



QP CODE: 25050701



25050701

Reg No : .....

Name : .....

**MSc DEGREE (CSS) EXAMINATION DECEMBER 2025**

**First Semester**

M.Sc APPLIED ELECTRONICS

**Core Courses - EL020104 - APPLIED MATHEMATICS**

2019 Admission Onwards

A2CECB19

Time: 3 Hours

Weightage: 30

**Part A (Short Answer Questions)**

*Answer any **eight** questions.*

*Weight 1 each.*

1. Define Probability.
2. Define support of a Fuzzy set.
3. Draw a 2-regular graph and a 3-regular graph on 4 vertices.
4. Define a spanning tree. Give example.
5. Define inverse of a matrix.
6. If 2 is one of the eigen values of a matrix A, then what is the eigen value  $A^{-1}$  and  $3A$ .
7. Find  $L\{t^3\}$
8. Find the inverse Laplace Transforms of  $S/(S^2 + 4)$
9. What is an Elliptic equation? Give an example
10. State One dimensional heat equation.

(8×1=8 weightage)

**Part B (Short Essay/Problems)**

*Answer any **six** questions.*

*Weight 2 each.*

11. Define distribution function of a discrete random variable. State its properties.
12. Explain various crisp set operations with example.
13. Prove that the number of odd degree vertices in a graph is always even.
14. Define binary search tree (BST). Draw the BST for the following data 25, 67, 28, 10, 15, 60, 70, 35, 50





15. Solve the following system of equations

$$x + y + z = 3$$

$$x + 2y + 3z = 4$$

$$x + 4y + 9z = 6$$

16. Find the eigen values of the matrix  $A = \begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$

17. Find  $L\{t e^{2t}\}$

18. State one dimensional heat Equation and show that it is parabolic

(6×2=12 weightage)

### Part C (Essay Type Questions)

Answer any **two** questions.

Weight 5 each.

19. A random variable X has the following probability density function

$$f(x) = k \cdot x^2 (1-x) ; 0 \leq x \leq 1$$

$$= 0 ; \text{otherwise}$$

Find the value of k. Also find

(i)  $P\{0 < X < 1/2\}$

(ii)  $P\{X > 1/2\}$

(iii)  $P\{1/2 < X < 3/2\}$

(v) Distribution function F(x)

20. Explain Prim's algorithm and Kruskal's algorithm with an example.

21. Find the characteristic equation of the matrix  $A = \begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix}$  and hence find the matrix represented by  $A^8 - 5A^7 + 7A^6 - 3A^5 + A^4 - 5A^3 + 7A^2 - 3A + I$ .

22. (1) Find the Z-transform of (a)  $(n+1)^2$   
(b)  $\sin(4n+6)$
- (2) Find the inverse Z transform of  $z^2/(z-1)(z-4)$

(2×5=10 weightage)

