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R-15

Code: 5G111

I B.Tech. I Semester Supplementary Examinations June 2022

Problem Solving Techniques and C Programming

(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)

Marks

UNIT-I

1. a) Define Computer? Explain hardware and software components of a computer.
- b) Write an algorithm and draw a flow chart to calculate percentage of a student in six subjects.

OR

2. a) Explain different types of computer languages in detail.
- b) What is Keyword? Write and explain any ten keywords in C programming language.

UNIT-II

3. a) Define operator? Describe different types of operators used in C language with example.
- b) What are formatted input and output functions used in C explain with an example.

OR

4. a) Explain different data types in C programming language.
- b) Evaluate the following expression by using rules of precedence and associativity.
 - i) $4 / 3 + 5 - 2 + 3 / 5$
 - ii) $3 * 6 + 9 - 10 / 6$

UNIT-III

5. a) What is an Array? Explain how to declare and initialize a one dimensional array in C with an example.
- b) Write code segments for displaying numbers from 1 to 10 using while, do..while and for statements.

OR

6. a) Write a C Program to check whether given number is Armstrong number or not
- b) Write a C program to accept and print the elements in a two dimensional array.

UNIT-IV

7. Explain about any four string handling functions with an example.

OR

8. Write a C program to find whether the given string is a palindrome or not.

UNIT-V

9. a) What is a function? Describe different categories of function with suitable example programs.
- b) Write a C program to find factorial of a number using recursion.

OR

10. a) What is the scope of variables of type extern, auto, register and static? Explain with example.
- b) Describe any four preprocessor commands with suitable examples.

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R-15

Code: 5GC14

I B.Tech. I Semester Supplementary Examinations June 2022

Engineering Mathematics-I

(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. Solve $x \frac{dy}{dx} + y = x^3 y^6$

OR

2. A body originally at 80° C cools down to 60° C in 20 minutes, the temperature of the air being 40° C. What will be the temperature of the body after 40 minutes from the original and when will be the temperature be 50° C.

UNIT-II

3. Solve $(D^2 + 4)y = x^2 + \cos 2x$

OR

4. Solve $(D^3 + 2D^2 + D)y = e^{-x} + \sin 2x$

UNIT-III

5. Verify Rolle's theorem for $f(x) = \frac{\sin x}{e^x}$ in $(0, f)$

OR

6. Expand e^x in powers $(x-1)$ upto four terms.

UNIT-IV

7. If $u = x^2 - 2y, v = x + y + z, w = x - 2y + 3z$, then find $\frac{\partial(u, v, w)}{\partial(x, y, z)}$

OR

8. If $x = r \cos \theta, y = r \sin \theta$, then find $\frac{\partial(x, y)}{\partial(r, \theta)}$.

UNIT-V

9. Trace the curve $y^2(2a-x) = x^3$

OR

10. Trace the curve $x = a(\theta + \sin \theta), y = a(1 + \cos \theta)$

Code: 5GC15

I B.Tech. I Semester Supplementary Examinations June 2022

Mathematical Methods-I

(Common to CSE & IT)

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) Give a brief note on the following.
 i) Hermitian matrix. ii) Skew-Hermitian iii) Unitary matrix iv) Orthogonal matrix
 b) Define the rank of the matrix. Find the rank of the matrix

$$A = \begin{bmatrix} -2 & -1 & -3 & -1 \\ 1 & 2 & 3 & -1 \\ 1 & 0 & 1 & 1 \\ 0 & 1 & 1 & -1 \end{bmatrix} \text{ by reducing it to normal form.}$$

OR

2. Find the values of a and b for which the equations
 $x + ay + z = 3$, $x + 2y + 2z = b$, $x + 5y + 3z = 9$
 will have i) no solution ii) Unique solution iii) Infinite no of solutions.

UNIT-II

3. Find the Eigen values and Eigen vectors of the matrix $\begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$

OR

4. Show that if $\lambda_1, \lambda_2, \lambda_3, \dots, \lambda_n$ latent roots of a matrix A are, then A^3 has the latent roots $\lambda_1^3, \lambda_2^3, \lambda_3^3, \dots, \lambda_n^3$ and $k\lambda_1, k\lambda_2, k\lambda_3, \dots, k\lambda_n$ are latent roots of kA .

UNIT-III

5. Reduce the quadratic form $-3x_1^2 - 3x_2^2 - 3x_3^2 - 2x_1x_2 - 2x_1x_3 + 2x_2x_3$ to the canonical form. Find Index and Signature

OR

6. Show that $A = \begin{bmatrix} i & 0 & 0 \\ 0 & 0 & i \\ 0 & i & 0 \end{bmatrix}$ is a skew-Hermitian matrix and also unitary

Find eigen values and the corresponding eigen vectors of A.

UNIT-IV

7. Using Newton-Raphson method, find a positive root of $\cos x - xe^x$.
OR
 8. Find a real root of $xe^x = 3$ using Regula-Falsi method.

UNIT-V

9. Evaluate $\int_0^2 e^{-x^2} dx$ using Simpson's rule. Taking $h=0.25$.

OR

10. Using Lagrange's interpolation formula, find $y(10)$ from the following table

X	5	6	9	11
Y	12	13	14	16
