

PROJECTIONS OF PLANES

In this topic various plane figures are the objects.

What is usually asked in the problem?

To draw their projections means F.V, T.V. & S.V.

What will be given in the problem?

1. Description of the plane figure.
2. It's position with HP and VP.

In which manner it's position with HP & VP will be described?

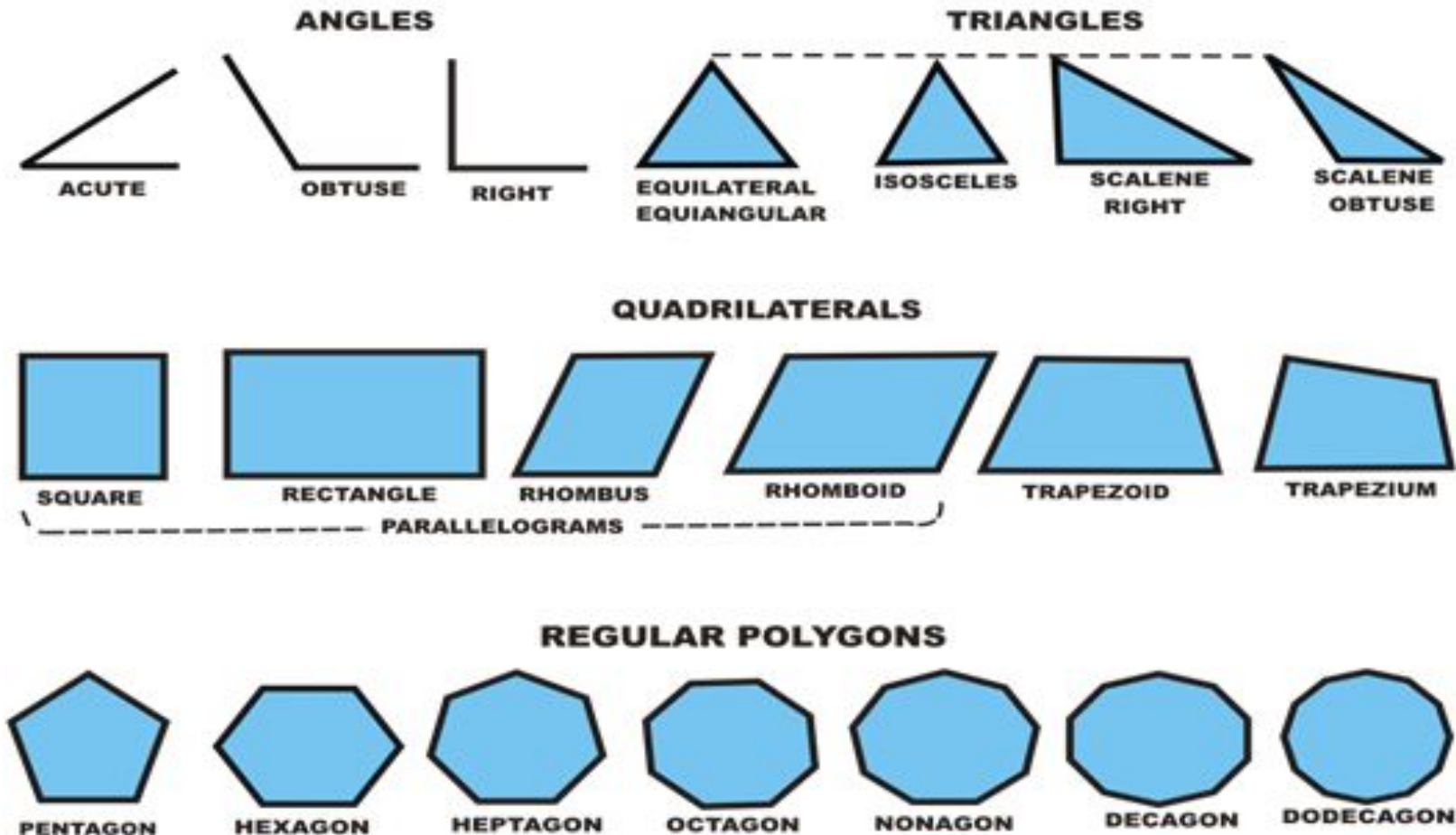
1. **Inclination of it's SURFACE with one of the reference planes will be given.**
2. Inclination of one of it's EDGES with other reference plane will be given
(Hence this will be a case of an object inclined to both reference Planes.)

Study the illustration showing
surface & side inclination given on next page.

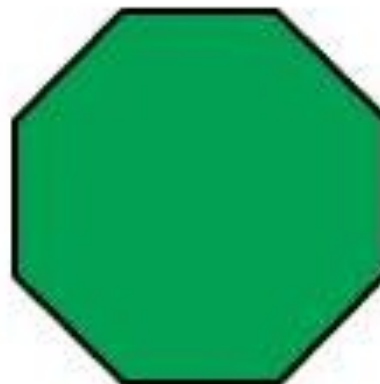


Plane surface (plane/lamina/plate)

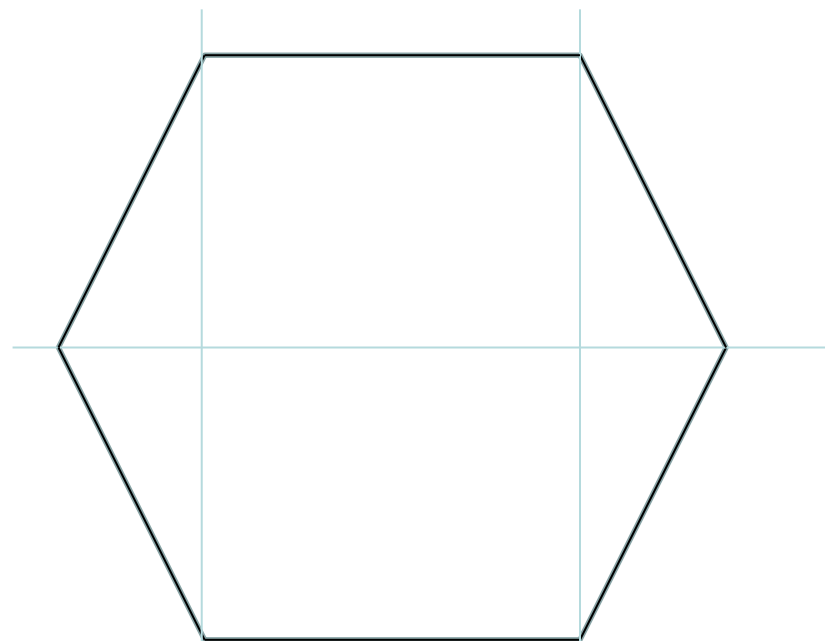
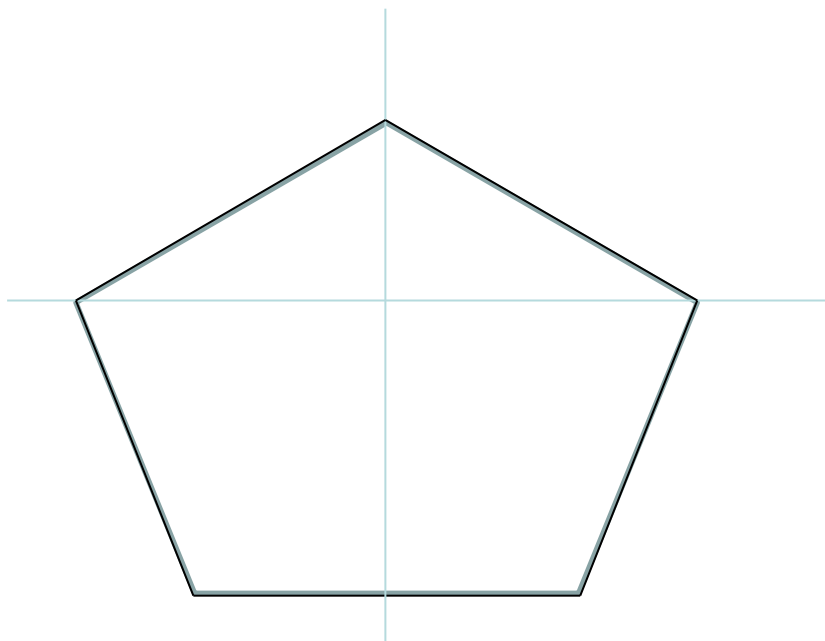
A plane is as two dimensional surface having length and breadth with negligible thickness. They are formed when any three non-collinear points are joined. Planes are bounded by straight/curved lines and may be either regular or an irregular. Regular plane surface are in which all the sides are equal. Irregular plane surface are in which the lengths of the sides are unequal.



Polygon n



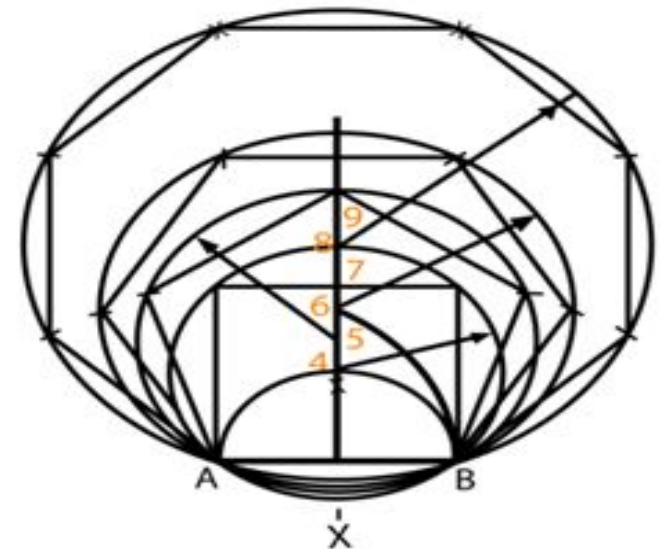
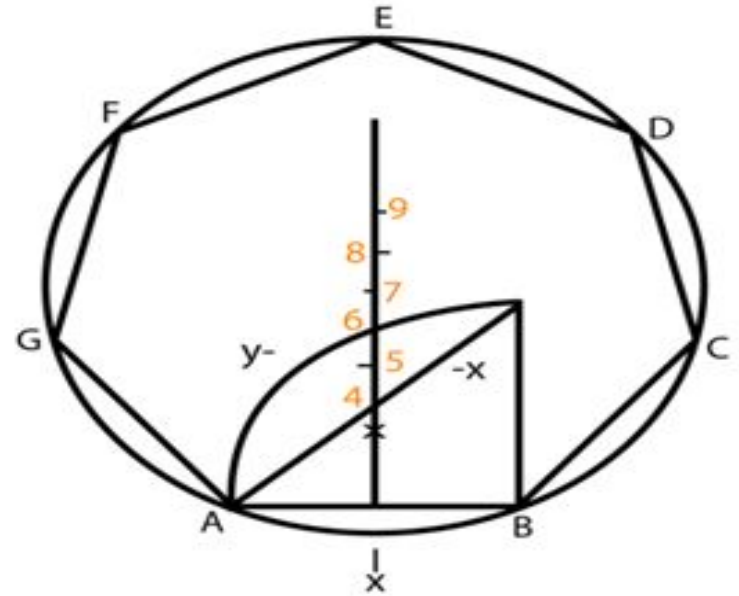
A **Polygon** is a plane figure that is bound by a finite chain of straight line segments closing in a loop to form a closed chain or circuit. These segments are called its edges or sides, and the points where two edges meet are the polygon's vertices.



General method of drawing any polygon

Procedure:

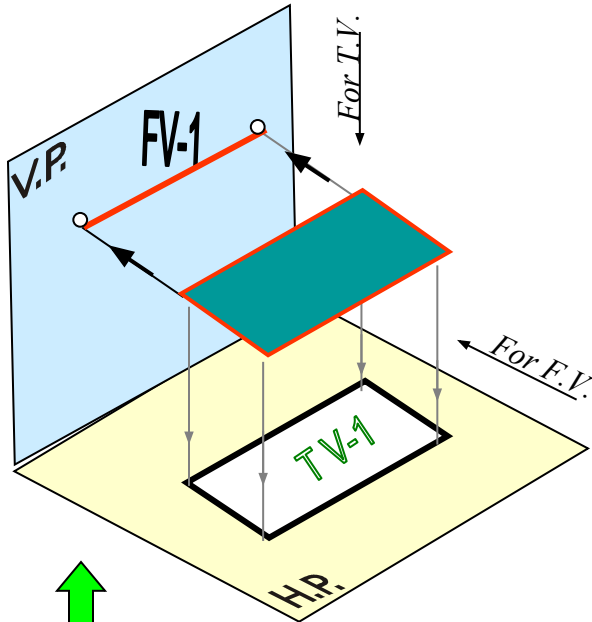
1. Draw AB = given length of polygon
2. At B , Draw BP perpendicular & = AB
3. Draw Straight line AP
4. With center B and radius AB , draw arc AP .
5. The perpendicular bisector of AB meets the line AP and arc AP in 4 and 6 respectively.
6. Draw circles with centers as 4, 5, & 6 and radii as $4B$, $5B$, & $6B$ and inscribe a square, pentagon, & hexagon in the respective circles.
7. Mark point 7, 8, etc with 6-7, 7-8, etc. = 4-5 to get the centers of circles of heptagon and octagon, etc.



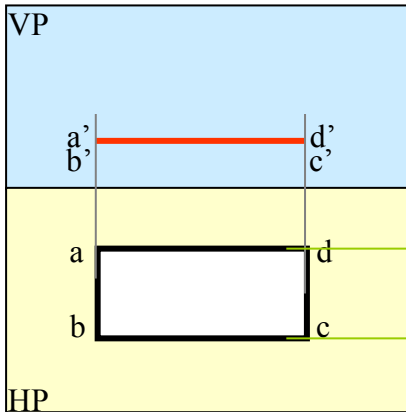
CASE OF A RECTANGLE – OBSERVE AND NOTE ALL STEPS.



SURFACE PARALLEL TO HP
PICTORIAL PRESENTATION

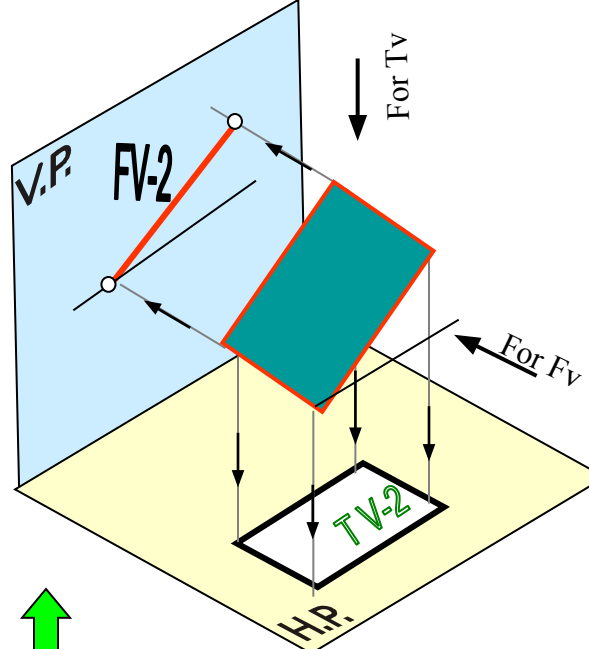


ORTHOGRAPHIC
TV- True Shape
FV- Line // to xy

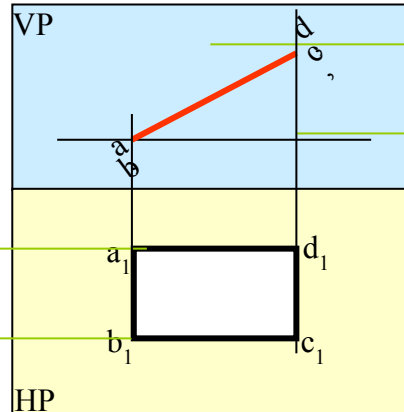


A

SURFACE INCLINED TO HP
PICTORIAL PRESENTATION

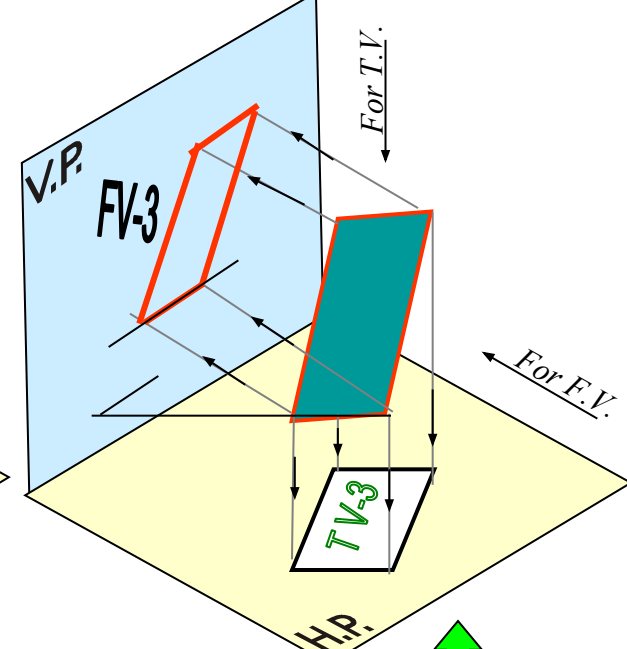


ORTHOGRAPHIC
FV- Inclined to XY
TV- Reduced Shape

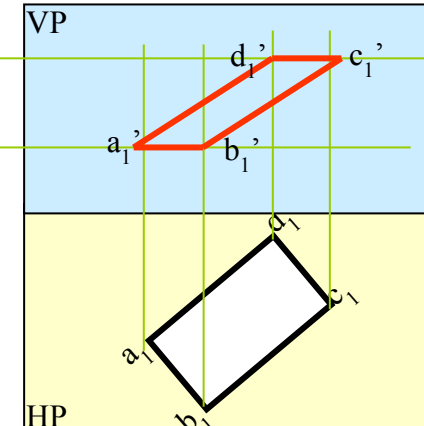


B

ONE SMALL SIDE INCLINED TO VP
PICTORIAL PRESENTATION



ORTHOGRAPHIC
FV- Apparent Shape
TV- Previous Shape



C

PROCEDURE OF SOLVING THE PROBLEM:

IN THREE STEPS EACH PROBLEM CAN BE SOLVED:(As Shown In Previous Illustration)

STEP 1. Assume suitable conditions & draw Fv & Tv of initial position.

STEP 2. Now consider surface inclination & draw 2nd Fv & Tv.

STEP 3. After this, consider side/edge inclination and draw 3rd (final) Fv & Tv.

ASSUMPTIONS FOR INITIAL POSITION:

(Initial Position means assuming surface // to HP or VP)

1.If in problem surface is inclined to HP – assume it // HP

Or If surface is inclined to VP – assume it // to VP

2. Now if surface is assumed // to HP- It's TV will show True Shape.

And If surface is assumed // to VP – It's FV will show True Shape.

3. Hence begin with drawing TV or FV as True Shape.

4. While drawing this True Shape –

keep one side/edge (which is making inclination) perpendicular to xy line
(similar to pair no. **A** on previous page illustration).

**Now Complete STEP 2. By making surface inclined to the resp plane & project it's other view.
(Ref. 2nd pair **B** on previous page illustration)**

**Now Complete STEP 3. By making side inclined to the resp plane & project it's other view.
(Ref. 3rd pair **C** on previous page illustration)**

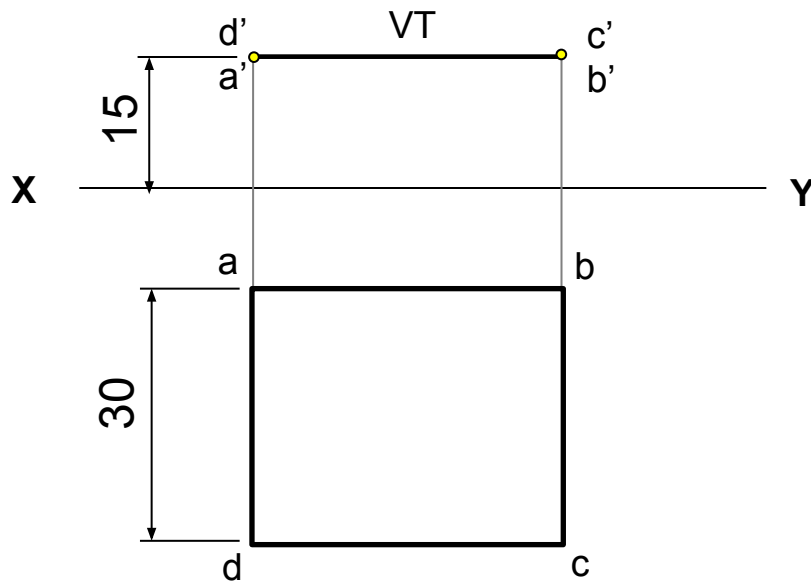
APPLY SAME STEPS TO SOLVE NEXT *ELEVEN* PROBLEMS

Q12.2: A square lamina ABCD of 30mm side is parallel to H.P. and is 15mm from it. Draw its projections when:

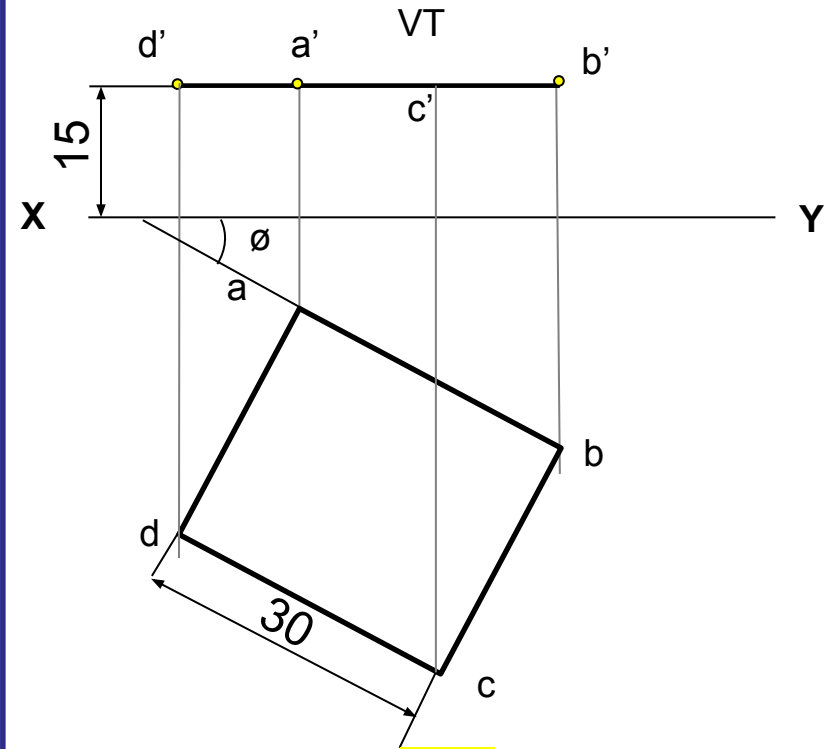
- (i) a side is parallel to VP,**
- (ii) a side is inclined at 30° to VP. Also locate its traces**

Hint: As the plane parallel to HP, it should be kept parallel to HP with one side parallel to VP

Hint: As the plane parallel to HP, it should be kept parallel to HP with one side inclined to VP



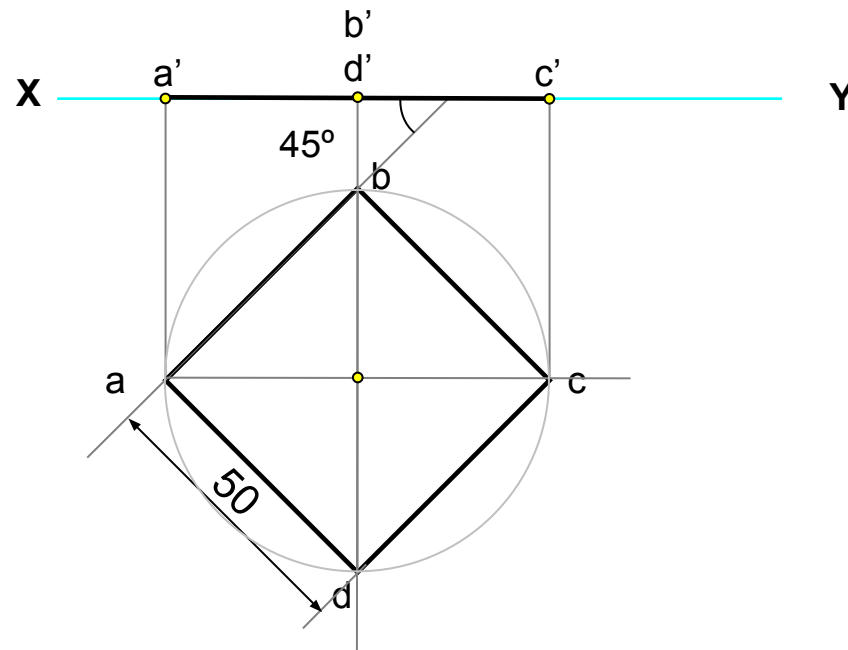
(i)



(ii)

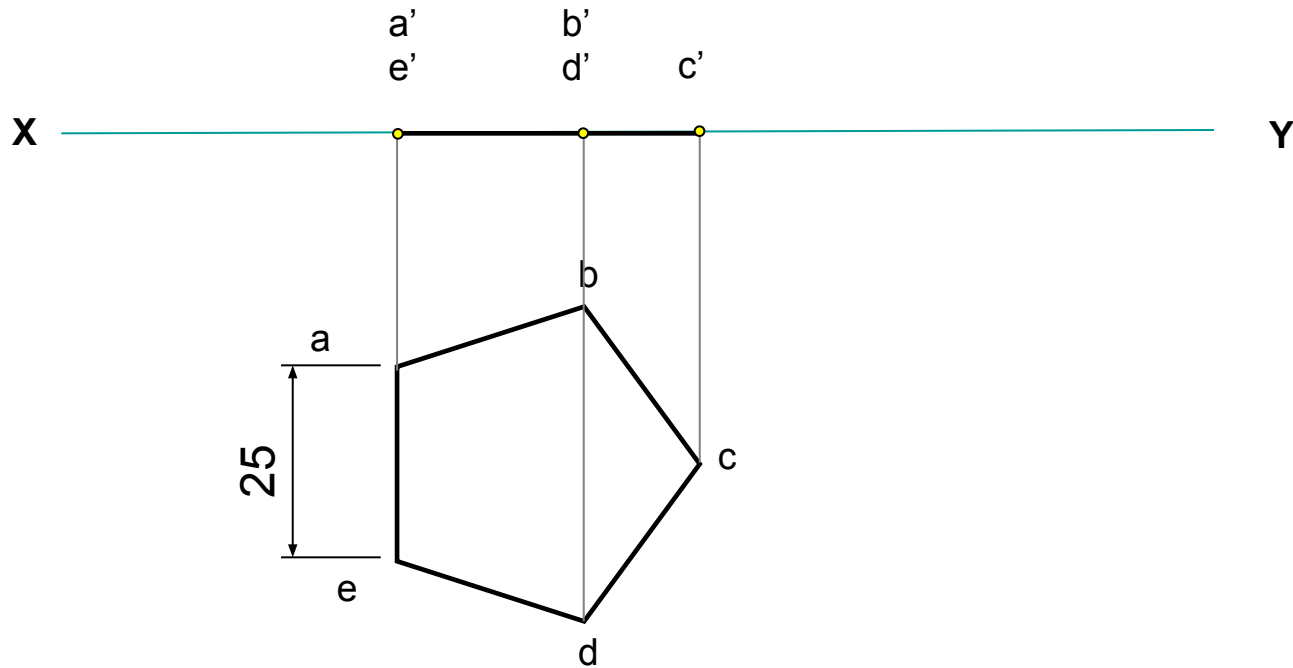
Q12.6: A square ABCD of 50 mm side has its diagonal AC parallel to the H.P. and VP, and the diagonal BD perpendicular to the V.P. and parallel to the H.P. Draw its projections.

**Keep AC parallel to the H.P.
& BD perpendicular to V.P.**



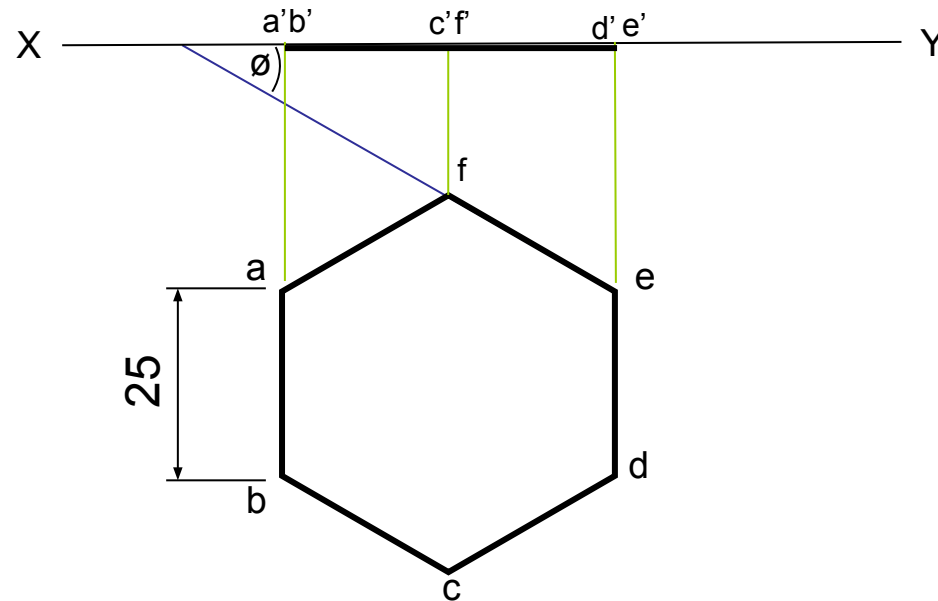
Q12.3: A regular pentagon of 25mm side has its plane parallel to the HP and perpendicular to the VP. One of its sides is perpendicular to the VP. Draw its projections and show its traces.

Hint: As the plane is parallel to HP, it should be kept parallel to HP with one edge perpendicular to VP



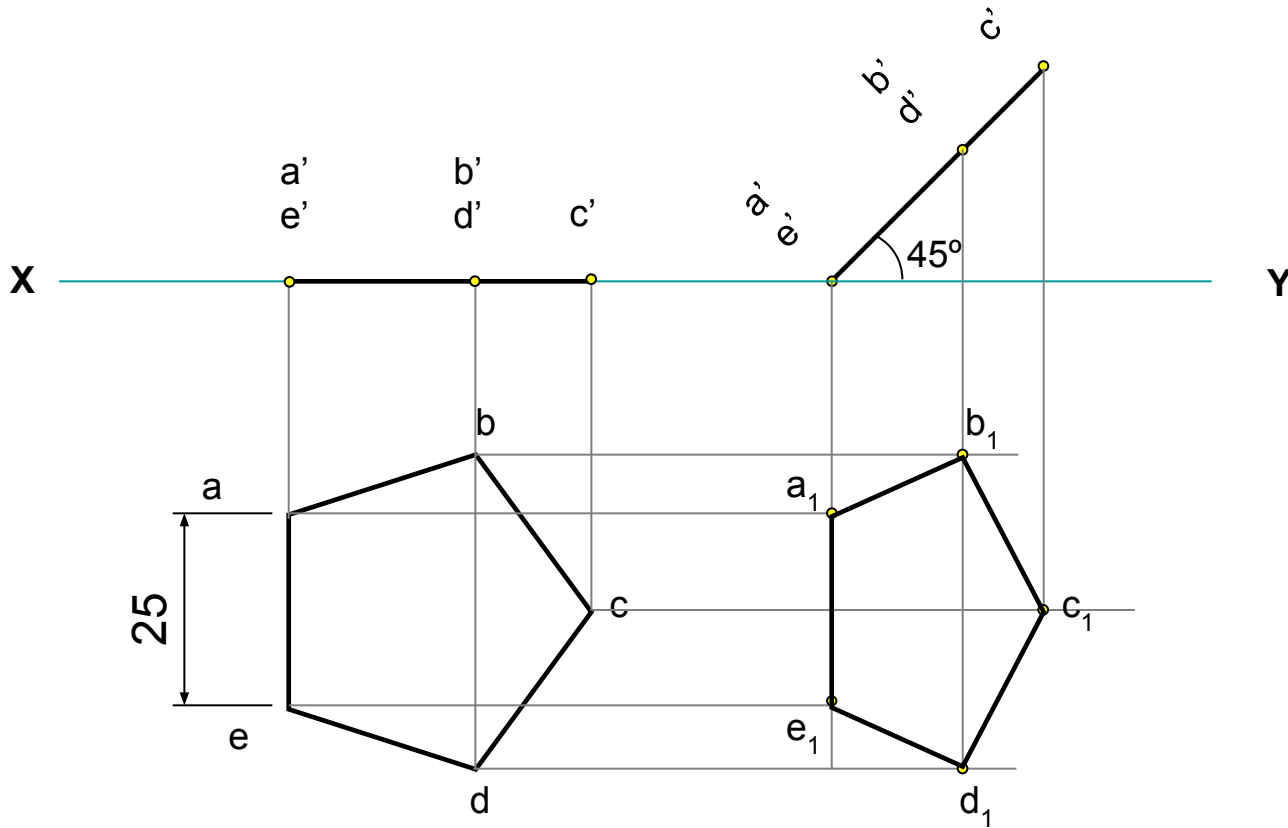
Q12.4.2: Draw the projections of a regular hexagon of 25mm sides resting on H.P, having one of its side is inclined at 60 to the V.P. and parallel to H.P.

NOTE: Plane parallel to HP

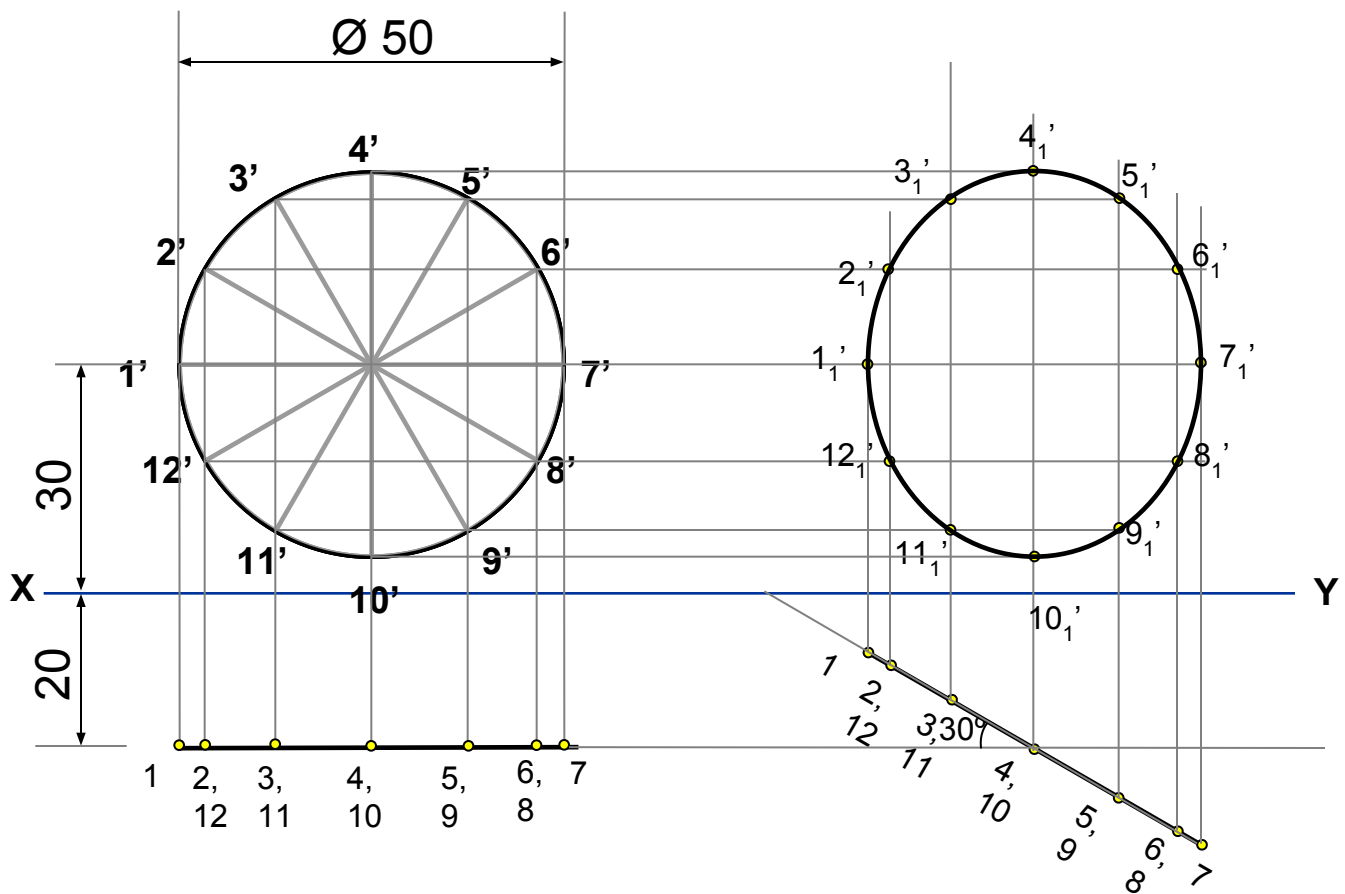


Q12.4: A regular pentagon of 25mm side has one side on the HP. Its plane is inclined at 45° to the HP and perpendicular to the VP. Draw its projections and show its traces

Hint: As the plane is inclined to HP, it should be kept parallel to HP with one edge perpendicular to VP



Q.12.5: Draw the projections of a circle of 5 cm diameter having its plane vertical and inclined at 30° to the V.P. Its centre is 3cm above the H.P. and 2cm in front of the V.P. Show also its traces



Q12.6: 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 parallel to the H.P. Draw its projections.

Q 2: A regular hexagon of 40mm side has a corner in the HP. Its surface inclined at 45° to the HP and the top view of the diagonal through the corner which is in the HP is parallel to the VP. Draw its projections.

Q12.10: A thin rectangular plate of sides 60 mm X 30 mm has its shorter side in the V.P. and perpendicular to the H.P. Project its top view and find the inclination with V.P. if its front view is a square of 30 mm long sides