## 8.4. GENERAL RULES FOR INITIAL POSITION OF PLANES

The following general rules may be followed while drawing the initial position of a plane.

**(1) Plane inclined to H.P., perpendicular to V.P. resting on edge or side on H.P.**

(i) Keep one edge in H.P. and draw the top view by keeping the side perpendicular to V.P. in initial positon step (i) Fig. 8.18.
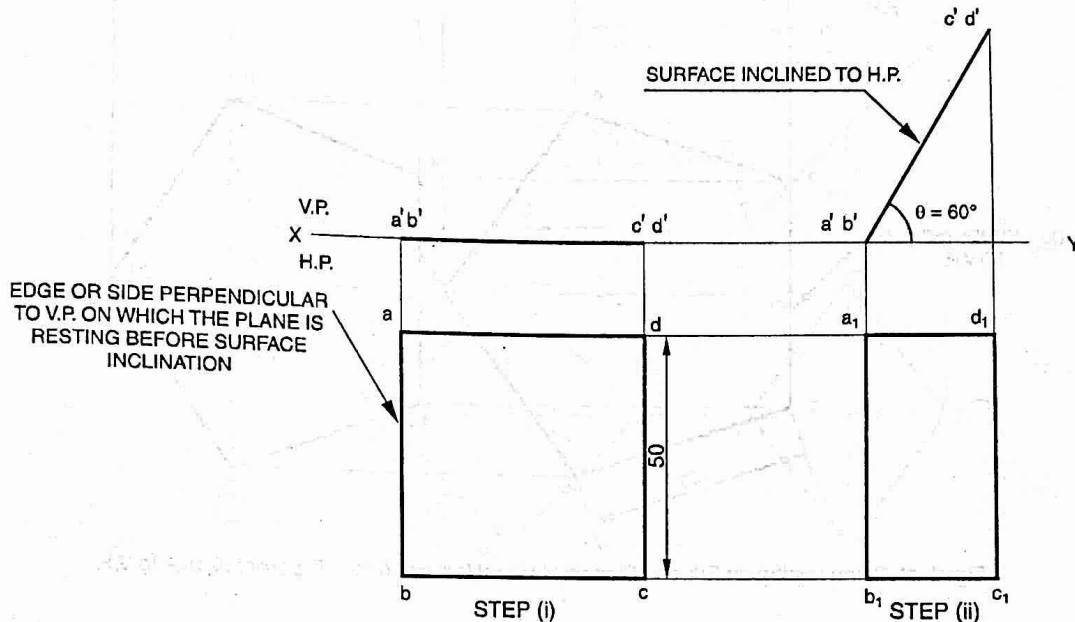


Fig. 8.18. Plane resting on edge or side in H.P. and inclined θ to H.P. θ, perpendicular to V.P.

(ii) Incline the surface of plane at given angle θ to H.P. keeping the edge or side, on which it is to rest, on XY line

(iii) Draw the top view by taking horizontal and vertical projections. Let them intersect and locate the points and complete the top view by joining these points.

(iv) Above rule in applicable vice versa when the plane is resting in V.P. on edge or side and inclined to V.P. at φ and perpendicular to H.P.

Fig. 8.19 and 8.20 show the position of other polygonal planes or side resting on an edge of base on H.P. and inclined θ to H.P. and perpendicular to V.P.



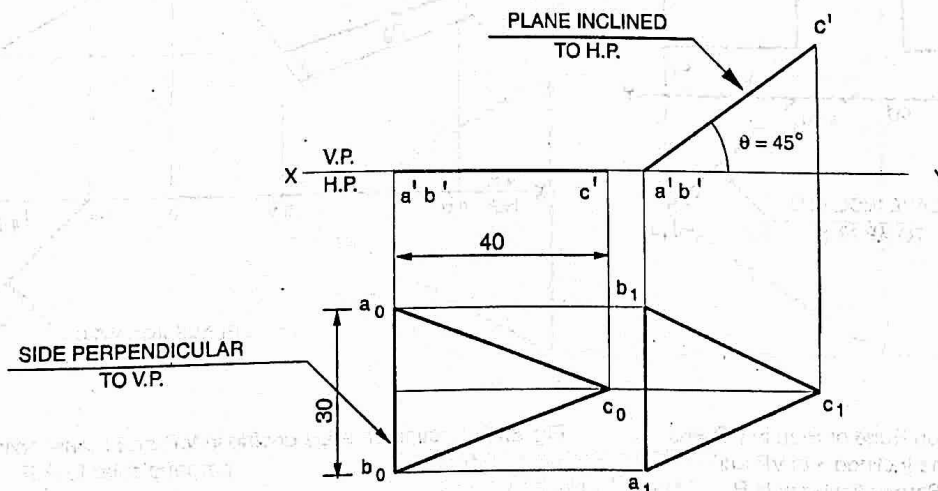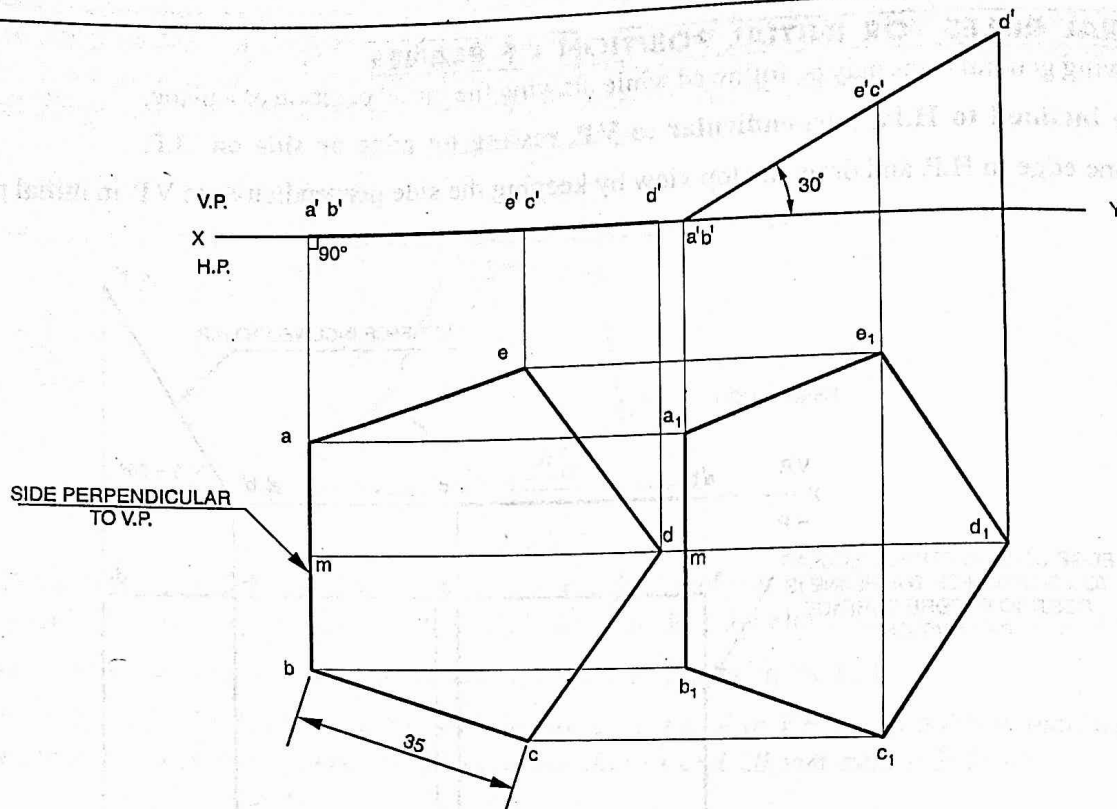Fig. 8.19. Plane resting on edge or side on H.P. and inclined θ to H.P., perpendicular to V.P.

Fig. 8.20. Plane resting on Edge or Side on H.P. and Inclined θ to H.P. perpendicular to V.P.

Fig. 8.21 and 8.22 shows the position of polygonal planes resting on an edge of base or side on V.P. and inclined φ to V.P. perpendicular to H.P.
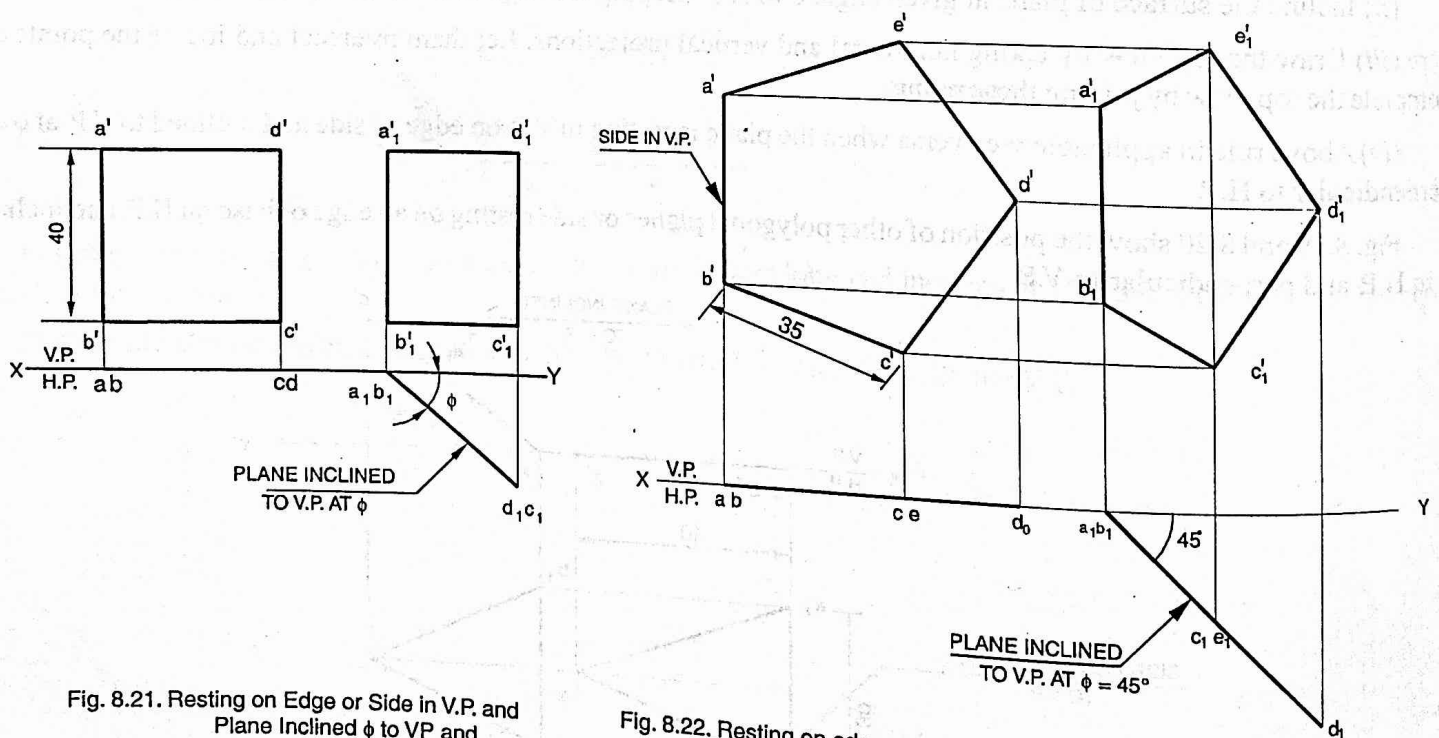


Fig. 8.21. Resting on Edge or Side in V.P. and Plane Inclined φ to VP and Perpendicular to H.P.



Fig. 8.22. Resting on edge or side in V.P. and Plane inclined φ to V.P. and perpendicular to H.P.

## (2) Plane inclined to H.P. and perpendicular to V.P., resting on a corner

(i) Keep the corner in H.P. and draw the top view as shown in step (i) keeping bisector of corner angle parallel to XY line.

(ii) Incline the surface of the plane at the given angle $\theta$ to H.P. by keeping one corner on XY line.

(iii) Complete the top view by drawing the vertical projections intersecting with horizontal projections. See Fig. 8.23.
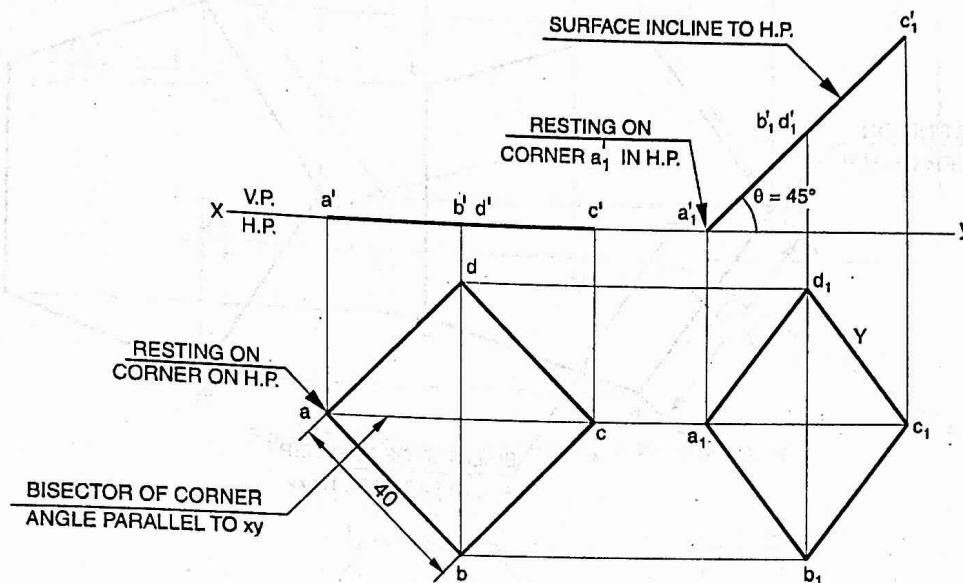


Fig. 8.23.

(iv) Above rule is applicable, vice-versa, when the plane is resting on V.P. on a corner and inclined to V.P. at angle $\phi$ and perpendicular to H.P.

Fig. 8.24 and 8.25 shows the position of other polygonal planes resting on a corner on H.P. and inclined to H.P. at $\theta$, perpendicular to V.P.
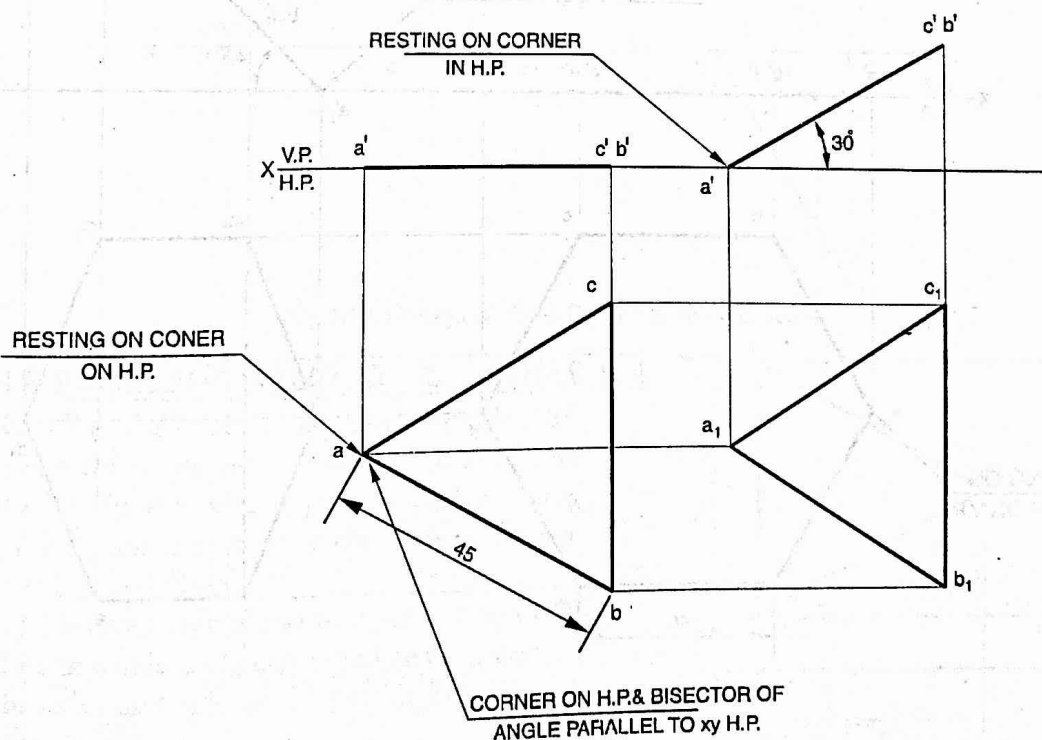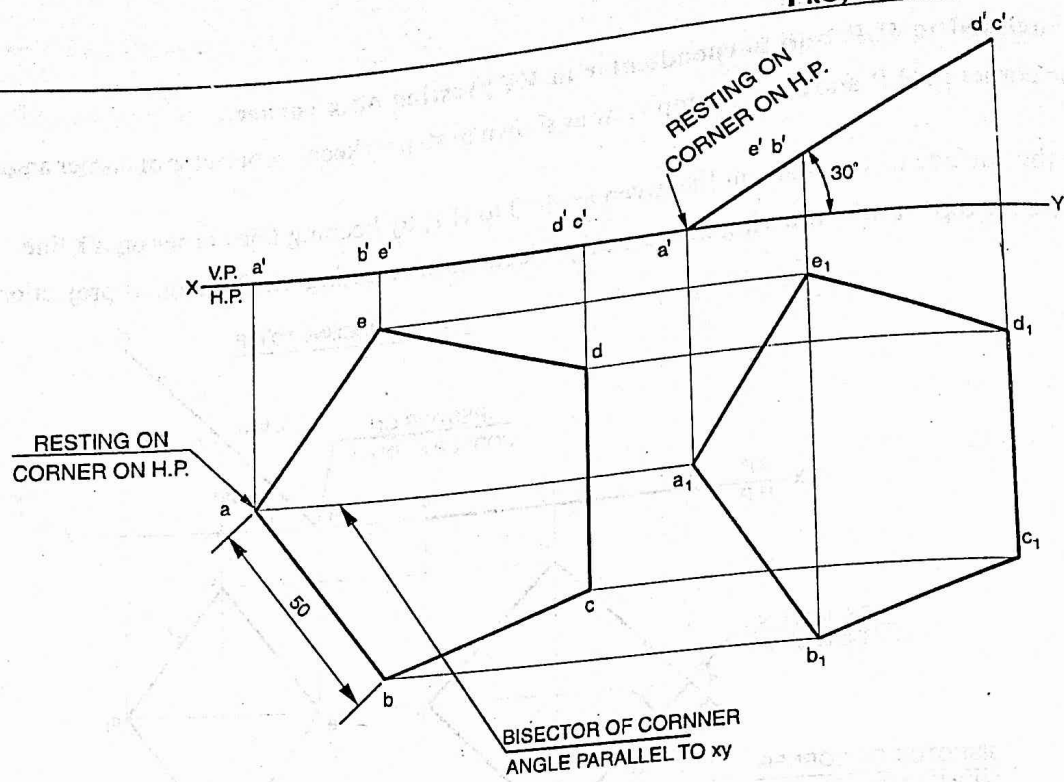


Fig. 8.24.

RESTING ON
CORNER ON H.P.

30°

RESTING ON
CORNER ON H.P.

BISECTOR OF CORNNER
ANGLE PARALLEL TO xy

50

Fig. 8.25. Pentagonal Plane Resting in HP on a Corner

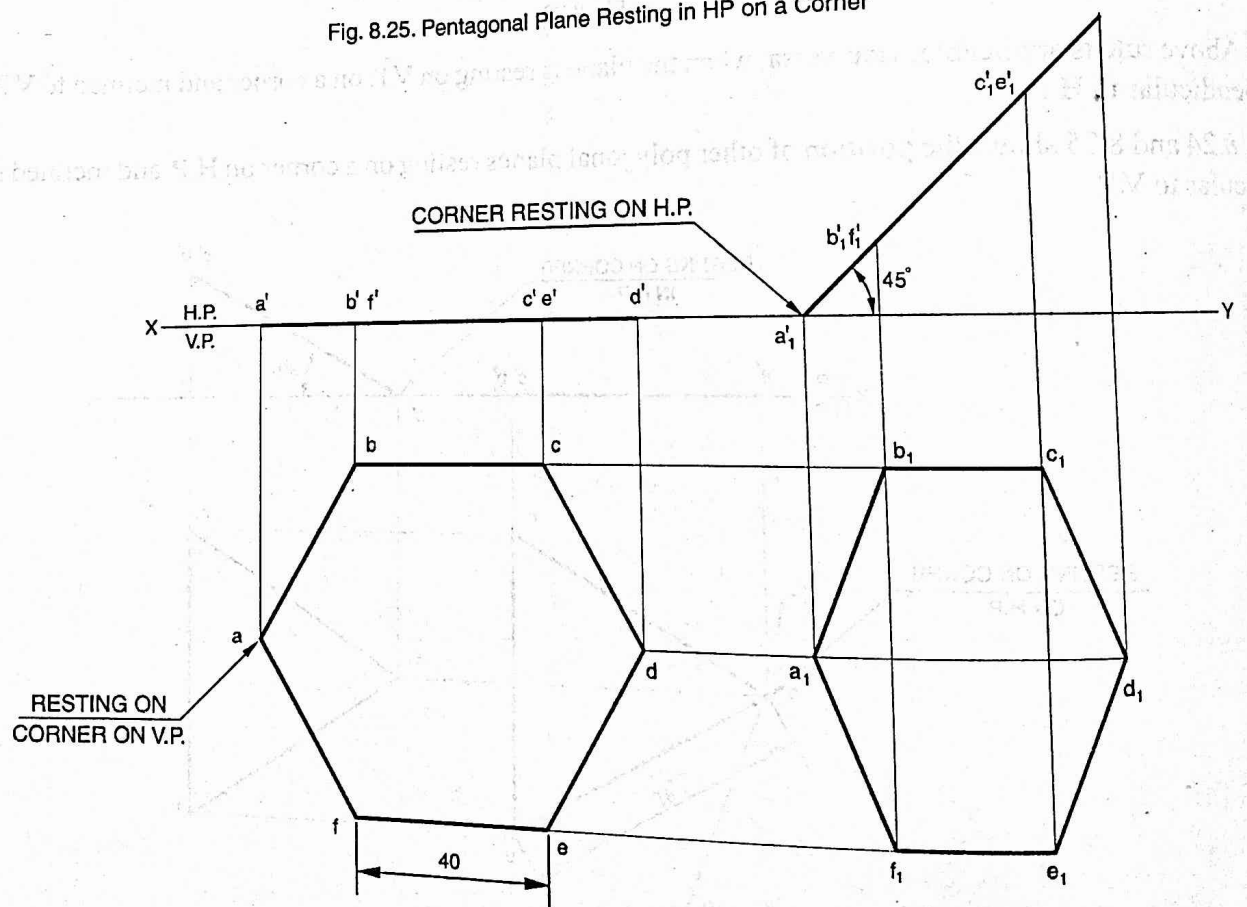CORNER RESTING ON H.P.

45°

RESTING ON
CORNER ON V.P.

40

Fig. 8.26. Hexagonal Plane Resting in HP on a Corner

Fig. 8.27 shows the position of polygonal planes resting on a corner on V.P. and inclined $\phi$ to V.P. and perpendicular to H.P.
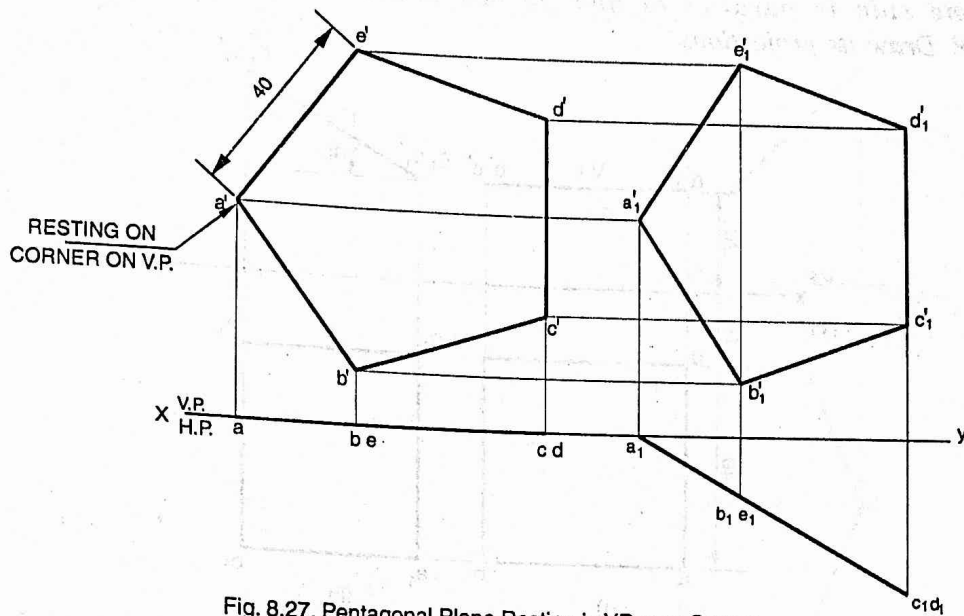


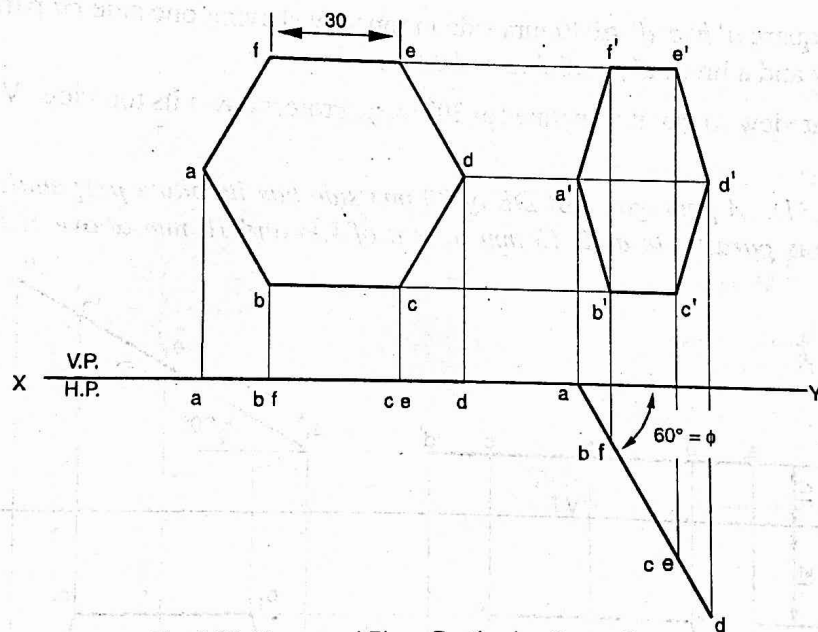Fig. 8.27. Pentagonal Plane Resting in VP on a Corner



Fig. 8.28. Hexagonal Plane Resting in vP on a Corner

## 8.5. SUITABLE PROBLEMS RELATED TO ARTICLE 8.4

**Problem 10.** *(Fig. 8.29). An equilateral triangle ABC of 50 mm side has its plane perpendicular to H.P. and inclined at 30° to V.P. Its one side is perpendicular to and 15 mm infront of V.P. and a corner of this side is 10 mm above H.P. Draw its projections.*

**Solution.** (*i*) Draw an equilateral triangle $a'b'c'$ of 50 mm side, having its one side $a'c'$ perpendicular to $xy$ and its corner 10 mm above $xy$ and side $ac$ 15 mm in front of V.P. Project down its top view.

(*ii*) Reproduce the top view so that it is inclined at 30° to $xy$. Project up its front view. H.T. of the triangle coincides with its top view.
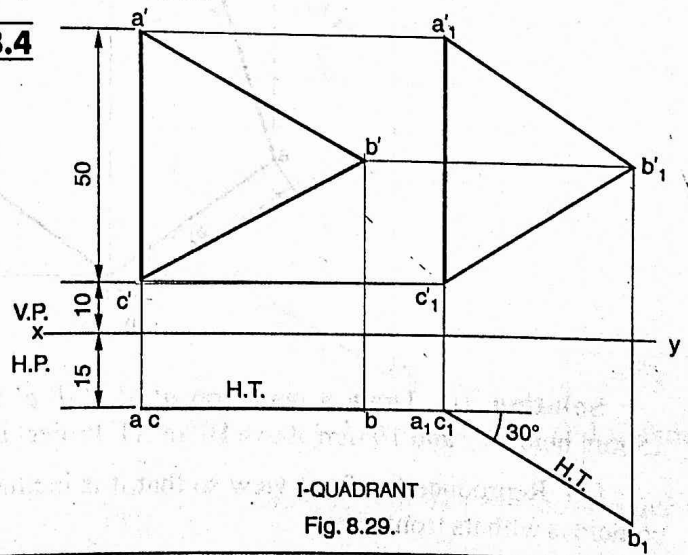


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Fig. 8.29.

**Problem 13.** *(Fig. 8.32). Draw the projections of a hexagonal plane 30 mm side resting in H.P. on one of corners and the plane makes an angle of 45° with H.P. Draw its projections.*



Fig. 8.32.
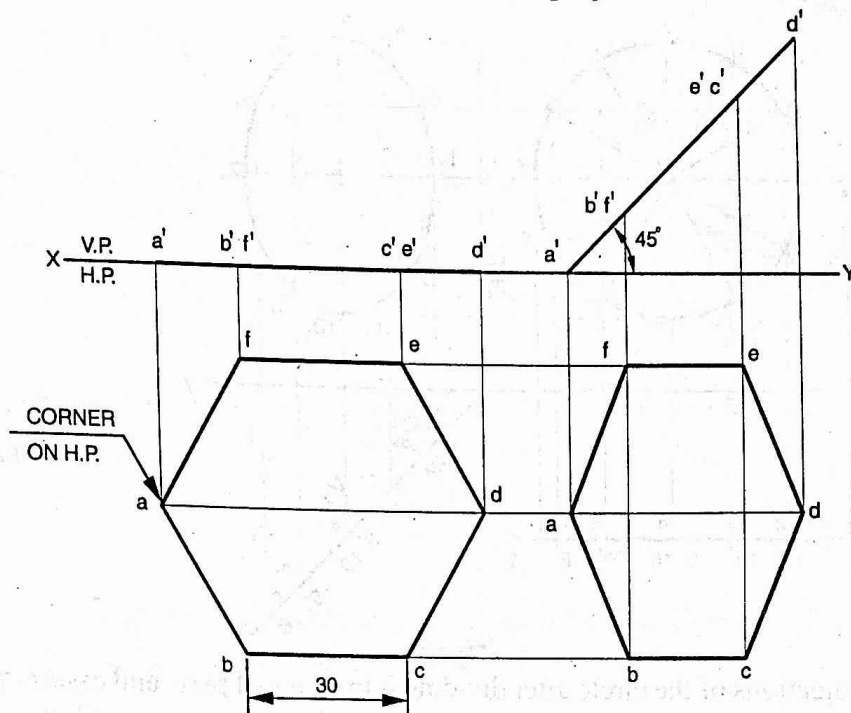
**Solution.** (*i*) Draw a hexagon *abcdef* keeping corner *a* on left side of the figure as shown and project the top view.

(*ii*) Redraw the front view *a'b'c'd'e'f'* at angle of 45° on H.P., keeping point *a'* on *XY* line.

(*iii*) Project down the projection of to intersect the horizontal projections of the points *abcdef* respectively.

(*iv*) Complete the top view of hexagonal plane by joining *abcdef*

**Problem 14.** *(Fig. 8.33). A hexagon ABCDEF of 25 mm side has its plane perpendicular to H.P. and 20 mm from V.P. It is inclined at 30° to V.P. Its one side is parallel to and 10 mm above H.P. Draw its projections.*
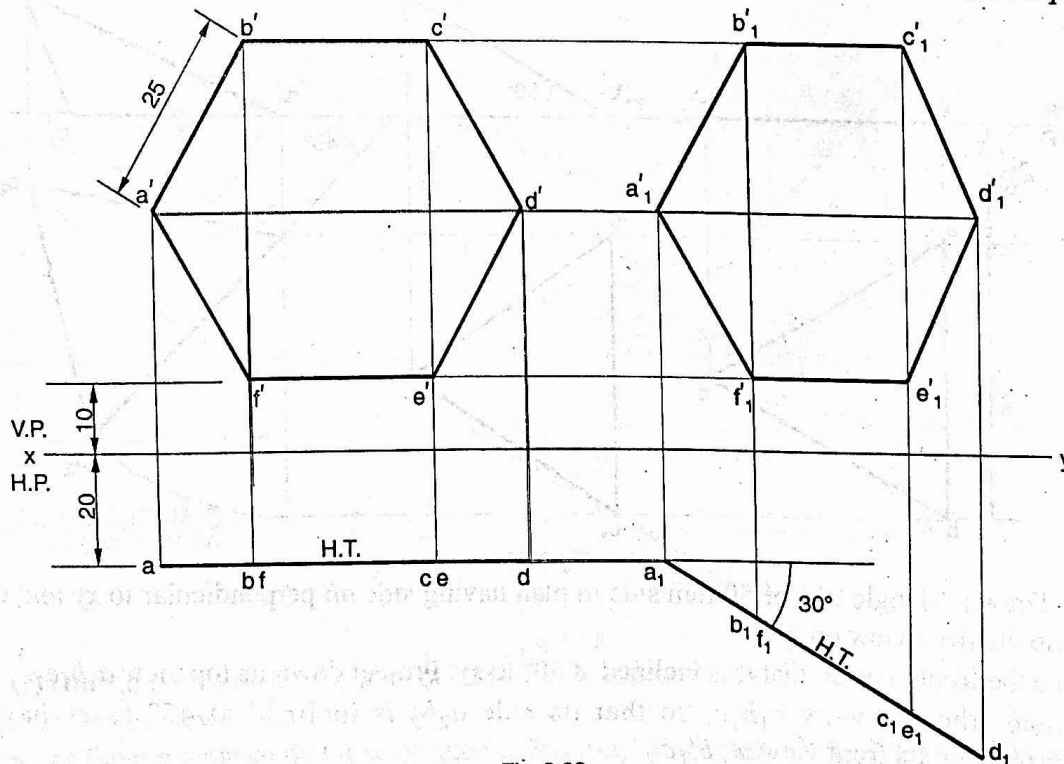


Fig. 8.33.

**Solution.** (*i*) Draw a hexagon *a'b'c'd'e'f'* of 25 mm side in front view, having one side parallel to and 10 mm above *xy*. Project down its top view at any line parallel to and 20 mm below *xy*.

(*ii*) Reproduce the top view so that it is inclined at 30° to *xy*. Project up its front view. H.T. of the hexagon coincides with its top view.