

- 5.15. A straight line is generated as the ____ of a moving point.
- 5.16. The ____ view of a point is obtained as the intersection point between the ray of sight and VP
- 5.17. The top view of a point is obtained as the intersection point between the ray of sight and ____.
- 5.18. The projecting lines meet the plane of projection at an angle of 90° to it.
(True/False)
- 5.19. The distance of a point from HP is marked from xy to ____ ((a) top view , (b) front view, (c) side view).
- 5.20. When a point lies on HP its front view will lie on _____. (xy, below xy, above xy)
- 5.21. When both the projections of a point lie below xy, the point is situated in _____ quadrant.
- 5.22. When a point lies on VP, its top view lies on xy. (True/False).
- 5.23. When a point is above HP its front view is _____xy.
- 5.24. When a point is _____VP its top view is above xy.
- 5.25. When a point lies on _____ and _____ its two views lie on xy.
- 5.26. A straight line is defined as the _____distance between two points.
- 5.27. The projection of a line on a plane parallel to it, appears in its true length.
(True/False).
- 5.28. When a line is perpendicular to one of the planes, it is _____ to the other plane.
- 5.29. When a line is perpendicular to HP, its front view is _____ to xy.
(parallel / Perpendicular).
- 5.30. When a line is perpendicular to VP, its _____ is a point. (Front view / Top view)
- 5.31. When a line is inclined to _____ and parallel to _____ its front view represents the true length of the line.
- 5.32. When a line is contained by a plane, its projection on that plane is a _____
(Point, equal to its true length)
- 5.33. When a line is inclined to a plane, its projection on the plane is a line shorter than its true length. (True/False).
- 5.34. Define trace of a line?
- 5.35. What is a horizontal trace of a line.

- 5.36. Define vertical trace of a line.
- 5.37. The trace of a line is a _____.
- 5.38. A line parallel to both the HP and the VP has no vertical and horizontal traces. (True/False)
- 5.39. A line inclined to VP and parallel to HP has _____ trace.
- 5.40. A line inclined to HP and parallel to VP has _____ trace and no _____ trace.
- 5.41. The HT and VT of a line will always lie on one and same projector. (True/False)
- 5.42. The HT of a line will always lie below xy line. (True/False).
- 5.43. The vertical trace of a line situated in the first quadrant will always lie above xy line. (True/False)
- 5.44. A line is perpendicular to the HP. Its _____ trace coincides with its _____ view.
- 5.45. A line is perpendicular to the VP. Its _____ trace coincides with its _____ view.
- 5.46. A line perpendicular to HP has no _____ trace and a line perpendicular to VP has no _____ trace.
- 5.47. A line perpendicular to VP has no HT because the line is _____ to the HP. (Parallel / Perpendicular).
- 5.48. A line perpendicular to HP has no VT because the line is _____ to the VP (Parallel/perpendicular)
- 5.49. A line contained by a profile plane will always have both HT and VT. (True/False)
- 5.50. A line is said to be _____ if it is inclined to both HP and VP.
- 5.51. When a plane is perpendicular to a reference plane, its projection on the plane is a _____.
- 5.52. One of the projections of an oblique plane is a **straight line**. (T/F).
- 5.53. When two planes intersect each other, their intersection is a **straight line**. (T/F).
- 5.54. The top view of a circular plane, inclined to VP and perpendicular to HP is a line.
- 5.55. The true shape of the front view of a circular plane, which is parallel to HP and perpendicular to VP is _____.

6. Chapter

- 6.1 What is a solid ?
- 6.2 What is a polyhedron?
- 6.3 What is a regular polyhedron?

- 6.4. What is a tetrahedron?
- 6.5. How many faces does a octahedron and dodecahedron have?
- 6.6. Define a prism.
- 6.7. What is a right regular prism?
- 6.8. Define a pyramid.
- 6.9. A prism is named according to the shape of its ends (T/F)
- 6.10. A prism is a regular polyhedron. (T/F).
- 6.11. All polyhedra are bounded by only equal equilateral triangles. (T/F)
- 6.12. Define the axis of a pyramid.
- 6.13. Pyramids are named depending on the shape of their base. (T/F).
- 6.14. Three examples of solids of revolution are _____
- 6.15. Define frustrum.
- 6.16. What is truncated solid?
- 6.17. When the axis of an object is perpendicular to the VP, it is _____ to the H.P.
- 6.18. The front view of the corners resting on the HP are on the _____ line.
- 6.19. The shape of a top view of a cone with its base on the VP is a _____.
- 6.20. A cylinder of diameter D and a hight H rests on its base on the Hp. Its front view is a _____ of width _____ and height _____.

ANSWERS

1. Chapter

- | | | |
|---------------------------------|-----------------------|-----------------|
| 1.1 drafting / draughting. | 1.2. 1mm, | 1.3. diameter, |
| 1.4. Hardness, Softness | 1.5. True, | 1.6. Full scale |
| 1.7. Standard (circles, etc.,) | 1.8. A0 to A4 | 1.9. True. |
| 1.10. 1:5 | 1.11. Lengthening bar | 1.12. Bow |
| 1.13. True. | | |

2. Chapter

- | | | |
|---|--------------------------|------------------------|
| 2.1 $X:Y = 1:\sqrt{2}$, $XY = 1$ | 2.2. 594 x 841, 841, 594 | 2.3. 170 x 65 |
| 2.4 at RH corner | 2.5. 2:1 | 2.6. Thin dotted lines |
| 2.7. Functional | 2.8. F | 2.9. 1mm |
| 2.10. 7 or 10 mm | 2.11. 3.5 or 10mm | 2.12. 15° |
| 2.13. more | 2.14. True | 2.15. True |
| 2.16. True | 2.17. True. | 2.18. False |
| 2.19. False | 2.20. 3:1 | 2.21. True |
| 2.22. True | 2.23. True | 2.24. not broken |
| 2.25 False | 2.26. True | 2.27. True |
| 2.28. (a) Aligned and (b) unidirectional. | | |

3. Chapter

- | | | |
|---|-----------------------|----------------|
| 3.1 Representative Factor also known as Scale Factor. | | |
| 3.2. False | 3.3. Greater than 1:1 | 3.4. Enlarging |
| 3.5. Diagonal | 3.11. True | 3.12. True |
| 3.13. False. | | |

4 Chapter

- | | | |
|--|--|--------------------|
| 4.4. Conic | 4.5. (a) Ellipse, (b) Parabola, (c) Hyperbola, (d) Circle. | |
| 4.6. Isosceles triangle, 4.7. 90° | 4.8. True, | 4.9. Hyperbola |
| 4.14. Cycloids. | 4.15. False. | 4.16. Epi-Cycloid. |
| 4.17. Involute. | 4.18. Involute. | |

5. Chapter

- | | | |
|----------------------------|----------------------------|-----------------------------------|
| 5.1. First and Third angle | 5.3 Projectors, plane. | 5.4 First angle |
| 5.5 Third angle | 5.6 True | 5.7. False. |
| 5.8. Parallel | 5.9. Vertical, Normal | 5.10. Horizontal, top. |
| 5.11, (a) Below (b) Left | 5.12. (a) above, (b) right | 5.13. Profile plane, normal, side |

- | | | |
|---------------------------------|-----------------------------|-----------------------------|
| 5.14. True. | 5.15. Locus | 5.16. Front |
| 5.17. HP | 5.18. True | 5.19. (b) Front view |
| 5.20 (a) XY | 5.21. Fourth | 5.22. True. |
| 5.23. Above | 5.24. Behind | 5.25. On HP and VP. |
| 5.26. Shortest | 5.27. True | 5.28. Parallel |
| 5.29. Perpendicular | 5.30. Front | 5.31. HP, VP |
| 5.32, Equal to its true length. | 5.33. True. | 5.37. Point, |
| 5.38. True, | 5.39. Vertical, Horizontal. | 5.40. Horizontal, Verticle. |
| 5.41. False, | 5.42. False, | 5.43. False. |
| 5.44. Horizontal, Top, | 5.45. Vertical, Front, | 5.46. Vertical, Horizontal |
| 5.47. Parallel | 5.48. Parallel | 5.49. False. |
| 5.50. Oblique. 5.51. Line | 5.52. False | 5.53. True |
| 5.54 Inclined to XY. | 5.55. Staright line. | |

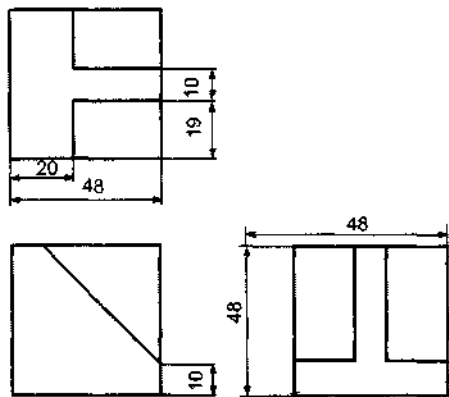
6. Chapter

- | | | |
|----------------------------|-------------------------------|-----------------------|
| 6.9. True, | 6.10 False, | 6.11. False, |
| 6.13 True. | 6.14. Cylinder, Cone, Sphere, | 6.17. Parallel, |
| 6.18 xy or Reference line. | 6.19. Triangle, | 6.20 Rectangle, D, H. |

Model Question Papers

Paper - I

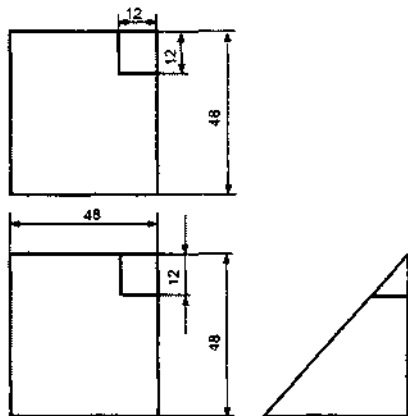
1. Construct a Diagonal scale of R.F = 1 : 32,00,000 to show kilometers and long enough to measure up to 400 Km. Show distances of 257 Km and 333 Km on the scale.
2. Trace the paths of the ends of the straight line AP, 120 mm long, when it rolls, with out slipping, on a semi-circle in the starting position.
3. The top view of a line PQ makes an angle of 30° with the horizontal and has a length of 100 mm. The end Q is in the H.P and P is in the VP and 65 mm above HP. Draw the projections of the line and find its true length and true inclinations with the reference planes. Also show its traces.
4. A sphere of 60 mm diameter rests on HP. It is cut by a section plane perpendicular to HP and inclined at 45° to VP and at a distance of 10 mm from its centre. Draw the sectional view and true shape of the section.
5. A vertical hexagonal prism of 25 mm side of base and axis 60 mm has one of its rectangular faces parallel to VP. A circular hole of 40 mm diameter is drilled through the prism such that the axis of the hole bisects the axis of the prism at right angle and is perpendicular to VP. Draw the development of the lateral surface of the prism showing the true shape of the hole in it.
6. Draw the isometric projection of a Frustum of hexagonal pyramid, side of base 30 mm the side of top face 15 mm of height 50 mm.
7. Draw the isometric view for the given orthogonal views as shown in the Figure.



8. A right regular square pyramid, base edge 30 mm and height 32 mm is resting on ground plane on its base. Its base edge, nearer to the picture plane, parallel to and 25 mm is behind the picture plane. The station point is 38 mm in front of the picture plane and 25 mm above the ground plane. The central plane containing station point, is 30 mm to left of vertex?. Draw perspective view of pyramid.

Paper - 2

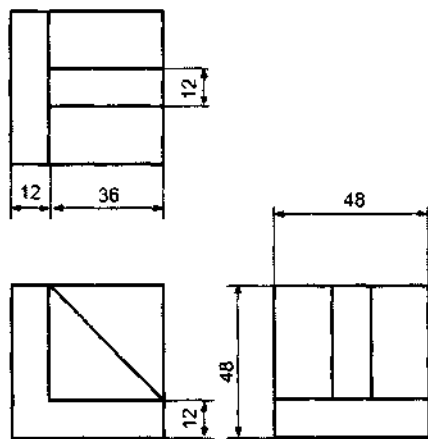
- Construct a diagonal scale of R.F = 1 : 2000 to show meters, decimeters and centimeters and long enough to measure 300 m. Mark a distance of 257.75 meters.
- ABC is an equilateral triangle of side equal 60 mm. Trace the loci of the vertices A, B and C, when the circle circumscribing ABC rolls without slipping along a fixed straight line for one revolution.
- A hexagonal lamina of 20 mm side rests on one of its corners on HP. The diagonal passing through this corner is inclined at 45° to HP. The lamina is then rotated through 90° such that the top view of this diagonal is perpendicular to VP and the surface is still inclined at 45° to HP. Draw the projections of the lamina.
- A cylinder base 40 mm diameter and axis 58 mm long rests with a point of its base circle on HP. Its axis is inclined at 45° to HP and parallel to VP. A section plane perpendicular to both the HP and VP bisects the axis of the cylinder. Draw its front, top and sectional side views.
- A vertical cylinder of 50 mm diameter is penetrated by a horizontal cylinder of same size with their axes intersecting. Draw the curves of intersections if the axis of the horizontal cylinder is inclined at 45° to VP.
- Draw the isometric view of a cone 40 mm diameter and axis 55 mm long when its axis is horizontal. Draw to isometric scale.
- For the given orthographic projections, draw the isometric view.



8. A point A is situated 20 mm behind the picture plane and 12 mm above the ground plane. The station point is 32 mm in front of the picture plane, 26 mm above the ground plane. It lies in a central plane 14 mm to the right of the point. Draw the perspective view of the point.

Paper - 3

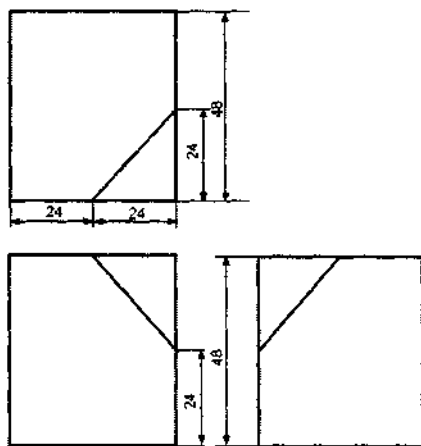
1. Construct a Diagonal scale of 1 : 5000 to show single metre and long enough to measure 300 meters. Mark on the scale a distance of 285.5 meters.
2. A circle of 60 mm diameter rolls on a horizontal line for half a revolution clock-wise and then on a line inclined at 60 degrees to the horizontal for another half, clock-wise. Draw the curve traced by a point P on the circumference the circle, taking the top most point on the rolling circle as generating point in the initial position.
3. A thin rectangular plate of sides 40 mm $\times$ 20 mm has its shorter side in the HP and inclined at an angle of 30° to VP. Project its front view when its top view is a perfect square of 20 mm side.
4. A cone of base 55 mm diameter and axis 65 mm long, rests with its base on HP. A section plane perpendicular to both HP and VP cuts the cone at a distance of 8 mm from its axis. Draw its top view, front view and sectional side view.
5. A cylinder of diameter of base 60 mm altitude 80 mm stands on its base. It is cut into two halves by a plane perpendicular to the VP and inclined at 30° to HP. Draw the development of the lower half.
6. A rectangular prism 30 $\times$ 20 $\times$ 60 mm lies on HP on one of its largest faces with its axis parallel to both HP and VP. Draw its isometric projection.
7. The orthogonal views of the picture as shown in the figure. Covert them into isometric view.



8. A hexagonal lamina of 25 mm side stands vertically on the ground plane and inclined at 50° to PP. The corner nearest to PP is 20 mm behind it. The station point is 45 mm in front of PP, 50 mm above the ground plane and lies in a central plane, which passes through the center of the lamina. Draw the perspective view.

Paper - 4

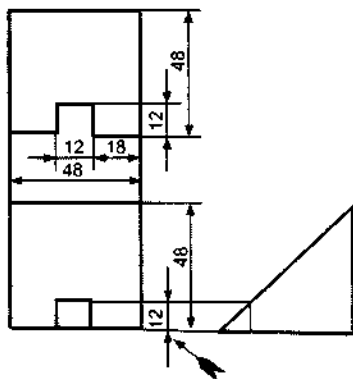
1. Draw a vernier of R.F = 1 : 2.4 to show diameters, centimeters and millimeters and long enough to read up to 6 decimeters. Mark a distance of 3.69 decimeters on the scale.
2. The foci of an ellipse are 100 mm apart and the minor axis is 70 mm long. Determine the length of the major axis and draw half the ellipse by concentric circles method and the other half by Oblong method. Draw a curve parallel to the ellipse and 25 mm away from it.
3. The distance between the projector containing the HT and VT of a straight line AB is 120 mm and the distance between the projections drawn from the end of a straight line is 40 mm. The HT is located 40 mm in front of VP and the line lies 15 mm above HP. Draw the projection and its true length and true inclinations.
4. A cone of base diameter 40 mm and axis height 60 mm rests on the ground on a point of its base circle such that the axis of the cone is inclined at 40° to the HP and 30° to the VP. Draw its front and top views.
5. A hexagonal prism of side of base 30 mm and height 60 mm is resting on HP with one of its base edges parallel to VP. Right half of the solid is cut by an upward plane inclined at 60° to the ground and starting from the axis and 30 mm below the top end. The left half of the solid is cut by a plane inclined at 30° to the HP downwards from the axis. The two section planes are continues. Draw the development of the lower portion.
6. Draw the isometric projection of a square prism side of base 60 mm height 50 mm surmounted by a square pyramid whose base coincides with the top of the prism and whose height is 60 mm.
7. Convert the orthogonal projections shown in figure into an isometric view of the actual picture.



8. Draw the perspective view of a horizontal circular lamina of 50 mm diameter resting on the ground. The center of the plane is 35 mm behind PP, the station point is in the central plane, passing through the center of the circular plane and 80 mm in front of the PP and 60 mm above the ground.

Paper - 5

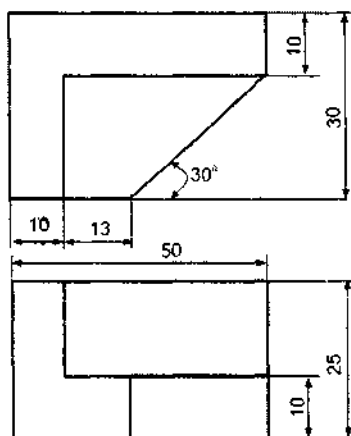
1. The area of field is 50,000 sq.m. The length and breadth of the field, on the map are 10 cm and 8 cm respectively. Construct a diagonal scale, which can read up to one metre. Mark the length of 236 meters on the scale. Find the R.F of the scale.
2. Draw an involute of a circle of 50 mm diameter. Also, draw a normal and tangent at any point on the curve.
3. (a) A line AB 100 mm long has its front view inclined at an angle of 45° to XY. The point A is in VP and 25 mm above HP. The length of the front view is 60 mm.
Draw the top view of the line and measure its length. Also find the inclinations of the line AB to HP and VP.
- (b) A point P is 15 mm above the HP and 20 mm in front of the VP. Another point Q is 25 mm behind the VP and 40 mm below the HP. Draw projections of P and Q keeping the distance between their projectors 60 mm apart distance between their top view and their front views.
4. A hexagonal prism of base of side 40 mm and axis length 80 mm rests on one of its base edges on the HP. The end containing that edge is inclined at 30° to the HP and the axis is parallel to VP. It is cut by a plane perpendicular to the VP and parallel to the HP. The cutting plane bisects the axis. Draw its front and the sectional top views.
5. A vertical cylinder of 50 mm diameter and 75 mm long is penetrated by a horizontal cylinder of 40 mm diameter and 75 mm long such that their axes bisect each other at right angles. Draw the intersection curve.
6. A sphere of diameter 40 mm rests centrally on the top of a square frustum, base 60 mm top 40 mm and height 75 mm. Draw the isometric view of the combination of solids.
7. For the given orthographic projections, draw the isometric view.



8. A step block is 15 mm high, 15 mm width and 15 mm long. The total length of the block is 30 mm. The largest side makes an angle of 45° to PP. The observer is at a distance of 60 mm in front of the edge and 10 mm to the left. The height of the observer is 50 mm. Draw the perspective projection of the object.

Paper - 6

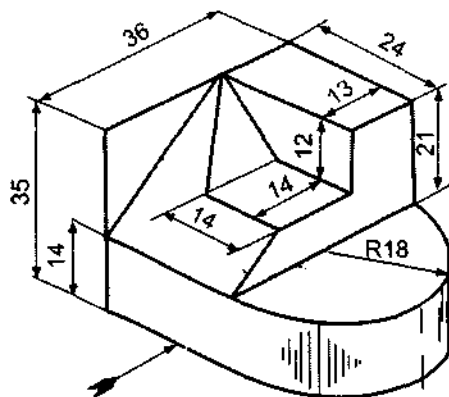
1. The distance between parry's corner and Egmore is 2.5 Km. On inspection of road map, its equivalent distance measures 5 cm. Draw a diagonal scale to read 50 meters minimum. Show on it a distance of 6350 metres.
2. Draw an inferior epitrochoid of base circle 150 mm diameter and rolling circle 50 mm diameter. The tracing point P is 20 mm from the center of the rolling circle.
3. (a) A square lamina of side 35 mm is parallel to HP with one of its sides is inclined at 30° to VP. The lamina is 20 mm above HP. Draw its top and front views and show its traces.
(b) Determine the locations of the following points with respect to HP and VP.
 - (i) Point A whose front view is 70 mm above XY and top view 50 mm below XY
 - (ii) Point B whose front view is 40 mm below XY and top view 55 mm above XY
 - (iii) Point C whose front view is 45 mm above XY and top view 60 mm above XY.
4. A pentagonal pyramid of base side 40 mm and axis length 80 mm is lying on the HP on one of its triangular faces with its axis parallel to the VP. It is cut by a plane inclined at 30° to the HP and perpendicular to the VP. The cutting plane meets the axis at 15 mm from the base. Draw the front view, sectional top view and the true shape of the section.
5. A cone of base diameter 70 mm and height 100 mm rests on the HP and is penetrated by a horizontal cylinder of diameter 45 mm, the axis of cylinder is 9 mm away from the axis of the cone and at a distance 30 mm above the base of the cone. Draw projection of the solids showing the curves of inter section between the solids.
6. A cylinder of base diameter 30 mm axis is 60 mm is resting centrally on a slab of 60 mm square and thickness 20 mm. Draw the isometric projection of the combination of the solids.
7. Draw the isometric view for the given orthogonal views as shown in the figure.



8. Draw the perspective view of a point P situated 10 mm behind the PP and 15 mm above the ground plane. The station point is 25 mm in front of the PP, 20 mm above the ground plane. It lies in a central plane 12 mm to the right of the point.

Paper - 7

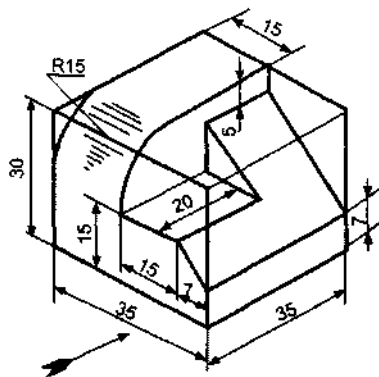
1. A rectangular plot of land area 0.45 hectare is represented on a map by a similar rectangle of 5 sq.cm. Calculate the R.F. of the scale of the map. Also draw a diagonal scale to read up to maximum of single Km from the map. The scale should be long enough to measure up to 500 meters. Show on it 459 m.
2. Draw an ellipse, given the minor and major diameters as 100 mm and 150 mm respectively. Draw the tangent and normal at any point on the curve.
3. (a) A rectangular plate of sides 70×40 mm, has one of its shorter edges in VP inclined at 40° to HP. Draw its top view if its front view is a square of side 40 mm.
(b) Determine the locations of the following with respect to HP and VP.
 - (i) Point P whose front view is 50 mm above XY and top view 50 mm below XY
 - (ii) Point Q whose front view is 60 mm below XY and top view 55 mm above XY
 - (i) Point R whose front view is 60 mm above XY and top view 60 mm above XY
4. A square pyramid of base side 30 mm and altitude 50 mm lies on one of its triangular faces on the HP with its axis parallel to the VP. It is cut by a vertical plane inclined at 30° to the VP and meeting the axis at 40 mm from the vertex measured in the plan. Draw the top view, sectional front view and the true shape of the section.
5. A hexagonal pyramid, side of base 30 mm, axis 70 mm is resting on HP on its base. It is cut by a section plane perpendicular to V.P and at 45° to H.P and passing through the mid point of the axis of the pyramid. Draw the development of the lateral surface of the truncated pyramid.
6. A hemisphere of 40 mm diameter is nailed on the top surface of a frustum of a square pyramid. The sides of the top and bottom faces of the frustum are 20 mm and 40 mm respectively and its height is 50 mm. The axes of both the solids coincide. Draw the isometric projection.
7. Consider the picture shown in figure and draw the front view, top view and side view in first angle projection.



8. Draw the perspective projection of a hollow cylinder of 60 mm external diameter and 80 mm long, with a wall thickness of 10 mm. It is resting on a generator on the ground, with its axis inclined at 60° to and touching the PP.

Paper - 8

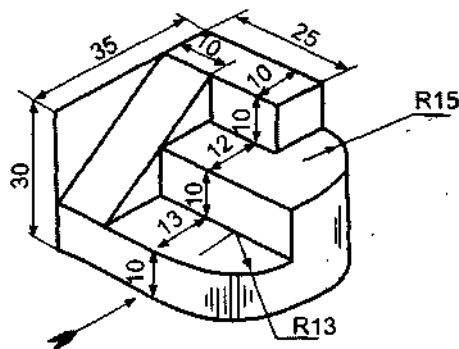
- Construct a vernier scale to read distances correct to a decimeter on a map in which the actual distance are reduced in the ratio of 1 : 40000. The scale should be long enough to measure 6 kilometers. Mark on the scale the lengths of 3.34 km and 0.57 km.
- Construct a hypocycloid, rolling circle 60 mm diameter and directing circle 180 mm diameter. Draw a tangent to it at a point 60 mm from the center of the directing circle.
- The top view of a circular lamina of diameter 60 mm resting on HP is an ellipse of major axis 60 mm and minor axis 40 mm. Draw its front view when the Major axis of the ellipse in the top view is horizontal. Find the angle of inclination of the lamina with HP.
 - An equilateral triangle of side 60 mm has its horizontal trace parallel to XY, 15 mm away from it. Draw its projections when one of its sides is inclined at 30° to HP.
- A hexagonal pyramid side of base 25 mm and axis 55 mm long, rests with its base on the HP such that one of the edges of its base is perpendicular to VP. It is cut by a section plane perpendicular to HP inclined at 45° to VP, and passing through the pyramid at a distance of 10 mm from the axis. Draw the sectional front view and the true shape of the section.
- A cone of base diameter 50 mm and axis length 70 mm rests with its base on HP. A section plane is perpendicular to V.P and inclined at 35° to HP bisects the axis of the cone. Draw the development of the truncated cone.
- A pentagonal pyramid, base 30 mm and axis 65 mm long rests with its base on HP. An edge of the base is parallel to VP and nearer to it. A horizontal section plane cuts the pyramid and passes through a point on the axis at a distance of 25 mm from the apex. Draw the isometric view of the frustum of the pyramid.
- Convert the isometric view of the picture shown in the figure into orthogonal projection of all three views.



- A circular cylinder slab, with diameter of base 120 mm and thickness 50 mm, rests with its base on the ground. The axis of the slab is 80 mm behind PP and 80 mm to the left of the eye. The eye is 160 mm from PP and 120 mm above the ground. Draw the perspective view.

Paper - 9

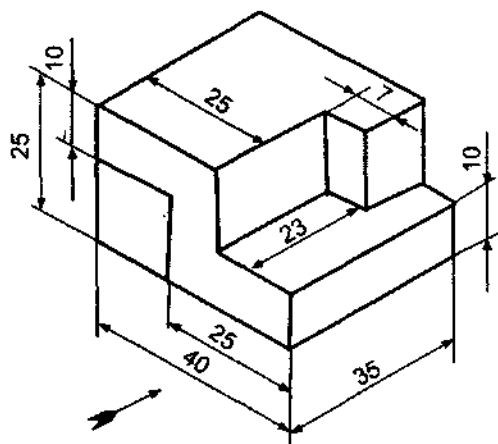
1. The distance between Vadodara and Surat is 130 Km. A train covers this distance in 2.5 hours. Construct a plain scale to measure time up to a single minute. The R.F. of the scale is 1 : 2,60,000. Show the distance covered by the train in 15 seconds.
2. The major axis of an ellipse is 160 mm long and the minor axis 90 mm long. Find the foci and draw the ellipse by 'Arcs of circles method'. Draw a tangent to the ellipse at a point on it 25 mm above the major axis.
3. The front view of a line AB measures 65 mm and makes an angle of 15 degrees with xy. A is in the H.P. and the V.T. of the line is 15 mm below the H.P. The line is inclined at 30 degrees to the V.P. Draw the projections of AB and find its true length and inclination with the H.P. Also locate its H.T.
4. A cone, diameter of base 50 mm and axis 65 mm long, is lying on the H.P. on one of its generators with the axis parallel to the V.P. It is cut by a horizontal section plane 12 mm above the ground. Draw its front view and sectional top view.
5. A vertical cylinder of 50 mm diameter and 75 mm long is penetrated by a horizontal cylinder of 40 mm diameter and 75 mm long such that their axes bisect each other at right angles. Draw the intersection curve.
6. A sphere of diameter 40 mm rests centrally on the top of a square frustum, base 60 mm, top 40 mm and height 75 mm. Draw the isometric view of the combination of solids.
7. Convert the isometric view of the picture shown in the figure below into orthogonal projection of all three views.



8. A circular lamina of 45 mm diameter lies on the ground plane and touches the picture plane. The center plane passes through the center of the circle. The station point is 70 mm in front of picture plane and 60 mm above the ground plane. Draw the perspective view.

Paper - 10

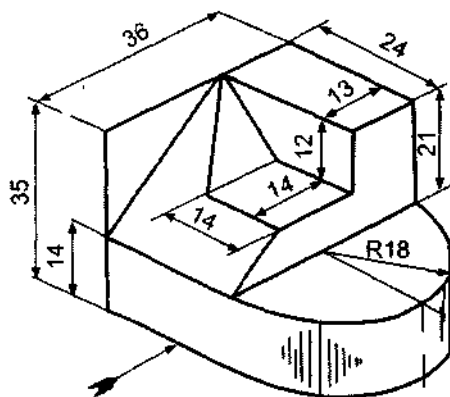
1. Draw a vernier of R.F = 1 : 2.4 to show decimeters, centimeters and millimeters and long enough to read up to 6 decimeters. Mark a distance of 3.69 decimeters on the scale.
2. A circle of 60 mm diameter rolls on a horizontal line for half a revolution clock-wise and then on a line inclined at 60 degrees to the horizontal for another half clock-wise. Draw the curve traced by a point P on the circumference the circle, taking the top most point on the rolling circle as generating point in the initial position.
3. Two lines AB and AC make an angle 120 degrees between them in their front view and top view. AB is parallel to both the H.P. and V.P. Determine the real angle between AB and AC.
4. A cube of 65 mm long edges has its vertical faces equally inclined to the V.P. It is cut by a section plane, perpendicular to the V.P., so that the true shape of the section is a regular hexagon. Determine the inclination of the cutting plane with the H.P. and draw the sectional top view and true shape of the section.
5. A cylinder of diameter of base 60 mm altitude 80 mm stands on its base. It is cut into two halves by a plane perpendicular to the VP and inclined at 30° to HP. Draw the development of the lower half.
6. Draw the isometric projection of a square prism side of base 60 mm height 50 mm surmounted by a square pyramid whose base coincides with the top of the prism and whose height is 60 mm.
7. Convert the isometric view of the picture shown in the figure below in to orthogonal projection of all three views.



8. A cube of edge 30 mm rests with one of its faces on the ground plane such that a vertical edge touches the picture plane. The vertical faces of the cube are equally inclined to PP and behind it. A station point is 40 mm in front of the PP, 50 mm above the ground plane and lies in a central plane 15 mm to the right of the axis of the cube. Draw the perspective view.

Paper - 11

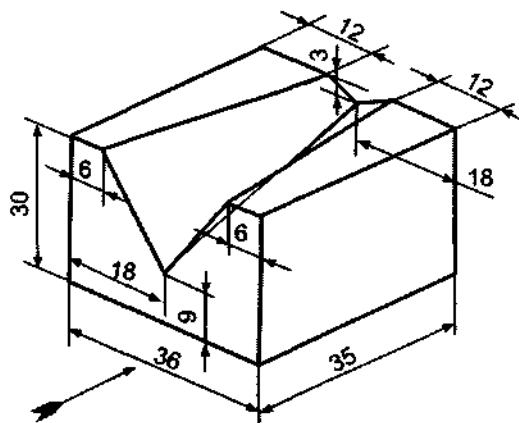
1. Draw a vernier of R.F = 1 : 2.4 to show decimeters, centimeters and millimeters and long enough to read up to 6 decimeters. Mark a distance of 3.69 decimeters on the scale.
2. A circle of 60 mm diameter rolls on a horizontal line for half a revolution clock wise and then on a line inclined at 60 degrees to the horizontal for another half clock-wise. Draw the curve traced by a point P on the circumference the circle taking the top most point on the rolling circle as generating point in the initial position.
3. A hexagonal plane of 30 mm side has a corner in the V.P. and the surface of the plane makes an angle 40 degrees with the V.P. Draw its projections when the front view of the diagonal through the corner which is in V.P. makes an angle of 50 degrees to H.P.
4. A hexagonal prism, side of the base 30 mm long and the axis 60 mm long has one of its sides on the H.P. and the axis is inclined at 45 degrees to the H.P. Draw its projections. Project another front view on an auxiliary vertical plane which is inclined at 40 degrees to the V.P.
5. A vertical cone of 40 mm diameter of base and height 50 mm is cut by a cutting plane perpendicular to V.P and inclined at 30° to the H.P so as to bisect the axis of the cone. Draw the developement of the lateral surface of the truncated portion of the cone.
6. A hemisphere of 40 mm diameter is nailed on the top surface of a frustum of a square pyramid. The sides of the top and bottom faces of the frustum are 20 mm and 40 mm respectively and its height is 50 mm. The axes of both the solid coincide. Draw the isometric projection.
7. Consider the picture shown in figure below and draw the front view, top view and side view in first angle projection.



8. Draw the perspective view of a point P is situated 10 mm behind the PP and 15 mm above the ground plane. The station point is 25 mm in front of the PP. 20 mm above the ground plane. It lies in a central plane 12 mm to the right of the point.

Paper - 12

1. The distance between Vadodara and Surat is 130 km. A train covers the distance in 2.5 hours. Construct a plain scale to measure time up to a single minute. The R.F. of the scale is 1 : 2,60,000. Show the distance covered by the train in 15 seconds.
2. A circle of 60 mm diameter rolls on a horizontal line for half a revolution clockwise and then on a line inclined at 60 degrees to the horizontal for another half clock-wise. Draw the curve traced by a point P on the circumference the circle taking the top most point on the rolling circle as generating point in the initial position.
3. Draw the projections of a circle of 60 mm diameter having end A of the diameter AB in the H.P. the end B in the V.P., and the surface inclined at 30 degrees to the H.P. and 60 degrees to the V.P.
4. A cone of base 55 mm diameter and axis 65 mm long, rests with its base on HP. A section plane perpendicular to both HP and VP cuts the cone at a distance of 8 mm from its axis. Draw its top view, front view and sectional side view.
5. A hexagonal prism of side of base 30 mm and height 60 mm is resting on HP with one of its base edges parallel to VP. Right half of the solid is cut by an upward plane inclined at 60° to the ground and starting from the axis and 30 mm below the top end. The left half of the solid is cut by a plane inclined at 30° to the HP downwards from the axis. The two section planes are continues. Draw the development of the lower portion.
6. Draw the isometric projection of a Frustum of hexagonal pyramid, side of base 30 mm, the side of top face 15 mm and of height 50 mm.
7. Draw the elevation, plan and side view of the picture shown in the figure below.



8. Draw the perspective view of a point P situated 10 mm behind the PP and 15 mm above the ground plane. The station point is 25 mm in front of the PP, 20 mm above the ground plane. It lies in a central plane 12 mm to the right of the point.