

GUJARAT TECHNOLOGICAL UNIVERSITY**ME - SEMESTER- 1 • EXAMINATION – WINTER - 2023****Subject Code:3716503****Date: 25 Jan 2024****Subject Name:Applied Statistics****Time:10:30 AM TO 01:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q1 (a) Explain the features of normal distribution its applicability in fields of civil engineering and hypothesis testing. 07
- Q1 (b) Discuss the utility of applied statistics in the field of civil engineering 07
- Q2 (a) Give the utility of the binomial distribution and the assumptions made in its derivation. 07
- Q2 (b) Explain what you understand by goodness of fit of a theoretical probability and how Chi Square distribution is used in testing goodness of fit. 07
- OR**
- Q2 (b) Define arithmetic, geometric and harmonic mean and illustrate giving examples the circumstances under which each one is useful. 07
- Q3 (a) Explain how the goodness of fit of a probability distribution be tested by the use of probability papers for that particular probability distribution 07
- Q3 (b) Explain how sampling theory of correlation is used to find the confidence limits of population coefficient of correlation corresponding to coefficient of correlation obtained from sample data. 07
- OR**
- Q3 (a) Illustrate with examples stratified sampling, random sampling and composite sampling. 07
- Q3 (b) Explain the factors affecting the size of sample to be taken from a population so that the data collected satisfies the purpose of survey. 07
- Q4 (a) Explain the latin square design and the randomized block design for analysis of variance. 07
- Q4 (b) Given the value of sample correlation coefficients r_1 and r_2 drawn from a population with sample size N_1 and N_2 , give the steps for finding if the sample correlation coefficients r_1 and r_2 differ significantly. 07
- OR**
- Q4 (a) Differentiate with examples between (i) discrete and continuous variables (ii) probability density function and probability mass function (iii) Standard deviation and standard error of estimate 07
- Q4 (b) A linear equation of the form $y = a + bx$; is to be fitted between y and x ; write the normal equations which are to be solved simultaneously to evaluate the values of constants a , b . Explain how the coefficient of correlation will be calculated for the fitted line and so explain negative and positive correlation 07
- Q5 (a) State the utility of the following statistic in analyzing the dispersion of the data : range, standard deviation and mean deviation. 07
- Q5 (b) Calculate the mean deviation and standard deviation for the following discrete data points : 11, 9, 10, 6, 8, 15, 10, 7, 6, 5. 07
- OR**
- Q5 (a) Give the steps for testing of a given hypothesis for a given level of significance. 07
- Q5 (b) Calculate the skewness coefficient for the following sample data corresponding to a random variables: 11, 9, 10, 6, 8, 15, 4, 7, 12, 5 07
