



VSB College of Engineering Technical Campus

Approved by AICTE, New Delhi & Affiliated to Anna University

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Department of Mechanical Engineering,

GE3251 –Engineering Graphics

Question Bank

UNIT I

PLANE CURVES AND FREE HAND SKETCHING

1. A circle of 50 mm diameter rolls clockwise on a horizontal line for half a revolution and then on a line inclined at 60° to the horizontal for another half a revolution in the same direction. Draw the curve traced by a point P on the circumference of the circle, taking the top most point on the rolling circle as the initial position of the generating point. (MAY 2019)
2. A point P moves in such a way that its distance from a fixed straight line is 9 units while its distance from a fixed point is always 7 units. Draw the curve by choosing at least 10 points. Assume that the distance between the fixed straight line is 30 mm from that the fixed point. (MAY 2018)
3. Draw locus of the point on the periphery of the circle having diameter of 50 mm, which rolls on straight line path.name the curve a tangent and normal to the curve at any point Q on it. (JAN19)
4. Construct a hyperbola when the distance between the focus and directrix is 55 mm and eccentricity is 1.5. Also draw the tangent and normal to any point on the curve. (DEC2015)
5. Construct an ellipse when the distance between the focus and directrix is 35 mm and eccentricity is $3/4$. Also draw the tangent and normal to any point on the curve. (MAY2016)
6. Construct a parabola when the distance between the focus and directrix is 50mm. Also draw the tangent and normal to any point on the curve. (NOV2015)
7. Construct a hyperbola when the distance between the focus and directrix is 50 mm and eccentricity is $3/2$. Also draw the tangent and normal line at a point 'P' on the curve at the distance 30 mm from directrix (MAY2017)
8. Draw an ellipse when the distance between the focus and directrix is 50 mm and eccentricity is $3/4$. Also draw the tangent and normal to any point on the curve. (JUN2016)
9. A fixed point is 75 mm from a fixed line. Draw the locus of a point 'P' moving such a way that its distance from the fixed point is twice its distance from the fixed straight line. Name the curve. Draw a tangent and normal at any point on the curve. (MAY2018)
10. A circle of 50 mm diameter rolls clockwise on a horizontal line for half a revolution and then on a line inclined at 60° the horizontal for another half revolution in the same direction. Draw the curve traced by a point P on the circumference of the circle, taking the top most point on the rolling circle as the initial position of the generating point. (DEC2019)

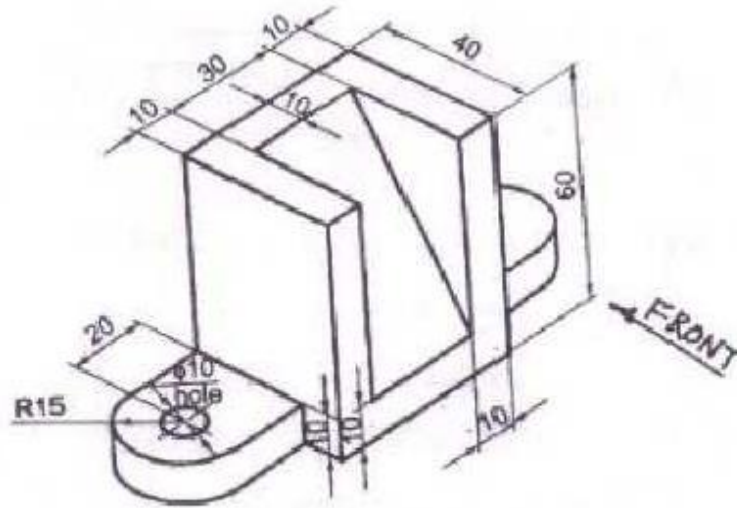


11. Draw the Involute of a circle of radius 20 mm. Also draw the tangent and normal at any point 'P' on the curve. (MAY2015)
12. Develop the Involute of a square of side 25 mm. Also draw the tangent and normal at any point on the curve. (JAN2014)
13. An inelastic string of 150 mm length has its one end attached to the bottom most point of the circumference of a circular disc of 40 mm diameter. Draw the curve traced by the other end of the string when it is completely wound around the disc keeping the string always tight. Name the curve obtained. Draw the tangent and normal to the curve at a point 100 mm from the centre of the disc. (DEC 2016), (NOV2017)
14. Construct an epicycloid of a circle 50 mm diameter which rolls outside of another circle of 100 mm diameter for one revolution. Draw tangent and normal to any point on the curve. (NOV 2016)
15. A circus man rides motor bike inside a globe of 6 m diameter. The motor bike has the wheel of 1m diameter. Draw the locus of the point on the circumference of the motor-bike for one complete revolution. Adopt suitable scale. (JUN2014)
16. Construct a parabola when the distance between the focus and directrix is 40 mm. Also draw the tangent and normal to any point on the curve.
17. Construct a cycloid given the radius of the generating circle is 30 mm. also draw a tangent and normal at any point on the cycloid.
18. Construct a cycloid for one and half revolutions when the radius of the generating circle is 25 mm.
19. Coir is unwound from a drum of 30 mm diameter. Draw the locus of the free end of the coir for unwinding through an angle of 360° . Also draw normal and tangent at any point on the curve.
20. Draw the locus of a point P which moves in a plane in such a way that the ratio of its distances from a fixed point F and a fixed straight line is always $\frac{2}{3}$. The distance between the fixed point F and fixed straight line is 50 mm. Also draw a tangent and normal on a point on the locus at a horizontal distance of 55 mm from the fixed straight line.
21. A water tank of size 27 m^3 was represented in the drawing by 216 cm^3 size. Construct a vernier scale for the same to measure up to 5m. Show on it, the following lengths (i) 3.95 m (ii) 0.27 m (iii) 0.042 m.
22. The distance between Chennai and Madurai is 400 Km. It is represented by a distance of 8 cm on a railway map. Find the R.F and construct a diagonal scale to read kilometers. Show on it the distance of 543 Km, 212 Km and 408 Km.
23. A circus man rides a motor bike inside a globe of 6 m diameter. The motor bike has the wheel of 1 m diameter. Draw the locus of the point on the circumference of the motorbike wheel for one complete revolution. Adopt suitable scale.
24. Draw the involute of a circle of diameter 40 mm. Also draw a tangent and normal to the curve at any point on the curve.



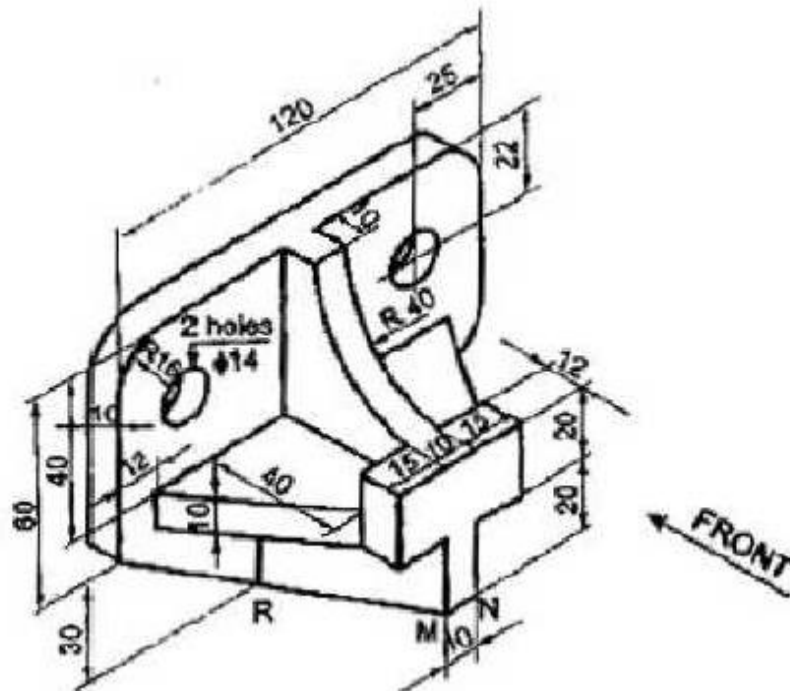
25. Construct a hyperbola when the distance between the focus and the directrix is 40mm and the eccentricity is $\frac{4}{3}$. Draw a tangent and normal at any point on the hyperbola

26. Sketch freehand the top, front and right side views of the object shown in figure.

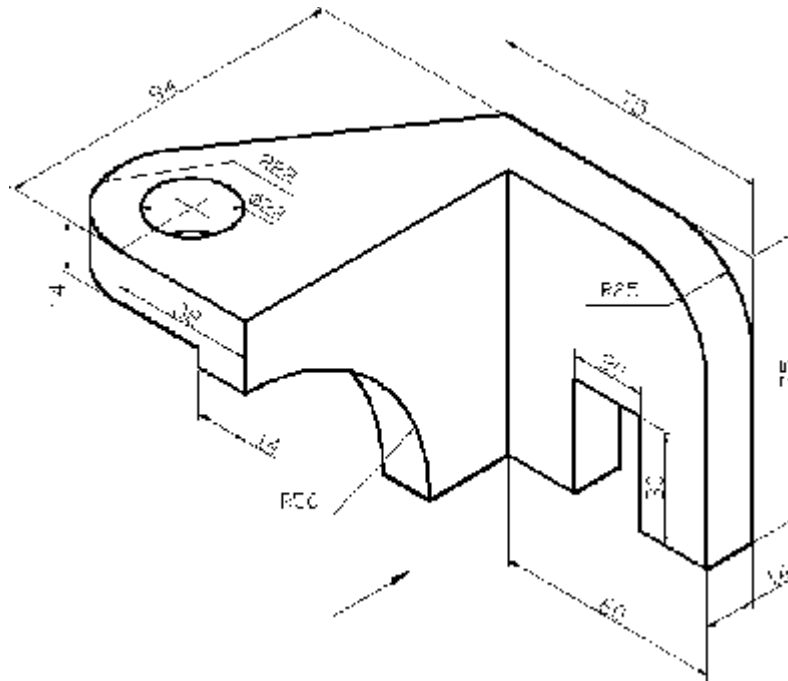


NOTE : ALL DIMENSIONS ARE IN 'mm'

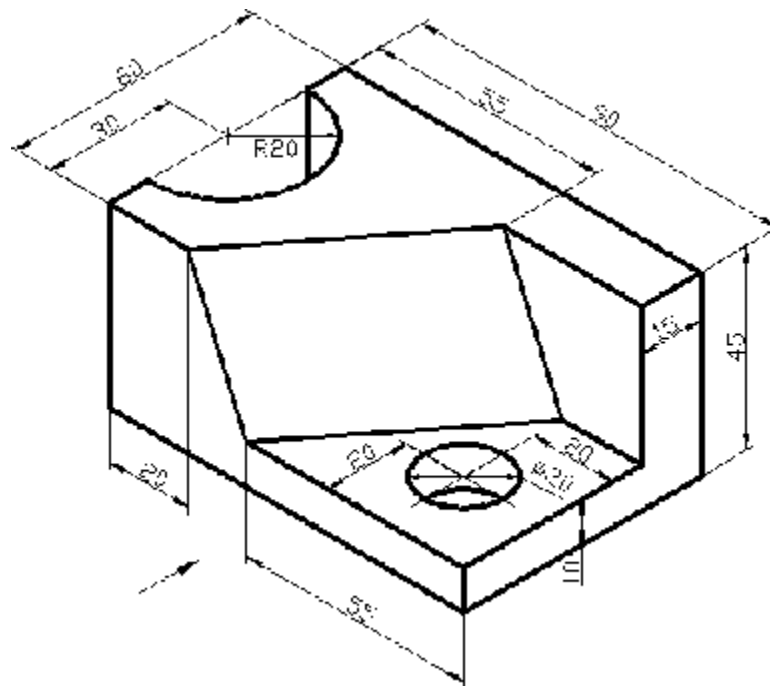
27. Draw the three views of the object shown in fig. Choosing the most important side as front. (May2016)



28. Draw the front top and side views of the component shown in figure by free hand.



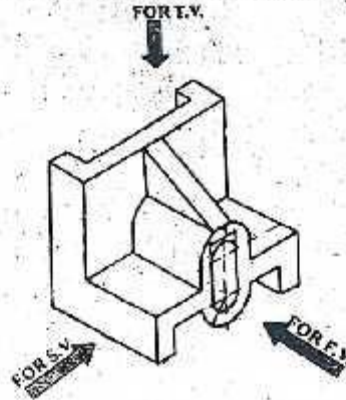
31. Draw the following views of the component shown in figure below by free hand sketching. (i)Front view (ii) Top view & (iii) Right side view and (iv) Left side view.



32. Draw by free hand front view, top view right side view for the following figure. (MAY 2016)(JUN 2014) (MAY 2018) (NOV2019)



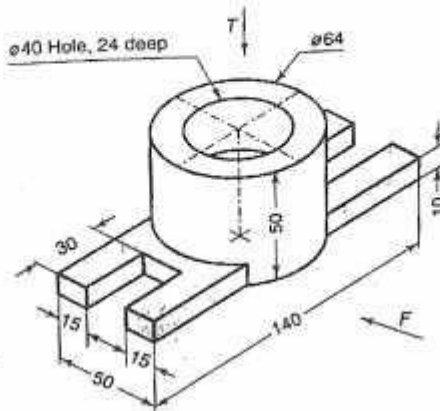
(b) Sketch by free hand the front view, the top view, and the right side view of the object shown in Figure 1. Assume proportional dimensions in mm.



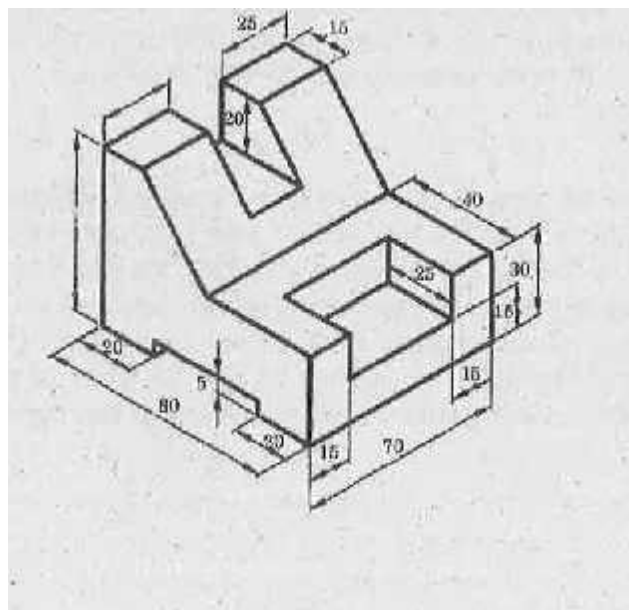
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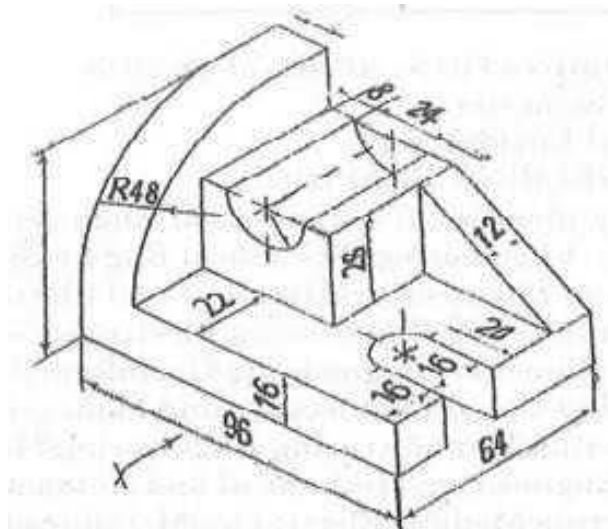
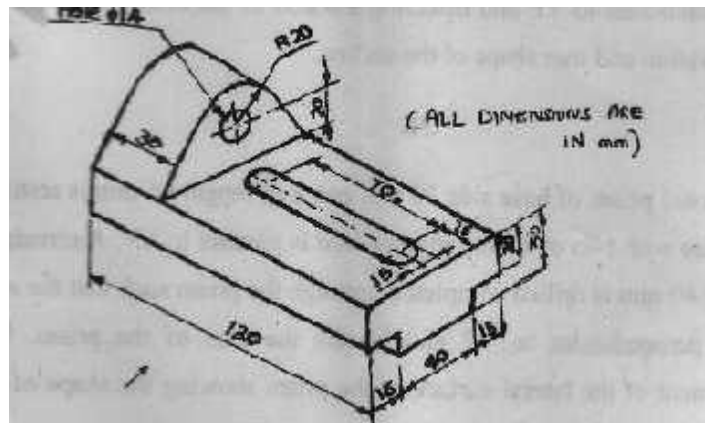
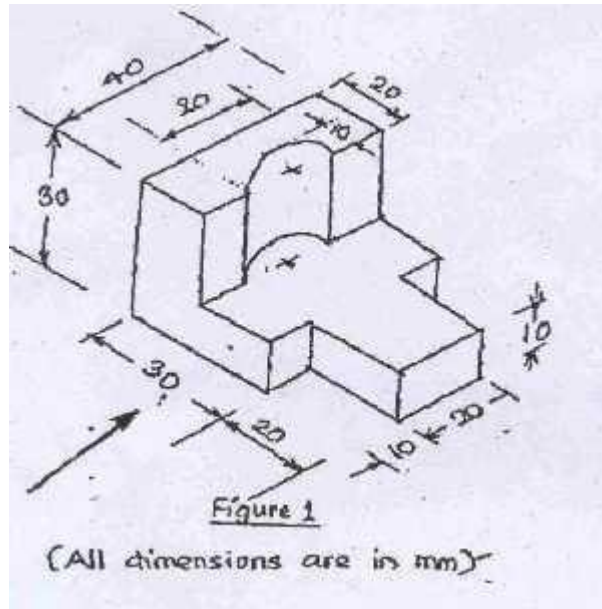
Figure 1

1. (a) Draw free hand sketches of the front, top and right side views of block shown in Fig. 1.



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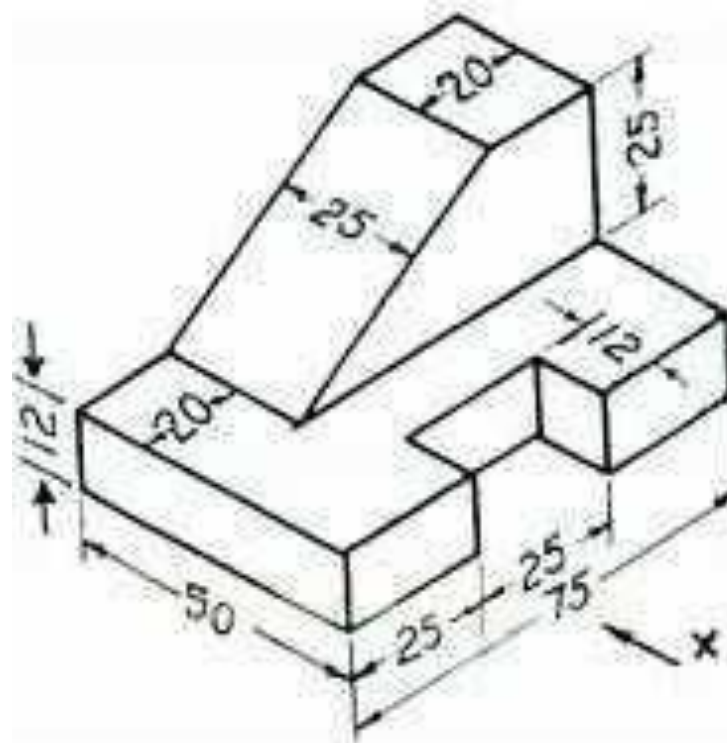
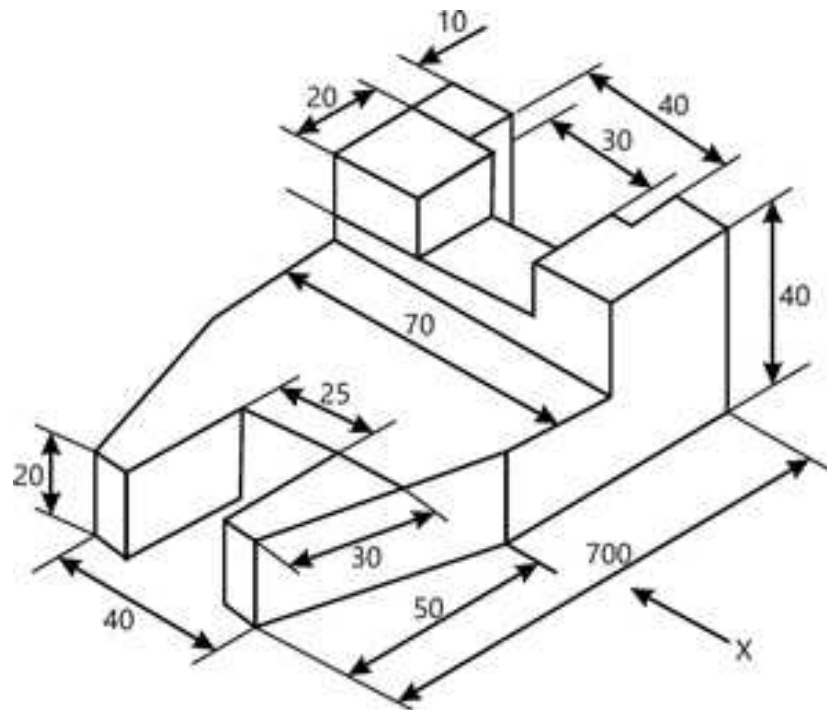
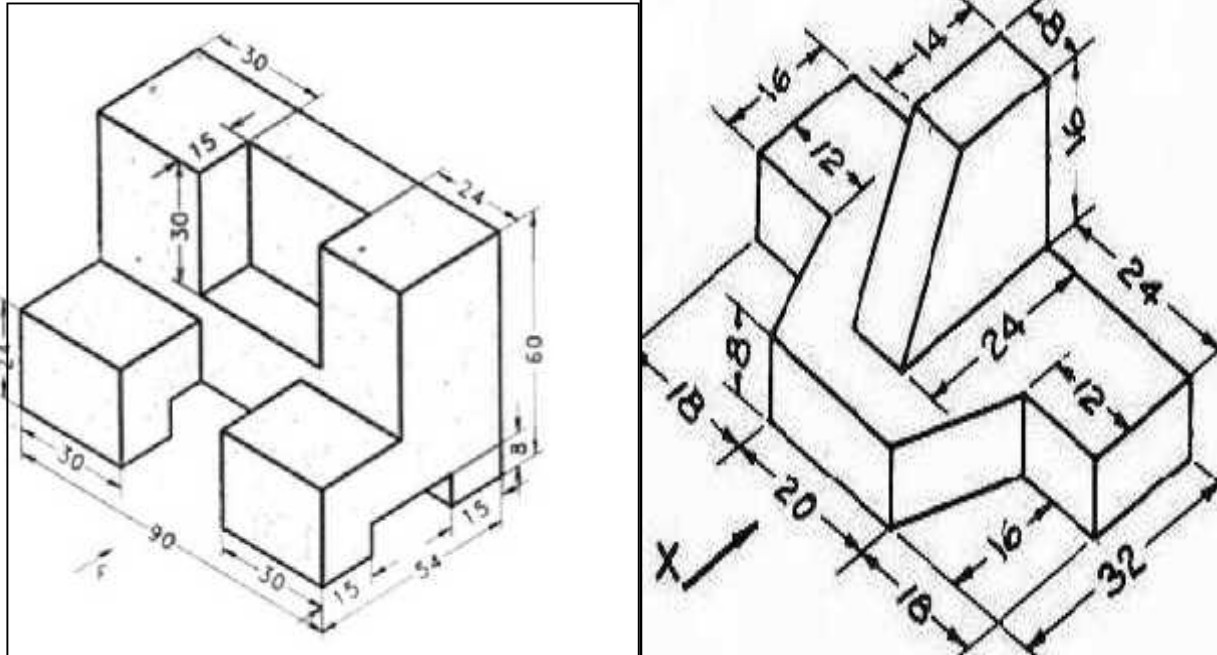


Fig 1



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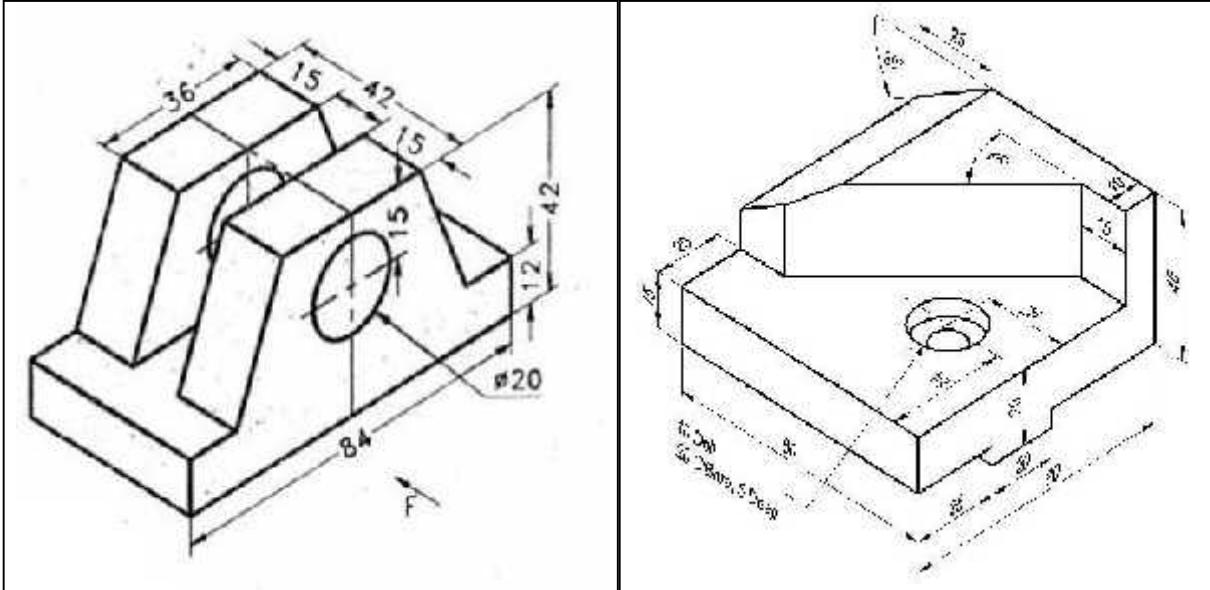


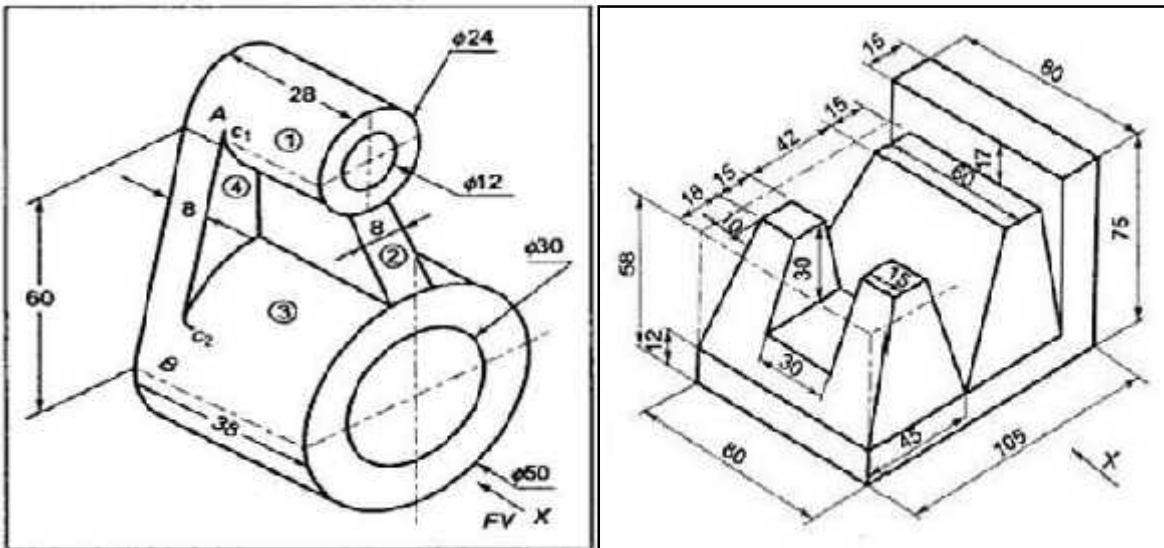


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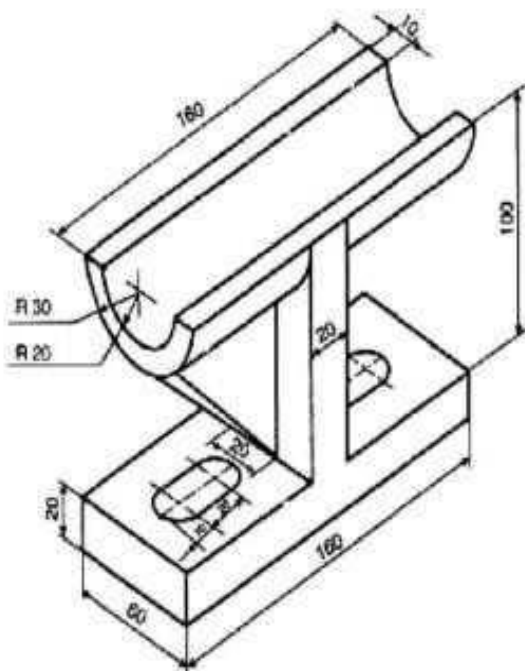
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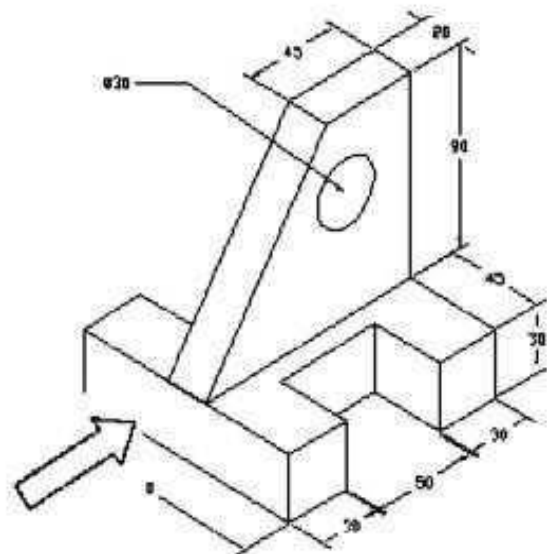




d)



e)





UNIT-II

PROJECTION OF POINT, LINES AND PLANES

1. A front view of the line AB of length 70 mm is inclined at 30° to 'xy' line and measures 45 mm. The end A is 20 mm above HP and 25 mm in front of VP. Draw the projections of the line and find the inclinations with HP and VP by rotating line method. **(MAY 2019)**
2. A regular pentagonal lamina of 30 mm base edges rests on one of its corners on HP. Draw its projections when the surface of the plate makes 60° with HP and the top view of the diagonal passing through that corner on HP makes 45° with VP. **(MAY 2019)**
3. A line a'b' is 50° inclined to xy and measures 55 mm long, while its top view is inclined at 60° to xy line. The end A of the line is 15 mm above HP and 20 mm in front of VP. Draw the projection of the line and find its true inclination with HP and VP. Also show its traces **(JAN 19)**
4. A rectangular lamina 40*70 mm size is standing on one of its corner with side is equally inclined to HP. The surface of the lamina is inclined to VP. The diagonal passing through the resting corner makes an angle 55° with HP. Draw the projection of the rectangular lamina. **(JAN19)**
5. The end P of line PQ is 30mm above HP and 35mm in front of VP. The line is inclined at 35° to the HP. Its top view is 70 mm long and inclined at 40° to XY. Draw the projections of the straight line. Locate the traces. Find the true length and inclination of the line with VP. **(MAY 2019)**
6. A hexagonal plate of side 20 mm rests on one of its sides inclined at 45° to the VP. The surface of the plate makes an angle of 30° with the HP. Draw the front and top views of the plate makes an angle of 30° with the HP. Draw the front and top views of the plate. **(MAY 2019)**
7. Draw the projections of a line CD 50 mm long, parallel to HP and inclined to VP. The end C is 10 mm in front of VP and D is 30 mm in front of VP. The line is 15 mm above HP. A line CD is parallel to VP and inclined at 40° to HP. C is in HP and 25 mm in front of VP. Top view is 50 mm long. Find its true length. **(NOV/DEC 2019)**
8. The projections of a line measure 80 mm in the top view and 70 mm in the front view. The mid-point of the line is 45 mm in front of VP and 35 mm above HP. One end is 10 mm in front of VP and nearer to it. Draw the projections. Find true length and true inclinations with reference planes. **(APR 2018)**
9. A hexagonal plate of the side 20 mm rests on the HP on one of its sides inclined at 45° to the VP. The surface of the plate makes an angle of 30° with the HP. Draw the front and top views of the plate. **(DEC2015)**
10. The point A of a line AB is in HP and 60 mm in front of VP. The point B is in VP and 40 mm above HP. The distance between the projectors is 70 mm. Draw the projections of the line, find the true length, inclination and locate its traces. **(MAY2015)**



11. The top view of a 80 mm long line AB measures 65 mm while the length of its front view is 55 mm. It's one end A in the HP and 12 mm in front of the VP. Draw the projections of AB and determine its inclination with the HP and VP. (MAY2017)
12. A pentagon of 35 mm side is resting on one of its corners on the VP. The edge opposite to that corner makes an angle of 30° to the HP. The surface of the pentagon is inclined at 40° to the VP. Draw the projections. (MAY2017)
13. An equilateral triangle ABC of side 70 mm is so placed that the side AB is parallel to HP and inclined to HP and inclined at 40° to VP. The difference in height between C and A is 30 mm. Draw the projections of the triangle. (DEC2016)
14. A rectangular plate measuring 70*40 mm has one of its shorter edges in VP and inclined at 40° to the HP. Draw its top view if its front view is a square of side 40 mm. Draw its projections and also find its true inclination of the plate with the VP. (MAY2016)
15. The front view of the line AB of length 70 mm is inclined at 30° to XY line measures 45 mm. The end A is 20 mm above HP and 25 mm in front of VP. Draw the projections of the line and find its inclinations with HP and VP. (DEC2015)
16. Mark the projections of the following points on a common reference line, keeping the projectors 35 mm apart.
 - i. A Point A is 30 mm above HP and 45 mm in front of VP
 - ii. A point B lying on HP and 50 mm in front of VP
 - iii. A point C lying on VP and 55 mm above HP
 - iv. A point D lying on VP and 58 mm above HP
 - v. A point E which lies in both the HP and the VP
 - vi. A point F is 45 mm above HP and 60 mm behind VP
 - vii. A point G is 35 mm below HP and 25 mm behind VP
 - viii. A point H is 45 mm below HP and 60 mm in front of VP
17. A pentagonal lamina of 30 mm side rests on the HP on one of its corners with its surface inclined at 30° to the HP. Draw its projections when the side opposite to the resting corner is 45° inclined to VP.
18. A room is 4.8 m*4.2 m*3.6 m high. Determine graphically the distance between a top corner and the bottom corner diagonally opposite to it.
19. The distance between the projectors of two points A and B is 70 mm. Point A is 10 mm above the HP and 15 mm in front of the VP. Point B is 50 mm above the HP and 40 mm in front of the VP. Find the shortest distance between A and B by the rotating line method. Measure the true inclinations of the line AB with the VP and the HP. Also mark the traces.



20. The end P of a line PQ 70 mm long is 15 mm above the HP and 20 mm in front of the VP. Q is 40 mm above the HP. The top view of the line is inclined at 45° to the VP. Draw the projections of the line and find its true inclination with the VP and the HP.
21. The distance between the projectors through the VT and the HT of a line PQ is 70 mm and that between the projectors through the ends is 40 mm. The VT is 45 mm above the HP and the HT is 30 mm in front of the VP. P is 15 mm above the HP. Draw the front and top views of the line. Also find the true length and true inclinations of the line with the HP and VP.
22. A hexagonal lamina of side 30 mm is resting on the HP such that one of its corners touches the HP and the VP. Draw the projections when its surface makes 30° with the HP and 60° with the VP.
23. A regular circular lamina of 60 mm diameter rests on HP such that the surface of the lamina is inclined at 30° to HP. Obtain its projection when the top view of the diameter passing through the point on HP and makes 45° to VP.
24. A straight line ST has its end S, 10 mm in front of the VP and nearer to it. The midpoint m of the line is 50 mm in front of the VP and 40 mm above the HP. The front and top views measure 100 mm and 120 mm respectively. Draw the projections of the line. Also find its true length and true inclinations with the reference planes.
25. A thin circular metal plate of 48 mm diameter, having its plane vertical and inclined at 40° to VP. Its center is 33 mm above HP and 25 mm in front of VP. Draw its projections.
26. A regular hexagonal plane surface of 25 mm side has two of its edges parallel to both HP and VP and the nearest edge is 15 mm from each plane. The surface is inclined at 60° to HP. Draw the projections.



UNIT –III

PROJECTION OF SOLIDS

1. A pentagonal prism 30 mm side of base and axis 70 mm long is resting on one of its edges of the base, in such a way that the base makes an angle of 40° with HP. Draw the projections if the axis is parallel to VP. **(MAY 2019)**
2. A cylinder of base diameter 30 mm and axis 70 mm long has its cylindrical end that is inclined at 30° to VP. Draw its projections, when the front view of the axis is parallel to the reference line. **(MAY 2019)**
3. A tetrahedron of 25 mm long edge is resting on one of its edge with the face containing that edge is perpendicular to HP and inclined at 30° to the VP. Draw its projection. **(JAN19)**
4. A hexagonal pyramid having a base with a 30 mm side and an 80 mm long axis is freely suspended from one of the corners of the base. Draw its projections when its axis is parallel to the VP **(JAN2019)**
5. A cylinder of diameter 30 mm and axis length 50 mm is resting on the HP on a point so that its axis is inclined at 45° to the HP and parallel to the VP. Draw its top and front views. **(MAY 2019)**
6. A square pyramid of base 60 mm and altitude 100 mm lies on the HP on one of its triangular faces with its axis parallel to the VP. Draw its projections. **(MAY 2019)**
7. A square prism of base side 35 mm and axis length 60 mm lies on the HP on one of its longer edges with its faces equally inclined to the HP. Draw its projections when its axis is inclined at 30° to the VP. **(DEC2016)**
8. A hexagonal prism of base side 30 mm and axis length 60 mm rests on the HP on one of its base edges with its axis inclined at 60° to the HP and parallel to the VP. Draw its top and front views. **(MAY2017)**
9. Draw the projections of a cube of side 40 mm when it rests on the ground on one of its corners and a face containing that corner is inclined at 30° to the ground and perpendicular to the VP. **(MAY2018)**
10. A cylinder of diameter 30 mm and axis length 50 mm is resting on the HP on a point so that its axis is inclined at 45° to the HP and parallel to the VP. Draw its top and front views. **(DEC2016, DEC2019)**
11. A pentagonal pyramid of base edge 25 mm and axis length 60 mm rests on the base side on HP such that the highest corner is 20 mm above HP. Its axis is parallel to the VP. Draw the top and front views. **(MAY2016)**
12. A cone of base diameter 40 mm and height 56 mm is freely suspended from one of its base points such that its axis is parallel to the VP. Draw its projections. **(DEC2017, DEC2018)**
13. A hexagonal pyramid of side 24 mm and axis length 40 mm is lying on the HP on one of its triangular faces with its axis parallel to the VP. Draw the top and front views of the pyramid. **(DEC)**



2019)

14. A pentagonal prism base side 25 mm and axis length 55 mm rests on the HP on one of its base corners with the base edges containing the corner being equally inclined to the HP. The axis is inclined at 45° to the HP and parallel to the VP. Draw the projections of the prism by change of position method. (MAY2018)
15. A hexagonal prism of base side 25 mm and axis length 55 mm rests on the HP on one of its base corners such that a solid diagonal passing through that corner is perpendicular to the HP. Draw its projections. (MAY2017)
16. A square pyramid, side of base 30 mm and height 65 mm, rests with one of the edges of its base on HP such that its base makes 30° to HP. Draw its projections. (DEC2016)
17. A hexagonal pyramid of base side 30 mm and altitude 75 mm rests on the HP on one of its base edges such that the triangular face containing the resting edge is perpendicular to both the HP and the VP. Draw its projections.
18. Draw the projections of a hexagonal prism of base side 20 mm and axis length 50 mm when it is lying on the ground on one of its rectangular faces and the axis is inclined at 35° to the VP.
19. Draw the projection of a cylinder of diameter 50 mm and axis length 80 mm when it is lying on the ground with its axis inclined at 45° to the VP and parallel to the ground.
20. A tetrahedron of 40 mm side rests with one of its edges on HP and perpendicular to VP. The triangular face containing that edge is inclined at 30° to HP. Draw its projection.
21. A right pentagonal pyramid of base side 20 mm and altitude 60 mm rests on one of its edges of the base in HP. the base being lifted up until the highest corner in it is 20 mm above HP. Draw the projections of the pyramid when the edge on which it rests is made perpendicular to VP.
22. A solid cylinder of diameter 60 mm and 80 mm axis length is lying on horizontal plane with its one of the circumferential line on HP and the axis makes 30° to VP. Draw its projections.
23. A cone of base diameter 40 mm and height 56 mm is freely suspended from one of its base points such that its axis is parallel to the VP. Draw its projections.
24. Draw the projections of a pentagonal pyramid of base side 35 mm and altitude 60 mm when it rests on the ground on one of its base edges with the axis inclined at 30° to the ground and parallel to the VP. Use change of reference line method.
25. A bucket in the form of the frustum of a cone has diameters 300 mm and 750 mm at the bottom and the top respectively. The bucket height is 800mm. The bucket is filled with water and then tilted through 40° . Draw the projections showing water surface in both the views. Remember that the axis of the bucket is parallel to the VP.
26. An octahedron of side 40 mm is resting on the ground with one of its triangular faces on the ground with an edge perpendicular to VP. Draw the projections.



27. A square pyramid of base 45 mm and axis 70 mm long has one of its triangular faces on VP and the edge of base contained by that face perpendicular to HP. Draw its projections.
28. A pentagonal prism, side of base 25 mm and axis 80 mm long, rests with one of its shorter edges on HP. Such that base containing that edge makes an angle of 30° to HP and its axis is parallel to VP. Draw its projections.
29. Draw the projections of a right circular cone of base diameter 80 mm and altitude 80 mm lying on HP with one of its generators. The axis is parallel to VP.
30. A hexagonal prism side of base 50 mm and axis 80 mm long, lies with one of its rectangular faces on the HP, such that the axis is inclined at 55° to the VP. Draw its projections by using change of reference line method.
31. A pentagonal pyramid of base side 55 mm and axis 85 mm long lies with one of its slant edges on HP such that its axis is parallel to VP. Draw its projections.
32. Draw the projections of a pentagonal prism of 60 mm side of base and 95 mm long. It is lying on one of its longer edges on HP with one rectangular face perpendicular to HP such that the axis makes 60° with VP.

UNIT -IV

SECTION OF SOLIDS AND DEVELOPMENT SURFACES

1. A hexagonal pyramid, base 30 mm side and axis 65 mm long, is resting on its base on the HP with two edges parallel to the VP. It is cut by a section plane, perpendicular to the VP which is inclined at 45° to the HP and intersecting the axis at a point 25 mm above the base. Draw the front view,



sectional top view, sectional side view and true shape of the section. (MAY 2019)

2. A cone of base diameter 60 mm and height 70 mm is resting on its base the ground. It is cut by a plane perpendicular to VP and parallel to HP at the distance 20 mm from vertex. It is also cut by a plane inclined at 40° to the base and meeting the axis at a point 20 mm above base. Draw the development of the lateral surface of the cut cone. (MAY 2019)

3. A right circular cone of base diameter 60mm and height 75mm is resting on its base on the HP. It is cut by the plane perpendicular to the VP and inclined at 30° to the HP bisecting the axis of the cone, draw the sectional top view and true shape of the section, when the top of the sectioned solid is removed.(JAN2019)

4. A square prism of base edge of 50mm sides and axis 70mm long is standing on its base with its faces equally inclined at 45° to HP and passing through the intersection of the top surface and the face of the solid. Draw the development of the lateral surface of the lower portion of the truncated solid.(JAN2019)

5. A pentagonal pyramid of base side 20 mm and altitude 45 mm rests on its base on the HP with an edge of the base perpendicular to VP. It is cut by a plane perpendicular to both the HP and VP. The cutting plane cuts the object at 8 mm from the axis in the top view. Draw the front, top and right end views of the pyramid.(MAY 2019)

6. A hexagonal prism of base edge 25 mm and height 60 mm rests on one of its ends on the HP with a vertical face parallel to the VP. A horizontal hole of diameter 36 mm is drilled centrally right through the prism with its axis perpendicular to the VP. Draw the development of lateral surfaces of the prism with the hole.(MAY 2019)

7. A pentagonal prism, side of base 25 mm and axis 60 mm long, rests with one of the edges of its base on HP. Its axis is inclined at 30° to HP and parallel to VP. It is cut by a horizontal section plane passing through the highest corner of the base. Draw the sectional top view. (MAY2018)

8. A cone having a 60 mm base diameter and a 70 mm long axis is resting on its base on the ground. It is cut by a plane such that the true shape of the section is a rectangular hyperbola with a 40 mm base and seen in the front view. Draw the sectional front view and find the distance of the section plane from the axis of the cone. (DEC 2015,2016)

9. A pentagonal prism of base side 25 mm and axis height 60 mm is resting on the ground with one of its base edges parallel to VP. Find graphically the shortest distance of a string, which connects one end of the lateral edge with the other end of the same edge, covering all the lateral surfaces of the solid. Also trace the points on the development. (DEC2018)

10. A hexagonal pyramid of side of base 30 mm and altitude 75 mm rests on its base on HP such that a base edge is parallel to VP. It is cut by two cutting planes, perpendicular to VP. One of the planes is inclined at 30° to HP and meeting the axis at a point 40 mm from the base. The other plane is curved of 30 mm radius with the right corner of the base as center. Develop the lateral surfaces of the remaining portion of the pyramid. (MAY2019)



11. A square prism 36 mm edge of base and 64 mm height stands on HP with two of its base edges equally inclined to VP. It has a square hole of 24 mm side centrally cut right through the prism such that its faces are equally inclined to HP. Axis of the hole is parallel to HP and perpendicular to VP. Draw the development of the lateral surfaces of the prism showing true shape of the square cut out formed on it. **(MAY2018)**
12. A right circular cone of base 55 mm and length of axis 70 mm rests on HP on its base. A section plane perpendicular to VP and inclined at 45° to HP cuts the cylinder. The section plane passes through the centre of the top face of the cone. Draw the apparent and true shape of section. **(DEC 2018, MAY 2019)**
13. A hexagonal pyramid side of base 40 mm height 80 mm stands with the base on HP. A through circular hole of 30 mm diameter is drilled through the pyramid such that the axis of hole is perpendicular to VP and intersects the axis of the pyramid 20 mm above the base. Draw the development of the lateral surface of the pyramid. **(DEC 2016)**
14. A cylinder of base diameter 40mm and height 50 mm rests on one of its end on the HP. A square slot of diagonal 26 mm is drilled right through the cylinder such that one diagonal coincides with the axis of the cylinder. The axis of the slot is perpendicular to the VP and bisects the axis of the cylinder. Draw the development of the cylinder with the hole. **(MAY2015)**
15. A lamp shade is formed by cutting a cone of base 144 mm diameter and 174 mm height by a horizontal plane at a distance of 72 mm from the apex and by another plane inclined at 30° to HP and passing through one extremity of the base. Draw the development of the lampshade.
16. A hollow hexagonal prism, side of base 30 mm and axis 60 mm long, has a square hole of side 20 mm through it such that the axis of the hole coincides with that of the prism. The prism rests with its base on HP and one of its rectangular faces is perpendicular to VP. Draw the sectional top view and true shape of the section.
17. A vertical chimney of circular section of 400 mm diameter joints the roofs of a room sloping at 35° to the horizontal. The shortest portion of the chimney is 300 mm. Determine the shape of the sheet metal from which the chimney can be made. Use 1:10 scale.
18. A vertical pentagonal pyramid of side of base 27 mm and altitude 50 mm rests with a base edge parallel to VP and nearer to it. It is cut by two planes perpendicular to VP. One is horizontal and cuts the portion of the pyramid on the left of the axis at a height of 18 mm above the base of the pyramid. The other plane inclined at 45° to HP cuts the portion of the pyramid to the right of the axis passing through a point on it 18 mm above the base and leans upwards. Draw the development of the lateral surfaces of the truncated pyramid.
19. A hexagonal pyramid, edge of base 25 mm and axis 60 mm long is lying on one of its triangular faces on HP. It is sectioned by a horizontal plane 15 mm from the highest point of the pyramid. (i) Draw the projections of solid. (ii) Develop the surfaces of solid remaining below the section plane.
20. A cube of side 30 mm rests with one of its faces on HP such that one of its vertical square faces



is inclined to 30° to VP. A section plane perpendicular to VP and inclined at 60° to HP passes through a point on the axis, 5 mm below its top end. Draw its sectional top view and true shape of the section.

21. A right regular hexagonal pyramid with edge of base 30 mm and height 60 mm stands with its base on HP with two of its base edges parallel to VP. It is cut by a plane passing through a point on the axis 30 mm from the base and inclined at 30° to the HP. Draw the sectional front view and true shape of the section.

22. A cone of base diameter 40 mm and axis length 70 mm rests with its base on HP. A sectional plane perpendicular to VP inclined at 35° to HP bisects the axis of the cone. Draw the development of the truncated cone.

23. A hexagonal prism of base 40 mm and axis length 60 mm is resting on HP on its base with two of its vertical faces perpendicular to VP. It is cut by a plane inclined at 50° to HP and perpendicular to VP and meets the axis of prism at a distance 10 mm from the top end. Draw the development of the lateral surface of the prism.

24. A square pyramid of base side 35 mm and altitude 65 mm rests on the HP on its base with the base edges equally inclined to VP. It is cut by a plane perpendicular to the VP and inclined at 30° to the HP meeting the axis at 25 mm above the HP. Draw the development of the lateral surface of the pyramid.

25. A cone of base diameter 40 mm and axis length 60 mm stands on the HP. A cylindrical hole of diameter 20 mm is drilled right through the cone. The axis of the hole is perpendicular to the VP and meets the axis of the cone at 15 mm above the base of the cone. Draw the development of the lateral surface of the cone with the hole.

26. A hexagonal pyramid of base edge 30 mm and altitude 55 mm stands on its base on the HP with a base edge parallel to VP. A circular hole of diameter 22 mm is drilled right through the pyramid with axis of the hole perpendicular to the VP and meeting the axis of the pyramid at 20 mm above the bases. Draw the development of the pyramid with the hole.

27. A cube of edge 40 mm rests on its base on the HP with a vertical face inclined at 45° to the VP. A horizontal hole of diameter 26 mm is drilled centrally right through the cube with its axis perpendicular to the VP. Draw the development of the lateral surfaces of the cube with the hole.

UNIT- V

ISOMETRIC AND PERSPECTIVE PROJECTION

1. Draw the isometric view of a hexagonal pyramid of base side 30 mm and height 70 mm rests on



its base on HP with a base edge parallel to VP. It is cut by a plane perpendicular to VP inclined at 45° to the HP and meeting the axis at 40 mm from the base. (MAY 2019)

2. A rectangular pyramid of sides of base 30 mm x 20 mm and height 40 mm rests with its base on the ground such that one of the longer base edges is parallel to the picture plane and 15 mm behind it. The observer is 50 mm in front of the picture plane, 25 mm to the left of the axis of the pyramid and 50 mm above the ground. Draw the perspective view of the pyramid (MAY 2019)

3. An inverted frustum of the cone base diameter 40 mm and top diameter 20 mm and 30 mm long axis is placed centrally over a cylinder of 70 mm diameter and 40 mm height. Draw the isometric projection of the combined solid. (JAN 2019)

4. A square pyramid of base edge 40 mm and altitude 50 mm, rest with its base on the ground plane such that all the edge of the base are equally inclined to PP. one of the corner of the base is touching the PP. The station point is 60 mm in front of the PP, 80 mm above the ground plane and lies in the central plane with passes through the axis of the pyramid. Draw the perspective projection. (JAN 2019)

5. Draw the isometric view of a frustum of a cone of height 30 mm, base diameter 34 mm, top diameter 20 mm when it is centrally placed over a square slab of side 50 mm and thickness 10 mm. (MAY 2019)

6. A square prism of base 25x25 mm and height 40 mm rests on the GP on one of its ends with a rectangular face receding away from the PP towards right making 60° with PP. The corner nearest to the PP is 40 mm to the left of the station point and 20 mm behind the PP. Draw the perspective view of the prism by visual ray method. Use the top view and the front view. (May 2019)

7. A hexagonal prism of base side 30 mm and axis length 60 mm rests on HP with two base edges parallel to the VP. It is cut by a section plane perpendicular to the VP and inclined at 50° to the HP bisecting the axis of the prism. Draw the isometric view of the truncated prism. (DEC 2014, MAY 2015)

8. Draw the isometric projection of a cone of base 30 mm diameter and height 58 mm when it rests with its base on HP. (MAY 2016)

9. Draw the isometric projection of a pentagonal prism of side of base 30 mm and height 60 mm, resting on its pentagonal base with one rectangular face parallel to VP which is sectioned by a cutting plane inclined at 40° to the base and passing through the axis at a height of 40 mm from the base. (DEC 2016)

10. Draw the isometric view of a frustum of a hexagonal pyramid when it is resting on its base on the HP with two sides of the base parallel to the VP. The side of base is 20 mm and top 8 mm. The height of the frustum is 55 mm. (MAY 2015).

11. A cylinder 50 mm diameter and 60 mm height stands on HP. A section plane perpendicular to VP, inclined at 55° to the HP cuts the cylinder and passes through a point on the axis at a height of 45



mm above the base. Draw the isometric projection of the truncated portion of the cylinder when the cut surface is clearly visible to the observer. **(DEC2015)**

12. Draw the isometric view of a frustum of cone of height 30 mm, base diameter 34 mm, top diameter 20 mm when it is centrally placed over a square slab of side 50 mm and thickness 10 mm. **(DEC2018)**

13. A square pyramid of base diagonal 20 mm and height 25 mm is kept centrally over a square prism of base side 30 mm and height 25 mm resting on the ground on a square face. The base edges of the pyramid are equally inclined to the VP. One base side of the prism is parallel to the VP. Draw the isometric view of the combination of solids to full scale. **(DEC2016)**

14. A square prism of base 25*25 mm and height 40 mm rests on the GP on one of its ends with a rectangular face receding away from the PP towards right making angle of 60° with picture plane. The corner nearest to the PP is 40 mm to the left of the station point and 20 mm behind the PP. The station point is 60 mm above the GP and 50 mm in front of the PP. Draw the perspective view of the prism by visual ray method. Use the top view and front view. **(MAY 2017)**

15. A cube of side 45 mm rests on the ground on its base with all the vertical faces equally inclined to the picture plane. One vertical edge is touching the picture plane and is 15 mm to the left of the station point which is 70 mm above ground and 55 mm in front of the picture plane. Draw the perspective of the cube. **(DEC2016)**

16. A rectangular prism, sides of base 50*30 mm and height 55 mm, rests with its base on the ground plane. A vertical edge is in the picture plane and one of the longer edges of its base is inclined at 45° to PP and behind it. The station point is 50mm in front of PP, 75 mm above the ground plane and lies in a central plane which passes through the centre of the prism. Draw the perspective view **(DEC2018)**

17. Draw the perspective view of a square pyramid of base 40 mm side and height of the apex 70 mm. the nearest edge of the base is parallel to and 15 mm behind the picture plane. The station point is situated at a distance of 150 mm in front of the picture plane, 30 mm above the ground plane and 20 mm to the right of the apex. **(DEC 2015) (MAY 2016) (DEC2019)**

18. A square prism of 25 mm side of base and height 40 mm rests with its base on ground, such that one of the rectangular faces is parallel to the picture plane and 10 mm behind it. The station point lies on the axis of the prism and 60 mm above the ground. Draw the perspective projection of the pyramid. **(DEC2016)**

19. A cylindrical slab of 75 mm diameter and 45 mm thick is surmounted by a cube of 38 mm side on the top of the cube rests a square pyramid of altitude of 38 mm and side of base 25 mm. The axes of the solids are in the same straight line. Draw the isometric view of the setup. Draw the isometric view of a frustum of square pyramid of height 50 mm, base 40 mm and the top base 20 mm. the frustum is resting with its base on HP.



20. Draw the isometric view of a waste paper basket which is in the shape of a hexagonal pyramid of base side 200 mm and top side 350 mm, height is 500 mm. Adopt the suitable scale.
21. Draw the isometric projection of a sphere of diameter 16 mm kept centrally over a frustum of a square pyramid of height 25 mm. The frustum has a base of side 35 mm and top of side 20 mm.
22. A regular hexagonal pyramid of base edge 20 mm and height 35 mm rests on its base on the ground plane with one of its base edges touching the picture plane. The station point is 30 mm above the ground plane and 40 mm in front of the PP. The central plane is 30 mm to the right of the axis. Draw the perspective projection of the pyramid by visual ray method. Use the top view and front view.
23. A cylinder 30 mm diameter and 40 mm long is lying on the ground with its axis perpendicular to the picture plane. The nearest point of contact with the ground is 60 mm on the left of the station point and 10 mm from the PP. The station point is 40 mm above the ground and 60 mm in front of the PP. Draw the perspective view of the cylinder.
24. A rectangular block 30*20*20 mm high is lying on the ground on one of its largest faces. A vertical edge is in the picture plane and the largest vertical rectangular faces make 30° with the picture plane. The station point of the picture plane, 30 mm above the ground and lies in a central plane which passes through the centre of the block. Draw the perspective view of the block.
25. A cylinder 40 mm diameter and 60 mm length, lies on the ground on one of its generators with its axis perpendicular to the PP. the nearest point of the solid is 20 mm on the right of SP and 30 mm behind the PP. draw the perspective view of the cylinder if the station point is 50 mm above GP and 100 mm in front of PP.