

**INTERNAL ASSIGNMENT QUESTIONS
M.SC. STATISTICS FINAL
ANNUAL EXAMINATIONS
(2015-2016)**



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. H.VENKATESHWARLU
Hyderabad – 7 , Telangana State

Dear Students,

Every student of M.Sc. (Statistics) Final 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. 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. The assignment marks will not be accepted after the stipulated date,

You are required to **pay Rs.300/- fee** towards Internal Assignment marks through DD (in favour of Director, PGRRCDE, OU) and submit the same along with assignment at the concerned counter **on or before 15-07-2016** and obtain proper submission receipt.

ASSIGNMENT WITHOUT THE DD 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 STUDENT :
2. ENROLLMENT NUMBER :
3. M.Sc. (Statistics) Final :
4. NAME OF THE PAPER :
5. 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 assignment number wise.
8. Submit the assignments on or before **15-07-2016** at the concerned counter at PGRRCDE, OU on any working day and obtain receipt.

**Prof.H.VENKATESHWARLU
DIRECTOR**

M.Sc FINAL YEAR (CDE)
ASSIGNMENT
SUBJECT : STATISTICS
Paper-I : STATISTICAL INFERENCE

I. Give the correct choice of the Answer like 'a' or 'b' etc in the brackets provided against the question. Each question carries half Mark.

1. The assumptions of most nonparametric test are
 - a) Sample observations are independent
 - b) The variable under study are continuous
 - c) both (a) and(b)
 - d) none of the above ()
2. If n_a is the sample size for test A and n_b is the sample size for test B, the power efficiency of test B with respect to test A is
 - a) $(n_a/n_b)*100$
 - b) $(n_b/n_a)*100$
 - c) $(n_a n_b)*100$
 - d) $(n_a + n_b)*100$ ()
3. The test statistic using LRT for testing the equality of two Normal population variances when means unknown
 - a) t
 - b) F
 - c) χ^2
 - d) none of the above ()
4. To test for the randomness of given sample we apply
 - a) Mann Whitney U test
 - b) Wilcoxon's Signed Rank test
 - c) Sign Test
 - d) Run test ()
5. In SPRT the sample size is
 - a) fixed
 - b) fixed but small
 - c) fixed but large
 - d) random variable ()
6. Among the class of unbiased test a test which is UMP is called
 - a) MP
 - b) UMP
 - c) UMPU
 - d) UMPIT ()
7. To decide about H_0 SPRT involves
 - a) One region
 - b) two region
 - c) three regions
 - d) None of the above ()
8. If the Likelihood Ratio is λ , the variable $-2\log_e \lambda$ is approximately distributed as
 - a) t
 - b) F
 - c) χ^2
 - d) none of the above ()
9. 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 ()
10. A best confidence Interval will have its width
 - a) larger
 - b) shortest
 - c) length is insignificant
 - d) none of the above ()

II. Fill in the blanks. Each question carries half Mark.

11. In SPRT Wald's Fundamental Identity is given by _____
12. The Kolmogorov and Smirnov two sample test statistic is given by _____
13. The mean of Spearman's ρ under the null hypothesis is _____.
14. In testing the equality of two Normal populations means with σ^2 unknown the test statistic is given by _____.
15. Confidence Interval is specified by _____limits.
16. In finding the C.I for large samples, Z is _____.
17. Homogeneity of several populations variances can be tested by _____.
18. The O.C. function in SPRT is _____
19. In SPRT the decision is taken after each _____ observation.
20. If X is Normal (μ, σ^2) when σ^2 is known the $100(1-\alpha)\%$ C.I for μ is _____

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

21. Define Randomized test and Non randomized test give an example
22. What is power efficiency, explain
23. Give the definition of one parameter exponential family, give an example, which does not belong to one parameter exponential family
24. What is an unbiased test, write an example
25. write the concept of Robustness
26. Obtain the Best Critical Region for the sample with density $f(x, \theta) = \exp(-(x-\theta)), (\theta \leq x < \infty)$ for testing $H_0: \theta = \theta_0$ vs. $H_1: \theta = \theta_1$
27. Find MP test of size α for testing $H_0: X \sim N(0,1)$ vs. $H_1: X \sim C(1,0)$
28. State the asymptotic properties of LRT.
29. Write the LRT procedure for testing the equality of several Normal populations means
30. Write the general assumptions and procedure for testing the measure of dispersion

FACULTY OF SCIENCE
M.Sc. II Year : MAY 2016
CDE ASSIGNMENT QUESTIONS
SUBJECT: STATISTICS
PAPER- II: LINEAR MODELS & DESIGN OF EXPERIMENTS
N.B.: Answer all questions.

(a) Give the correct choice of the answer like 'a' or 'b' etc in the brackets provided against the question, Each question carries ½ mark:

1. ANCOVA is a combination of ()
 (a) ANOVA and Regression analysis (b) ANOVA and Time series analysis
 (c) ANOVA and Multivariate analysis (d) None of these
2. $V(e_{1.23}) =$ ()
 (a) σ_1^2 (b) $\sigma_1^2 - \sigma_{1.23}^2$ (c) $\sigma_{1.23}^2$ (d) $\sigma_1^2 + \sigma_{1.23}^2$
3. The contrast coefficients for estimating the quadratic effect in a 3^2 factorial experiment are ()
 (a) -1,2,1 (b) 1,-2,1 (c) -1,0,-1 (d) -1,0,1
4. The correlation between two sets of variables is called _____ correlation ()
 (a) multiple (b) partial (c) canonical (d) None
5. The degrees of freedom for the effect AB in a 3^2 factorial experiment is ()
 (a) 2 (b) 4 (c) 1 (d) 8
6. The estimate of an effect in a 2^2 factorial experiment with r-replicates is ()
 (a) $(\text{contrast})/2^2.r$ (b) $(\text{contrast})^2/2^2.r$ (c) $(\text{contrast})/2^{2-1}.r$ (d) $(\text{contrast})^2/2^{2-1}.r$
7. The sum of coefficients in a contrast is ()
 (a) positive (b) negative (c) zero (d) none
8. In a 2^3 factorial design with 3 replicates in 2 blocks each, if the effect AB is confounded in replicate I and II effect AC is confounded in replicate III, then the design is ()
 (a) Partially confounded (b) Completely confounded (c) Balanced partially confounded (d) None
9. Which of the following is a multiple comparison test ()
 (a) t-test (b) LSD test (c) ANOVA (d) None
10. In the Analysis of covariance one way the estimate of regression parameter β is ()
 (a) E_{YY}/E_{XX} (b) E_{YY}/E_{XY} (c) E_{XY}/E_{XX} (d) None of the above

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

1. A factorial experiment with equal number of levels of all factors is called _____ factorial experiment.
2. In the ANCOVA two-way classification, if the regression coefficient β is insignificant then the model reduces to _____.
3. The one-way classification model is _____.
4. The partial correlation coefficient $r_{12.3} =$ _____.
5. The technique of arranging 2^k factorial experiment in two blocks is known as _____.
6. The relation between multiple and partial correlation coefficients is given by _____.
7. The linear statistical model for Youden square design is _____.
8. The treatment combinations of 2^3 factorial experiment with factors A, B, C are _____.
9. Gauss Markov model assumes variance – covariance matrix of error vector of the form _____.
10. In generalized least squares method $V(\hat{C}) =$ _____.

(c) Each question carries 1 mark

Answer the following questions within the space provided

- 1. Explain fisher's least significant difference test.**
- 2. Give the normal equation for estimating the regression coefficient β in the analysis of covariance one-way classification model.**
- 3. Give the estimates of main effects and interaction effect of a 2^2 factorial experiment with two replicates.**
- 4. Give the layout of 2^4 factorial experiment.**
- 5. Explain Balanced partial confounding technique.**
- 6. Explain Simple lattice design.**
- 7. Define a BIBD.**
- 8. Give the differences between BIBD and PBIBD.**
- 9. What is fractional replication.**
- 10. Define a Split plot design.**

Center for Distance Education
M.Sc. Final Year: April 2016
INTERNAL ASSESSMENT
SUBJECT: STATISTICS (CDE)
PAPER : (III) OPERATIONS RESEARCH

Date:-
Time: - 1 hr.

Timing:-
Max. Marks: 20

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

N.B.: Answer all questions.

**(a) Give the correct choice of the answer like 'a' or 'b' etc in the brackets provided
Against the question, each question carries ½ marks: (5 Marks)**

- 1) The origin of Operations Research was during ()
(a) World war I (b) World war II (c) French revolution (d) None
- 2) For solving a $m \times n$ ($m < n$) game without a saddle point the method used is : (a) Analytical method
(b) Graphical Method (c) Simplex Method (d) None of the above ()
- 3) When a game is solved by LPP method ,the strategies of the second player given by (from the optimum simplex table): (a) θ rule column (b) $|Z_j - C_j|$ row (c) X_b Column (d) C_b Column. ()
- 4) When the supply and demand are at the rate of K and R respectively thn EOQ is equal to: (a) Kt
(b) $(K-R)t_1$ (c) $(K-R)t$ (d) Kt_1 . ()
- 5) While writing the dual problem, the subject to condition $x_1 + 3x_2 + 5x_3 \leq 3$ can be written as ()
(a) $x_1 + 3x_2 + 5x_3 = 3$ (b) $x_1 + 3x_2 + 5x_3 \geq 3$ (c) $x_1 + 3x_2 + 5x_3 \leq 3$ (d) None
- 6) If the primal problem has an unbounded solution then the dual problem has ()
(a) Unbounded solution (b) feasible solution
(c) No Feasible solution (d) Optimum solution
- 7) In which method, we use the formula $\min\{x_{bi}; x_{bi} < 0\}$ to obtain the leaving variable ()
(a) Dual simplex (b) Duality (c) Simplex (d) Big M
- 8) The probability distribution of departures follows what distribution. ()
a) Truncated Poisson b) Exponential c) Poisson d) Geometric
- 9) If the arrival rate is 3 per hour and the service rate is 6 per hour then the traffic intensity $\rho =$ ()
a) 6 b) 3 c) 2 d) 0.5
- 10) Single item Inventory models occur when an item is ordered only once to satisfy the ()
(a) Supply for the period (b) Supply and Demand for the period (c) Demand for the period
(d) None of the above.

II Fill in the Blanks.

(5 Marks)

- 1) The branch and bound graphical approach for solving a Linear IPP cannot be used when a problem Involves more than
- 2) With respect to ABC analysis graph, the categories are decided by the points of-----
- 3) When the production is instantaneous, and demand is uniform at the rate of R also C_1 and C_s are the holding and set up costs for a period t is given by $C=$ -----
- 4) Annual usage value of the ith item is defined as -----
- 5) When a saddle point exists, the value of the game is given by -----
- 6) In a game without a saddle point, the value of the game V is given by-----
- 7) A stage is device in DPP to ----- the decisions.
- 8) In DPP the process is dependent on -----
- 9) In DP Problem the problem under consideration is divided in to -----
- 10) Expand PERT-----

III Each question carries 1 mark Answer the following questions in Short: (10 Marks)

- 1) Define the General Linear Programming Problem
- 2) Define the Primal and Dual Problems.
- 3) Explain the Travelling Salesman Problem.
- 4) Explain the rule of dominance.
- 5) Explain Float
- 6) Compare and contrast PERT and CPM.
- 7) Explain S-s Policy.
- 8) Describe the M/M/1 system
- 9) Define Goal Programming problem with an example.
- 10) Explain the Bellmans Principle of optimality

FACULTY OF SCIENCE
M.Sc. (Final) CDE : INTERNAL ASSIGNMENT - 2016
SUBJECT : STATISTICS
Paper-IV : Time Series & Statistical Process and Quality Control

Name of the Student : _____ Roll No: _____

I. Give the correct choice of the Answer like 'a' or 'b' etc in the brackets provided against the question. Each question carries half Mark. (5 Marks)

1. Data Collected in chronological order is known as []
a) time series b) statistics c) population d) none of these
2. Which is not a time series? []
a) hourly temperature of a patient b) monthly income of a person
c) marks of students in a class d) marks of a student in weekly tests
3. A time series is stationary if []
a) mean is constant b) variance is constant c) both (a) and (b) d) neither (a) nor (b)
4. The three explicit forms of ARIMA are used in []
a) identification b) estimation c) forecasting d) adequacy
5. Yule-Walker equations are used to find initial estimators in []
a) AR b) MA c) ARMA d) ARIMA
6. Conditional expectation $[Z_{t-j}]$ for $j = 0, 1, 2, \dots$, is equal to []
a) Z_{t-j} b) Z_{t+j} c) Z_t d) Z_j
7. The relation between expected value of R and S.D. σ with usual constant factors is []
a) $E[R] = d_1 \sigma$ b) $E[R] = d_2 \sigma$ c) $E[R] = D_1 \sigma$ d) $E[R] = D_2 \sigma$
8. The graph of the proportion of defectives in the lot against average sample number is called []
a) OC curve b) ASN curve c) Power curve d) none of these
9. OC curve reveals the ability of the sampling plan to distinguish between: []
a) good and bad lots b) good and bad sampling plans
c) good and bad product d) all the above
10. The maximum limit of percentage defectives in a finally accepted product is called []
a) AQL b) LTPD c) AOQL d) None of these

II Fill in the Blanks. (5 Marks)

1. ACF of lagk of AR(1) model is given by _____
2. The stationarity property of AR(p) model is similar to _____ property of MA(q) model.
3. ARIMA(p,d,q) is defined by _____
4. For testing the adequacy of the model, the Portmanteau test-statistic is given by _____

5. If the LSE and MLE both exist for a parameter, then they must be _____
6. The Box-Jenkins methodology is used for modeling a _____ time series data.
7. The variation due to _____ factors is tolerable.
8. The control limits delimited by the consumer are known as _____ limits.
9. Type B OC curve usually evaluate _____
10. The expectation of the sample size n in sequential sampling is known as _____

III Each question carries 1 mark Answer the following questions in Short: (10 Marks)

1. Derive the invertibility condition of MA(1) model.
2. Derive the power spectrum of MA(1) model.
3. Derive the variance of AR(1) model
4. Find $[Z_{t+l}]$ for $l = 1, 2, \dots$
5. Find $[a_{t-j}]$ for $j = 0, 1, 2, \dots$
6. Define control chart and discuss various applications of control chart in industry.
7. Distinguish between process and product control.
8. Explain the basic principles of CUSUM control chart.
9. Define Producer's and Consumer's risk.
10. Define CSP-1 and CSP-2 plans.