INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)
Dundigal, Hyderabad -500 043

MECHANICAL ENGINEERING

TUTORIAL QUESTION BANK

Course Name	:	**ENGINEERING DRAWING**
Course Code	:	AME001
Class	:	I Year
Branch	:	**MECH/AERO/CIVIL**
Year	:	2016 – 2017
Course Coordinator	:	BVSN Rao, Professor.
Course Faculty	:	USP Rao, Professor, Sarat Raju, Assistant Professor, BDY Sunil, Assistant Professor.

OBJECTIVES:

The course should enable the students to

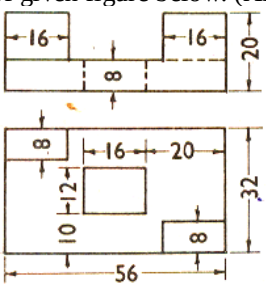
I. Understand the basic principles of engineering drawing and construction of curves used in engineering field.
II. Apply the knowledge of interpretation of projection in different quadrants.
III. Understand the projections of solids, when it is inclined to both planes simultaneously.
IV. Convert the pictorial views into orthographic view and vice versa.
V. Create intricate details of components and develop its surfaces.

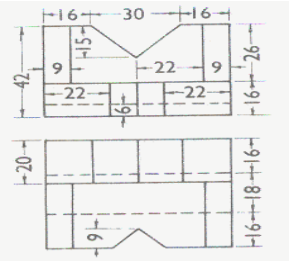
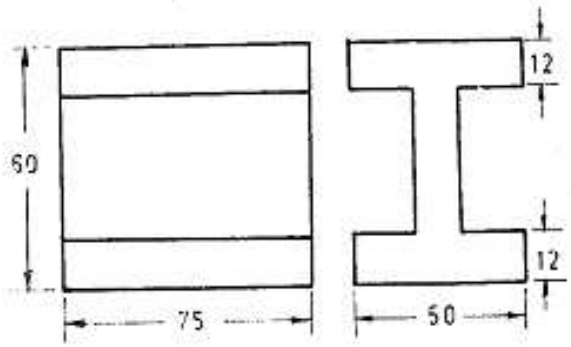
S No	QUESTION	Blooms taxonomy level	Course Outcomes
	UNIT – I **SCALES AND CURVES**		
1	A 4 cm long line on a map represents a 1.5 m length. Determine the RF and draw a scale long enough to measure upto 6m. Show a distance of 4.6 m on it.	Knowledge	1,2
2	Construct a scale of 1:14 to read feet and inches and long enough to measure 7 feet. Show a distance of 5 feet 10 inches on it.	Comprehension	1,2
3	Construct a scale of 1:54 to show yards and feet and long enough to measure 9 yards. Mark a distance of 5 yards 2 feet on it.	Analysis	1,2
4	Old road map of Bombay city was drawn with 10 cm, on the map representing 25 miles. Construct a plain scale to read miles on this map and long enough to measure distance between gateway of India and Borivalli which is 40 miles.	Knowledge	1,2
5	Construct a scale to measure upto 50 m if 1cm represents 4 m, find its RF and mark a distance 37 m on it.	Comprehension	1,2
6	A 4 cm long line on map represents 1.5 metre length. Determine the RF and draw a scale long enough to measure upto 6 meters. Show a distance of 4.6 metres on it.	Analysis	1,2
7	A Stone is thrown from a 4 m high building and at its highest flight; the stone just crosses the top of a 10 m high tree from the ground. Trace the path of the projectile, if the horizontal distance between the building and the tree is 5m. Find the distance of the point from the building where the stone falls on the ground.	Knowledge	1,2
8	A circus man rides on a motor cycle inside a globe having a 100mm radius. The motor cycle wheel is 60mm diameter. Draw the locus of a point lying on the circumference of the wheel of the motor cycle for one complete revolution.	Comprehension	1,2

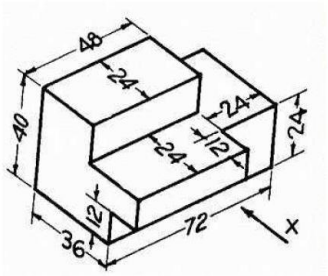
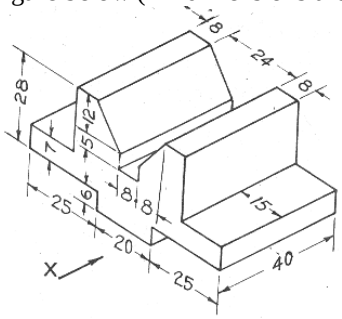
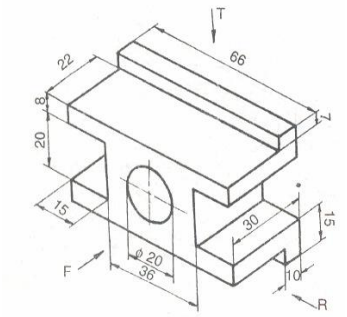
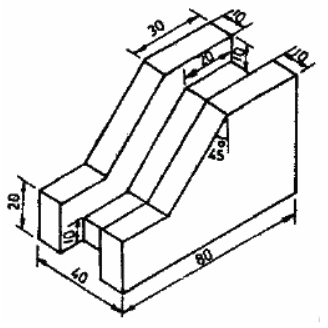
9	Construct an ellipse when the distance of the focus from the directrix is equal to 60 mm and eccentricity 2/3. Also, draw a normal and a tangent to the curve at a point 35 mm from the focus.	Knowledge	1,2
10	Draw a straight line AB of any length. Make a point F, 80 mm from AB. Trace the paths of a point P moving in such a way that the ratio of its distance from the point F, to its distance from AB is (a) 3:2 (b) 1 Plot at least 10 points. Name each curve. Draw a normal and a tangent to each curve at a point on it 45mm from F.	Comprehension	1,2
11	Draw the major axis of an ellipse is 110 mm long and the foci are at a distance of 15 mm from its ends. Draw the ellipse, One-half of it by concentric circles method and the other half by rectangle method.	Analysis	1,2
12	Draw an involute of a circle of 50 mm diameter. Also draw a tangent and a normal at a point 100 mm distant from the center of the circle.	Knowledge	1,2
13	A circle of 50 mm diameter, rolls on a horizontal line for half a revolution clock wise and then on a line inclined at 60^0 to the horizontal for another half clockwise. 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.	Comprehension	1,2
14	Construct an ellipse when the distance between the locus and the directrix is 30 mm and the eccentricity is 3/4. Draw the tangent and normal at any point P on the curve using directrix.	Analysis	1,2
15	The asymptotes of a hyperbola are making 70^0 with each other. A point P on the curve is at a distance of 40 mm from the horizontal asymptote and 50 mm from the inclined asymptote. Plot the curve. Draw a normal and a tangent to the curve at any point.	Knowledge	1,2
16	Draw a cycloid for one complete revolution of a cycle having a 30 mm radius. Taking the top most point on the rolling circle as the initial position of the generating point. Draw a tangent and a normal to the curve at a point distant 40 mm above the base line.	Comprehension	1,2
17	A circle of 40 mm diameter rolls on the concave side of another circle of 40 mm radius. Draw the path traced by a point on the generating circle for one complete revolution.	Knowledge	1,2
18	Draw a hyperbola having its two asymptotes inclined at 70^0 to each other and passing through a point P at a distance of 30 mm from one asymptote and 36 mm from the other. Draw a normal and tangent at any convenient point.	Comprehension	1,2
19	The foci of an ellipse are 100 mm apart and the minor axis is 70 mm long. Determine the length of the minor 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 25mm away from it.	Analysis	1,2
20	Construct a hypocycloid, rolling circle 60 mm diameter and directing circle 120mm diameter.	Knowledge	1,2
	UNIT - II **POINTS, STRAIGHT LINES, PLANES**		
1	Draw the projectors of the following points in different quadrants. I. Point A, 25 mm infront of V.P. and 30 mm above H.P. II. Point B, 22 mm behind V.P. and 28 mm above H.P. III. Point C, 28 mm behind V.P. and 30 mm below H.P IV. Point D, 40 mm infront of V.P. and 25 mm below H.P	Knowledge	3,4,5
2	The front view of a line makes an angle of 30^0 with reference line. The HT of a line is 30 mm in front of the VP. While VT is 20 mm below the HP. One end of the line is 15mm above the HP and the other end of the line is 100 mm in front of the VP. Draw the projections of the line and determine its true length and true angles of inclination with the reference planes.	Comprehension	3,4,5
3	A 70 mm long line PQ is inclined at 30^0 to the HP. The end P is 15 mm in front of the VP and 25 mm above the HP. The front view of the line measures 45mm. Draw its projections and determine the true angle of inclination with V.P.	Analysis	3,4,5
4	A line AB 75 mm long is inclined at 45^0 to the HP and 30^0 to VP. Its end B is in the HP and 40 mm infront of the VP. Draw its projections and determine traces.	Knowledge	3,4,5

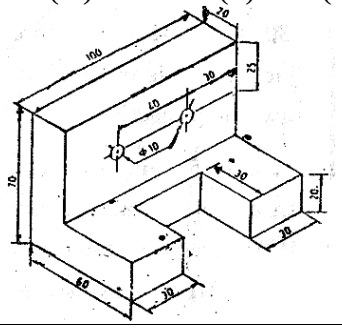
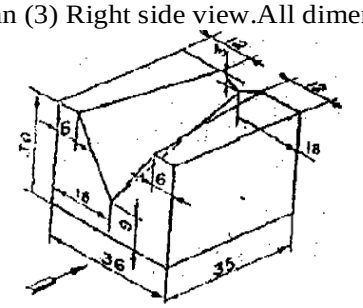
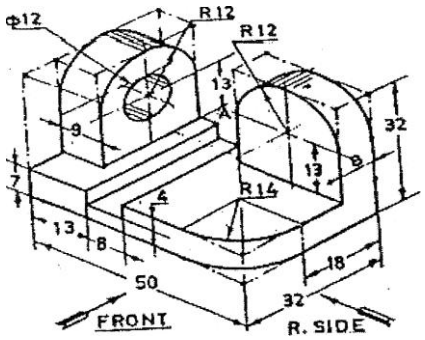
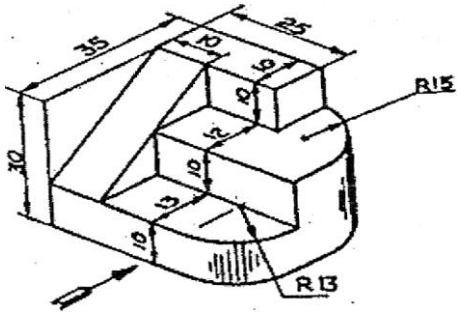
5	The top view of the 75 mm long line CD measures 50 mm. C is 50 mm infront of VP and 15 mm below the HP. The point D is 15 mm infront of VP and it is above the HP. Draw the front of view of CD and find its inclinations with the HP and VP. Show the traces.	Knowledge	3,4,5
6	A straight line PQ has its end P at 20 mm above the HP and 30 mm infront of the VP and end Q is 80 mm above the HP and 70 mm infront of VP. If the end projectors are 60 mm apart. Draw the projections of the line. Determine its true length and true inclinations with the reference planes.	Comprehension	3,4,5
7	A line of 100 mm long makes an angle 35^0 with HP and 45^0 with VP. Its mid point is 20 mm above HP and 15 infront of VP. Draw the projections of the line. Also draw the traces.	Analysis	3,4,5
8	A line PQ measures 70 mm. The projector through its VT and the end P are 40 mm apart. The point P is 30 mm above the HP and 40 mm infront of the VP. The VP is 10 mm above the HP. Draw the projections of the line and determine its HT and inclinations with the HP and VP.	Knowledge	3,4,5
9	A 75 mm long line PQ is inclined at an angle of 30^0 to the VP. The end P is on the HP and 30mm infront of the VP. The end Q is 50 mm above the HP. Draw the projections of the line and locate its traces.	Knowledge	3,4,5
10	The front view and top view of a straight line PQ measures 50mm and 65 mm respectively. The point P is in the HP and 20 mm infront of the VP and the front view of the line is inclined at 45^0 to the reference line. Determine the true length of PQ, true angles of inclination with the reference planes and the traces.	Comprehension	3,4,5
11	A 60 mm line AB, has an end P at 25 mm above the HP and 30 mm in front of VP. The line is inclined at 50° to HP and 40° to VP. Draw its projections.	Analysis	3,4,5
12	A line AB of 70 mm long has its end A at 10 mm above HP and 15 mm infront of VP. Its front view and top view measures 50 mm and 60 mm respectively. Draw the projections of the line and determine its inclinations with HP and VP.	Knowledge	3,4,5
13	The top view of a 75 mm long line measures 65 mm, while the length of its front view is 50 mm. Its one end A is in the HP and 12 mm infront of VP. Draw the projections of AB and determine its inclinations with the HP and VP. Draw it's traces.	Comprehension	3,4,5
14	A line AB, 90 mm long, is inclined at 45^0 to the HP and its top view makes an angle of 60^0 with the VP. The end A is in the HP and 12 mm infront of VP. Draw its front view and find its true inclination with VP.	Analysis	3,4,5
15	A line AB 65 mm long has its end A 25 mm above HP and 20 mm infront of VP. The end B is 40 mm above HP and 50 mm infront of VP. Draw its projections and find its inclinations with HP and VP. Determine traces.	Knowledge	3,4,5
16	A 60^0 set square of 125mm longest side is so kept that, the longest side is in the H.P. making an angle of 30^0 with the V.P. and the set square itself inclined at 45^0 to the H.P. Draw the projections of the set square using auxiliary plane method.	Knowledge	3,4,5
17	Draw the projections of a regular hexagon of 30 mm side, having one of its sides in the HP and inclined at 60^0 to the V.P and its surface making an angle of 45^0 with the H.P.	Comprehension	3,4,5
18	A circular plate of negligible thickness and 50 mm diameter appears as an ellipse in the front view, having its major axis 50 mm long and minor axis 30 mm long. Draw its top view when the major axis of ellipse is horizontal.	Analysis	3,4,5
19	A square of ABCD of 50 mm side has its corner A in the HP, its diagonal AC inclined at 30^0 to the HP and the diagonal BD inclined at 45^0 to the VP and parallel to the HP. Draw its projections.	Knowledge	3,4,5
20	A pentagonal plane of 30mm side has one of its sides in the V.P. and inclined at 60^0 to the H.P. while the surface of the plane makes an angle of 40^0 V.P. Draw its projections.	Comprehension	3,4,5
	UNIT-III **PROJECTION OF SOLIDS**		
1	A square Pyramid base 40 mm side and axis 75 mm long is placed on the ground on one of its slant edges. So that the vertical plane passing through that edge and axis makes and angle of 30^0 with the V.P. Draw its three Views.	Knowledge	6,7

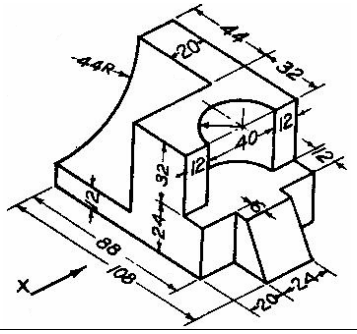
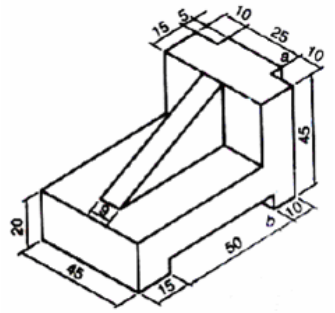
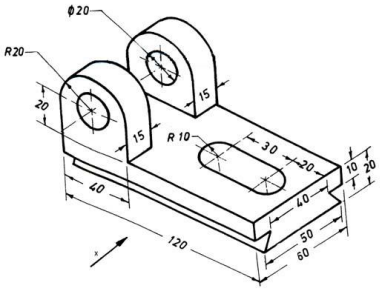
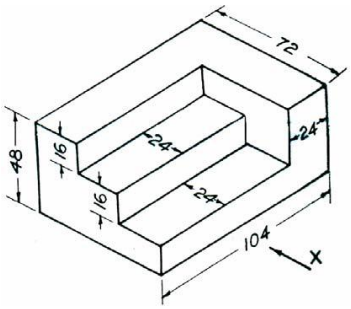
2	A pentagonal pyramid having a base with a 30 mm side and a 60 mm long axis rests on an edge of its base on the ground, so that the highest point of the base is 20 mm above the ground. Draw its projections if the vertical plane containing the axis is inclined at 30^0 to the V.P.	Comprehension	6,7
3	Draw the projection of a cone, base 75 mm diameter and axis 100 mm long, lying on H.P. on one of its generators with axis parallel to the V.P.	Analysis	6,7
4	A Pentagonal prism is resting on corner of its base on the ground with a large edge containing that corner is inclined at 45^o to the HP and the vertical plane containing that edge and the axis inclined at 30^o to the VP. Draw its projections of its base side 40 mm and height 65 mm.	Knowledge	6,7
5	A square prism, side of base 30 mm and axis 50 mm long , has its axis inclined at 60^0 to H.P. its has an edge of its base in the H.P and inclined at 45^0 to V.P. Draw the projections.	Comprehension	6,7
6	A cone of base diameter 60mm and altitude 75 mm lies on the H.P. on one of its generators. The plan of the axis is inclined at 45^0 to the V.P. draw its projections.	Analysis	6,7
7	A square prism base 40 mm side and height 65 mm has its axis inclined at 45^o to HP and has an edge of its base on the HP and inclined at 30^o to VP. Draw its projections.	Knowledge	6,7
8	A square pyramid having a base with a 40 mm side and a 75 mm long axis has a corner of its base on the V.P. A slant edge contained by that corner is inclined at 45^0 to the V.P and the plane containing the slant edge and the axis is inclined at 60^0 to the H.P. Draw its projections.	Comprehension	6,7
9	Draw the projection of a rectangular pyramid of height 60 mm and base edge 30 mm resting on a corner with the slanting edge containing the above corner at 60^0 with H.P.	Analysis	6,7
10	A pentagonal pyramid, base 25 mm side and axis 50 mm long has one of triangular faces in the V.P. and the edge of the base contained by that face makes an angle of 30 degrees with the H.P. Draw its projections.	Knowledge	6,7
11	One of the body diagonals of a cube of 45 mm edge is parallel to the H.P. and inclined at 45 degrees to the V.P. Draw the front view and top view of the cube.	Comprehension	6,7
12	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 40o to the H.P and 30° to the V.P, Draw its front and top view.	Analysis	6,7
13	A square prism, side of base 30mm and axis 50mm long, has its axis inclined at 60° to HP. It has an edge of its base in the HP and inclined at 45° to VP. Draw its projections.	Knowledge	6,7
14	A square pyramid of base edge 30 mm and altitude 40mm has one of its slant faces in the V.P and the edge of the base contained by that face is inclined at 45° to the H.P. Draw the projections of the pyramid when the vertex is in the H.P.	Comprehension	6,7
15	A pentagonal prism side of base 25mm and axis 65 mm long rests with one of edges of its, base on H.P Its axis is inclined at 30°, to H.P and parallel to V.P. Draw its projections.	Analysis	6,7
16	A square prism, base 40 mm side and height 65mm has its axis inclined at 45 degrees to the HP and has an edge of its base, on the H.P and inclined at 30 degrees to the V.P. Draw its projections.	Knowledge	6,7
17	Draw the projections of a cone, base 30 mm diameter and axis 50 mm long, resting on H.P on a point of its base circle with the axis making an angle of 45° with H.P and 30° with V.P.	Comprehension	6,7
18	Draw the projection of a square pyramid of base 40 side and axis 70 long, when the solid lies with one of its slant edges on HP and the vertical plane passing through that slant edge and axis makes 300 with V.P.	Analysis	6,7
19	A pentagonal pyramid, with base 35 side and height 70 rests on one edge of its base on HP so that the highest point on the base is 25 above HP. Draw its projection, when the axis is parallel to VP. Draw another front view, on a reference line inclined at 450 to the edge on which it is resting so that the base is visible.	Knowledge	6,7

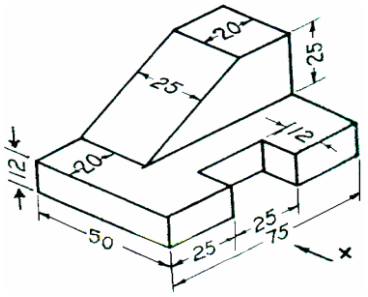
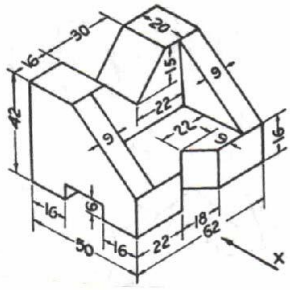
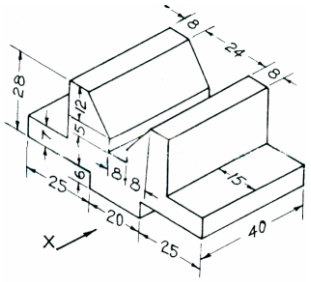
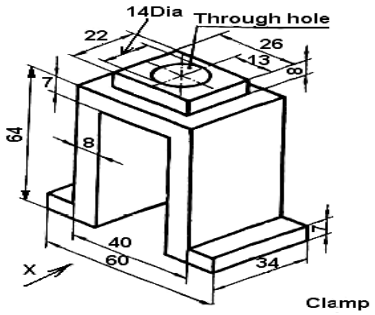
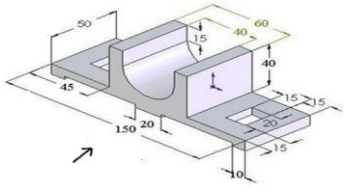
20	A frustum of a cone diameter of base 60mm, diameter of top surface surface 30mm and axis 45mm long is lying on HP on one of its generators. The plane containing the axis and the generator makes an angle of 45 degree to VP. Draw its front and top views	Knowledge	6,7
	UNIT-IV **DEVELOPMENTS, ISOMETRICS**		
1	Draw the development of a cylinder of 50 mm diameter and 75 mm height, containing a square hole of 25 mm side. The sides of the hole are equally inclined to the base and the axis of the hole bisects the axis of the cylinder.	Knowledge	8,9
2	A Hexagonal pyramid of base 50 mm and axis 100 mm long is resting on its base with two of its side parallel to VP. It is cut by a sectional plane perpendicular to VP and inclined at 45^0 to HP. Sectional plane is passing through the mid point of axis .Draw the development for the top part of the pyramid.	Comprehension	8,9
3	Draw the development of a cylinder of 50 mm diameter and 75 mm height, containing a square hole of 25 mm side. The sides of the hole are equally inclined to the base and the axis of the hole bisects the axis of the cylinder.	Analysis	8,9
4	A cylinder, base 65 mm diameter and 90 mm long, and the base lying on the ground. It is cut by a horizontal section plane inclined 30^0 to the H.P and cutting the axis at a point 40 mm above the ground. Draw the development of lateral surface of cylinder.	Knowledge	8,9
5	A pentagonal prism, base 30 mm side and axis 60 mm long, and the base lying on the ground. It is cut by a horizontal section plane inclined 30^0 to the H.P and cutting the axis at a point 25 mm above the ground. Draw the development of lateral surface of cylinder.	Comprehension	8,9
6	A pentagonal prism having a base with 30 mm side and 70 mm long axis is resting on its base on HP. Such that one of the rectangular faces is parallel to VP. It is cut by an auxiliary inclined plane whose VT is inclined at 45^0 with the reference line and passes through mid point of the axis, draw the development of the lateral surface of the prism.	Analysis	8,9
7	A cube of 40 mm edge stands on one of its faces on H.P. with a vertical face making 45^0 to the V.P. a horizontal hole of 30 mm diameter is drilled centrally through the cube such that the hole passes through the opposite vertical edges of the cube. Obtain the development of the lateral surface of the cube with the hole.	Knowledge	8,9
8	A right cone with 50 mm base diameter and 60 mm axis is resting on its base in the HP ,its cut by an auxiliary inclined lane parallel to and 8 mm away from the extreme generator, draw the development of the lateral surface of the remaining solid.	Comprehension	8,9
9	A cone, base 50 mm diameter and 70 mm long, and the base lying on the ground. It is cut by a horizontal section plane inclined 45^0 to the H.P and cutting the axis at a point 40 mm above the ground. Draw the development of lateral surface of cone.	Analysis	8,9
10	A square pyramid with side of base 30 mm axis 50 mm long is resting on its base on H.P with on edge of the base parallel to V.P .it is cut by a sectional plane, perpendicular to V.P and inclined at 45^0 to H.P the sectional plane is passing through the midpoint of the axis. Draw the development of the surface cut pyramid.	Knowledge	8,9
11	Draw an isometric view of given figure below. (All dimensions are in mm).  	Comprehension	8,9

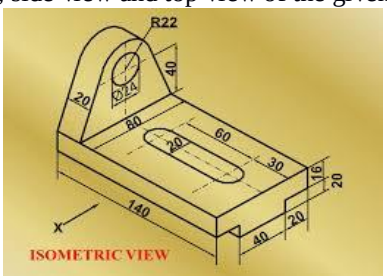
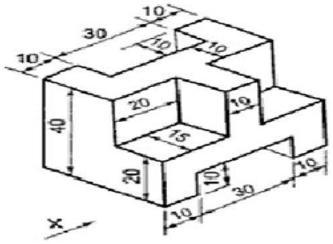
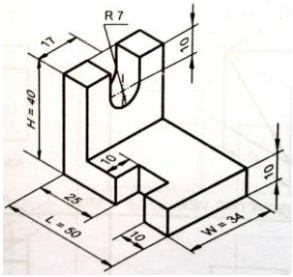
12	Draw the isometric view of given orthographic views. (All dimensions are in mm)  	Knowledge	8,9
13	Draw the isometric projection of a frustum of hexagonal pyramid, side of base 30 mm the side of top face 15 mm of height 50 mm.	Comprehension	8,9
14	Draw the isometric view of a cone 40 mm diameter and axis 55 mm long when its axis is horizontal.	Analysis	8,9
15	Draw the isometric projection of a Frustum of hexagonal pyramid, side of base 30mm the side of top face 15mm of height 50 mm.	Knowledge	8,9
16	The outside dimensions of a box made of 5 mm thick wooden planks are 80 x 60 x 50 mm. The depth of the lid on outside is 10 mm. Draw the isometric view of the box with the lid open.	Comprehension	8,9
17	A cylinder of base diameter 30 mm axis 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.	Analysis	8,9
18	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.	Knowledge	8,9
19	A paperweight consists of a frustum of a square pyramid, side of base 70 mm at the bottom, 40 mm at the top and 20 mm height. It is surmounted by a cylinder of 30 mm diameter with spherical knob of 40 mm diameter at the top such that the center of the sphere is at a height of 25 mm from the top of the frustum. Draw the isometric projection of the assembly.	Comprehension	8,9
20	Draw the isometric view of the object whose orthographic projections are given in fig. All dimensions are in mm.  	Analysis	8,9

	UNIT-V **TRANSFORMATIONS**		
1	Draw the following views of the object given in figure. All dimensions are in mm. **I.** Front view **II.** Top view **III.** Both side views 	Knowledge	10,11,12
2	Draw the front view, top view and side view of the object whose isometric view is shown in the figure below (All dimensions are in mm). 	Comprehension	10,11,12
3	Draw top, front and side views of the isometric projection given in the figure. 	Analysis	10,11,12
4	Draw the front view, top view and side view of the object whose isometric view is shown in the figure below (All dimensions are in mm). 	Knowledge	10,11,12

5	Draw the orthographic projections of the part shown in Fig All dimensions are in mm. (i) Elevation (ii) Plan (iii) Right side view. 	Comprehension	10,11,12
6	Draw the orthographic projections of the machine part shown in Fig (1)Elevation (2) Plan (3) Right side view.All dimensions are in mm. 	Analysis	10,11,12
7	Draw the orthographic projections of the machine part shown in Fig • Front View • Top View • Right side view. All dimensions are in mm. 	Knowledge	10,11,12
8	Draw the orthographic projections of the parts shown in Fig • Front View • Top View • Both side views. • All dimensions are in mm. 	Comprehension	10,11,12

9	Draw the orthographic projections of the parts shown in Fig • Front View • Top View • Both side views. All dimensions are in mm 	Analysis	10,11,12
10	Draw front view, top view and side view of the model shown below: 	Knowledge	10,11,12
11	Draw the necessary Orthographic views for the Isometric view of the object shown below: 	Comprehension	10,11,12
12	Draw front view, top view and side view of the model shown below: 	Analysis	10,11,12

13	Draw the Orthographic views of the Isometric view shown in the following figure: 	Knowledge	10,11,12
14	Draw front view, top view and left side view of the model shown below: 	Comprehension	10,11,12
15	Draw the necessary Orthographic views for the Isometric view of the object shown below: 	Analysis	10,11,12
16	Draw the Orthographic views of the Isometric view shown in the following figure: 	Knowledge	10,11,12
17	Draw the elevation, plan and end view from the right of the casting shown in figure. 	Comprehension	10,11,12

18	Draw the front view, side view and top view of the given figure. 	Analysis	10,11,12
19	Draw the orthographic views for the figure shown below. 	Knowledge	10,11,12
20	Draw the orthographic use for the given fig. 	Comprehension	10,11,12

Prepared By:
BVSN Rao, Professor.
BDY Sunil, Assistant Professor.

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