

Hall Ticket Number :

**R-23**

**Code: 23AHS13T**

B.Tech. I Semester Regular Examinations January 2024

**Engineering Chemistry**  
(Common to CE & ME)

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 ( 10 X 2 = 20M )    | CO  | BL |
| a) Name the salts that cause temporary hardness. How are they removed?        | CO1 | L3 |
| b) Name the hardest scale formed? How is it removed?                          | CO1 | L2 |
| c) Write the Nernst's equation for the electrode reaction.                    | CO2 | L1 |
| d) Why the rate of metallic corrosion increases with increase in temperature. | CO2 | L2 |
| e) Bakelite is used in the electrical appliances? Give reasons.               | CO3 | L3 |
| f) Classify fuels based on their physical state with examples.                | CO3 | L2 |
| g) List out the few applications of composites.                               | CO4 | L2 |
| h) Define a lubricant? List the functions of a lubricant.                     | CO4 | L3 |
| i) List out the applications of nanomaterials in medicine.                    | CO5 | L1 |
| j) Write BET equation   | CO5 | L1 |

**PART-B**

Answer **five** questions by choosing one question from each unit ( 5 x 10 = 50 Marks )

Marks CO BL

**UNIT-I**

- |  |     |     |    |
|--|-----|-----|----|
| 2. Explain the methods of estimation of permanent, temporary and total hardness of water by EDTA method. | 10M | CO1 | L2 |
|--|-----|-----|----|

**OR**

- |   |    |     |    |
|---|----|-----|----|
| 3. a) What is desalination? Explain desalination of water by reverse osmosis process.       | 5M | CO1 | L2 |
| b) Explain how caustic embrittlement occurs in a boiler and outline the prevention methods. | 5M | CO1 | L2 |

**UNIT-II**

- |   |     |     |    |
|---|-----|-----|----|
| 4. What is a secondary cell? Explain the working of Lithium-ion battery and mention its applications. | 10M | CO2 | L3 |
|---|-----|-----|----|

**OR**

5. Discuss in detail the mechanism of electrochemical corrosion theory with the evolution of hydrogen and absorption of oxygen with chemical equations. 10M CO2 L2

**UNIT-III**

6. a) Distinguish between addition and condensation polymerisation. 5M CO3 L3  
 b) Explain preparation, properties and applications of Buna-N 5M CO3 L2

**OR**

7. a) Describe the process of refining of petroleum. 5M CO3 L2  
 b) Write a short note on octane number and cetane number. 5M CO3 L1

**UNIT-IV**

8. a) Give the classification of refractories with suitable examples. 5M CO4 L2  
 b) Explain in detail about setting and hardening of Portland cement. 5M CO4 L2

**OR**

9. Explain the mechanism of different types of lubricating processes. 10M CO4 L1

**UNIT-V**

10. Synthesis any one of the nanoparticles by using chemical Method. 10M CO5 L4

**OR**

11. a) Discuss about adsorption isotherm. 5M CO5 L1  
 b) List out the applications of colloids. 5M CO5 L1

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

Hall Ticket Number :

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R-23

Q.P.Code: 23A0511T

B.Tech. I Semester Regular Examinations January 2024

## Introduction to 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 )

- |   | CO | BL |
|---|----|----|
| 1. Answer <b>all</b> the following short answer questions ( 10 X 2 = 20M )  |    |    |
| a) Define flowchart and explain different symbols used for constructing flowchart.                                      | 1  | 1  |
| b) Evaluate the expression $a+b*c/d$ where $a=20$ , $b=10$ , $c=15$ and $d=5$ . Also print the value through C program. | 1  | 1  |
| c) List the control structures in C.  | 2  | 1  |
| d) List the decision-making statements in C.  | 2  | 1  |
| e) Explain recursion with example.  | 3  | 1  |
| f) List the types of functions in C.  | 3  | 1  |
| g) Display the first n natural number with user-defined function  | 4  | 1  |
| h) Compare structure and union in terms of memory allocation with an example  | 4  | 1  |
| i) List basic operations of a file.   | 5  | 1  |
| j) Explain a file opening mode with an example.   | 5  | 1  |

### PART-B

Answer *five* questions by choosing one question from each unit ( 5 x 10 = 50 Marks )

- |   | Marks | CO | BL |
|---|-------|----|----|
| <b>UNIT-I</b>   |       |    |    |
| 2. a) Differentiate among compiler, assembler, and interpreter.               | 5M    | 1  | 2  |
| b) Discuss tokens in C with examples.   | 5M    | 1  | 2  |
| <b>OR</b>   |       |    |    |
| 3. a) Explain all the data types with their ranges and examples.              | 5M    | 1  | 2  |
| b) Summarize Type Conversion and type casting in C.                           | 5M    | 1  | 2  |
| <b>UNIT-II</b>  |       |    |    |
| 4. a) Discuss briefly about multi-way selection statements with an example.   | 5M    | 2  | 2  |
| b) Write a C program to find the sum of odd numbers using jumping statements. | 5M    | 2  | 2  |

**OR**

5. a) Discuss about different format strings in c 5M 2 2  
 b) Write a C program to compute the real roots of a quadratic equation  $a*x^2 + b*x+c = 0$ . The program should request for the values of the constants a, b and c and print the values of root1 and root2.

Use the following rules:

- i. No solution, if both a and b are zero There is only one root, if  $a=0$   
 ii. There are no real roots, if  $b^2-4*a*c$  is negative  
 iii. Otherwise, there are two real roots.

Write a C program to test all the above conditions 5M 2 4

**UNIT-III**

6. a) List the string handling function with an example 5M 3 2  
 b) Write a C program to copy the string str2 into str1 without using strcpy() function 5M 3 2

**OR**

7. a) Explain call by value and call by reference with examples. 5M 3 2  
 b) Write a C program to check whether a string is palindrome or not without using string function. 5M 3 2

**UNIT-IV**

8. a) Explain usage of structure in terms of definition, declaration and accessing members with syntax and example 5M 4 2  
 b) Differentiate structures and unions. 5M 4 2

**OR**

9. a) What are pointers? Describe pointer arithmetic with examples 5M 4 2  
 b) Explain call by reference mechanism with an example program 5M 4 2

**UNIT-V**

10. a) C program to read name and marks of n number of students and store them in a file. 5M 5 2  
 b) Write C program that uses both recursive and non-recursive functions to find the sum of n natural numbers. 5M 5 2

**OR**

11. a) Write C program that uses both recursive and non-recursive functions to find the factorial of a given number. 5M 5 2  
 b) Explain various storage classes in C with an example 5M 5 2

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

QPCode: 23AHS11T

B.Tech. I Semester Regular Examinations January 2024

**Linear 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 ( 10 X 2 = 20M )
- |  |     |    |
|--|-----|----|
|  | CO  | BL |
| a) Define the rank of a matrix. What is the rank of an identity matrix of order n?               | CO1 | L1 |
| b) State Cauchy's Binet formula.   | CO1 | L1 |
| c) Show that the Eigen values of a matrix A and its transpose A <sup>1</sup> are same.           | CO2 | L1 |
| d) State Cayley-Hamilton theorem.  | CO2 | L1 |
| e) State Rolle's theorem.  | CO3 | L1 |
| f) State Maclaurin's theorem with Lagrange's form of remainder.                                  | CO3 | L1 |
| g) If $f(x, y) = ax^2 + 2hxy + by^2$ , then find its first and second order partial derivatives. | CO4 | L2 |

h) If  $x = r \cos \theta$ ,  $y = r \sin \theta$  then find  $J \left( \frac{x, y}{r, \theta} \right)$ .

	CO4	L2
--	-----	----

i) Evaluate  $\int_0^1 \int_0^{\sqrt{1+x^2}} \frac{dx dy}{1+x^2+y^2}$ .

	CO5	L2
--	-----	----

j) Evaluate  $\int_0^{\frac{\pi}{2}} \int_0^{\frac{\pi}{2}} \frac{1}{x^2+y^2} dx dy$ .

	CO5	L1
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**PART-B**Answer **five** questions by choosing one question from each unit ( 5 x 10 = 50 Marks )

Marks CO BL

**UNIT-I**

2. a) Find the rank of the matrix  $B = \begin{bmatrix} 0 & 1 & -3 & -1 \\ 1 & 0 & 1 & 1 \\ 3 & 1 & 0 & 2 \\ 1 & 1 & -2 & 0 \end{bmatrix}$

	5M	CO1	L2
--	----	-----	----

b) Solve by Gauss elimination method the following equations  
 $x - 2y + 3z = 2, 2x + y + z + t = -4, 4x - 3y + z + 7t = 8.$

	5M	CO1	L3
--	----	-----	----

**OR**

3. Show that the system of equations  
 $2x_1 - 2x_2 + x_3 = \lambda x_1, 2x_1 - 3x_2 + 2x_3 = \lambda x_2, -x_1 + 2x_2 = \lambda x_3$   
 can possess a non trivial solution only if  $\lambda = 1, \lambda = -3$ .  
 Obtain the solution in each case.

	10M	CO1	L3
--	-----	-----	----

UNIT-II

4. Verify Cayley-Hamilton theorem for the following matrix and hence find the

$$\text{inverse} \begin{bmatrix} 1 & 1 & 3 \\ 1 & 3 & -3 \\ -2 & -4 & -4 \end{bmatrix}$$

10M CO2 L3

OR

5. Reduce the following quadratic form  $2x_1x_2 + 2x_1x_3 - 2x_2x_3$  into canonical form or sum of squares through orthogonal reduction and hence find the nature.

10M CO2 L3

UNIT-III

6. State first mean value theorem, and using it prove that  $(0 < a < b < 1)$ ,  $\frac{b-a}{1+b^2} < \tan^{-1} b - \tan^{-1} a < \frac{b-a}{1+a^2}$ .

Hence show that  $\frac{f}{4} + \frac{3}{25} < \tan^{-1} \frac{4}{3} < \frac{f}{4} + \frac{1}{6}$ .

10M CO3 L3

OR

7. Expand  $\log_e^x$  in powers of  $(x-1)$  and hence evaluate  $\log_e^{1.1}$  correct to 4 decimal places.

10M CO3 L3

UNIT-IV

8. If  $u = x^2 - y^2, v = 2xy$  and  $x = r \cos \theta, y = r \sin \theta$ , find  $\frac{\partial(u,v)}{\partial(r, \theta)}$ .

10M CO4 L3

OR

9. If  $u = \log(x^3 + y^3 + z^3 - 3xyz)$  then show that  $(\frac{\partial}{\partial x} + \frac{\partial}{\partial y} + \frac{\partial}{\partial z})_z u = \frac{-9}{(x+y+z)^2}$

UNIT-V

10. Change the order of integration in  $I = \int_0^1 \int_{x^2}^{2-x} xy dx dy$  and hence evaluate the same.

10M CO5 L3

OR

11. Evaluate, by changing to spherical polar coordinates

$$\int_0^1 \int_0^{\sqrt{1-x^2}} \int_0^{\sqrt{1-x^2-y^2}} \frac{dx dy dz}{\sqrt{1-x^2-y^2-z^2}}$$

10M CO5 L4

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

Hall Ticket Number :									
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<b>R-23</b>
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**Q.P.Code: 23A0111T**

B.Tech. I Semester Regular Examinations January 2024

**Basic Civil & Mechanical Engineering**

(Common to CE, ME, CSE, CSE(DS) and AI&ML)

Max. Marks: 70

Time: 3 Hours

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- Note: 1. Question Paper consists of two parts (**Part-1** and **Part-2**)  
2. Use separate Answer booklets for **Part-1** and **Part-2**  
3. Part-1 & Part-2 of question paper consists of Part-A & Part-B  
4. In Part-A, each question carries **One marks**.  
5. Answer **ALL** the questions in **Part-A** and **Part-B**

**PART-1 (Basic Civil Engineering)**

**PART-A**

**(Compulsory question)**

1. Answer **all** the following short answer questions ( 5 X 1 = 5M )
- |   | CO  | BL |
|---|-----|----|
| a) List out various disciplines in Civil Engineering. | CO1 | L2 |
| b) Define Surveying.                                  | CO2 | L2 |
| c) What is the definition of a contour line?          | CO2 | L2 |
| d) Name any two Railway Gauges.                       | CO3 | L2 |
| e) Define Hydrology.                                  | CO3 | L2 |

**PART-B**

Answer **five** questions by choosing one question from each unit ( 3 x 10 = 30 Marks )

Marks	CO	BL
-------	----	----

**UNIT-I**

2. Explain role and scope of Civil Engineering in the society. 10M CO1 L2

**OR**

3. What are the various materials used for construction? Explain in detail. 10M CO1 L2

**UNIT-II**

4. Enumerate the objectives of Surveying and Explain in detail the types of Bearings. 10M CO2 L2

**OR**

5. Explain in detail about all available estimates for buildings. 10M CO2 L2

**UNIT-III**

6. Differentiate between Flexible Pavements and Rigid Pavements. 10M CO3 L2

**OR**

7. What is rainwater harvesting? Explain the methods used for the rainwater harvesting. 10M CO3 L1

**PART-2 (Basic Mechanical Engineering)****PART-A****(Compulsory question)**

- |  |     |    |
|--|-----|----|
| 1. Answer <b>all</b> the following short answer questions ( 5 X 1 = 5M ) | CO  | BL |
| a) Interpret the fields which dealt by a Mechanical Engineer?            | CO1 | L2 |
| b) Summarize the mechanical engineering role in Aerospace sector         | CO1 | L2 |
| c) Explain the basic Refrigeration and air conditioning cycles?          | CO2 | L2 |
| d) Outline the links and Joints used in robot?                           | CO3 | L3 |
| e) Illustrate the advantages and Disadvantages of hydro power plants.    | CO3 | L2 |

**PART-B****Answer five questions by choosing one question from each unit ( 3 x 10 = 30 Marks )**

Marks CO BL

**UNIT-I**

- |   |     |     |    |
|---|-----|-----|----|
| 2. Analyze the mechanical engineering technologies role in Energy sector? | 10M | CO1 | L4 |
|---|-----|-----|----|

**OR**

- |  |    |     |    |
|--|----|-----|----|
| 3. a) Distinguish the ferrous and non-ferrous metals?                      | 5M | CO1 | L2 |
| b) What do you mean by composites? Outline the applications of composites? | 5M | CO1 | L2 |

**UNIT-II**

- |   |     |     |    |
|---|-----|-----|----|
| 4. Classify the manufacturing processes and analyze about any three types of manufacturing processes. | 10M | CO2 | L4 |
|---|-----|-----|----|

**OR**

- |   |    |     |    |
|---|----|-----|----|
| 5. a) Distinguish between 2 stroke and 4 stroke IC engines?     | 5M | CO2 | L4 |
| b) Explain the working principle of Boilers with a neat sketch? | 5M | CO2 | L2 |

**UNIT-III**

- |  |     |     |    |
|--|-----|-----|----|
| 6. Draw the layout of a steam Power Plant and explain its working. | 10M | CO3 | L2 |
|--|-----|-----|----|

**OR**

- |  |    |     |    |
|--|----|-----|----|
| 7. a) State the type of mechanical power transmission and explain any one in detail. | 5M | CO3 | L4 |
| b) Explain the Basic components of Robot configurations?                             | 5M | CO3 | L2 |

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



Hall Ticket Number :

R-23

Code: 23AHS12T

B.Tech. I Semester Regular Examinations January 2024

**Communicative English**

(Common to CE, ME, CSE, CSE(DS) and AI&ML)

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 )**

- |   | CO | BL |
|---|----|----|
| 1. Answer <b>all</b> the questions (10 X 2 = 20M)   |    |    |
| a) Do you agree with the last paragraph of the story "The Gift of the Magi"? Give reasons.  | 1  | L2 |
| b) Write antonyms for the following words:<br>i) diffident                      ii) urban   | 1  | L3 |
| c) Justify the brook's stand when it claims "For men may come and men may go, But I go on forever."   | 2  | L4 |
| d) Differentiate between Homonyms and Homophones.   | 2  | L2 |
| e) Write briefly about any one aspect of Elon Musk's innovations in his attempt at making technology a user friendly.                             | 3  | L2 |
| f) Explain the importance of paraphrasing / summarizing.  | 3  | L2 |
| g) Describe a couple of the "peace toys" that Harvey brings for Eric and Bertie. What do these toys represent?                                    | 4  | L2 |
| h) Define Jargon. Mention any four types of jargons that you know.  | 4  | L3 |
| i) Define intrapersonal communication skills.   | 5  | L2 |
| j) Convert the following sentences in passive voice.<br>i) When are you buying motor cycle?<br>ii) The chairman praised Sarala for her good work. | 5  | L3 |

**PART-B**

Answer **five** questions by choosing **one** question from each unit (5 x 10 = 50 Marks)

Marks CO BL

**UNIT-I**

- |           |   |     |   |    |
|-----------|---|-----|---|----|
| 2.        | How are the gifts given by the Magi can be compared to the gifts exchanged by the principal characters in O Henry's story "The Gift of the Magi."?  | 10M | 1 | L2 |
| <b>OR</b> |   |     |   |    |
| 3. a)     | Use the prefix or suffix to the given word provided in the bracket in its appropriate form.<br>i) You can't just believe it. The plot was _____ (believable)<br>ii) I saw her just a few days ago. Still, I miss her. It looks like she just _____ (appeared)<br>iii) I am sorry; I didn't mean to hurt you. I must have _____ you. (understood)<br>Use prefix in the below words to find out its opposite words.<br>i) Happy                      ii) Wrap                      iii) Connect | 5M  | 1 | L3 |
| b)        | Write two synonyms for each word.<br>i) abate    ii) cloth    iii) hazardous    iv) sparkle    v) connect    vi) frightened   | 5M  | 1 | L3 |

<b>UNIT-II</b>
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4. Distinguish between the journeys undertaken by a human being and the brook. 10M 2 L2
- OR**
5. a) Fill in the blanks with 'a', 'an' or 'the' wherever necessary.
- i) The guide knows \_\_\_\_\_ way.  
 ii) Let us discuss \_\_\_\_\_ matter seriously.  
 iii) You are \_\_\_\_\_ fool to say that.  
 iv) French is \_\_\_\_\_ easy language.  
 v) Mumbai is \_\_\_\_\_ very dear place to live in. 5M 2 L3

- b) Fill in the blanks with suitable prepositions.

I am Andrew, and I live (i) London (ii) my wife. I like (iii) travel and every year. The guests are coming (iv) 6'o' clock (v) the evening on Thursday. 5M 2 L3

<b>UNIT-III</b>
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6. Write in detail about the contributions of Elon Musk in the field of technology. 10M 3 L2

**OR**

7. a) Fill in the blanks with the correct form of verbs.
- i) Mathematics \_\_\_\_\_ (be) an interesting subject.  
 ii) John \_\_\_\_\_ (work) as a doctor.  
 iii) Sita is \_\_\_\_\_ (read) a novel right now.  
 iv) My father \_\_\_\_\_ (paint) the wall for two hours.  
 v) I \_\_\_\_\_ (not, meet) her yesterday. 5M 3 L3
- b) Form five compound words for each of the following cases:
- i) Adjective + Noun    ii) Verb + Noun 5M 3 L3

<b>UNIT-IV</b>
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8. a) How does the boy's transformation of the peace toys into violent scenarios reflect their exposure to real-world conflicts and societal influences in the story "The Toys of Peace"? 5M 4 L4
- b) Analyse the role of education and upbringing in shaping children's perspectives. How does 'The Toys of Peace' highlight the challenge of redirecting established behaviors and attitudes ingrained in early childhood? 5M 4 L4

**OR**

9. Prepare a resume/CV with a cover letter for the following job advertisements.
- i) Wanted an Office Assistant for a reputed company based in Delhi. The candidate must be a graduate with an experience of at least two years. Computer knowledge and Communicative English are necessary. Apply within a week to post Box No. 5665, c/o Indian Express, Sk Marg, New Delhi 110046. 10M 4 L4

<b>UNIT-V</b>
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10. The lesson "Power of Intrapersonal Communication" suggests that developing intrapersonal communication skills can lead to effective decision-making, problem-solving, and stress management. Can you think of any potential limitations or challenges in relying solely on intrapersonal communication for these processes? How might external perspectives and input play a role in enhancing these skills? 10M 5 L2

**OR**

11. Attempt an expository essay on "Class room learning and online learning." 10M 5 L2

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