INTERNAL ASSIGNMENT QUESTIONS

M.Sc. (Statistics) II Semester

2026-2027

PROF. G. RAM REDDY CENTRE FOR DISTANCE EDUCATION
(RECOGNISED BY THE DISTANCE EDUCATION BUREAU, UGC, NEW DELHI)

OSMANIA UNIVERSITY
(A University with Potential for Excellence and Re-Accredited by NAAC with "A" + Grade)

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PROF.G.RAM REDDY CENTRE FOR DISTANCE EDUCATION | OSMANIA UNIVERSITY, HYDERABAD – 500 007

Dear Students,

Each student has to write the answers to the Assignment questions with neat own handwriting using Blue Pen (Black Ink not allowed) for each paper. Assignments have to submit after the payment of Rs.500/- by showing the receipt of the same. If the Assignment is not submitted within stipulated time i.e. before the theory exams / last date is treated as absent.

Methodology for writing the Assignments (Instructions) :

- First read the subject matter in the course material that is supplied to you.
- If possible read the subject matter in the books suggested for further reading.
- You are welcome to use the PGRRCDE Library on all working days for collecting information on the topic of your assignments. (10.30 am to 5.00 pm).
- Give a final reading to the answer you have written and see whether you can delete unimportant or repetitive words.
- The cover page of the each theory assignments must have information as given in FORMAT below.

FORMAT

1. **NAME OF THE STUDENT :**
2. **ENROLLMENT NUMBER :**
3. **NAME OF THE COURSE :**
4. **SEMESTER (I, II, III & IV) :**
5. **TITLE OF THE PAPER :**
6. **DATE OF SUBMISSION :**

- Write the above said details clearly on every subject assignments paper, otherwise your paper will not be valued.
- Tag all the assignments paper wise and submit them in the concerned counter.

Submit the assignments on or before **30.11.2026** at the concerned counter at PGRRCDE, OU on any working day and obtain receipt.

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INTERNAL ASSIGNMENT QUESTION PAPER

COURSE : M.Sc. (Statistics) Previous II Semester

Paper : _____I_____ Subject : __Statistical Inference____

Total Marks: 30

Section – A

Answer the following short questions (each question carries two marks) **5x2=10**

1. Define the terms with examples (a) Randomized test (b) Non Randomized (c) Critical region (d) power of a test function
2. Obtain the UMP test at level α for testing $H_0: \theta < \theta_0$ against $H_1: \theta > \theta_0$ for the pdf

   $P_\theta = \frac{1}{\theta}$, 0 < x <θ

   = 0 otherwise
3. State and prove any two properties of SPRT testing procedure.
4. Let X~P(θ) for testing $H_0: \theta =$ against $H_1: \theta > \theta_0$. Derive the expression for ASN function.
5. Describe Wilcoxon signed rule test and derive its mean and variance.

Section – B

Answer the following short questions (each question carries ten marks) **2x10=20**

1. Obtain the testing procedure for testing the equality of means and equality of variance of several normal populations.
2. Three different types of radios manufactured by the same company, all carry 1-year warranty. A record is kept of how many radios needed to be replaced, were repairable, or were not returned under warranty.

	TYPE		
	A	B	C
Replaced	12	3	6
Repaired	10	8	7
Not returned	82	96	58

(a) Does there sum to be a significant difference among the reliabilities of the different radio types? If so, which one sum to be different?

(b) Find the sampling distribution of Kendall's sample statistic and state its large sample approximation.

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INTERNAL ASSIGNMENT QUESTION PAPER

COURSE : M.Sc. (Statistics) Previous II Semester

Paper : _____II_____ Subject : __ Sampling Theory ____

Total Marks: 30

Section – A

Answer the following short questions (each question carries two marks) **5x2=10**

1. Construct confidence interval limits for population mean in SRSWOR? Explain with an example.
2. Compare SRSWOR and SRSWR and state which is more efficient and why?
3. Compare the bias of Separate Ratio Estimators and Combined Ratio Estimators in Stratified Random Sampling.
4. Explain the sampling techniques:(a) Cluster Sampling (b) Two-Stage Sampling (c) PPSWR (d) PPSWOR
5. Consider the data containing the number of households and area under wheat in 12 villages. Draw a PPSWR sample of villages with 8 draws using the number of households as sizes. Apply the suitable method for selection of a PPSWR sample.

Villages	1	2	3	4	5	6	7	8	9	10	11	12
No. of Households (in Sizes)	30	45	39	14	9	8	21	35	109	35	42	37

Section – B

Answer the following short questions (each question carries ten marks) **2x10=20**

1. (a) Define and derive the properties of Separate and Combined Ratio Estimators in Stratified Random Sampling.
   (b) State and prove the properties of Separate and Combined Regression Estimators in Stratified Random Sampling.
2. (a) Derive "Horowitz – Thompson" and "Yates – Grundy" estimators.
   (b) Prove that PPSWOR is more efficient than PPSWR with an example.

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INTERNAL ASSIGNMENT QUESTION PAPER

COURSE : M.Sc. (Statistics) Previous II Semester

Paper : ___ III ____ Subject : Linear Models and Design and Analysis of Experiments

Total Marks: 30

Section – A

Answer the following short questions (each question carries two marks) **5x2=10**

1. Explain Aitkin's generalized least square estimation.
2. State and prove Gauss Markoff Theorem.
3. Write down the layout of 2^3 factorial experiment in three replicates with three factor interaction (ABC) completely confounded and hence write the analysis.
4. Explain the analysis of split-plot design.
5. Define PBIBD. Write any four parametric relations of PBIBD.

Section – B

Answer the following short questions (each question carries ten marks) **2x10=20**

1. Construct one-half replication of a 2^4 factorial design by defining relation I = +ABCD. Also write down the alias structure and analysis with approximate conclusions.
2. Explain the intra-block analysis of BIBD.

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INTERNAL ASSIGNMENT QUESTION PAPER

COURSE : M.Sc. (Statistics) Previous II Semester

Paper : IV Subject : Multivariate Analysis

Total Marks: 30

Section – A

Answer the following short questions (each question carries two marks) **5x2=10**

1. Define Multinomial distribution by stating its physical conditions.
2. Define the Wilks Criterion. State its applications.
3. Define Wishart Matrix and establish its additive property.
4. Define Canonical Correlation and explain how you would compute them.
5. If the random variables X_1, X_2,------,X_k have a multinomial distribution, show that the marginal distribution of X_i is a binomial distribution with the parameters n and p_i, with i=1,2,-----,k.

Section – B

Answer the following short questions (each question carries ten marks) **2x10=20**

1. (a) Derive the M.L estimators of the population mean vector and the variance covariance matrix of a Multivariate normal distribution.

   (b) Show that every linear combination of the components of a multivariate normal vector follows a multivariate normal population.

2. (a) Explain the derivation of obtaining the principal components.

   (b) Distinguish the factor analysis with principal component analysis.