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**R-20**

**Code: 20AC11T**

I B.Tech. I Semester Regular & Supplementary Examinations February 2023

**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 |
| a) Define the rank of the matrix.                                  | 1  | 2  |
| b) State Caley Hamilton Theorem.                                   | 2  | 2  |
| c) Expand $\cos x$ using by Maclaurin's series.                    | 3  | 2  |
| d) Evaluate $\int_0^2 \int_1^3 \int_1^2 x y^2 z dz dy dx$          | 4  | 3  |
| e) Find the value of $(1, 1/2)$                                    | 5  | 3  |

**PART-B**

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

Marks    CO    BL

**UNIT-I**

- |  |    |        |
|--|----|--------|
| 2. a) Reduce the following matrix into the matrix Echelon form and hence find its rank           |    |        |
| $\begin{bmatrix} 1 & 2 & 3 & 0 \\ 2 & 4 & 3 & 2 \\ 3 & 2 & 1 & 3 \\ 6 & 8 & 7 & 5 \end{bmatrix}$ |    |        |
|  | 6M | 1    3 |
| b) Test for consistency and solve  |    |        |
| $5x+3y+7z=4$<br>$3x+26y+2z=9$<br>$7x+2y+10z=5$   |    |        |
|  | 6M | 1    3 |

**OR**

- |  |     |        |
|--|-----|--------|
| 3. Find the eigenvalues and eigenvectors of matrix                     |     |        |
| $\begin{bmatrix} 1 & -1 & 4 \\ 3 & 2 & -1 \\ 2 & 1 & -1 \end{bmatrix}$ |     |        |
|  | 12M | 1    3 |

<b>UNIT-II</b>
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4. Verify Cayley-Hamilton theorem for the matrix A and find its inverse.  $A = \begin{bmatrix} -2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$

12M 2 3

OR

5. Reduce the quadratic form  $2x^2 + 2xy + 2y^2$  to a canonical form by an orthogonal reduction and discuss its nature. Also, find the modal matrix.

12M 2 3

<b>UNIT-III</b>
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6. If  $x = u(1-v)$ ,  $y = uv$  then prove that  $\frac{\partial(x,y)}{\partial(u,v)} = \frac{\partial(u,v)}{\partial(x,y)}$  where  $J = \frac{\partial(x,y)}{\partial(u,v)}$  &  $J' = \frac{\partial(u,v)}{\partial(x,y)}$

12M 3 3

OR

7. Examine the following function for extreme values:  $f(x,y) = x^4 + y^4 - 2x^2 + 4xy - 2y^2$

12M 3 3

<b>UNIT-IV</b>
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8. Characterize the order of integration  $I = \int_0^a \int_{x^2/4a}^{2\sqrt{ax}} dy dx$  and hence evaluate

12M 4 3

OR

9. Evaluate

$$\int_0^1 \int_0^{\sqrt{1-x^2}} \int_0^{\sqrt{1-x^2-y^2}} xyz \, dx dy dz$$

12M 12M 4 3

<b>UNIT-V</b>
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10. Show that  $\beta(p,q) = \int_0^{\infty} \frac{y^{q-1}}{(1+y)^{p+q}} dy = \int_0^1 \left[ \frac{x^{p-1} + x^{q-1}}{(1+x)^{p+q}} \right] dx$

12M 5 3

OR

11. Prove that (i)  $\beta(m, 1/2) = 2^{2m-1} \beta(m, 1)$   
(ii)  $\Gamma(m)\Gamma(m + 1/2) = \frac{\sqrt{\pi}}{2^{2m-1}} \Gamma(2m)$

12M 5 3

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

Hall Ticket Number :

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**R-20**

**Code: 20AC15T**

I B.Tech. I Semester Regular & Supplementary Examinations February 2023

**Communicative English**

(Common to CE, ME, 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 mark**.  
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 )
- |   |    |
|---|----|
| a) What emotions did Hazlitt's son express when he was going to school? | BL |
| b) What is the poem " The Brook" about?                                 | L2 |
| c) Justify the title " The death trap.                                  | L2 |
| d) How did Mrinalini fight for change?                                  | L2 |
| e) Discuss the concept of Micro credit and Micro finance.               | L2 |

**PART-B**

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

Marks CO BL

**UNIT-I**

2. "Never conceive a prejudice against others". Substantiate it with reference to William Hazlitt's essay " on the conduct of life". 12M L3

**OR**

3. a) **Change the following statements in to questions.** L4
- |                                   |    |  |
|-----------------------------------|----|--|
| i) I do not Know English.         | 1M |  |
| ii) I will meet you tomorrow.     | 1M |  |
| iii) I had never been to Bombay.  | 1M |  |
| iv) I ate salad for my Breakfast. | 1M |  |
| v) She came here yesterday        | 1M |  |
| vi) They are not Indians.         | 1M |  |
- b) **Identify the parts of speech of the underlined words.** L2
- |  |    |  |
|--|----|--|
| vii) It being a <u>hot</u> day, We <u>stayed</u> Indoors.            | 2M |  |
| viii) It is <u>too</u> hot today. I <u>can't</u> go out.             | 2M |  |
| ix) It is an <u>irrevocable</u> change <u>and</u> cannot be revoked. | 2M |  |

**UNIT-II**

4. Write a critical appreciation of 'The Brook' by Tennyson. 12M L4

**OR**

5. Write a paragraph on the importance of communication skills. 12M L3

**UNIT-III**

6. How does Dimitri defend himself from the death trap? 12M L4

OR

7. a) **Rearrange the jumbled sentences to form a meaningful paragraph.** L3
- i) Although he had learned German at college, he soon realized that he did not remember much. 1M
- ii) His German has improved a lot. 1M
- iii) When Pradeep returned to India after a one Month's stay in Germany, he started learning German again 1M
- iv) Now he is preparing to appear for an Exam. 1M
- v) He intends to work on a new project. 1M
- vi) Next year, he plans to enroll himself in an advance course. 1M
- vii) It is essential for him to make frequent visits. 1M
- b) **Fill in the blanks using appropriate form of the given verb.** L4
- viii) Sindhu \_\_\_\_\_(Win) the silver medal in Olympics. 1M
- ix) Suraj \_\_\_\_\_(wake) up early this morning. 1M
- x) She has just \_\_\_\_\_(arrive) 1M
- xi) They always \_\_\_\_\_(drink) coffee at breakfast. 1M
- xii) I \_\_\_\_\_ (be) happy to hear this news. 1M

## UNIT-IV

8. Explain how Muhammed Yunus makes a difference in the banking sector? 12M L3

OR

9. Write an Essay on the Topic, "importance of world peace." 12M L4

## UNIT-V

10. How does Ranjana Deve convey the notion that being a performer was not an acceptable career choice for "Respectable Women?" 12M L3

OR

11. **Correct the following sentences:** L4
- i) He is elder than me. 1M
- ii) Let us discuss about the issue. 1M
- iii) He gave me a good advice. 1M
- iv) You went home yesterday. Isn't it? 1M
- v) If I went to Bombay next week, I will meet your Uncle. 1M
- vi) They have lived here from March 2020 1M
- vii) Bread and Butter are what we usually have for Breakfast. 1M
- viii) Walking along the Road, my hat was lost. 1M
- ix) My Father went to buy floor carpets and returned back. 1M
- x) You have to agree that I am cent percent right. 1M
- xi) I came on foot. 1M
- xii) Taj mahal is an unique Monument. 1M

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

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

I B.Tech. I Semester Regular & Supplementary Examinations February 2023

**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)

- |   |           |           |
|---|-----------|-----------|
| <b>1. Answer the following ( 5 X 2 = 10M )</b>                  | <b>CO</b> | <b>BL</b> |
| a) Differentiate an algorithm and a flowchart.                  | CO1       | L2        |
| b) Differentiate do-while and while statements.                 | CO2       | L2        |
| c) Describe the scope of variables in C program.                | CO3       | L2        |
| d) Define predefined functions realloc() and free()             | CO4       | L2        |
| e) Illustrate the use of enumerated data type in C programming. | CO5       | L3        |

**PART-B**

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

Marks CO BL

**UNIT-I**

- |   |    |   |    |
|---|----|---|----|
| 2. a) Illustrate the use of ternary or conditional operator to find the maximum of three given integers | 6M | 1 | L4 |
| b) Describe the concept of Associativity and Precedence of operators.                                   | 6M | 1 | L2 |

**OR**

- |   |     |   |    |
|---|-----|---|----|
| 3. Explain the structure of a C program | 12M | 1 | L2 |
|---|-----|---|----|

**UNIT-II**

- |  |    |   |    |
|--|----|---|----|
| 4. a) Develop a C program for Binary search.   | 6M | 2 | L4 |
| b) Apply bubble sort on the following list of elements<br>30, 60, 80, 10, 50, 90, 70, 20 | 6M | 2 | L3 |

**OR**

- |  |    |   |    |
|--|----|---|----|
| 5. a) Model a C program for matrix multiplication        | 8M | 2 | L3 |
| b) Discuss the loop control statements in C programming. | 4M | 2 | L2 |

**UNIT-III**

6. a) Differentiate call by value and call by reference with example. 8M 3 L3  
 b) Illustrate the concept of recursion. 4M 3 L3

**OR**

7. a) Discuss the preprocessor directives. 8M 3 L2  
 b) Develop a C program to find the LCM of two integers. 4M 3 L5

**UNIT-IV**

8. a) Define a pointer and list the advantages and disadvantages of pointers. 6M 4 L3  
 b) Differentiate malloc() and calloc() with examples 6M 4 L2

**OR**

9. a) Develop a c program to swap two integer variables using swap function. 6M 4 L6  
 b) Illustrate the concept of pointer arithmetic. 6M 4 L4

**UNIT-V**

10. a) Differentiate structure and union with examples. 4M 5 L3  
 b) Develop a c program to display the content of unformatted text file. 8M 5 L5

**OR**

11. a) Outline the concept of self-referential structures. 6M 5 L3  
 b) Demonstrate the passing of structures to functions as parameters. 6M 5 L3

**\*\*\*END\*\*\***

Hall Ticket Number :

R-20

Code: 20AC13T

I B.Tech. I Semester Regular & Supplementary Examinations February 2023

## 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 ALL the following short answer questions ( 5 X 2 = 10M )             | CO  | BL |
| a) Define standard electrode potential. Write its units.                       | CO1 | L1 |
| b) What is the principle involved in secondary battery? Give any two examples. | CO2 | L1 |
| c) Name the monomers of i) PVC and ii) Bakelite.                               | CO3 | L1 |
| d) What is electromagnetic spectrum?   | CO4 | L1 |
| e) Define molecular elevator.  | 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) Explain the measurement of single electrode potential. | 6M | CO1 | L2 |
| b) Discuss the any four applications of Nernst equation.     | 6M | CO1 | L3 |

OR

- |  |    |     |    |
|--|----|-----|----|
| 3. a) What is reference electrode? Describe the construction and working of saturated calomel electrode. | 6M | CO1 | L2 |
| b) Discuss the classification of ion selective electrodes.   | 6M | CO1 | L3 |

#### UNIT-II

- |  |    |     |    |
|--|----|-----|----|
| 4. a) What is the basic concept of battery? Explain characteristics and applications of batteries. | 6M | CO2 | L3 |
| b) Discuss the construction and merits of hydrogen-oxygen fuel cell.                               | 6M | CO2 | L2 |

OR

- |   |    |     |    |
|---|----|-----|----|
| 5. a) Explain the working and applications of propane and oxygen fuel cell. | 6M | CO2 | L3 |
| b) Discuss the construction and advantages of Zinc air battery.             | 6M | CO2 | L2 |

<b>UNIT-III</b>
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6. a) What do you mean by conducting polymer? Illustrate mechanism of conduction and applications of polyaniline. 6M CO3 L4
- b) Differentiate between thermoplastics and thermosetting plastics. 6M CO3 L2

**OR**

7. a) Illustrate mechanism of conduction and applications of polyacetylene. 6M CO3 L4
- b) Describe the preparation and properties of Nylon-6,6. 6M CO3 L2

<b>UNIT-IV</b>
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8. a) Explain the principle and applications of conductometry. 6M CO4 L2
- b) Discuss the principle and applications of IR spectroscopy. 6M CO4 L2

**OR**

9. a) What is potentiometry? Describe its principle and applications. 6M CO4 L2
- b) Explain the principle and applications of Thin layer chromatography(TLC) 6M CO4 L2

<b>UNIT-V</b>
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10. a) Describe the concept of cyclodextrin- based switches. 6M CO5 L2
- b) Explain the mechanism involved in linear motion of Rotaxanes. 6M CO5 L2

**OR**

11. a) Write brief note on  
i) system based on catenanes and ii) molecular elevator. 6M CO5 L2
- b) Discuss the concept of Rotaxanes as molecular machine. 6M CO5 L2

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