	Course Title: **ENGINEERING GRAPHICS-II**	Course Code:**15ME21D**
	Credits (L:T:P) : **0:2:4**	Core/ Elective: **Core**
	Type of course: **Lectures & Practice**	Total Contact Hours: **78**
CIE- 25 Marks		SEE- 100 Marks

(Common to all Mechanical /AE/MTT/CH Programme)

Prerequisites: ENGINEERING GRAPHICS-I

COURSE OBJECTIVES

1. The course is aimed at developing Basic Graphic skills
2. Develop Skills In Preparation Of Engineering Drawings, their Reading And Interpretation

Course Outcomes:

On successful completion of the course, the students will be able to attain CO:

	Course Outcome	**CL**	**Linked units**	**Linked PO**	**Teaching Hrs**
CO1	Draw simple solids and sectional views of simple solids	*U/A*	1,2	1,2,3,9,10	**39**
CO2	Draw the development of simple utility articles	*U/A*	3	1,2,3,9,10	**15**
CO3	Draw Orthographic views of given machine component.	*U/A*	4	1,2,3,9,10	**12**
CO4	Develop the ability to draw the isometric view from the orthographic views of a given machine component.	*U/A*	5	1,2,3,9,10	**12**
				Total sessions	**78**

COURSE-PO ATTAINMENT MATRIX

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
ENGINEERING GRAPHICS-II	**3**	**3**	**3**	-	-	-	-	-	**3**	**3**

LEVEL 3- HIGHLY ADDRESSED, LEVEL 2-MODERATELY ADDRESSED, LEVEL 1-LOW ADDRESSED.
METHOD IS TO RELATE THE LEVEL OF PO WITH THE NUMBER OF HOURS DEVOTED TO THE COS WHICH ADDRESS THE GIVEN PO.
IF $\geq$40% OF CLASSROOM SESSIONS ADDRESSING A PARTICULAR PO, IT IS CONSIDERED THAT PO IS ADDRESSED AT LEVEL 3
IF 25 TO 40% OF CLASSROOM SESSIONS ADDRESSING A PARTICULAR PO, IT IS CONSIDERED THAT PO IS ADDRESSED AT LEVEL 2
IF 5 TO 25% OF CLASSROOM SESSIONS ADDRESSING A PARTICULAR PO, IT IS CONSIDERED THAT PO IS ADDRESSED AT LEVEL 1
IF < 5% OF CLASSROOM SESSIONS ADDRESSING A PARTICULAR PO, IT IS CONSIDERED THAT PO IS CONSIDERED NOT-ADDRESSED.

COURSE CONTENT AND BLUE PRINT OF MARKS FOR SEE

Unit No	Unit Name	Hour	Questions to be set for SEE/MARKS			Marks weightage	weightage (%)
			R	U	A		
1	**Projection of solids**	21	--	10	30	40	27
2	**Section of solids**	18	--	--	30	30	21
3	**Development of Surfaces**	15	--	--	30	30	21
4	**Conversion of pictorial views into Orthographic views**	12	---	---	15	15	10
5	**Isometric projection**	12	---	---	30	30	21
	Total	78		10	135	145	100

Legend: R; Remember, U: Understand A: Application

COURSECONTENT

UNIT:I	PROJECTION OF SOLIDS	CONTACT HOURS:21 Hours

Introduction-Positioning of solids –Solid lying with base on HP- Solids lying with base or axis inclined to HP- Solids lying with one of the lateral faces on HP- Solids lying with one of their lateral edges on HP-Cylinder lying with its axis or base inclined to HP- Cone lying with its axis or base inclined to HP -Solid lying with their axis inclined to both HP and VP.

UNIT:II	SECTION OF SOLIDS	CONTACT HOURS: 18 Hours

Introduction to Sectioning –Representation of section planes-Section lines and hatching-Types of Section planes-True shape of a section-Sectioning of solid like cube, prism, pyramid, cylinder and cone -Obtaining true shape of section.

UNIT:III	DEVELOPMENT OF SURFACES	CONTACT HOURS: 15 Hours

Introduction to Development of surfaces-Development of lateral surfaces of cube, prism, cylinder, pyramid, and cone-Development of lateral surfaces of truncated prism, cylinder, pyramid, and cone-Development of lateral surfaces of Tray, Funnel.

UNIT:IV	CONVERSION OF PICTORIAL VIEWS INTO ORTHOGRAPHIC VIEWS	CONTACT HOURS: 12 Hours

Introduction –Guidelines for conversion of pictorial views into orthographic views-Illustrative problems.

UNIT:V	ISOMETRIC PROJECTIONS	CONTACT HOURS: 12 Hours

Principles of isometric projection – isometric scale – isometric views of simple solids – cube – prisms, pyramids, cylinder and cone - Conversion of orthographic views into isometric View -Drawing of Isometric views of machine parts.

TOTAL: 78 Hours

TEXT BOOK

1.K.R.Gopalakrishna*"Fundamentalsof Drawing"* Subhas Publications, 2010.
2.K.R.Gopalakrishna*"Engineering Drawing" (Vol. I & II),*Subhas Publications, 2014.

REFERENCES

1. R.K. Dhawan, *"A text book of Engineering Drawing",*S.ChandPublishers, Delhi,2010.
2.G.S. Phull and H.S.Sandhu, *"Engineering Graphics",* Wiley Publications, 2014.
3. K.Venugopal and V.Prabhu Raja, *"Engineering Graphics",* New Age International Private Limited, 2008.
4. M.B.Shah and B.C.Rana, *"Engineering Drawing",* Pearson Education, 2005.
5. BasantAgarwal and Agarwal.C.M.,*"Engineering Drawing",* Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.

Course Assessment and Evaluation Scheme:

		What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment method		CIE	IA	Students	Graded Exercises	25	Drawing Sheets	1,2,3,4,
		SEE	End Exam		End of the course	100	Answer scripts at BTE	1,2,3,4,
Indirect Assessment		Student Feedback on course		Students	Middle of the course		Feedback forms	1, 2,3 ,4 Delivery of course
		End of Course Survey			End of the course		Questionnaires	1,2,3,4,Effectiveness of Delivery of instructions & Assessment Methods

NOTE:THIS SUBJECT SHOULD THOUGHT IN A BATCH OF 15 TO 20 STUDENTS,TEACHER ALOTTED PER BATCH HAS TO MONITER, EVALUATE OR ASSESS THE STUDENTS.

Diploma in Mechanical Engineering
2nd semester
Course title: **Engineering Graphics-II (Conventional)**

Time: 4 Hrs.   **Max. marks: 100**

Note: Part –A is compulsory. Answer ANY TWO full questions from Part-B,C& D

Part –A

1.A hexagonal pyramid of 25 mm side of base and height 55 mm rests with one of its   10
triangular faces on HP and the axis parallel to VP. Draw its top and front views.

Part –B

2.Draw the projection of a pentagonal prism of base side 25mm and axis length 45mm resting on a corner such that the two base edges passing through it make equal inclination with HP and   its base inclined at 60° to HP and the axis appears to be inclined at 30° to VP in the top view.--15

3.A cone of base diameter 50mm and altitude 70mm is lying with one of its generators on HP and the axis appears to be inclined to VP at an angle of 40 degree in the top view. Draw its top and front views.
-- 15

4. A cylinder 60 mm diameter and 80 mm long stands with its base on HP. A section plane
Perpendicular to VP and inclined at 60° to HP cuts the axis at a point 28 mm from its top end.
Draw the sectional top view and true shape of the section.   --15

Part –C

5.A hexagonal pyramid of base side 30 mm and axis 65 mm rests on its base on the HP with
one of its base edges perpendicular to VP. A cutting plane perpendicular to VP and inclined
at 45° to HP meeting the axis 25 mm from the vertex. Draw the sectional top view and true shape of the section.
                                                                    -- 15
.
6.A vertical cone 40 mm diameter of base and height 50 mm is cut by a section plane perpendicular to VP and inclined at 30° to HP so as to bisect the axis of the cone. Draw the
development of the lateral surface of the truncated cone.   --15

7.A square pyramid of 30mm edges of base and height 50mm rests on its base on HP with one of its base edges parallel to VP. It is cut by a sectional plane perpendicular to VP and inclined at45° to HP bisecting the axis.
Draw the development of the truncated pyramid.--15

Part –D

8.Draw the three principal views of the component as shown in the figure.   --15
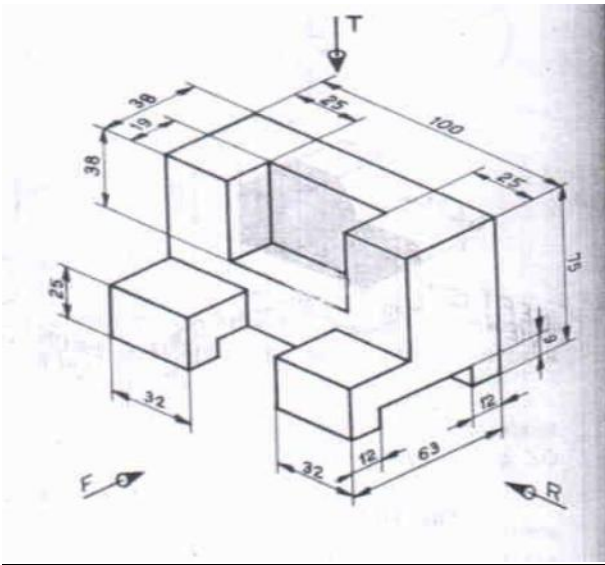
9.Draw the isometric view of the machine component whose orthographic views are given below:
-- 15

All dimensions in mm
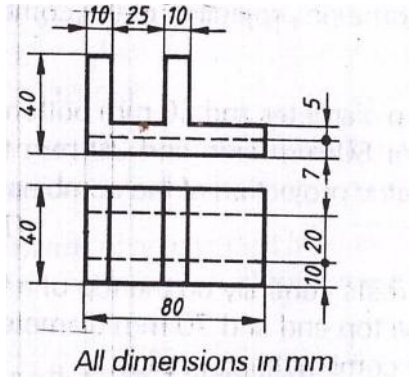
10. Draw the isometric projection of a frustum of a cone of 40 mm top diameter, 80 mm bottom diameter and 60 mm height.   --15

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Course title: Engineering Graphics-II (Conventional)

CO 1:DRAW SIMPLE SOLIDS

LEVEL:UNDERSTANDING

(10Marks Questions)

1. A triangular prism of base edge 40mm and height 65mm rests with one of its base edges on HP so that the axis of the prim is inclined at 30° with HP. Draw the projections when the axis of the prism is parallel to VP.
2. A square prism of base edge 40mm and height 65mm rests with one of its base edges on HP. The axis of the prism is inclined at 45° to HP and parallel to VP. Draw the top and the front views of the prism.
3. A pentagonal prism of base 35mm and height 60mm has its base edge on HP. Draw the projections if the base of the prism is inclined at 30° to the HP. The axis of the prism is parallel to the VP.
4. A Hexagonal prism of base 35mm and height 60mm is resting with its base edge on HP so that the axis is inclined at 45° and parallel to VP. Draw its projections.
5. The axis of the square prism of base edge 40mm and height 60mm is inclined at 30° to HP and parallel to the VP. Draw the projections when the prism is placed with one of its corners on HP. The two adjacent base edges containing this corner are equally inclined to HP.
6. A pentagonal prism of base 35mm and axis height 60mm is resting with one of its base corners on HP such that the axis is inclined at 30° to the HP. Draw the projections when the axis of the prism is parallel to VP.
7. A triangular pyramid of base edge 40mm and height 65mm is resting with one of its base edges on HP so that the axis of the pyramid is parallel to VP and inclined at 45° to HP. Draw the projections.
8. Draw the projections of a hexagonal pyramid resting with one of its base edges on HP such that the axis of the pyramid is inclined at 30° to HP. The hexagonal pyramid has its base edges as 35mm and axis height as 60mm.
9. A pentagonal pyramid of base edge 35mm and axis height 65mm rests with one of its base corners on HP so that the axis of the pyramid is inclined at 45° to the HP. Draw the projections if the axis of the pyramid is parallel to the VP.
10. A square pyramid of base 40mm and axis height 65mm rests with its triangular lateral surfaces on HP so that the axis of the pyramid is parallel to the VP. Draw the projections.
11. A hexagonal pyramid is resting with one of its triangular lateral surfaces on HP. Draw the projections if its base edges are 40mm and the axis height is 65mm.
12. A pentagonal pyramid of base edge 40mm and axis 65mm rests with its slant edge on HP so that its axis is parallel to the VP. Draw the projections.
13. A cylinder of 40mm diameter and axis height 65mm rests with its points of the circumference on HP so that the axis is inclined at 45° to the HP and parallel to the VP. Draw the projections.
14. A cone of 40mm diameter and axis height 65mm is resting with points of the circumference on HP. Draw the projections if the axis of the cone is inclined at 30° with HP and parallel to VP.

15. A cone of 45mm diameter and axis height 60mm is resting with its end slant generator on HP so that the axis of the cone is parallel to VP. Draw the projections of the cone.

16. **A pentagonal prism of 30mm side of base and height 60mm rests with one of its edges of the base on HP such that the axis is inclined at 30° to HP and parallel to VP. Draw the top and front views.**

17. A hexagonal pyramid of 25mm side of base and height 60mm rests with one of its base edges on HP such that the base is inclined at 45° to HP, and the axis parallel to VP. Draw the top and front views.

18. A hexagonal pyramid of 25mm edge of base and height 60mm rests with one of its corners of the base on HP such that the base is inclined at 30° to it and the axis parallel to VP. The two of the base edges containing the corner on which the pyramid rests make equal inclinations with HP. Draw the projections.

19. A pentagonal prim of 30mm side of base and height 55mm rests with one of its rectangular faces on HP and the axis parallel to VP. Draw its projections.

20. Draw the top and front views of a triangular prism of 35mm side of triangular faces and height 60mm rest with one of its longer edges on HP such that the axis is parallel to VP and the rectangular face opposite to the slant edge on which the prism rests in perpendicular to VP.

21. Draw the top and front views of a pentagonal pyramid of side of base 30mm and height 60mm rests with one of its slant edges on HP and the axis parallel to VP.

LEVEL:APPLICATION   (15 MARKS)

22. A cube of 40mm edge rests on HP so that this edge is inclined at 45° to VP. One of the lateral surface is inclined at 45° to HP. Draw the top and front views of the cube.

23. An equilateral triangular prism of base side 25mm and 50mm long rests with one of the its shorter edges on HP so that the rectangular face containing the edge on which the prism rests inclined at 30° to the HP. The edge on which the prism rests is inclined at 60° to the VP. Draw its projections.

24. A pentagonal prism of base edge 30mm and 60mm long has its base edge on HP. The axis of the prism is inclined at 30° to the HP and appears to be inclined at 45° to the VP. Draw the top view and the front views of the prism.

25. A hexagonal prism of 30mm base edge and axis 60mm long is placed with one of its base edges on HP so that the axis is inclined at 30° to HP and the **axis appears to be inclined at 45° to VP.** Draw the projections when the base of the prism is nearer to the observer.

26. A square prism of base edge 40mm and 60mm long rests with one of its corners of the base so that the longer edge passing through this corner is inclined at 40° to the HP. Draw the projections if the axis appears to be inclined at 45° to the VP in the top view.

27. A square pyramid of base edge 40mm and 60mm long has one of its shorter edges on HP. The axis of the pyramid is inclined at 30° to the HP and appears to be inclined at 45° to the VP. Draw the projections if the apex is near to the observer.

28. A cylinder of 40mm diameter and axis height 60mm is resting with its ends of the base diameter on HP. The axis of the cylinder is inclined at 30° to the HP and appears to be inclined at 45° to VP. Draw the projections.

29. A cone of base diameter 50mm and axis 80mm lies on HP with its axis inclined at 45° to HP and appears to be inclined at 30° to the VP in the top view. Draw the top and front views of the cone.

30. A right cylinder is 50mm diameter of base and height 70mm. It rests such that the axis is **inclined at 30° and 45° to HP and VP respectively**. Draw the top and front views.

31. A cone of base 80mm diameter and height 100mm is lying with one of its generators on HP and its axis appears to be inclined at 40° to VP in the top view. Draw its front and top views.

32. **Draw the projections of a pentagonal prism 20mm side of base and axis 40mm long resting on a corner such that two base edges passing through it make equal inclinations with HP and its base is inclined at 60° to HP, and the axis appears to be inclined at 30° to VP in the top view.**

33. Draw the top and front views of a rectangular pyramid of sides of base 20x25mm and height 35mm when it lies with one of its triangular faces containing the longer edge of the base on HP. This longer edge of the base containing the triangular face lying on HP is inclined at 60° to VP in the top view with the apex of the pyramid nearer to VP.

34. A pentagonal pyramid 20mm side of base of 35mm altitude rests with one of its corners on HP such that the two base edges passing through the corner on which it rests make equal inclinations with HP. The axis is inclined at 45° to VP and 30° to HP. Draw the top and front views of the pyramid.

35. A hexagonal pyramid, base 30mm side and axis 60mm long has one of its slant edges on HP such that two of its triangular faces containing the slant edge on which it rests are equally inclined to HP. The top view of the axis appears to be inclined at 45° to VP. Draw its projections when its base is nearer to the observer than its apex.

36. A cone of base 60mm diameter and axis 80mm long rests on **HP with its axis inclined 45° an 30° with HP and VP respectively**. Draw the top and front views of the cone.

37. Draw the top and front views of a right cylinder of base 45mm diameter and 60mm long when it lies on HP, such that its axis is inclined at 30° to HP and the axis appears to be perpendicular to the VP in the top view.

CO 1:DRAW SECTIONAL VIEWS OF SIMPLE SOLIDS

LEVEL:APPLICATION

(15 Marks Questions)

1. A cube of 30 mm edges rests with a square face of HP such that one of its vertical square faces is inclined at 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, front view and true shape of the section.

2. A square prism of 45 mm side ofbase, height 90 mm rests with its base on HP such that one of the rectangular faces is inclined at 30° to VP. A section plane perpendicular to VP and inclined at 60° to HP passes through a point on the axis at a height of 70 mm. Draw the front view, sectional top view and true shape of the section.

3. A square prism side of base 40 mm and axis 60 mm long rests with its base on HP such that one of its rectangular faces is inclined at 30° to VP. A section plane perpendicular to HP and inclined at 60° to VP passes through the prism at a distance of 10 mm from the axis. Draw the top view, sectional front view and true shape of the section.

4. A pentagonal pyramid of 20 mm edge of base and 40 mm high stands vertically with its base on HP and an edge of the base perpendicular to VP. A section plane perpendicular to HP and inclined at 30° to VP cuts the pyramid such that it passes through the pyramid at a shortest distance of 5 mm from its axis and in front of it. Draw the top view, sectional front view and true shape of the section.

5. A triangular pyramid of 30 mm side of base and axis 45 mm long is placed with its base on HP such that an edge of the base is parallel to VP and nearer to it. A cutting plane inclined at 60° to HP and perpendicular to VP bisects the axis of the pyramid. Draw the front view, sectional top view and true shape of the section.

6. Draw the front view, sectional top view and true shape of the section of a hexagonal pyramid, 20 mm side of the base and 50 mm high resting with its base HP such that an edge of the base is parallel to VP. The pyramid is cut by a section plane perpendicular to VP and inclined at 30° to HP. Section plane bisects the axis of the pyramid.

7. A cylinder 60 mm diameter and 80 mm long stands with its circular base on HP. A section plane perpendicular to VP and inclined at 60° to HP cuts the axis at a point 28 mm from its top end. Draw front view, sectional top view and true shape of the section.

8. A cylinder of base diameter 45 mm and height rests on its base on HP. It is cut by a section plane perpendicular to VP and inclined at 30° to HP and meets the axis at a distance of 30 mm from the base. Draw the front view, sectional top view and true shape of the section.

9. A cone, diameter of base 60 mm and axis 70 mm long, is resting on its base on HP. It is cut by a section plane perpendicular to VP, inclined at 45° to HP and passing through a point on the axis 40 mm above the base. Draw the front view, sectional top view and true shape of the section.

10. A cone, base 60 mm diameter and axis 70 mm long, stands vertically with its base on HP. It is cut by a section plane perpendicular to VP, inclined at 45° to HP and is bisecting the axis. Draw the front view, sectional top view and true shape of the section. Name the true shape of the section.

11. A cone, base 60 mm diameter and axis 70 mm long, stands vertically with its base on HP. It is cut by a section plane whose vertical trace is perpendicular to VP and parallel to one of the end generators of the cone and passes at a distance of 15 mm from it. Draw the front view, sectional top view and true shape of the section. Name the true shape of the section.

12. A cone, base 60 mm diameter and axis 70 mm, stands vertically with its base on HP. It is cut by a section plane perpendicular to VP and inclined at 75° to HP, so as to cut the axis of the cone at a point 20 mm above the base. Draw the front view, sectional top view and true shape of the section. Name the true shape of the section.

13. A cone, base 60 mm diameter and axis 70 mm, stands vertically with its base on HP. The section plane perpendicular to HP and parallel to VP cuts the cone at a distance of 10 mm from the axis. The section

plane is in front of the axis of the cone. Draw top view, sectional front view and true shape of the section. Name the true shape of the section.

14. A square pyramid of base side 30 mm and axis length 60 mm is resting on HP on its base with one side of base inclined at 30° to VP. It is cut by a section plane inclined at 45° to HP and perpendicular to VP and passes through the axis at a distance 52 mm from the apex. Draw its front view, sectional top view and true shape of the section.

15. A pentagonal pyramid of base side 40 mm and axis length 75 mm is resting on HP on its base with one of its base side parallel to VP. It is cut by a section plane inclined at 35° to HP and perpendicular to VP and is bisecting the axis. Draw its front view, sectional top view and true shape of the section.

16. A pentagonal pyramid of base side 20 mm and altitude55 mm rests on its base on HP with one of the base edges being perpendicular to VP. It is cut by a section plane perpendicular to VP and inclined at 50° to the HP. The section plane meets the axis at 15 mm above the base. Draw its front view, sectional top view and true shape of the section.

17. A hexagonal pyramid of base side 25 mm and axis 50 mm long rests with its base on HP and an edge of its base is perpendicular to VP. It is cut by a section plane perpendicular to VP, inclined at 30° to HP and passing through a point on the axis 20 mm below the apex. Draw its front view, sectional top view and true shape of the section.

18. A hexagonal pyramid of base side 30 mm and altitude 70 mm rests with its base on HP and with a side of base is parallel to VP. It is cut by a section plane perpendicular to VP, inclined at 35° to HP and is bisecting the axis. Draw its front view, sectional top view and true shape of the section.

19. A hexagonal pyramid of base side 25 mm and axis 50 mm long rests with its base on HP such that one of the edges of its base is perpendicular to VP. It is cut by a section plane perpendicular to HP and inclined at45° to VP and passing through the pyramid at a distance of 10 mm from the axis. Draw its top view, sectional front view and true shape of the section.

20. A square prism side of base 40 mm and axis 60 mm long rests with its base on HP such that one of its rectangular faces is incline at 30° to VP. A section plane perpendicular to HP and inclined at 60° to VP passes through the prism at a distance of 10 mm from the axis. Draw its top view, sectional front view and true shape of the section.

21. A cube of 40mm edge rests on HP so that this edge is inclined at 45° to VP. One of the lateral surface is inclined at 45° to HP. Draw the top and front views of the cube.

22. An equilateral triangular prism of base side 25mm and 50mm long rests with one of the its shorter edges on HP so that the rectangular face containing the edge on which the prism rests inclined at 30° to the HP. The edge on which the prism rests is inclined at 60° to the VP. Draw its projections.

23. A pentagonal prism of base edge 30mm and 60mm long has its base edge on HP. The axis of the prism is inclined at 30° to the HP and appears to be inclined at 45° to the VP. Draw the top view and the front views of the prism.

24. A hexagonal prism of 30mm base edge and axis 60mm long is placed with one of its base edges on HP so that the axis is inclined at 30° to HP and the **axis appears to be inclined at 45° to VP.** Draw the projections when the base of the prism is nearer to the observer.

25. A square prism of base edge 40mm and 60mm long rests with one of its corners of the base so that the longer edge passing through this corner is inclined at 40° to the HP. Draw the projections if the axis appears to be inclined at 45° to the VP in the top view.

26. A square pyramid of base edge 40mm and 60mm long has one of its shorter edges on HP. The axis of the pyramid is inclined at 30° to the HP and appears to be inclined at 45° to the VP. Draw the projections if the apex is near to the observer.

27. A cylinder of 40mm diameter and axis height 60mm is resting with its ends of the base diameter on HP. The axis of the cylinder is inclined at 30° to the HP and appears to be inclined at 45° to VP. Draw the projections.

28. A cone of base diameter 50mm and axis 80mm lies on HP with its axis inclined at 45° to HP and appears to be inclined at 30° to the VP in the top view. Draw the top and front views of the cone.

29. A right cylinder is 50mm diameter of base and height 70mm. It rests such that the axis is **inclined at 30° and 45° to HP and VP respectively**. Draw the top and front views.

30. A cone of base 80mm diameter and height 100mm is lying with one of its generators on HP and its axis appears to be inclined at 40° to VP in the top view. Draw its front and top views.

31. Draw the projections of a pentagonal prism 20mm side of base and axis 40mm long resting on a corner such that two base edges passing through it make equal inclinations with HP and its base is inclined at 60° to HP, and the axis appears to be inclined at 30° to VP in the top view.

32. Draw the top and front views of a rectangular pyramid of sides of base 20x25mm and height 35mm when it lies with one of its triangular faces containing the longer edge of the base on HP. This longer edge of the base containing the triangular face lying on HP is inclined at 60° to VP in the top view with the apex of the pyramid nearer to VP.

33. A pentagonal pyramid 20mm side of base of 35mm altitude rests with one of its corners on HP such that the two base edges passing through the corner on which it rests make equal inclinations with HP. The axis is inclined at 45° to VP and 30° to HP. Draw the top and front views of the pyramid.

34. A hexagonal pyramid, base 30mm side and axis 60mm long has one of its slant edges on HP such that two of its triangular faces containing the slant edge on which it rests are equally inclined to HP. The top view of the axis appears to be inclined at 45° to VP. Draw its projections when its base is nearer to the observer than its apex.

35. A cone of base 60mm diameter and axis 80mm long rests on HP with its axis inclined 45° and 30° with HP and VP respectively. Draw the top and front views of the cone.

36. Draw the top and front views of a right cylinder of base 45mm diameter and 60mm long when it lies on HP, such that its axis is inclined at 30° to HP and the axis appears to be perpendicular to the VP in the top view.

LEVEL:APPLICATION

(15 Marks Questions)

1. A vertical square prism, side of the base 30mm and altitude 60 mm rests with its base on HP such that one of its rectangular faces makes an angle of 30° to VP. The prism is cut by a section plane perpendicular to VP and inclined at 60° to HP. The cutting plane bisects the axis of the prism. Develop the lower portion of the lateral surfaces of the prism.

2. A pentagonal prism 20 mm side of the base and height 55 mm stands vertically such that one of its rectangular faces is parallel to VP and nearer to it. Prism is cut by a cutting plane which is perpendicular to VP, inclined at 60° to HP and passes through one of the extreme corners of the top face of the prism. Develop the lower portion of the lateral faces of the prism so as to produce a one-piece development.

3. A vertical cylinder of base diameter 80 mm and axis length 100 mm is cut by a section plane perpendicular to VP and inclined at 45° to HP. Vertical trace of the section plane passes through the top end of one of the extreme generators. Develop the lower portion of the lateral surface of the cylinder.

4. A square pyramid of 30 mm side of the base and height 50 mm rests with its base on HP with one of the edges of the base parallel to VP. It is cut by a section plane perpendicular to VP and inclined at 45° to HP and bisecting the axis. Draw the development of the truncated pyramid.

5. A vertical cone 40 mm diameter of base and height 50 mm is cut by a section plane perpendicular to VP and inclined at 30° to HP so as to bisect the axis of the cone. Draw the development of the lateral surface of the truncated cone.

6. A pentagonal pyramid of side of base 30 mm and axis length 60 mm is resting on its base on HP with an edge of the base perpendicular to VP. It is cut by a section plane perpendicular to VP and parallel to HP and meets the axis at a distance of 30 mm from the vertex. Draw the development of remaining portion of the pyramid.

7. Draw the development of lower portion of a hexagonal pyramid of side 30 mm and height 60 mm resting on HP such that two of its base edges are perpendicular to VP. It is cut by a section plane perpendicular to VP and inclined at 40° to HP.

8. The frustum of a square pyramid has the following dimensions:
   i)   Side of the bottom square = 50 mm
   ii)   Side of the top square = 25 mm
   iii) Height of the frustum = 70 mm.
   Draw the development of lateral surface of the pyramid.

9.Develop the lateral surface of the funnel shown in the figure:
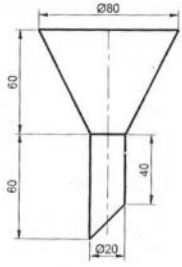
9. Draw the development of the tray shown in figure:
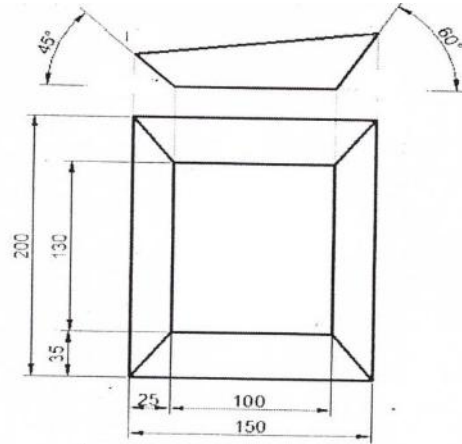
CO 3:DRAW ORTHOGRAPHIC VIEWS OF GIVEN MACHINE COMPONENT.

LEVEL:APPLICATION

(15 MARKS QUESTION)

.Draw the three principal views of the component as shown in the figure.
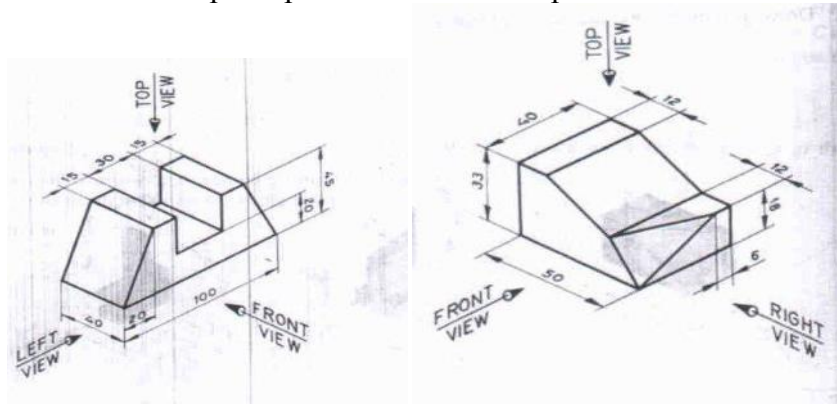
FIG-1   **FIG-2**
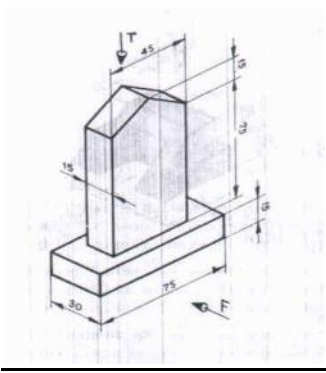
FIG-3
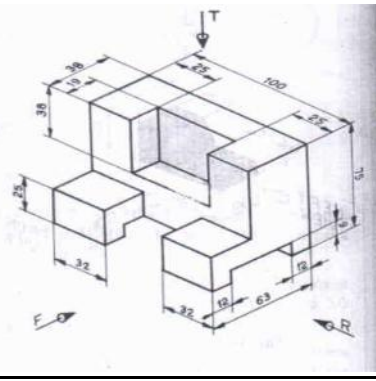
FIG-4
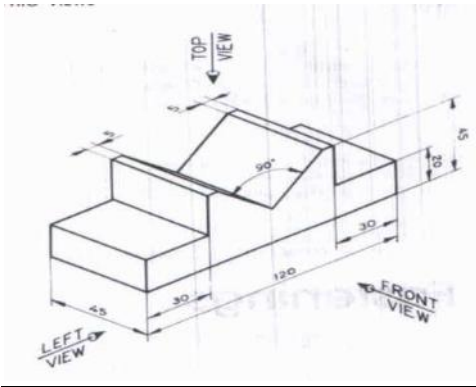
FIG-5
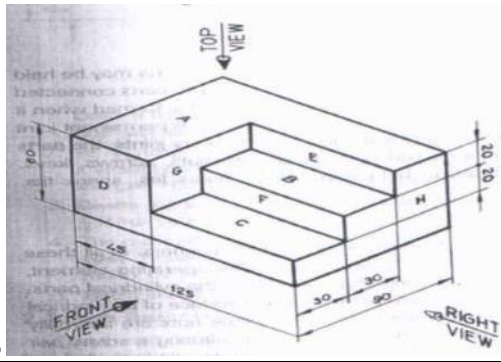
FIG-6
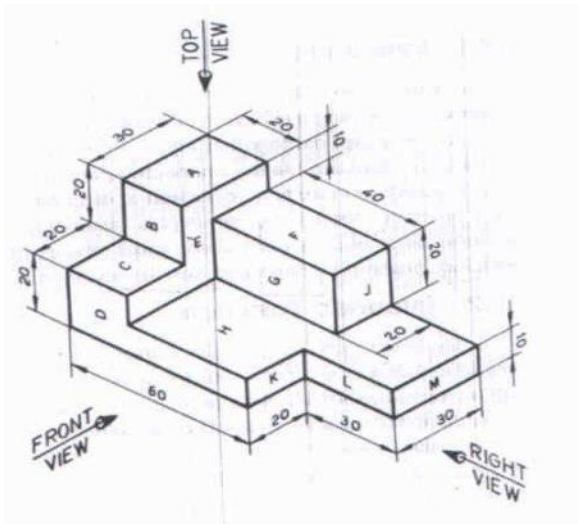
FIG-7
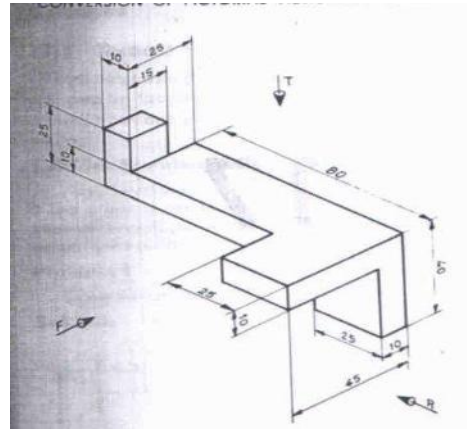
FIG-8
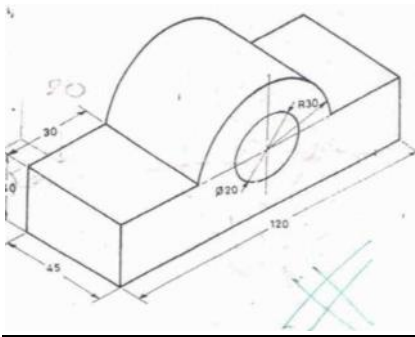
FIG-9
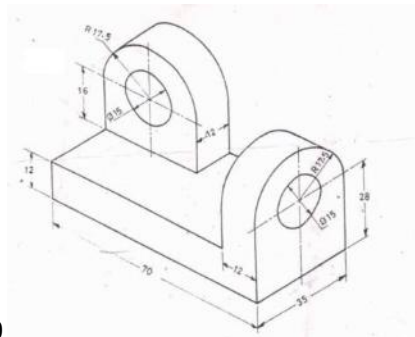
FIG-10
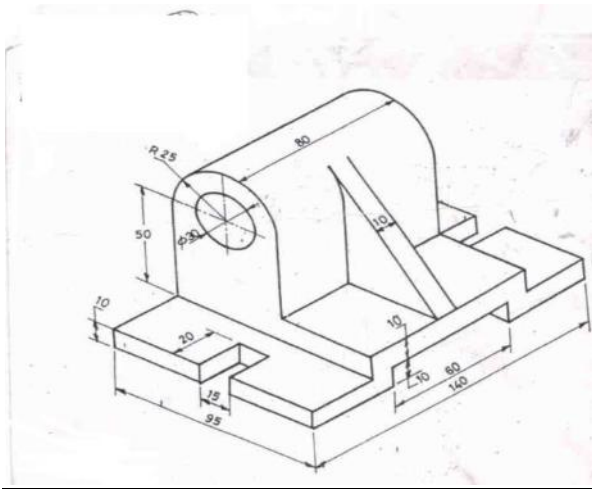
FIG-11
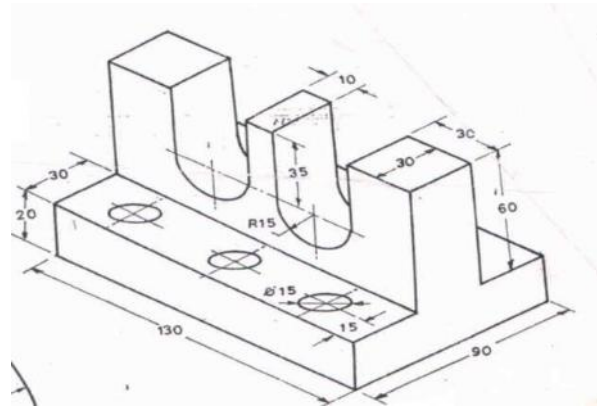
FIG-12
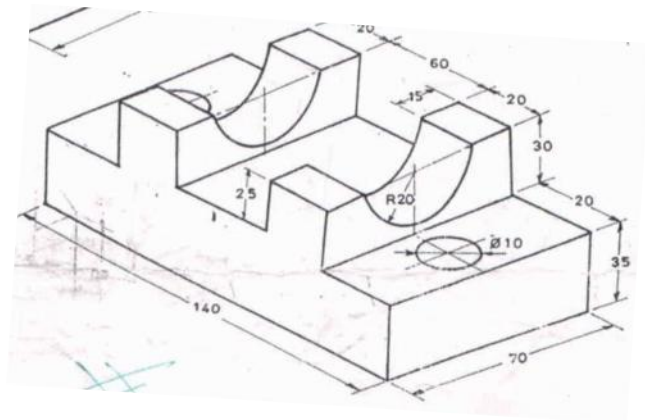
FIG-13
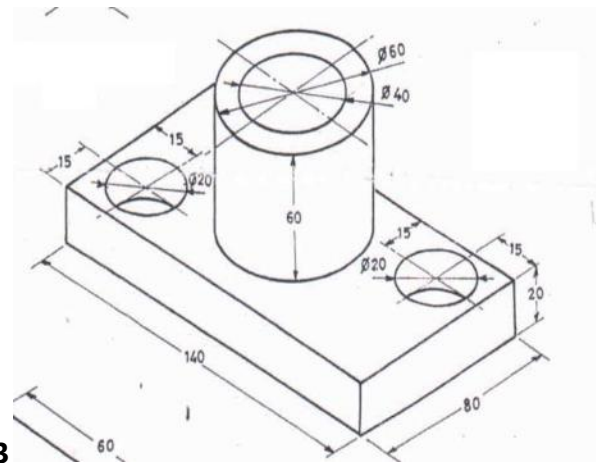
FIG-14
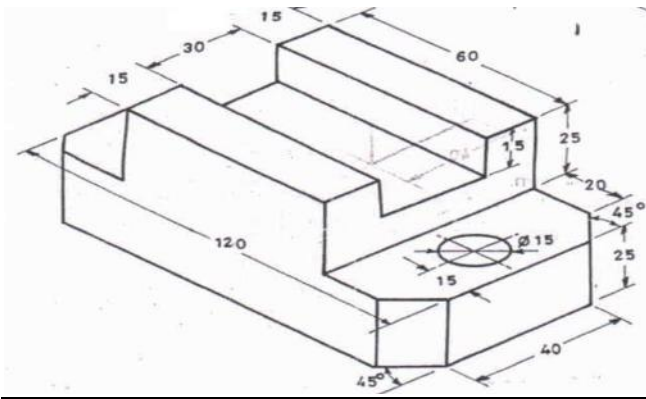
FIG-15
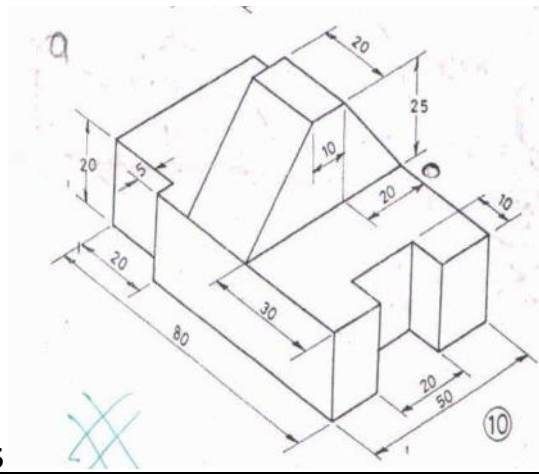
FIG-16

ALL DIMENSIONS ARE IN MM

LEVEL:APPLICATION

(15 MARKS QUESTION)

.Draw the isometric view of the machine component whose orthographic views are given below:
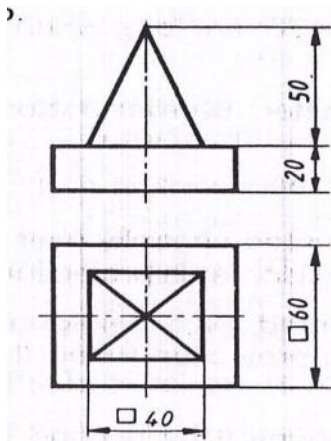
FIG-1   **FIG-2**   **FIG-3**
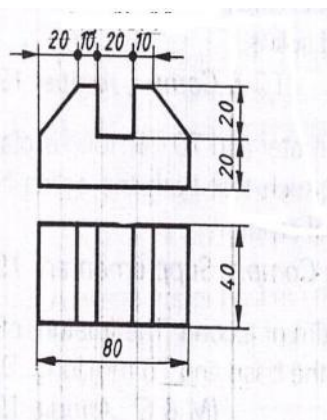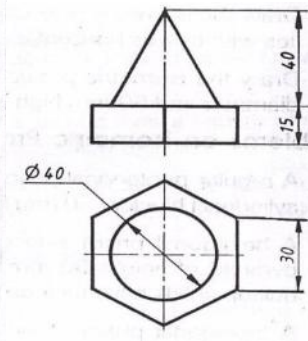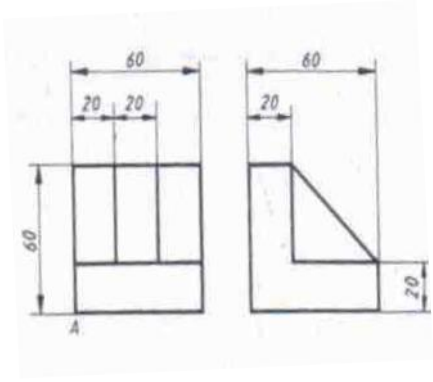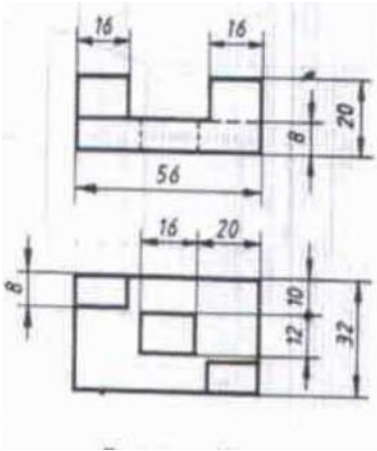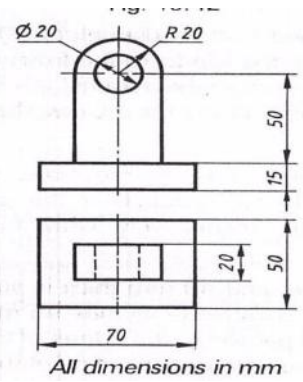
FIG-4   **FIG-5**   **FIG-6**
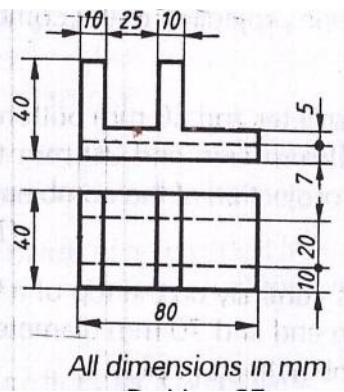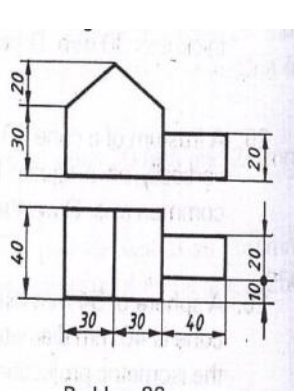
FIG-8   **FIG-9**
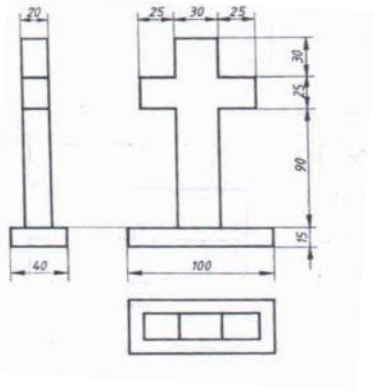
FIG-7
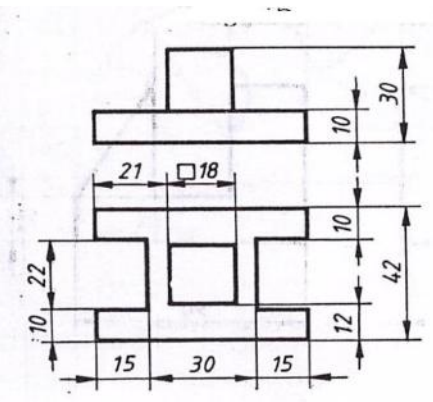
FIG-10FIG-11   **FIG-12**
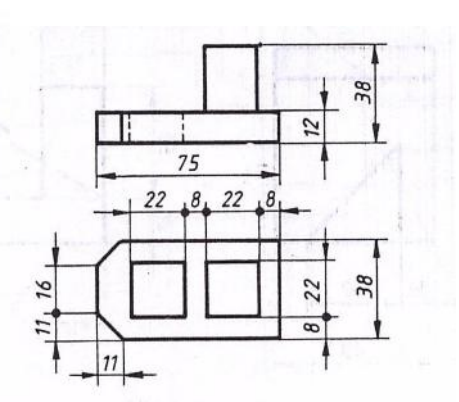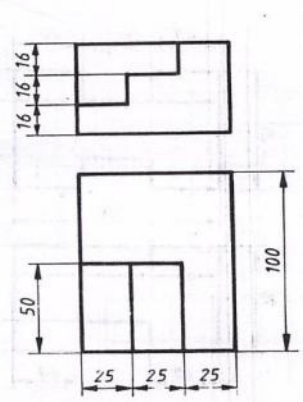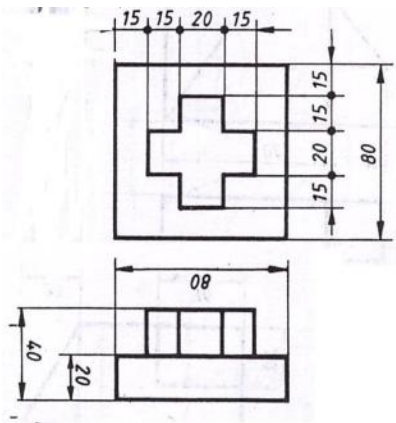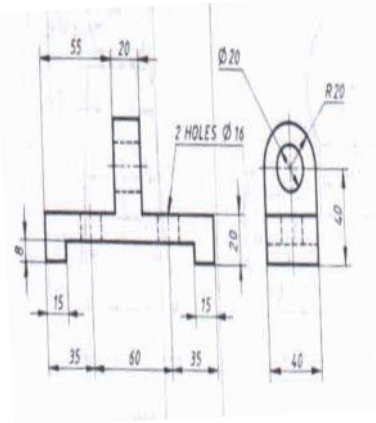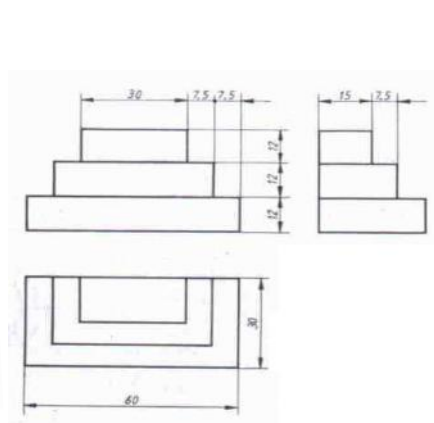
FIG-13   **FIG-14**   **FIG-15**
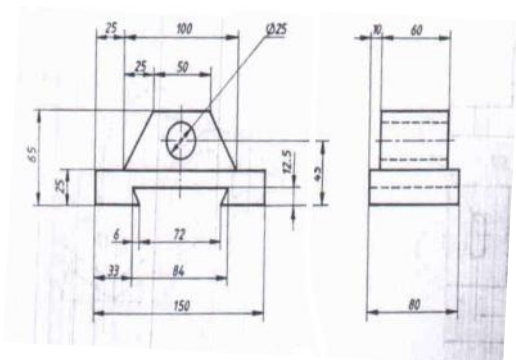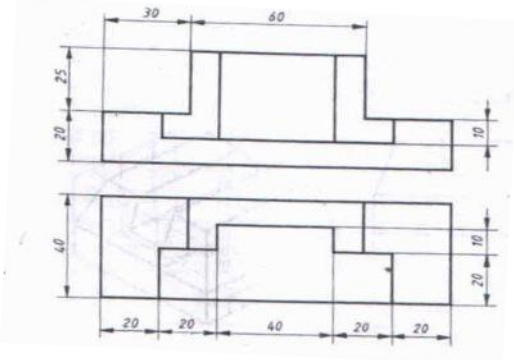
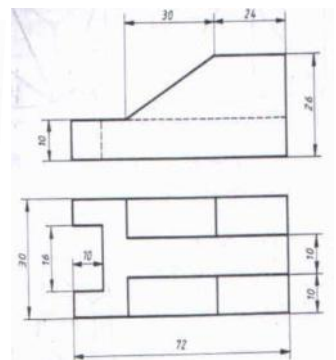**FIG-16FIG-17**   **FIG-18**

FIG-19   **FIG-20**
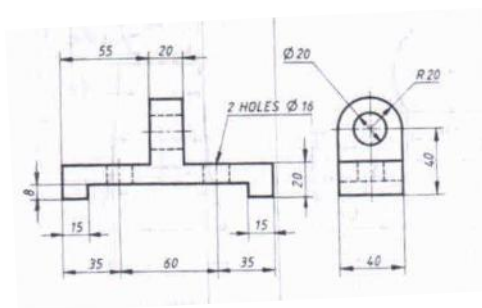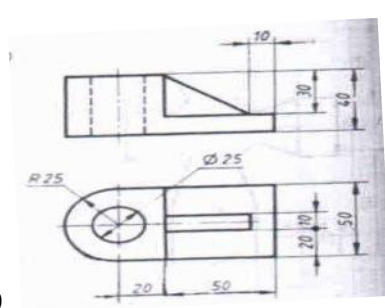
21. Draw the isometric view of a frustum of a cone of 40 mm top diameter, 80 mm bottom diameter and 60 mm height.
22. A cube of side 30 mm rests centrally on the top of another cube of side 60 mm. Draw the isometric view of the solid.
23. A square pyramid of base edge 50 mm and height 80 mm rests on the top of the cube of side 100 mm. Two sides of the base of the pyramid are parallel to the top edges of the cube. Draw the isometric view of the solid.
24. A cylindrical block of 40 mm diameter and length 50 mm is resting vertically on the centre of the cube of 70 mm side. Draw the isometric view of the combination of solids.

25. A square pyramid of base side 22 mm and height 20 mm rests centrally on the top of a cylinder of base diameter 40 mm and height 30 mm.