Government of Karnataka
Department of Collegiate and Technical Education
Board of Technical Examinations, Bangalore

Course Code	20ME12P	Semester	I/II
Course Title	**Computer Aided Engineering Drawing**	Course Group	Mechanical and Allied courses
No. of Credits	4	Type of Course	Lecture & Practice
Course Category	PC	78Hrs Per Semester (L:T:P)= 1:0:2	6Hrs Per Week
Prerequisites	Enthusiasm to learn the subject/Visualizing/Creativity	Teaching Scheme	Practical
CIE Marks	60	SEE Marks	40

1. COURSE RATIONALE:

Engineering Drawing is an effective language of engineers. It is the foundation block which strengthens the engineering & technological structure. Moreover, it is the transmitting link between ideas and realization.

2. LIST OF COMPETENCIES:

The course content should be taught and implemented with the aim to develop different types of skills leading to the achievement of the following competencies:

1. Prepare engineering drawings both manually and using CAD with given geometrical dimensions using prevailing drawing standards and drafting instruments.
2. Visualize the shape of simple object from orthographic views and vice versa

3. COURSE OUT COMES:

CO1	Able to use drawing instruments and Adopt the standards, dimensioning and construct appropriate drawing scales, in technical drawing development.
CO2	Able to draw the projections of objects in all planes and learn displaying techniques for graphical communication in design process.
CO3	Able to Sketch orthographic projections into isometric projections and vice versa.
CO4	Use computer software and Apply computer aided drafting tools to create 2D /3 D engineering drawings

4. INSTRUCTIONAL STRATEGY:

1. Teacher should show model of real of the component/part whose drawing is to be made. Emphasis should be given on cleanliness, dimensioning and layout of sheet.
2. Focus should be on proper selection of drawing instruments and their proper use.
3. The institute should procure AutoCAD or other engineering graphics software for practice in engineering drawings.
4. Separate labs for practice on Engineering graphics Software should be established.

5-a CONTENTS:

The following topics/sub topics is to be taught and assessed in order to develop Unit Skill sets for achieving CO to attain identified skill sets

5-b COURSE CONTENT DETAILS:

Unit	Major Learning Topics and Sub- Topics	Outcomes (in cognitive domain)	Hours L-T-P

UNIT-1 Basic elements of Drawing	1.1 List the different drawing instruments and application
	1.2 Convention of lines and its application (Thick, Thin, Axis etc.,)
	1.3 Practice use of drawing instruments
	1.4 Representative fraction
	1.5 Scales - Full Scale, Reduced Scale and Enlarged Scale
	1.6 Dimensioning
	  a. Aligned system and Unidirectional system in the Sketches
	  b. Chain dimensioning and Parallel dimensioning
	1.7 Construct different polygons
		1. Drawing equipments, instruments and materials.
		2. Equipments-types, specifications, method to use them, applications.
		3. Instruments-types, specifications, methods to use those and applications.
		4. Pencils-grades, applications, Different types of lines.
		5. Scaling technique used in drawing.
		6. Dimensioning methods.- Aligned method. Unilateral with chain, parallel dimensioning.
		7. Constructions of geometrical figures
			4-0-8

UNIT-2 Introduction to Projections	2.1 Introduction to Projections-Principle Planes of Projection and Principle Views 2.2 Introduction to First angle and Third angle method, their symbols 2.3 Projection of points in All 4 Quadrants	1. Reference planes, orthographic projections. 2. Concept of quadrant, 1st angle and 3rd angle projection and their symbols. 3. Projection of points.	**8-0-16**

	2.4 Projection of Lines
	  a) Parallel to both the planes
	  b) Parallel to one and Perpendicular to another
	  c) Parallel to one and Inclined to another
		1. Projection of lines determination of true length and inclinations for following cases.
		(a) Line parallel to one or both the plane.
		(b) Line perpendicular to one of the plane.
		(c) Line inclined to one plane and parallel to another.	

	2.5 Projection of plane surfaces.
	  a) Parallel to one plane and Perpendicular to other two
	
	  b) Planes Perpendicular to one plane and inclined to the other
	(Resting on Edge, Corner, Inclined to HP And VP)
		1. Projection of Planes.
		(a) Types of planes.
		(b) Projection of planes parallel to one of the reference planes.
		(c) Projection of plane inclined to one reference plane and perpendicular to another.
		Note:
		Triangle, Square / rectangle, pentagon, hexagon and circle shape should be included in various plane problems.	

	2.6 Projection of Solids for the above conditions	1. Projections of solids in various positions with respect to the reference planes. (Parallel, perpendicular and inclined to HP and / or VP.)	
UNIT-3 EXPOSURE TO CAD	3.1 Introduction to CAD- Hardware requirements. 3.2 Various CAD software available 3.3 Familiarization of CAD window - Commands like New file, Saving the file, Opening an existing drawing file, Creating templates 3.4 Setting up new drawing: Units, Limits, Grid, Snap. Standard sizes of sheet. 3.5 Selecting Various plotting parameters such as Paper size, paper units, Drawing orientation, plot scale, plot offset, plot area, print preview 3.6 Draw basic entities like Line, Circle, Arc, Polygon, Ellipse, Rectangle, Multiline, Dimensioning, Inserting text Applying constraints - horizontal, vertical, parallel, concentric, perpendicular, symmetric equal, collinear 3.7 Insert title block for the drawing and take the Print out 3.8 Create objects by applying constraints and convert the objects to full scale , reduced scale and enlarged scale 3.9 Apply copy, mirroring, array, fillet and trim on the object created	1. Computer graphics & its terminology. 2. CAD definition, concept & need. 3. Commands used in CAD 4. Functional areas of CAD. - Coordinate systems. 5. Familiarization of Cad commands 6. Draw simple Geometrical figures using CAD	3-0-6

UNIT-4 Orthographic projections	4.1 Introduction to orthographic, Isometric projections 4.2 Conversion of pictorial view into Orthographic Views (USING SKETCH BOOK AND CAD)	1. Types of projections-orthographic, isometric projections: concept and applications. 2 Various term associated with orthographic projections. (a) Theory of projection. (b) Methods of projection. (c) Orthographic projection. (d) Planes of projection. 3. Conversion of simple pictorial views into Orthographic views. Illustrative problems on orthographic projection. Note : (1) Problem should be restricted up to - Front view/Elevation, Top view/Plan and Side views only. Use First Angle Method only.	2-0-4
UNIT-5 Isometric projections	5.1 Introduction to Isometric Projections 5.2 Isometric Scales and Natural Scale 5.3 Isometric View and Isometric Projection 5.4 Conversion of Orthographic Views into Isometric (USING SKETCH BOOK AND CAD)	1. Isometric axis, lines and planes. 2. Isometric scales. 3. Isometric view and isometric drawing. 4. Difference between isometric projection and isometric drawing. 5. Illustrative problems limited to Simple elements	2-0-4
UNIT-6 CAD Drafting	6.1 Draw different types of 2D/3D modeling entities using viewing commands, to view them (Problems solved in chapter no 3 and 4 i.e Orthographic, isometric projection). 6.2 2D/3D modeling for Thread profiles,nuts,bolts,studs,setscrews,washer,Locking arrangements. (USING CAD)	1 Difference between 2D & 3D models. 2.2D/3D modeling – concept, Simple objects	7-0-14
		TOTAL	**26-0-52**

6. LIST OF PRACTICAL EXERCISES:

The exercises/practical/experiments should be properly designed and implemented with an attempt to develop different types of skills leading to the achievement of the competency. Following is the list of exercises/practical/experiments for guidance.

Sl. No	Unit No	Practical Exercises (Outcomes in Psychomotor Domain)	Hours
1	1	1. Teacher will demonstrate a: Use of a. Drawing instruments. b. Planning and layout as per IS. c: Scaling technique.	1-0-2

		2. Draw following. Problem – 1 Drawing horizontal, vertical, 30 degree, 45 degree, 60 & 75 degrees lines using Tee and Set squares/ drafter.(Drawing sheet)	
		Problem – 2 Indicate different convention of lines on the drawing. .(Drawing sheet)	1-0-2
		Problem – 3 Copy the sketch to the required scale and dimensioning adopting right system and positioning of dimensions using Tee and Set squares / drafter.(Drawing sheet)	1-0-2
		Problem 4. Draw regular geometric constructions Pentagon, Hexagon, Square, circle, Triangle and other shapes. .(Drawing sheet)	1-0-2
2	2	First angle Projection symbol Problem 5: Draw Projection of points in 1ˢ , 2nd ,3 ᵈ and 4 Quadrants.(Drawing sheet)	2-0-4

		Problem 6: Draw Projection of Lines
		    a) Parallel to both the planes
		    b)Parallel to one and Perpendicular to another
		    c) Parallel to one and Inclined to another. .(Drawing sheet)
			1-0-2

		Problem 7: Draw Projection of plane surfaces.
		    a) Parallel to one plane and Perpendicular to other two
		       (Resting on Edge, Corner, Inclined to HP And VP)
			1-0-2

		Problem 8: Planes Perpendicular to one plane and inclined to the other (Resting on Edge, Corner, Inclined to HP And VP) (Drawing sheets)	1-0-2
2	2	Problem 9: Draw Projection of Solids for the above conditions (Resting on Edge, Corner, Inclined to HP And VP) (Drawing sheet)	3-0-6
3	3	Use of CAD commands , plotting the drawing	1-0-2
		Problem 10:Drawing basic entities : Circle, Arc, Polygon, Ellipse, Rectangle, Multiline	1-0-2
		Applying constrains draw basic entities Insert title Block (CAD Drawings and Printout)	1-0-2
4	4	Problem 11: Draw Orthographic views for the given object. (Sketch book and CAD Drawing)	2-0-4
5	5	Problem 12: Draw Isometric projections for the given Orthographic views (Sketch book and CAD Drawing)	2-0-4
6	6	Problem 13:Produce Orthographic (2D) Drawings in CAD-Chap 3 Problem 14:Produce Isometric and 3D Drawings in CAD – Chap 4(CAD Drawings and Printout)	5-0- 10
		Problem 15:create 3D models of Mechanical Elements such as Hexagonal headed bolt, Simple toy, ball bearing (CAD Drawings and Printout)	2-0-4
		TOTAL	26-0-52

Note: Use both sides of sheet. For example, draw sheet number 2 on back side of sheet number 1, 4 on back of 3, and likewise.

1 Theory & practice should be in first angle projections and IS codes should be followed wherever applicable.
2   The dimensions of line, axes, distances, angle, side of polygon, diameter, etc. must be varied for each student in batch so that each student will have same problems, but with different dimensions.
3 The sketchbook has to contain data of all problems, solutions of all problems and student activities performed.
4 Students' activities are compulsory to be performed. A hand out containing applicable standards from IS codes including title block as per IS standard should be given to each student by concerned teacher.
5   End Semester Examination will be conducted in practical mode for 100marks and wieghtage is reduced for 40 marks.
6 Students are to be assessed for competencies achieved.

7.SUGGESTED LIST OF STUDENT ACTIVITIES:

SL.NO.	ACTIVITY
1	Sketch the combinations of set squares to draw angles in step of 15°.(15°, 30°, 45°, 60°, 75°,90°,105°,120°,135°,150°,165°,180°).
2	Take two simple objects. Sketch isometric of them. Also draw orthographic projections of them (all views).
3	Take one circular shape. Assume one point on circumference and mark it. Roll that shape on flat and circular surface. Observe the path of point.
4	List at least two questions individually which you would like to ask for followings:
5	Prepare a 2D drawing using AutoCAD and 2D parametric sketcher environment.
6	Prepare 3D solid models using AutoCAD any on e mechanical component (Four components).

8. SUGGESTED LEARNING RESOURCES:

1. Bureau of Indian Standards. *Engineering Drawing Practice for Schools and Colleges IS: Sp-46.* BIS. Government of India, Third Reprint, October 1998; ISBN: 81-7061-091-2.
2. Bhatt, N. D. *Engineering Drawing.* Charotar Publishing House, Anand, Gujrat 2010; ISBN: 978-93-80358-17-8.
3. Jain &Gautam, Engineering Graphics & Design, Khanna Publishing House, New Delhi (ISBN: 978- 93-86173-478)
4. Jolhe, D. A. *Engineering Drawing.* Tata McGraw Hill Edu. New Delhi, 2010; ISBN: 978-0-07-064837-1
5. Dhawan, R. K. *Engineering Drawing.* S. Chand and Company, New Delhi; ISBN: 81-219-1431-0.
6. Shah, P. J. *Engineering Drawing.* S. Chand and Company, New Delhi, 2008, ISBN:81-219-2964-4.
7. Kulkarni, D. M.; Rastogi, A. P.; Sarkar, A. K. *Engineering Graphics with AutoCAD .* PHI Learning Private Limited-New Delhi (2010); ISBN: 978-8120337831.
8. Jeyapoovan, T. *Essentials of Engineering Drawing and Graphics using AutoCAD.* Vikas Publishing   HousePvt. Ltd, Noida, 2011; ISBN: 978-8125953005.
9. Autodesk. *AutoCAD User Guide.* Autodesk Press, USA, 2015.

10. Sham, Tickoo. *AutoCAD 2016 for Engineers and Designers* .Dreamtech Press; Galgotia Publication, New Delhi, 2015; ISBN 978-9351199113.

9.SOFTWARE/LEARNING WEBSITES :

1. https://www.youtube.com/watch?v=TJ4jGyDWCw
2. https://www.youtube.com/watch?v=dmt6_n7Sgcg
3. https://www.youtube.com/watch?v=_MQScnLXL0M
4. https://www.youtube.com/watch?v=3WXPanCq9LI
5. https://www.youtube.com/watch?v=fvjk7PlxAuo
6. http://www.me.umn.edu/coursesme2011/handouts/engg%20graphics.pdf
7. https://www.machinedesignonline.com

10.Mapping of Course Outcomes with Programme Outcomes (Suggestive only):

Course	CO's	Programme Outcomes (PO's)						
		1	2	3	4	5	6	7
Engineering Graphics	CO1	3	0	0	3	0	0	0
	CO2	3	0	0	3	0	0	0
	CO3	3	0	0	3	0	0	0
	CO4	3	0	0	3	0	0	0

Level 3- Highly Mapped, Level 2-Moderately Mapped, Level 1-Low Mapped, Level 0- Not Mapped
Method is to relate the level of PO with the number of hours devoted to the CO s which maps the given PO.
If ≥50% of classroom sessions related to the CO are addressing a particular PO, it is considered that PO is mapped at Level 3
If 30 to 50% of classroom sessions related to the CO are addressing a particular PO, it is considered that PO is mapped at Level 2
If 5 to 30% of classroom sessions related to the CO are addressing a particular PO, it is considered that PO is mapped at Level 1
If < 5% of classroom sessions related to the CO are addressing a particular PO, it is considered that PO is considered not mapped i.e. Level 0

11. COURSE ASSESSMENT AND EVALUATION CHART:

Sl. No	Assessment	Time frame in semester	Duration	Max marks	Conversion
1.	Portfolio Evaluation of Drawings(Manual Drawings - drawing sheet mode)	**Semester**	-	20	**20**
2	Skill Test-1 (unit 1 and 2- Manual based)	At the end of 6 week	3 Hrs	100	**Skill tests-1 is to be reduced to wieghtage of 20**
3	Skill Test-2 (Skill test 2 is of CAD based from Unit 4,5)	At the end of 9 week	3 Hrs	100	**Average of two skill tests 2 and 3 (Both skill tests are to**
4	Skill Test-3	- At the end of 13 week	3 Hrs	100	

	(Skill test 3 is CAD based-Unit 6)				be reduced to wieghtage of 20 independently) 20
5	Total Continuous Internal Evaluation (CIE) Assessment				60
6	Semester End Examination(SEE) Assessment conducted for 100 marks, finally reduced to 40 marks wieghtage	3 Hrs	100		40
				TOTAL	100

Scheme of Valuation for End Examination

SL NO	QUESTIONS	MARKS
1.	One Problems from Geometrical constructions/Projection of points (Answer Sheet)	25
	OR	
	One Problems from Projection of lines (Answer Sheet)	25
2.	One Problems from Projection of planes (Answer Sheet)	25
	OR	
	One Problems from Projection of solids (Answer Sheet)	25
3	Create 3D drawing for the given Sketch and Dimensioning(CAD)	40+10=50
	TOTAL	100

12.CAD Laboratory and Other Requirements to Conduct Engineering Graphics Course

1. Latest Configuration Computers which can be able to run latest any Computer Aided Drafting Software. (At least One Computer per student in practical session.)-20 no
2. Any latest Authorized Computer Aided Drafting Software (20 user licenses)
3. Plotter of size A2/A3
4. LCD Projector

MODEL QUESTION BANK (Suggestive only)

1. a) Illustrate the elements of dimensioning with the help of a sketch.

    b) Illustrate the dimensioning of given common features: diameter, radius, chord, Arc and angle.

2. a) Mention the uses of the following drawing instruments.

    i) T-square ii) Set square iii) Bow compass iv) Clinograph v) Minidrafter

    b) Mention the uses of the following drawing instruments.

    i) French curves ii) Protractor iii) Clips iv) Erasing Shield v) Drafting machine

3. Define RF. Mention the types of scales based on RF.

4. Draw the conventional representation of lines

5 Draw six horizontal parallel lines of 50 mm long with 10 mm intervals (Fig 1).

6 Draw six vertical parallel lines of 50 mm length with 10 mm intervals (Fig 2)
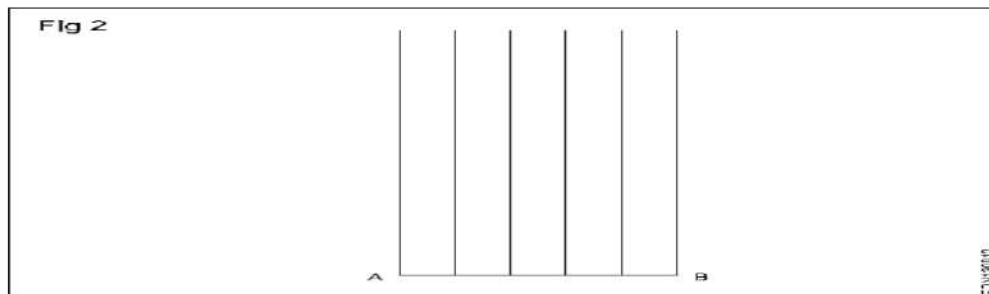
7 Draw 45° inclined lines (Fig 3).
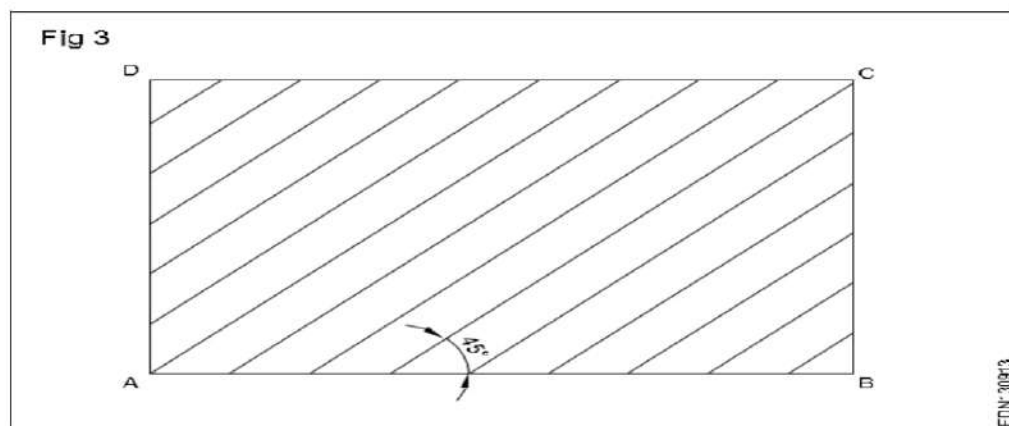
8 Draw the given types of lines using 0.5 range thickness of line according to the specification (Fig 4)

Fig 4
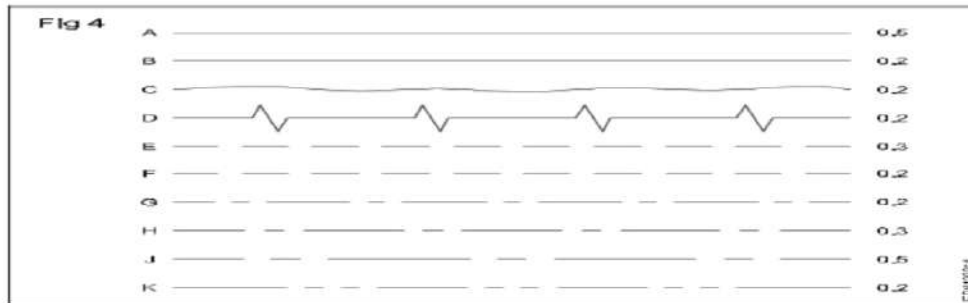
Draw the following Exercises in A4 sheet (Fig 5).
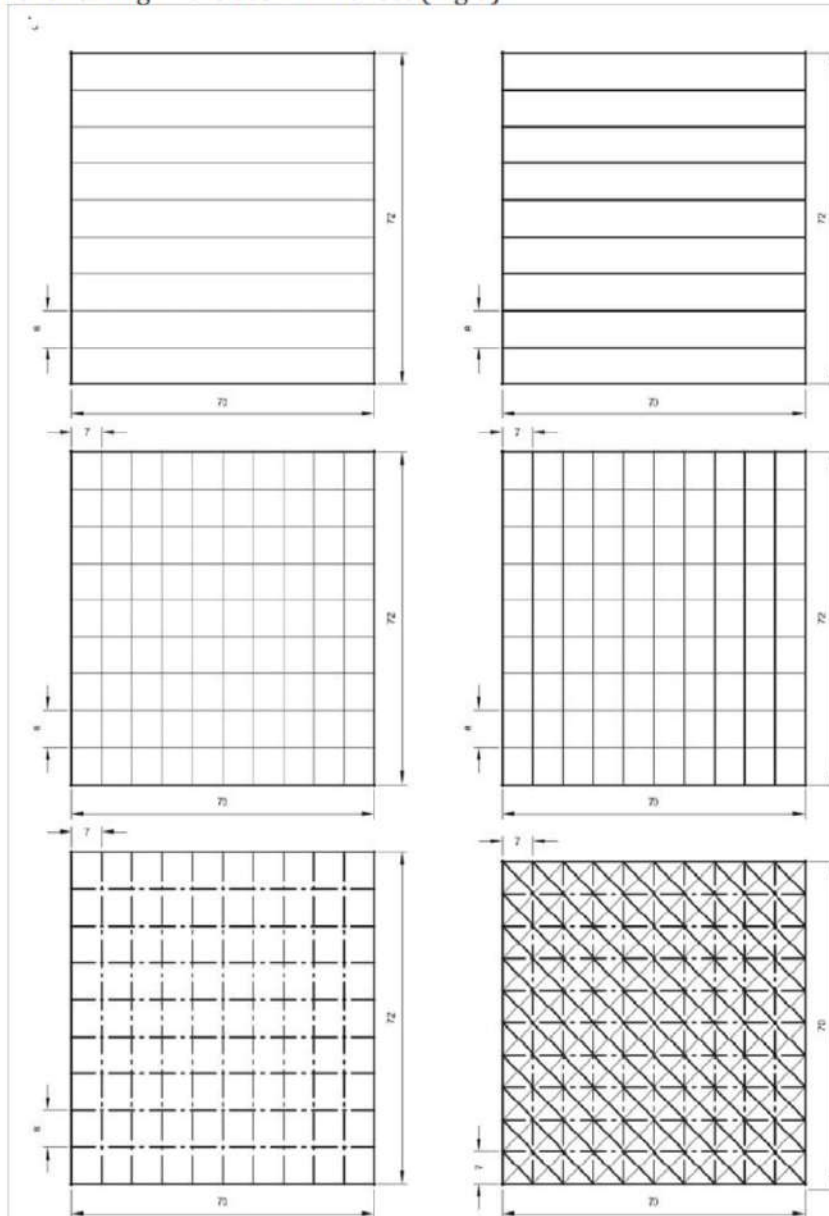
10 Draw the pattern drawing given Figure1,2,3

Fig 1

SQ 60

45°

40

SQ80

Fig 2

SQ 70

ALL RECTANGLES 20 x 10

Fig 3

15   20   5   10   20

20   5   45

85
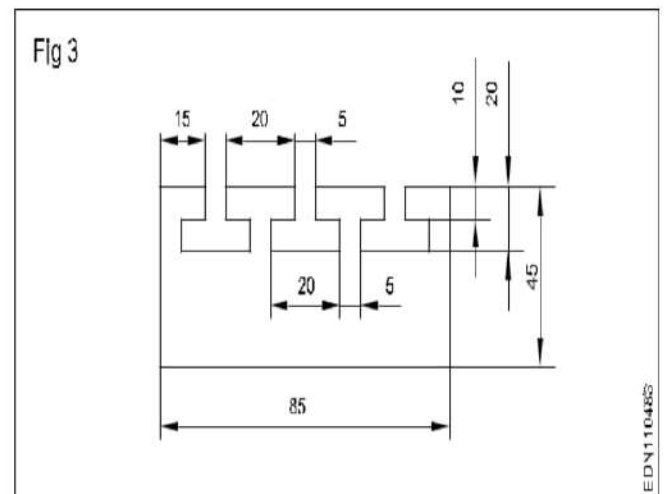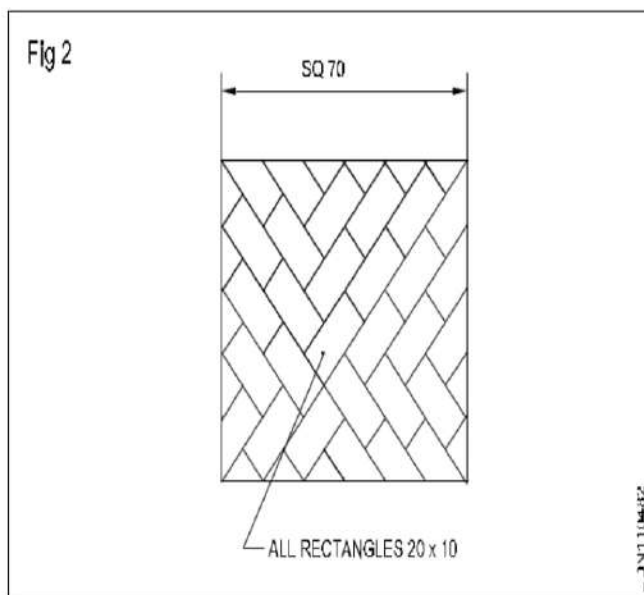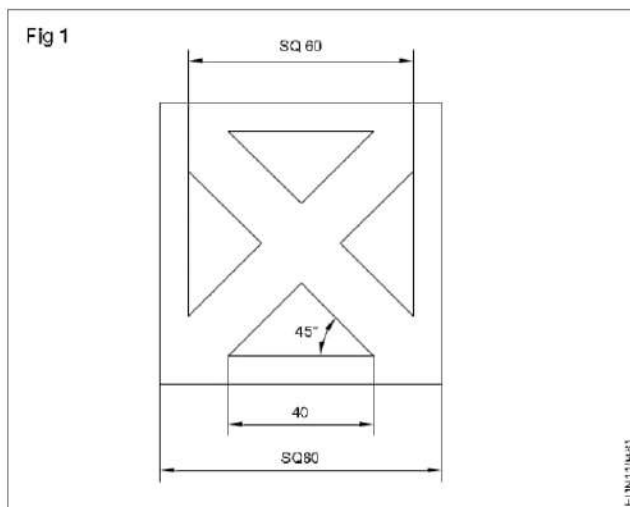
11 a) Illustrate the elements of dimensioning with the help of a sketch.

b) Illustrate the dimensioning of given common features: diameter, radius, chord, Arc and angle.

12 Copy the sketch to 1:1 scale and dimension it using Aligned system.
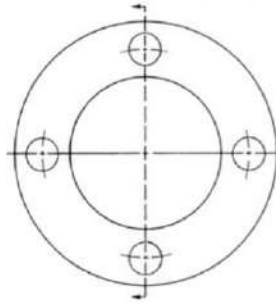
13 Copy the sketch to 1:1 scale and dimension it using unidirectional system with Parallel dimensioning method.
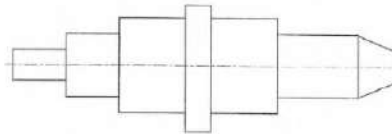
14 Copy the sketch to 1:1 scale and dimension it using Aligned system with Chain dimensioning method.
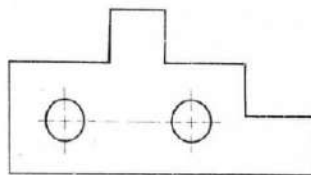
15 Copy the sketch to 1:1 scale and dimension it using Aligned system with Parallel dimensioning method.
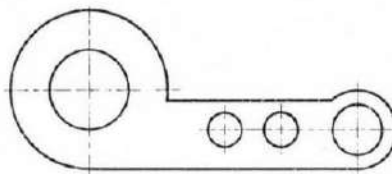
16 Copy the sketch to 1:1 scale and dimension it using unidirectional system with Chain dimensioning method
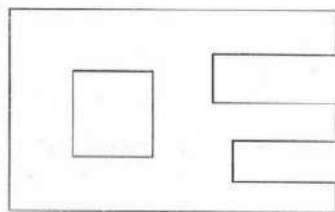
17 Copy the sketch to 1:1 scale and dimension it using unidirectional system with Parallel dimensioning method.
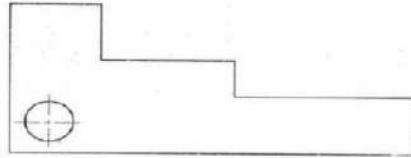
15 Copy the sketch as shown in figure below   dimension it in a Chain and parallel dimensioning

Fig 5
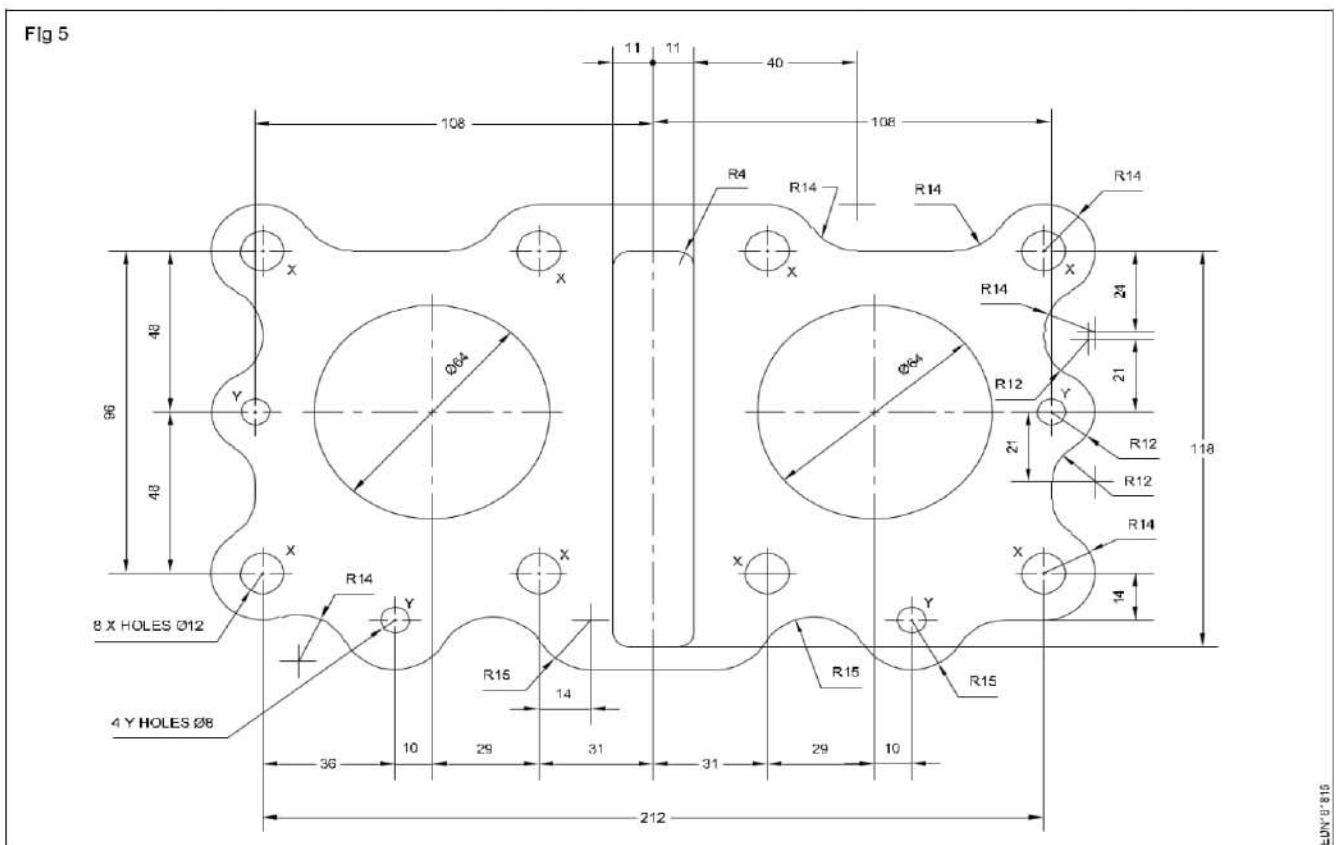
UNIT 2 PROJECTIONS

PROJECTIONS OF POINTS

Draw the symbolic representation of First and Third angle projection method.

1. Draw the projections of the following points:
    i.   A is 25mm above the HP and 30mm in front of the VP.
    ii.   B is lying on HP and 45mm in front of VP.
    iii. C is lying on VP and 50mm above HP.
    iv.   D lies in both HP and VP.
2. A point P is 40 mm in front of VP; 50 mm above HP and 30 mm in front of left PP. Draw the three principal views of the point.
3. A point Q is 30mm in front of VP, 40mm above HP and 35mm in front of right PP. Draw the three principal views of the point.
4. Draw the projections of the following points on a common reference line:

    a)Point P is 25mm above the HP and 40mm behind the VP
    b)Point Q is 30mm below the HP and 40mm behind the VP
    c) Point R is 25mm above the HP and in the VP.
    d)Point S is 30mm below the HP and in the VP
    e)Point T is 35mm in front of the VP and in the HP.

PROJECTIONS OF LINES

1. Draw the three views of a line 70mm long when it is parallel to both HP and VP. The line   is 20mm in front of VP and 30mm above HP.
1. Draw the three views of a line 80mm long is perpendicular to VP and parallel to HP. The end nearer to VP is 20mm above HP and 25mm in front of VP.
2. Draw the projections of a line 80mm long placed parallel to VP, perpendicular to HP. The line is 70mm in front of VP and 60mm in front of right PP. the lower end of the line is 30mm above HP. (Ref: KRG Ed 2018 P151)
3. Draw the projections of a line 80mm long placed parallel to HP, perpendicular to VP with the rear end of the line 30mm in front of it. The line is 55mm above HP and 50mm in front of the right PP. (Ref: KRG Ed 2018 P152)
4. Draw the three principal views of a line 80 mm long placed parallel to VP and perpendicular to HP. The line is 70mm in front of VP and 60mm in front of right PP. The lower end of the line is 30mm above HP.
5. Draw the three principal views of a line 80 mm long when it is placed parallel to both HP & VP. One of the ends of the line is 70 mm above HP, 60 mm in front of VP and 30mm in front of the right PP.
6. A line AB 80 mm long is inclined at 30° to HP and parallel to VP. The line is 90 mm in front of VP. The lower end A is 35 mm above HP,110 mm in front of the right PP and is away from it than the higher end. Draw the three principal views of the line.
7. Draw the projections of a line AB, 80 mm long inclined at 30° to HP and parallel to VP. The line is 40 mm in front of VP. The lower end A is 20 mm above HP.

PROJECTIONS OF PLANE SURFACE

1. A regular triangular lamina of side 30mm is placed with one its corner on HP such that the surface is inclined at 40° to HP and perpendicular to VP. Draw its Top and Front views.
2. A regular square lamina of side 40mm is placed with one its side on HP such that the surface is inclined at 30° to HP and perpendicular to VP. Draw its Top and Front views.
3. A regular pentagonal lamina of side 30mm is placed with one its side on HP such that the surface is inclined at 45° to HP and perpendicular to VP. Draw its Top and Front views.
4. A regular hexagonal lamina of side 30mm is placed with one its corner on HP such that the surface is inclined at 45° to HP and perpendicular to VP. Draw its Top and Front views.
5. A circular lamina of 40mm diameter lies on HP such that its surface is inclined at 40° to HP. Draw its front and top.
6. **An equilateral triangular lamina of side 40mm rests with one its sides on HP so that the surface of the lamina is inclined at 30° to HP. The side on which the lamina rests is inclined at 45° to VP. Draw the projections of the lamina.**
7. An equilateral triangular lamina of sides 30mm is resting with one of its corners on HP. The surface of the lamina is inclined at 45° to HP and the side opposite to the corner on which the lamina rests is inclined at 45° to VP. Draw the projections of the lamina.
8. A square lamina of 40mm side rests with one of its sides on HP so that the surface of the lamina is inclined at 30° to HP. The side on which the lamina rests is inclined at 45° to VP. Draw the top and front views of the square lamina in this position.
9. A square lamina of 40mm sides rests with one of its corner on HP. The diagonal passing through this corner is inclined at 45° to HP and appears to be inclined at 45° to VP. Draw its projections.

PROJECTIONS OF SOLIDS

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 prism is inclined at 30° with HP. Draw the top and front views when the axis of the prism is parallel to VP.
2. A square prism of base edge 40mm and height 70mm 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 top and front views, 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 top and front views.
5. A triangular pyramid of base edge 40mm and height 65mm is resting with one of its base corner on HP so that the axis of the pyramid is parallel to VP and inclined at 45° to HP. Draw the top and front views.
6. Draw the top and front views of a hexagonal pyramid resting with one of its base corner on HP such that the axis of the pyramid is inclined at 30° to HP. The hexagonal pyramid has its base edges as 30mm and axis height as 60mm.
7. A pentagonal pyramid of base edge 30mm and axis height 65mm rests with one of its base corners on HP so that the base of the pyramid is inclined at 45° to the HP. Draw the projections if the axis of the pyramid is parallel to the VP.

8. 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 top and front views.

9. A cone of 40mm diameter and axis height 65mm is resting with points of the circumference on HP. Draw the top and front views, if the axis of the cone is inclined at 30° with HP and parallel to VP.
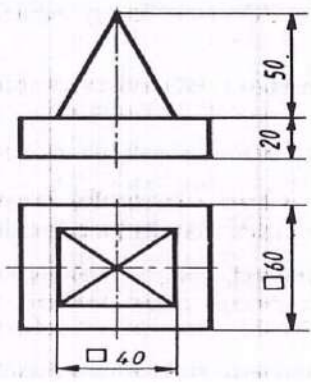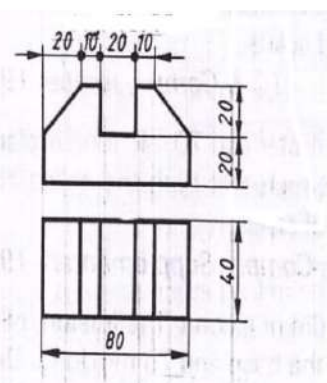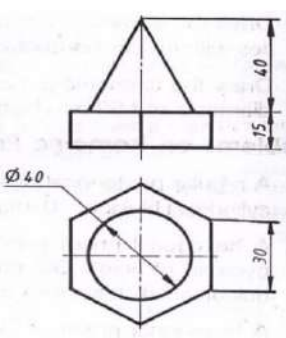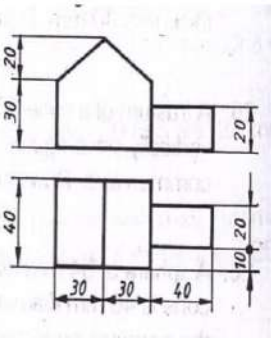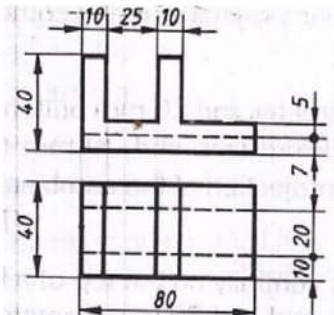
UNIT 3 ORTHOGRAPHIC ROJECTIONS
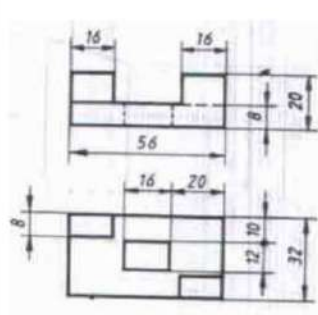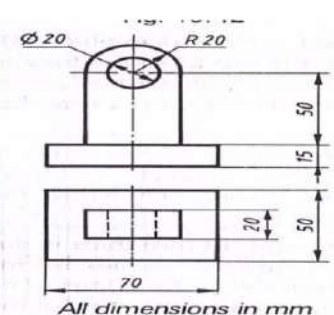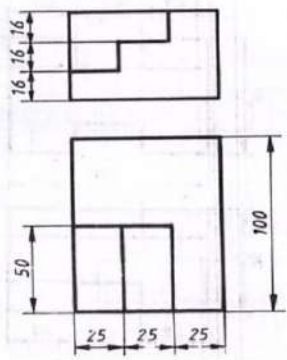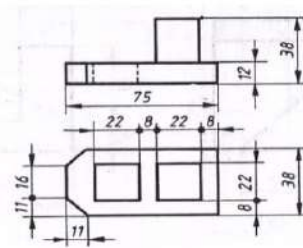
Draw the three principal views of the component as shown in the figure.
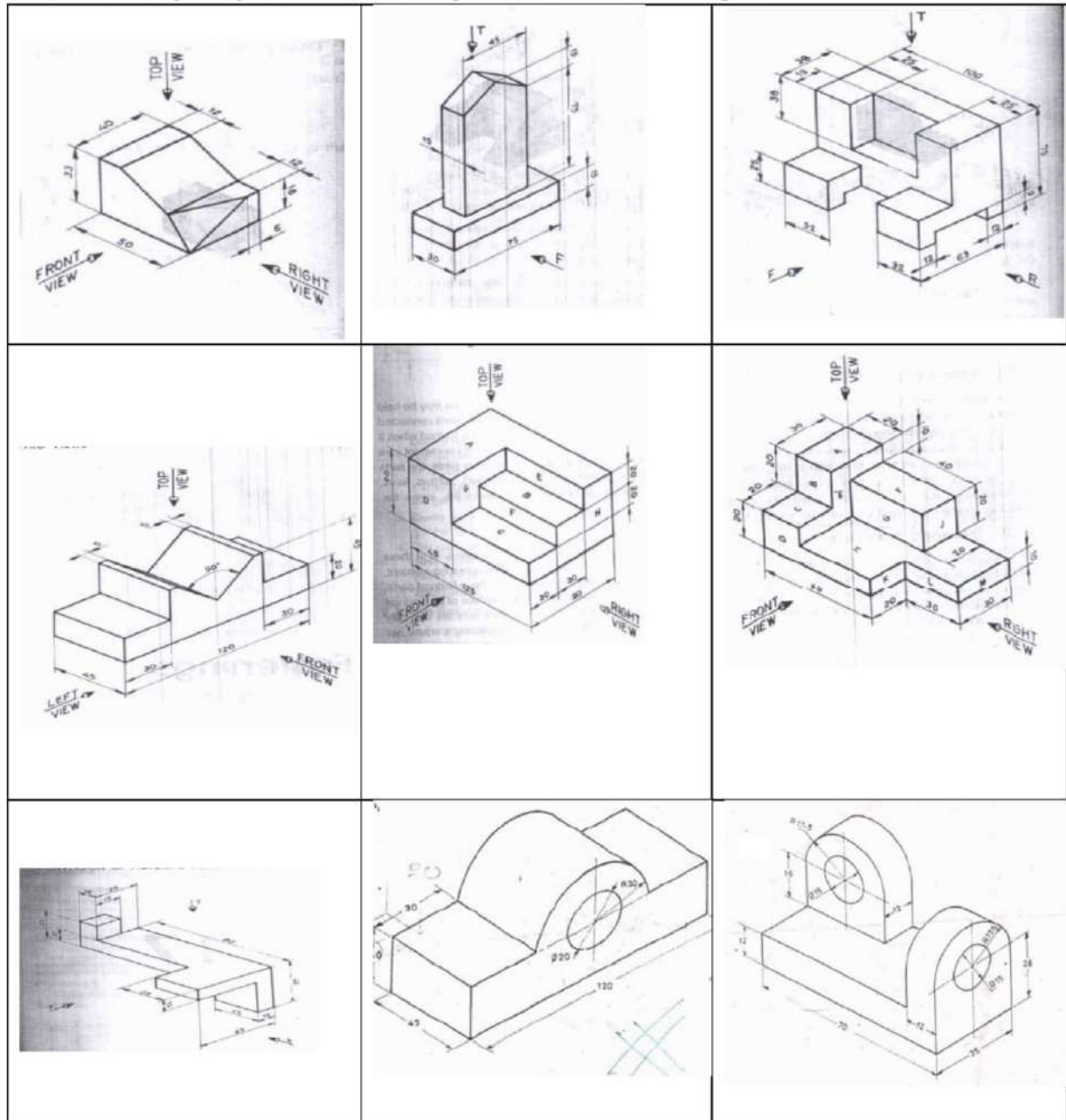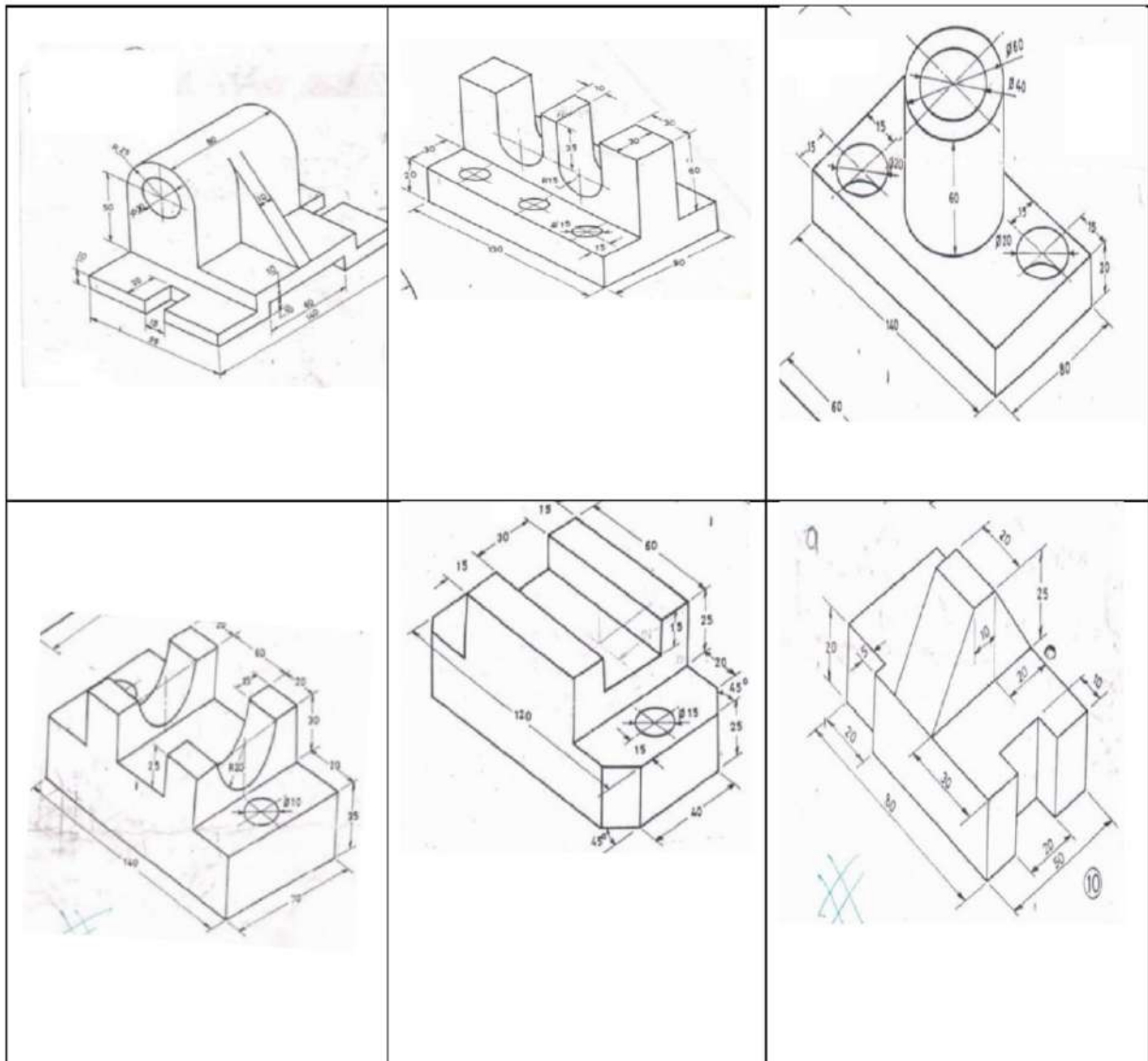
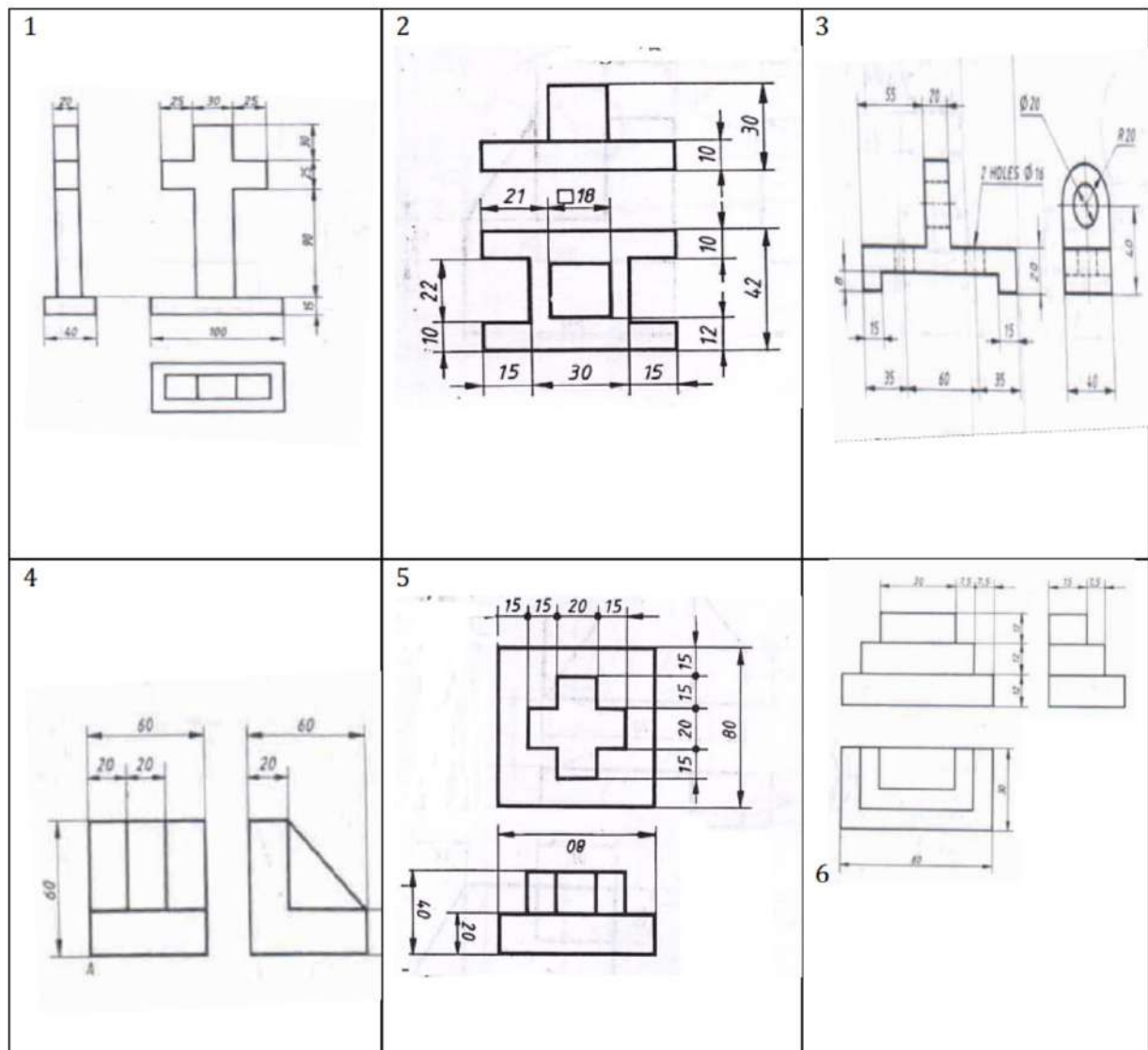## UNIT 4 ISOMETRIC PROJECTIONS

1. .Draw the isometric view of the machine component whose orthographic views are given below:

2. Draw the isometric Projection of the machine component whose orthographic views are given below:

1	2	3

4	5	
		6

3. Draw the isometric Projection of the machine component whose orthographic views are given below