

ME 1480

ENGINEERING DRAWING

ASSIGNMENT BOOKLET

Coordinator
Dr. Ramkumar P



**Department of Mechanical Engineering
Indian Institute of Technology Madras
Chennai – 600036**

January 2024

Schedule of Classes for Branches BE & EP, CS, ME & MM (Jan - May 2024)

Batch	Lecture		Drawing		Teacher	Course Asst.	Teaching Asst.
	Day & Time	Room No.	Day & Time	Room No.			
BE&EP CS23B001-005 (Lecture)	Tuesday 2:00-2:50 PM	CRC 101	Monday 2:00-4:50 PM	MSB 301&2/ CAE Lab	AU	GM	AKK, SK, PG
CS	Thursday 2:00-2:50 PM	CRC 101	Wednesday 2:00-4:50 PM	MSB 301&2/ CAE Lab	AM	KB	SVS, RR, AA
ME I ME23B031-121	Monday 2:00-2:50 PM	CRC 101	Tuesday 2:00-4:50 PM	MSB 301&2/ CAE Lab	PR	PJ	LC, DD, GK
ME II ME23B122-214	Friday 2:00-2:50 PM	CRC 101	Tuesday 2:00-4:50 PM	MSB 301&2/ CAE Lab	KV	SR, CMS	GS, AKG
ME III & MM ME23B001-030 MM23B001-70	Wednesday 2:00-2:50 PM	CRC 101	Monday 2:00-4:50 PM	MSB 301&2/ CAE Lab	MP	RT	RC, CP, MK

Initial	Name	Room No.	Phone No.
PR	P Ramkumar (Coordinator)	MDS 408	4684
KV	K Viswanath	FSL 202	4664
MP	Manoj Pandey	MDS 411	4658
AM	Arun Menon	STR 212	4299
AU	Anirudh Udupa		
GM	G Murali	MDS 219	4674
RT	R Thamilarasan	MDS 219	5684
SR	S Ravi Subramanian	MDS 219	5684
CMS	C M Swathi	MDS 219	5684
KB	K Baskar	MDS 219	5684
PJ	P Jeyalakshmi	MDS 219	5684
AKK	Asok Kumar K [ME22D045]	MDS	5689
RC	Reshma Chandran [ME21D302]	MDS	5689
LC	Loheshwaran C [ME21D045]	MDS	5689
DD	Darshan Dange [ME20D019]	MDS	5689
PG	Pranaydeep Garewal [ME20D012]	MDS	5689
GS	Gunda Sachin [ME21D011]	MDS	5689
SVS	Suvin VS [ME20D022]	MDS	5689
CP	Chathri Poshadri [ME20D029]	MDS	5689
SK	Sandeep Kumar [ME22S038]	Thermal	
RR	Rahul Ramadas [ME22S035]	Thermal	
AKG	Amit Kumar Goswami [ME22S008]	Thermal	
MK	Monu Kumar [ME22S032]	Thermal	
GK	Gokul Krishnan V V [ME22S034]	Thermal	
AA	Arnav A [ME22S051]	Thermal	

Schedule of CAD classes (CAE Lab, Machine Design Section)

Batch	Date					
BE&EP	22/01	05/02	19/02	04/03	18/03	01/04
CS	17/01	31/01	14/02	28/02	13/03	27/03
ME I	23/01	06/02	20/02	05/03	19/03	02/04
ME II	30/01	13/02	27/02	12/03	26/03	16/04
ME III & MM	29/01	12/02	26/02	11/03	25/03	08/04

Schedule of Examination*

Exam.	Date		Time
Mid Sem.	Manual	16.03.2024 (Saturday)	8:30 – 10:00 am & 10:30 am – 12:00 noon 1:30–3:00 pm & 3:30–5:00 pm
End Sem.	Manual CAD	29.04.2024 (Monday)	2:00–3:30 pm, 4:00–5:30 pm
		30.04.2024 (Tuesday)	2:00–3:30 pm, 4:00–5:30 pm
		01.05.2024 (Wednesday)	2:00–3:30 pm, 4:00–5:30 pm

* Batch-wise schedule will be informed later

DEPARTMENT OF MECHANICAL ENGINEERING

INDIAN INSTITUTE OF TECHNOLOGY MADRAS

ME 1480 ENGINEERING DRAWING

L T E O P C¹ 1 0 0 3 3 7

SYLLABUS:

Manual drawing

Introduction to engineering drawing and graphics, construction of plane curves, projection of points, lines and planes, projection of solids, sections of solids and development of surfaces.

Computer Aided Drawing

Systems of projections, principles, conventions and applications of orthographic and isometric projections, dimensioning principles and conventional representations.

Students are requested to possess at least one book. The following references are only a recommendation.

References:

1. **Luzadder W.J.,** *Fundamentals of Engineering Drawing* – Prentice Hall India, 1993
2. **French and Vierk,** *Fundamentals of Engineering Drawing* – McGraw Hill, 1996
3. **Narayana K.L., Kannaiah.P.,** *Engineering Drawing* – Scitech Publications, 2014.
4. **Venugopal K.,** *Engineering Drawing* – New Age International, 2004
5. **Natarajan K.V.,** *A text book on Engineering Drawing* – Classic prints, 2000
6. **Gopalakrishna K.R.,** *Engineering Drawing* – Subash Stores, 2000
7. **Bhatt N.D.,** *Engineering Drawing* – New Age International, 2000

Weightage:

Assignments (Manual + CAD)	30 marks
Mid-semester Exam (Manual)	20 marks
End-semester Exam (Manual 25 + CAD 25)	50 marks

¹ L: Lecture, T: Tutorial, E: Extended Tutorial, P: Practical, O: Hours spent Outside class, C: Credits

Important Note:

The students are required to come to the drawing classes with all the instruments listed below, the assignment booklet and sketch book. Students must practice the assignment problems before coming to the manual drawing class so that they can complete the problems within the stipulated time. **No extra time will be given.** Completed assignment sheets should be submitted at the end of the manual drawing class to the person in charge. Marks for the assignments will be awarded only for the problems that were completed in the manual drawing class. All the exercises should be preserved till the end of the semester and should be produced whenever required.

Drawing Instruments and Materials:

- | | |
|--------------------------|---|
| 1. Mini drafter | 2. Set square set ($45^\circ \times 45^\circ$ and $30^\circ \times 60^\circ$, one each) |
| 3. Protractor | 4. Scale |
| 5. Compass | 6. Clutch pencils 0.7 mm with H, HB leads |
| 7. Eraser | 8. Card board backup sheet |
| 9. Roll of cello tape | 10. Small scissors |
| 11. Paper clips (4 Nos.) | 12. A3 size drawing sheets (10 Nos.) |

Schedule of Exercises

Sl. No	Topics	Class Assignments	
		Manual	CAD
1	Introduction of Engineering drawing, line types, lettering and dimensioning, free hand sketch	1	-
2	Projection of points, lines and traces.	2	-
3	Projection of planes	1	-
4	Projection of solids	1	-
5	Sections of solids	1	
6	Development of surfaces	1	
7	Introduction to CAD		1
8	Conic sections		1
9	Orthographic projections		2
10	Isometric projections		2
		Total	7
			6

ASSIGNMENTS FOR MANUAL CLASSES

Assignment 1 (Lettering, Free hand sketch, Line type and Title block)

1.1 Reproduce Fig. 1.1 (Lettering Practice). Refer the procedure for lettering given in Fig. 1.3

1.2 Sketch the lines shown in Fig. 1.2 with free hand (Free hand sketching practice)

1.3 Construct the following lines and mention the scale.

- a) 150 mm to full scale
- b) 500 mm to half scale
- c) 25 mm to 4 : 1 scale

1.4 Reproduce Table 1.1 on your drawing sheet.

1.5 Draw title block on lower right corner of the drawing sheet. Refer page no.12.

Assignment 2 (Projection of points and lines)

2.1 Draw the projections of the following points:

- i) A: 25 mm in front of VP and 30 mm above HP
- ii) B: 20 mm behind VP and 15 mm above HP
- iii) C: 40 mm behind VP and 40 mm below HP
- iv) D: 30 mm in front of VP and 20 mm below HP

2.2 A line EF is 50 mm long. Draw its projections when it is above HP, in front of VP and

- a) Parallel to VP and inclined at 60° to HP
- b) Parallel to HP and inclined at 40° to VP
- c) Perpendicular to HP
- d) Perpendicular to VP
- e) Parallel to Profile Plane (PP) and inclined to both HP and VP ($\phi = 40^\circ$).

2.3 Point A of a line AB is 15 mm above HP and 20 mm in front of VP. The other point B is 50 mm above HP and 65 mm in front of VP. The distance between the projectors is 50 mm. Draw the projections. Determine its true length and true inclinations with HP and VP.

2.4 A line CD has one of its ends 60 mm above HP and 20 mm in front of VP. The other end is 15 mm above HP and 45 mm in front of VP. The front view is 65 mm long. Draw its projections and find true length of the CD. Also find the true inclinations with HP and VP.

2.5 A line EF, 85 mm long has its end E is 25 mm above HP and 20 mm in front of VP. The end F is 60 mm above HP and 50 mm in front of VP. Draw the projections and find its inclinations with HP and VP.

2.6 The end P of a straight line PQ is 20 mm above HP and 30 mm in front of VP. The end Q is 15 mm below HP and 45 mm behind VP. If the end projectors are 50 mm apart, draw the projections of PQ and determine the true length and its inclinations with reference line.

Assignment 3 (Projections of lines with traces)

- 3.1 The top view of line AB is 75 mm long and inclined to 45° to XY line. The length of the front view is 65 mm long. The end A is 20 mm above HP and 10 mm in front of VP. Draw the projections. Find its true length and inclinations with reference planes. Also locate horizontal and vertical traces.
- 3.2 A 80 mm long of a line GH is inclined 30° to HP and 45° to VP. Its mid point is 35 mm above HP and 50 mm in front of VP. Draw its projections and its traces.
- 3.3 The straight line CD has its end C is 20 mm above HP and 25 mm in front of VP. The other end D is 60 mm above HP and 65 mm in front of VP. The ends of the line are on the same projector. Draw its projections. Find its true length and angles of the line with HP and VP. Also mark HT and VT.
- 3.4 A line PQ has its ends P and Q are 20 mm and 45 mm in front of VP. The end projectors are 50 mm apart. The HT of a line is 10 mm in front of VP. The line PQ is inclined at 35° to HP. Draw the projections of the line and determine the true length of the line and its vertical trace. Find the distance of VT from HP and inclination with VP.
- 3.5 The end projectors of a line RS are 50 mm apart. The distance between HT and VT is 90 mm. The HT is 40 mm in front of VP and the VT is 80 mm above HP. Draw the projections of RS, if its end R is 10 mm above HP. Determine its true lengths and inclinations.

Additional problems for practice

- 3.6 The end of a line PQ is 20 mm above HP and 25 mm in front of VP. The line is inclined at 30° to HP. Its top view is 60 mm long and inclined at 45° with XY. Draw the projections and find its true length and inclination with VP. Locate the traces.
- 3.7 A straight line of AB whose front view measures 60 mm and makes an angle of 45° with XY line. The end A is in HP. The vertical trace of a line is 10 mm below XY. The top view is inclined 30° to XY. Draw the projections, locate its traces. Mark the distance of end A from the VP.
- 3.8 A line CD, 80 mm long, is inclined at 45° to HP and its top view makes an angle 60° with VP. The end C is in HP and 12 mm in front of VP. Draw its front view, true inclination with VP and its traces.
- 3.9 The end of the line AB is in the first quadrant, 20 mm above HP and 30 mm in front of VP. The other end is 40 mm behind VP and 50 mm below HP. The distance between the projectors of the line is 60 mm. Draw the projections of the line find its true length, inclinations with reference planes and traces.
- 3.10 Draw the projections of a straight line ST of 100 mm line long when one of its ends is touching HP. The angle inclination with HP and VP are 40° and 50° respectively. Find its traces.

Assignment 4 (Projection of Planes)

- 4.1 A regular pentagon of 30 mm sides is resting on HP with one of its side and the surface is inclined at 45° to HP. Draw its projections when the side in HP makes 30° angle with VP.
- 4.2 A circle of 50 mm diameter is resting on HP on end A of its diameter AC which is 30° inclined to HP while its top view is 45° inclined to VP. Draw its projections.
- 4.3 A hexagonal plane of 30 mm side has an equilateral triangular hole of side 30 mm located centrally. The plane lies on the HP with one of its edges and it is inclined at 45° with HP. One of the sides of the triangular hole is parallel to the plane edge which lies on HP. Draw the projections of the hexagonal plane and the hole.
- 4.4 A rhombus of diagonals 40 mm and 70 mm long respectively having one end of its longer diagonal in HP while that diagonal is 35° inclined to HP and makes 40° inclination with VP. Draw its projections
- 4.5 Triangle ABC carries AB = 55 mm, BC = 65 mm and CA = 50 mm. AB lies in HP and point A is 15 mm in front of VP. Distance between projectors of A and B is 45 mm. Complete the projections if point C is 45 mm above HP.

Additional problems for practice

- 4.6 A pentagonal lamina having edges 25 mm is placed on one of its corners on HP such that the surface makes an angle 30° with HP and perpendicular bisector of the edge passing through the corner on which that lamina rests appear to be inclined at 30° to VP. Draw the top and front views of the lamina.
- 4.7 A rectangular plate 40×80 mm rests on one of its smaller side on VP. Its front view appears like a square with all sides 40 mm. Complete the projections of the plate if one of its diagonals is parallel to HP. Determine the inclination of the plate with VP.
- 4.8 A 30° - 60° set square has its shortest side 40 mm long and is in the HP. The top view of the set square is an isosceles triangle and the hypotenuse of the set square is inclined at an angle of 45° with the VP. Draw the projections of the set square and find its inclination with the HP.
- 4.9 A semicircle of 100 mm diameter is suspended from a point on its straight edge 30 mm from the midpoint of that edge so that the surface makes an angle of 45° with V.P. Draw its projections.

Assignment 5 (Projections of Solids)

- 5.1 A square prism of 25 mm base side and 60 mm height rests on HP. It is tilted such that the base makes an angle of 30° to HP resting on one of its edge. Draw its projections.
- 5.2 Draw the projections of a hexagonal pyramid of base side 25 mm and axis 65 mm resting on one of its edges on HP and that edge is inclined at 45° to VP. The base of the prism makes an angle of 35° to HP.

- 5.3 A cylinder of 30 mm diameter and height 70 mm is tilted such that the axis makes an angle of 45° to HP. Draw the projections of the solid.
- 5.4 Draw the projections of a cone of base diameter 45 mm and height 75 mm, when it lies on the ground on one of its generators and the axis of the cone inclined at 30° to VP.

Assignment 6 (Sections of Solids)

- 6.1 A pentagonal pyramid with base edge 25 mm and axis 60 mm long, rests on one of its base edge on HP with its axis inclined at 45° to HP. It is cut by a section plane inclined 30° to HP and meets the axis at 25 mm from the apex. Draw the front view, sectional top view and true shape of the section.
- 6.2 A cylinder with 40 mm diameter and 70 mm long, has its axis inclined at 20° to VP. It is cut by a section plane perpendicular to HP, inclined at 30° to VP and meets the axis at its midpoint. Draw the top view, sectional front view and true shape of the section.
- 6.3 A cone with 40 mm diameter and axis 75 mm long, is resting on HP. It is tilted such that the axis makes an angle of 35° to HP. It is cut by a section plane perpendicular to VP and inclined 45° to HP, passing through a point on the axis at 30 mm from the apex. Draw the front view, sectional top view and true shape of the section.
- 6.4 A cube of edge 45 mm is cut, such that the true shape of the section is regular hexagon. Draw the front view, sectional plan and determine the inclination of the cutting plane. Show the true shape of the section.

Additional problems for practice

- 6.5 A tetrahedron of 45 mm edge length is resting on one of its faces on HP. It is cut by section plane perpendicular to VP such that a square is obtained as true shape. Draw its projections, true shape of the section and determine the inclination of the cutting plane.
- 6.6 Draw the projections of a hexagonal pyramid with base edge 30 mm and axis 80 mm long, resting with one of its base edges on HP and axis inclined at 45° to HP and parallel to VP. A sectional plane inclined at 60° to HP and perpendicular to VP cuts and bisects the axis of the pyramid. Draw the sectional top view, front view and true shape of the section.
- 6.7 A triangular pyramid of base edge 40 mm and axis 55 mm long is suspended from one of the corners of the base. The axis is parallel to VP. Draw its projections.
- 6.8 An isosceles triangle of base 50 mm and height 70 mm is the elevation of a wedge, cut from a cylinder of diameter 50 mm. Project an auxiliary plan of the wedge on a new ground line X1-Y1 inclined at 45° to XY.

Assignment 7 (Development of surfaces)

- 7.1 A cylinder of diameter 40 mm and height 80 mm is resting vertically on one of its ends on HP. It is cut by a plane perpendicular to VP and inclined 45° to HP. The cutting plane meets

the axis at a point 50 mm above the base. Draw the development of the lateral surface of the lower portion of the truncated cylinder.

- 7.2 A hexagonal pyramid of base side 30 mm and height 80 mm resting on HP with one of its base edge perpendicular to VP. Solid sectioned by a cutting plane inclined 40° and to HP bisects the axis. Draw the development of the lateral surface of the truncated pyramid.
- 7.3 A pentagonal prism, side of base 25 mm and altitude 50 mm, rests on its base on the HP such that an edge of the base is parallel to VP and nearer to the observer. It is cut by a plane inclined at 45° to HP, perpendicular to VP and passing through the center of the axis. Draw the development of the complete surfaces of the truncated prism.
- 7.4 A cone 50 mm diameter and 65 mm axis is resting on one generator on HP and axis is parallel to VP. Draw its projections. It is cut by a horizontal section plane through its base center. Draw sectional top view and development of the surface of the remaining part of cone.

Additional problems for practice

- 7.5 A square prism of 40 mm edge of the base and 65 mm height stands on its base on the HP with vertical faces inclined at 45° with the VP. A horizontal hole of 40 mm diameter is drilled centrally through the prism such that the hole passes through the opposite vertical edges of the prism. Draw the development of the surfaces of the prism.
- 7.6 A solid composed of a half-cone and half-hexagonal pyramid. It is cut by a section plane 45° inclined to HP, passing through mid-point of axis. Draw sectional Top view and development of remaining part of the solid. Take radius of cone and each side of hexagon 30mm long and axis 70mm.
- 7.7 A cylinder of 50 mm base diameter and axis 70 mm long rests on its base on HP. A square cutout of 35 mm side is drilled through the cylinder such that axis of cutout is perpendicular to the axis of the cylinder. The center of the cutout is 35 mm above HP and 15 mm away from the axis of cylinder. Two faces of the cutout are equally inclined to HP. Develop lateral surfaces.

Assignments for CAD Classes (Computer Aided Drawing)

Assignment 8 (Introduction)

Reproduce the drawings given in Figs. 8.1 - 8.3

Assignment 9 (Conic Sections)

- 9.1 Draw an ellipse when the distance of focus from the directrix is equal to 35 mm and eccentricity is $3/4$. Draw a tangent and normal at a point P located at 30 mm above the major axis.

- 9.2 Draw the path traced by a point P moving in such a way that the distance of the focus from directrix is 40 mm. The eccentricity is unity.
- 9.3 Draw an isosceles triangle of 100 mm long base and 110 mm long altitude. Inscribe a parabola in it by method of tangents.
- 9.4 Construct a rectangular hyperbola, when a point A on it is at a distance 35 mm and 45 mm from two asymptotes. Also draw a tangent to the curve at a distance of 25 mm from asymptote.
- 9.5 Draw hyperbola whose distance of focus is 55 mm and $e = 1.5$. Draw the tangent and normal at 50 mm from the directrix.

Additional problems for practice

- 9.6 Construct an ellipse using oblong method with major axis 130 mm and minor axis 85 mm.
- 9.7 Draw an ellipse using concentric circles method. Take major axis and minor axis as 110mm and 65mm respectively.
- 9.8 In a rectangle of sides 150 mm and 90 mm, inscribe two parabolas such that their axis bisect each other. Find out their focus points and positions of directrix.
- 9.9 Two straight lines OA and OB are at 75° to each other. A point "P" is at a distance 20 mm from OA and 30 mm from OB. Draw a hyperbola passing through the point "P" with marking at least 10 points.
- 9.10 Draw a parabola having an abscissa of 50 mm and the double ordinate of 110 mm by using rectangle method.

Assignment 10 (Orthographic projections)

Draw the orthographic projections consisting of front view, top view and side view for the objects shown in Figs. 10.1 – 10.6

Assignment 11 (Orthographic projections)

Draw the orthographic projections consisting of front view, top view and side view for the objects shown in Figs. 11.1 - 11.4

Assignment 12 (Isometric projections)

Draw the isometric drawing of the objects represented in orthographic views shown in Figs. 12.1 - 12.6

Assignment 13 (Isometric projections)

Draw the isometric view of the objects represented in orthographic views shown in Figs. 13.1 - 13.4

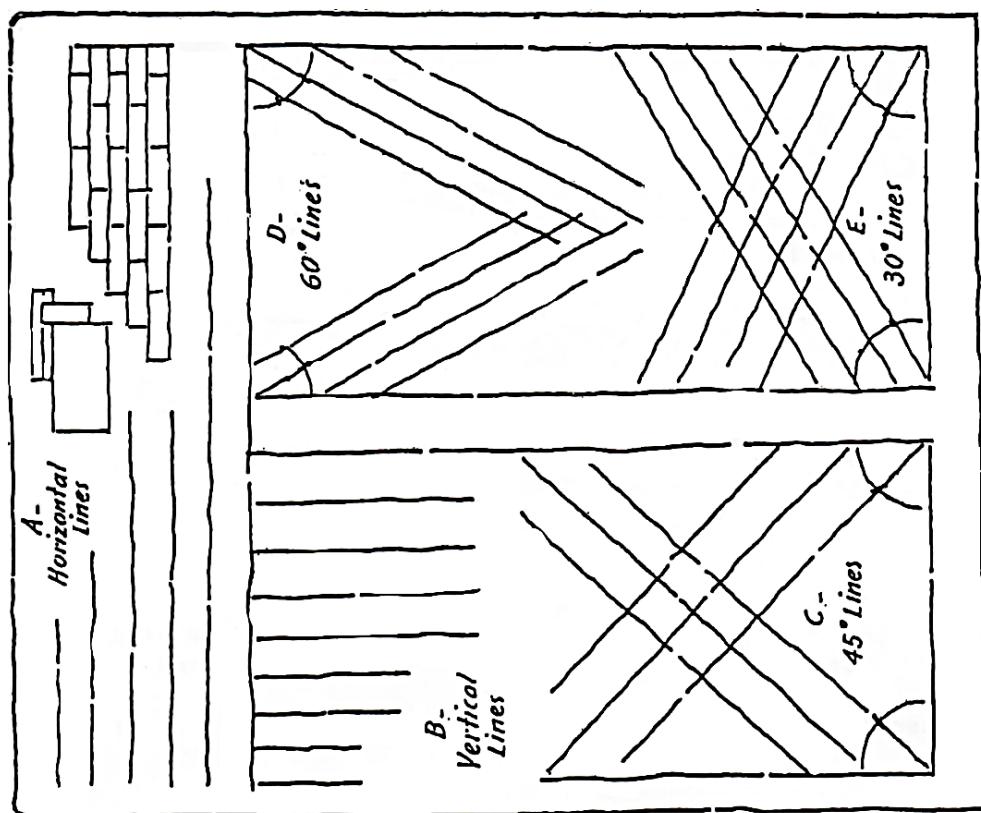


Fig. 1.1 Lettering Practice

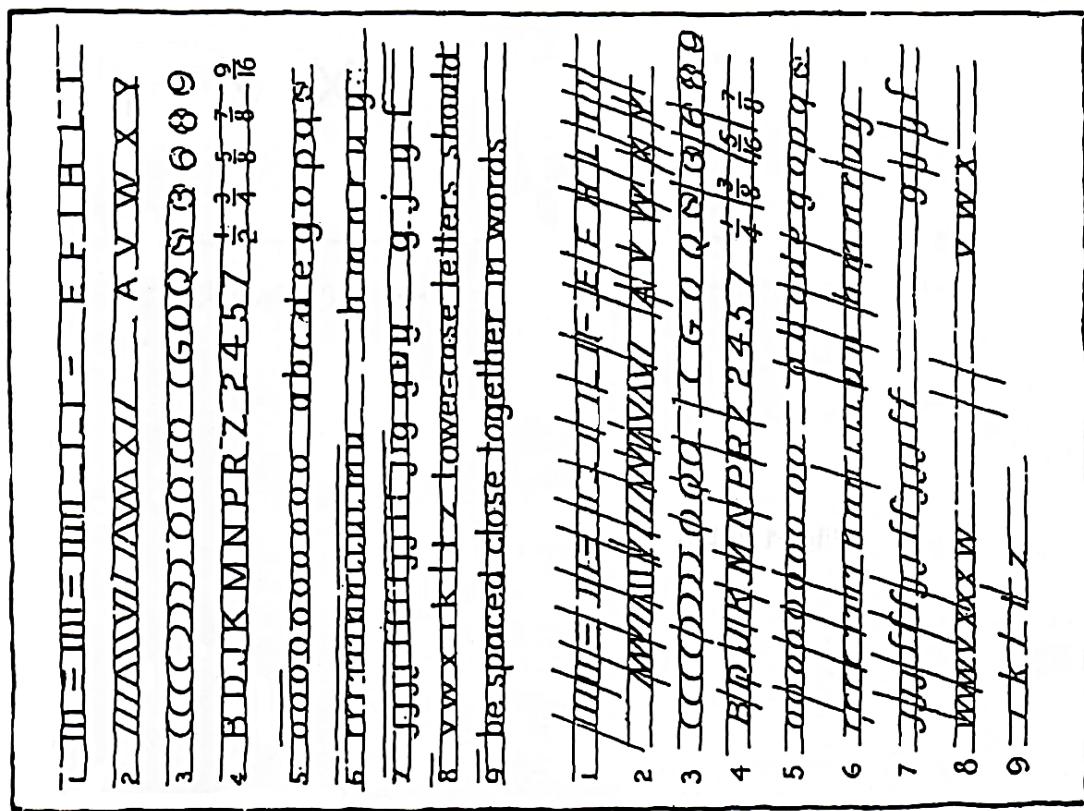
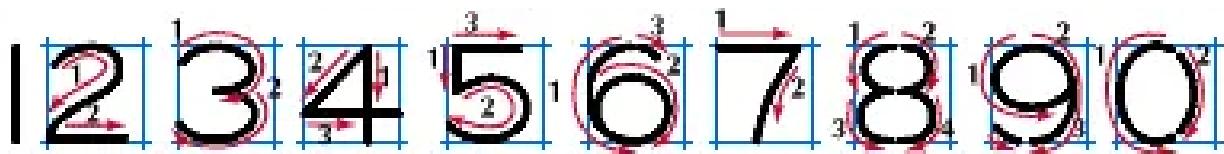
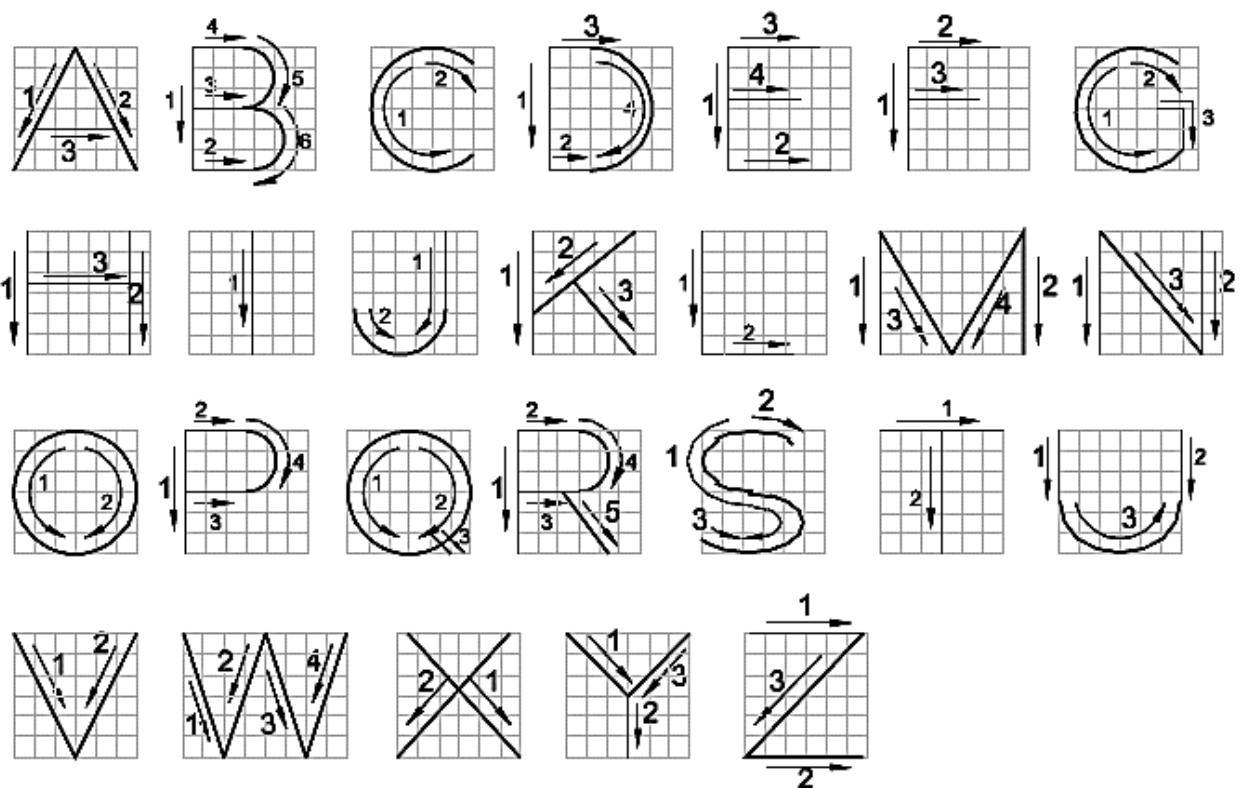


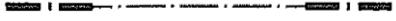
Fig. 1.2 Sketching Practice



a ¹₂ or b ¹₂ c d e f g ¹₂ f g ¹₂ h i j k l m
 n o p q r s t u v w x y or z

Fig. 1.3 Lettering Procedures

Table 1.1 Line works

Line Type	Illustration	Application
Continuous thick		Visible outlines (boundary lines)
Continuous thin		Dimension lines, leader lines, extension lines, construction lines, and hatching lines
Continuous thin wavy (drawn free hand)		Irregular boundary lines, short break lines
Continuous thin with zigzag		Long break lines
Short dashes		Invisible edges
Long chain thin		Center lines, locus lines
Long chain thick at ends and thin elsewhere		Cutting plane lines

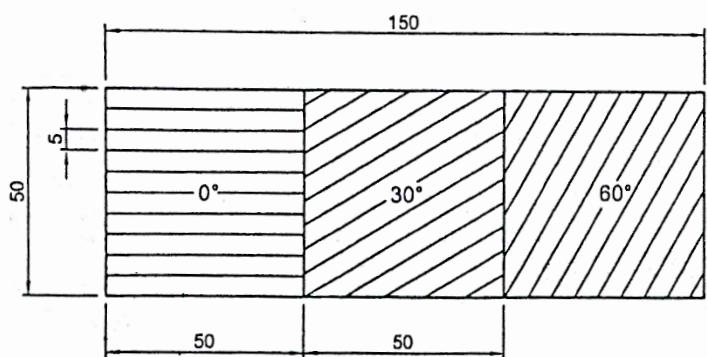


Fig. 8.1

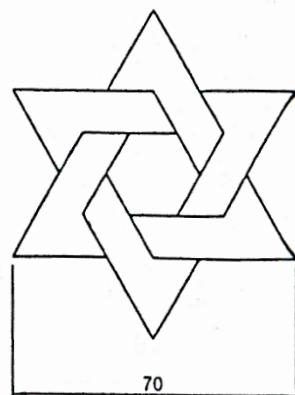


Fig. 8.2

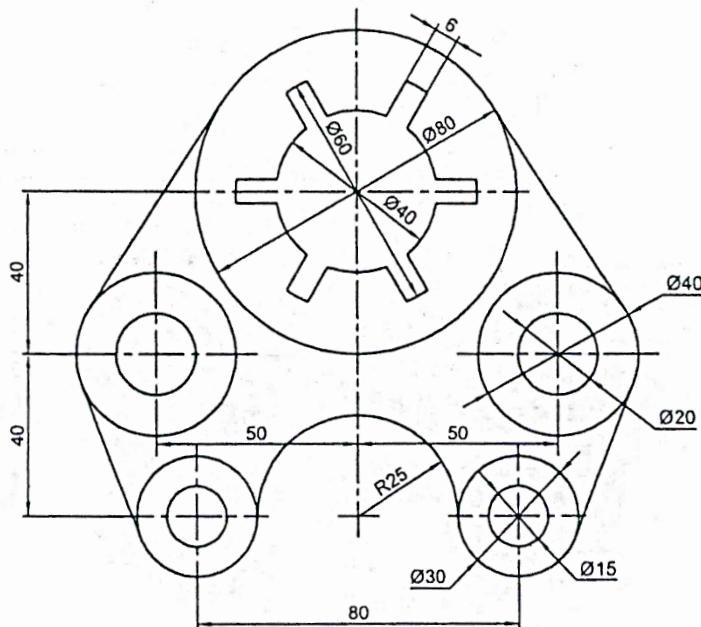
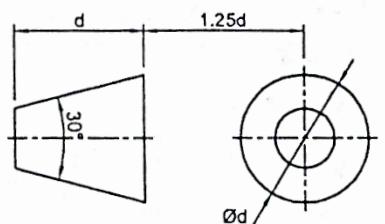


Fig. 8.3



DETAILS OF PROJECTION SYMBOL

150		60
INDIAN INSTITUTE OF TECHNOLOGY MADRAS		
NAME:		ASSIGNMENT NO:
ROLL NO:		DUE DATE:
BATCH:		SUBMISSION DATE:
SCALE:	TITLE:	
50	100	

DETAILS OF TITLE BLOCK
(Suggested for students)

ALL DIMENSIONS ARE IN mm

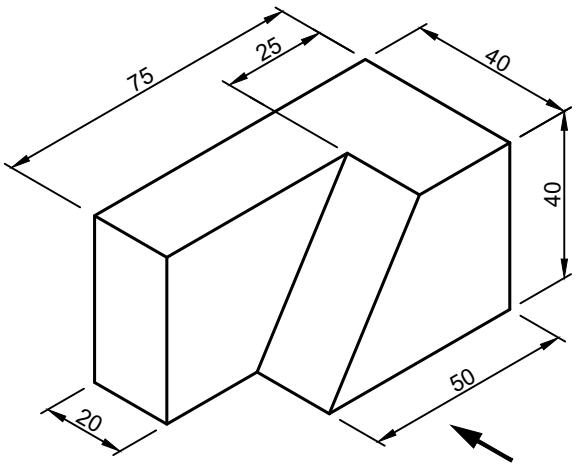


Fig. 10.1

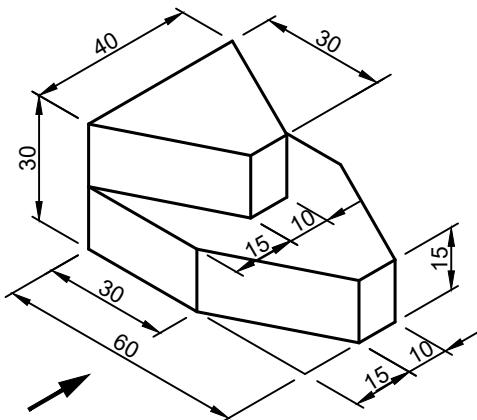


Fig. 10.2

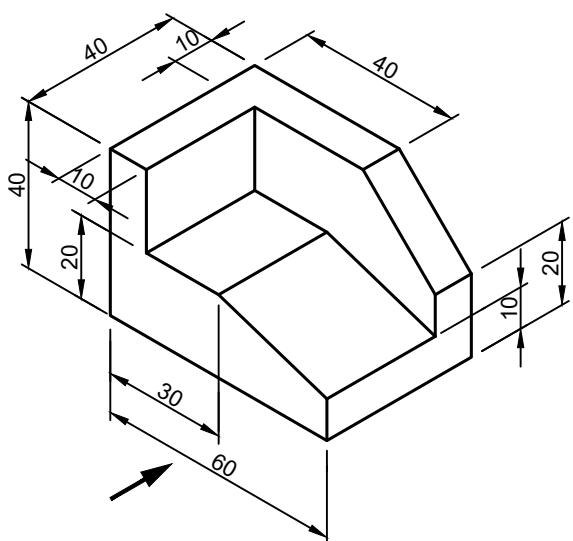


Fig. 10.3

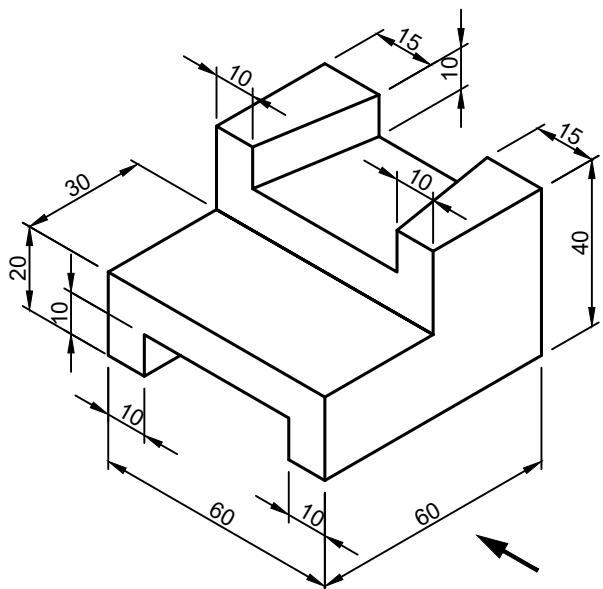


Fig. 10.4

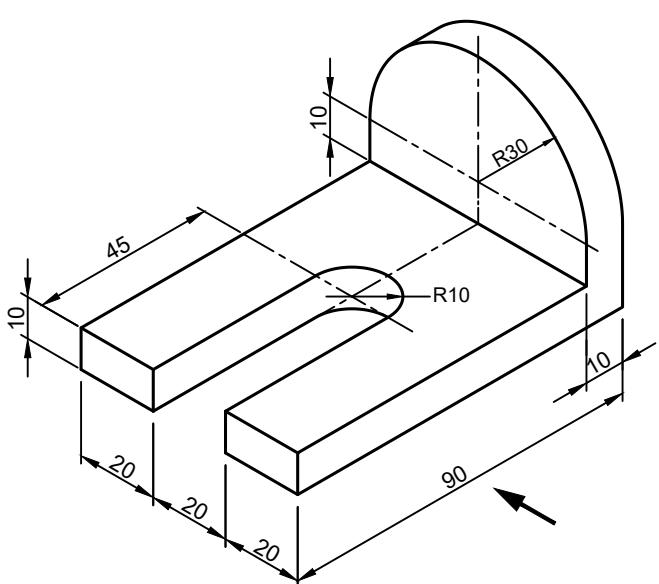


Fig. 10.5

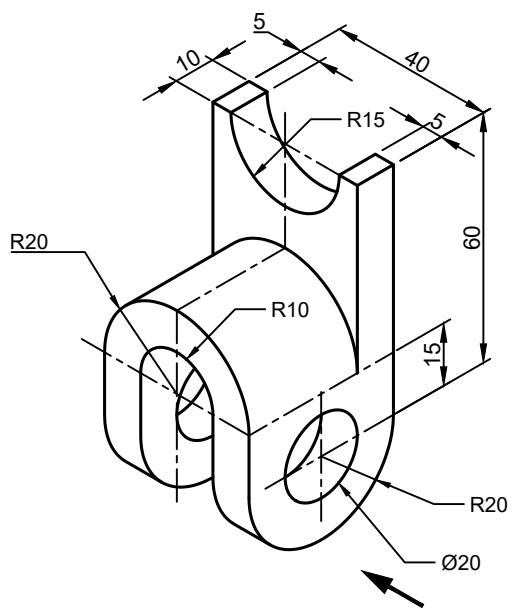


Fig. 10.6

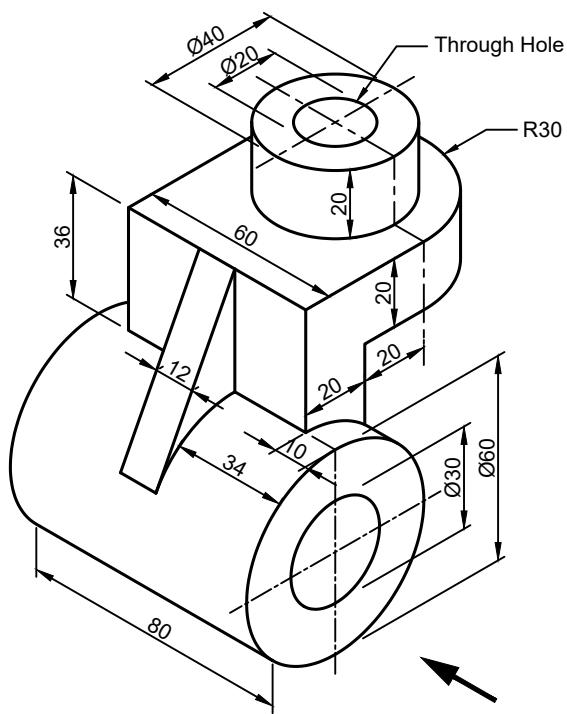


Fig. 11.1

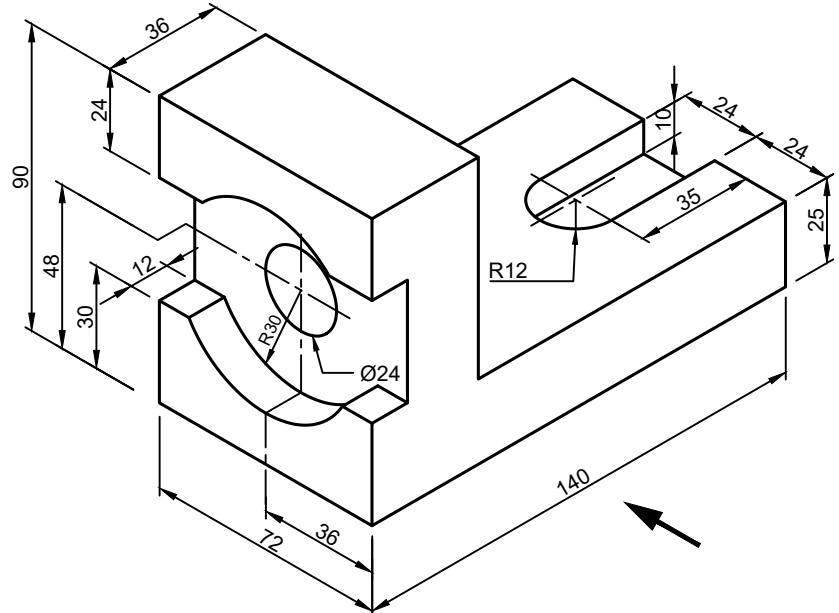


Fig. 11.2

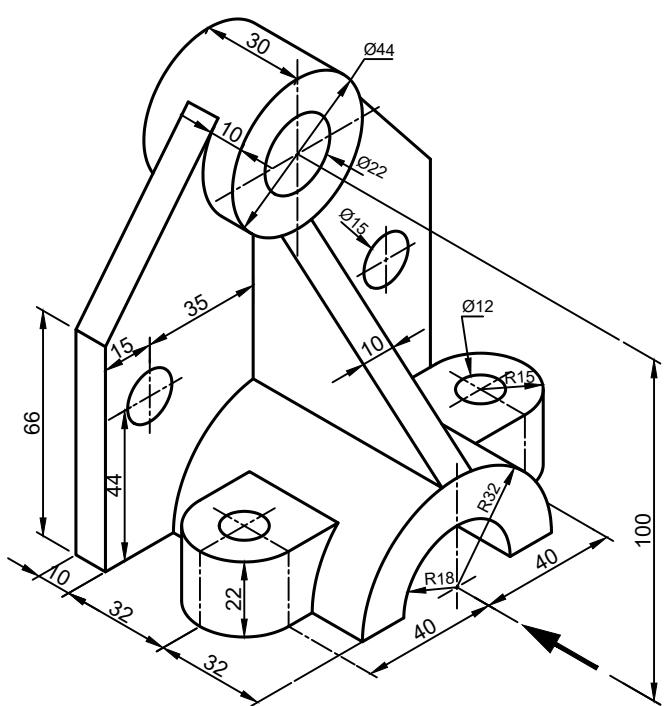


Fig. 11.3

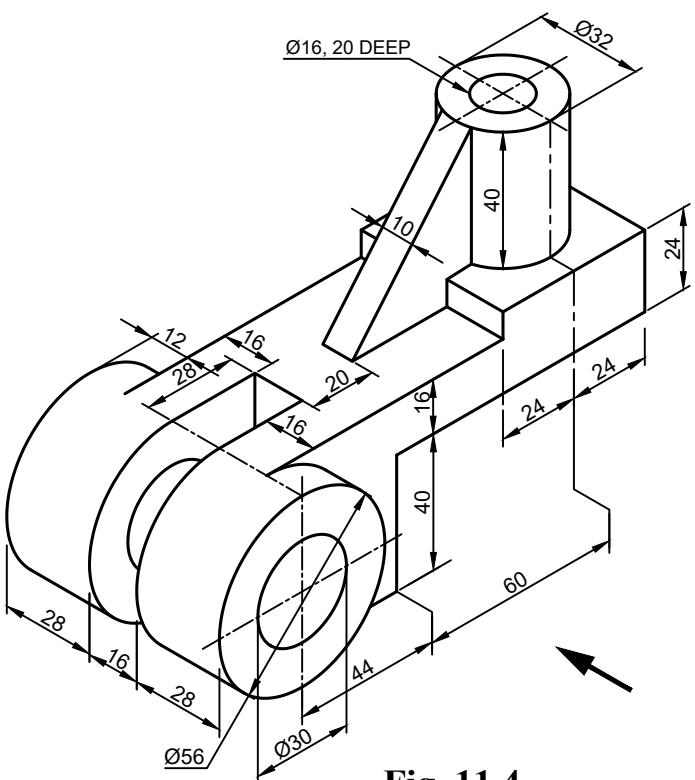
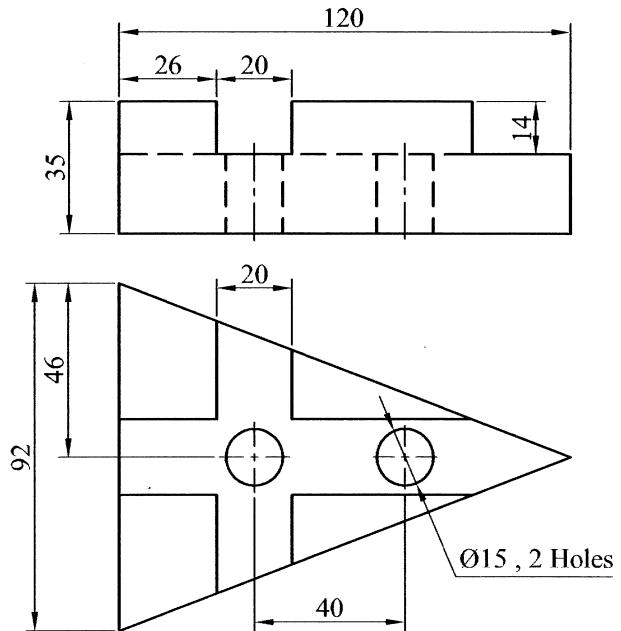
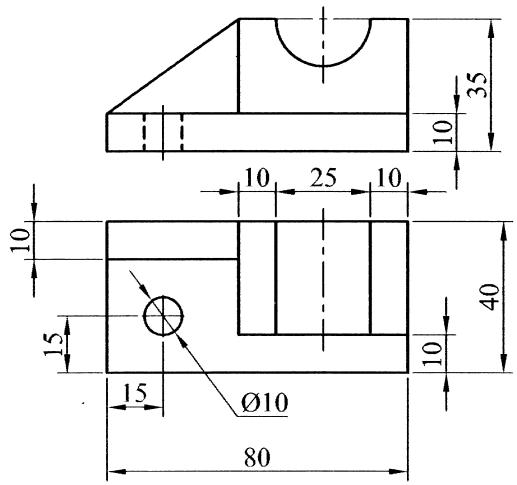
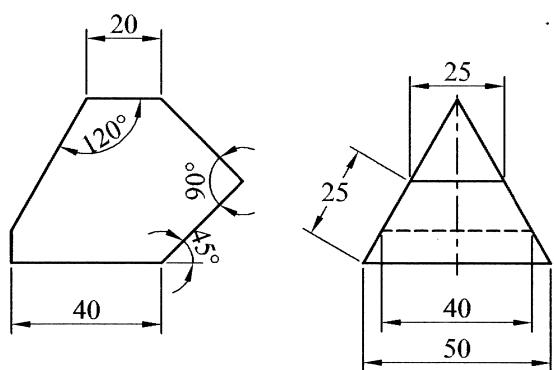
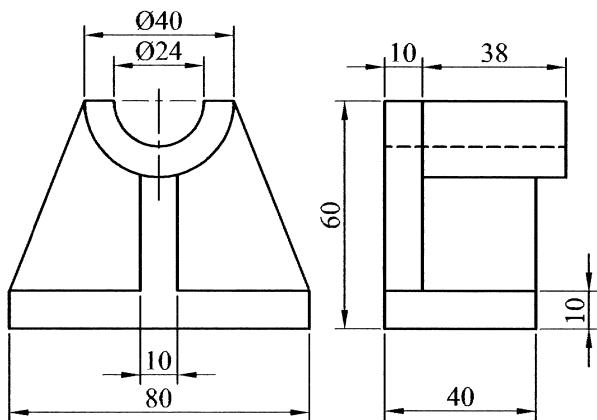
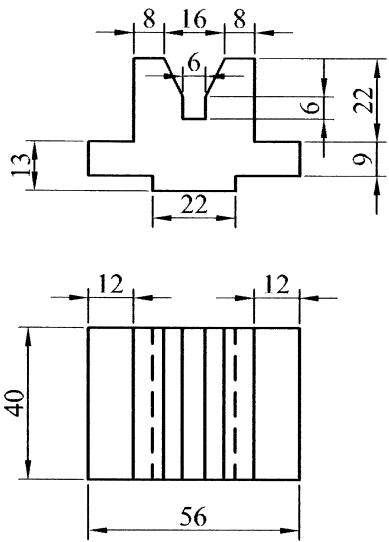
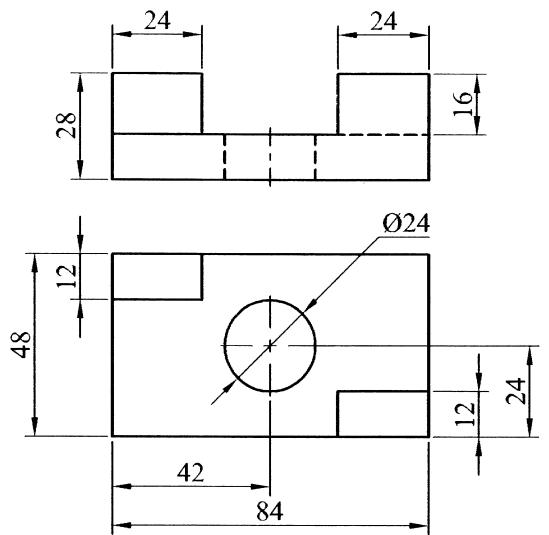


Fig. 11.4



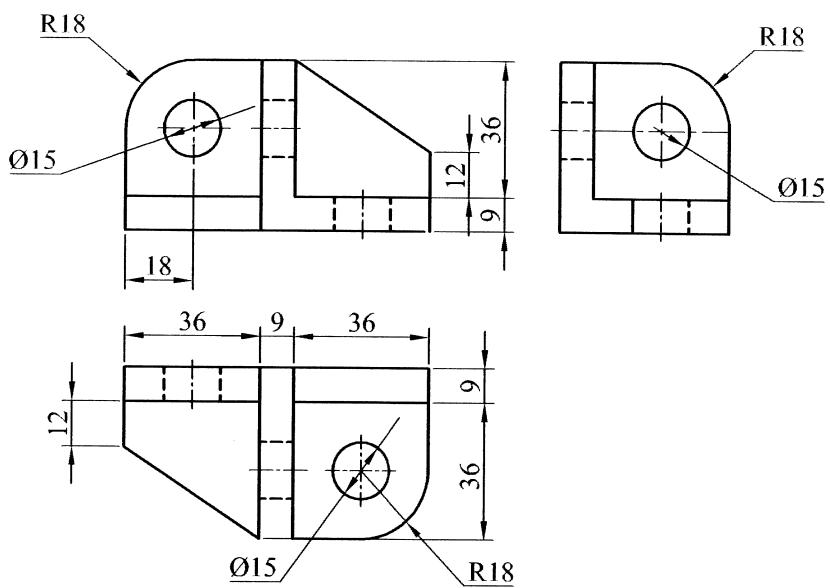


Fig.13.1

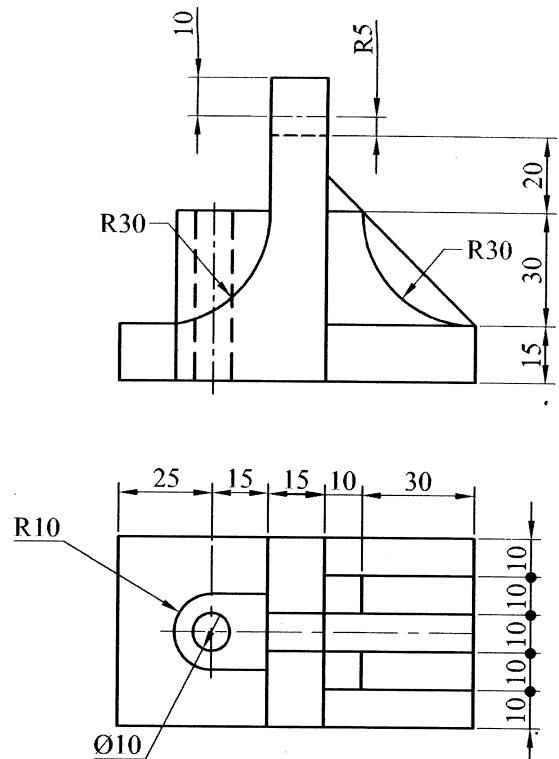


Fig.13.2

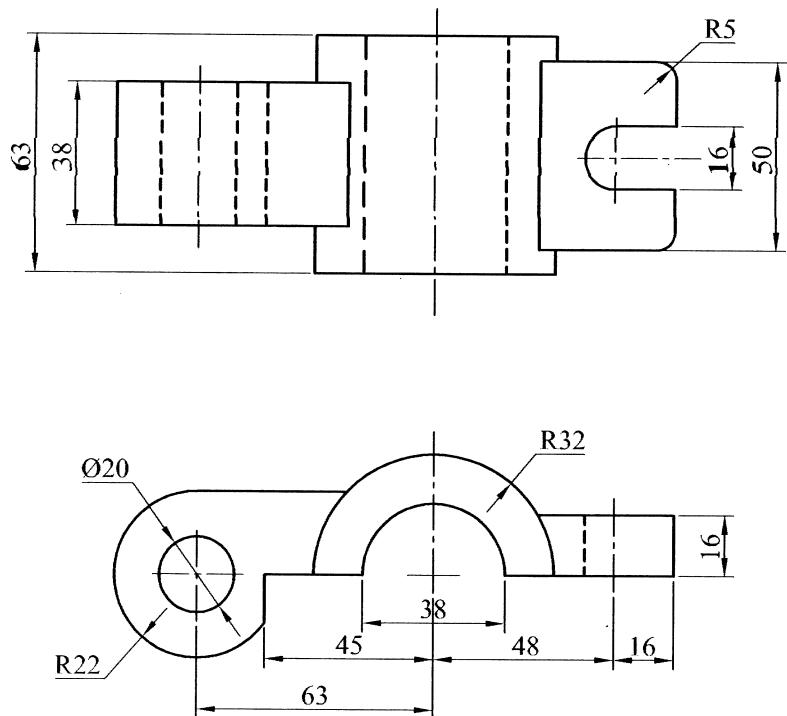


Fig.13.3

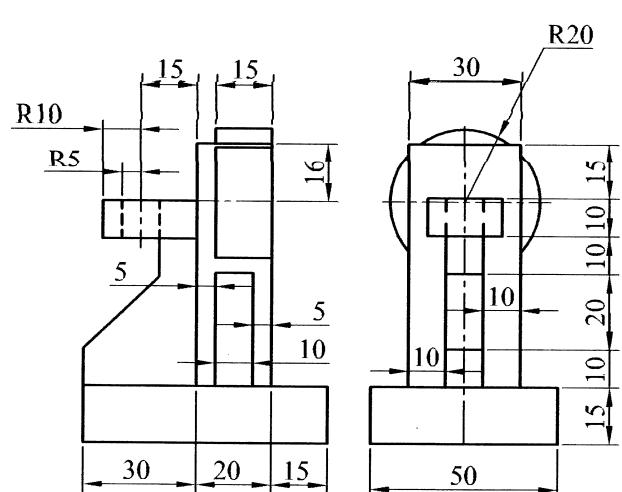
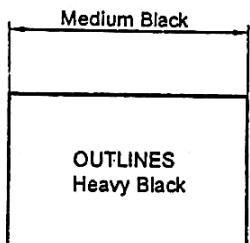


Fig.13.4

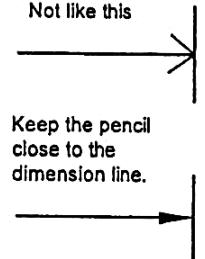
DIMENSIONING

① DIMENSION LINES



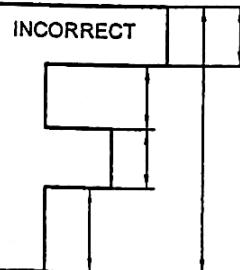
② ARROWHEADS

Not like this

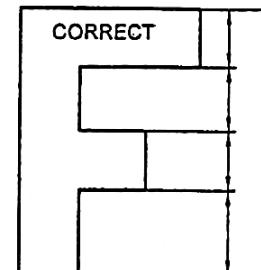


Keep the pencil close to the dimension line.

③ Avoid haphazard dimensioning.



The overall dimension is placed outside the smaller dimensions.



④ FIGURES

FIGURES

Constant practice is necessary to achieve a good style.

1234567890

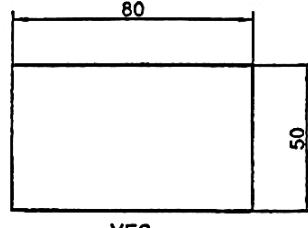
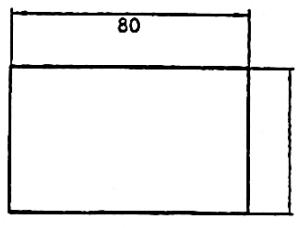
Figures written like these

2 4 8

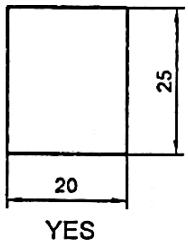
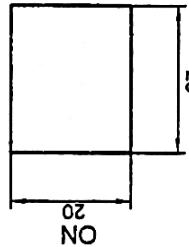
spoils the finish of a good drawing. Practise doing certain figures in pairs like this,

11,14,^co₂8,^c9,₂0

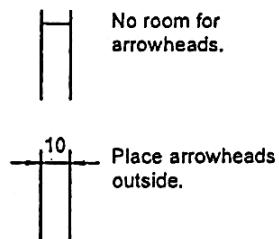
⑤ Dimensions should be placed above the dimension line.



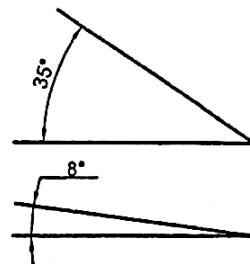
⑥ Figures must be readable from the bottom or right.



⑦ Dimensioning a narrow space

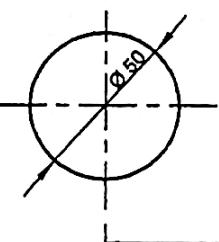


⑧ Dimensioning an angle.

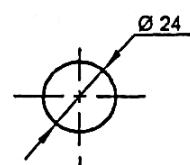


⑨ Dimensioning circles

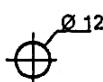
for large circles,



for small circles,



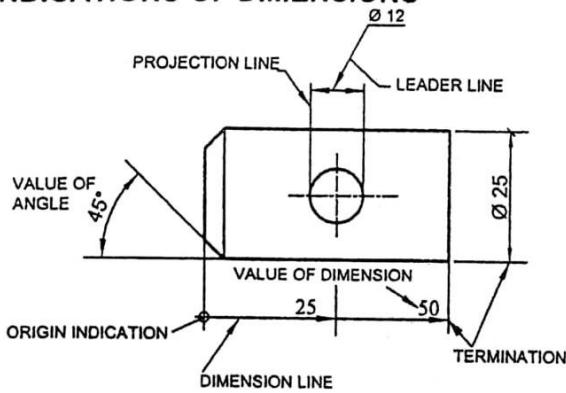
for very small circles,



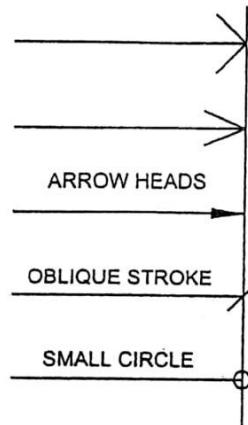
Like this for a radius, where the centre is off the paper.

Distance between centre lines are important dimensions to show.

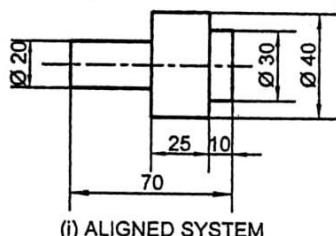
INDICATIONS OF DIMENSIONS



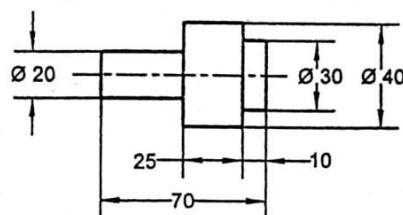
(a) ELEMENTS OF DIMENSIONING



(b) TERMINATION INDICATORS



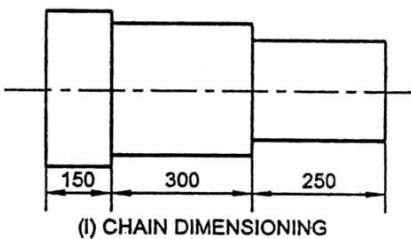
(i) ALIGNED SYSTEM



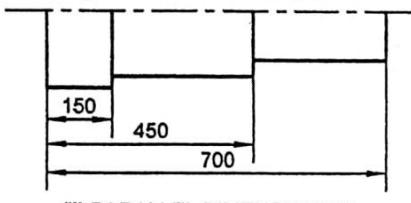
(ii) UNIDIRECTIONAL SYSTEM

(c) TWO METHODS OF INDICATING DIMENSIONAL VALUES

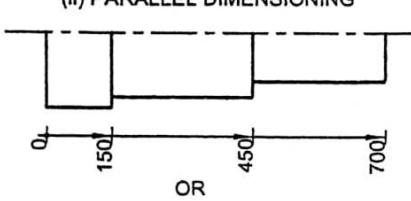
DIMENSIONING SCHEMES



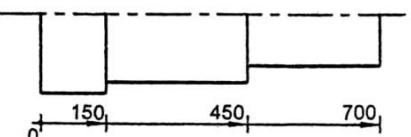
(I) CHAIN DIMENSIONING



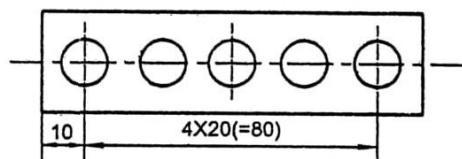
(II) PARALLEL DIMENSIONING



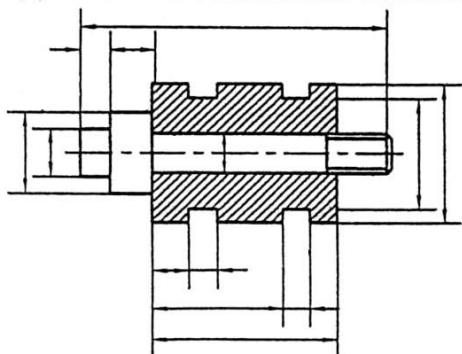
OR



(III) DIMENSIONING FROM A COMMON FEATURE



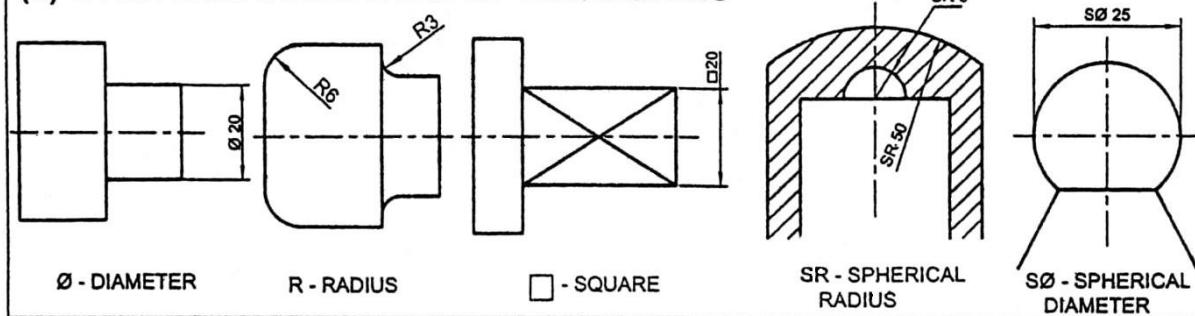
(iv) DIMENSIONING EQUIDISTANT FEATURES



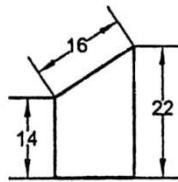
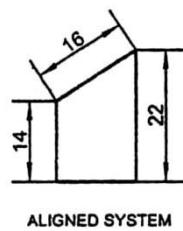
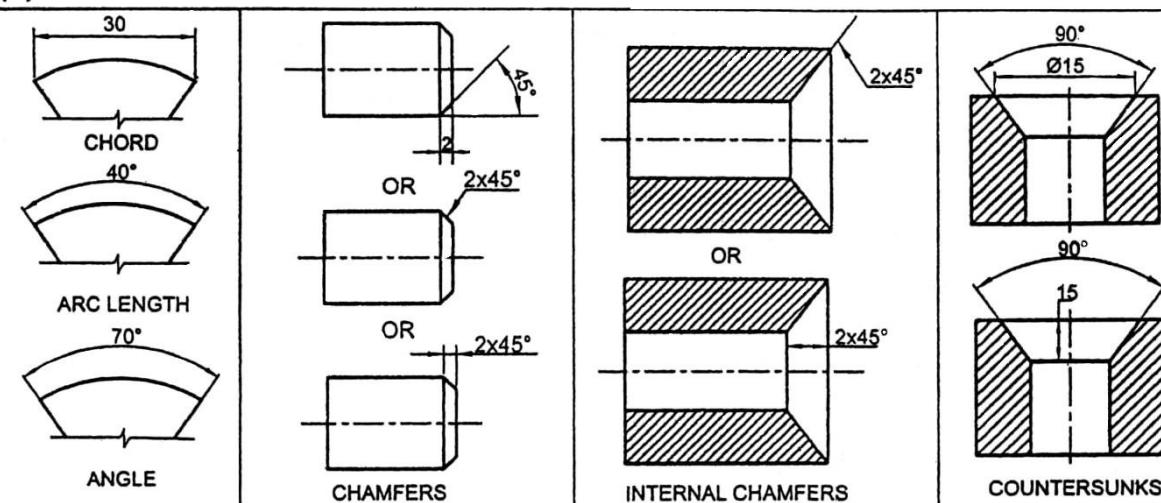
(v) DIMENSIONING SCHEME FOR A TYPICAL ASSMBLY

ARRANGEMENT AND INDICATION OF DIMENSIONS

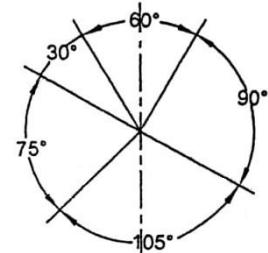
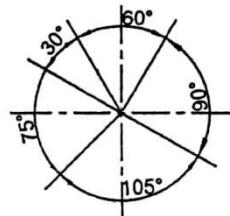
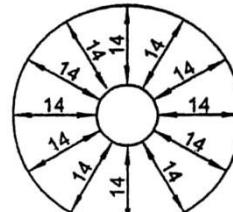
(a) SYMBOLIC INDICATION OF DIMENSIONS



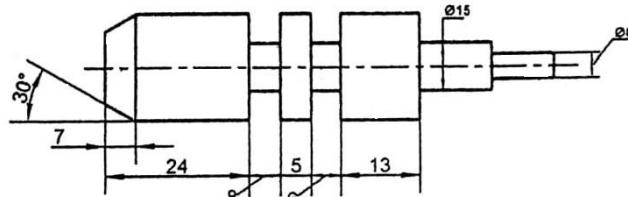
(b) SOME SPECIAL INDICATIONS



(a) METHOD OF OBLIQUE DIMENSIONING



(c) PLACING VALUES ON SMALL DIMENSION LINES



Auto CAD

File → New → Open with no Template-Metric (*from Select template Dialogue Box*)

To set the required sheet size before starting drafting (*other than A3 size*)

LIMITS⁴

(⁴- represents activation of enter button)

Specify lower left corner: 0, 0 ⁴

Specify upper right corner: 594,420⁴ *(for A2 size)*

ZOOM ⁴ All ⁴

Draw commands		Modify commands		View commands		Format utilities		Edit commands	File utilities
LINE	L	ERASE	E	ZOOM	z	COLOR	CO L	UNDO	New
CIRCLE	C	COPY	CO	All	z ⁴ A ⁴	LINETYPE	LT	REDO	Open
ARC	A	OFFSET	O	Window	z ⁴ W ⁴	LINEWEIGHT	LW		Close
POLYGON	POL	MOVE	M	Previous	z ⁴ P ⁴	DIMSTYLE	D		Save
ELLIPSE	EL	ROTATE	RO	Extents	z ⁴ E ⁴	LTSCALE	LTS		Save As
PLINE	PL	TRIM	TR						Plot
TEXT		EXTEND	EX	PAN	P				Exit
MTEXT	T	MIRROR	MI	REDRAW	R				
SPLINE	SPL	ARRAY	AR	TOOLBAR	TO				
		CHAMFER	CHA						
		FILLET	F						
		BREAK	BR						
		DDEDIT	ED						
		SCALE	SC						
		STRETCH	S						
		PEDIT	PE						

Object selection methods: Window & Crossing

Key	Function
F1	AutoCAD Help
F2	AutoCAD Text Window
F3	Osnap On/Off
F5	Isoplane Top/Right/Left
F6	Co-Ords On/Off
F7	Grid On/Off
F8	Ortho On/Off
F9	Snap On/ Off

Standard sheet sizes, mm

A0	-	1189, 841
A1	-	841, 594
A2	-	594, 420
A3	-	420, 297
A4	-	297, 210

Object snap		Dimensioning methods
End point	end	Linear
Mid point	mid	Aligned
Center point	cen	Radius
Intersection	int	Diameter
Perpendicular	per	Angular
Tangent	tan	Leader
Nearest	nea	Oblique
Quadrant	qua	

To draw an isometric view

SNAP ⁴ → Style ⁴ → Isometric⁴⁴