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R-20

Code: 20AC14T

I B.Tech. I Semester Supplementary Examinations June 2024

Engineering Chemistry

(Common to CE&ME)

Max. Marks: 70

Time: 3 Hours

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) What are the salts responsible for the temporary and permanent hardness of water? | CO1 | L1 |
| b) What is the working principle of an electrochemical cell? | CO2 | L2 |
| c) Define knocking in the context of an internal combustion engine. | CO3 | L2 |
| d) What are composite materials | CO4 | L1 |
| e) What are nanomaterials? Give examples | 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. Explain the concepts of priming and foaming problems in boilers | 12M | CO1 | L2 |
|--|-----|-----|----|

OR

- | | | | |
|--|-----|-----|----|
| 3. Differentiate between scale and sludge. How are scales formed and what are their disadvantages? | 12M | CO1 | L4 |
|--|-----|-----|----|

UNIT-II

- | | | | |
|--|----|-----|----|
| 4. a) Describe the significance of the electrochemical series in reactions | 6M | CO2 | L2 |
| b) Explain the method of determining electrode potential using hydrogen electrode? | 6M | CO2 | L2 |

OR

- | | | | |
|--|-----|-----|----|
| 5. Describe the construction and working of Hydrogen- Oxygen fuel cell. Mention its advantages and disadvantages | 12M | CO2 | L2 |
|--|-----|-----|----|

UNIT-III

- | | | | |
|--|-----|-----|----|
| 6. What are the characteristics of chain growth polymerization. Discuss its mechanism with a suitable example. | 12M | CO3 | L2 |
|--|-----|-----|----|

OR

- | | | | |
|--|----|-----|----|
| 7. a) Analyze the advantages and disadvantages of using propane as an alternative fuel | 6M | CO3 | L4 |
| b) Explain the production of power alcohol, an alternative fuel. | 6M | CO3 | L2 |

UNIT-IV

- | | | | |
|---|----|-----|----|
| 8. a) Describe the constituents of composite materials. How do these constituents contribute to the overall properties of composites? | 6M | CO4 | L2 |
| b) Describe the applications of composite materials in various industries. | 6M | CO4 | L2 |

OR

- | | | | |
|--|-----|-----|----|
| 9. Describe briefly Fluid film lubrication and Thin-film lubrication | 12M | CO4 | L2 |
|--|-----|-----|----|

UNIT-V

- | | | | |
|---|-----|-----|----|
| 10. Explain the role of SEM in various scientific fields in detail. | 12M | CO5 | L2 |
|---|-----|-----|----|

OR

- | | | | |
|--|-----|-----|----|
| 11. Illustrate the practical applications of nanomaterials in wastewater treatment, lubricants & engines | 12M | CO5 | L3 |
|--|-----|-----|----|

*** End ***

Hall Ticket Number :

R-20

Code: 20A311T

I B.Tech. I Semester Supplementary Examinations June 2024

Engineering Graphics
(Mechanical Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

UNIT-I

- | | Marks | CO | BL |
|--|-------|-----|----|
| 1. a) Construct a regular (i) Hexagon. (ii) Heptagon. by General Method, given the length of its side is 50mm. | 8M | CO1 | L1 |
| b) Construct an equilateral triangle, given the side of the triangle is 35mm. | 6M | CO1 | L1 |

OR

- | | | | |
|---|-----|-----|----|
| 2. The major and minor axes of an ellipse are 110mm and 50mm. Draw an ellipse by Oblong method. | 14M | CO1 | L2 |
|---|-----|-----|----|

UNIT-II

- | | | | |
|--|-----|-----|----|
| 3. Draw a cycloid for one complete revolution of a cycle having a 30 mm radius. Taking the top most point on the rolling circle as the initial position of the generating point. Draw a tangent and a normal to the curve at a point distant 40 mm above the base line | 14M | CO2 | L1 |
|--|-----|-----|----|

OR

- | | | | |
|--|-----|-----|----|
| 4. Draw the involute of a regular pentagon of side 25 mm. Draw a tangent and normal to the curve at a distance of 90 mm from the centre of the pentagon. | 14M | CO2 | L2 |
|--|-----|-----|----|

UNIT-III

- | | | | |
|---|-----|-----|----|
| 5. A point P is 15 mm above H.P and 20 mm in front of the V.P. Another point Q is 25mm behind V.P and 40 mm below H.P. Draw the projections of P and Q keeping the distance between the projectors equal to 90 mm. Draw straight lines joining their (i) Top views and (ii) Front views | 14M | CO3 | L2 |
|---|-----|-----|----|

OR

- | | | | |
|--|-----|-----|----|
| 6. A line CD 75mm long is inclined at an angle of 45° to HP and 30° to VP. The point P is 15mm above HP and 20mm in front of VP. Draw the projections of the line. | 14M | CO3 | L3 |
|--|-----|-----|----|

UNIT-IV

- | | | | |
|---|-----|-----|----|
| 7. A regular hexagonal lamina of 22mm side, rests on one of its sides on HP. It is parallel to and 15mm away from the VP. Draw its projections. | 14M | CO4 | L2 |
|---|-----|-----|----|

OR

- | | | | |
|--|-----|-----|----|
| 8. Draw the projections of a regular hexagon of 30 mm side having one of its sides in HP and inclined at 60° to VP and its surface making an angle of 30° to HP. | 14M | CO4 | L3 |
|--|-----|-----|----|

UNIT-V

- | | | | |
|---|-----|-----|----|
| 9. A Line PQ, 40mm long is inclined at 45° to the HP and its top view makes angle of 60° with the VP. Draw its projection using auxiliary plane method. | 14M | CO5 | L2 |
|---|-----|-----|----|

OR

- | | | | |
|---|-----|-----|----|
| 10. A hexagonal plane of side 30mm is placed with its surface inclined at 60° to VP and a side resting on VP. Draw its projection using auxiliary plane method. | 14M | CO5 | L3 |
|---|-----|-----|----|

Important Note: 1. On completing your answers. Compulsorily draw diagonal cross line on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 32+8=40, will be treated as malpractice.

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R-20

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

- 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) 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

*** End ***

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R-20

Code: 20AC11T

I B.Tech. I Semester Supplementary Examinations June 2024

Algebra and Calculus
(Common to All Branches)

Max. Marks: 70

Time: 3 Hours

- 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^T have the same Eigen values

6M CO1 L2

- b) If λ is Eigen value of an Orthogonal matrix, then show that $\frac{1}{\lambda}$ 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 ***

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R-20

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

- 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) 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

UNIT-III

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

UNIT-IV

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

UNIT-V

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

*** End ***