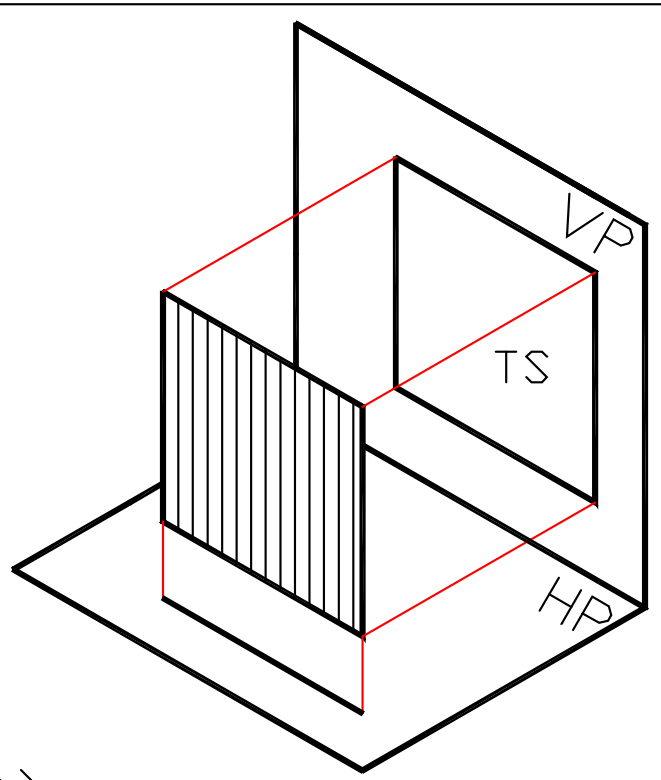
(b) Perpendicular to one plane and inclined to the other

(B) Oblique Planes

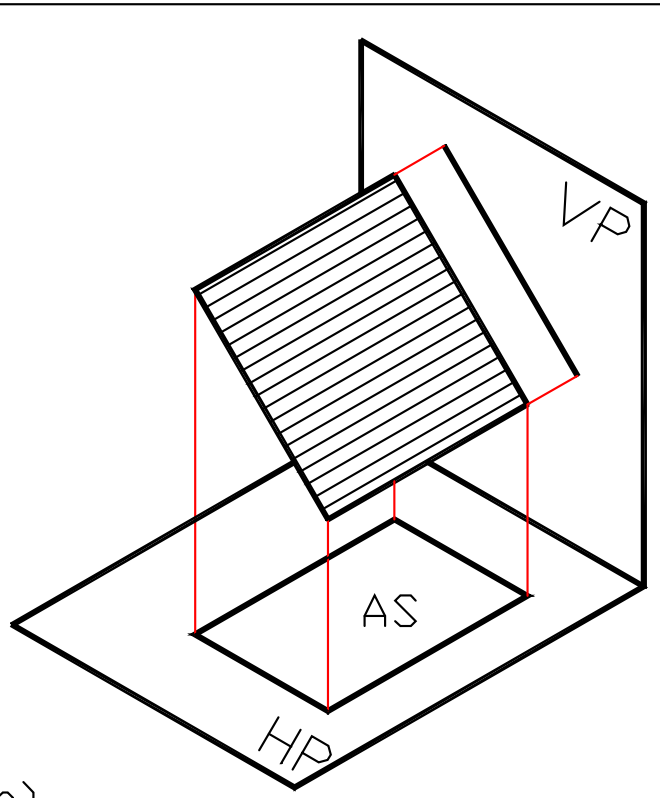
Perpendicular Planes



(a)
Surface perpendicular to VP and parallel to HP

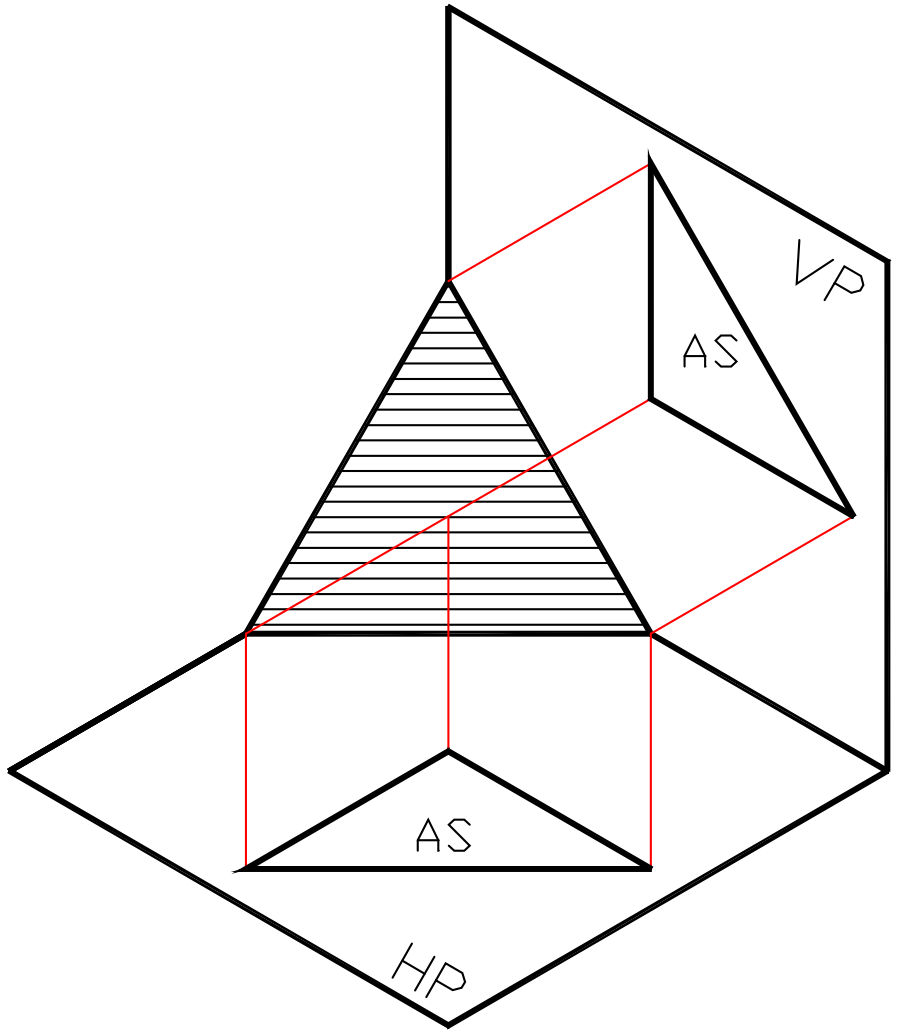


(a)
Surface perpendicular to HP and parallel to VP



(b)
Surface is inclined θ° to HP and perpendicular to VP

Oblique Planes



Inclined Planes

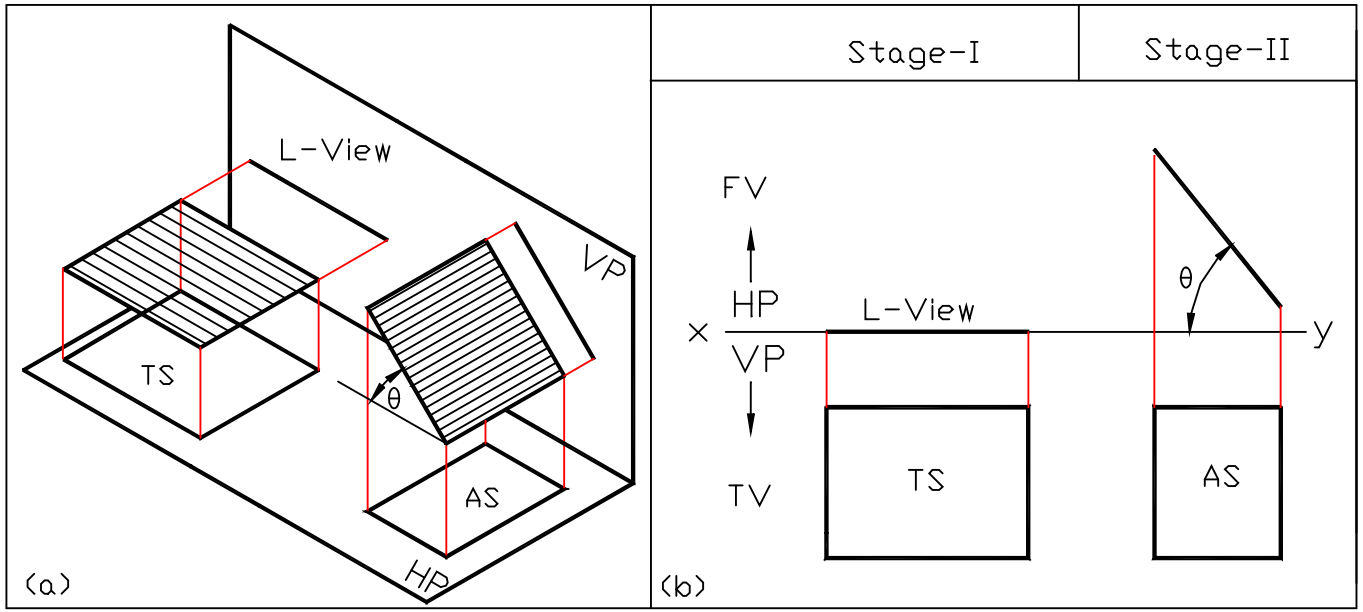
How to Determine True Shape or True Inclination

Stage I: Assumption stage

Assume plane surface parallel to that reference plane to which it is inclined and obtain the true shape and line view (L-view).

Stage II: Surface inclination stage

Now, rotate the line view of the surface through required inclination (θ^o) and obtain an apparent shape.



Oblique Planes

How to Determine True Shape or True Inclination

Stage I: Assumption stage

Assume plane surface parallel to that reference plane to which it is inclined and obtain the true shape and line view (L-view).

Stage II: Surface inclination stage

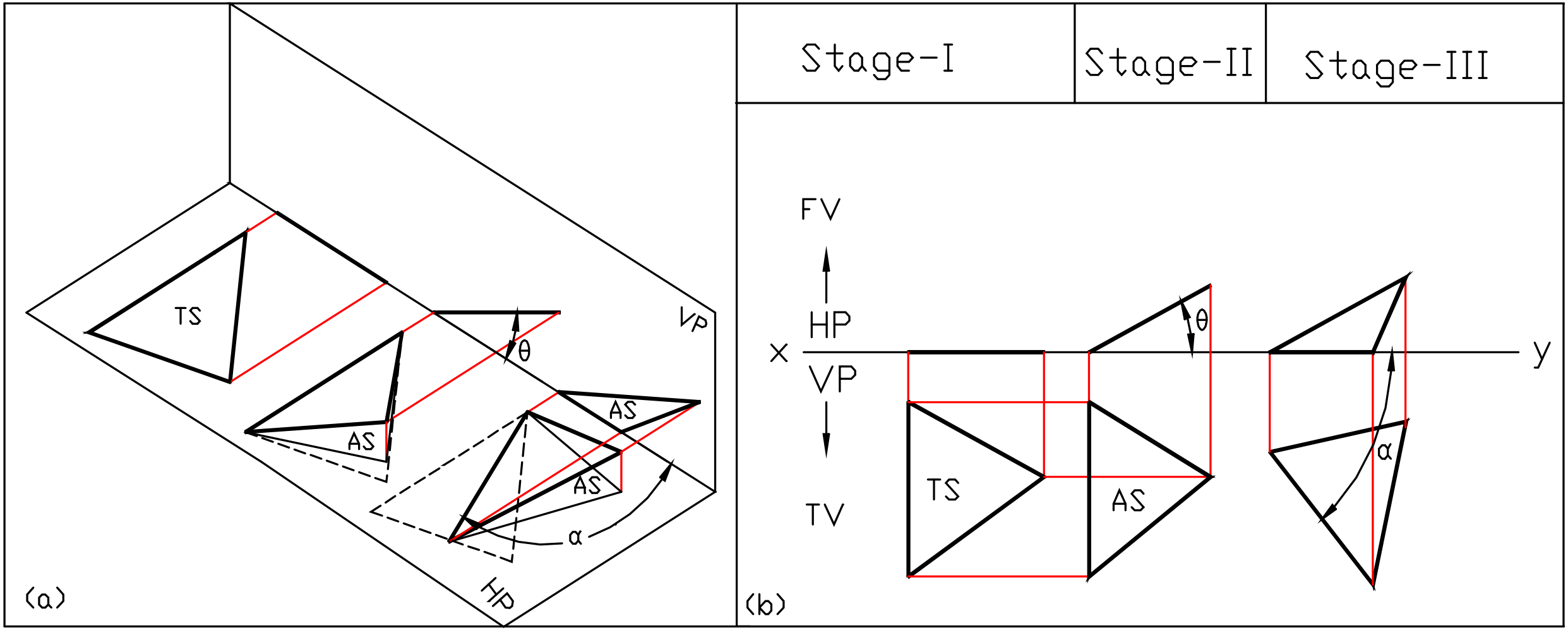
Now, rotate the line view of the surface through required inclination (θ^o) and obtain an apparent shape.

Stage III: Edge inclination

In this stage, the edge of the apparent shape of plane surface is rotated through required inclination (say α^o) to obtain the final projections.

Oblique Planes

How to Determine True Shape or True Inclination



True Shape Stage Assumption

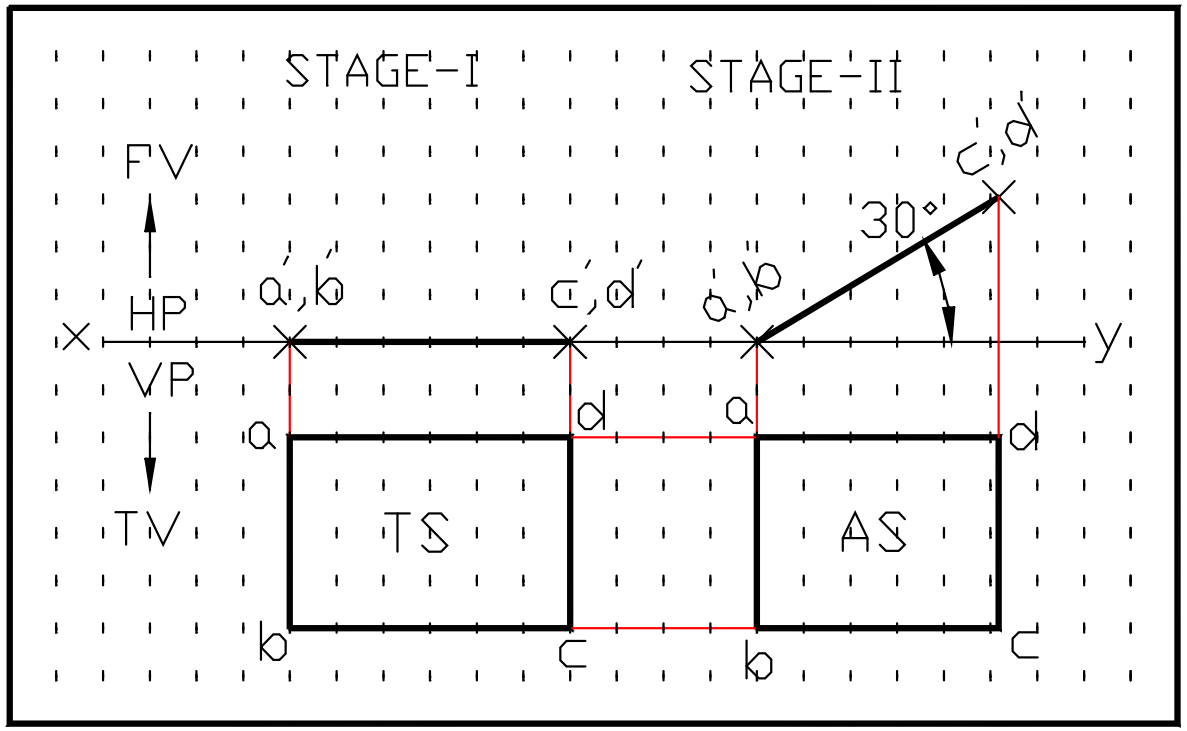
There are two options to draw a true shape:

(a)If plane is resting on its edge, draw a true shape of the surface with the resting edge perpendicular to the x-y line.

(b)If the plane surface is resting on one of its corner, then draw the true shape of the plane surface such that line joining resting corner and the center of the plane parallel to the x-y line. In this stage, we obtain true shape in one view and line view of surface in another view.

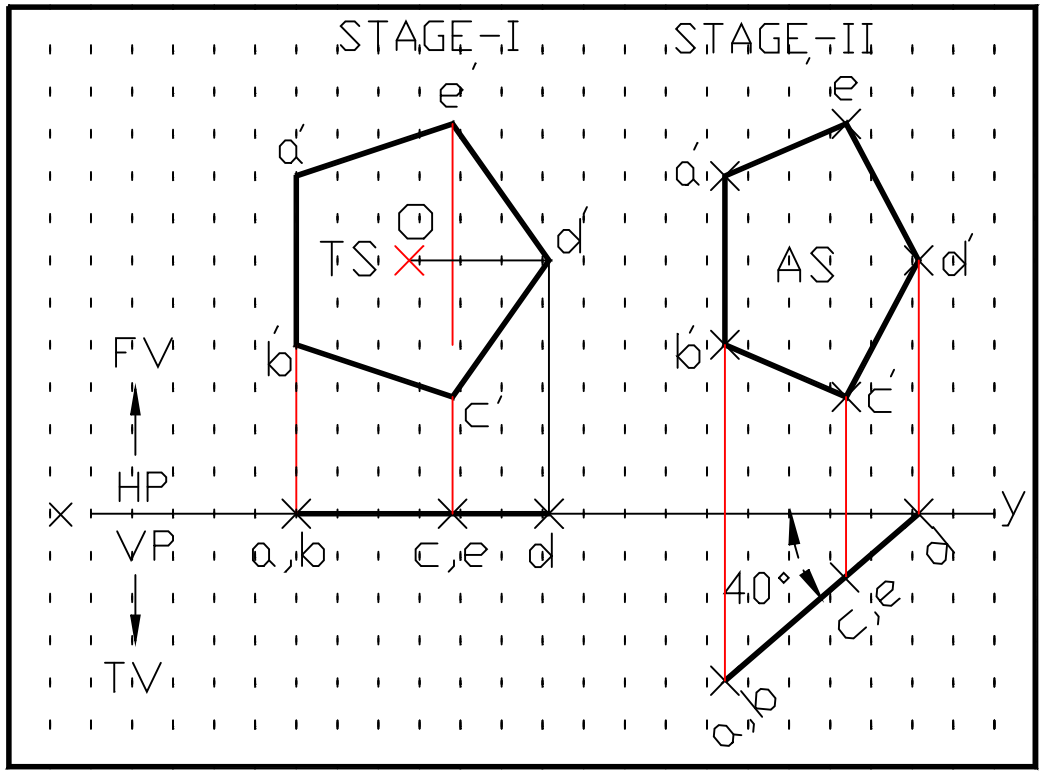
Model Solution-1

A rectangular plate of negligible thickness having 150 mm length and 100 mm width is resting on one of its smaller side on HP. The surface is perpendicular to VP and makes an inclination of 30º to HP. Draw projections of the plate.



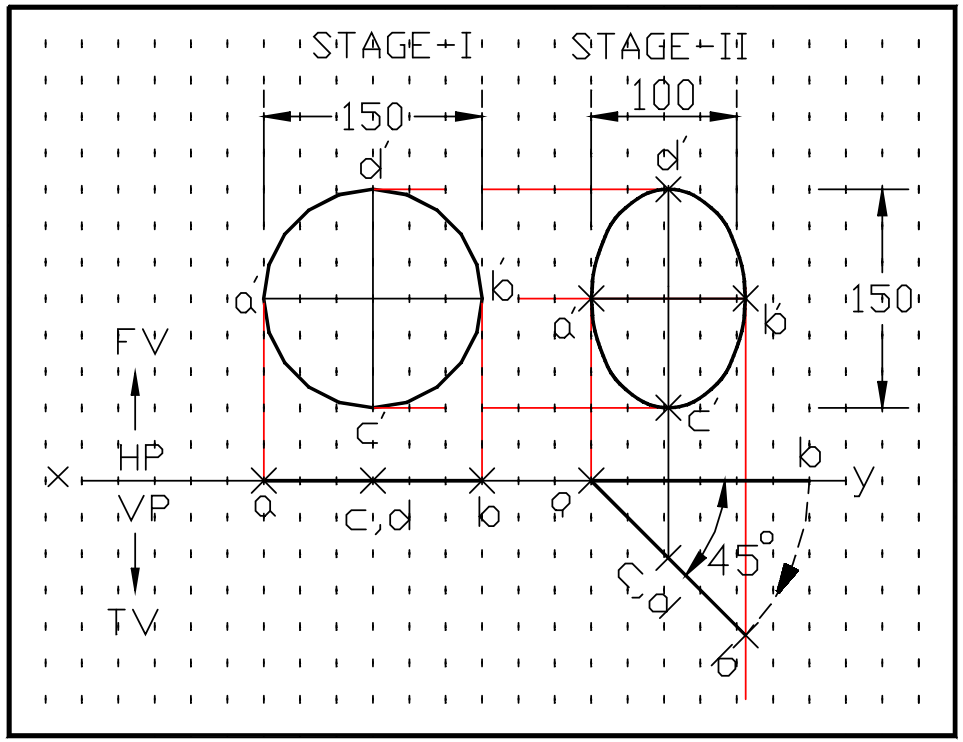
Model Solution-2

A pentagonal plate of negligible thickness and having edge length 100 mm is resting on one of its corners on VP. The plate is inclined 40^{o} to VP and perpendicular to HP. Draw projections of the plate.



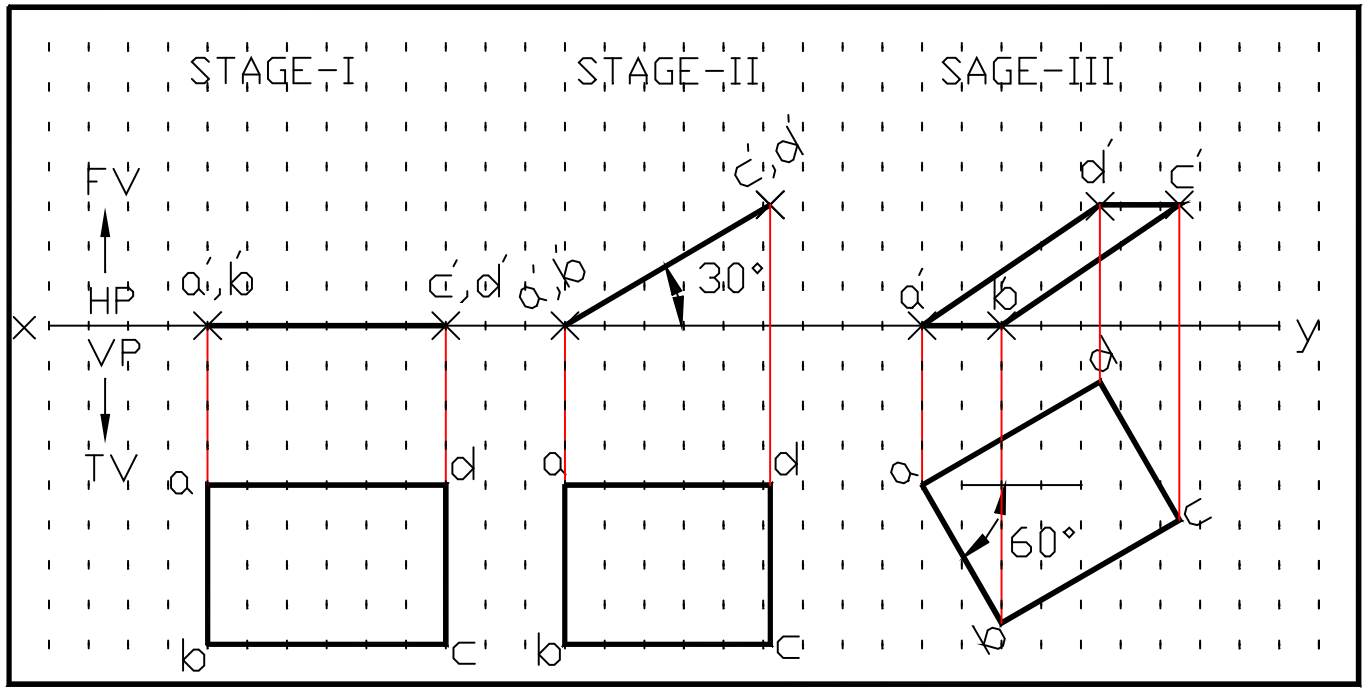
Model Solution-3

A circular plate is resting on its circumferential point on VP with surface perpendicular to HP. It is inclined to VP such that FV appears as an ellipse. Find the surface inclination at which the ellipse has minor axis 100 mm and major axis 150 mm.



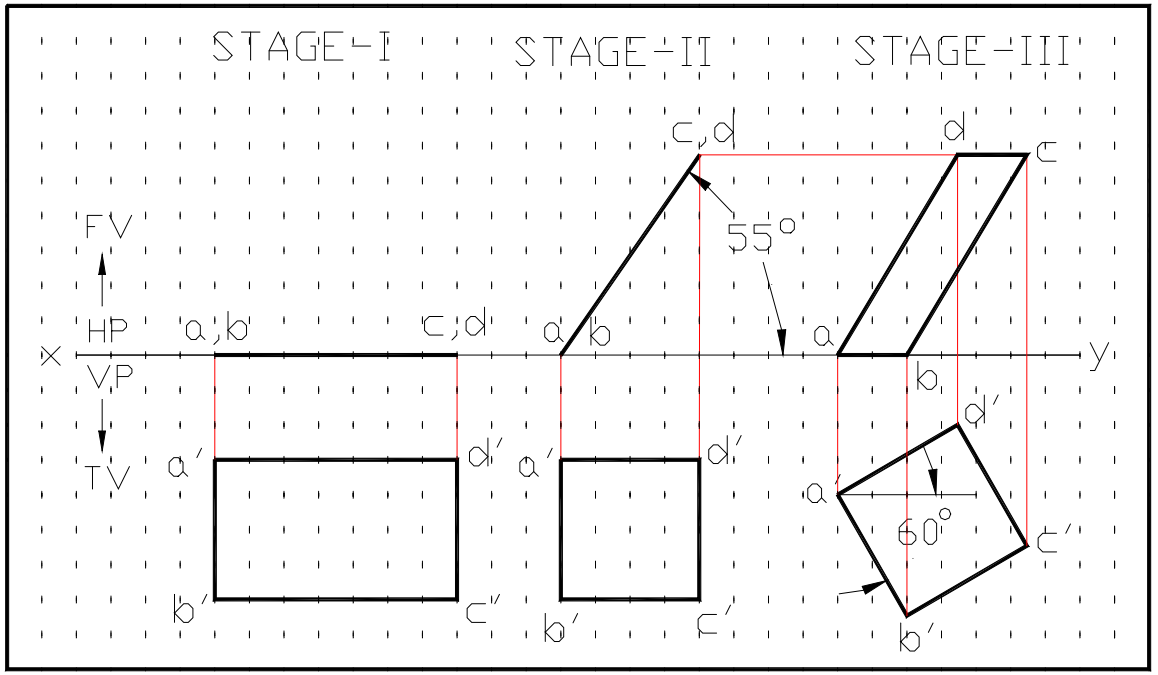
Model Solution-4

A rectangular plate of negligible thickness having 150 mm length and 100 mm width is resting on one of its smaller side on HP. The surface makes an inclination of 30º to HP and the smaller side makes an inclination of 60º to VP. Draw projections of the plate.



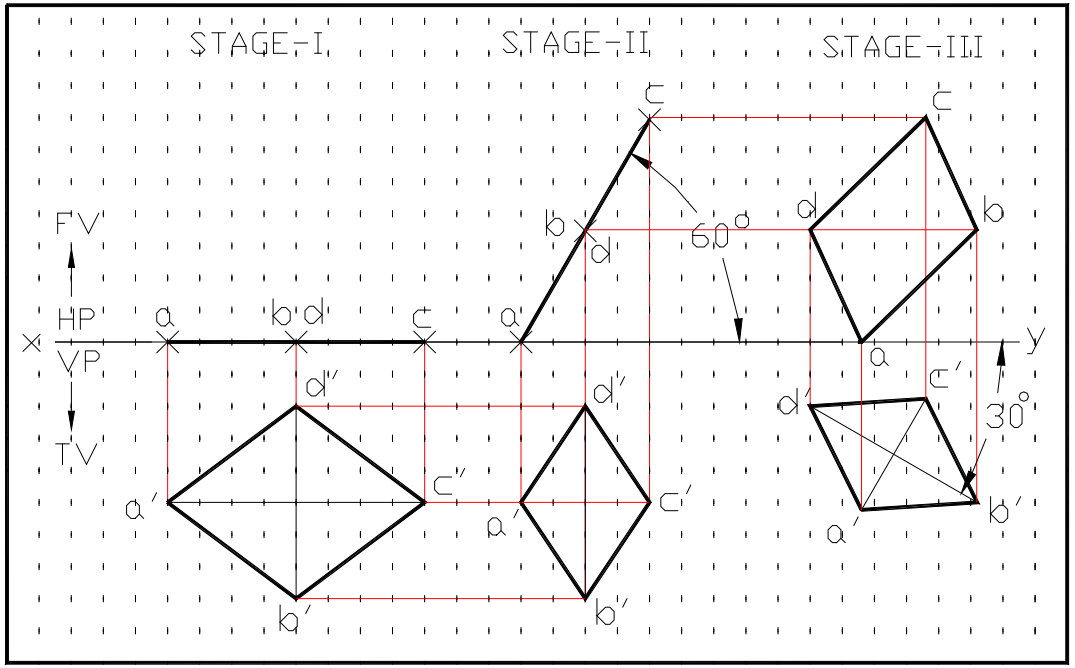
Additional Problems

A rectangular lamina with longer edge 175 mm and smaller edge 100 mm, is resting on one of its smaller edges on the HP. It is inclined with the HP in such a way that its TV appears as a square with maximum dimensions. Draw projections if the smaller edge makes an inclination of 60° with the VP.



Additional Problems

A lamina of rhombus shape, has major diagonal of 200 mm and minor diagonal of 150 mm. It is resting on one of its corners on HP. The lamina is inclined to the HP in such a way that its major diagonal appears as a minor diagonal of 100 mm. Draw projections of the lamina when its original minor diagonal makes an inclination of 30° with the VP.



Thank You!