

Code: 5GC24

I B.Tech. II Semester Supplementary Examinations December 2022

**Engineering Mathematics-II**

(Common to All Branches)

Max. Marks: 70

Time: 3 Hours

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

\*\*\*\*\*

**UNIT-I**

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

hence show that  $\int_0^{\infty} e^{-x^2} dx = \frac{\sqrt{f}}{2}$

14M

**OR**

2. a) Evaluate  $\int_0^{\frac{f}{2} \sin \theta} \int_0^{\frac{a^2-r^2}{a}} r dz dr d\theta$

7M

b) Evaluate  $\int_0^{5x^2} \int_0^x x(x^2+y^2) dy dx$

7M

**UNIT-II**

3. a) Find the Laplace Transform of  $t e^{-t} \sin t$

7M

b) Find  $L^{-1} \left\{ \frac{s}{(s^2+1)(s^2+9)(s^2+25)} \right\}$

7M

**OR**

4. a) Find the Laplace Transform of  $\int_0^t \frac{e^{-t} \sin t}{t} dt$

7M

- b) Write the Laplace Transforms of some standard functions

7M

**UNIT-III**

5. Solve the differential equation by Laplace Transform

$$(D^2 + 2D + 5)y = e^{-t} \sin t, \quad y(0) = 0; \quad y'(0) = -1$$

14M

**OR**

6. Solve the differential equation  $y'' + y = t, y(0) = 1, y'(0) = 2$  Using Laplace Transform

14M

**UNIT-IV**

7. Using the line integral, calculate the work done by the force,

$$\vec{F} = (3x^2 - 6yz)\vec{i} + (2y + 3xz)\vec{j} + (1 - 4xyz^2)\vec{k}$$

in moving a particle from the point (0,0,0) to the point (1,1,1) along the curve  $C: x=t, y=t^2, z=t^3$ .

14M

OR

8. a) Show the vector  $(x^2 - yz)\bar{i} + (y^2 - zx)\bar{j} + (z^2 - xy)\bar{k}$  is irrotational and find its scalar potential. 7M
- b) Find the directional derivative of  $2xy + z^2$  at the point  $(1, -1, 3)$  in the direction of  $\bar{i} + 2\bar{j} + 3\bar{k}$  7M

<b>UNIT-V</b>
---------------

9. Verify the Stoke's theorem for a vector field  $\bar{F} = (2x - y)\bar{i} - yz^2\bar{j} - y^2z\bar{k}$  over the upper half surface of  $x^2 + y^2 + z^2 = 1$  bounded by projection on xy-plane 14M

OR

10. Verify by Green's Theorem for  $\int_c [(xy + y^2)dx + x^2dy]$  where 'c' is bounded by  $y=x$  and  $y=x^2$  14M

\*\*\*

Hall Ticket Number :

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

**R-15**

**Code: 5GC22**

I B.Tech. II Semester Supplementary Examinations December 2022

**Engineering Chemistry**

(Common to EEE & ECE)

Max. Marks: 70

Time: 3 Hours

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

\*\*\*\*\*

Marks

**UNIT-I**

1. a) Describe the estimation of hardness of water by EDTA method. 8M  
b) What are boiler troubles? Describe scale and sludge. 6M

**OR**

2. Describe the process of water treatment by ion exchange method. 14M

**UNIT-II**

3. a) Differentiate the Primary and secondary batteries 7M  
b) Describe the chemistry of Dry Cell. 7M

**OR**

4. a) Write short notes on i) electrode ii) electrolyte iii) salt bridge. 6M  
b) What are conductometric titrations? Describe strong acid Vs Strong base titration. 8M

**UNIT-III**

5. a) Illustrate the conducting mechanism of poly-acetylene 7M  
b) Discuss the differences between Thermoplastics and Thermo settings 7M

**OR**

6. Describe the processing of Natural rubber. What are its disadvantages? 14M

**UNIT-IV**

7. a) Explain the process of Flue gas analysis by Orsat's apparatus. 7M  
b) Write a note on a) Octane Number b) Cetane Number. 7M

**OR**

8. Describe the manufacture of Coke by Otto Hoffmann by product Oven. Also explain the recovery of by products. 14M

**UNIT-V**

9. Describe the manufacture of Portland cement. 14M

**OR**

10. a) What are lubricants Describe any two properties of lubricants. 7 M  
b) Define refractories. Describe their classification with examples. 7 M

\*\*\*

Hall Ticket Number : 

--	--	--	--	--	--	--	--	--	--

**R-15**

**Code: 5G121**

I B.Tech. II Semester Supplementary Examinations December 2022

**C Programming and Data Structures**

(Common to All Branches)

Max. Marks: 70

Time: 3 Hours

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

\*\*\*\*\*

**UNIT-I**

- 1. a) Write a program to perform addition of array elements using pointer to array. 7M
- b) Explain the declaration of pointers and pointer to pointer with examples. 7M

**OR**

- 2. a) Explain dynamic memory allocation functions in C in detail. 7M
- b) What is the use of command line arguments 7M

**UNIT-II**

- 3. a) Write a program for sorting given numbers using selection sort technique 7M
- b) Write an algorithm for Binary search? Validate it with suitable data set? 7M

**OR**

- 4. Write a C program that defines a structure **employee** containing the details such as **empno, empname, department name and salary**. The structure has to store 20 employees in an organization. Use the appropriate method to define the above details and define a function that will display the contents? 14M

**UNIT-III**

- 5. Write an algorithm to convert a given infix expression into prefix expression. 14M

**OR**

- 6. Write a C Program to perform the following operations on a queue 14M
  - a) Insert    b) Delete

**UNIT-IV**

- 7. What is a Circular Linked List.? Explain different operations of a Circular linked list with suitable examples. 14M

**OR**

- 8. What are different types of linked list? Write a C function to count number of elements present in single linked list. 14M

**UNIT-V**

- 9. State binary search tree property. And construct the binary search tree for the following keys: G , K, L ,R, A, C, T, F, J, T, Y, E. 14M

**OR**

- 10. Define Graph and describe various representations of a graph with suitable examples. 14M

\*\*\*