Hall Ticket Number :

UNIT–I
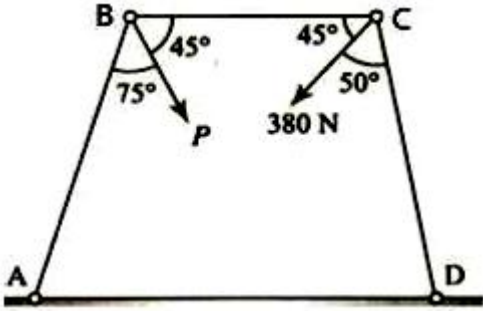
1. a) How do you define the system of forces? Sketch at least three systems of forces.   7M

   b) State and prove Lami's theorem.   7M

OR

2. In the four-bar mechanism ABCD, as shown in fig. below, determine the force P for equilibrium.
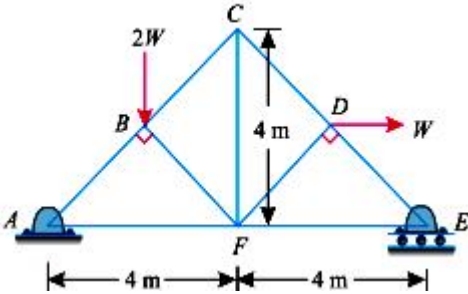

14M

UNIT–II

3. a) Explain various types of loads acting on beams.   7M
   b) Explain the reactions at i) fixed support and ii) roller support. 7M

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.


14M

UNIT–III

5. 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   14M

OR

6. What is the value of P in the system shown in figure to cause the motion of 500 N block to the right side? Assume the pulley is smooth and the coefficient of friction between other contact surfaces is 0.20.
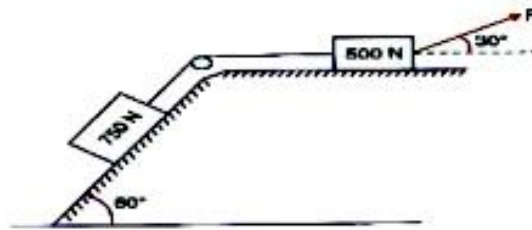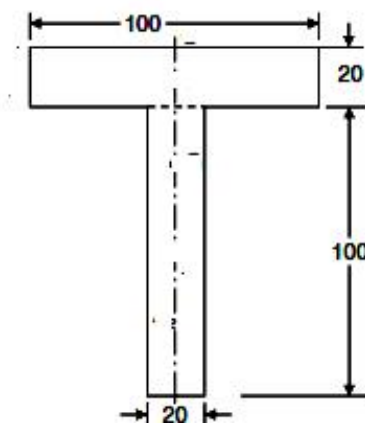

14M

UNIT–IV

7. a) Determine centroid of semicircle whose radius is R. 7M

   b) Determine surface area and volume of sphere using the Pappus and Guldinus theorems. 7M

OR

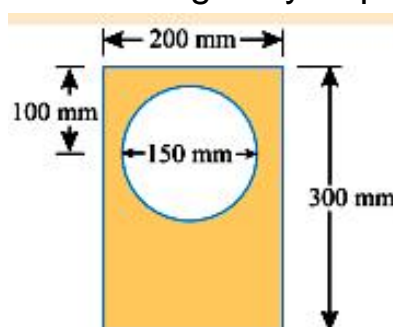8. Locate the centroid of the T-section shown in the Fig.

UNIT–V

9. a) State and prove perpendicular axis theorem. 5M

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

OR

10. Find the moment of inertia of a hollow section shown in Fig. about an axis passing through its centre of gravity or parallel X-X axis.

14M

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I B.Tech. I Semester Supplementary Examinations March/April 2023
Engineering Chemistry
(Common to CE, ME & CSE)

Max. Marks: 70   Time: 3 Hours
Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)
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UNIT–I

1. Give detailed procedure for the determination of dissolved oxygen in water.

OR

2. a) Explain the basic principle involved in the estimation of hardness by EDTA method?

    b) Why is sterilization of water necessary? Discuss any two methods of sterilization.

UNIT–II

3. Give reasons for the following
    (i) Corrosion of water-filled tank occurs below the waterline
    (ii) A Copper equipment should not possess a small Steel bolt

OR

4. Discuss various factors which influence the corrosion of metals?

UNIT–III

5. Write a note on processing of raw rubber? Explain the draw backs of raw rubbers.

OR

6. a) Differentiate Thermoplastic and Thermosetting plastics with suitable examples.

    b) Write a note on the classification of polymers with examples

UNIT–IV

7. The percentage composition of a sample of coal by weight was found to be: C = 76%, H = 5.2%, O = 12.8%, N = 2.7%, S = 1.2%, the remaining being ash. Calculate the minimum weight of air necessary for complete combustion of 1 kg of coal and percentage composition by weight of dry products, if 50% excess air supplied.

OR

8. a) Describe the determination of calorific value of a solid fuel using bomb calorimeter.

    b) Describe the Production and uses of water gas and Biogas.

UNIT–V

9. a) Explain the importance of refractories and their applications.

    b) Describe the mechanism of extreme pressure lubrication

OR

10. Describe the manufacture of Portland cement by wet method with a neat labelled diagram of rotary kiln.

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Code: 7GC14

I B.Tech. I Semester Supplementary Examinations March/April 2023

Engineering Mathematics-I

(Common to All Branches)

Max. Marks: 70   Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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UNIT–I

1. Define the rank of the matrix and find the rank of the following matrix

$$\begin{bmatrix} 2 & 1 & 3 & 5 \\ 4 & 2 & 1 & 3 \\ 8 & 4 & 7 & 13 \\ 8 & 4 & -3 & -1 \end{bmatrix}$$

OR

2. Investigate the values of λ *and* μ so that the equations

2x+3y+5z=9, 7x+3y-2z=8, 2x+3y+$\lambda z = \mu$, have (i) no solution, (ii) a unique solution and (iii) an infinite number of solutions.

UNIT–II

3. Show that the matrix

$$\begin{bmatrix} i & 0 & 0 \\ 0 & 0 & i \\ 0 & i & 0 \end{bmatrix}$$ is Skew-Hermitian and hence find eigen values

OR

4. Find the transformation that will transform $10x^2 + 2y^2 + 5z^2 + 6yz - 10zx - 4xy$ into a sum of squares

UNIT–III

5. Solve $(1 + y^2)dx = (\tan^{-1} y - x)dy$

OR

6. Solve $\left(\dfrac{e^{-2\sqrt{x}}}{\sqrt{x}} - \dfrac{y}{\sqrt{x}} \right) \dfrac{dx}{dy} = 1$

UNIT–IV

7. In L-C-R circuit, the charge q on a plate of a condenser is given by Solve $L\dfrac{d^2q}{dt^2} - \dfrac{dq}{dt} + \dfrac{q}{C} = E \sin pt$ the circuit is turned to resonance so that $\dfrac{p^2}{LC}$. Find the current i

OR

8. Solve $\dfrac{d^2y}{dx^2} - 3\dfrac{dy}{dx} + 2y = xe^{3x} + \sin 2x$

UNIT–V

9. If $x + y + z = u, y + z = uv, z = uvw, then\ evaluate\ \dfrac{\partial(x, y, z)}{\partial(u, v, w)}$

OR

10. Verify Langrange's mean value theorem for $f(x) = \log_e x\ in\ [1, e]$

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R-17

Code: 7G111

I B.Tech. I Semester Supplementary Examinations March/April 2023

Problem Solving Techniques and C Programming

(Common to All Branches)

Max. Marks: 70   Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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Marks

		UNIT–I	

1. a) Give a comparison between system and application software's with examples.   7M

   b) List and explain various symbols used in flowcharts with figures   7M

OR

2. a) Discuss about different computer languages with examples.   7M

   b) Explain in detail about the software development method.   7M

UNIT–II

3. a) What are bitwise logical operators? Explain about bitwise logical operators with suitable programming example.   7M

   b) Evaluate the following expressions:

   (i) a*(3+b)/2-c++ *b where a=3,b=4 and c=5   (ii) !(4+5*0>=6-4)   7M

OR

4. a) What is the need of explicit type conversion in C? How to cast the data?   7M

   b) What is the need of escape sequence? Write a sample program to illustrate escape sequences.   7M

UNIT–III

5. a) Give the control flow diagram of the *for loop*. How is the execution of 'for' loop proceeds?   7M

   b) Write a C program to find biggest of three integer numbers.   7M

OR

6. a) Explain counter-controlled and **c**ondition-controlled loops with examples.   7M

   b) Write a C program to find the sum of first and last digit of a number   7M

UNIT–IV

7. a) What are the different types of arrays in C? Explain with a suitable example, array declaration, initialization and accessing of the elements for these different types.   7M

   b) Write a C program to accept 3x3 matrix and display elements of the matrix.   7M

OR

8. a) Explain any five string manipulation functions with example   10M

   b) Write a program to find highest and smallest number in the given array.   4M

UNIT–V

9. a) Write a C program to exchange the value of two integers using call by reference.   7M

   b) Write a c program to find factorial of a number using recursive function   7M

OR

10. a) Define scope. Briefly explain the scope, life time and visibility of Identifier.   7M

    b) Explain about pre-processor commands with examples.   7M

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