INTERNAL ASSIGNMENT QUESTIONS
M.Sc. STATISTICS FINAL

ANNUAL EXAMINATIONS
June / July 2018

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. C. GANESH

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 **submit Internal Assignment Answer Script along with Examination Fee Receipt** at the concerned counter on or before **15th June, 2018**

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 **15th June, 2018** at the concerned counter at PGRRCDE, OU on any working day and obtain receipt.

Prof. C. GANESH
DIRECTOR

FACULTY OF SCIENCE
M.Sc. Final Year : MAY 2018
CDE ASSIGNMENT QUESTIONS
SUBJECT: STATISTICS
PAPER- I: STATISTICAL INFERENCE

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. In a test procedure rejecting H_0 when H_0 is true 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. A test T which is atleast as powerful as any other test of the sample size is called ( )

(a) Best test (b) MP test (c) UMP test (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 A ≤ ( )

(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) Min (D_n^+ , D_n^-) (b) Not related to D_n^+ *and* D_n^- (c) Max (D_n^+ , D_n^-) (d) None

10. The $V_{H_0}(R)$ ( )

(a) $\frac{(\mu-1)(\mu-2)}{(m-n-1)}$ (b) $\frac{(\mu+1)(\mu+2)}{(m+n-1)}$ (c) $\frac{(\mu-1)(\mu-2)}{(m+n+1)}$ (d) $\frac{(\mu-1)(\mu-2)}{(m+n-1)}$

(b) Fill up the blanks, Each question carries ½ mark:

1. If the critical region corresponds to the largest values of the test statistic, then it is known as _____ ___ test.

2. A Probability Distribution which does not satisfy MLR property is _____ Distribution

3. A test in which decision about a hypothesis is based on a statistic T(X) is called _____ test.

4. Homogeneity of several population variances can be tested by _____ _____ _____ test.

5. The pivotal quantity, in the construction of the confidence limits should be _____ ___ of θ.

6. SPRT terminates with probability **_____**.

7. According to Walds equation $E[S_N]$ =____E[X]. E[N]_____ , where $S_N = X_1 + X_2 + \ldots + X_N$.

8. If $X_1, X_2, \ldots, X_n$ is a random sample drawn from f(x,θ) then the OC function to test H_0: θ = θ_0 vs H_1: θ = θ_1 is L (θ) = _____$[A^{h(\theta)}-1] /[A^{h(\theta)}- B^{h(\theta)}]$_____.

9. In SPRT of strength (α, β) if $S_n \geq A$ such that $0<B<1<A<\infty$ then ___Reject__ H_0 and stop sampling.

10. Non parametric methods are known as _____distribution_____ free methods.

Each question carries 1 mark
Answer the following questions within the space provided

1. **State Neyman-Pearson Lemma:-**
2. **Define UMP test:-**
3. **What is confidence interval in testing of hypothesis:-**
4. **Define LR test:-**
5. **What is an Unbiased test:-**
6. **Write two differences between Parametric and Non Parametric tests:-**
7. **Define OC Function:-**
8. **Define Run:-**
9. **Define Kolmogorov Smirnov statistic:-**
10. **Define Wilcoxon Mann Whitney U- Statistic:-**

M.Sc Statistics – Final

CDE ASSIGNMENT-2018

PAPER-II: LINEAR MODELS AND DESIGNS OF EXPERIMERNT

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

1. The BLUE in the linear regression model $Y=X\beta+\varepsilon$ is

   a) $(XX')^{-1}XX'$ b) $(X'X)^{-1}X'Y$ c) $(XX')^{-1}X'Y$ d) None [ ]

2. For testing H_0: $\beta=0$ in the linear regression model $Y=X\beta+\varepsilon$ the Error sum of squares is

   a) $Y'Y-\hat{\beta}'X'Y$ b) $Y'Y-\hat{\beta}'X'Y'$ c) $Y'Y-\hat{\beta}'XY'$ d) None [ ]

3. In the following the statement that is false is [ ]

   a) $R^2_{1.23}=1-\frac{W}{W11}$ b) $r_{12.3}=\frac{-W12}{W11W22}$ c) $\hat{\beta}_{12.3}=-\frac{\sigma_1 W12}{\sigma_3 W11}$ d) $V(X1.23)=\sigma^2_1 W/W_{11}$

4. The degrees of freedom of Error Sum of Squares in one way ANCOVA is [ ]

   a) vn-1 b) (vn-1)-1 c) v(n-1)-1 d) None

5. In 2^2 Factorial experiment Sum of Square due to interaction between A & B is [ ]

   a) $\frac{((ab)+(1)-(a)-(b))^2}{4r}$ b) $\frac{((ab)-(1)-(a)-(b))^2}{4r}$ c) $\frac{((ab)-(1)-(a)+(b))^2}{4r}$ d) None

6. In ANCOVA of two way classification $\hat{\beta}$ is [ ]

   a) $\frac{S_{xx}-E_{xy}}{S_{xy}-E_{xx}}$ b) $\frac{S_{xx}-E_{xx}}{S_{xy}-E_{xy}}$ c) $\frac{S_{xy}-E_{xx}}{S_{xx}-E_{xy}}$ d) None

7. In 4x4 LSD with one missing value the degrees of freedom of Error Sum of Squares is

a) 15 b)5 c)7 d)None [ ]

8. The block size in 2^3 Factorial experiment where ABC is confounded is [ ]

a) 4 b) 8 c) 6 d) None

9. In a 2^{3-1} Fractional factorial experiment the following pair is not an Alias [ ]

a) A & BC b) C & AB c) B & BC d) B & AC

10. Following parametric inequalities of BIBD is not true [ ]

a) vr = bk b) λ (v-1)= r(λ -1) c) b ≥ v d) b≥ (v+ r-k)

II Fill in the blanks with correct answer, each question carries ½ marks.

11. The equation of the plane of regression X_1 on X_2, X_3,……..X_k in Yule's notation is

_____

12. The All possible regression procedure is explained using the criterion of

_____

13. The least square estimate of missing value in L.S.D is _____

14. The linear statistical model of two way ANCOVA is

_____

15. The Error Sum of Squares in L.S.D is

_____

16. In 3^2 factorial experiment with AB2 totally confounded in two replicates the degrees of freedom for AB is _____

17. Adjusted treatment sum of squares in intra block BIBD is

_____

18. Sum of Squares of the effect of ABCD in 2^4 factorial experiment is

_____

19. In the linear model $Y=X\beta+\varepsilon$ where $D(\varepsilon) = \sigma^2\Omega$ and $\Omega = P'P$ then $\bar{\beta}_{GLS}$ is

_____

20. If $|X'X| \equiv 0$ the linear relations among the independent variables is described as

_____-

III Answer all the following short answer questions, each carry 1 mark.

21. Give the importance of a linear model.
22. State Gauss Markoff theorem.
23. Give the properties of residuals.
24. For the three variables X_1, X_2 and X_3 if $r_{12}= 0.61$, $r_{13}= 0.40$ & $r_{23}= 0.81$, $r_{12.3}$
25. Give the efficiency of L.S.D over R.B.D.
26. Write the ANOVA TABLE of R.B.D with one missing value estimated.
27. what is confounding in factorial experiments.
28. Give the expression for sum of squares of AB^2 in 3^2 factorial experiment.
29. What is Youden square?
30. Define PBIBD (2)

FACULTY OF SCIENCE
M.Sc. II Year: MAY 2018
CDE ASSIGNMENT QUESTIONS
SUBJECT: STATISTICS
PAPER-III: OPERATIONS RESEARCH
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. The probability Distribution of Pure death model is `( )
(a) Poisson Distribution (b) Exponential Distribution (c) Truncated Poisson Distribution (d) None

2. In job sequencing the total elapsed time is ( )
(a) Maximised (b) Minimised (c) Constant (d) No particular condition

3. In processing n jobs through 3 machines, if t_{1j} and t_{2j} represent the processing times on machines 1 and 2 respectively then Min t_{1j} ( )
(a) $\geq$ min t_{2j} (b) $\leq$ max t_{2j} (c) $\leq$ min t_{2j} (d) $\geq$ max t_{2j}

4. In the EOQ model with constant rate of demand, Optimum quantity Q = ( )
(a) $2DC_0/C_1$ (b) $2DC_1/C_0$ (c) $(2DC_0/C_1)^{1/2}$ (d) $(2DC_1/C_0)^{1/2}$

5. In a network Critical path has the ( )
(a) Shortest distance (b) Longest distance (c) Cannot be said (d) A Constant distance

6. In the model **(M/M/1): (∞/FIFO)**, Second **M** represents ( )
(a) Exponential Service times (b) Poisson arrivals (c) Capacity of the queue (d) Number of servers

7. Graphical method is used for games of order ( )
(a) 2 x n (b) m x 2 (c) m x n (d) Both (a) and (b)

8. If x is the number of units in inventory and s, S are the minimum and maximum stock levels and if x< s then order _____ number of units. ( )
(a) S-x (b) S+x (c) s-x (d) s+x

9. Goal programming problem deals with ( )
(a) Single goal (b) Multi goals (c) Priority goals (d)All the above

10. Dynamic programming problem is a _____ decision system. ( )
(a) Single stage (b) Two stage (c) Multi stage (d) Cannot be said

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

1. If Maximin = Minimax then the game has a _____ point.

2. To sequence the jobs on machines the procedure is given by_____ .

3. In networks if the value of the total float is zero then that activity is a _____activity.

4. In a Single period Inventory problem without setup cost, uniform demand and continuous units, F(Q*) = _____.

5. In Algebraic method, the value of the game is V= _____.

6. The amount by which the first goal is underachieved is represented by _____.

7. In optimal subdivision problem, of dividing a quantity "C" into n parts, so as to maximize their product then the optimal allocation to each part is _____.

8. For obtaining the optimum solution to an assignment problem _____ method is used.
9. In DPP when we want to minimize $Z = p_1 \log p_1 + p_2 \log p_2 + \ldots + p_n \log p_n$ STC $p_1 + p_2 + \ldots + p_n = 1$ and $p_i > 0$, then p_i are all equal to_____.
10. The best method for obtaining the IBFS of a TPP is _____.

(c) Each question carries 1 mark

Answer the following questions within the space provided

1. **What are perishable items, explain.**
2. **Define pure and mixed strategies.**
3. **Explain briefly about GPP.**
4. **Define Bellman's Principle of Optimality.**
5. **define a TPP.**
6. **Define a LPP.**
7. **What is meant by basic feasible solution.**
8. **What do you mean by pure birth process.**
9. **Define IPP.**
10. **Give the procedure for sequencing n jobs on 2 machines.**

M.Sc. STATISTICS - FINAL
CDE ASSIGNMENT - 2018
PAPER- IV: STATISTICAL QUALITY AND PROCESS CONTROL & TIME SERIES ANALYSIS

I 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. Average Run Length is given by

   a) $1-P_a$ b) $1/(1 - P_a)$ c) $1/(1 - \alpha)$ d) none of the above ( )

2. The EWMA is defined as Y_t =

   a) $\beta x_i - (1 - \beta) Y_{t-1}$ b) $\alpha x_i + (1 - \alpha) Y_{t-1}$
   c) $\alpha x_i - (1 - \beta) Y_t$ d) None of the above ( )

3. V-Mask procedure is proposed by

   a) Duncun, 1950 b) Dodge, 1930 c) Bernard, 1959 d) None ( )

4. If the items are selected one by one from the lot and the accumulated number of defective items at every stage are compared with a sequence of numbers for a decision, such plans are called

   a) Acceptance plans b) Sequential sampling plans
   c) Continuous sampling plans d) None of the above ( )

5. Psychological dis-satisfaction of giving the lot a second chance is an advantage of

   a) SSP b) DSP c) VSP d) None ( )

6. Relation between ψ weights and $\prod$ weights is

   a) $\prod(B) = \psi(B)$ b) $\prod(B) = \psi^{-1}(B)$ c) $\prod^{-1}(B) = \psi(B)$ d) $\prod^{-1}(B) = \psi^{-1}(B)$ ( )

7. Variance of MA(1) process is

   a) $\gamma_0 = (1 + \theta_1)\sigma_a^2$ b) $\gamma_0 = (1 - \theta_1)\sigma_a^2$ c) $\gamma_0 = (1 + \theta_1^2)\sigma_a^2$ d) $\gamma_0 = (1 - \theta_1^2)\sigma_a^2$ ( )

8. ARMA(1,1) process is given by

   a) $Z_t - \phi_1 Z_{t-1} = a_t - \theta_1 a_{t-1}$ b) $Z_t + \phi_1 Z_{t-1} = a_t + \theta_1 a_{t-1}$
   c) $Z_t + \phi_1 Z_{t-1} = a_t - \theta_1 a_{t-1}$ d) $Z_t - \phi_1 Z_{t-1} = a_t + \theta_1 a_{t-1}$ ( )

9. Estimates of Partial autocorrelations in AR(2) are given by

a) $\hat{\phi}_{21} = r_1(1+r_2)/1-r_1^2 and\ \hat{\phi}_{22} = r_2 + r_1^2/1-r_1^2$

b) $\hat{\phi}_{21} = r_1(1-r_2)/1-r_1^2 and\ \hat{\phi}_{22} = r_2 + r_1^2/1-r_1^2$

c) $\hat{\phi}_{21} = r_1(1+r_2)/1-r_1^2 and\ \hat{\phi}_{22} = r_2 - r_1^2/1-r_1^2$

d) $\hat{\phi}_{21} = r_1(1-r_2)/1-r_1^2 and\ \hat{\phi}_{22} = r_2 - r_1^2/1-r_1^2$

10. In time series forecasting procedure Z_{t+l}

a) $\hat{e}_t(l) + z_t(l)$ b) $e_t(l) + \hat{z}_t(l)$ c) $\hat{e}_t(l) - z_t(l)$ d) $e_t(l) - \hat{z}_t(l)$ ( )

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

11. P-chart is _____ sensitive than $\overline{X}$ and P-charts.
12. The highest peak of Average Outgoing Quality curve is known as _____ .
13. In designing a control chart _____ size is the most important factor.
14. The moving average of span 'w' at time 't' is defined as $M_{t=}$ _____ .
15. _____ is defined as number of items inspected on an average and rectifying sampling plans where rejected lots are inspected 100%.
16. Auto Regressive process is always _____.
17. Autocorrelation function of ARMA process is _____ for $k \geq q+1$.
18. No. of significant partial autocorrelations will define order of _____ process.
19. In ARIMA(1,d,1) model p_1 decays exponentially from _____ Lag.
20. In time series models a_t is known as _____ Process.

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

21. What are CUSUM control charts.
22. Explain TQM.
23. Define double sampling plan for attributes.
24. Write about Dodge's continuous sampling plan - I.
25. Give the control limits of $\overline{X}$ and R charts.
26. Define Stationary Time Series.
27. Define the two general linear processes. State their properties.
28. Define the three explicit forms of ARIMA process.
29. Explain the role of autocorrelations and partial autocorrelations in model identification.
30. State the rules to obtain the forecasts $\hat{Z}_t(l)$ in any of the three explicit forms.