R17 Regulation *Subject: 1B2AC*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

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

MATHEMATICS-III

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

Maximum Marks: 70 Date:28.06.2024 Duration: 3hours

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.
4. Each question carries 10 marks and may have a,b,c,d as sub questions.

Part-A

All the following questions carry equal marks 10X2M=20 Marks

1. If 'X' is a random variable and 'a' and 'b' are constants, then prove that E(ax+b)= aE(x)+b
2. A die is tossed until 6 appears. Find the probability that it must be cast more than 5 times.
3. A sample of size 10 was taken from a population S.D of sample is 0.03. Find the maximum error with 99% confidence
4. A random sample of 200 measurements from a large population gave a mean value of 50 and S.D of 9. Determine the 95% confidence interval for the mean of the population
5. Write about type I and type II errors.
6. In a sample of 500 from a village in Rajasthan 280 are found to be wheat eaters and the rest rice eaters can we assume that the both articles are equally popular.
7. Write merits and demerits of Newton-Rapson method.
8. Explain the iterative method approach in solving the problems.
9. Use trapezoidal rule with n = 3 to estimate $\int_0^1 \frac{dx}{1+x^2}$
10. Prove that (i) $E\nabla = \Delta$ (ii) $E^{\frac{1}{2}} = \mu + \frac{\delta}{2}$

Part-B

Answer all the questions: 10X5M=50 Marks

11. If the probability density function of a random variable 'X' is given by

f(x) = $\{k(1-x^2)$ 0 < x < 1, f(x)= 0 otherwise

Find (i) K (ii) Mean (iii) Variance (iv) Cumulative distribution function of X. (10M)

(or)

12. Fit a binomial distribution to the following data. (10M)

x	0	1	2	3	4	5
y	2	14	20	34	22	8

13. Prove that for a random sample of size n, $x_1, x_2, \ldots\ldots x_n$ taken from an infinite population $S^2 = \frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})^2$ is not unbiased estimator of the parameter σ^2 but $s^2 = \frac{1}{n-1}\sum_{i=1}^{n}(x_i - \bar{x})^2$ is unbiased. (10M)

(or)

14. A random sample of size 100 is taken from an infinite population having the mean $\mu = 76$ and variance $\sigma^2 = 256$ .What is the probability that $\bar{x}$ will be between 75 and 78. (10M)

15. In a referendum submitted to the students body at a university 850 men and 566 women voted. 530 of the men and 304 of the women voted in favor of a matter. does this indicate a significant difference of the opinion on the matter at least 1% level, between men and women and students. (10M)

(or)

16. Test the significance of the difference between the means of the sample from the following Data. (10M)

	Size of the sample	Mean	S.D.
Sample A	100	61	4
Sample B	200	63	6

17. Find the real root of the equation $e^{2x} - e^x - 2 = 0$ using Newton – Rapson method. (10M)

(or)

18. Fit a polynomial of second degree to the data points given in the following table. (10M)

x	2	4	6	8	10
y	3.07	12.85	31.47	57.38	91.29

19. Find f(2.5) using Newtons forward formula. (10M)

X	0	1	2	3	4	5	6
Y	0	1	16	81	256	625	1296

(or)

20. Use Lagranges interpolation formula to find the polynomial of the following table. (10M)

x	1	2	4
P(x)	1	27	64