

Hall Ticket Number :

**R-20**

**Code: 20AC13T**

I B.Tech. I Semester Supplementary Examinations June 2024

## Chemistry

(Common to CSE, CSE(AI), CSE(DS) 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 marks**.

3. Answer **ALL** the questions in **Part-A** and **Part-B**

### PART-A

( **Compulsory question** )

- |   |     |    |
|---|-----|----|
| 1. Answer <b>all</b> the following short answer questions ( 5 X 2 = 10M ) | CO  | BL |
| a) What is a polymer membrane electrode? Give any two examples.           | CO1 | L1 |
| b) Identify and write the key components of a battery.                    | CO2 | L4 |
| c) Differentiate between chain growth and step-growth polymerization.     | CO3 | L2 |
| d) State Beer-Lambert's Law.  | CO4 | L2 |
| e) Name the types of motions exhibited by rotaxanes.                      | CO5 | L1 |

### PART-B

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

Marks CO BL

#### UNIT-I

- |  |     |     |    |
|--|-----|-----|----|
| 2. Define an electrochemical cell. Discuss the origin of electrode potential in electrochemical cells. | 12M | CO1 | L1 |
|--|-----|-----|----|

**OR**

- |   |     |     |    |
|---|-----|-----|----|
| 3. Classify ion-selective electrodes based on their types (glass membrane, polymer membrane, solid-state, gas-sensing). | 12M | CO1 | L4 |
|---|-----|-----|----|

#### UNIT-II

- |  |     |     |    |
|--|-----|-----|----|
| 4. Describe the diverse applications of batteries in everyday life and various industries. | 12M | CO2 | L2 |
|--|-----|-----|----|

**OR**

- |   |     |     |    |
|---|-----|-----|----|
| 5. Outline the main features of zinc-air batteries and lithium cells (Li- MnO <sub>2</sub> ), emphasizing their unique characteristics. | 12M | CO2 | L4 |
|---|-----|-----|----|

#### UNIT-III

- |  |     |     |    |
|--|-----|-----|----|
| 6. Assess the steps involved in the preparation of Bakelite and Nylon-6,6. | 12M | CO3 | L5 |
|--|-----|-----|----|

**OR**

- |   |     |     |    |
|---|-----|-----|----|
| 7. Explain how the unique properties of conducting polymers make them suitable for specific applications in electronics, sensors, and other fields. | 12M | CO3 | L2 |
|---|-----|-----|----|

#### UNIT-IV

- |   |     |     |    |
|---|-----|-----|----|
| 8. Explain the principles behind pHmetry, including the functioning of a glass electrode. Discuss any five applications of pHmetry. | 12M | CO4 | L1 |
|---|-----|-----|----|

**OR**

- |  |     |     |    |
|--|-----|-----|----|
| 9. Describe the various regions of the electromagnetic spectrum. Provide examples of applications for each region. | 12M | CO4 | L2 |
|--|-----|-----|----|

#### UNIT-V

- |   |     |     |    |
|---|-----|-----|----|
| 10. Given a specific set of environmental conditions, predict the behaviour of a molecular elevator and explain the key components and their functions. | 12M | CO5 | L3 |
|---|-----|-----|----|

**OR**

- |   |     |     |    |
|---|-----|-----|----|
| 11. What are molecular switches? Write about cyclodextrin-based switches. | 12M | CO5 | L1 |
|---|-----|-----|----|

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Hall Ticket Number :									
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<b>R-20</b>
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**Code: 20AC15T**

I B.Tech. I Semester Supplementary Examinations June 2024

**Communicative English**

(Common to CE, ME, CSE, AI&DS, CSE(AI) and CSE(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 marks**.  
3. Answer **ALL** the questions in **Part-A** and **Part-B**

**PART-A**

( **Compulsory question** )

- |   |     |    |
|---|-----|----|
| 1. Answer <b>all</b> the following short answer questions ( 5 X 2 = 10M )                       | CO  | BL |
| a) What are the two things the author does not like about his son's reaction to his new school? | CO1 | L2 |
| b) What is the refrain from the poem, "The Brook"?  | CO2 | L2 |
| c) How has the prince been trapped in "The Death Trap"?   | CO1 | L2 |
| d) What is the name of the bank that Muhammad Yunus founded? When was it established?           | CO1 | L2 |
| e) Which issues did Mrinalini Sarabhai focused in her dance practice?                           | CO1 | L2 |

**PART-B**

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

Marks CO BL

**UNIT-I**

- |  |     |     |    |
|--|-----|-----|----|
| 2. What is the author's attitude towards how one should behave with other people? Do you agree with his reasoning? Give reasons for your answer. | 12M | CO1 | L2 |
|--|-----|-----|----|

**OR**

- |  |     |     |    |
|--|-----|-----|----|
| 3. Write in detail about Skimming and Scanning skills and their uses in reading. | 12M | CO5 | L2 |
|--|-----|-----|----|

**UNIT-II**

- |   |     |     |    |
|---|-----|-----|----|
| 4. How has the poet described landscape, flowers, plants and colors in the poem? How does it make you feel as a reader? Substantiate your answer with examples from the poem? | 12M | CO2 | L2 |
|---|-----|-----|----|

**OR**

5. **Complete the following sentences with the appropriate Preposition:**

- i) She's interested \_\_\_\_\_ history.
- ii) The keys are \_\_\_\_\_ the pillow.
- iii) He's afraid \_\_\_\_\_ heights.
- iv) The hotel is located \_\_\_\_\_ the beach.
- v) I'm thinking \_\_\_\_\_ going to the gym later.
- vi) The ball went \_\_\_\_\_ the fence.
- vii) The cat slept \_\_\_\_\_ the bed.
- viii) The bird flew \_\_\_\_\_ the window.
- ix) The rabbit hopped \_\_\_\_\_ the hole.
- x) The car drove \_\_\_\_\_ the corner.
- xi) Dr Siddique is the person I spoke \_\_\_\_\_
- xii) Raghu is fond \_\_\_\_\_ reading.

12M CO4 L3

<b>UNIT-III</b>
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6. How does Dimitri defend himself from the death trap? 12M CO1 L2

**OR**

7. **Rewrite the sentences as directed:**

- i) He said to her "What are you doing?" (Indirect Speech)
- ii) She says, "I am ready." (Indirect Speech)
- iii) The manager said to the attendant, "Close the door". (Indirect Speech)
- iv) Ramu said "I was reading Ramayana last night". (Indirect Speech)
- v) She asked me if I had finished dinner. (Direct Speech)
- vi) He said, "I wrote a letter". (Indirect Speech)

**Fill in the blanks by using appropriate tense form by using the directions given in brackets:**

- i) Both the rice and curd \_\_\_\_\_ fresh and tasty. (be: Simple Present)
- ii) The planes \_\_\_\_\_ the airport. (approach: Present Perfect Continuous)
- iii) Either the boys or their parents \_\_\_\_\_ have report cards. (collect: Present Perfect)
- iv) It \_\_\_\_\_ since yesterday. (rain: Present Perfect Continuous)
- v) Rs.10,000 a month \_\_\_\_\_ a good salary for a beginner. (be: Simple Present)
- vi) He \_\_\_\_\_ here since 2011. (work: has been/ have been)

12M CO4 L4

<b>UNIT-IV</b>
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8. Describe and discuss Mohammad Yunus' contribution for the upliftment of the economic status of the poor people. 12M CO2 L4

**OR**

9. **a) Choose the appropriate adjective given in brackets:**

- i) Janaki is as \_\_\_\_\_ (tall/taller) as his sister.
- ii) Alexander was one of \_\_\_\_\_ (the greatest/great) king who ever lived.
- iii) Chennai is \_\_\_\_\_ (hot/hotter) than Mumbai.
- iv) This temple is \_\_\_\_\_ (the biggest/bigger) in South India.
- v) Sindhu is \_\_\_\_\_ (cleverer/ more cleverer) than Sara.
- vi) Ravi is \_\_\_\_\_ (stron/the strongest) boy in his class.

**b) Re write the sentences as directed:**

- i) He said, "I wrote a letter". (Indirect Speech)
- ii) She says, "I am ready". (Indirect Speech)
- iii) They said to the teacher, "Let us go home". (Indirect Speech)
- iv) Raghu said that he had been writing letters. (Direct Speech)
- v) She asked Meena where she had gone. (Direct Speech).
- vi) Sravan said to me, "What are you doing?" (Indirect Speech)

12M CO4 L3

<b>UNIT-V</b>
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10. What inspires and motivates you through the story of Mrinalini in Ranjana Dev's "The Dancer with a White Parasol"? 12M CO1 L2

**OR**

11. Imagine yourself as the Librarian of AITS, Rajampet. Write a letter to the XYZ Publishers, Hyderabad, placing an order for the required books of Engineering for your college library. 12M CO5 L4

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Hall Ticket Number :									
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<b>R-20</b>
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**Code: 20A511T**

I B.Tech. I Semester Supplementary Examinations June 2024

**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 marks**.  
3. Answer **ALL** the questions in **Part-A** and **Part-B**

**PART-A**

( **Compulsory question** )

- |   |     |    |
|---|-----|----|
| 1. Answer <b>all</b> the following short answer questions ( 5 X 2 = 10M ) | CO  | BL |
| a) List the various steps that are involved in solving a problem          | CO1 | L1 |
| b) What are selection statements?   | CO2 | L1 |
| c) What is the difference between strlen() and sizeof the string?         | CO3 | L1 |
| d) What is pointer and how to declare and initialize pointer.             | CO4 | L1 |
| e) How do we identify the end of file in C. Illustrate with an example?   | CO5 | L1 |

**PART-B**

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

Marks CO BL

**UNIT-I**

- |  |    |     |    |
|--|----|-----|----|
| 2. a) Briefly explain about the basic data types that C language supports.                                     | 6M | CO1 | L2 |
| b) What is flow chart? How it is useful in writing the programs? Explain about different symbols in flow chart | 6M | CO1 | L2 |

**OR**

- |  |    |     |    |
|--|----|-----|----|
| 3. a) Illustrate the Relational Operators and Logical operators in C.    | 6M | CO1 | L3 |
| b) Explain the operator precedence and Associativity with examples in C. | 6M | CO1 | L2 |

**UNIT-II**

- |  |    |     |    |
|--|----|-----|----|
| 4. a) In what way a do...while is different from while looping statement. Explain. | 6M | CO2 | L2 |
| b) Write a C program to find the factorial of a number using while loop.           | 6M | CO2 | L3 |

**OR**

- |   |    |     |    |
|---|----|-----|----|
| 5. a) Sort the following list of elements using bubble sorting technique. -2,45,0,11,-9 | 6M | CO2 | L4 |
| b) Briefly explain Binary Search algorithm.   | 6M | CO2 | L2 |

**UNIT-III**

6. a) Write a C program to count the number of vowels and consonants, digits spaces and special characters in a line of string. 6M CO3 L3
- b) Illustrate the concept of Towers of Hanoi Problem. How recursion helps to solve this problem. 6M CO3 L3

**OR**

7. a) Discuss the preprocessor directives. 6M CO3 L2
- b) Write a C program to find the LCM of two integers. 6M CO3 L3

**UNIT-IV**

8. a) What is pointer arithmetic? Illustrate with an example 6M CO4 L3
- b) Write a c program to swap two integer variables using swap function. 6M CO4 L3

**OR**

9. Explain in detail about Dynamic Memory Allocation functions with an examples in C programming. 12M CO4 L2

**UNIT-V**

10. a) How to represent union in Structure? Explain with an example. 6M CO5 L2
- b) Illustrate file positioning functions in C with example. 6M CO5 L3

**OR**

11. a) What are self-referential structures? Explain them with an example 6M CO5 L2
- b) Write a program to copy one file data into another file. 6M CO5 L3

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Hall Ticket Number :									
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<b>R-20</b>
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**Code: 20AC11T**

I B.Tech. I Semester Supplementary Examinations June 2024

**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 marks**.  
3. Answer **ALL** the questions in **Part-A** and **Part-B**

**PART-A**

(Compulsory question)

1. Answer **all** the following short answer questions (5 X 2 = 10M)

CO BL  
CO1 L1

a) If  $A = \begin{bmatrix} 1 & 4 & 5 \\ 0 & 6 & 8 \\ 0 & 0 & 22 \end{bmatrix}$  then find the rank of A

- b) State Cayley-Hamilton theorem.

CO2 L2

- c) Obtain Maclaurin's series for  $f(x) = \sin x$

L3  
CO3

- d) Write the area enclosed by a plane curve in xy-plane

CO4 L2

- e) Define Beta function

CO5 L1

**PART-B**

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

Marks CO BL

**UNIT-I**

2. Reduce the following matrix into its normal form and hence find its rank.

$$\begin{bmatrix} 2 & 3 & -1 & -1 \\ 1 & -1 & -2 & -4 \\ 3 & 1 & 3 & -2 \\ 6 & 3 & 0 & -7 \end{bmatrix}$$

12M CO1 L1

**OR**

3. a) Show that a square matrix **A and A<sup>T</sup>** have the same Eigen values

6M CO1 L2

- b) If } is Eigen value of an Orthogonal matrix, then show that is also its Eigen value.

6M CO1 L2

**UNIT-II**

4. Reduce the quadratic form  $2x_1x_2 + 2x_1x_3 - 2x_3x_2$  to canonical form by an orthogonal reduction and discuss its Nature. Also find the model matrix.

12M CO2 L3

**OR**

5. Show that the matrix  $\begin{bmatrix} 1 & -2 & 2 \\ 1 & -2 & 3 \\ 0 & -1 & 2 \end{bmatrix}$  satisfies its characteristic equation. Hence find  $A^{-1}$ . 12M CO2 L2

## UNIT-III

6. a) Expand the Taylor's series expansion of  $\sin x$  in powers of  $\left(x - \frac{\pi}{2}\right)$  6M CO3 L3
- b) If  $U = f(2x - 3y, 3y - 4z, 4z - 2x)$  then find the value of  $\frac{1}{2} \frac{\partial U}{\partial x} + \frac{1}{3} \frac{\partial U}{\partial y} + \frac{1}{3} \frac{\partial U}{\partial z}$  6M CO3 L3

OR

7. A rectangular box open at the top is to have volume of 32 cubic ft. find the dimensions of the box requiring least material for its construction. 12M CO3 L3

## UNIT-IV

8. Evaluate the double integral  $\iint_R xy dx dy$  where 'R' is the region bounded by the lines  $x$  - axis, the line  $y = 2x$  and  $y = \frac{x}{4a}$  12M CO4 L5

OR

9. Evaluate the integral by changing the order of integration  $\int_0^a \int_{\frac{x}{a}}^{2a-x} xy^2 dy dx$  12M CO4 L5

## UNIT-V

10. a) Show that  $\int_0^1 x^m (\log x)^n dx = \frac{(-1)^n n!}{(m+1)^{n+1}}$  where  $n$  is a positive integer and  $m > -1$  6M CO5 L2
- b) Evaluate  $\int_0^{\frac{\pi}{2}} \sin^{10} \theta d\theta$  6M CO5 L5

OR

11. Express the following integrals in terms of gamma function  
 (i)  $\int_0^1 \left(\frac{1}{\sqrt{1-x^2}}\right) dx$       (ii)  $\int_0^{\frac{\pi}{2}} \sqrt{\tan \theta} d\theta$  12M CO5 L2

\*\*\* End \*\*\*