R17 Regulation *Subject code: 1B2AC*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech I Year II Semester Supplementary Examinations, January 2024

Mathematics-III

(Common to CE ,EEE,ME,ECE,CSE & IT)

Maximum Marks: 70 Date:25.01.2024 Duration: 3 hours

Note: 1.This question paper contains two parts A and B.
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit which carries 10M.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Statistical tables are allowed.

Part-A

All the following questions carry equal marks (10x2M=20 Marks)

1 Determine the Binomial distribution for which the mean is 4 and variance 3.
2 Define geometric distribution and find its mean.
3 State central limit theorem
4 Write about type I error and type II error.
5 Explain about One tailed and Two tailed tests
6 Write normal equations for fit a second degree polynomial.
7 Find the Newton-Raphson iterative formula to find the reciprocal of a number N N , 0 > .
8 Write the normal equations of the power curve $Y= ab^X$
9 Write any two formulae for evaluating of numerical integration.
10 What is the Simpson's 3/8 rule

Part-B

Answer All the following questions. (5X 10M=50Marks)

11 a) A random variable X has the following distribution: (5M)

x:	0	1	2	3	4
P(x):	K	2K	2K	K^2	$5K^2$

Determine i) the distribution function of X and ii) variance of X iii) Mean of X

OR

12 a) The mean and standard deviation of the marks obtained by 1000 students in an examination are respectively 34.5 and 16.5. Assuming the normality of the distribution, find the approximate number of students expected to obtain marks between 30 and 60. (5M)
b) Find the Mean and variance of Geometric Distribution. (5M)

13 a) The mean height of students in a college is 155 cms and standard deviation is 15. What is the probability that the mean height of 36 students is less than 157 cms. (5M)
b) What is the size of the smallest sample required to estimate an unknown proportion to within a maximum error of 0.06 with at least 95% confidence. (5M)

OR

14 a) From the following data, find whether there is any significant liking in the habit of taking soft drinks among categories of employees. (Tabulated value 9,488). (5M)

Employees

Soft drinks	Clerks	Teachers	Officers
Pepsi	10	25	65
Thumsup	15	30	65
Fanta	50	60	30

b) A sample of 26 bulbs gives a mean life of 990 hours with a S.D of 20 hours.The manufacturer claims that the mean life of bulbs is 1000hrs.Is the sample not up to the standard. (Table value 1.708) (5M)

15 a) The mean voltage of a battery is 15 and standard deviation 0.2. Find the probability that four such batteries connected in series will have a combined voltage of 60.8 or more volts. (5M)
b) Discuss critical region and level of significance with example. (5M)

OR

16 a) Explain the terms i) one-tailed and ii) two-tailed tests. (5M)
b) The sizes and means of two independent random samples are 400, 225; 3.5 and 3.0 respectively. Can we conclude that the samples are drawn from the same population with standard deviation 1.5? (5M)

17 a) Find the root of the equation $x \log_{10}(x) = 1.2$ using False position method. (5M)
b) Fit a straight line $y = a+bx$ from the following data (5M)

x	0	1	2	3	4
y	1	1.8	3.3	4.5	6.3

OR

18 a) Find a real root of $xe^x-\cos x=0$ using Newton-Raphson method. (5M)
b) Estimate y at $x = 5$ by fitting a least squares curve of the form $y = \frac{b}{x(x-a)}$ to the following data. (5M)

x	3.6	4.8	6.0	7.2	8.4	9.6	10.8
y	0.83	0.31	0.17	0.10	0.07	0.05	0.04

19 a) Use Taylor series method to solve $Y'=2Y+3e^x$, $y(0)=0$ at $x=0.1$. Compare with exact solution. (5M)

b) Evaluate $\int_0^6 \frac{1}{1+x^2}dx$ using Simpson's $\frac{3}{8}$ rule. (5M)

OR

20 a) The following data gives the melting points of an alloy of lead and zinc. Find the melting point of the alloy containing 54%lead using appropriate interpolation formula. (5M)

Percentage of lead in the alloy (p)	50	60	70	80
Temparature (Q°C)	205	225	248	274

b) Use the Trapezoidal rule n=4 to estimate $\int_0^1 \frac{1}{1+x^2}$ dx correct to four decimal places. (5M)