

Code No: 132AC

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year II Semester Examinations, July/August - 2021

MATHEMATICS-III

(Common to CE, EEE, ME, ECE, CSE, EIE, IT, MCT, ETM, MMT, AE, MIE, PTM, CEE, MSNT)

Time: 3 Hours

Max. Marks: 75

Answer any Five questions  
All questions carry equal marks

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- 1.a) If the pdf of a continuous random variable is given by  $f(x) = e^{-x}$ ,  $0 \leq x < \infty$ , find the mean and variance of the random variable.
- b) Compute the first four moments about the mean from the following data: [7+8]
- |    |   |   |   |   |   |
|----|---|---|---|---|---|
| x: | 1 | 2 | 3 | 4 | 5 |
| f: | 2 | 3 | 5 | 4 | 1 |
- 2.a) A continuous random variable  $X$  is normally distributed with mean 25 and standard deviation 8. Find the probability that i)  $20 \leq X \leq 40$  and ii)  $X \geq 35$ .
- b) A random sample of size 100 is taken from an infinite population having the mean 76 and variance 256. Find the probability that mean of sample will be between 75 and 78. [7+8]
- 3.a) Determine a 95% confidence interval for the mean of a normal distribution with variance 0.25 using a sample of 100 values with mean 212.3.
- b) A sample of 64 students have a mean weight 70 kgs. Can this be regarded as a sample from a population with mean weight 56 kgs and standard deviation 25 kgs? [7+8]
4. The following are the values of skills of 2 samples with individuals 5 and 6. Test the difference between the means. [15]
- |          |      |      |      |      |      |      |
|----------|------|------|------|------|------|------|
| Sample 1 | 74.1 | 77.7 | 74.4 | 74.0 | 73.8 | --   |
| Sample 2 | 70.8 | 74.9 | 74.2 | 70.4 | 69.2 | 72.2 |
5. Random samples of 500 men and 500 women were asked whether they would like to have a fly over near their residence. 150 men and 200 women are in favor of it. Test the difference between the proportions. [15]
- 6.a) Perform three iterations of the Gauss-Seidel method to solve the system of equations  $4x + y + 2z = -1$ ,  $x + 5y + z = 5$ ,  $2x + y + 4z = 3$ .
- b) The equation  $\ln x - x + 3 = 0$  has a root in (4,5). Find the root correct to three decimal places by Newton-Raphson method. [7+8]
- 7.a) Evaluate  $\int_{1.0}^{1.6} \sqrt{x} dx$  using Simpson's  $\frac{1}{3}rd$  rule with  $h = 0.1$ .
- b) Find the approximate value of  $y(x)$  at  $x = 1.2, 1.4, 1.6$  for the initial value problem  $y' = 3x^2 + \sqrt{y}$ ,  $y(1) = 1$ ,  $h = 0.2$  by Euler's method. [7+8]
8. Apply Runge-Kutta method of order 4 to find the approximate value of  $y(1.3)$  for  $y' = x^2 + y^2$ ,  $y(1) = 2$  with  $h = 0.1$ . [15]