

Hall Ticket Number :

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**R-20**

**Code: 20A311T**

I B.Tech. I Semester Supplementary Examinations September 2022

**Engineering Graphics-I**

(Mechanical Engineering)

Max. Marks: 70

Time: 3 Hours

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

Marks	CO	Blooms Level
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**UNIT-I**

1. Draw the hyperbola when the distance of the focus from the directrix is equal to 50 mm and the eccentricity is  $\frac{4}{3}$ . Name the curve. Draw a tangent and normal at any point.

14M	CO1	L4
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**OR**

2. a) The major and minor axes of an ellipse are 120 mm and 80 mm. Draw an ellipse concentric circles method.  
b) Draw a rectangle having its sides 150 mm and 75 mm long. Inscribe parabola in it.

7M	CO1	L4
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7M	CO1	L4
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**UNIT-II**

3. Construct a hypocycloid, rolling circle 60 mm diameter and directing circle 120 mm diameter.

14M	CO2	L6
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**OR**

4. a) Draw the involute of a regular hexagon of side 20 mm.  
b) A circle of 60mm diameter rolls along a straight line. Trace the path of a point A on the periphery of the circle. Name the curve.

7M	CO2	L4
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7M	CO2	L4
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**UNIT-III**

5. A straight line PQ has its end P at 20 mm above the HP and 30 mm in front of the VP and end Q is 80 mm above the HP and 70 mm in front of VP. If the end projectors are 60 mm apart. Draw the projections of the line. Determine its true length and true inclinations with the reference planes.

14M	CO3	L4
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**OR**

6. A line of 100 mm long makes an angle  $35^\circ$  with HP and  $45^\circ$  with VP. Its mid-point is 20 mm above HP and 15 in front of VP. Draw the projections of the line. Also draw the traces.

14M	CO3	L4
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**UNIT-IV**

7. A pentagonal plane of 30mm side has one of its sides in the V.P. and inclined at  $60^\circ$  to the H.P. while the surface of the plane makes an angle of  $40^\circ$  V.P. Draw its projections.

14M CO4 L4

**OR**

8. A square of ABCD of 50 mm side has its corner A in the HP, its diagonal AC inclined at  $30^\circ$  to the HP and the diagonal BD inclined at  $45^\circ$  to the VP and parallel to the HP. Draw its projections.

14M CO4 L4

**UNIT-V**

9. A line AB, 65 mm long, is inclined at  $35^\circ$  to the H.P. and its top view makes an angle of  $65^\circ$  with the V.P. Draw its projections using auxiliary planes method.

14M CO5 L4

**OR**

10. A hexagonal plane of side 30 mm has an edge on the H.P. Its surface is inclined at  $45^\circ$  to the H.P. and the edge on which the plane rests is inclined at  $30^\circ$  to the V.P. Draw its projections using auxiliary planes method.

14M CO5 L4

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Hall Ticket Number :

**R-20**

**Code: 20AC14T**

I B.Tech. I Semester Supplementary Examinations September 2022

**Engineering Chemistry**

(Common to CE and 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 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) Distinguish Scale and Sludge.  | CO1 | L1           |
| b) List any three advantages of Lithium batteries.                        | CO2 | L1           |
| c) What are thermosetting resins? Give example.                           | CO3 | L1           |
| d) Mention any three properties of lubricant oils.                        | CO4 | L1           |
| e) Briefly write about Nano materials.                                    | CO5 | L1           |

**PART-B**

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

- |  | Marks | CO  | Blooms Level |
|--|-------|-----|--------------|
| <b>UNIT-I</b>  |       |     |              |
| 2. a) Discuss the method of estimation of total hardness of water by EDTA method.          | 6M    | CO1 | L4           |
| b) Explain the WHO standards of drinking water.  | 6M    | CO1 | L2           |
| <b>OR</b>  |       |     |              |
| 3. a) Discuss the various methods of formation and removal of sludges.                     | 6M    | CO1 | L4           |
| b) Describe the desalination of blackish water process.                                    | 6M    | CO1 | L2           |
| <b>UNIT-II</b>   |       |     |              |
| 4. a) Derive Nernst's equation for determination of single electrode potential.            | 6M    | CO2 | L4           |
| b) Discuss the working function of H <sub>2</sub> -O <sub>2</sub> fuel cell.               | 6M    | CO2 | L4           |
| <b>OR</b>  |       |     |              |
| 5. a) Explain the mechanism of Electro Chemical theory of corrosion with suitable example. | 6M    | CO2 | L2           |
| b) Write note on anodic inhibitors.  | 6M    | CO2 | L1           |

**UNIT-III**

6. a) Define Polymerization and explain the different types of polymerization reactions with suitable examples. 6M CO3 L1  
 b) Write note on Cetane values. 6M CO3 L1

**OR**

7. a) Describe the determination of calorific value of fuel using Bomb calorimeter. 6M CO3 L2  
 b) What are the differences between thermo plastics and thermo setting plastics? 6M CO3 L2

**UNIT-IV**

8. a) Write note on Constituents of composites. 6M CO4 L1  
 b) Describe the properties of refractories. 6M CO4 L2

**OR**

9. a) Describe the manufacture of Portland cement. 6M CO4 L2  
 b) Write note on classification of lubricants. 6M CO4 L1

**UNIT-V**

10. a) Write the applications of nano material in waste water treatment. 6M CO5 L1  
 b) Describe the uses of smart materials. 6M CO5 L2

**OR**

11. a) Describe the chemical synthesis of nano materials by SOL-gel method. 6M CO5 L2  
 b) Write note on Self-healing materials. 6M CO5 L1

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

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

I B.Tech. I Semester Supplementary Examinations September 2022

**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. Answer ALL the following short answer questions ( 5 X 2 = 10M )      |   |    |              |
| a) Consider the following program                                       |   |    |              |
| #include<stdio.h>   |   |    |              |
| main()  |   |    |              |
| {   |   |    |              |
| int a=5;  |   |    |              |
| b = a << 2;   |   |    |              |
| printf("a=%d b=%d \n", a,b);  |   |    |              |
| }   |   |    |              |
| What is the output of above program? Explain it in two lines.           | 1 |    | L1           |
| b) What is the difference between 'getchar()' and 'scanf()' in C        | 1 |    | L1           |
| c) What is meant by Scope of Variable in C?                             | 2 |    | L2           |
| d) What is a void pointer?  | 4 |    | L1           |
| e) How do we identify the end of file in C. Illustrate with an example? | 4 |    | L2           |

**PART-B**

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

- |  |    | Marks | CO | Blooms Level |
|--|----|-------|----|--------------|
| <b>UNIT-I</b>  |    |       |    |              |
| 2. a) Write briefly about the C Tokens with suitable examples                                | 6M |       | 1  | L2           |
| b) How many keyword and identifiers does C Language support? Explain.                        | 6M |       | 1  | L2           |
| <b>OR</b>  |    |       |    |              |
| 3. a) Explain the Structure of C program.  | 6M |       | 1  | L2           |
| b) Describe the various operators in C language along with its priority.                     | 6M |       | 1  | L2           |
| <b>UNIT-II</b>   |    |       |    |              |
| 4. a) What are Multi-dimensional arrays? How do we represent a Matrix using arrays?          | 6M |       | 3  | L2           |
| b) Write a program to print the series in the following form for a number 'n' : Example(n=4) | 6M |       | 2  | L3           |

1  
1 2  
1 2 3  
1 2 3 4  
1 2 3  
1 2  
1

**OR**

5. a) Explain Bubble sort algorithm with a suitable example. 6M 3 L3  
 b) Your teacher has conducted a test having a total of N questions, each question carries 3 marks for a correct answer and -1 for an incorrect answer. Students have decided to attempt all the questions. It is known that each student got X questions correct and the rest of them incorrect. For student to pass the course he must score at least P marks. Write a C program to simulate the above.  
 (Input: N, X, P  
 Output: Marks Obtained: \_\_\_\_\_, Status: Pass/ Fail) 6M 2 L3

**UNIT-III**

6. a) What is recursion? What is the format of a recursive function? Explain its advantages and limitations? 6M 3 L2  
 b) Explain any four basic string functions with examples. 6M 3 L2

**OR**

7. a) What are the various types of preprocessor directives? 6M 4 L2  
 b) Write a program to find GCD of Two numbers using recursion. 6M 3 L3

**UNIT-IV**

8. a) Explain pointer to function and function returning pointer with example. 6M 3 L2  
 b) Write a program to concatenate two strings using pointers. 6M 4 L3

**OR**

9. a) What is advantage of representing an array of string by an array of pointer to string? 6M 4 L3  
 b) Distinguish between call by value and call by reference. Illustrate it with an example in C. 6M 4 L3

**UNIT-V**

10. a) Define a structure with the name 'student'. Assume appropriate fields in student structure. Develop a program which reads 'n' students data and displays all 'n' students' information. 6M 5 L3  
 b) Write about different built-in functions used in Files concept. 6M 5 L2

**OR**

11. a) What are self-referential structures? Explain them with an example. 6M 4 L2  
 b) Write a program to copy one file data into another file. 6M 5 L3

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

Hall Ticket Number :

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R-20

Code: 20AC11T

I B.Tech. I Semester Supplementary Examinations September 2022

### 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 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) If  $A = \begin{bmatrix} 1 & 2 & 5 \\ 0 & 3 & 2 \\ 0 & 0 & 4 \end{bmatrix}$  then find the Eigen values of A.

CO1 L3

- b) Define quadratic form and Write matrix of a quadratic form of

$$Q = 6x_1^2 + 3x_2^2 + 3x_3^2 - 4x_1x_2 - 2x_2x_3 + 4x_3x_1$$

CO2 L2

- c) Differentiate Taylor's and Maclaurin's power series expansion

CO3 L2

d) Evaluate  $\int_{z=0}^1 \int_{y=0}^2 \int_{x=1}^2 xyz \, dzdydx.$

CO4 L3

e) Evaluate  $\Gamma\left(-\frac{1}{2}\right)$

CO5 L3

#### PART-B

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

Marks CO Blooms  
Level

#### UNIT-I

2. Reduce the matrix  $\begin{bmatrix} 2 & 3 & -1 & -1 \\ 1 & -1 & -2 & -4 \\ 3 & 1 & 3 & -2 \\ 6 & 3 & 0 & 7 \end{bmatrix}$  into normal form.

12M L3

**OR**

3. Find the Eigen values and Eigen vectors of the matrix

$$A = \begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$$

12M

L2

**UNIT-II**

4. Reduce the matrix  $A = \begin{bmatrix} -1 & 2 & -2 \\ 1 & 2 & 1 \\ -1 & -1 & 0 \end{bmatrix}$  to a Diagonal form

12M

L2

**OR**

5. Reduce the quadratic form

$$3x^2 + 3y^2 + 3z^2 + 2xy + 2xz - 2yz \text{ to canonical form by an orthogonal transformation}$$

12M

L3

**UNIT-III**

6. a) If  $u = f(e^{y-z}, e^{z-x}, e^{x-y})$ , prove that

$$\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} + \frac{\partial u}{\partial z} = 0.$$

6M

L3

- b) If  $u = x^2 + y^2 + z^2$ ,  $v = xy + yz + zx$ ,  $w = x + y + z$ , find  $\frac{\partial(u,v,w)}{\partial(x,y,z)}$

$$\frac{\partial(u,v,w)}{\partial(x,y,z)}$$

6M

L2

**OR**

7. Find the minimum value of  $x^2 + y^2 + z^2$ , given that  $xyz = \alpha^3$

12M

L2

**UNIT-IV**

8. a) Evaluate  $\int_0^\infty \int_0^\infty e^{-(x^2+y^2)} dx dy$  by changing to polar coordinates

6M

L3

- b) Evaluate  $\int_{y=1}^e \int_{x=1}^{\log y} \int_{z=1}^{e^x} \log z dz dx dy$

6M

L4

**OR**



9. Evaluate  $\int_0^{4a} \int_{\frac{x^2}{4a}}^{2\sqrt{ax}} dy dx$  by changing the order of integration.

12M

L3

## UNIT-V

10. a) Prove that  $\int_0^1 \frac{dx}{\sqrt{1-x^4}} = \frac{\sqrt{f}}{4}$

6M

L3

- b) Evaluate  $\int_0^1 \left(\log \frac{1}{x}\right)^{n-1} dx, n > 0$  in terms of Gamma functions.

L2

**OR**

6M

11. a) Symmetry of Beta function  $B(m, n) = B(n, m)$

4M

L3

- b) Prove that  $\int_0^{\frac{\pi}{2}} \sin^2 x \cos^4 x = \frac{f}{32}$

8M

L2

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