

Roll No.

3100

**B. Tech. 4th Semester (EE)
Examination – July, 2021**

**MATHEMATICS-III (Numerical Methods, Probability &
Statistics)**

Paper : BSC-MATH-204-G

Time : Three Hours]

[Maximum Marks : 75

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard will be entertained after examination.

Note : Attempt *five* questions in all, selecting *one* question from each Unit. Question No. 1 is *compulsory*. All questions carry equal marks.

1. (a) State Regula-Falsi method.
- (b) Write Newton's forward difference formula.
- (c) Write Trapezoidal rule of numerical integration.
- (d) Define transcendental equation.

3100-1500-(P-4)(Q-9)(21)

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- (e) Explain Taylor's series method for ordinary differential equations.
- (f) Write one dimensional heat equation.
- (g) Define conditional probability.
- (h) Define discrete random variables.
- (i) Define skewness.
- (j) Define hypothesis.

UNIT - I

2. Find the positive root of $x^3 - 2x - 5 = 0$ by :

- (i) Bisection method
- (ii) Newton's method

3. Given the values :

x : 5 7 11 13 17

$f(x)$: 150 392 1452 2366 5202

Evaluate $f(9)$, using Newton's divided difference formula.

3100-1500-(P-4)(Q-9)(21) (2)

UNIT – II

4. Apply Runge-Kutta method to find an approximate value of y for $x = 0.2$ in steps of 0.1, if $\frac{dy}{dx} = x + y^2$, given that $y = 1$, where $x = 0$.

5. Solve the Poisson equation :

$$U_{xx} + U_{yy} = -81xy, 0 < x < 1, 0 < y < 1 \text{ given that :}$$

$$u(0, y) = 0, u(x, 0) = 0, u(1, y) = 100, u(x, 1) = 100 \text{ and}$$

$$h = \frac{1}{3}.$$

UNIT – III

6. Explain various discrete probability distributions in short.
7. Write short note on :
- Expectation of discrete random variables.
 - Variance of a sum of discrete random variables.

UNIT – IV

8. Write detail note on different measures of central tendency.

9. Write note on :

(i) Large sample test for single proportion.

(ii) Tests for single mean.