

**INTERNAL ASSIGNMENT QUESTIONS
M.Sc. (Statistics) SEMESTER I**

2024



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)

DIRECTOR

Prof. G.B. Reddy

Hyderabad – 7 Telangana State

Dear Students,

Every student of M.Sc. (Statistics) Semester I has to write and submit **Assignment** for each paper compulsorily. Each assignment carries **30 marks**. The marks awarded to the students will be forwarded to the Examination Branch, OU for inclusion in the marks memo. If the student fail to submit Internal Assignments before the stipulated date, the internal marks will not be added in the final marks memo under any circumstances. The assignments will not be accepted after the stipulated date. **Candidates should submit assignments only in the academic year in which the examination fee is paid for the examination for the first time.**

Candidates are required to submit the Exam fee receipt along with the assignment answers scripts at the concerned counter on or before **12-08-2024** and obtain proper submission receipt.

ASSIGNMENT WITHOUT EXAMINATION FEE PAYMENT RECEIPT (ONLINE) WILL NOT BE ACCEPTED

Assignments on Printed / Photocopy / Typed will not be accepted and will not be valued at any cost. Only HAND WRITTEN ASSIGNMENTS will be accepted and valued.

Methodology for writing the Assignments (Instructions) :

1. First read the subject matter in the course material that is supplied to you.
2. If possible read the subject matter in the books suggested for further reading.
3. 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).
4. Give a final reading to the answer you have written and see whether you can delete unimportant or repetitive words.
5. 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 :
6. Write the above said details clearly on every subject assignments paper, otherwise your paper will not be valued.
 7. Tag all the assignments paper wise and submit them in the concerned counter.
 8. Submit the assignments on or before **12-08-2024** at the concerned counter at PGRRCDE, OU on any working day and obtain receipt.


22/7/24
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OSMANIA UNIVERSITY, HYDERABAD-500 007.

INTERNAL ASSIGNMENT QUESTION PAPER 2023-2024

COURSE: M.Sc. (STATISTICS) I-SEMESTER

PAPER-I: MATHEMATICAL ANALYSIS & LINEAR ALGEBRA MAX. MARKS 30

Note: Write the answers to the assignment questions with your own hand in the order of questions given only.

SECTION-A (5 Q X 2 M = 10 MARKS)

Answer the following Questions.

1. If f is continuous on $[a,b]$ and if α is of bounded variation on $[a,b]$, then show that $f \in R(\alpha)$ on $[a,b]$.
2. State and prove Cauchy's theorem.
3. Write the importance of Generalized inverses in statistics.
4. State and prove the Cayley-Hamilton theorem? Write its importance and applications?
5. X and Y be any two real column vectors then show that $(X'Y)^2 \leq (X'X)(Y'Y)$

SECTION-B (2 Q X 10 M = 20 MARKS)

Answer the following Questions.

6. Define Jacobian function of n variables. If $x^2+y^2+u^2-v^2=0$ and $uv+xy=0$, find the Jacobian of transformation and the derivatives x, y, u and $\partial u/\partial x, \partial v/\partial y$.
7. Define Moore-Penrose inverse and generalized inverse of a matrix and state their properties and also write in detail any four of its applications?

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INTERNAL ASSIGNMENT QUESTION PAPER 2023-2024

COURSE: M.Sc. (STATISTICS) I-SEMESTER

PAPER-II: PROBABILITY THEORY

MAX. MARKS 30

Note: Write the answers to the assignment questions with your own hand in the order of questions given only.

SECTION-A (5 Q X 2 M = 10 MARKS)

Answer the following Questions.

1. Write any four statistical applications on each of Monotone and dominated Convergences, discuss how those applications satisfy those theorems
2. State all does not implications in different modes of convergence? How can you examine those?
3. Write on the real time usage, importance, applications and all properties of Characteristic functions?
4. Let $\{X_k, k \geq 1\}$ be a sequence of random variables with $P[X_k = \pm k^\alpha] = \frac{1}{2} K^{-2\alpha}$ and $P[X_k = 0] = 1 - K^{-2\alpha}$. $\alpha < \frac{1}{2}$ examine whether the sequence holds weak and strong law of large numbers?
5. Let $\{X_k, k \geq 1\}$ be a sequence of random variables follows Cauchy with density function $f(x) =$ examine whether sequence holds central limit theorem.

SECTION-B (2 Q X 10 M = 20 MARKS)

Answer the following Questions.

6. Stating, establish the inter-relationships among the various probability inequalities and also write at least four applications / real usages on each.
7. What do you understand from the theory of convergence, law of large numbers and central limit theorems? What are the interrelationships among them? Discuss their use and applications at least four on each?

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INTERNAL ASSIGNMENT QUESTION PAPER 2023-2024

COURSE: M.Sc. (STATISTICS) I-SEMESTER

PAPER-III: DISTRIBUTION THEORY

MAX. MARKS 30

Note: Write the answers to the assignment questions with your own hand in the order of questions given only.

SECTION-A (5 Q X 2 M = 10 MARKS)

Answer the following Questions.

1. Write the properties and real time applications of Log normal distribution?
2. Write the importance of non-central exact sampling distributions?
3. If X_1 and X_2 are two independent exponential variates each with mean one, then find the density of transformed random variable $Y = X_1 - X_2$?
4. Let X_1, X_2, \dots, X_n are 'n' i.i.d. random variates follow standard Weibull distribution then evaluate the distribution function of minimum order statistic?
5. Let X_1, X_2, \dots, X_n are 'n' independent random variates follows $N(\mu, 1)$ then find the distribution function of $Y = ?$.

SECTION-B (2 Q X 10 M = 20 MARKS)

Answer the following Questions.

6. (i) If the random variable X follows $f(x) = 2e^{-2x}$, $x > 0$ then find the distribution of transformed random variable $Y = X^3$? (ii) The joint density of X and Y is $f(x, y) = e^{-(x+y)}$; $x, y > 0$; find the density of the random variable $U = \frac{1}{2}(X+Y)$?
7. Derive the distribution of noncentral Chi-square and non-central F distributions? State their properties?

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INTERNAL ASSIGNMENT QUESTION PAPER 2023-2024

COURSE: M.Sc. (STATISTICS) I-SEMESTER

PAPER-IV: ESTIMATION THEORY

MAX. MARKS 30

Note: Write the answers to the assignment questions with your own hand in the order of questions given only.

SECTION-A (5 Q X 2 M = 10 MARKS)

Answer the following Questions.

1. Let x_1, x_2, \dots, x_n be an i.i.d. random sample of size n drawn from the population with density $f(x, \theta) = \theta e^{-\theta}, 0 < x < 1$ and $\theta > 0$ then the sufficient statistic for θ ?
2. Obtain the confidence interval for estimation of parameter θ of Poisson distribution?
3. Let x_1, x_2, \dots, x_n be a random sample of size n drawn from Poisson with parameter θ . Find the confidence interval for θ using pivot method at confidence level $1-\alpha$.
4. Write any four real time applications of CAN and BAN estimators?
5. Let x_1, x_2, \dots, x_n be a random sample drawn from a population with pdf $f(x, \theta) = (1+\theta)x^\theta; 1 > x > 0$; then obtain the maximum likelihood estimators for the parameter θ ?

SECTION-B (2 Q X 10 M = 20 MARKS)

Answer the following Questions.

6. Define consistent and asymptotically normal, and best and asymptotically normal estimator. Show that Method of Moment estimator is consistent and asymptotically normal estimator?
7. Let x_1, x_2, \dots, x_n be an independent random sample of size n drawn from exponential distribution with density $f(x, a, b) = b e^{-b(x-a)}$ then the obtain the maximum likelihood estimator for b ?