1901GEX02 ENGINEERING GRAPHICS

Academic Year	:	2019-2020	**Question Bank**	Programme	:	B.E – CIVIL,EEE, MECH
Year / Semester	:	I / II		Course Coordinator:		

Course Objectives	Course Outcomes:
1. To develop in students, graphic skills for communication of concepts, ideas and design of engineering products. 2. To expose them to existing national standards related to technical drawings.	On the successful completion of the course, students will be able to 1. Perform free hand sketching of basic geometrical constructions and multiple views of objects. 2. Do orthographic projection of lines and plane surfaces. 3. Draw projections of solids. 4. Draw the sections of solids and development of surfaces. 5. Prepare isometric and perspective sections of simple solids.

S.No	Questions	Mark	COs	BTL
	UNIT I – PLANE CURVES AND FREE HAND SKETCHING			
1	Construct an **ellipse** when the distance between the focus and the directrix is 30 mm and eccentricity is 3/4. Also draw the tangent and normal at any point P on the curve using directrix.	20	1	K6

F, & F₂ - FOCI
V, & V, - VERTICES
DD & D'D' - DIRECTRICES

2	Construct a **parabola** when the distance between the focus and the directrix is 40mm. Also draw the tangent and normal to any point on the curve.	20	1	K6

QP - TANGENT
NM - NORMAL

F - FOCUS
V - VERTEX
DD - DIRECTRIX

3	Construct a **hyperbola** when the distance between the focus and directrix is 40 mm. The eccentricity is 4/3. Also draw the tangent and normal to any point on the curve.	20	1	K6

QP - TANGENT
MN - NORMAL

4	A coin of 40mm diameter rolls over a horizontal table without slipping. A point on the circumference of the coin is in contact with the table surface in the beginning and after one complete revolution. Draw the path traced by the point. Draw a tangent and normal at any point on the curve.	20	1	K6

FIG. 1 CYCLOID

5	Draw the **involute** of a square of side 25mm. Also draw the tangent and normal at any point on the curve.	20	1	K6

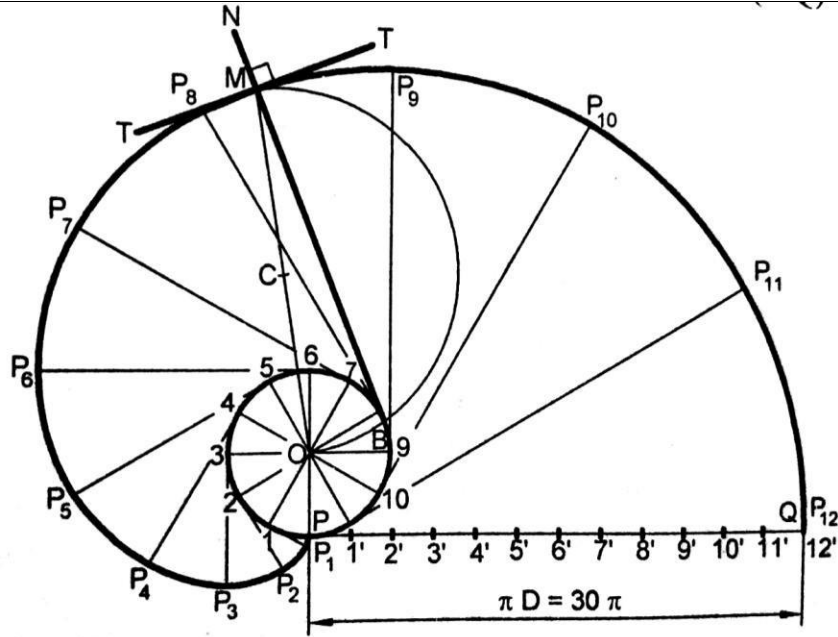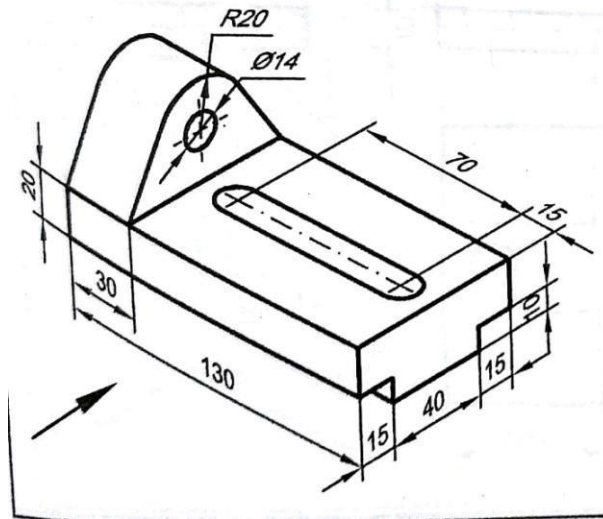| 6	A coir is unwound from a drum of 30 mm diameter. Draw the locus of the free end of the coir for unwinding through an angle of 360°. Also draw normal and tangent at any point on the curve.	20	1	K6

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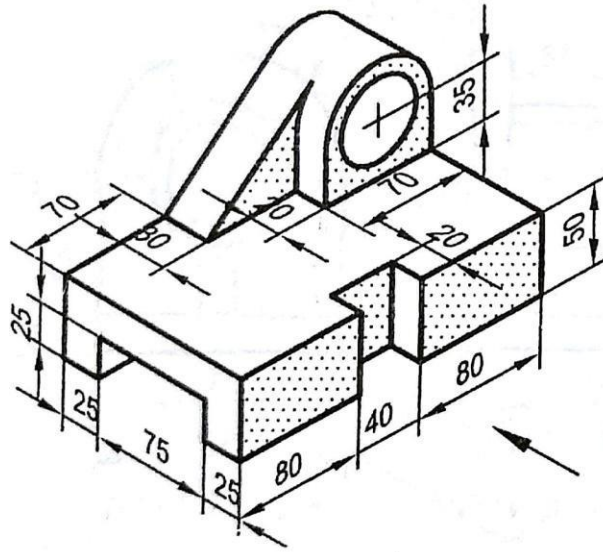COE/2019/QB

FIG. 12   INVOLUTE OF A CIRCLE

$\pi D = 30 \pi$

7	Draw the three orthographic views for the following fig.	20	2	K6

R20

Ø14

20

70

15

30

130

40

15

15
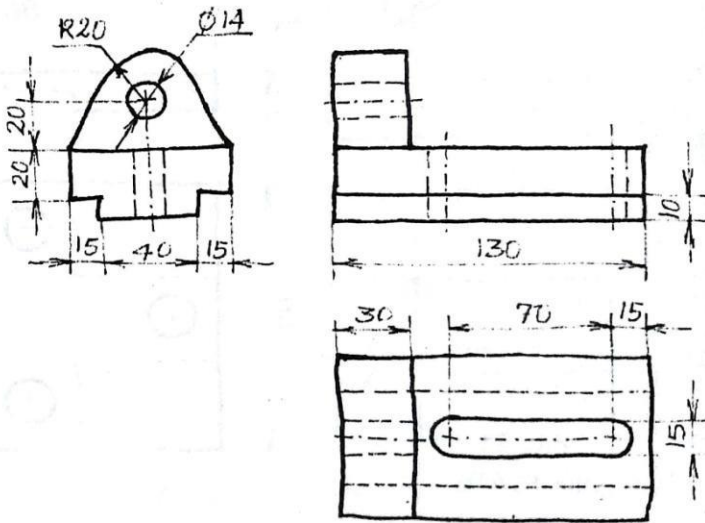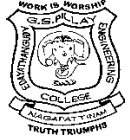
8	Draw the three ortho graphic views for the following fig.(2)			
		20	2	K6

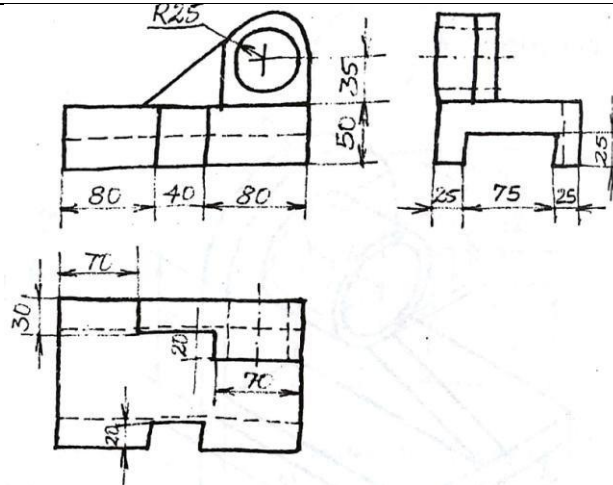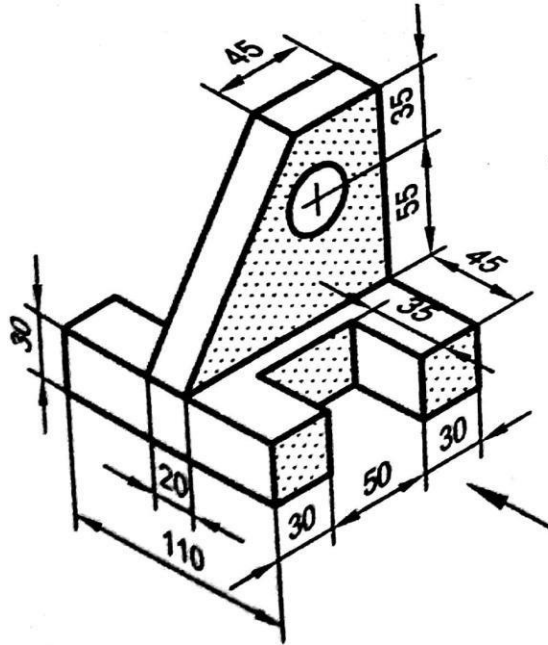| 9	Draw the three ortho graphic views for the following fig.(3)	20	2	K6

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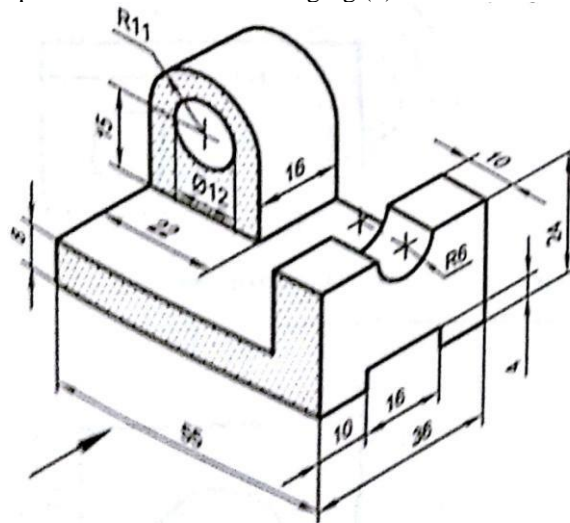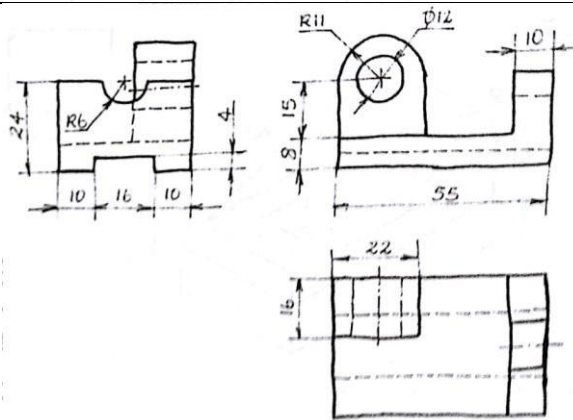
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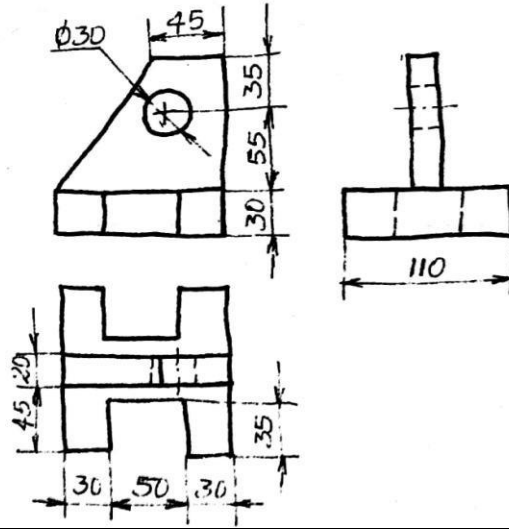
10	Draw the three ortho graphic views for the following fig.(5)	20	2	K6

UNIT II – PROJECTION OF POINTS, LINES AND PLANE SURFACES

1	Mark the projections of the following points on a common reference line, keeping the projectors 35mm apart. 1. A, 25mm above HP and 35mm in front of VP 2. B, 25mm above HP and 40mm behind VP 3. C, 30mm below HP and 45mm behind VP 4. D, 30mm below HP and 40mm in front of VP 5. E, 25mm above HP and on VP 6. F, 35mm below HP and on VP 7. G, 25mm in front of VP and on HP 8. H, 20mm behind VP and on HP	20	2	K6
2	A line CD measuring 80mm is inclined at an angle of 30^0 to HP and 45^0 to VP. The point C is 20mm above HP and 30mm in front of VP. Draw the projections of the straight line.	20	2	K6

3	A line LM 70mm long, has its end L10mm above HP and 15mm in front of VP. Its top and front views measure 60mm and 40mm respectively. Draw the projections of the line. Find its inclinations with HP and VP.	20	2	K6

RESULTS : $\theta = 31°$; $\phi = 55°$ FIG. 35

4	A line AB, 65mm long, has its end A 20mm above HP and 25mm in front of VP. End B is 40mm above HP and 65mm in front of VP. Draw the projections of AB. Find the inclinations with HP and VP.	20	2	K6

FIG. 25
RESULTS: $\theta = 18°$ and $\phi = 38°$

5	The top view of a line is 65mm long and is inclined at 30^0 to the reference line. One end is 20mm above HP and 10mm in front of VP. The other end is 60mm above HP and is in front of VP. Draw the projections and find the true length of the line and its true inclinations to HP and VP.	20	2	K6

FIG. 27

6	The mid-point M of a straight line AB is 60mm above HP and 50mm in front of VP. The line measures 80mm long and inclined at an angle of 30^0 to HP and 45^0 to VP. Draw its projections.	20	2	K6

| 7 | The distance between the projectors of two points A and B is 70mm. A is 10mm above HP and 15mm in front of VP. B is 50mm above HP and 40mm in front of VP. Find the shortest distance between A and B by rotating line method. Find true inclinations of AB with VP and HP. | 20 | 2 | K6 |

(UQ)

Locus of b'

$\theta = 28°$

$\phi = 17°$

Results:
Shortest Distance
Between A and B =
85 mm; $\theta = 28°$; $\phi = 17°$

FIG. 32

| 8 | A regular pentagonal lamina of 30mm sides has one edge in HP and inclined at an angle of 30^0 to VP. Draw its projections when its surface is inclined at 45^0 to HP. | 20 | 2 | K6 |

9	A thin rectangular plate of sides 50mmX25mm has its shortest side in the HP and inclined at an angle of 30^0 to the VP. Project its front view when its top view is a perfect square of 25mm side.	20	2	K6

FIG. 8

10	Draw the projections of a pentagonal sheet of 26mm side, having its surface inclined at 30^0 to VP. Its one side parallel to VP and inclined at 45^0 to HP.	20	2	K6

FIG. 11

11	A circular lamina of 60mm diameter rests on HP on a point 1 on the circumference. The lamina is inclined to HP such that the top view of it is an ellipse of minor axis 35mm. The top view of the diameter through the point 1 makes an angle of 45^0 with VP. (i) Draw the projections. (ii) Determine the angle made by the lamina with HP.	20	2	K6

Result: θ = 54°   FIG. 16

12	A hexagonal lamina of 24mm side has its surface inclined at 30^0 to HP. Its one side is parallel to HP and inclined at 45^0 to VP. Draw its projections.	20	2	K6

UNIT III – PROJECTION OF SOLIDS

1	A pentagonal prism, side of base 25mm and axis 50mm long, rests with one of its edges on HP such that the base containing that edge makes an angle of 30^0 to HP and axis is parallel to VP. Draw its projections.	20	3	K6

FIG. 31

2	A Hexagonal prism, side of base 25mm and axis 50mm long, rests with one of its base corner on HP such that its base makes an angle of 60^0 to HP and its axis is parallel to VP. Draw its projection.	20	3	K6

FIG. 40

| 3 | Draw the projection of cylinder, base 30mm diameter and axis 40mm long, resting with a point of its base circle on HP such that the axis is making an angle of 30^0 with HP and parallel to VP. | 20 | 3 | K6 |

FIG. 44

| 4 | A hexagonal pyramid side of base 25mm and axis 50mm long, rests with one of the edges of its base on HP and its axis is inclined to 30^0 to HP and parallel to VP. Draw its projections | 20 | 3 | K6 |

FIG. 32

5	A pentagonal pyramid side of base 20mm and axis 45mm long rest with one of its corners on HP such that the base is inclined at an angle of 60^0 to HP and one side of base is perpendicular to VP. Draw its projection.	20	3	K6

FIG. 43

6	Draw the projection of a cone. Base 30mm diameter and axis 50mm long, resting on HP on a point of its base circle with the axis making an angle 45^0 with HP and parallel to VP.	20	3	K6

FIG. 45

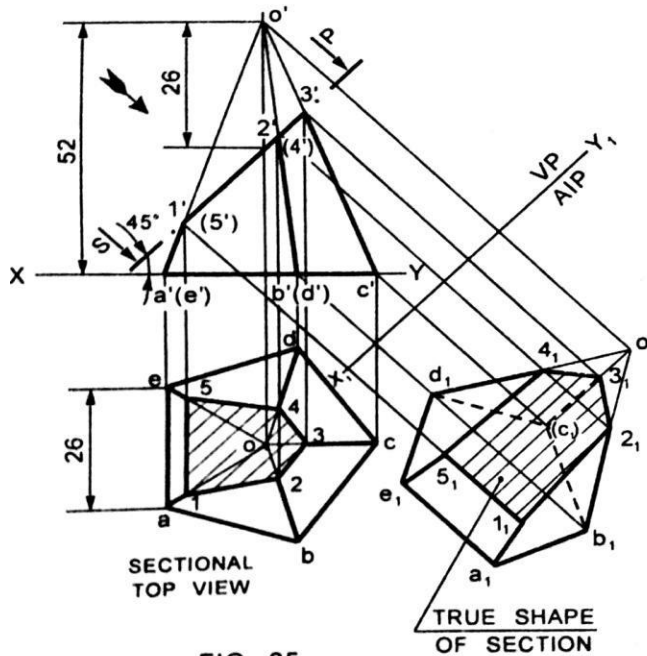| 7	A pentagonal pyramid of base side 20mm and altitude 60mm rests on one of its edges of the base in HP. The base being lifted up until the highest corner in it is 20mm above HP. Draw the projections of the pyramid when the edge on which it rests is made perpendicular to VP.	20	3	K6
	FIG. 35			
8	A hexagonal pyramid of 26mm side of base and 70mm height rests on HP on one of its base edges such that the triangular face containing the resting edge is perpendicular to both HP and VP.. draw its projection.	20	3	K6
	FIG. 36			

9	Draw he top and front views of a cone of base diameter 46mm and height 65mm lying with one of its generators on HP. The axis is parallel to VP.	20	3	K6

FIG. 47

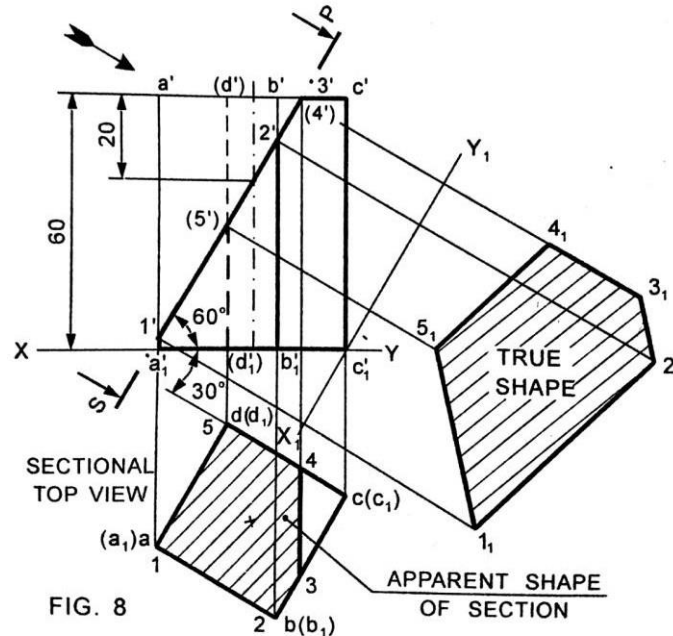| 10	A hexagonal pyramid side of base 25mm, axis 50mm long lies with one of its triangular faces on the HP and its axis is parallel to the VP. Draw its projections.	20	3	K6

FIG. 37

UNIT IV – PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES

1	A pentagonal pyramid side of base 26mm and 52mm height, rests with its base on HP. One of the edges of its base is perpendicular to VP. A section plane perpendicular to VP and inclined at 45^0 to HP bisect the axis. Draw the sectional top view.	20	4	K1

FIG. 25

2	A square prism, side of base 30mm and axis 60mm, rests with its base on HP and one of its rectangular faces is inclined at 30^0 to VP. A section plane perpendicular to VP and inclined at 60^0 to HP cuts the axis of the prism at a point 20mm from its top end. Draw sectional top view and true shape of the section.	20	4	K1

FIG. 8

3	A cylinder diameter 40mm and height 60mm is having its axis vertical. It is cut by a plane perpendicular to VP and inclined at 30^0 to HP. The plane bisects the axis of the cylinder. Draw its front view, sectional top view and true shape of section.	20	4	K1

4	A cube of side 40mm is resting on the ground with one of its faces. Two of its vertical faces are equally inclined to VP. It is cut by a plane perpendicular to VP and inclined at 30^0 to HP and passing through a point on the axis at a distance of 30mm from the base. Draw the front view, sectional top view and true shape of the section	20	4	K1

FIG. 56

5	A cone base 50mm diameter and axis 65mm long, rests with its base on Hp. It is cut by a section plane perpendicular to VP. Inclined to 45^0 to HP and passing through a point on the axis 35mm above the base. Draw the sectional top view, sectional side view and true shape of section.	20	4	K1

Sectional Top View (Apparent Section)

6	A hexagonal prism, edge of base 20mm and axis 50mm long, rests with its base on HP such that one of its rectangular faces is parallel to VP. It is cut by a plane perpendicular to VP, inclined at 45^0 to HP and passing through the right corner of the top face of the prism.(i) Draw the sectional top view, (ii) Development the lateral surfaces of the truncated prism.	20	4	K1

PARALLEL LINE DEVELOPMENT
OF TRUNCATED HEXAGONAL PRISM

FIG. 5

7	Draw the development of the lateral surface of a hexagonal prism of 24mm base and 68mm 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.	20	4	K1

SHORTEST PATH OF THE INSECT

DEVELOPMENT SHOWING
THE SHORTEST PATH OF THE INSECT

FIG. 8

8	A vertical chimney of 70cm diameter joins a roof sloping at 35^0 with horizontal. The shortest portion over the roof is 32cm. obtain the shape of the sheet metal from which the chimney can be fabricated.	20	4	K1

SCALE 1: 20

DEVELOPMENT OF CHIMNEY
(TRUNCATED CYLINDER)

FIG. 9

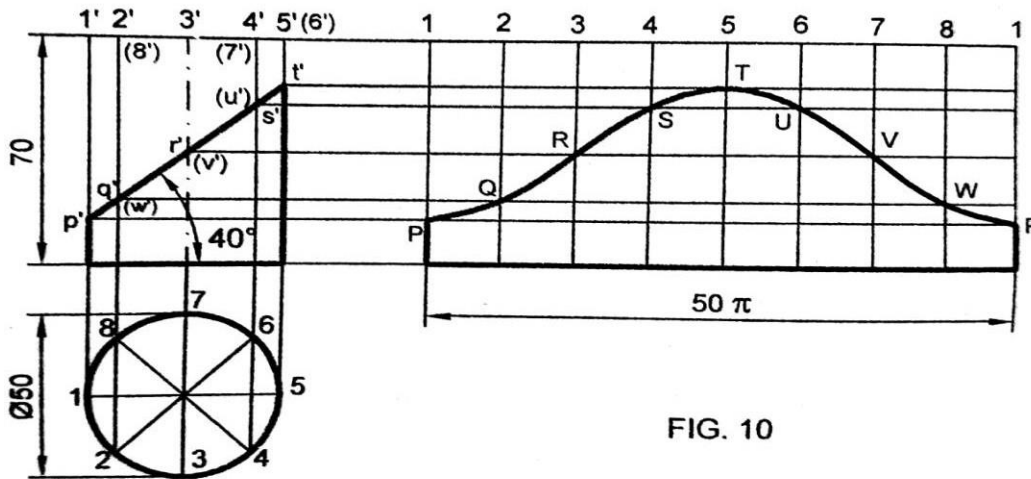| 9	Draw the development of the lateral surface of the lower portion of a cylinder of diameter 50mm and axis 70mm when sectioned by a plane inclined at 40^0 to HP and perpendicular to VP and bisecting the axis.	20	4	K1

FIG. 10

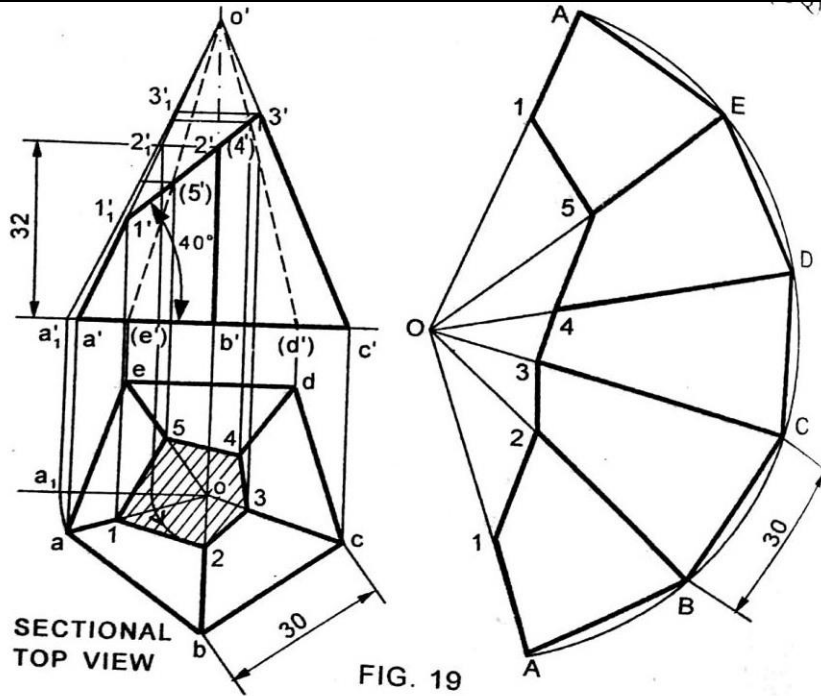| 10 | A pentagonal pyramid, side of base 30mm and height 52mm. stands with its base on HP and an edge of the base is parallel to VP and nearer to it. It is cut by a plane perpendicular to VP, inclined at 40^0 to HP and passing through a point on the axis, 32mm above the base. Draw the sectional top view. Development the lateral surface of the truncated pyramid. | 20 | 4 | K1 |

SECTIONAL TOP VIEW

FIG. 19

UNIT V – ISOMETRIC AND PERSPECTIVE PROJECTIONS

1	A hexagonal prism, side of base 25mm and height 50mm rests on HP and one of the edges of its base is parallel to VP. A section plane perpendicular to VP and inclined at 50^0 to HP bisects the axis of the prism. Draw the isometric projection of the truncated prism, showing the cut surface.	20	5	K1

FIG. 34
ISOMETRIC PROJECTION OF
TRUNCATED HEXAGONAL PRISM

2	A cylinder 50mm diameter and 60mm height stands on HP. A section plane perpendicular to VP, inclined at 55^0 to HP cuts the cylinder and passes through a point on the axis at a height of 45mm above the base. Draw the isometric projection of the truncated portion of the cylinder. When the cut surface is clearly visible to the observer.	20	5	K1

FIG. 35
ISOMETRIC PROJECTION OF
TRUNCATED CYLINDER

| 3	A pentagonal pyramid 30mm edge of base and 65mm height stands on HP such that an edge of the base is parallel to VP and nearer to it. A sectional plane perpendicular to VP and inclined at 30^0 to HP cuts the pyramid passing through a point on the axis at a height of 35mm from the base. Draw the isometric projection of the truncated pyramid, showing the cut surface.	20	5	K1
	 ISOMETRIC PROJECTION OF TRUNCATED PENTAGONAL PYRAMID			
4	Draw the isometric projection of the frustum of cone of base diameter 60mm and top face diameter 35mm and axis length 50mm resting on HP on its base.	20	5	K1
	 ISOMETRIC PROJECTION FIG. 39			

5	A pentagonal pyramid 30mm edge of base and 65mm long rests with its base on HP. An edge of the base is parallel to VP and nearer to it. A horizontal section plane cuts the pyramid and passes through a point on the axis at a distance of 25mm from the apex. Draw the isometric projection of the frustum of the pyramid.	20	5	K1
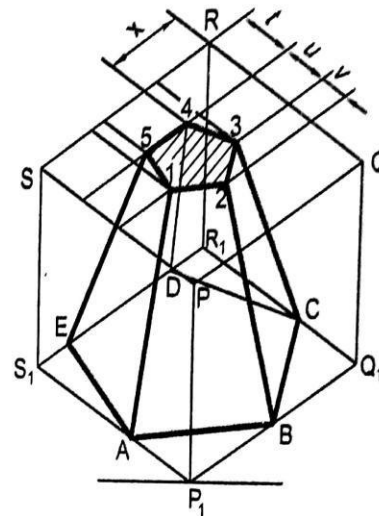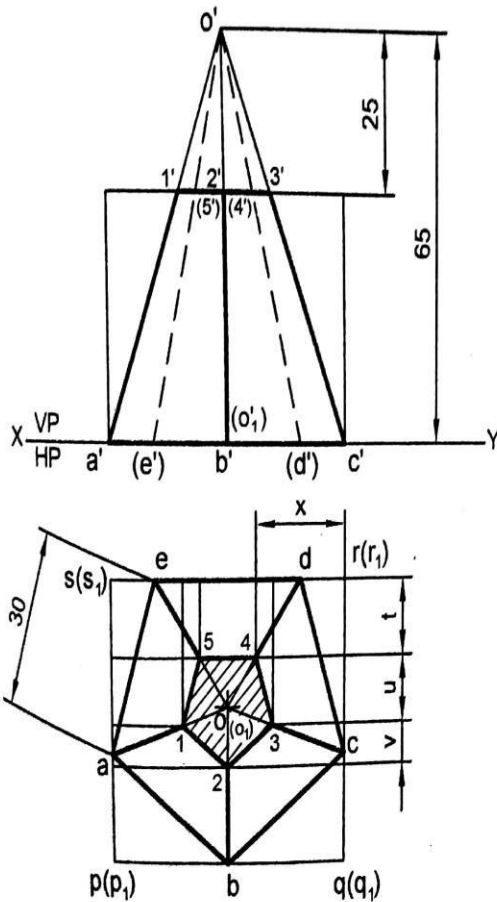
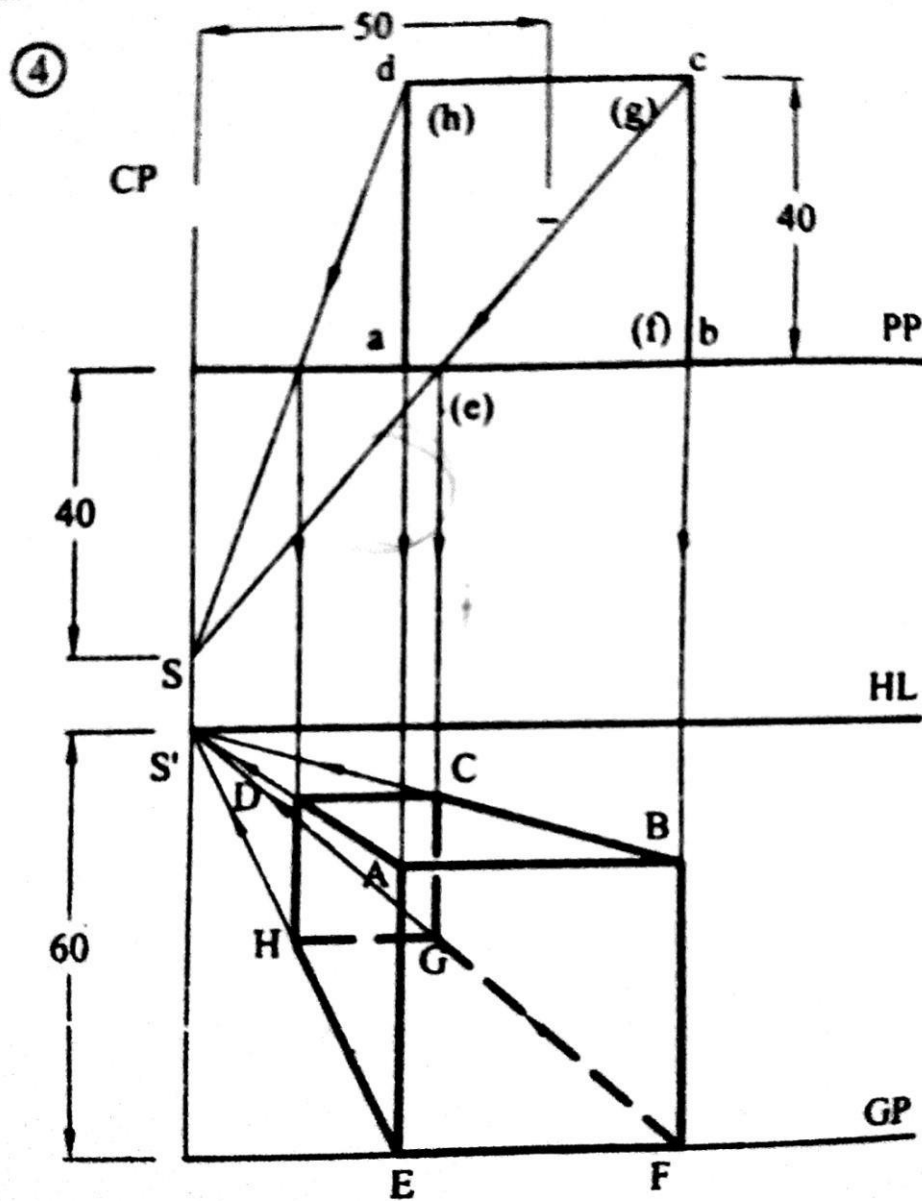ISOMETRIC PROJECTION OF
FRUSTUM OF PENTAGONAL PYRAMID

| 6	A cube of side 40mm is resting on the ground on one of its faces, with a vertical face in PP and the rest behind it. The central plane is located 50mm to the left of the axis of the cube. The station point is 40mm in front of PP and 60mm above GP. Draw the perspective view of the solid.	20	5	K1

| 7	A square pyramid of side of base 50mm and altitude 70mm stands on the ground vertically with an edge of base parallel to and 20mm behind PP. The station point 40mm in front of PP and 70mm above the ground. The central plane is located 45mm to the left of the axis of the solid. Draw the perspective projection.	20	5	K1
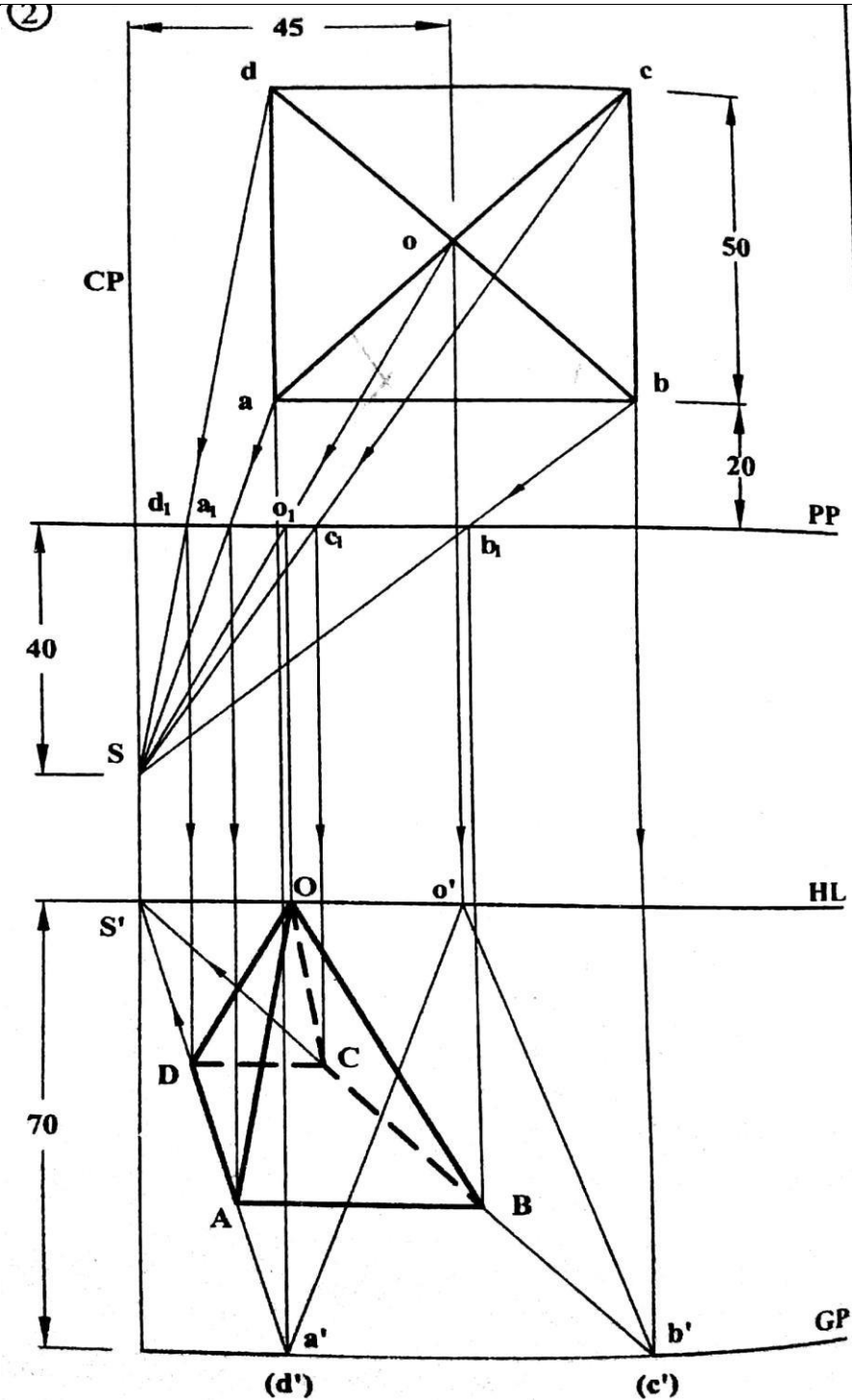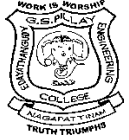
8	A pentagonal pyramid of 30mm base side and axis height 40mm is standing on its base on the ground plane with a base side parallel to and 25mm behind PP. The central plane is 35mm to the left of the apex and the station point is 40mm in front of PP and 20mm above the ground plane. Draw the perspective view of the pyramid.	20	5	K1
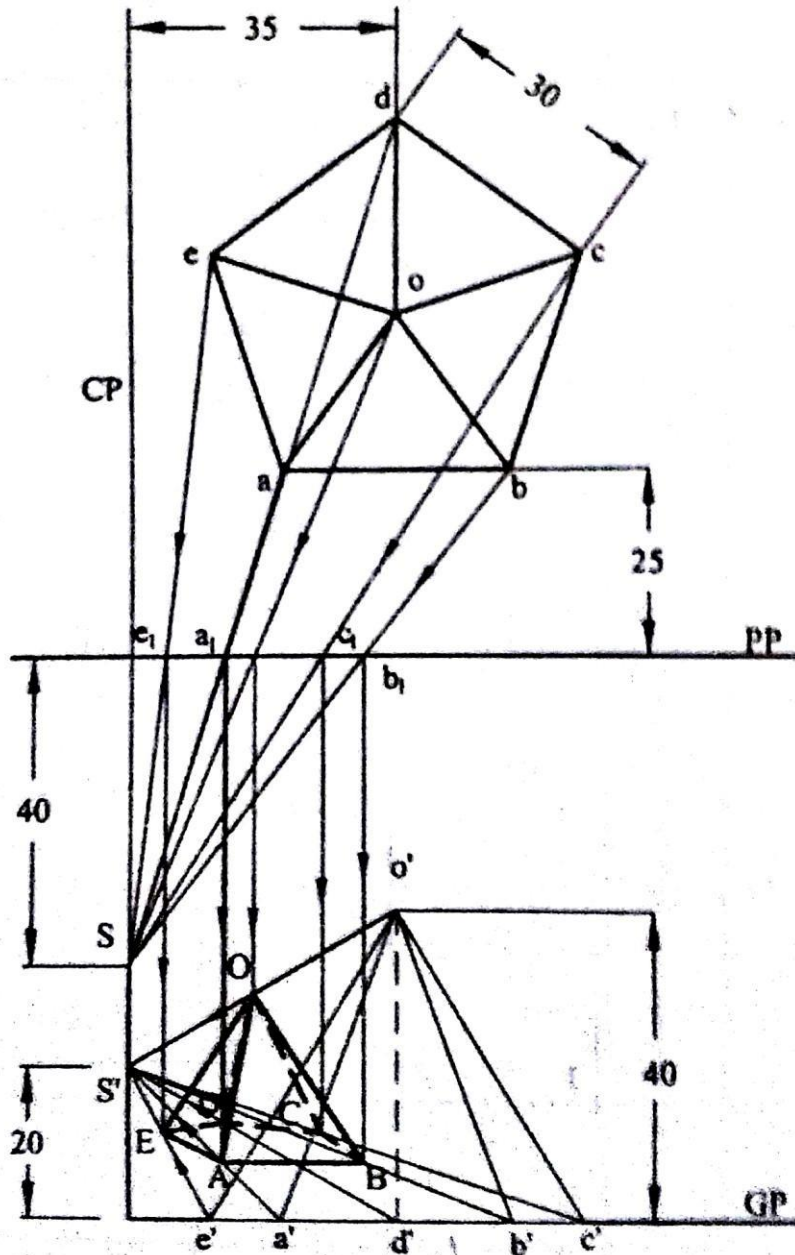
Note : 10 Questions with answer key must be prepared in each unit