S.S. Jain Subodh P.G. College, Jaipur

M.Sc. sem II (Statistics)

Paper Name: Sampling Distributions

Assignment March 2026

Attempt four questions, selecting one from each unit.

UNIT I

Q.1) Define sampling distribution, parameter, statistic and standard error. What is Chi-Square Distribution and derive its p.d.f.

Q.2) Describe F-statistic and Non-central F-test.

UNIT II

Q.3) What is order statistic and their distributions.

Q.4) What is sampling distributions of range and median of univariate population.

UNIT III

Q.5) Define Bivariate distribution and its joint distribution.

Q.6) Write the marginal and conditional distributions of bivariate distribution.

UNIT IV

Q.7) Define correlation, regression and linear regression.

Q.8) What is correlation ratio and intra-class correlation.

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M.Sc. (Statistics)

Paper Code: 24STA-9203T

Paper Name: Design of Experiment-I

Assignment March 2026

Attempt four questions, selecting one from each unit.

Maximum Marks: 30

Unit I

Q1. Discuss in detail the need for analysis of covariance. Also discuss in detail the analysis of covariance for a two-way classified design.

Q2. Write shot note on: a) Regression analysis b) Transformation of data.

Unit II

Q3. Explain the concept of linear model. Explain the i) fixed effect ii) random effect iii) mixed effect.

Also explain the basic principles of design of experiments.

Q4. Explain the Completely randomized design with merits and demerits. Give its analysis with ANOVA table.

Unit III

Q5. Explain the concept of main effect and interaction by taking 2^2 factorial experiments. Also give the analysis of 2^2 factorial experiment conducted in 5 replication of a randomized block design.

Q6. Explain the concept of confounding. Give the analysis of 2^3 factorial experiment in which AB, AC, BC and ABC are partially confounded in r replications.

Unit IV

Q7. Derive the analysis of balanced incomplete block design.

Q8. Explain Split Plot Design and its analysis.

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M.Sc. Sem II (Statistics)

Paper Code: 24STA-9204T

Paper Name: Demography

Assignment March 2026

Attempt four questions, selecting one from each unit.

Maximum Marks: 30

Unit – I

Q1 Discuss the sources of demographic data in India and also point out the uses and limitations of the data.

Q2 Discuss demographic profiles of the Indian Census.

Unit – II

Q3 What do you mean by fertility? Define crude birth rate, general fertility rate, specific fertility rate, and age specific fertility rate. How are these rates computed in practise?

Q4 Discuss various death rates and their utility in study of population growth.

Unit - III

Q5 Explain the uses of life table. State the general procedure and steps for the construction of life tables.

Q6 Explain the stationary and stable population models. Discuss the situation when stationary and stable populations are identical. Explain King's method.

Unit - IV

Q7 Discuss causes of migration in detail. Write note on Makheham and Gompertz curve.

Q8 Discuss in detail the fitting of logistic curve method after listing the various method of population projection.

S.S. Jain Subodh P.G. College, Jaipur

M.Sc. (Statistics)

Paper : II

Paper Name: Statistical Inference- I

Assignment

Attempt four questions, selecting one from each unit.

UNIT-I

Q.1) What is point estimation and write the criteria of a good estimator.

Q.2) State and prove Cramer-Rao Inequality.

Unit - II

Q.3) What are the procedure of hypothesis testing? Explain in detail.

Q.4) State and Prove Neyman Pearson Lemma.

Unit – III

Q.5) Explain in detail Sequential Probability Ratio Test (S.P.R.T)?

Q.6) Explain Wald Sequential Probability Ratio Test?

Unit- IV

Q.8) With the help of numerical explain the concept of median test and Run test.

Q.9) Write short notes on the following:

(i) Mann- Whitney U- test.

(ii) Kolmogorov- Smirnov test.

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ASSIGNMENT

M.Sc. Statistics Semester – IV

Paper- Sample Survey-II

Attempt any four questions, selecting one from each unit.

Unit-I

Q1. Define Des-raj's ordered estimator of population mean for sample of size n. show that Des-raj estimator is unbiased for population mean $\bar{Y}_N$. Derive its variance also.

Q2. Define varying probability random sampling. What are the methods of PPS sample?

Unit-II

Q3. Define multistage sampling scheme. Obtain an unbiased estimator for this scheme and also obtain its sampling variance.

Q4. Define Horwitz and Thompson estimation for population total. Show that it is unbiased. Obtain expression for variance of this estimator and its unbiased.

Unit-III

Q5. Write detailed notes on the following:

a) Quenoullie's techniques for building almost unbiased estimator.
b) Construct a unbiased ratio type estimator and derive its variance.

Q6. Describe Hartley and Ross technique to build unbiased ratio estimator. Obtain its large sample variance.

Unit-IV

Q7. Write detailed notes on the following:

a)Politz's Simmon technique of estimation.

b) Olkin's ratio estimator.

Q8 Discuss the problem of Non-Response in mail surveys. Discuss in detail Hansan and Hurwitz's technique of estimation with incomplete sampling frame. Obtain unbiased estimation of population mean and its variance.

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ASSIGNMENT

M.Sc. Statistics Semester – IV

Paper- Population Studies

Attempt any four questions, selecting one from each unit.

UNIT-I

Q1. Write the sources of collection of data and explain them with their merits and demerits.

Q2. Explain in detail the arithmetic, geometric and exponential growth models of population

UNIT- II

Q3. Discuss the various theories of population growth. Explain the points on which Malthus was criticized.

Q4. Describe the theory of demographic transition with the help of different stages.

UNIT-III

Q5. Explain the consequences of migration in detail. What are the push and pull factors?

Q6. What are the methods used to measure internal migration? What do you understand by the term urbanization?

UNIT- IV

Q7. Discuss the role of fertility in the study of population dynamics . Explain the physiological, social and cultural factors affecting fertility.

Q8. Write short note on the following terms-

i) Differentials of fertility
ii) Bongaarfs proximate determinants of fertility
iii) Family planning programmes during 1951to1975 in India

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M.Sc. (Statistics)

Paper: I Multivariate Analysis

Assignment

Maximum Marks: 30

Attempt four questions, selecting one from each unit.

Unit-I

Q1What is the utility of multivariate normal distribution? Derive the p.d.f. of multivariate normal distribution.

Q2 Find the characteristic function of a p-variate normal distribution.

Unit- II

Q3 Derive the M.L.E.'s of mean and variance based on a random sample with mean μ and variance Σ. Prove that they are independently distributed.

Q4 What are partial and multiple correlation coefficients? Derive null distribution of the sample multiple correlation coefficient.

Unit - III

Q5 Explain Fisher's Discriminant Function and its significance in discriminant analysis. State the limitations or assumptions associated with it. Describe the steps involved in performing discrimination analysis.

Q6 Explain the problem of classification of two unknown populations. Derive Fisher 's discriminate function.

Unit -IV

Q7 Define a Wishart distribution. State and prove its reproductive property.

Q8 Define Hotelling T^2 statistics . State and prove two properties of Hotelling's T^2 statistics

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ASSIGNMENT

M.Sc. Statistics Semester – IV

Paper- Applied Statistics

Attempt any four questions, selecting one from each unit.

UNIT-I

Q1. Define index number. What are the basic problems involved in the construction of index number? What are the limitations of index number?

Q2. Explain the various methods of construction of index numbers. Explain tests for index number.

UNIT –II

Q3. Describe the pigou' s method of estimating price elasticity of demand for time series data and give its limitations.

Q4. What is an Engel's curve and how will you determine it on the basis of family budget data? Give some situation where Engel's law will be applicable.

UNIT- III

Q5. What do you understand by autocovariance and autocorrelation function? Explain it. Write down its properties in detail.

Q6.What is time series? Mention its important components with illustration. Also explain the additive and multiplicative models in time series.

UNIT-IV

Q7. Define correlogram. Also obtain the correlogram for second order autoregressive series.

Q8. Write a autoregressive series of order k . Find out the solution and correlogram of first order autoregressive series.