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<b>R-20</b>
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**Code: 20AC11T**

I B.Tech. I Semester Regular Examinations July 2021

**Algebra and Calculus**

( Common to All )

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. <b>Answer ALL the following short answer questions</b> ( 5 X 2 = 10M )                              | CO |              |
| a) Find the eigen values of $A = \begin{bmatrix} 5 & 4 \\ 1 & 2 \end{bmatrix}$                         | 1  | 1,2          |
| b) Find the symmetric matrix corresponding to the quadratic form $x^2 + 6xy + 5y^2$                    | 2  | 1,2          |
| c) If $x = r \cos \Theta$ , $y = r \sin \Theta$ then find $\frac{\partial(x, y)}{\partial(r, \Theta)}$ | 3  | 1.2          |
| d) Find $\int_0^1 \int_0^x xy \, dy \, dx$   | 4  | 1,2          |
| e) Define Gamma function   | 5  | 1            |

**PART-B**

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

- |  | Marks | CO | Blooms Level |
|--|-------|----|--------------|
| <b>UNIT-I</b>  |       |    |              |
| 2. a) Reduce the matrix $\begin{bmatrix} 0 & 1 & 2 & -2 \\ 4 & 0 & 2 & 6 \\ 2 & 1 & 3 & 1 \end{bmatrix}$ to normal form and hence find the rank. | 6M    | 1  | 1,2          |
| b) Show that the equations $x + y + z = 6$ , $x + 2y + 3z = 14$ , $x + 4y + 7z = 30$ are consistent and solve them.                              | 6M    | 1  | 1,2          |

**OR**

- |  |     |   |     |
|--|-----|---|-----|
| 3. Find the eigen values and the corresponding eigen vectors of              |     |   |     |
| $A = \begin{bmatrix} -2 & 2 & -3 \\ 2 & 1 & -6 \\ -1 & -2 & 0 \end{bmatrix}$ | 12M | 1 | 1,2 |

**UNIT-II**

- |   |     |   |     |
|---|-----|---|-----|
| 4. Verify Cayley-Hamilton theorem for the matrix $A = \begin{bmatrix} 1 & 2 & -1 \\ 2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix}$ and |     |   |     |
| hence find $A^{-1}$ and $A^4$   | 12M | 2 | 1,2 |

**OR**

5. Reduce the quadratic form  $3x^2+2y^2+3z^2-2xy-2yz$  to the normal form by orthogonal transformation 12M 2 1,2

<b>UNIT-III</b>
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6. a) If  $x = r \sin \theta \cos \phi, y = r \sin \theta \sin \phi, z = r \cos \theta$ , then show that  $\frac{\partial(x, y, z)}{\partial(r, \theta, \phi)} = r^2 \sin \theta$  6M 3 1,2
- b) Find the maximum and minimum values of  $xy + \frac{a^3}{x} + \frac{a^3}{y}$  6M 3 1,2

**OR**

7. Find the volume of the greatest rectangular parallelepiped that can be inscribed in the ellipsoid  $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$  12M 3 1,2

<b>UNIT-IV</b>
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8. a) Evaluate  $\int_a^{2a} \int_0^{\sqrt{2ax-x^2}} xy \, dy \, dx$  6M 4 1,2
- b) Evaluate  $\int_0^1 \int_0^{\sqrt{1-x^2}} \int_0^{\sqrt{1-x^2-y^2}} xyz \, dz \, dy \, dx$  6M 4 1,2

**OR**

9. Change the order of integration and evaluate  $\int_0^{4a} \int_{x^2/4a}^{2\sqrt{ax}} dy \, dx$  12M 4 1,2

<b>UNIT-V</b>
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10. a) Show that  $\Gamma\left(\frac{1}{2}\right) = \sqrt{\pi}$  6M 5 1,2
- b) 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 5 1,2

**OR**

11. a) Evaluate  $\int_0^1 x^{\frac{3}{2}} (1-x^2)^{\frac{5}{2}} \, dx$  6M 5 1,2
- b) Evaluate  $\int_0^{\frac{\pi}{2}} \sin^{10} \theta \, d\theta$  6M 5 1,2

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

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Code: 20AC13T

I B.Tech. I Semester Regular Examinations July 2021

**Chemistry**

(Common to CSE and AI&amp;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) | CO  | Blooms Level |
|----|---|-----|--------------|
| a) | Define single electrode potential.                            | CO1 | L1           |
| b) | Mention the components of Leclanche battery.                  | CO2 | L1           |
| c) | What is co-polymerisation?                                    | CO3 | L1           |
| d) | State Beer Lambert's law.                                     | CO4 | L1           |
| e) | Define molecular machine. Give examples.                      | CO5 | L1           |

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

- |                 |  | Marks | CO  | Blooms Level |
|-----------------|--|-------|-----|--------------|
| <b>UNIT-I</b>   |  |       |     |              |
| 2.              | a) What is single electrode potential? Derive an expression for the determination of single electrode potential. | 6M    | CO1 | L4           |
|                 | b) Describe the construction and working of hydrogen electrode.  | 6M    | CO1 | L2           |
| <b>OR</b>       |  |       |     |              |
| 3.              | a) What is galvanic cell? Explain the determination of EMF of a galvanic cell.                                   | 6M    | CO1 | L4           |
|                 | b) What is an ion selective electrode (ISE)? Give the classification of ISEs.                                    | 6M    | CO1 | L2           |
| <b>UNIT-II</b>  |  |       |     |              |
| 4.              | a) Describe the construction, working and applications of Li-MnO <sub>2</sub> battery.                           | 6M    | CO2 | L3           |
|                 | b) What are fuel cells? Discuss the classification and merits of fuel cells.                                     | 6M    | CO2 | L2           |
| <b>OR</b>       |  |       |     |              |
| 5.              | a) Explain the construction, working, applications and disadvantages of Dry cell.                                | 6M    | CO2 | L3           |
|                 | b) Illustrate the construction working and applications of H <sub>2</sub> -O <sub>2</sub> fuel cell.             | 6M    | CO2 | L3           |
| <b>UNIT-III</b> |  |       |     |              |
| 6.              | a) Differentiate chain growth and step growth polymerization.  | 6M    | CO3 | L3           |
|                 | b) List any six differences between thermoplastics and thermosetting polymers.                                   | 6M    | CO3 | L4           |
| <b>OR</b>       |  |       |     |              |
| 7.              | a) Explain the synthesis and uses of Nylon-6, 6 and Buna-N rubber.   | 8M    | CO3 | L2           |
|                 | b) What are conducting polymers? List the applications of conducting polymers.                                   | 4M    | CO3 | L3           |
| <b>UNIT-IV</b>  |  |       |     |              |
| 8.              | Describe the working principle of Thin layer chromatography (TLC)? Write its applications                        | 12M   | CO4 | L3           |
| <b>OR</b>       |  |       |     |              |
| 9.              | Discuss the principle and applications of<br>i) Conductometry                      ii) UV-Visible spectroscopy   | 12M   | CO4 | L3           |
| <b>UNIT-V</b>   |  |       |     |              |
| 10.             | a) Explain Rotaxanes as artificial molecular machines  | 6M    | CO5 | L3           |
|                 | b) Describe molecular shuttle with an example  | 6M    | CO5 | L2           |
| <b>OR</b>       |  |       |     |              |
| 11.             | Explain the following<br>i) Cyclodextrin based molecular switches<br>ii) Displacement switching                  | 12M   | CO5 | L2           |

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

Code: 20AC15T

I B.Tech. I Semester Regular Examinations July 2021

**Communicative English**

(Common to CE, ME, CSE and AI&amp;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 )                                   | CO  | Blooms Level |
|--|-----|--------------|
| a) Why does William Hazlett ask his son to be courteous and polite to his classmates?                | CO1 | L2           |
| b) What are the types of water bodies and plant life that are talked about in the poem, "The Brook"? | CO1 | L2           |
| c) How has the prince been trapped in "The Death Trap."?   | CO1 | L2           |
| d) What was the innovative approach of Mohammad Yunus to traditional approach??                      | CO1 | L2           |
| e) What do you learn from the life story of Mrinalini Sarabhai?                                      | CO1 | L2           |

**PART-B**

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

Marks    CO    Blooms Level

**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 |
| <b>OR</b>  |     |     |    |
| 3. a) <b>Change the following statements into questions.</b>   | 6M  | CO3 | L4 |
| i. My grandparents live with my uncle.   |     |     |    |
| ii. He had a strange experience yesterday.   |     |     |    |
| iii. Her mother has bought a nice gift for her.  |     |     |    |
| iv. Jack has bought an interesting book from the library.  |     |     |    |
| v. They have accepted the invitation.  |     |     |    |
| vi. My neighbour is a kind-hearted lady.   |     |     |    |
| b) <b>Identify the parts of speech of the underlined words in the following sentences.</b>   | 6M  | CO3 | L4 |
| i. The car moved <u>slowly</u> around the track  |     |     |    |
| ii. He walked <u>quickly</u> through the park  |     |     |    |
| iii. He waited <u>anxiously</u> for the game to begin.   |     |     |    |

**UNIT-II**

- |   |     |     |    |
|---|-----|-----|----|
| 4. How has the poet described landscape, flowers, plants and colours in the poem? How does it make you feel as a reader? Substantiate your answer with examples from the poem?  | 12M | CO1 | L2 |
| <b>OR</b>   |     |     |    |
| 5. <b>Develop the following hints into a meaningful paragraph:</b>  |     |     |    |
| a) Devan - clever thief - robs the rich - gives all to the sick and the needy - other thieves jealous - plan to get rid of him - challenge Devan to steal the King's pyjamas - Devan accepts challenge - finds king sleeping - opens a bottle of red ants on the bed - King badly bitten - cries for help - servants rush in pretends to look for ants - Devan removes King's pyjamas – escapes - other thieves dumbfounded - accept Devan their leader | 6M  | CO4 | L3 |

- b) Manager of a firm advertised - night watchman - applicants presented - manager not satisfied - found something wrong with each man - there was Raju - an applicant - sat in a corner - patiently waiting - his turn came - manager found nothing wrong in his appearance - questioned about his health - got the reply - I suffering from sleeplessness - manager happy - appointed him

6M CO4 L3

UNIT-III
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6. What can you make out of the prince's character? What kind of person do you think he is and why do you think he is that way? Use examples from the text to support your answer.

12M CO1 L3

## OR

7. a) **Rearrange each group of jumbled sentences below so as to have well-written paragraphs.**

7M CO4 L4

- i. It is awarded from funds bequeathed by Alfred Nobel, a Swedish inventor and philanthropist.
- ii. Nobel's will designated six areas for which prizes could be awarded.
- iii. The funds are administered by the Nobel Foundation in Stockholm.
- iv. The Nobel Prize is considered one of the most prestigious awards made to people whose work benefits humanity.
- v. They are chemistry, physics, physiology or medicine, literature and peace.
- vi. Prizes in these seven areas are presented in December every year, in the presence of the King of Sweden, as fitting tribute to Alfred Nobel.
- vii. In 1969, economics was added to the list.

- b) **Fill in blanks in the sentences below using appropriate form of the verb in brackets.**

5M CO4 L4

- i. Tanya \_\_\_\_\_ (speak) German very well.
- ii. He \_\_\_\_\_ (prepare) the students for APPSC since January 2014.
- iii. He \_\_\_\_\_ (meet) a lot of people recently.
- iv. Did you \_\_\_\_\_ (see) me yesterday in the institution?
- v. The children \_\_\_\_\_ (not/do) their homework, so they were in trouble.

UNIT-IV
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8. Describe and discuss Mohammad Yunus's contribution for the upliftment of the economic status of the poor people.

12M CO2 L4

## OR

9. Prepare a narrative essay on the topic, "The proudest moment of your life."

12M CO4 L4

UNIT-V
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10. **Correct the following sentences and rewrite them.**

12M CO3 L3

- i. Vijay's cap was *red in colour*.
- ii. Manisha practiced English *on a daily basis*.
- iii. The enemy was *surrounded on all sides*.
- iv. Are you going for the party?
- v. He climbed across the wall and ran until the main road.
- vi. The purse is below the pillow.
- vii. All applicants must possess an university degree.
- viii. In the class, the children were having arithmetic lesson.
- ix. After the wedding, there was a eight course meal.
- x. The petrol is expensive.
- xi. We must try harder to stop these people from destroying the nature.
- xii. He had spelt the word with a 's' instead of a 'c'.

## OR

11. Narrate the inspiring story of Mrinalini Sarabhai and describe the left by her for future generation.

12M CO4 L4

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

Hall Ticket Number :

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**R-20**

**Code: 20A511T**

I B.Tech. I Semester Regular Examinations June 2021

**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. <b>Answer ALL the following short answer questions</b> ( 5 X 2 = 10M ) |     |              |
| a) Define high level language and low level language                      | CO1 | L2           |
| b) Define an array. How to store elements in an array?                    | CO2 | L2           |
| c) Write a program to check whether the string is palindrome or not       | CO3 | L1           |
| d) Compare and contrast calloc() and malloc().                            | CO4 | L5           |
| e) Give various modes of opening a file                                   | CO5 | L4           |

**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) Briefly explain about the basic data types that C language supports.                                      | 6M | CO1 | L5 |
| b) What is flow chart? How it is useful in writing the programs? Explain about different symbols in flow chart. | 6M | CO1 | L1 |

**OR**

- |   |    |     |    |
|---|----|-----|----|
| 3. a) Is there any difference between the pre-decrement and post decrement operators? Explain with suitable examples. | 6M | CO1 | L2 |
| b) Write a pseudo code for swapping two numbers without using any temporary variable.                                 | 6M | CO1 | L1 |

**UNIT-II**

- |  |    |     |    |
|--|----|-----|----|
| 4. a) Compare the use of if-else construct with that of conditional operator. Explain with examples. | 6M | CO2 | L5 |
| b) Give the control flow diagram of the for loop. How is the execution of 'for' loop proceeds?       | 6M | CO2 | L4 |

**OR**

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|---|----|-----|----|
| 5. a) Describe about two dimensional arrays, initializing the two dimensional arrays and accessing elements in such arrays. | 6M | CO2 | L2 |
| b) Write a program to find an element present in a given array using Search techniques.                                     | 6M | CO2 | L1 |

UNIT-III
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- |    |  |    |     |    |
|----|--|----|-----|----|
| 6. | a) Write a C program with recursive function that counts the number of vowels in a string.                     | 6M | CO3 | L1 |
|    | b) Describe the concept of functions and the mechanism of a function call. Discuss the advantages of functions | 6M | CO3 | L2 |

OR

- |    |   |    |     |    |
|----|---|----|-----|----|
| 7. | a) Explain about C Preprocessor with an example.                          | 6M | CO3 | L1 |
|    | b) Illustrate the storage classes extern, static and auto with an example | 6M | CO3 | L4 |

UNIT-IV
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- |    |  |    |     |    |
|----|--|----|-----|----|
| 8. | a) Define a pointer. How to initialize and declare pointer variables? Explain the same with examples | 6M | CO4 | L2 |
|    | b) Write a recursive program for finding the n <sup>th</sup> Fibonacci value, using functions.       | 6M | CO4 | L1 |

OR

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|----|--|----|-----|----|
| 9. | a) Differentiate user defined and predefined function. Explain with one example. | 6M | CO4 | L2 |
|    | b) Explain how to pass one dimensional arrays to functions.                      | 6M | CO4 | L4 |

UNIT-V
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- |     |   |    |     |    |
|-----|---|----|-----|----|
| 10. | a) Differentiate between structures and unions, and write the syntax for nested structures. | 6M | CO5 | L2 |
|     | b) What is an enumerated data type? Explain with example.                                   | 6M | CO5 | L1 |

OR

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|-----|--|----|-----|----|
| 11. | a) Write a program to count no of words and lines in a file        | 6M | CO5 | L1 |
|     | b) Describe the process of handling errors during file operations. | 6M | CO5 | L2 |

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