

**INTERNAL ASSIGNMENT QUESTIONS
M.Sc (STATISTICS) FINAL**

2022



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
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Hyderabad – 7 Telangana State**

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

Dear Students,

Every student of M.Sc Statistics Final Year has to write and submit **Assignment** for each paper compulsorily. Each assignment carries **20 marks**. The marks awarded to you will be forwarded to the Controller of Examination, OU for inclusion in the University Examination marks. The candidates have to pay the examination fee and submit the Internal Assignment in the same academic year. If a candidate fails to submit the Internal Assignment after payment of the examination fee he will not be given an opportunity to submit the Internal Assignment afterwards, if you fail to submit Internal Assignments before the stipulated date the Internal marks will not be added to University examination marks under any circumstances.

You are required to **pay Rs.300/-** towards the Internal Assignment Fee through Online along with Examination fee and submit the Internal Assignments along with the Fee payment receipt at the concerned counter.

ASSIGNMENT WITHOUT THE FEE RECEIPT WILL NOT BE ACCEPTED

Assignments on Printed / Photocopy / Typed papers 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:

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 including Sunday 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 COURSE :
2. NAME OF THE STUDENT :
3. ENROLLMENT NUMBER :
4. NAME OF THE PAPER :
5. DATE OF SUBMISSION :
6. Write the above said details clearly on every assignments paper, otherwise your paper will not be valued.
7. Tag all the assignments paper-wise and submit
8. Submit the assignments on or before **8th July, 2022** at the concerned counter at PGRRCDE, OU on any working day and obtain receipt.


DIRECTOR

CDE ASSIGNMENT QUESTIONS
Paper-I SUBJECT: STATISTICAL INFERENCE

(A) Give the correct choice of the answer like 'a' or 'b' etc in the brackets provided against the question, Each question carries $\frac{1}{2}$ mark:

1. In a test procedure Accepting H_0 when it is actually false is called ()
 (a) Type I error (b) Type II error (c) Level of significance (d) None
2. The ratio of the likelihood functions under H_0 and under the entire parametric space is called ()
 (a) Probability ratio (b) Sequential ratio (c) Likelihood ratio (d) None
3. Equality of several normal population means is tested by ()
 (a) Bartlett's test (b) F test (c) t test (d) Z test
4. If T_1 and T_2 are two consistent estimators of a certain parameter θ , then T_1 is more efficient than T_2 for all sample sizes. ()
 (a) $V(T_1) > V(T_2)$ (b) $V(T_1) < V(T_2)$ (c) $V(T_1) = V(T_2)$ (d) None
5. If the Likelihood Ratio is λ , the variable $-2\log\lambda$ is approximately distributed as ()
 (a) χ^2 (b) t (c) F (d) None
6. The Non parametric test in which not only the signs but also the ranks of the observations are considered is ()
 (a) Sign test (b) Wilcoxon signed rank test (c) Wilcoxon Mann Whitney - U test (d) None
7. In Wilcoxon signed rank test $T^+ + T^- =$ ()
 (a) The sample size n (b) $n(n+1)$ (c) $n(n-1)$ (d) $n(n+1)/2$
8. In SPRT $B \leq$ ()
 (a) $\beta/(1-\alpha)$ (b) $\beta/(1+\alpha)$ (c) $(1-\beta)/\alpha$ (d) $(1+\beta)/\alpha$
9. The Kolmogorov Smirnov statistic D_n is ()
 (a) $\text{Min} (D_n^+, D_n^-)$ (b) Not related to D^+ and D^- (c) $\text{Max} (D^+, D^-)$ (d) None
10. In SPRT the bounds of two constants A and B are given by ()
 a) $0 < A < B < 1$ b) $0 < B < A < 1$ c) $B < A < 1$ d) none of the above

(B) Fill up the blanks, Each question carries $\frac{1}{2}$ mark:

1. Homogeneity of several population variances can be tested by _____ test.
2. Spearman rank correlation is a non-parametric test that is used to measure the degree of association between two variables is given by _____.
3. SPRT terminates with probability _____.
4. A **non parametric test** sometimes called a _____ test does not assume anything about the underlying distribution.
5. Pearson Lemma provides the _____ of simple hypothesis against a simple alternative hypothesis.
6. The most commonly used nonparametric tests for the k-independent sample situation is _____.
7. Quantitative analysts aim to represent a given reality in terms of a _____ value.
8. The _____ is used to determine if there is a significant relationship between two nominal (categorical) variables.
9. A best confidence Interval will have its width _____.
10. To test for the randomness of given sample we apply _____.

(C)Each question carries 1 mark

Answer the following questions within the space provided

1. State Neyman-Pearson Lemma.
2. Define Maximum likelihood Estimation.
3. Define Point Estimator?
4. Define LR test.
5. State Unbiased Estimator?
6. Write differences between Parametric and Non Parametric tests.
7. Define OC and ASN Function.
8. Define Run.
9. Define Sign test.
10. Define Wilcoxon Mann Whitney U- Statistic.

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FACULTY OF SCIENCE
M.Sc. STATISTICS FINAL YEAR (CDE) ASSESSMENT
Paper- II: Linear Models and Design of Experiments

Date:

Max. Marks : 20

Name of Candidate: _____ Roll No: _____

SECTION-A (Multiple Choice : 10 x ½ = 5 Marks)

1. In the analysis of multiple regression model, regression sum of squares is given by
a) $\hat{\beta}' XY$ b) $\hat{\beta}' X'Y$ c) $\hat{\beta} XY$ d) $\hat{\beta}' X'Y$ ()
2. In the linear model $Y = X\beta + \varepsilon$ with $E(\varepsilon) = 0$ and $D(\varepsilon) = \sigma^2 I$, normal equations for estimating the parameter vector β is given by
a) $XY = (XX) \hat{\beta}$ b) $X'Y = (X'X) \hat{\beta}$ c) $XY = (XX)^{-1} \hat{\beta}$ d) $X'Y = (X'X)^{-1} \hat{\beta}$ ()
3. In a multiple regression model with two independent variables each with n observations, error d.f are
a) n b) n-1 c) n-2 d) n-3 ()
4. In the linear model $Y = X\beta + \varepsilon$ with $E(\varepsilon) = 0$ and $D(\varepsilon) = \sigma^2 I$, variance covariance matrix of $\hat{\beta}$ is
a) $(XX) \sigma^2$ b) $(X'X) \sigma^2$ c) $(X'X)^{-1} \sigma^2$ d) $(XX)^{-1} \sigma^2$ ()
5. In a 2^3 factorial design the effect AB is same as
a) BA b) A c) B d) ABC ()
6. Sum of the coefficients of contrast of an effect is
a) one b) zero c) two d) None of the above ()
7. In 2^4 factorial design with two replicates, the degrees of freedom for total sum of squares is
a) 31 b) 15 c) 7 d) 5 ()
8. Youden Squares are incomplete
(a) RBD (b) CRD (c) LSD (d) Both a and c ()
9. If $\beta = 0$ in one way ANCOVA model with single factor, then analysis reduces to

- a) ANOVA two way classification
classification
- b ANCOVA two way
- c) ANOVA one way classification
- d) None of the above ()
10. In 2^5 factorial design the no. of factors are
- a) four b) five
- c) two d) three ()

Section-B 10 x 1/2 = 5M)

Fill in the blanks. Each question carries half Mark.

11. The d.f for total sum of squares in 2^3 factorial design with two replicates is _____.
12. The two-way classification with ANCOVA model is _____.
13. A linear function of the response vector Y is said to be a linear zero function, if $E(CY) = \underline{\hspace{2cm}}$.
14. An estimate of error variance σ^2 obtained using repeated observations on the response is called _____.
15. According to Gauss Markoff theorem, unbiased estimate of error variance σ^2 is _____.
16. Linear zero functions are some times referred to as _____.
17. If the _____ mean square is significantly greater than the prior estimate of error variance σ^2 , then lack of fit of the regression model is considered
18. The Fisher's Least Significant difference between two treatment means = _____.
19. The number of treatment combinations in 2^4 design, are _____.
20. The sum of squares of an effect in 2^3 factorial design is _____.

Section-C (10 x 1 = 10M)

Write short answers to the following. Each question carries one Mark.

21. State Gauss Markoff theorem
22. State the properties of Residual
23. Define linear parametric function and linear zero function, state the relation between two functions.
24. What are multiple comparison tests
25. State the properties of Least Square Estimators
26. Give the layout of 2^3 factorial design with two replicates.
27. Explain the Concept of Fractional factorial designs
28. Explain the Split-Plot Design.
29. Define BIBD & PBIBD
30. Explain the Lattice Design
31. Explain the Youden square design

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FACULTY OF SCIENCE
M.SC. II YEAR CDE ASSIGNMENT: JUNE 2022
SUBJECT: STATISTICS
PAPER- III: OPERATIONS RESEARCH

Date:

Max. Marks: 20

Name of the Candidate: -----Roll No. -----

Note: Answer all questions.

Note: 1. Answer Section-A & Section-B on the Question paper by taking print of these pages.

2. Answer the questions in Section C in the order that specified in Q.P. on white papers.

(a) Give the correct choice of the answer like 'a' or 'b' etc in the brackets provided against the question, each question carries $\frac{1}{2}$ marks:

1. In an Assignment problem, if the number of rows is less than the number of columns then we need to add ()

(a) dummy row (b) dummy column (c) dummy row and a dummy column (d) constant

2. Lpp with two variables can be solved by _____ method. ()

(a) Graphical (b) Simplex (c) Big - M (d) Both b and c

3. In Game theory, if minmax is equal to maxmin. Then value is refer as point ()

(a) saddle (b) non equilibrium (c) profit (d) all the above

4. Goal programming problem deals with ()

(a) Single goal (b) Multi goals (c) Priority goals (d) All the above

5. If the constraint is $7x_1 + 6x_2 = 30$ then we need to add variable. ()

(a) Slack (b) Surplus (c) Artificial (d) Both b and c

6. In Big M method the cost of artificial variable is taken as ()

(a) 1 (b) -1 (c) -M (d) Cannot be said

7. In Critical Path Method we can obtain a path which has ()

(a) Minimum Distance (b) Maximum Distance (c) Constant Distance (d) cannot be said

8. In Assignment problem, to obtain the optimal solution, draw lines through _____ rows and columns. ()

(a) Marked, Marked (b) marked, Unmarked (c) Unmarked, Marked (d) Unmarked, Unmarked

9. If the primal problem has unbounded solution then the dual problem has _____ solution ()

(a) Feasible (b) Infeasible (c) unbounded (d) None

10. Dynamic programming problem is a _____ decision system. ()

(a) Single stage (b) Two stage (c) Multi stages (d) Cannot be said

(b) Fill up the blanks, each question carries ½ marks:

1. Dual of Dual is _____.
2. The net evaluations of the primal slack variables will be the solution to the _____ variables.
3. In M/M/1 queueing models, first M is stand for _____.
4. At EOQ Ordering cost _____ Carrying cost
5. In simplex method, when basis contain negative then need to use _____.
6. In Integer Programming Problem, decision variable should be _____.
7. In job sequencing the total elapsed time is _____.
8. PERT stands for _____.
9. In simplex method, if there is a tie in the values of the minimum ratios θ then such a problem is known as _____.
10. For the games of order $2 \times n$ or $m \times 2$ _____ method is used to solve the game.

c) Answer the following questions, each question carries 1 mark

1. Define Linear Programming Problem.
2. Explain why we introduce an artificial variable into the simplex table.
3. Explain about unbalanced Assignment Problem.
4. Define Primal and Dual problems.
5. Explain about the Mathematical form of Transportation problem.
6. Explain briefly about various time estimates involved in PERT.

7. Define Bellman's Principle of Optimality.
8. Define DPP.
9. Explain the need for Integer programming problem and give two of its applications.
10. Define Carrying cost and set up cost in Inventory.

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Mounika Final
Time Series

FACULTY OF SCIENCE
M.Sc. (FINAL)
INTERNAL ASSESSMENT
SUBJECT : STATISTICS
Paper-IV: TIME SERIES ANALYSIS

1. Holt-Winter method is applicable when the time series data consists of
a) trend and cyclical components b) trend and seasonal components
c) seasonal and cyclical components d) trend, seasonal and cyclical Component
()
2. The Spectral density function $g(f) =$
a) $I(f)/\sigma_z^2$ b) $E \{I(f)\}$
c) $P(f)/\sigma_z^2$ d) $E \{P(f)\}$ ()
3. The residual analysis will help in evaluating the ARIMA model for
a) adequacy b) inadequacy
c) Stationary d) none of the above ()
4. To get the initial estimates of AR or MA or ARMA processes we use
a) Least squares method b) Maximum likelihood method
c) neither a) nor b) d) both a) and b) ()
5. In an ARIMA(p, d, q) process, order of the polynomial $g(B)$ is
a) p+d b) p+q
c) q+d d) p+d+q ()
6. The equation $T_t = \beta(L_t - L_{t-1}) + (1 - \beta) T_{t-1}$ represents trend in
a) Holt Winter b) Winter
c) Stationary d) none of the above ()
7. In the model $Z_t(1 - 1.8B + 1.9B^2) = a_t$ the values of g_1, g_2 are
a) 1.8, 1.9 b) -1.8, -1.9 c) 1.8, -1.9 d) -1.8, 1.9 ()
8. Functions which are helpful in identifying the order of stationary time series ARIMA model is
a) ACF b) PACF
c) ACF and PACF d) none of the above ()
9. The model of ARIMA(0, 1, 1) is
a) $\nabla Z_t = a_t + \theta_1 a_{t-1}$ b) $\nabla Z_t = (1 - \theta_1 B)a_t$
c) $\nabla Z_t = a_t + \phi_1 a_{t-1}$ d) $\nabla Z_t = (1 + \phi_1 B)a_t$ ()
10. The model $\tilde{Z}_t = \phi_2 \tilde{Z}_{t-2} + a_t$ represents
a) AR(1) b) AR(2)
c) MA(2) d) MA(1) ()

II. Fill in the blanks

1. ARIMA(p, d, q) can be expressed in _____ explicit forms.
2. The inverted form of ARIMA (p, d, q) model is _____.
3. To convert a non-stationary time series to stationary time series _____ operator is used.
4. In ARIMA (0, d, 1) process $\phi_1 =$ _____.
5. Initial estimates of AR(2) process are _____.
6. The residuals of AR(1) process are _____.
7. The white noise process a_t follows normal distribution with mean _____ and variance _____.
8. For an ARMA(p, q) process ACF is a mixture of _____ and _____.
9. The correlation coefficient between the t- origin forecasts errors at lead time l and l+j, $\rho(e_t(l), e_t(l+j)) =$ _____.
10. Auto correlation function of forecasts errors at different time origin with same lead time $\rho(e_t(l), e_{t-j}(l)) =$ _____.

III. Answer the following questions:

1. What are the different methods of Forecasting?
2. Write difference equation form of ARIMA?
3. Find ψ weights for an ARIMA (1, 1, 1) model
4. Write the diagnostic checks for the given time series model
5. Write the expression for forecasts in integrated form
6. What is the necessity of smoothing in a time series
7. What is a stochastic time series model
8. What is a periodogram?
9. Write the AR(2) model. Write the conditions for stationarity
10. What is an autocovariance function? Write the expression for AR(p) process?