

Problem 12-6. (fig. 12-12): A square $ABCD$ of 50 mm side has its corner A in the $H.P.$, its diagonal AC inclined at 30° to the $H.P.$ and the diagonal BD inclined at 45° to the $V.P.$ and parallel to the $H.P.$ Draw its projections.

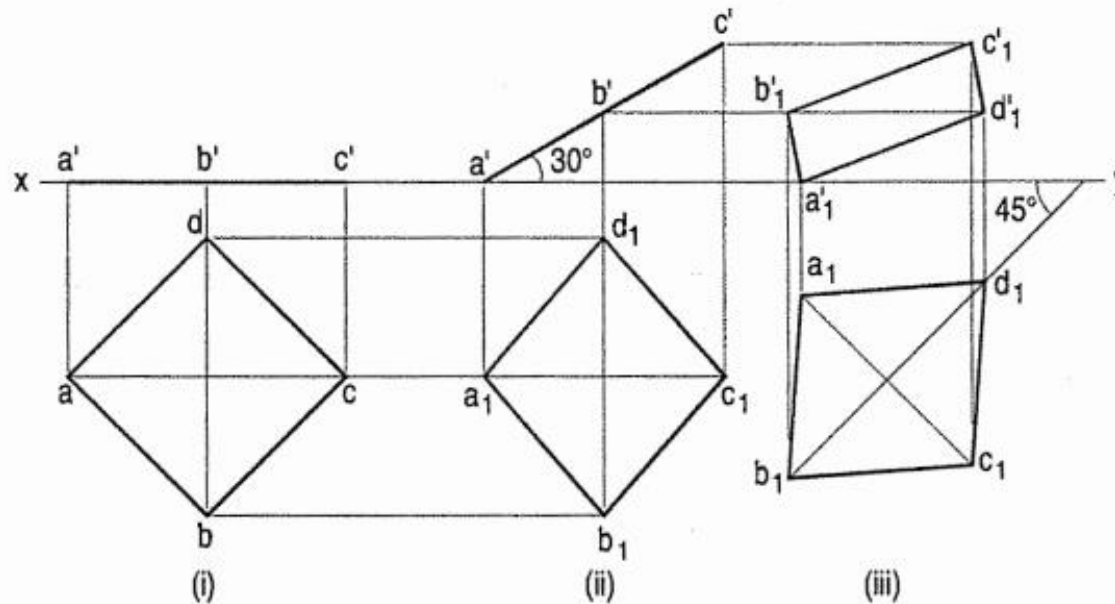


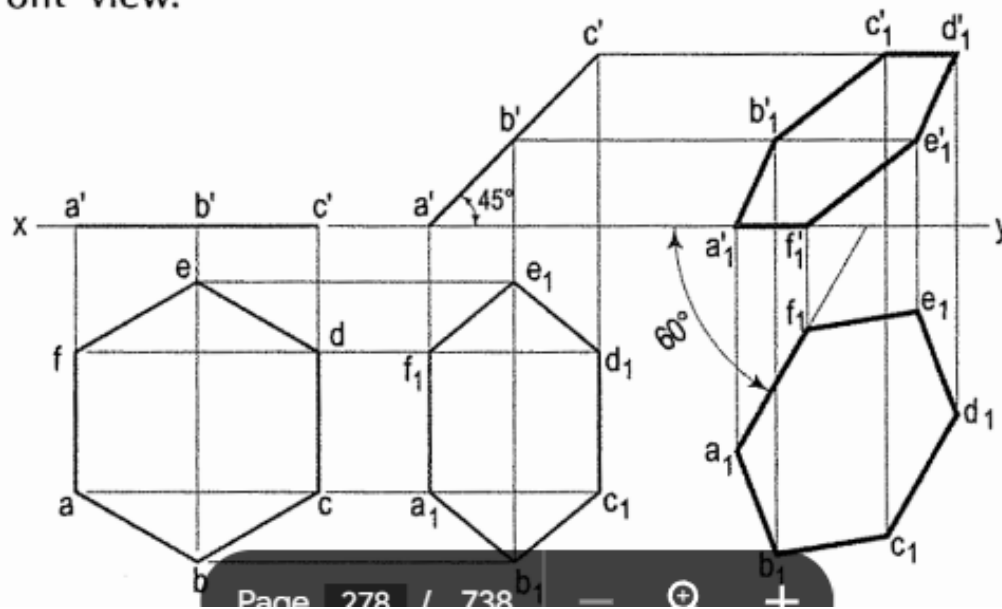
FIG. 12-12

In the initial stage, assume the square to be lying in the $H.P.$ with AC parallel to the $V.P.$

- (i) Draw the top view and the front view. When the square is tilted about the corner A so that AC makes 30° angle with the $H.P.$, BD remains perpendicular to the $V.P.$ and parallel to the $H.P.$
- (ii) Draw the second front view with $a'c'$ inclined at 30° to xy , keeping a' or c' in xy . Project the second top view. The square may now be turned so that BD makes 45° angle with the $V.P.$ and remains parallel to the $H.P.$ Only the position of the top view will change. Its shape and size will remain the same.

Problem 12-8. (fig. 12-14): Draw the projections of a regular hexagon of 25 mm side, having one of its sides in the H.P. and inclined at 60° to the V.P., and its surface making an angle of 45° with the H.P.

- (i) Draw the hexagon in the top view with one side perpendicular to xy . Project the front view $a'c'$ in xy .
- (ii) Draw $a'c'$ inclined at 45° to xy keeping a' or c' in xy and project the second top view.
- (iii) Reproduce this top view making a_1f_1 inclined at 60° to xy and project the final front view.



EXERCISES 12



1. Draw an equilateral triangle of 75 mm side and inscribe a circle in it. Draw the projections of the figure, when its plane is vertical and inclined at 30° to the V.P. and one of the sides of the triangle is inclined at 45° to the H.P.
2. A regular hexagon of 40 mm side has a corner in the H.P. Its surface is inclined at 45° to the H.P. and the top view of the diagonal through the corner which is in the H.P. makes an angle of 60° with the V.P. Draw its projections.
3. Draw the projections of a regular pentagon of 40 mm side, having its surface inclined at 30° to the H.P. and a side parallel to the H.P. and inclined at an angle of 60° to the V.P.
4. Draw the projections of a rhombus having diagonals 125 mm and 50 mm long, the smaller diagonal of which is parallel to both the principal planes, while the other is inclined at 30° to the H.P.

5. Draw a regular hexagon of 40 mm side, with its two sides vertical. Draw a circle of 40 mm diameter in its centre. The figure represents a hexagonal plate with a hole in it and having its surface parallel to the V.P. Draw its projections when the surface is vertical and inclined at 30° to the V.P. Assume the thickness of the plate to be equal to that of a line.
6. Draw the projections of a circle of 75 mm diameter having the end *A* of the diameter *AB* in the H.P., the end *B* in the V.P., and the surface inclined at 30° to the H.P. and at 60° to the V.P.
7. A semi-circular plate of 80 mm diameter has its straight edge in the V.P. and inclined at 45° to the H.P. The surface of the plate makes an angle of 30° with the V.P. Draw its projections.
8. The top view of a plate, the surface of which is perpendicular to the V.P. and inclined at 60° to the H.P. is a circle of 60 mm diameter. Draw its three views.
9. A plate having shape of an isosceles triangle has base 50 mm long and altitude 70 mm. It is so placed that in the front view it is seen as an equilateral triangle of 50 mm sides and one side inclined at 45° to *xy*. Draw its top view.
10. Draw a rhombus of diagonals 100 mm and 60 mm long, with the longer diagonal horizontal. The figure is the top view of a square of 100 mm long diagonals, with a corner on the ground. Draw its front view and determine the angle which its surface makes with the ground.
11. A composite plate of negligible thickness is made-up of a rectangle 60 mm \times 40 mm, and a semi-circle on its longer side. Draw its projections when the longer side is parallel to the H.P. and inclined at 45° to the V.P., the surface of the plate making 30° angle with the H.P.
12. A 60° set-square of 125 mm longest side is so kept that the longest side is in the H.P. making an angle of 30° with the V.P. and the set-square itself inclined at 45° to the H.P. Draw the projections of the set-square.
13. A plane figure is composed of an equilateral triangle *ABC* and a semi-circle on

12. A 60° set-square of 125 mm longest side is so kept that the longest side is in the H.P. making an angle of 30° with the V.P. and the set-square itself inclined at 45° to the H.P. Draw the projections of the set-square.
13. A plane figure is composed of an equilateral triangle ABC and a semi-circle on AC as diameter. The length of the side AB is 50 mm and is parallel to the V.P. The corner B is 20 mm behind the V.P. and 15 mm below the H.P. The plane of the figure is inclined at 45° to the H.P. Draw the projections of the plane figure.
14. An equilateral triangle ABC having side length as 50 mm is suspended from a point O on the side AB 15 mm from A in such a way that the plane of the triangle makes an angle of 60° with the V.P. The point O is 20 mm below the H.P. and 40 mm behind the V.P. Draw the projections of the triangle.
15. $PQRS$ and $ABCD$ are two square thin plates with their diagonals measuring 30 mm and 60 mm. They are touching the H.P. with their corners P and A respectively, and touching each other with their corresponding opposite corners R and C . If the plates are perpendicular to each other and perpendicular to V.P. also, draw their projections and determine the length of their sides.