Hall Ticket Number :

R-15

Code: 5G511

I B.Tech. I Semester Supplementary Examinations March 2021
Engineering Mechanics-Statics
(Common to CE & ME)
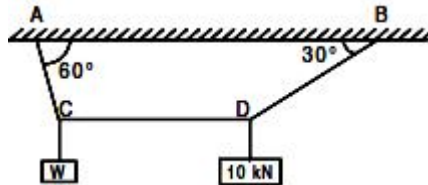
Max. Marks: 70   Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
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UNIT–I

1.   A cord supported at A and B carries a load of 10 KN at D and a load of W at C as shown in Fig. Find the value of W so that CD remains horizontal.


OR

2.   A boom AD supporting a load of 15KN at the end D is held in a horizontal position by a ball and socket joint at A and by two cables BE and CF as shown. Determine the tension in each cable and the reaction at A. Neglect the weight of the boom.
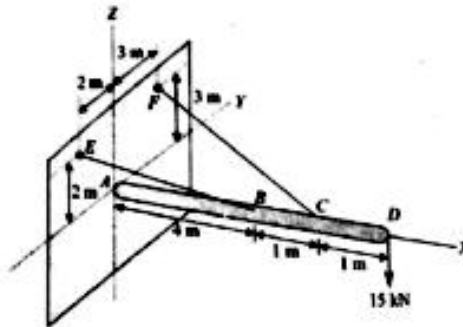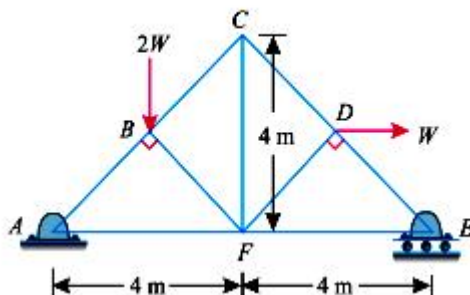

UNIT–II

3.   Discuss the assumptions made in the analysis of simple truss.

Determine the forces in all the members of the truss shown in Fig. and indicate the magnitude and nature of forces on the diagram of the truss. All inclined members are at 60° to horizontal and length of each member is 2 m.
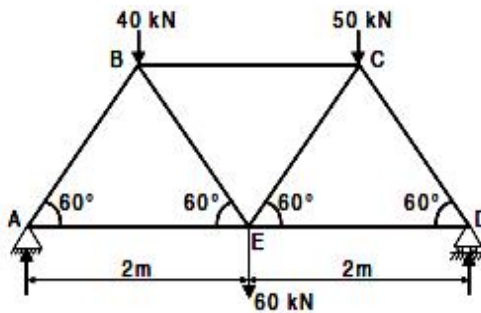
OR

4.   A truss of 8 m span and 4 m height is loaded as shown in Fig. Find the magnitude and nature of the forces in all the members.

UNIT–III

5. Define the terms: Friction, limiting force of friction, co-efficient of friction and angle of friction.

A body, resting on a rough horizontal plane, required a pull of 180 N inclined at 30° to the plane just to move it. It was found that a push of 220 N inclined at 30° to the plane just moved the body. Determine the weight of the body and the coefficient of friction

OR

6. Two blocks W1 and W_2 resting on two inclined planes are connected by a horizontal bar AB as shown in figure. If W1 equals 1000N, determine the maximum value of W_2 for which the equilibrium can exist. The angle of limiting friction is 20^0 at all rubbing faces.
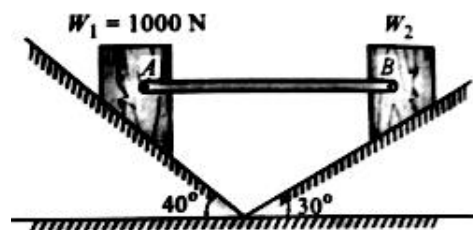
UNIT–IV

7. Uniform lamina shown Figure. consists of rectangle, a semi-circle and a triangle. Find the center of gravity.
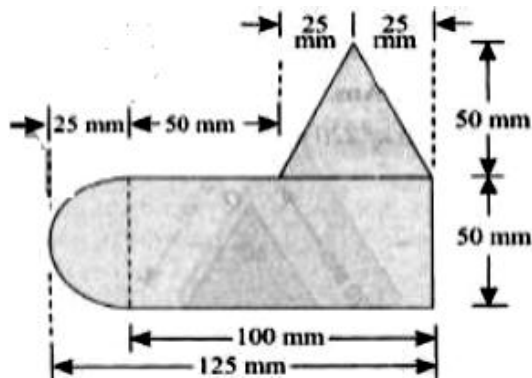
OR

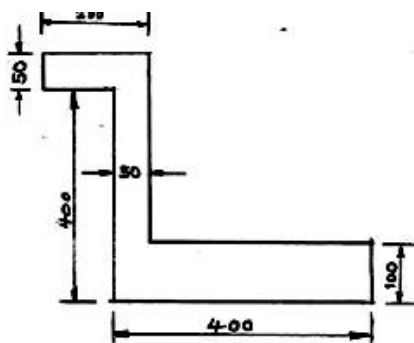8. Locate the centroid of the T-section shown in the Fig.
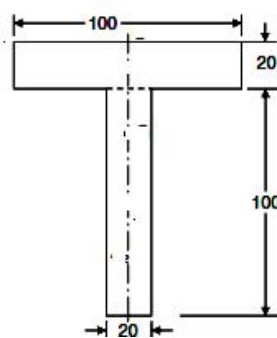
UNIT–V

9. Find the mass moment of inertia of a right circular cone of base radius 'R' and mass 'M' about the axis of the cone.

OR

10. Determine MI of the following section with respect to centroidal axis. All dimensions are in mm.

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R-15

Code: 5GC12

I B.Tech. I Semester Supplementary Examinations March 2021
Engineering Chemistry
(Common to CE, ME & CSE)

Max. Marks: 70   Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
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UNIT–I

1.		Explain in detail how hardness of a water sample is estimated by EDTA method.	14M

OR

2.	a)	How do you determine dissolved oxygen present in a water sample by Winkler's method?	7M
	b)	What is desalination? Explain desalination of water by reverse osmosis process.	7M

UNIT–II

3.	a)	What are secondary batteries? Give an account of Lithium ion batteries and Ni-Cd batteries	7M
	b)	What are potentiometric sensors? Explain their construction and working. Principle of potentiometric sensors	7M

OR

4.	a)	Explain various factors influencing corrosion of metals	7M
	b)	Explain the corrosion control by i) cathodic protection and	
		ii) Impressed current cathodic protection	7M

UNIT–III

5.	a)	Write the differences between addition and condensation polymerization?	6M
	b)	Explain the preparation, properties and uses of Bakelite	8M

OR

6.	a)	Write the differences between thermoplastics and thermosetting plastics.	7M
	b)	Explain the process of processing of rubber? Mention the differences between natural and vulcanized rubber.	7M

UNIT–IV

7.	a)	Describe the Otto Hoffmann's method of manufacture of metallurgical coke with a neat labelled diagram	7M
	b)	Explain the manufacture, advantages and disadvantages of power alcohol	7M

OR

8.	a)	Describe the method of determination of calorific value of a solid fuel by using Bomb calorimeter with a neat labelled diagram	7M
	b)	A sample of Coal on analysis was found to contain the following. C = 76.0 %, H_2 = 5.2 %, O_2 = 12.0 %, S = 2.7 %, N_2 = 2.7 %, and ash = 2.2 %. Calculate the quantity of air required for complete combustion of 1 kg of this coal	7M

UNIT–V

9.	a)	Explain the important properties of a refractory material?	7M
	b)	Present a brief account on the following properties of lubricants	
		i) Flash and fire point ii) Mechanical stability iii) cloud and pour point	7M

OR

10.	a)	What are the raw materials used for manufacturing of Portland cement? Describe the method of manufacturing of Portland cement by wet process with the help of a rotary kiln.	8M
	b)	Explain the chemical reactions involved in setting and hardening process of cement?	6M

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Code: 5G512

I B.Tech. I Semester Supplementary Examinations March 2021
Engineering Graphics–I
(Common to CE & ME)

Max. Marks: 70   Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) construct an ellipse in a parallelogram having sides 150 mm and 100 mm long and an included angle of 120^0.

    b) A point *P* is 40 mm and 60 mm respectively from two straight lines which are at right angles to each other. Draw the rectangular hyperbola from *p* within 15 mm distance from each line.

OR

2. Two points A and B are 100 mm apart. A point C is 75 mm from A and 60 mm from B. Draw an ellipse passing through A, B and C.

UNIT–II

3. Show by means of a drawing that when the diameter of the directing circle is twice that of generating circle, the hypocycloid is a straight line. Take the diameter of the generating circle equal to 50 mm.

OR

4. Draw a circle with diameter AB equal to 65 mm. Draw a line AC 150 mm long and tangent to the circle. Trace the path of A when the line AC rolls on the circle without slipping.

UNIT–III

5. The end A of a line AB is in the H.P. and 25 mm behind the V.P. The end B is in the V.P. and 50 mm above the H.P. The distance between the end projectors is 75 mm. Draw the projections of AB and determine its true length, traces and inclination with the two planes.

OR

6. A line AB inclined at 40° to the V.P. has its ends 50 mm and 20 mm above the H.P. The length of its front view is 65 mm and its V.T. is 10 mm above the H.P. Determine the true length of AB, its inclination with the H.P. and its H.T.

UNIT–IV

7. A circular plate of negligible thickness and 50 mm diameter appears as an ellipse in the front view having its major axis 50 mm and minor axis 30 mm long. Draw its top view when the major axis of the ellipse is horizontal.

OR

8. A thin rectangular plate of sides 60 mm X 30 mm has its shorter side in the V.P. and inclined at 30° to the H.P. Project its top view if its front view is a square of 30 mm long sides.

UNIT–V

9. The projectors of the ends of a line AB are 50 mm apart. The end A is 20 mm above the H.P. and 30 mm in front of the V.P. The end B is 10 mm below the H.P. and 40 mm behind V.P. Determine the true length of AB, and its inclinations with the two planes using auxiliary method.

OR

10. A thin regular pentagonal plate of 60 mm long edges has one of its edges in the H.P. and perpendicular to V.P. while its farthest corner is 60 mm above the H.P. Draw the projections of the plate. Project another front view on an A.V.P. making an angle of 45° with the V.P.

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Code: 5GC14

I B.Tech. I Semester Supplementary Examinations March 2021
Engineering Mathematics-I
(Common to All)

Max. Marks: 70   Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
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UNIT–I

1. Find the Orthogonal trajectories of the family of curves $r = a(1 + \cos\theta)$

OR

2. Solve $2xy\,dy - (x^2 + y^2 + 1)dx = 0$

UNIT–II

3. Using the method of variation of parameters, solve $(D^2 + 4)y = \tan 2x$

OR

4. Solve $(D^2 + 4D + 20)y = 23\sin t - 15\cos t$.

UNIT–III

5. Verify Rolle's theorem for the function $f(x) = (x - a)^m (x - b)^n$, where *m* and *n* are positive integers, in [a, b].

OR

6. Verify Lagrange's Mean value theorem for $f(x) = e^x \, in\, [0,1]$

UNIT–IV

7. Find a point on the plane *3x+2y+z-12=0*, which is nearest to the origin.

OR

8. If $x = r\cos\theta$, $y = r\sin\theta$, then find $\dfrac{\partial(x, y)}{\partial(r, \theta)}$.

UNIT–V

9. Trace the curve $y^2(a + x) = x^2(3a - x)$.

OR

10. Trace the curve $x^3 + y^3 = 3axy$

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Code: 5G111

I B.Tech. I Semester Supplementary Examinations March 2021

Problem Solving Techniques and Introduction to C Programming

(Common to All Branches)

Max. Marks: 70   Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Write an algorithm to check the given number is perfect number or not.

    b) List and explain various symbols used in flowcharts with figures

OR

2. Discuss about different computer languages with examples.

UNIT–II

3. Explain with examples the different types of operators used in C.

OR

4. a) Describe the structure of a C program with example

    b) Explain about data types in C programming language.

UNIT–III

5. a) In what way a do – while loop differs from while loop. Explain.

    b) Write a C program to find whether the given number is prime numbers or not.

OR

6. Explain the syntax of else if ladder and write a C program to read the value of x and evaluate the following function.

$$Y= \begin{cases} 1 \text{ for } x>0 \\ 0 \text{ for } x=0 \\ -1 \text{ for } x<0 \end{cases}$$

Using else if statement and nested if statement.

UNIT–IV

7. Describe creation and initialization of two dimensional arrays and write a C program to perform sum of two matrices.

OR

8. Define string and explain various string input/output functions with suitable examples.

UNIT–V

9. What is function? Explain different parameter passing methods in functions with example.

OR

10. a) Explain about static and register storage classes.

    b) Write a C program to find factorial of a number using recursion.

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