

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

Course Code	20CE21P	Semester	II
Course Title	CIVIL ENGINEERING GRAPHICS	Course Group	Core
No. of Credits	4	Type of Course	Lecture & Drawing Exercise
Course Category	PC	Total Contact Hours	6Hrs Per Week
			78Hrs Per Semester
Prerequisites	High School Level Mathematics	Teaching Scheme	(L:T:P)= 1:0:2
CIE Marks	60	SEE Marks	40

Prerequisites: Basic Geometry in Secondary Education and zeal to learn the course.

Course Objectives:

1. The course is aimed at developing Basic Drawing skills.
2. Skills in Reading and Interpretation of Engineering Drawings.
3. Skills in usage of CADD software.

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

	Course Outcome	CL	Linked PO	Teaching Hrs
CO1	Acquire Knowledge about importance of Engineering drawing and use of drawing instruments effectively and Able to draw figures to given scale and dimension the given figures as per BIS	R,U,Ap	1,2,4	09
CO2	Acquire knowledge about geometric constructions and conic section and to learn their application in civil engineering field	R,U,Ap	1,2,4	06
CO3	Discover the concept of projection and acquire visualization skills related to projections of points, Lines, planes and solids	R,U,Ap	1,2,4	27
CO4	Develop the ability to draw the isometric view from the orthographic views and Convert isometric views into orthographic views and learn concept of 3D visualization	R,U,Ap	1,2,4	18
CO5	Interpret the basic concept and usage of CADD software. Compare the utilities of alternate drafting software from open source. Setup CADD workstation and demonstrate basic commands of Computer Aided Design and Drafting Software.	R,U,Ap	1,2,4	18
Total sessions				78

Legend- R: Remember U: Understand Ap: Application Ay: Analysis

Course Outcome and Programme outcome mapping

Second Semester - CO & PO Mapping of Civil Engineering Graphics 20CE22D							
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7
C205.1	3	3	-	1	-	-	-
C205.2	3	3	-	1	-	-	-
C205.3	3	3	-	1	-	-	-
C205.4	3	3	-	1	-	-	-
C205.5	3	3	-	1	-	-	-
AVG	3	3	-	1	-	-	-

Programme outcome Attainment Matrix

Course	Programme Outcome							PSO 1	PS 02
	PO1	PO2	PO3	PO4	PO5	PO6	PO7		
CIVIL ENGINEERING GRAPHICS	3	3	-	1	-	-	-	2	2

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 >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 CONTENTS

UNITS	CONTENT	HOURS
1	<ul style="list-style-type: none"> ➤ INTRODUCTION TO ENGINEERING DRAWING AND DRAWING INSTRUMENTS <ul style="list-style-type: none"> • Introduction to Engineering drawing, • Drawing Instruments, Standard Sizes of Drawing sheets-Layout of drawing sheets, Folding of Drawing sheets as per Bureau of Indian Standards, • Types of lines and their applications, Conventions used in Civil Engineering ➤ DIMENSIONING PRACTICE <ul style="list-style-type: none"> • Introduction to Dimensioning, Elements of Dimensioning, Systems of Dimensioning, Methods of arrangements of Dimensioning • Representative Fraction and Scales recommended by the Bureau of Indian Standards(Reducing scale, Enlarging scale and Full scale) • Dimensioning of common features like diameters, radii, arcs and chords and simple Civil Engineering Objects. 	09
2	<ul style="list-style-type: none"> ➤ GEOMETRIC CONSTRUCTIONS <ul style="list-style-type: none"> • To divide a line into any number of equal parts • Construction of regular Polygons using different methods ➤ CONIC SECTIONS <ul style="list-style-type: none"> • Elements of Ellipse and Parabola • Applications of Ellipse and Parabola in engineering constructions • Construction of Ellipse by Concentric Circle method and Rectangle method • Construction of Parabola by Rectangle method and Parallelogram method 	06
3	<ul style="list-style-type: none"> ➤ ORTHOGRAPHIC PROJECTION OF POINTS <ul style="list-style-type: none"> • Introduction to orthographic projection-Principal planes of projection- Four Quadrants- Concept of First angle & Third angle projection • Methods-Projection of points in all the four quadrant system. Practicing exercises on projection of points in all four quadrants ➤ ORTHOGRAPHIC PROJECTION OF LINES <ul style="list-style-type: none"> • Projection of lines - Line Parallel to both HP and VP, Line parallel to one plane and Perpendicular to other-Line parallel to one plane and Inclined to the other, Line inclined to both HP and VP. • Practicing of exercises on projection of lines in different positioning 	12

4	<ul style="list-style-type: none"> ➤ ORTHOGRAPHIC PROJECTION OF PLANES • Projection of Plane surface: Parallel to one and perpendicular to the other planes of projection, Perpendicular to one and inclined to the other planes of projection, Plane surface inclined to both planes of projection. • Practicing of exercises on projection of planes in different positioning ➤ ORTHOGRAPHIC PROJECTION OF SOLIDS • Introduction-Positioning of solids -Solid lying with base on HP- Solids lying with base or axis inclined to HP, solid with lateral faces, lateral edge on HP, Solids lying with their base inclined to both HP and VP. (Solids like- prisms, pyramids, cone and cylinder) • Practicing of exercises on projection of solids in different positioning 	15
5	<ul style="list-style-type: none"> ➤ ISOMETRIC VIEWS • Principles of isometric Views, Isometric views of regular polygons. • Conversion of orthographic views into isometric View- Drawing of Isometric views of solids like prisms, pyramids, cylinder and cone. • Conversion of orthographic views into isometric View -Drawing of Isometric views of combination of solids and simple civil engineering objects • Conversion of isometric views into orthographic views 	18
6	<p>BASIC CADD IN CIVIL ENGINEERING</p> <ul style="list-style-type: none"> ➤ Introduction to CADD • General features of CADD, CADD work station, Hardware and Software requirements • Advantages of using CADD, Starting CADD, Understanding CADD • Editor Screen- title bar, menu bar, dashboard, standard tool bar, drawing area, UCS, command prompt area, status bar. ➤ Demonstration of commands in CADD • Commands- Command Entry Options using -Command Line, Menus (File Edit, View, Insert, Format, Tools, Draw, Dimension, Modify, Window, Help) and Dialog Boxes. • Understanding the use of CADD Menus and Tool Bars • CADD Basic Entities- Drawing Line, Arc, Circle, Rectangle and polygons using different coordinate Systems such as Absolute Cartesian Coordinates, Relative Cartesian Coordinates, and Absolute Polar coordinates, Relative Polar Coordinates • Direct distance entry and line command, picking coordinates on the screen and line command • Using a wizard, using a template, starting from scratch. • Selection of units, Selection of paper space, Setting up of limits • Four Exercises on 2 Dimensional drawings • Exercises on isometric views(Conversion of Orthographic projection to Isometric view) • Exercises on isometric views(Conversion of Isometric view to Orthographic projection) 	18
Total		78 Hrs

Note: Graded exercises Plan in each unit should be as per table provided below.

Course Delivery:

Unit 1 to Unit 5: The course content will be delivered through lectures and Power point

presentations/ Video with classroom practices (Manual drawing)

Unit 6 :The course content will be delivered through lectures with demonstration in CADD laboratory with lab practice using CADD software

UNIT	DETAILED COURSE CONTENT	CO	PO	Conta ct Hrs
UNIT-1 :INTRODUCTION TO ENGINEERING DRAWING AND DIMENSIONING PRACTICE				
1	<ul style="list-style-type: none"> Introduction to Engineering drawing, Drawing Instruments, Standard Sizes of Drawing sheets Layout of drawing sheets, Folding of Drawing sheets as per Bureau of Indian Standards 	CO1	1,2,4	3
	<ul style="list-style-type: none"> Types of lines and their applications, Conventions used in Civil Engineering Introduction to Dimensioning, Elements of Dimensioning, Systems of Dimensioning Methods of arrangements of Dimensioning 	CO1	1,2,4	6
	<ul style="list-style-type: none"> Representative Fraction and Scales recommended by the Bureau of Indian Standards(Reducing scale, Enlarging scale and Full scale) Dimensioning of common features like diameters, radii, arcs and chords and simple Civil Engineering Objects. 	CO1	1,2,4	9
UNIT-2 GEOMETRIC CONSTRUCTION AND CONIC SECTIONS				
2	<ul style="list-style-type: none"> To divide a line into any number of equal parts Construction of regular Polygons using different methods Elements of Ellipse and Parabola 	CO2	1,2,4	12
	<ul style="list-style-type: none"> Applications of Ellipse and Parabola in engineering constructions Construction of Ellipse by Concentric Circle method and Rectangle method Construction of Parabola by Rectangle method and Parallelogram method 	CO2	1,2,4	15
UNIT-3 : ORTHOGRAPHIC PROJECTION,PROJECTION OF POINTS AND LINES				
3	<ul style="list-style-type: none"> Introduction to orthographic projection Principal planes of projection- Four Quadrants Concept of First angle & Third angle projection method 	CO3	1,2,4	18
	<ul style="list-style-type: none"> Projection of points in all the four quadrant system. Exercises on projection of points in all four quadrants 	CO3	1,2,4	21
	<ul style="list-style-type: none"> Introduction to projection of line Projections of Line Parallel to both HP and VP Projection of Line parallel to one plane and Perpendicular to other 	CO3	1,2,4	24
	<ul style="list-style-type: none"> Projections of Line parallel to one plane and Inclined to the other Projection of line inclined to both HP and VP. 	CO3	1,2,4	27
UNIT-4 : ORTHOGRAPHIC PROJECTION AND PROJECTION OF PLANES AND SOLIDS				
4	<ul style="list-style-type: none"> Introduction to projection of planes. Projection of plane surfaces parallel to one plane and perpendicular to the other Projection of Plane surface perpendicular to one plane and inclined to other 	CO3	1,2,4	30

	<ul style="list-style-type: none"> • Projection of Plane surface inclined to both HP and VP • Exercises on projection of planes 	CO3	1,2,4	33
	<ul style="list-style-type: none"> • Introduction-Positioning of solids • Solid lying with base on HP • Solids lying with base or axis inclined to HP. 	CO3	1,2,4	36
	<ul style="list-style-type: none"> • Positioning of solid with lateral faces, lateral edge on HP • Solids lying with their base inclined to both HP and VP • Exercises on projection of solids 	CO3	1,2,4	39

UNIT-5 : ISOMETRIC VIEWS

5	<ul style="list-style-type: none"> • Principles of isometric Views • Isometric views of regular polygons. 	CO4	1,2,4	45
	<ul style="list-style-type: none"> • Conversion of orthographic projection into isometric View of solids like prisms, pyramids, cylinder, cone. 	CO4	1,2,4	48
	<ul style="list-style-type: none"> • Conversion of orthographic projection into isometric Views of combination of solids and simple civil engineering objects 	CO4	1,2,4	51
	<ul style="list-style-type: none"> • Conversion of isometric views into orthographic projection of combination of solids 	CO4	1,2,4	54
	<ul style="list-style-type: none"> • Conversion of isometric views into orthographic projection of simple civil engineering objects 	CO4	1,2,4	57
	<ul style="list-style-type: none"> • Exercises on isometric views 	CO4	1,2,4	60

UNIT-6 : BASIC CADD IN CIVIL ENGINEERING

6	<ul style="list-style-type: none"> ➤ Introduction to CADD • General features of CADD, CADD work station, Hardware and Software requirements, • Advantages of using CADD, Starting CADD • Understanding CADD Editor Screen- title bar, menu bar, dashboard, standard tool bar, drawing area, UCS, command prompt area, status bar. ➤ Demonstration of commands in CADD • Commands- Command Entry Options using -Command Line, Menus (File, Edit, View, Insert, Format, Tools, Draw, Dimension, Modify, Window, Help) and Dialog Boxes. <p>Understanding the use of CADD Menus and Tool Bars</p>	CO5	1,2,4	63
	• CADD Basic Entities- Drawing Line, Arc, Circle, Rectangle and polygons using different coordinate Systems such as Absolute Cartesian Coordinates, Relative Cartesian Coordinates, and Absolute Polar coordinates, Relative Polar Coordinates			
	• Direct distance entry and line command, picking coordinates on the screen and line command.			
	• Using a wizard, using a template, starting from scratch.			
	• Selection of units, Selection of paper space, Setting up of limits			
	• Four Exercises on 2 Dimensional (2D) drawings	CO5	1,2,4	69
	• Exercises on isometric views(Conversion of Orthographic projection to Isometric view)	CO5	1,2,4	72
	• Exercises on isometric views (Conversion of Orthographic projection to Isometric view)	CO5	1,2,4	75
	• Exercises on isometric views (Conversion of Isometric view to orthographic projection)	CO5	1,2,4	78

Course Assessment and Evaluation Chart

Assessment Method	Type of Assessment		Target	Assessment methods	Max Marks	Type of record	Duration	
Direct Assessment	CIE Continuous Internal Evaluation	Portfolio Evaluation of drawing Skill tests	STUDENT	Marks awarded for each unit exercises	20 (Average of all units marks)	Drawing sheet with log sheet (to be folded as per BIS and filed)	Submissions to be taken after the completion of every unit	
				Skill Test 1 [unit 1,2 , (part of 3)]	20 (Average of 2 tests)	Manual drawing	180 minutes	
				Skill Test 2 [(part of unit 3) & unit 4 & unit 5]		Manual drawing	180 minutes	
				Skill Test 3 (unit 6)	20 marks	Drawing execution using CADD	180 minutes	
				Total CIE Marks	60 marks	All the above	End of semester	
				SEE	40 marks	Answer sheets & CADD execution.	180 minutes	
				Total	100 marks			
Indirect Assessment	Student feedback		STUDENT	Middle of the course	-NA-	Feedback forms	Middle of semester	
	End of Course survey			End of course		Questionnaire	End of the semester	

Note:

1. CIE is conducted for 60 marks and SEE is conducted for 100 Marks & Weightage is reduced to 40 marks
2. Three Skill tests to be conducted for 100 marks (3 Hrs) and should be reduced to 20 marks and average marks of skillTest 1 and skill test 2 shall be rounded off to the next higher digit.
3. Content of Unit 3 can be divided for Skill test 1 and skill test 2 as required
4. CIE & SEE to be conducted as per the scheme of Evaluation below

Scheme of Evaluation for CIE : SKILL TEST 1 AND SKILL TEST 2

MODEL QUESTION PAPER FOR SKILL TEST 1

Programme :	Semester: I				
Course :	Max Marks :100				
Course Code :	Duration :180 minutes				
Name of the course coordinator:	SKILL Test :I				
Note: Answer the following questions. One full question carries 20 marks.					
Qn.No	Question	CL	CO	PO	Marks
Section-1 (UNIT 1)					
1.a)					20
	OR				
b)					20
2.a)					20
	OR				
b)					20
Section-2(UNIT 2)					
3.a)					20
	OR				
b)					20
4.a)					20
	OR				
b)					20
Section-3(PART OF UNIT 3)					
5.a)					20
	OR				
c)					20

MODEL QUESTION PAPER FOR SKILL TEST 2

Programme :	Semester: I				
Course :	Max Marks :100				
Course Code :	Duration :180 minutes				
Name of the course coordinator:	SKILL Test :II				
Note: Answer one full question from each section. One full question carries 10 marks.					
Qn.No	Question	CL	CO	PO	Marks
Section-1 (PART OF UNIT 3)					
1.a)					20
	OR				
b)					20
Section-2(UNIT4)					
2.a)					20
	OR				
b)					20
3.a)					20
	OR				
b)					20
Section-3(UNIT 5)					
4.a)					20
	OR				
b)					20

1	Viva	10 marks
2	Concept of CADD work station and Demo of commands	20 marks
3	Drawing of Isometric view (orthographic projection to isometric view)	35 marks
4	Drawing of Isometric view (Isometric view to orthographic projection)	35 marks
Total		100 marks
5.a)		20
	OR	
b)		20

Scheme of Evaluation for CIE – SKILL TEST 3 (Practical mode)

Scheme of Evaluation for SEE (Practical mode)

Sl. No	Questions	Max. Marks
SECTION 1: Manual Drawing in given answer sheet		
A)	i. Question from Unit 1 or 2 Or ii. Question from Unit 3	25
B)	i. Question from Unit 4 Or ii. Question from Unit 5	25
SECTION 2 : Basic CAD Drawing		
C)	i) One exercise execution on Isometric Views using CADD ii) Dimensioning of the CADD drawing executed	40 10
Total		100

GRADED EXERCISE PLAN

Unit no	Name of the unit	Drawing Sheets	Title of the drawing	Minimum no of exercise
I	INTRODUCTION TO ENGINEERING DRAWING AND DIMENSIONING PRACTICE	1	Use of drawing instruments	05
		2	Dimensioning	05
II	GEOMETRIC CONSTRUCTION AND CONIC SECTIONS	2	Geometric construction	05
			conic sections	08
III	ORTHOGRAPHIC PROJECTION PROJECTION OF POINTS AND LINES	2	Projection of Points	10
			Projection of Lines	15
IV	ORTHOGRAPHIC PROJECTION OF PLANES AND SOLIDS	3	Projection of Planes	15
			Projection of Solids	20
V	ISOMETRIC VIEWS	6	Isometric Views	30

VI	BASIC CADD IN CIVIL ENGINEERING	Printouts	CADD applications	10
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TEXT BOOK

1. K.R.Gopalakrishna "Fundamentals of 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.Chand Publishers, Delhi, 2010.
2. G.S. Phull and H.S.Sandhu, "Engineering Graphics", Wiley Publications, 2014.
3. KVenugopal 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. Dhananjay A.Jolhe, "Engineering Drawing with an Introduction to AutoCAD", Tata McGrawHill Publishing Company Limited, 2008.
6. BasantAgarwal and Agarwal.C.M., "Engineering Drawing", Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.
7. IS 962 (1989) Code of practice for Architectural and Building Drawings
8. CAD in Civil Engineering a Laboratory Referrel- DrM.A.Jayaram, D.S.Rajendra Prasad, Sapna Book House
9. Sham Tickoo-CADD: A Problem-Solving Approach Thomson Learning EMEA, Limited George Omura- Mastering Auto CAD BPB Publication
10. Arshad N Siddique, ZahidKhab, Mukhtar Ahmed- Engineering Drawing with CADD

E-Learning:

ORIGAMI	https://www.youtube.com/watch?v=a3WFm8Yffm4
UNIT 1	https://www.youtube.com/watch?v=z4xZmBpXIzQ https://www.youtube.com/watch?v=uojN7SOHPBw https://www.youtube.com/watch?v=w2-a_EzO4-Q https://www.youtube.com/results?search_query=dimensioning
UNIT 2	https://www.youtube.com/watch?v=rt7qTvPYVXE https://www.youtube.com/results?search_query=conic+sections+in+engineering+drawing
UNIT3	https://www.youtube.com/watch?v=SB83cUaAiCM https://www.youtube.com/watch?v=fk4h5gM73w8&list=PLlhUrsYr8yHxEk_jv8yOatn3Dcr6KYK3j https://www.youtube.com/watch?v=FtuLo9DMw8&list=PLlhUrsYr8yHz_FkG5tGWXaNbIxVcibQvV
UNIT4	https://www.youtube.com/watch?v=AoNIOxnxD00&list=PLlhUrsYr8yHx7TVB51jN3HZVyW3R6RiBg https://www.youtube.com/watch?v=YV4RZNQ2yB8&list=PLlhUrsYr8yHxARPzEFz1nXgt8j6xF_tEm
UNIT5	https://www.youtube.com/watch?v=Vo9LC9d7FQA&list=PLlhUrsYr8yHxVky7bfrnbRcdXcHjTK83 https://www.youtube.com/watch?v=f1Hdtf_iAWk
	https://www.youtube.com/watch?v=It2jXzsXrVw&list=PLrOFa8sDv6jd0R3IzK-olrYadMkwsDG2g

UNIT6	<p>http://www.sketchup.com</p> <p>http://www.autodesk.in/products/3ds-max/overview</p> <p>http://www.we-r-here.com/cad/tutorials/index.htm</p> <p>http://www.cadtutor.net/tutorials/CADD/</p> <p>http://www.caddprimer.com/CADD_training_tutorial/CADD_training_lessons.html</p> <p>http://www.CADDmark.com/</p> <p>http://www.CADDtutorials.net/</p> <p>https://www.youtube.com/watch?v=J2LiXosRKKk</p> <p>https://www.youtube.com/watch?v=8rkkYc8mFck</p>
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Infrastructure required

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.)-30 no
2. Any latest Authorized Computer Aided Drafting Software (30 user licenses)
3. Plotter of size A2/A3
4. LCD Projector
5. Drawing Table with chair in drawing room

ACTIVITIES

Course co coordinator	<ul style="list-style-type: none"> ❖ Course coordinator should make the student understand the importance of Engineering graphics, study and deliver the course content effectively. ❖ Focus should be on proper selection of drawing instruments and their proper use. ❖ Emphasis should be given on cleanliness, dimensioning and layout of sheet. ❖ Course coordinator should show model of real component/part and should give live applications of those, whose drawing is to be made. ❖ Students should be encouraged to practice manual drawing and CADD drawings and to be given with activities to perform which can enhance their skills towards engineering objects ❖ At regular interval students should be assessed for the skill attainment. ❖ Encourage students for improvement in performance through skill tests and portfolio Evaluation ❖ Students should be encouraged for blended learning and flipped learning
Program coordinator	<ul style="list-style-type: none"> ❖ The department should procure AutoCADD or other engineering graphics software for practice in engineering graphics. ❖ Separate CADD labs and drawing room for practice on Engineering graphics should be set up ❖ Monitor the progress of skill learning among the students.
Student(suggested)	<p>The topic should be related to the course in order to enhance his knowledge, practical skill & and lifelong learning, communication, modern tool usage.</p> <ul style="list-style-type: none"> ❖ Plot the different line styles used in Civil Engineering drawing. ❖ Collect and measure the dimensions of different paper sizes available in market. ❖ Develop a 3D model of simple objects like cube, prism, cylinder and cone. ❖ Develop a conic section ❖ Object of preparing models - Learn the art of ORIGAMI to prepare models <ul style="list-style-type: none"> • Rectangular prism, Rectangular pyramid, • Triangular prism and pyramid, Square prism and pyramid, • Pentagonal prism and pyramid, • Hexagonal prism and pyramid ,

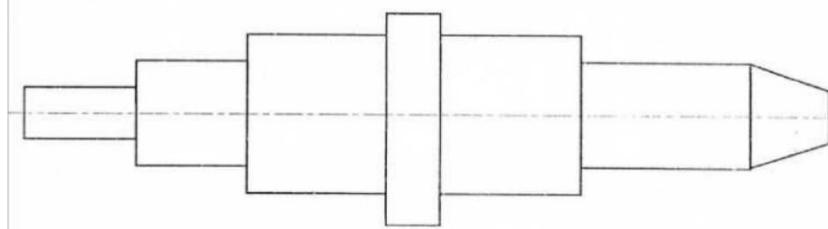
	<ul style="list-style-type: none"> • Octagonal prism and pyramid, • Decagonal prism and pyramid, • Cube, cone , cylinder, tetrahedron, octahedron • Simple Civil Engineering objects
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LOG SHEET FOR PORTFOLIO EVALUATION (Model)**(To be maintained by the student for portfolio evaluation along with filing)**

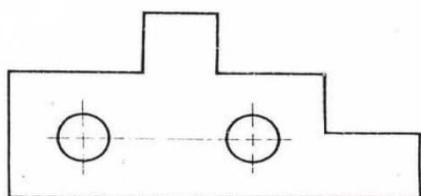
SI.NO	DATE OF SUBMISSION	UNIT	TITLE OF THE DRAWING	NO OF SHEETS	MARKS AWARDED	SIGNATURE OF COURSE COORDINATOR
1						
2						

MODEL QUESTION BANK**Course: CIVILENGINEERING GRAPHICS Code: 20CE21P****UNIT-I****10 Marks Questions**

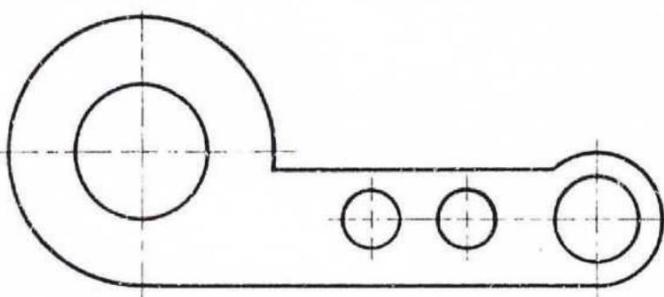
1. (a) List the standard sizes of drawing sheets.
(b) Mention the types of lines and their applications.
2. (a) Illustrate the elements of dimensioning with the help of a sketch.
b) Illustrate the dimensioning of given common features: diameter, radius, chord, Arc and angle.
3. (a) Mention the uses of the following drawing instruments.
i) T-square ii) Set square iii) Bow compass iv) Clinograph v) Mini-drafter
b) Mention the uses of the following drawing instruments.
i) French curves ii) Protractor iii) Clips iv) Erasing Shield v) Drafting machine
Mention the types of lines and their applications (10 marks questions)
4. Copy the given sketch to 1:1 scale and dimension adopting aligned system with parallelDimensioning method.



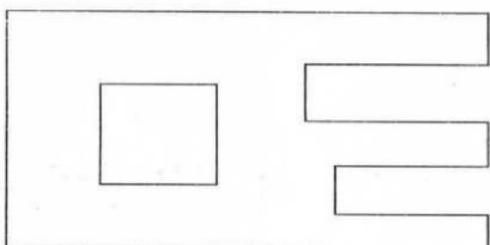
5. Copy the given sketch to 1:1 scale and dimension adopting aligned system with progressive dimensioning method.



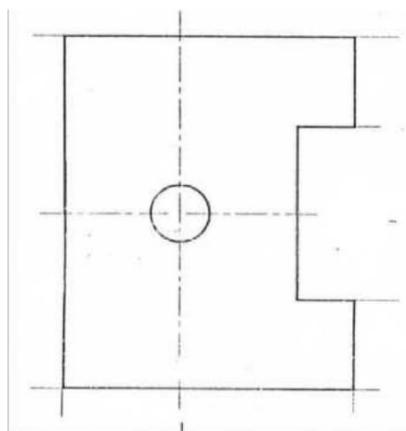
6. Copy the given sketch to 1:1 scale and dimension adopting unidirectional system with chain dimensioning method.



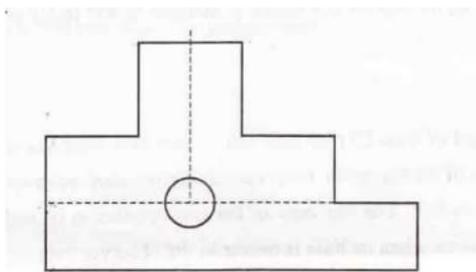
7. Copy the given sketch to 1:1 scale and dimension adopting unidirectional system with combined dimensioning method.



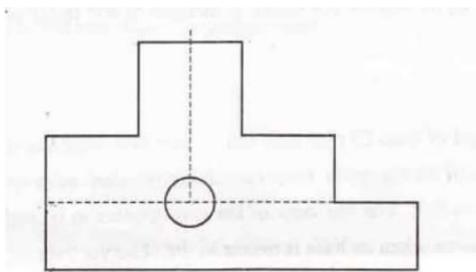
8. Copy the given sketch to 1:1 scale and dimension adopting unidirectional system with parallel dimensioning method.



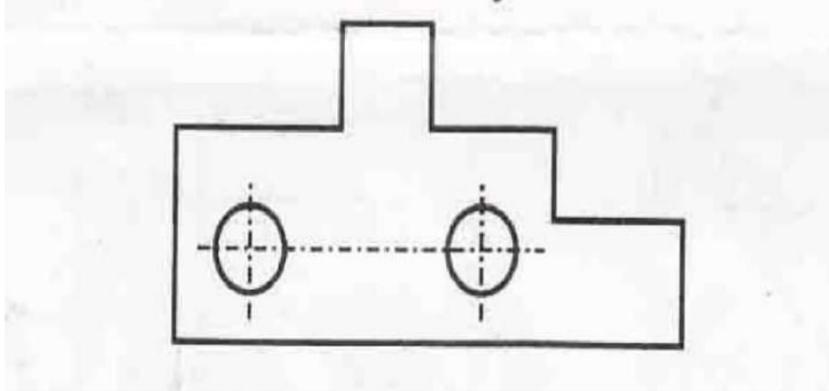
9. Copy the given sketch to 1:1 scale and dimension adopting aligned system with chain dimensioning method.



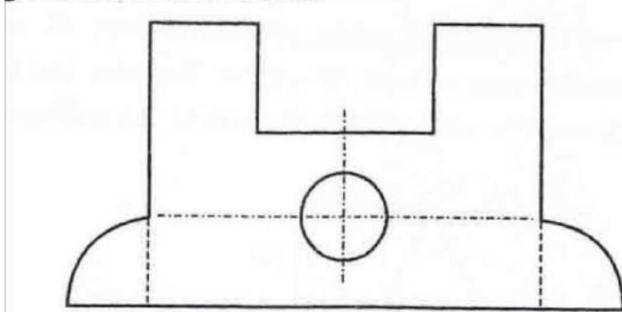
10. Copy the given sketch to 2:1 scale and dimension adopting aligned system with chain dimensioning method



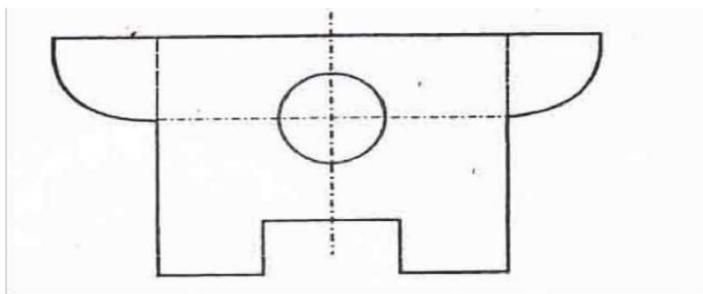
11. Copy the given sketch to 1:2 scale and dimension adopting aligned system with chain dimensioning method



12. Draw the given sketch to 1:2 scale and dimension adopting aligned system with chain dimensioning method



13. Draw the given sketch to 1:2 scale and dimension adopting aligned system with chain dimensioning method



Unit II (10marks)

14. A shot thrown from the ground level reaches a maximum of 45mt and falls on the ground at a distance of 100mt from the point of projection. Trace the path of the stone in space, select scale of 1:1000.
15. An ellipse has the major and minor axes in the ratio 3:2. Draw the ellipse when the major axis is 120mm by concentric circles method.
16. Inscribe an ellipse in a rectangle of side 150mm and 120mm
17. Inscribe parabola in a rectangle of side 120mm and 80mm.
18. Inscribe parabola in a parallelogram of side 100mm and 70mm and having included angle 55°
19. A shot is discharged from the ground level at an inclination of 55° to the ground which is assumed to be horizontal. The shot returns to the ground at a point 75m distance from the point of discharge. Trace the path of the shot. Take scale 1:1000.
20. A shot thrown from the ground level reaches a maximum of 45mt and falls on the ground at a distance of 100mt from the point of projection. Trace the path of the stone in space, select scale of 1:1000.

UNIT-III (10 marks Questions)

21. 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.
22. A point P is 30 mm above HP, 50 mm behind VP and 45 mm in front of left PP. Draw the three principal views of the point
23. Draw the three principal views of a point P lying 40 mm behind VP, 60 mm below HP and 30 mm behind the right PP.
24. Draw the three principal views of a point P lying 60 mm below HP, 50 mm in front of VP and 45 mm in front of the left PP.
25. Draw the three principal views of a line 90 mm long placed parallel to VP and perpendicular to HP. The line is 60mm in front of VP and 50mm in front of right PP. The lower end of the line is 40mm above HP.
26. Draw the three principal views of a line 90 mm long when it is placed parallel to both HP & VP. One of the ends of the line is 60 mm above HP, 30 mm in front of VP and 40mm in front of the right

PP.

27. A line AB 95 mm long is inclined at 40° 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.
28. A line AB 80 mm long is inclined at 45° to VP and parallel to HP. The end nearer to VP is 30mm in front of VP, 60 mm above HP and 100 mm in front of right PP. Draw the three principal views of the line.
29. 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.
30. The length of a line is 100 mm long and is inclined at 45° to VP and parallel to HP. The line is 15 mm above HP and one end of the line is 10 mm in front of VP. Draw the projections of the line and measure top and front views.
31. A line AB 80 mm long has one of its extremities 25 mm in front of VP and 30 mm above HP. The line is inclined at 30° to HP and 45° to VP. Draw its top and front views.
32. A line AB measuring 70 mm has its end A 15 mm in front of VP and 20 mm above HP. The other end B is 60 mm in front of VP and 50 mm above HP. Draw the projections of the line with HP & VP.
33. A line PQ has its end P 15 mm above HP and mm in front of VP. The end Q is 55 mm above HP and the line is inclined at 30° to HP. The distance between the end projectors of the line when measured parallel to the line of intersection of HP &
34. VP is 50 mm. Draw the projections of the line and find its inclinations with VP.
35. The distance between the end projectors passing through the end points of a line AB is 40 mm. The end A is 20 mm above HP and 15 mm in front of VP. The line AB appears as 65 mm long in the front view. Complete the projections. Find the true length of the line and its inclinations with HP & VP.

UNIT-IV

(15 marks questions)

36. An equilateral triangular lamina of side 50mm rests with one its sides on HP so that the surface of the lamina is inclined at 40° to HP. The side on which the lamina rests is inclined at 50° to VP. Draw the projections of the lamina.
37. An equilateral triangular lamina of sides 40mm is resting with one of its corners on HP, The surface of the lamina is inclined at 50° to HP and the side opposite to the corner on which the lamina rests is inclined at 40° to VP. Draw the projections of the lamina.
38. 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.
39. .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 VP and Lamina appears to be inclined at 35° to HP. Draw its projections.
40. A square lamina of side 40mm rests with one of its corner on HP. The diagonal passing through this corner is inclined at 55° to HP and 30° to VP. Draw its projections.
41. A hexagonal lamina of sides 30mm rests on 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 lamina.
42. A hexagonal lamina of side 30mm is resting with one of its corner on HP so that the diagonal passing through that corner is inclined at an angle of 45° and appears to be inclined at 30° to VP. Draw the top and front views of the lamina.
43. A square lamina of ABCD of 40mm side rests on the corner C such that diagonal AC appears as at 35° to the VP in the top view. The two sides BC and CD containing the corner C make equal

inclinations with the HP. The surface of the lamina makes 40° with HP. Draw its top and front views.

44. A pentagonal plane lamina of edges 30mm is resting on HP with one of its corner touching it such that plane surface makes an angle of 50° with HP. The two of the base edges containing the corner on which the lamina rests make equal inclinations with HP. If the edge opposite to this corner makes an angle of 40° with the VP, draw the top and front views of the plane lamina in this position.
45. A hexagonal lamina of 40mm sides rests on HP on one of its sides. The side which is on HP is perpendicular to VP and the surface of the lamina is inclined to HP at 45° . The lamina is then rotated through 90° such that the side on HP is parallel to the VP, while the surface is still inclined to HP at 45° . Draw the front view and the top view of the lamina in its final position.
46. A circular lamina of 65mm diameter rests on HP such that the surface of the lamina is inclined at 40° to HP. The diameter through the point on which the lamina rests on HP appears to be inclined at 50° to the VP in the top view. Obtain its projections.
47. A hexagonal pyramid, base 30mm side and axis 60mm long has one of its triangular face containing the slant edge on which it rests are equally inclined to HP. The axis appears to be inclined at 45° to VP. Draw its projections when its base is nearer to the observer than its apex.
48. 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.
49. An equilateral triangular prism 30 mm side of base and 50mm long rests with one of its shorter edge on HP such that rectangular face containing the edge on which the prism rests is inclined at 30° to HP. The edge on which the prism rests is inclined at 60° to VP. Draw its projections.
50. 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° in the top view. Draw its top and front views.
51. A Hexagonal prism of 30 mm side of base and axis 60mm long is placed with one of its base edges on HP such that the axis is inclined at 35° to HP and 45° to VP. Draw its projections.
52. A Pentagonal pyramid 25mm side of base and 50mm altitude rests with one of its corners on HP such that the two base edges passing through the corner on which rests make equal inclinations with HP. The axis is inclined at 50° to VP and 30° to HP. Draw the top and front views of the pyramid.
53. A cone of base 60mm diameter and axis 80mm long rests on HP with its axis inclined 45° to HP and 30° to VP. Draw the top and front views of the cone.
54. Draw the top and front views of a right cylinder of base 50mm diameter and 70mm long when it lies on HP, such that its axis is inclined at 30° to HP and axis appears to be perpendicular to VP in the top view.
55. An equilateral triangular prism of base side 25mm and 50mm long rests with one of 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.

56. 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.
57. 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.
58. 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.
59. 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.
60. 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.
61. 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.
62. 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.
63. 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.
64. 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.
65. 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.
66. 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.
67. 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.

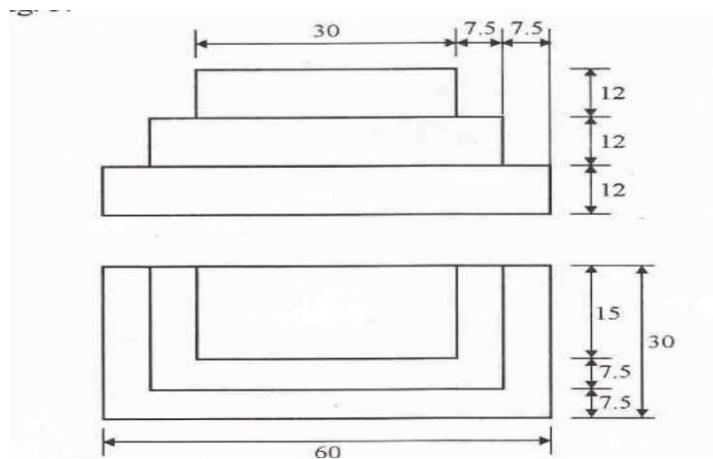
68. A cone of base 60mm diameter and axis 80mm long rests on HP with its axis inclined 45° and 30° with HP and VP respectively. Draw the top and front views of the cone.

69. 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

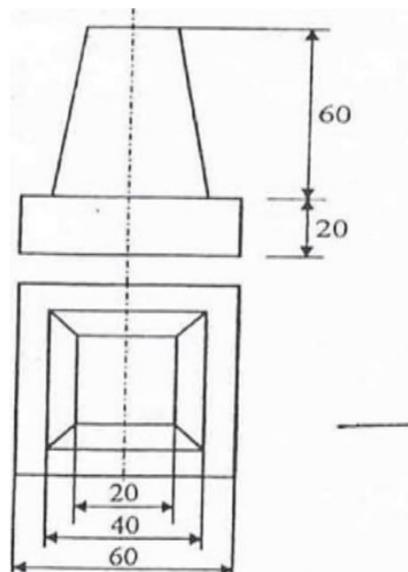
UNIT V

(15 marks questions)

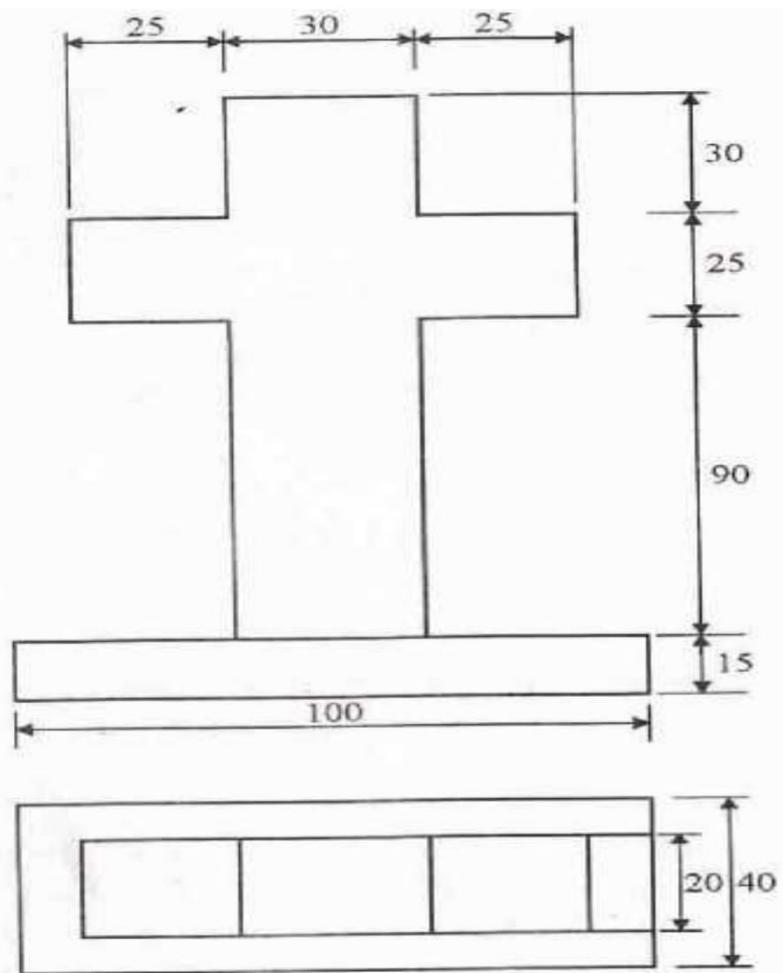
1. Draw the isometric view of the following objects whose orthographic views are given below:



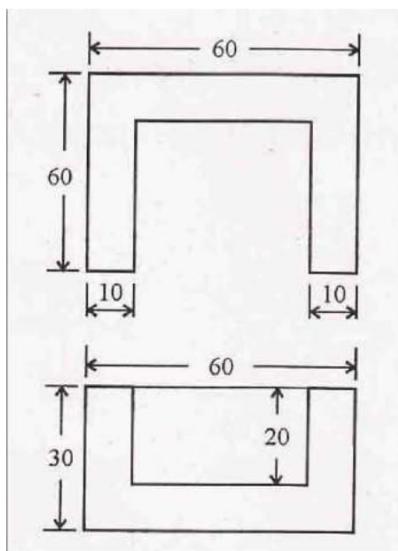
2. Draw the isometric view of the following objects whose orthographic views are given below



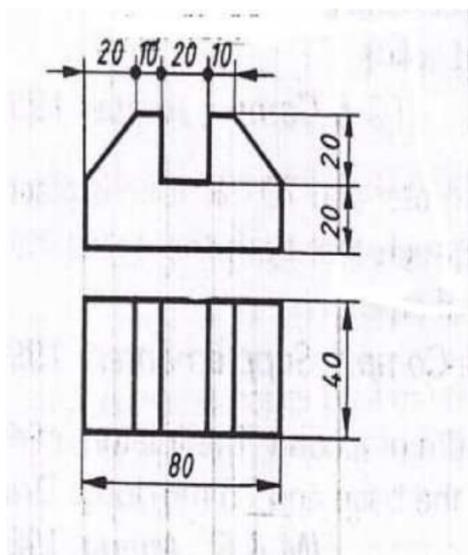
3. Draw the isometric view of the following objects whose orthographic views are given below

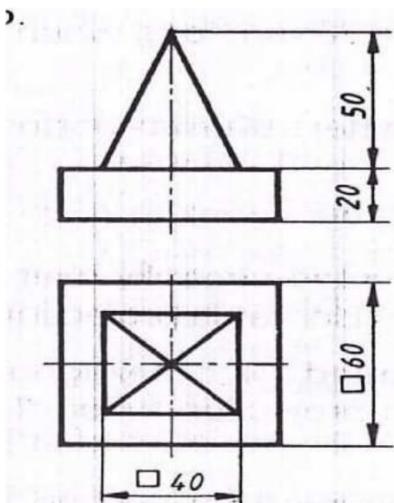
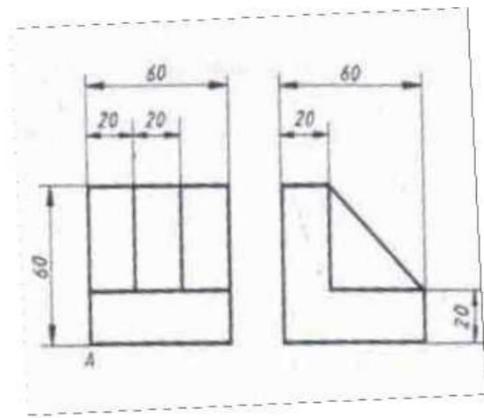


4.. Draw the isometric view of the following objects whose orthographic views are given below



5. Draw the isometric view of the following objects whose orthographic views are given below





5. A Circular column of side 40mm and height 50mm is placed centrally on a square footing of side 100mm and thickness 25mm. Draw the Isometric projections of the combination
6. A Cube of side 50mm is resting coaxially over a circular slab of diameter 100mm and thickness 30mm. Draw the isometric view of the combination of the solid. cone having diameter of the base 60mm and height 70 mm is resting co- axially on the square slab of side 100mm and thickness 40mm. Draw the isometric view of the combination of the solid.
7. A cylinder of 50mm diameter and 50mm high is placed centrally on the rectangular footing of sides 75mm and 100mm and thickness 25mm. Draw the isometric projections of the arrangement.
8. A frustum of a cone 30mm top diameter and 60mm bottom diameter and 70mm long is placed vertically on a square block of 80mm side and 30mm thick such that both the solids have common axis. Draw the isometric of the combination of the solids.
9. A cylindrical slab 100mm diameter and 40mm thick is supporting a cube of 50mm edge. On the top of the cube rests a square pyramid of altitude 55mm and side of base 30mm such that the base edges of the pyramid are parallel to the edges of the top face. The axes of the solids are in

the same straight line. Draw the isometric projection of the combination of the solids.

10. 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.
11. Three cubes of sides 60mm, 40mm and 20mm are placed centrally one above the other. Draw the isometric projections of the combination.

Fig-1

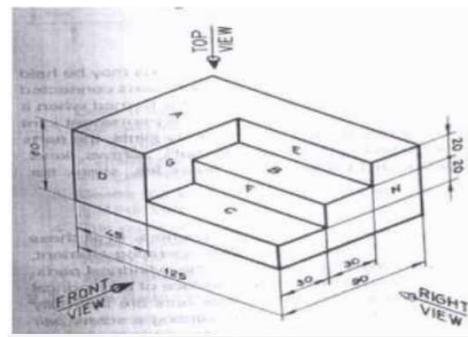


Fig-2

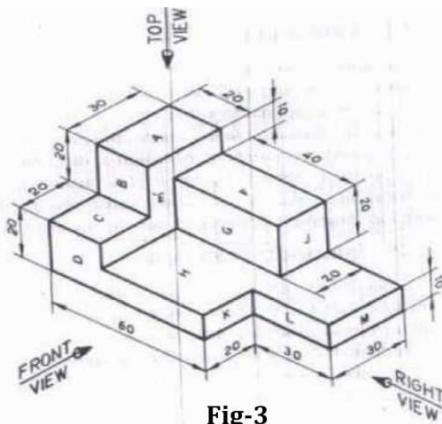


Fig-4

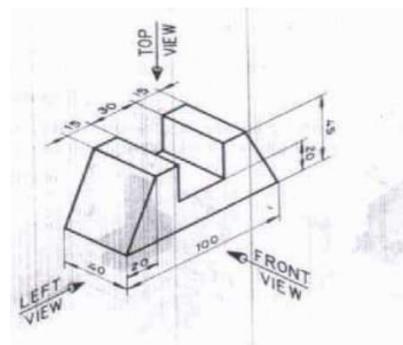


Fig-5

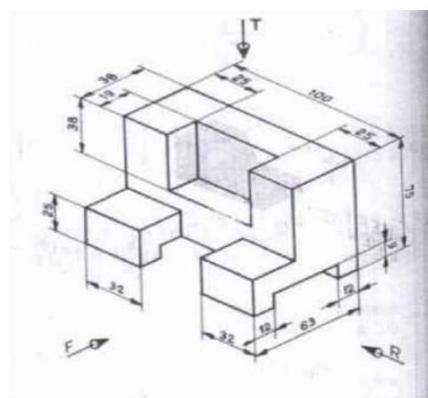


Fig-6