Code No: 132AC **R16**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year II Semester Examinations, August - 2019

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

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1.a) For the density function $f(x)=6x(1-x), 0 \leq x \leq 1$, find the mean. [2]

b) If the mean of the binomial distribution is 4 and variance is 2 then find P. [3]

c) State central limit theorem. [2]

d) The variance of a population is 2. The size of the sample collected from the population is 169. Find the standard error of mean. [3]

e) Define ANOVA. [2]

f) Write about type-I error and type-II error. [3]

g) Find two points between which the root of $x-\cos x=0$ lies. [2]

h) If $y=2x+5$ is the best fit for 6 pairs of values (x, y) by the method of least squares, find $\sum x_i$, if $\sum y_i=120$. [3]

i) Write the formula to evaluate $\int_a^b f(x)dx$ by Simpson's 1/3 rule. [2]

j) Using Picard's method, find $y(x)$ for $\frac{dy}{dx}=x-y^2$, $y(0)=1$ upto second approximation. [3]

PART-B

(50 Marks)

2.a) From a lot of 10 items containing 3 defectives, a sample of 4 items is drawn at random. Let the random variable X denote the number of defective items in the sample. Find the probability distribution of X when the sample is drawn without replacement.

b) The mean and variance of a binomial distribution are 4 and 4/3 respectively. Find $P(X \geq 1)$. [5+5]

OR

3.a) The probability density function $f(x)$ of a continuous random variable is $f(x)=\begin{cases} kx^3, & 0<x<1 \\ 0 & otherwise \end{cases}$. Find the value of k and the probability that the random variable takes on a value between 1/4 and 3/4.

b) In a sample of 1000 cases, the mean of a certain test is 14 and standard deviation is 2.5 assuming the distribution to be normal. Find how many students score between 12 and 15. [5+5]

4.a) Define t-distribution and write its properties.

b) A random sample of 500 points on a heated plate resulted in an average temperature of 75.54 degrees Fahrenheit with a standard deviation of 2.79 degrees Fahrenheit. Find a 99% confidence interval for the average temperature of the plate. [5+5]

OR

5.a) Samples of size 2 are collected from a sample of size 5 without replacement.
i) Write the samples of size 2 ii) Find the mean of sampling distribution of means.
iii) The standard deviation of sampling distribution of means.

b) What is the size of smallest sample required to estimate an unknown proportion to within a maximum error of 0.06 with atleast 95% confidence. [5+5]

6.a) A die was thrown 9000 times and of these 3220 yielded a 3 or 4. Is this consistent with the hypothesis that the die was unbiased.

b) What is meant by level of significance, one tailed and two tailed tests? [5+5]

OR

7. The following table gives the number of refrigerators sold by 4 salesman of L.G India Ltd., in three months

Month	A	B	C	D
May	50	40	48	39
June	46	48	50	45
July	39	44	40	39

Is there a significant difference in the sales made by the four salesmen? [10]

8.a) Using Netwon-Raphson method, find a positive real root of $xe^x - 2 = 0$ correct to four decimal places.

b) Fit a least square parabola $y = a + bx + cx^2$ to the following data. [5+5]

x	-1	0	1	2
y	-2	1	2	4

OR

9. Solve the system of equations $8x + y + z = 8$, $2x + 4y + z = 4$, $x + 3y + 3z = 5$ by Gauss seidal method. [10]

10. Using Taylor's series method, find $y(0.1)$ and $y(0.2)$ for $\frac{dy}{dx} = x^2 - y$, $y(0) = 1$. [10]

OR

11. Using Runge-kutta method of order 4, find $y(2.5)$ for $\frac{dy}{dx} = \frac{x+y}{x}$, $y(2) = 2$ taking $h = 0.25$. [10]

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