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R-20

Code: 20AC14T

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

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) Why do we express hardness of water in terms of calcium carbonate equivalent? | | CO1 | L1 |
| b) Define reference electrode. | | CO2 | L1 |
| c) What is meant by degree of polymerization? | | CO3 | L1 |
| d) What is meant by thermal spalling? | | CO4 | L1 |
| e) Mention any two uses of smart materials. | | 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) What are Boiler troubles? Explain Scale and Sludge formation in boilers. How are they removed? | 6M | CO1 | L2 |
| b) What is meant by hardness of water and its units? What are the disadvantages of hard water? | 6M | CO1 | L2 |

OR

- | | | | |
|--|----|-----|----|
| 3. a) Describe the estimation of hardness of water by EDTA method. | 6M | CO1 | L2 |
| b) Explain the zeolite exchange process for softening of water. | 6M | CO1 | L2 |

UNIT-II

- | | | | |
|--|----|-----|----|
| 4. a) Write a short note on fuel cells. | 6M | CO2 | L1 |
| b) Write briefly about: (i)Primary cells (ii)Secondary Cells | 6M | CO2 | L1 |

OR

- | | | | |
|---|----|-----|----|
| 5. a) Describe about (i) Sacrificial anodic protection method (ii) impressed current method of cathodic protection. | 6M | CO2 | L2 |
| b) Define corrosion. Explain the factors which influence the corrosion. | 6M | CO2 | L2 |

UNIT-III

6. a) Distinguish between thermoplastics and thermosetting polymers or resins. 6M CO3 L4
- b) Discuss, with examples about the types of polymerization. 6M CO3 L4

OR

7. a) Describe the determination of calorific value of a fuel by using bomb calorimeter. 6M CO3 L2
- b) What is crude oil? Describe the refining Process of crude petroleum. 6M CO3 L2

UNIT-IV

8. a) Discuss the classification of composites with suitable examples in brief. 6M CO4 L4
- b) Define refractory. What are the properties of a good refractory? 6M CO4 L1

OR

9. a) Write notes on lubricants with special reference to their classification, mode of action, examples and applications. 6M CO4 L2
- b) What is Portland cement? Explain the different ingredients of Portland cement. 6M CO4 L2

UNIT-V

10. a) Describe the chemical synthesis of nanomaterials by Sol-gel method. 6M CO5 L2
- b) Discuss the applications of nanomaterials in wastewater treatment. 6M CO5 L4

OR

11. a) Discuss the classification of smart materials. 6M CO5 L4
- b) What are the applications of shape memory alloys? Explain. 6M CO5 L2

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Hall Ticket Number :

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R-20

Code: 20A311T

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

Engineering Graphics-I
(Mechanical Engineering)

Max. Marks: 70

Time: 3 Hours

Answer *five full* questions by choosing one question from each unit (5 x 14 = 70 Marks)

UNIT-I

1. A fountain jet is discharged from the ground level at an inclination of 45° . The jet travels a horizontal distance of 10 m from the point of discharge and falls on the ground. Trace the path of the jet.

Marks CO BL

14M CO1 L2

OR

2. Construct a conic when the distance of its focus from its directrix is equal to 50 mm and its eccentricity is $2/3$. Name the curve, mark its major axis and minor axis. Draw a tangent at any point, P on the curve.

14M CO1 L2

UNIT-II

3. A coin of 40 mm diameter rolls over horizontal table without slipping. A point on the circumference of the coin is in contact with the table surface in the beginning and after one complete revolution. Draw and name of the curve. Draw a tangent and normal at any point on the curve.

14M CO2 L2

OR

4. Draw an epi-cycloid of a circle of 40 mm diameter, which rolls on another circle of 120 mm diameter for one revolution clockwise. Draw a tangent and a normal to it at a point 90 mm from the centre of the directing circle.

14M CO2 L2

UNIT-III

5. A line AB, 90 mm long, is inclined at 30° to the H.P. Its end A is 12 mm above the H.P and 20 mm in front of the V.P. Its front view measures 65 mm. Draw the top view of AB and determine its inclination with the V.P.

14M CO3 L3

OR

6. The top view of a 75 mm long line AB, measures 65 mm; while the length of its front view is 50 mm. It's one end A is in the H.P and 12 mm in front of the V.P. Draw the projections of the line AB and determine its inclination with H.P and V.P.

14M CO3 L3

UNIT-IV

7. A square lamina ABCD of 30 mm side rests on one of its corners on the ground. Its plane is inclined at 35° with H.P and diagonal DB inclined at 65° to V.P. Draw its projections.

14M CO4 L3

OR

8. Draw the projections of circle of 50mm diameter resting in the HP on a point A on the circumference, its plane inclined at 45° to the HP and the top view of the diameter AB making an angle 30° to the VP.

14M CO4 L3

UNIT-V

9. Draw the projections of a line 80 mm long inclined at 30° to H.P and its top view appears to be inclined at 60° to V.P. One of the ends of the line is 45 mm above H.P and 60 mm in front of V.P. Draw its projections by auxiliary plane method.

14M CO5 L3

OR

10. A regular hexagon of 25 mm side has a corner on the H.P. Its surface inclined at 45° to the H.P and top view of the diagonal through the corner which is in the H.P makes an angle of 60° with the V.P. Draw the projections. (Use auxiliary plane method).

14M CO5 L3

*** End ***

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R-20

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

- 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 the following (5 X 2 = 10M) | CO | BL |
| 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
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

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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

- 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 | | |
| $\begin{aligned} 5x+3y+7z &= 4 \\ 3x+26y+2z &= 9 \\ 7x+2y+10z &= 5 \end{aligned}$ | 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 |

UNIT-II

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

UNIT-III

6. If $x = u(1-v)$, $y = uv$ then prove that $\frac{\partial(x,y)}{\partial(u,v)} = \frac{1}{J}$ 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

UNIT-IV

8. Characterize the order of integration $I = \int_0^{4a} \int_{x^2/4a}^{2\sqrt{ax}} dy dx$ 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

UNIT-V

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 ***

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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

- 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 ***