



R17 Regulation

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

Subject Code:1B2AC

B.Tech I Year II Semester Supplementary Examinations, September 2023

MATHEMATICS-III

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

Maximum Marks: 70

Date:20.09.2023 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 type I 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. Write 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 $E\nabla = \Delta$

Part-B

Answer all the questions

5X10M=50 Marks

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

$$f(x) = \begin{cases} k(1 - x^2) & 0 < x < 1, \\ f(x) = 0 & \text{otherwise} \end{cases}$$

Find (i) K (ii) Mean (iii) Variance

(10M)

(or)

12. In a normal distribution 31% of the items are under 45% and 8% are over 64. Find the mean and variance of the distribution.

(10M)

13. Prove that for a random sample of size n , x_1, x_2, \dots, 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 population consists of six numbers 4, 8, 12, 16, 20, 24. Consider all possible samples of size

two that can be drawn (i) without replacement (ii) with replacement

Find (a) The population mean (b) The population S.D.

(c) The mean of the sampling distribution of the means

(d) The S.D. of the sampling distribution of the means (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. Two independent samples of 8 & 7 items respectively at the following values (10M)

Sample I 11 11 13 11 15 9 12 14

Sample II 9 11 10 13 9 8 10 -

Test whether there is any difference between two means.

17. Find the real root of the equation $e^{2x} - e^x - 2 = 0$ using Newton - Rapson metod. (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. Evaluate $\int_0^1 e^{-x^2} dx$ using Simpson's 1/3rd rule. (10M)

(or)

20. Find $y(25)$, given that $y_{20} = 24$, $y_{24} = 32$, $y_{28} = 35$, $y_{32} = 40$ Using Gauss Forward difference formula. (10M)

Note: pl Allow statistical tables.