Hall Ticket Number :										

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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Hall Ticket Number :										

R-15

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 $r = a(1+\cos^{-})$

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 $(D^2 + 4D + 20)y = 23sint - 15cost$.

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 $x = r\cos^{-}, y = r\sin^{-}$, then find $\frac{\partial(x,y)}{\partial(r,^{-})}$.

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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Hall Ticket Number :										

R-15

Code: 5GC15

I B.Tech. I Semester Supplementary Examinations March 2021

Mathematical Methods-I

(Common to CSE & IT)

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 rank of the matrix A= $\begin{bmatrix} 2 & -1 & 0 & 6 \\ 4 & 2 & 0 & 2 \\ 1 & -1 & 0 & 3 \\ 1 & -2 & 1 & 2 \end{bmatrix}$ by reducing it to canonical form

OR

2. Find for what values of ^{a} the equations x+y+z=1, x+2y+4z= ^{a} , x+4y+10z= $^{a^2}$ have a solution and solve them completely in each case.

UNIT–II

3. a) State Cayley Hamilton theorem and use it to find the inverse of the matrix A= $\begin{bmatrix} 1 & 2 & 3 \\ 2 & -1 & 4 \\ 3 & 1 & -1 \end{bmatrix}$

b) Diagonalize the matrix A= $\begin{bmatrix} 8 & -8 & -2 \\ 4 & -3 & -2 \\ 3 & -4 & 1 \end{bmatrix}$

OR

4. Show that the matrix $\begin{bmatrix} 1 & -2 & 2 \\ 1 & -2 & 3 \\ 0 & -1 & 2 \end{bmatrix}$ satisfies its characteristic equation. Hence find A^{-1}.

UNIT–III

5. Reduce the quadratic form $3x_1^2 + 3x_2^2 + 3x_3^2 + 2x_1x_2 + 2x_1x_3 - 2x_2x_3$ in to a sum of squares. Also find the rank, index, signature and nature of the quadratic form.

OR

6. Reduce the quadratic form $6x^2 + 3y^2 + 3z^2 - 2yz = 4zx - 4xy$ to a sum of squares.

UNIT–IV

7. Using Newton-Raphson Method find Numerical root of the Equation $x\sin x + \cos x = 0$

OR

8. Find the real root of the equation $xe^x = 3$ by Regular-falsi method.

UNIT–V

9. Evaluate $\int_0^1 \sqrt{1+x^3}\,dx$

Using (i) Simpson's 3/8th rule (ii) Weddle's rule.

OR

10. Find the first and second derivatives of the function tabulated below at x=0.5

X	0.4	0.5	0.6	0.7	0.8
y	1.5836	1.7974	2.0442	2.3275	2.6511

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Hall Ticket Number :										

R-15

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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