



SRM VALLIAMMAI ENGINEERING COLLEGE

SRM Nagar, Kattankulathur– 603203



DEPARTMENT OF MECHANICAL ENGINEERING

QUESTIONBANK



I SEMESTER

1901007 - ENGINEERING GRAPHICS

Academic Year 2020-2021 (Odd Semester)

Prepared by

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QUESTION BANK

All Questions (1 x 20 = 20 Marks)

UNIT I -PLANE CURVES AND SPECIAL CURVES

Basic Geometrical constructions, Curves used in engineering practices: Conics – Construction of ellipse, parabola and hyperbola by eccentricity method – Construction of cycloid (Rolling Circle rolls on flat surface only).construction of involutes of square and circle – Drawing of tangents and normal to the above curves.

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|---|---|-------|--------|
| 1 | Construct a parabola when the distance between the focus and directrix is 50 mm. Also draw the tangent and normal to any point on the curve. | BTL-6 | Create |
| 2 | 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 to any point on the curve. | BTL-6 | Create |
| 3 | 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 fixed straight line AB is always $2/3$. The distance between the fixed point F and fixed straight line is 50mm. also draw a tangent and normal on a point on the locus at a horizontal distance of 55 mm from the fixed straight line. | BTL-6 | Create |
| 4 | Construct a cycloid given the radius of the generating circle is 25 mm. Also draw a tangent and normal at any point on the cycloid. | BTL-6 | Create |
| 5 | Construct a cycloid for one and half revolutions when the radius of the generating circle is 25 mm. | BTL-6 | Create |
| 6 | A coir is unwound from a drum of 50 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. | BTL-6 | Create |
| 7 | Draw the involute of a circle of diameter 50 mm.(15)
Draw the involute of a square of base side 30 mm.(5) | BTL-6 | Create |
| 8 | A roller of 40mm diameter rolls over a horizontal table without slipping for one complete rotation, Draw the path traced by the point P on the circumference of the circle. Also draw a tangent and normal at any point on the curve. | BTL-6 | Create |

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|----|---|-------|--------|
| 9 | A circle of 30 mm diameter rolls over a horizontal line clockwise for $1\frac{1}{2}$ revolution. Draw the path traced by the point P on the circumference of the circle. Also draw a tangent and normal at any point on the curve. | BTL-6 | Create |
| 10 | A circle of 50 mm diameter rolls over a horizontal roof in anticlockwise direction for one complete revolution. Draw the path traced by the point P on the circumference of the circle. Also draw a tangent and normal at any point on the curve. | BTL-6 | Create |
| 11 | Construct an ellipse when the distance between the focus and directrix is 35 mm and eccentricity is $\frac{3}{4}$. Also draw the tangent and normal to any point on the curve. | BTL-6 | Create |
| 12 | Construct an Parabola when the distance between the focus and directrix is 40 mm and eccentricity is 1. Also draw the tangent and normal to any point on the curve. | BTL-6 | Create |
| 13 | Construct a parabola when the distance between the focus and directrix is 1000 mm. Also draw the tangent and normal to any point on the curve. Use suitable scale to draw the curve. | BTL-6 | Create |
| 14 | Construct a hyperbola when the distance between the focus and directrix is 450 mm and eccentricity is $\frac{5}{4}$. Also draw the tangent and normal to any point on the curve. Use suitable scale to draw the curve. | BTL-6 | Create |
| 15 | Construct a cycloid given the radius of the generating circle is 150 mm. Also draw a tangent and normal at any point on the cycloid. Use suitable scale to draw the curve. | BTL-6 | Create |



All Questions (1 x 20 = 20 Marks)

UNIT II-PROJECTION OF POINTS, LINES AND PLANE SURFACES

Orthographic projection- Principles-Principal planes-First angle projection-projection of points at First Quadrant only. Projection of straight lines (only First angle projections) inclined to both the principal planes –Determination of true lengths and true inclinations by rotating line method. Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.

Q. No	Questions	BT Level	Competence
1	Draw the projection of following points. Give 30mm space between each projectors with proper dimensions. A is 35 mm above H.P. and 45 mm in front of V.P. (5) B is 40 mm above H.P. and in V.P. (5) C is in H.P. and 45 mm in front of V.P. (5) D is in both H.P. and V.P. (5)	(BT-6)	Create
2	A line AB 70 mm long is inclined at an angle of 30° to H.P. and 45° to V.P. The point A is 20 mm above H.P. and 15 mm in front of V.P. Draw the projections of the straight line.	(BT-6)	Create
3	The end A of a line AB is 10mm in front of VP and 20 mm above HP. The line is inclined at 30° to HP and front view is 45° with XY. Top view length is 60 mm long. Draw the projections. Find the true length, True and apparent inclination with VP.	(BT-6)	Create
4	A line measuring 75 mm long has one of its ends 50 mm in front of VP and 15 mm above HP. The top view of the line measures 50 mm. The other end is 15 mm in front of VP and above HP. Draw and measure the front view. Determine the true inclinations.	(BT-6)	Create
5	A line AB 65 mm long has its end A, 10 mm above HP and 25 mm in front of VP. It is inclined at 65° to HP and 25° to VP. Draw its projections.	(BT-6)	Create
6	The mid-point of a straight line AB is 60 mm above H.P. and 50 mm in front of V.P. the line measures 80 mm long and inclined at 30° H.P. and 45° to V.P. Draw its projections.	(BT-6)	Create

- 7 A line AB 90 mm long ,the front view of a line is inclined at 45° to XY line. The front view measures 65 mm long. Point A is located 15 mm above H.P. and is in V.P. Draw the projection and find its true inclinations. (BT-6) Create
- 8 A room is 4.8 m x 4.2 m x 3.6 m high. Determine graphically, the distance between a top corner and the bottom corner diagonally opposite to it. (BT-6) Create
- 9 Draw the projection of pentagonal plate whose side is 30 mm long, which is rest on HP by one of its edge and inclined at 45° to VP. The surface of the plate is inclined at 30° to HP. (BT-6) Create
- 10 Draw the projection of hexagonal plate whose side is 30 mm long, which is rest on HP by one of its edge and inclined at 45° to VP. The surface of the plate is inclined at 30° to HP. (BT-6) Create
- 11 A rectangular plate of side 50 x 25 mm is resting on its shorter side on V.P. and inclined at 30° to H.P. Its surface is inclined to V.P. such that Front view looks like square. Draw its projections. (BT-6) Create
- 12 A hexagonal lamina of side 30 mm rests on one of its corner on V.P. the diagonal containing the corner inclined 60° to H.P. The surface of the lamina is inclined 50° to V.P. Draw its projection. (BT-6) Create
- 13 A square lamina of side 40 mm rests on one of its corner on H.P. the diagonal containing the corner inclined 55° to V.P. The surface of the lamina is inclined 35° to H.P. Draw its projection. (BT-6) Create
- 14 A pentagonal lamina of side 30 mm rests on one of its corner on H.P. the edge opposite to resting corner is inclined at 45° to V.P. The surface of the lamina is inclined to H.P. such that the edge opposite to the resting corner is 35 mm above H.P. Draw its projection. (BT-6) Create
- 15 A circular lamina of diameter 40 mm rests on one of its circumference point on H.P. the diameter containing the point inclined 45° to V.P. The surface of the lamina is inclined 40° to H.P. Draw its projection. (BT-6) Create



All Questions (1 x 20 = 20 Marks)

UNIT III PROJECTION OF SOLIDS AND ISOMETRIC PROJECTION

Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is Inclined to one of the principal planes by rotating object method. Principles of isometric projection – isometric scale – Isometric projections of simple solids - Prisms, pyramids, cylinders, cones.

- 1 Draw the projections of a pentagonal pyramid of 30 mm base edges and axis 70 mm long rest on one of its base corner in H.P with axis inclined at 40^0 to H.P. and parallel to V.P. BTL-6 Create
- 2 A pentagonal 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 50^0 to HP and parallel to the VP. Draw its top and Front views. BTL-6 Create
- 3 A right regular hexagonal pyramid, edge of base 30 mm and height 70 mm rests on one of its base edges on H.P. with its axis parallel to V.P. Draw the projections of the pyramid when its base makes an angle of 45^0 to the H.P. BTL-6 Create
- 4 A hexagonal prism of base side 40 mm and axis length 60 mm rests on the HP on one of its base edges with its axis inclined at 50^0 to HP and parallel to the VP. Draw its top and Front views. BTL-6 Create
- 5 A square pyramid of base side 40 mm and axis length 70 mm is resting on HP on one of its base edge with its axis parallel to VP and inclined 50^0 to HP. Draw its projections. BTL-6 Create
- 6 A right pentagonal pyramid of side 30 mm and altitude 60 mm rests on one of its edges of the base in the HP. The base is being tilted up such that the apex is 50 mm above HP. Draw the projection of the pyramid when the edge on which it is resting is perpendicular to V.P. BTL-6 Create
- 7 Draw the projection of a cone of diameter 40 mm and height 70 mm lying on the ground on one of its base point such that base makes an angle 40^0 to H.P. and perpendicular to V.P. BTL-6 Create

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| 8 | A pentagonal pyramid of side of base 30 mm and axis 70 mm long is freely suspended from a corner of the base. Draw the projections by the change of position method. | BTL-6 | Create |
| 9 | A pentagonal prism of base 30 mm and axis length 60 mm is resting on HP on one of its rectangular faces with its axis perpendicular to VP. Draw its isometric projection. | BTL-6 | Create |
| 10 | A hexagonal pyramid of base side 35 mm and axis height 65 mm is resting on HP by its base, such that one of the base edge if perpendicular to V.P. with its axis parallel to VP. Draw its isometric Projections. | BTL-6 | Create |
| 11 | A cone of base diameter 50 mm and axis height 65 mm is resting on HP on one of its base with its axis parallel to VP. Draw its isometric projection. | BTL-6 | Create |
| 12 | A cylinder of base diameter 50 mm and axis height 65 mm is resting on HP on one of its base with its axis parallel to VP. Draw its isometric projection. | BTL-6 | Create |
| 13 | A cylinder of base diameter 50 mm and axis height 65 mm is resting on H.P. by one of its generator which is perpendicular to VP and parallel to HP. Draw its Isometric projections. | BTL-6 | Create |
| 14 | Draw the isometric view of a pentagonal pyramid of side of base 30 mm and height 70 mm, when it is resting on H.P. such that an edge of base is perpendicular to V.P. | BTL-6 | Create |
| 15 | Draw the isometric view of a Triangular pyramid of side of base 30 mm and height 70 mm, when it is resting on H.P. such that an edge of base is parallel to VP and far Away from it. | BTL-6 | Create |



All Questions (1 x 20 = 20 Marks)

UNIT IV PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES

Sectioning of above solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other – obtaining true shape of section. Development of lateral surfaces of simple and sectioned solids – Prisms, pyramids cylinders and cones.

- 1 A hexagonal prism of base 30 mm and axis 65 mm rests on its base on HP with its axis perpendicular to HP and one of the base edge parallel to VP. The solid is cut by a plane which is perpendicular to VP, inclined at 40° to HP and bisecting the axis of the prism. Draw the front view, sectional top view and true shape of the section. BTL-6 Create
- 2 A square pyramid has a base side of 30 mm and altitude 70 mm. It rests with its base on HP such that one side of the base is inclined at 30° to VP. The pyramid is cut by a plane which bisects the axis and is inclined at 45° to HP. Draw the front view, sectional top view and true shape of the section. BTL-6 Create
- 3 A cylinder of base diameter 50 mm and height 65 mm rests on its base on HP. It is cut by a plane perpendicular to VP and inclined at 30° to HP and meets the axis at a distance 30 mm from the base. Draw the front view, sectional top view and true shape of the section. BTL-6 Create
- 4 A cone of base diameter 40 mm and altitude 50 mm rests on its base on the HP. It is cut by a plane inclined at 45° to HP and passes through a point on axis which is 35 mm above HP. Draw the front view, sectional top view and true shape of the section. BTL-6 Create
- 5 A hexagonal pyramid of base 35 mm and axis 70 mm is resting on HP on its base with two sides of base perpendicular to VP. It is cut by a plane inclined at 45° to VP, perpendicular to HP and 10 mm away from the axis. Draw its top view, sectional front view and true shape of the section. BTL-6 Create
- 6 A hexagonal prism, side of base 45 mm and axis 75 mm long, rests with its base on HP such that one of its rectangular faces is parallel to VP. A sectional plane perpendicular to HP and parallel to VP cuts the prism at a distance of 15 mm from the axis. Draw its top view and sectional front view and True shape of the section. BTL-6 Create
- 7 A cone of base diameter 50 mm and axis length 60 mm is resting on HP on its BTL-6 Create

- base. It is cut by a plane inclined at 40° to VP and perpendicular to HP that cuts the cone at a distance of 10mm from the axis and in front of it. Draw its top view, sectional front view and true shape of the section.
- 8 A hexagonal pyramid of base side 30 mm and axis height 60 mm is resting on HP on its base with a base edge parallel to VP. It is cut by a plane perpendicular to VP, inclined 70° to HP and passing through a point in its axis at a distance of 20 mm from the base. Draw front view , sectional top view and true shape of the section. BTL-6 Create
- 9 A cube of 40 mm long edges have its vertical faces equally inclined to V.P. it is cut by an auxiliary inclined plane in such a way that the true shape of the cut part is regular hexagon. Determine the inclination of the cutting plane with H.P. Draw the top sectional view and true shape of the section. BTL-6 Create
- 10 A hexagonal pyramid of base side 30 mm and axis height 60 mm is resting on its base on HP with two of the base edges parallel to VP. It is cut by a plane perpendicular to VP, inclined 30° to HP and bisects the axis of the pyramid. Draw the development of the lateral surfaces of the lower portion of the pyramid. BTL-6 Create
- 11 A cone of base diameter 50mm and height 70 mm rests on its base on the ground. A string is wound round the curved surface of the cone starting from left extreme point and ending at the same point. Find the shortest length of the string required. Trace the path of string in front and top views. BTL-6 Create
- 12 A square pyramid has a base side of 40 mm and altitude 80 mm. It rests with its base on HP such that one side of the base is inclined at 30° to VP. The pyramid is cut by a plane which bisects the axis and is inclined at 45° to HP. Draw the development of the remaining portion of the pyramid. BTL-6 Create
- 13 A cylinder of base diameter 50 mm and height 70 mm rests on its base on the ground. A cutting plane inclined at 50° to H.P. and meeting the axis 35 mm from the base. Draw the development of the lateral surface of cut cylinder. BTL-6 Create
- 14 A pentagonal pyramid has a base side of 30 mm and axis height of 70 mm. It rests with its base on HP such that one of the base edges perpendicular to VP. The pyramid is cut by a plane which bisects the axis and is inclined at 50° to HP. Draw the development of the remaining portion of the pyramid. BTL-6 Create
- 15 Draw the development of the lateral surface of hexagonal prism of 30 mm base edge and 60 mm height. An insect moves on its surface from a corner on the base to the diametrically opposite corner of the top face by the shortest route Trace graphically the path of the insect in front view. BTL-6 Create



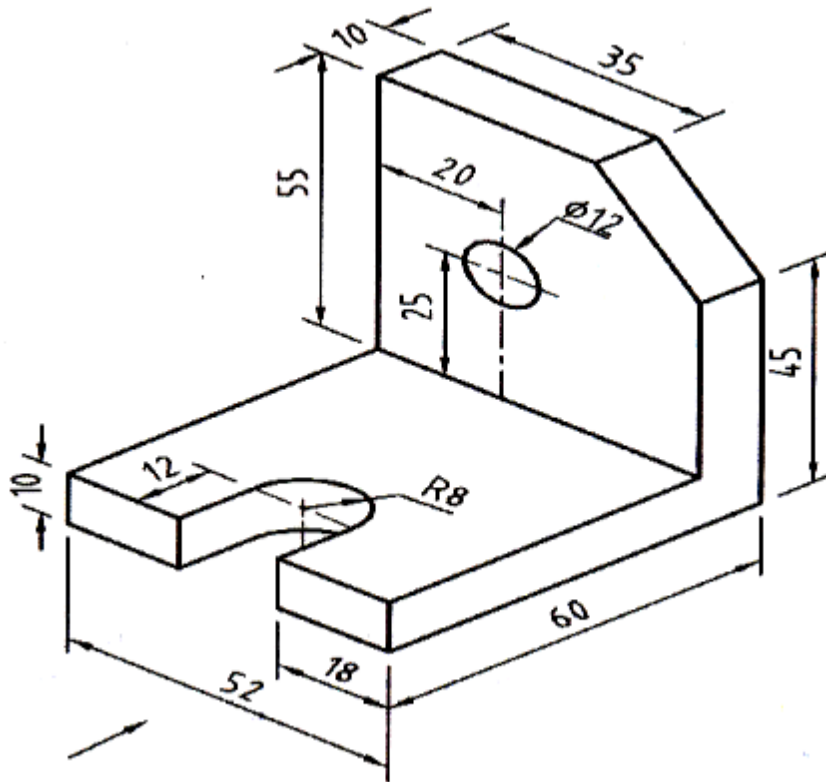
All Questions (1 x 20 = 20 Marks)

UNIT V FREE HAND SKETCHING AND PERSPECTIVE PROJECTIONS

Free Hand sketching: Visualization principles –Representation of Three-dimensional objects – Layout of views- Free hand sketching of multiple views from pictorial views of objects. Perspective projection of simple solids-Prisms and pyramids by visual ray method.

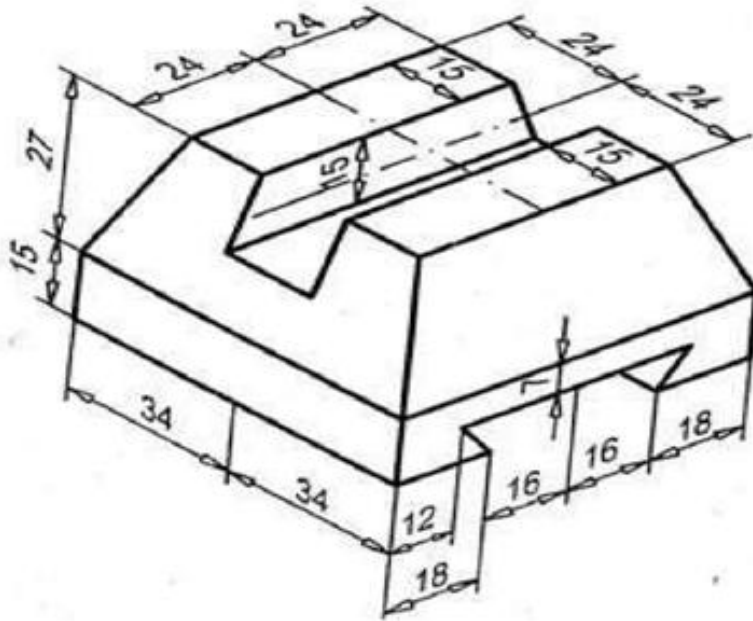
1 Draw the three orthographic views for the following fig.

BTL-6 Create



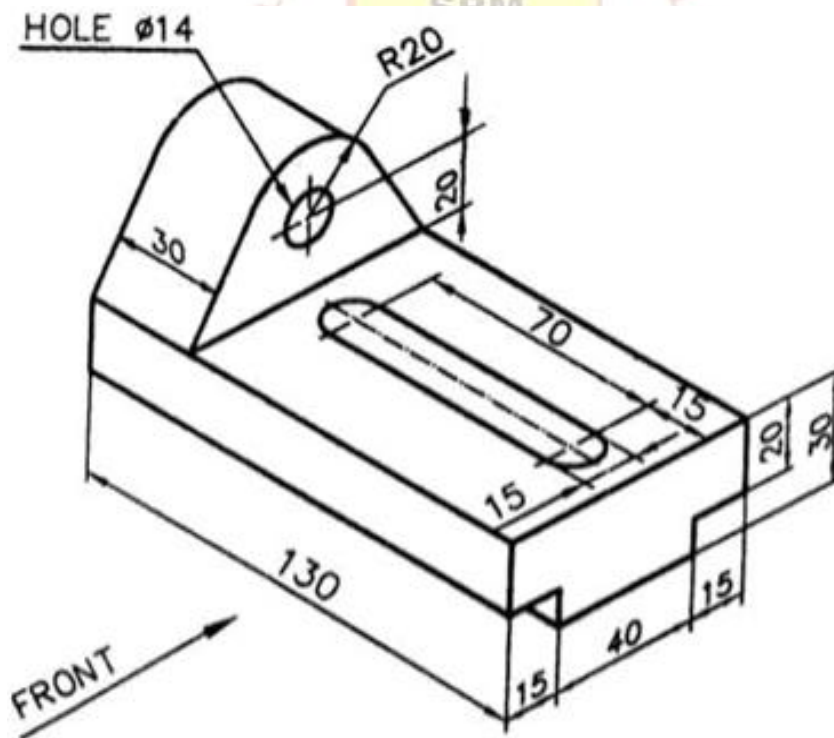
2 Draw the three orthographic views for the following fig.

BTL-6 Create



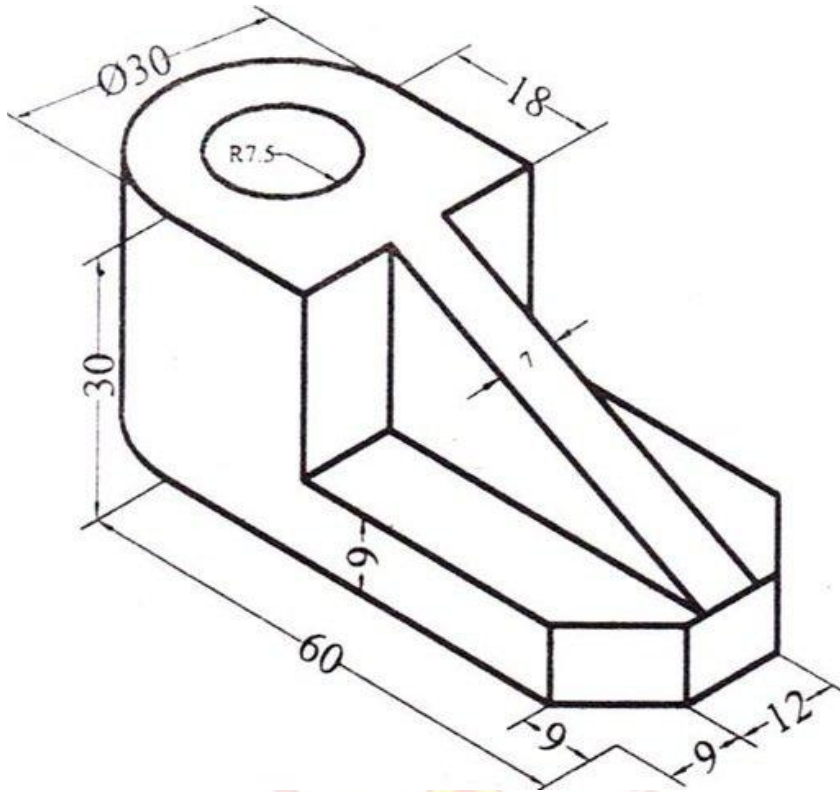
3 Draw the front, top and side view of the given image..

BTL-6 Create



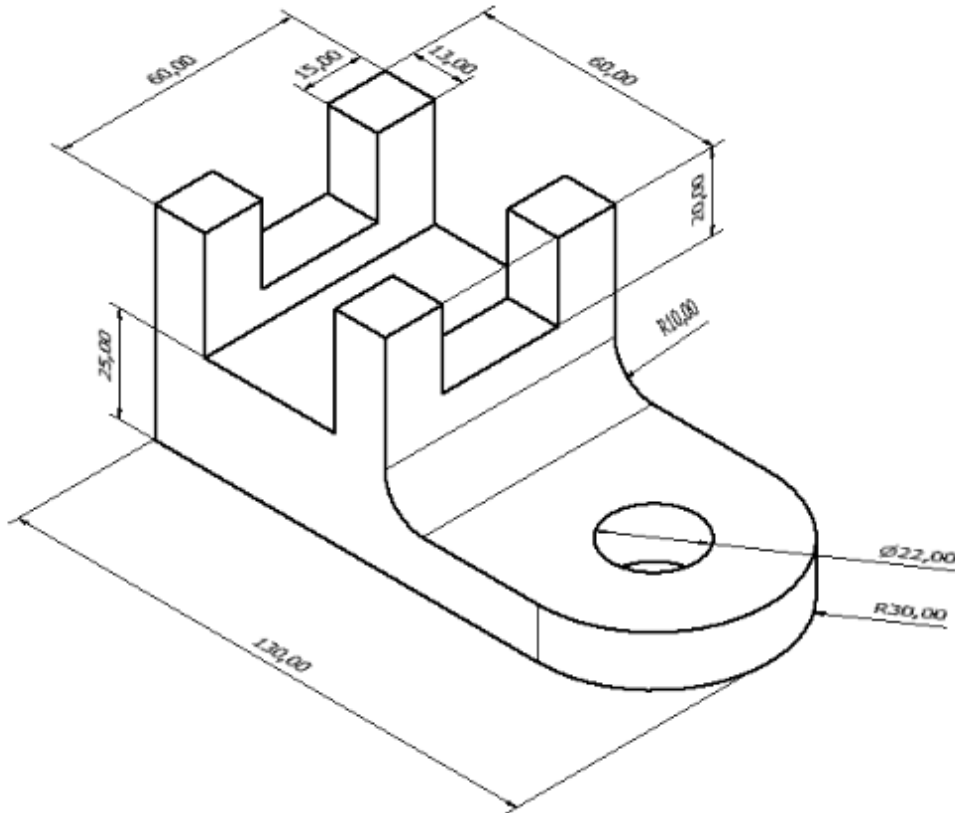
4 Draw the three orthographic views for the following fig

BTL-6 Create



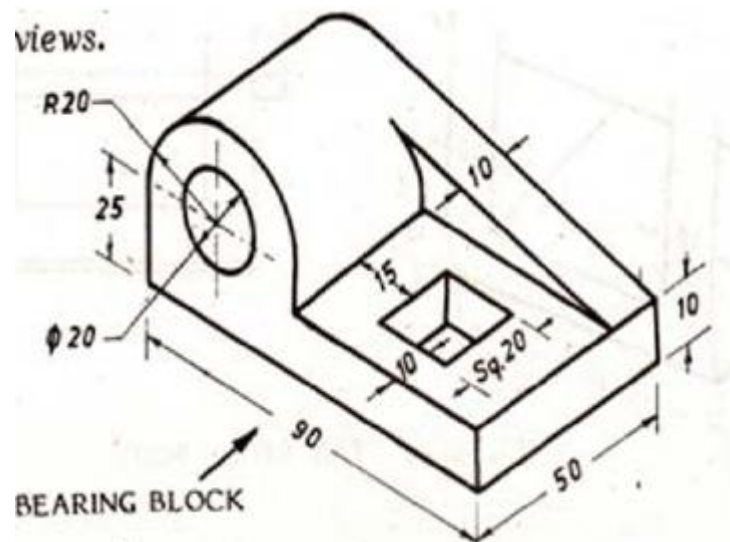
5 Draw the three orthographic views for the following fig.

BTL-6 Create



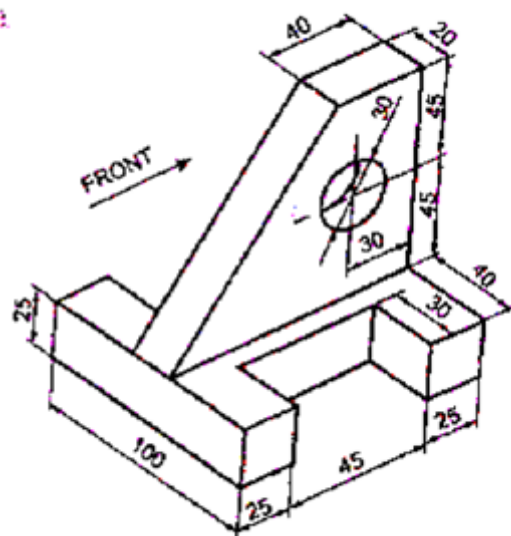
6 Draw the front, top and left and right hand side view of the given image..

BTL-6 Create



7 Draw the front, top and left and right hand side view of the given image..

BTL-6 Create



8 A rectangular pyramid of sides 30 mm x 20 mm and height 55 mm rests with its base on ground such that one of the longer edges is parallel to picture plane and 30 mm behind it. The station point is 50 mm in front of the picture plane, 30 mm to the left of the axis of the pyramid and 75 mm above the ground. Draw the perspective view of the pyramid.

BTL-6 Create

9 A square pyramid of base side 30 mm and height 60 mm rests with its base on ground such that the nearest edge of the base is parallel to picture plane and 30 mm behind it. The station point is 70 mm in front of the picture plane, 60 mm to the right of the axis of the pyramid and 75 mm above the ground. Draw the perspective view of the pyramid.

BTL-6 Create

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|----|--|-------|--------|
| 10 | A cube of 35 mm edge lies with a face on the ground and an edge on the picture plane. All the vertical faces are equally inclined to picture plane. The station point is 80 mm in front of the PP and 60 mm above the ground. The edge of the cube in contact with the picture plane is situated 45 mm to the right of the station point. Draw the perspective projection of the cube. | BTL-6 | Create |
| 11 | A frustum of a square pyramid of base edge 30 mm and top edge 20 mm. The height of the frustum is 35 mm. It rests on its base on the ground with the base edges equally inclined to picture plane. The axis of the frustum is 30 mm to the right of the station point. The station point is 55 mm in front of PP and 55 mm above GP. The nearest base corner is 10 mm behind picture plane. Draw the perspective projection of the frustum. | BTL-6 | Create |
| 12 | A Cylinder 60 mm diameter and 50 mm length, lies on the ground on one of the generators with its axis perpendicular to the PP. The nearest point of the solid is 20 mm on the right of the station point and 20 mm behind PP. Draw the perspective view of the cylinder if the station point is 50 mm above GP and 80 in front of PP. | BTL-6 | Create |
| 13 | A rectangular prism 30 x 50 x 70 is placed on the ground behind the picture plane with the longest edges vertical to GP and longer base edge receding to the left at an angle of 40° to the picture plane. The nearest vertical edge is on the picture plane and 15 mm to the left of the observer who is at a distance of 60 mm in front of picture plane. The height of the observer above the ground is 90 mm. Draw the perspective view of the prism. | BTL-6 | Create |
| 14 | 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. | BTL-6 | Create |
| 15 | A regular pentagonal prism of base edge 20 mm and height 40 mm rests on its base on the ground plane with one of its base edges 20 mm behind the picture plane. The station point is 60 mm above the ground plane and 40 mm in front of the PP. The central plane is 45 mm to the right of the axis. Draw the perspective projection of the prism. | BTL-6 | Create |