Code: 20AC11T

I B.Tech. I Semester Supplementary Examinations September 2022

Algebra and Calculus

(Common to All Branches)

Max. Marks: 70   Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
    2. In Part-A, each question carries **Two mark.**
    3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A
(Compulsory question)

			CO	Blooms Level
1.	**Answer ALL the following short answer questions**	(5 X 2 = 10M)		

a) If $A = \begin{bmatrix} 1 & 2 & 5 \\ 0 & 3 & 2 \\ 0 & 0 & 4 \end{bmatrix}$ then find the Eigen values of A.

CO1   L3

b) Define quadratic form and Write matrix of a quadratic form of

$$Q = 6x_1^2 + 3x_2^2 + 3x_3^2 - 4x_1x_2 - 2x_2x_3 + 4x_3x_1$$

CO2   L2

c) Differentiate Taylor's and Maclaurin's power series expansion

CO3   L2

d) Evaluate $\int\limits_{z=0}^{1} \int\limits_{y=0}^{2} \int\limits_{x=1}^{2} xyz\,dzdydx.$

CO4   L3

e) Evaluate $\Gamma\left(-\frac{1}{2}\right)$

CO5   L3

PART-B

Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

Marks   CO   Blooms Level

UNIT–I

2. Reduce the matrix $\begin{bmatrix} 2 & 3 & -1 & -1 \\ 1 & -1 & -2 & -4 \\ 3 & 1 & 3 & -2 \\ 6 & 3 & 0 & 7 \end{bmatrix}$ into normal form.

12M   L3

OR

3. Find the Eigen values and Eigen vectors of the matrix

$$A = \begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$$

12M   L2

UNIT–II

4. Reduce the matrix $A = \begin{bmatrix} -1 & 2 & -2 \\ 1 & 2 & 1 \\ -1 & -1 & 0 \end{bmatrix}$ to a Diagonal form

12M   L2

OR   L2

5. Reduce the quadratic form

$$3x^2 + 3y^2 + 3z^2 + 2xy + 2xz - 2yz \text{ to}$$

canonical form by an orthogonal transformation   12M   L3

UNIT–III

6. a) If $u = f(e^{y-z}, e^{z-x}, e^{x-y})$, prove that

$$\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} + \frac{\partial u}{\partial z} = 0.$$

6M   L3

b) $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} = x^2 + y^2 + z^2$, prove that

If $u = \frac{\partial(u,v,w)}{\partial(x,y,z)}$; $v = xy + yz + zx$, $w = x + y + z$, find $\frac{\partial(u,v,w)}{\partial(x,y,z)}$

6M   L2

OR

7. Find the minimum value of $x^2 + y^2 + z^2$, given that $xyz = a^3$

12M   L2

UNIT–IV

8. a) Evaluate $\displaystyle\int_0^\infty \int_0^\infty e^{-(x^2+y^2)} \, dxdy$ by changing to polar coordinates

6M   L3

b) Evaluate $\displaystyle\int_{y=1}^{e} \int_{x=1}^{\log y} \int_{z=1}^{e^x} \log z \, dz \, dx \, dy$.

6M   L4

OR

9. Evaluate $\displaystyle\int_{0}^{4a} \int_{\frac{x^2}{4a}}^{2\sqrt{ax}} dy\,dx$ by changing the order of th

   integration.   12M   L3

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UNIT–V

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10. a) Prove that $\displaystyle\int_{0}^{1} \frac{dx}{\sqrt{1-x^4}} = \frac{\sqrt{f}}{4}$

                                                                    6M   L3

   b) Evaluate $\displaystyle\int_{0}^{1} \left(\log\frac{1}{x} \right)^{n-1} dx, n>0$ in terms of Gamma

   functions.   L2

<div align="center">

OR   6M

</div>

11. a) Symmetry of Beta function B(m, n)=B(n, m)   4M   L3

   b) Prove that $\displaystyle\int_{0}^{\frac{f}{2}} Sin^2\text{''}\ Cos^4\text{''} = \frac{f}{32}$

                                                                    8M   L2

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*** End ***

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R-20

Code: 20AC13T
I B.Tech. I Semester Supplementary Examinations September 2022
Chemistry
(Common to CSE and AI&DS)

Max. Marks: 70   Time: 3 Hours
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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
      2. In Part-A, each question carries **Two mark.**
      3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A
(Compulsory question)

		CO	Blooms Level
1. Answer ALL the following short answer questions (5 X 2 = 10M)			
a) Write a note on electro chemical series		CO1	L1
b) Where do you use battery? give some example		CO2	L1
c) What do you mean by Degree of Polymerisation?		CO3	L2
d) Give any four examples for chromophores		CO4	L1
e) Define molecular machine. Give examples		CO5	L1

PART-B
Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

		Marks	CO	Blooms Level

UNIT–I

		Marks	CO	Blooms Level
2. a)	Derive the Nernst Equation for a reversible electrochemical reaction and highlight the thermodynamic relationship to derive the equation. Mention the applications of Nernst equation	6M	CO1	L4
b)	Explain different types of electrodes with suitable example	6M	CO1	L2

OR

		Marks	CO	Blooms Level
3. a)	Explain the measurement of pH of a solution using glass electrode. Mention the advantages of this electrode	6M	CO1	L2
b)	Explain the polymer membrane electrodes	6M	CO1	L2

UNIT–II

		Marks	CO	Blooms Level
4. a)	What are primary and secondary cells? Discuss the working of each category with suitable examples	6M	CO2	L2
b)	Write a short note on Modern batteries-zinc air with suitable example	6M	CO2	L1

OR

		Marks	CO	Blooms Level
5. a)	With neat diagram, discuss about Lithium battery and give its applications	6M	CO2	L1

b) Explain the construction and working of propane and oxygen fuel cell, giving a neat diagram. **6M** CO2 L2

UNIT–III

6. a) Give a detailed note on types of polymerisation. **6M** CO3 L2

   b) Deduce the steps involved in the preparation, properties and applications of Bakelite. **6M** CO3 L2

OR

7. a) Discuss the preparation, properties and applications of the following: a. Nylon 6, 6, b. urea-formaldehyde. **6M** CO3 L4

   b) Briefly explain the conducting polymers of polyaniline with mechanism of conduction and applications **6M** CO3 L2

UNIT–IV

8. a) Explain the principle of UV-Visible spectroscopy and define the following terms i) Chromophore ii) Auxochrome iii) Bathochromic Shift iv) Hypsochromic Shift. **6M** CO4 L2

   b) Discuss the Thin layer chromatography (TLC) technique with a block diagram. **6M** CO4 L4

OR

9. a) Derive Beer-Lamberts law. **6M** CO4 L2

   b) Draw a neat block diagram of Gas Chromatography (GC) and explain its components. **6M** CO4 L2

UNIT–V

10. a) Write note on systems based on Catenanes **6M** CO5 L1

    b) Explain various types of Molecular switches. **6M** CO5 L2

OR

11. a) Describe the linear motion in Rotaxanes **6M** CO5 L2

    b) Describe molecular shuttle with an example **6M** CO5 L2

*** End ***

Hall Ticket Number :										

R-20

Code: 20A511T

I B.Tech. I Semester Supplementary Examinations September 2022
Problem Solving through C Programming
(Common to All Branches)

Max. Marks: 70   Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
     2. In Part-A, each question carries **Two mark.**
     3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A
(Compulsory question)

			CO	Blooms Level
1.	**Answer ALL the following short answer questions** (5 X 2 = 10M)			

a)	Consider the following program
	#include<stdio.h>
	main()
	{
	  int a=5;
	  b = a << 2;
	  printf("a=%d b=%d \n", a,b);
	}
	What is the output of above program? Explain it in two lines.
			1	L1

b)	What is the difference between 'getchar()' and 'scanf()' in C		1	L1
c)	What is meant by Scope of Variable in C?		2	L2
d)	What is a void pointer?		4	L1
e)	How do we identify the end of file in C. Illustrate with an example?		4	L2

PART-B
Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

			Marks	CO	Blooms Level
	UNIT–I				
2.	a)	Write briefly about the C Tokens with suitable examples	6M	1	L2
	b)	How many keyword and identifiers does C Language support? Explain.	6M	1	L2
		OR			
3.	a)	Explain the Structure of C program.	6M	1	L2
	b)	Describe the various operators in C language along with its priority.	6M	1	L2
	UNIT–II				
4.	a)	What are Multi-dimensional arrays? How do we represent a Matrix using arrays?	6M	3	L2
	b)	Write a program to print the series in the following form for a number 'n' : Example(n=4)	6M	2	L3

```
1
1 2
1 2 3
1 2 3 4
1 2 3
1 2
1
```

OR

5. a) Explain Bubble sort algorithm with a suitable example. 6M 3 L3
   b) Your teacher has conducted a test having a total of N questions, each question carries 3 marks for a correct answer and −1 for an incorrect answer. Students have decided to attempt all the questions. It is known that each student got X questions correct and the rest of them incorrect. For student to pass the course he must score at least P marks. Write a C program to simulate the above.
   (Input: N, X, P
   Output: Marks Obtained:_____, Status: Pass/ Fail) 6M 2 L3

UNIT–III

6. a) What is recursion? What is the format of a recursive function? Explain its advantages and limitations? 6M 3 L2
   b) Explain any four basic string functions with examples. 6M 3 L2

OR

7. a) What are the various types of preprocessor directives? 6M 4 L2
   b) Write a program to find GCD of Two numbers using recursion. 6M 3 L3

UNIT–IV

8. a) Explain pointer to function and function returning pointer with example. 6M 3 L2
   b) Write a program to concatenate two strings using pointers. 6M 4 L3

OR

9. a) What is advantage of representing an array of string by an array of pointer to string? 6M 4 L3
   b) Distinguish between call by value and call by reference. Illustrate it with an example in C. 6M 4 L3

UNIT–V

10. a) Define a structure with the name 'student'. Assume appropriate fields in student structure. Develop a program which reads 'n' students data and displays all 'n' students' information. 6M 5 L3
    b) Write about different built-in functions used in Files concept. 6M 5 L2

OR

11. a) What are self-referential structures? Explain them with an example. 6M 4 L2
    b) Write a program to copy one file data into another file. 6M 5 L3

*** End ***