

INTERNAL ASSIGNMENT QUESTIONS M.Sc (STATISTICS) PREVIOUS

2019



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

Dear Students,

Every student of M.Sc. Statistics Previous 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:

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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 **29th June, 2019** at the concerned counter at PGRRCDE, OU on any working day and obtain receipt.

**Prof. C. GANESH
DIRECTOR**

**M.Sc. STATISTICS - PREVIOUS
CDE ASSIGNMENT - 2019
PAPER- I : MATHEMATICAL ANALYSIS and LINEAR ALGEBRA**

I Give the correct choice of the answer like ‘a’ or ‘b’ etc. in the brackets provided against the question. Each question carries 1/2 mark.

1. $\Delta x_k =$ _____ ()
 a. x_k b. $x_k - x_{k-1}$ c. $x_k + x_{k-1}$ d. None of the above
2. $V_{f-g}(a,b) =$ _____ ()
 a. $v_f(a)$ b. $v_f(b)$ c. $v_f(a,b) + v_g(a,b)$ d. $v_f(a,b) - v_g(a,b)$
3. In Riemann integral $\int_a^b f(x) dx$, f is known as _____ ()
 a. integrand b. integrator c. both a and b d. None of the above
4. In Reimann Stieltjes integral $A =$ _____ ()
 a. $f(x)$ b. 0 c. $\int_a^b f(x) dx$ d. both a and b
5. $U(P,f,\alpha) - L(P,f,\alpha)$ should be _____ ()
 a. $=\epsilon$ b. $> \epsilon$ c. $< \epsilon$ d. None of the above
6. If A is an $(m \times n)$ matrix of rank m then, A^+ is _____ ()
 a. $A'(AA')^{-1}$ b. $(A'A)^{-1}A'$ c. both a and b d. none of the above
7. If $\rho(A) = \rho(B) < n$ (number of unknowns) _____ ()
 a. Consistent & has unequal solutions b. Consistent & has infinite solutions
 c. Inconsistent d. None
8. The notation of _____ arises in connection with the problem of reduction & classification of Quadratic form by means of nonsingular linear transformation. ()
 a. Equivalence b. Similarity c. Congruence d. Gramm
9. If $K = 0$, then $KA = 0$ thus, each characteristic root of matrix is _____ ()
 a. Null Matrix b. Identity Matrix c. Inverse Matrix d. Symmetric Matrix

10. In algebraic multiplicity of λ , if $\lambda = 0$ of the Matrix A of order 't', then t is always__ ()
- a. One b. Two c. Zero d. Three

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

11. $U(P,f,\alpha) =$ _____
12. $\sum_{k=1}^n a_k b_k =$ _____
13. $N(x)$ is called _____
14. $\int (f, \alpha) =$ _____
15. $V_{fg}(a,b) =$ _____
16. The set of vectors $\{X_1, X_2 \dots X_n\}$ is linearly dependent then there exists scalars $C_1, C_2 \dots C_n$ are _____
17. A vector X whose length is one is called a _____
18. The MP inverse of the transpose of A is the transpose of the MP inverse of A i.e. _____.
19. If A is Square & nonsingular i.e., A is of full rank, then its Hermite is _____.
20. The number of positive square terms in the canonical form of the Q.F. $X^T A X$ is called _____.

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

1. Define Bounded variation.
2. Define Riemann integral.
3. Define Reimann stieltjes integral.
4. Solve $\int_0^1 x^2 d[x]$.
5. Define upper and Lower Stieltjes sums.
6. Definition of vector space and inner product vector space
7. Definition of MP inverse
8. State Cayley Hamilton Theorem.
9. Definition of Quadratic forms.
10. State Cauchy Schwartz inequality.

M.Sc. STATISTICS - Previous
CDE ASSIGNMENT - 2019
PAPER- II : PROBABILITY THEORY

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. If A & B are two disjoint events then $P(A \cup B)$ is
a. $P(A)+P(B)$ b. $P(A).P(B)$ c. $P(A \cap B)$ d. $P(A \cap B^c)$ ()
2. If A is an Event, the conditional Probability of A given A is equal to
a. 0 b. 1 c. α d. A ()
3. Marginal Distribution of a r.v Y is
a. $f(x)$ b. $f(y)$ c. 1 d. 0 ()
4. If $p=2$ and $q=2$ in Holders Inequality, we get _____ Inequality.
a. Markovs b. Cauchy-Schwartz's c. Chebychevs d. Minkowski ()
5. Let X is a Poisson r.v with parameter λ then the characteristic function is
a. Pe^{it} b. $\exp[\lambda(e^{it}-1)]$ c. 1 d. does not exist ()
6. Probability generating function of any r.v. is
a. Unique b. Double c. 0 d. None of the above ()
7. Convergence in Probability implies convergence in
a. Law b. Distribution c. weekly d. All of the Above ()
8. Let $\{E_n\}$ be a sequence of events defined on probability space then $P[\lim_{n \rightarrow \infty} \text{Sup } E_n] =$
a. 1 b. 0 c. ∞ d. None of the above ()
9. All the elements of p_{ij} in tpm is
a. 1 b. Non negative c. 0 d. All of the above ()

10. Marginal distribution of X_3 is
- a. p_0p^2 b. p_0p^3 c. p_0p d. p_0p^4 ()

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

11. If A & B are two events then $P(A^c \cap B)$ is _____.
12. In Bayes Probability we calculate _____ probability
13. If X & Y are two independent r.v's then the joint distribution $f_{x,y}(X,Y) =$ _____
14. The Characteristic function of Normal Distribution $N(\mu, \sigma^2)$ is _____
15. $F(X)$ is a _____ Function.
16. If X is a r.v that takes only non negative values then for any value $a > 0$ is _____.
17. For _____ Distribution moments does not exist.
18. Convergence in Probability is Closed under _____ Operations.
19. If $i=j$, then $f_{ij}^{(n)}$ is called the _____ of Markov chain to state i in n steps.
20. Recurrent state is also called as _____ State.

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

21. Define Axiomatic approach of probability.
22. Define Measure and Measure Space.
23. Define Indicator r.v.
24. List any two properties of Characteristic function.
25. State Borel 0-1 Law.
26. Define Convergence in Distribution.
27. State Kolmogorov's SLLNS.
28. State Levy Lindeberg form of CLT.
29. Show that sum of elements in any row of the tpm is Unity.
30. Define Recurrent & Transient states.

**M.Sc. STATISTICS - Previous
CDE ASSIGNMENT - 2019**

PAPER- III : DISTRIBUTION THEORY AND MULTIVARIATE 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. Mean and variance of Poisson distribution are

a. Mean = Variance	b. Mean > Variance	()
c. Mean < Variance	d. None of the above	

2. Mean of negative binomial distribution with parameters (x, p, k) is

a. k-p	b. k+p	c. $\frac{kq}{p}$	d. $\frac{kp}{q}$	()
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3. Variance of central chi square distribution is

a. n	b. 2n	c. 4n	d. 8n	()
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4. Median of lognormal distribution is

a. 0	b. 1	c. -1	d. e^e	()
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5. The curve of uniform distribution is

a. Meso kurtic	b. Platy kurtic	c. Lepto kurtic	d. None of the above	()
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6. X vector is said to follow multinomial distribution with _____ n, p_1, p_2, \dots, p_k

a. dependent variable	b. independent variable	()
c. parameters	d. None	

7. If $W_1 \sim W_p(\Sigma, n_1)$ and $W_2 \sim W_p(\Sigma, n_2)$ are independent then $W_1 + W_2 \sim W_p$

a. $(\Sigma, n_1 n_2)$	b. $(\Sigma, n_1 + n_2)$	c. $(n_1 + n_2, \Sigma)$	d. none of the above	()
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8. If X is assign to W_k for which prior probabilities of mis-classification is _____

a. Minimum	b. Maximum	c. Equal	d. none of the above	()
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9. The variance of the Principal Components satisfies _____

a. $V(Y_1) \geq V(Y_2)$	b. $V(Y_1) \leq V(Y_2)$	c. $V(Y_1) = V(Y_2)$	d. None of the above	()
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10. The distance between two cluster is maximum then it is called

- a. Single linkage b. complete linkage c. average linkage d. None of the above ()

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

11. Mean of lognormal distribution is _____.
12. Mode of Weibull distribution is _____.
13. Variance of central t distribution is _____.
14. Moment generating function of central chi square distribution is _____.
15. Snedecor's F statistic is defined by _____.
16. The characteristic function of multivariate normal distribution is _____
17. If μ_1, μ_2, Σ are unknown then D^2 is _____
18. The correlation between Y and its best linear predictor is called the _____
19. Primary components of path analysis are _____
20. The orthogonal rotation of the variables used in _____

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

21. State the additive property of Negative Binomial distribution.
22. State the linear combination of independent normal variates.
23. State the memory less property of Exponential distribution.
24. Define non central chi square distribution.
25. Define non central t distribution.
26. Definition of multivariate normal distribution.
27. Definition of Hotelling T^2 and its applications
28. Write Multiple correlation in terms of simple and partial correlation
29. Definition of Multi-Dimensional scaling.
30. Definition of factor analysis.

**M.Sc. STATISTICS - PREVIOUS
CDE ASSIGNMENT - 2019**

PAPER- IV: SAMPLING TECHNIQUES AND ESTIMATION THEORY

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. The Number of possible Samples of size n out of N Population units without Replacement is
a. $\binom{N}{n}$ b. N^n c. n^2 d. $n!$ ()
2. Under equal allocation in stratified Sampling the Sample form each stratum is
a. Proportional to Stratum size b. of Same size from each Stratum
c. In proportion to the per unit cost of survey of the Stratum d. All the above ()
3. With usual notations the estimate of the variance of \bar{x}_{st} under Proportional allocation is
a. $V(\bar{x}_{st}) = \frac{N-n}{Nn} \sum_{j=1}^k w_j S_j^2$ b. $V(\bar{x}_{st}) = (1 - \frac{n}{N}) \sum_{j=1}^k \frac{w_j^2 S_j^2}{n_j}$
c. $V(\bar{x}_{st}) = (1 - \frac{n}{N}) \sum_{j=1}^k \frac{w_j S_j}{n}$ d. $V(\bar{x}_{st}) = (1 - \frac{n}{N}) \sum_{j=1}^k \frac{w_j S_j}{n_j}$ ()
4. The errors emerging out of faculty planning of surveys are categorized as
a. Non – Sampling errors b. Non – response errors
c. Sampling errors d. absolute errors ()
5. Supposing that in clusters sampling S_w^2 represents the variance within the clusters and S_b^2 represents the variance between clusters. What is the relation between S_w^2 and S_b^2 .
a. $S_w^2 = S_b^2$ b. $S_w^2 \geq S_b^2$ c. $S_w^2 \leq S_b^2$ d. None of the above ()
6. A statistic whose variance is as small as possible when compared to any other unbiased estimator is called
a. MVUE b. BLUE c. MVB d. None of the above ()
7. A resampling technique which consists of drawing “n” resamples of size $m=n-1$ each time from the original sample by deleting one observation at a time and uses for estimation of functional of F is called
a. Bootstrapping b. Sampling c. Jackknifing d. None of the above ()

8. A statistic which is CAN but with asymptotic variance equal to MVB is called
 a. UMVUE b. BAN c. MLE d. MVUE ()
9. A functional parameter for which there exists a functional statistic that is unbiased is called
 a. Non estimable functional parameter b. Non parametric estimation
 c. parametric estimation d. Estimable functional parameter ()
10. A random function of X and Θ whose distribution does not depend on Θ is called
 a. Pivot b. Confidence Interval
 c. Random Variable d. None of the above ()

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

1. Any population Constants is called a _____
2. The Probability of selection of any one sample out of $\binom{N}{n}$ sample is _____.
3. Optimum allocation is also known as _____ allocation.
4. Estimator of population total $\hat{y}_{lr} =$ _____
5. Under PPS selection a unit has _____ chance of being included in the sample than a unit smaller.
6. The process of making decisions about either the form of distribution or parameters involved in it, on the basis of observed sample data set is called _____.
7. A statistic which is a function of all other sufficient statistics for Θ is called _____.
8. A statistic whose values are sufficiently close to the true value of parameter to be estimated with high probability is called _____ estimator.
9. _____ estimation consists of choosing a value that maximizes the likelihood function for a fixed sample data.
10. A functional parameter for which there exists no statistic that is unbiased is called _____.

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

1. Find Number of possible samples of size 2 from a population of 4 units under SRSWOR method.
2. Define of Systematic Sampling ?
3. Give the Ratio estimator of population total Y.
4. Show that \bar{y}_r is an unbiased estimator of \bar{Y} .
5. Statement of Horwitz – Thomson estimator.
6. State Neyman Factorization Theorem
7. State Rao – Blackwell Theorem
8. Give two properties of MLE
9. Define Interval estimation.
10. Define CAN estimator.

INTERNAL ASSIGNMENT QUESTIONS M.Sc (STATISTICS) FINAL

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11. An example of simple hypothesis is _____
12. LR test function $\lambda(x) =$ _____
13. The conditions for a test to be consistent i, _____ and ii, _____
14. When $t(\theta) \neq 0$, the OC curve $L(\theta) =$ _____
15. The expression for ASN function $E(N) =$ _____
16. $\text{Var } U_{mn} =$ _____
17. Spearman's Rank correlation $r_s =$ _____
18. Variance of $S_n^+ =$ _____
19. Kruskal Wallis Statistic $T_{n,KW} =$ _____
20. Wilcoxon Rank sum statistic is _____

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

21. Describe Types of errors
22. Define Power function
23. Statement of NP Lemma
24. Define MLR property
25. Define OC Curve
26. Define Finite sample size Relative Efficiency
27. Define concordance and discordance
28. Define Linear Rank test statistic
29. Write Kolmogorov smirnov test statistics for two samples
30. Name the tests for testing independence of a two samples

M.Sc. STATISTICS - FINAL
CDE ASSIGNMENT - 2019
PAPER- II : LINEAR MODELS AND DESIGN OF EXPERIMENTS

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. In a trivariate distribution $\sigma_1=2, \sigma_2=3, r_{12}=0.7, r_{23}=r_{13}=0.5$ then $b_{12.3}=\$
a) 0.5 b) 0.4 c) 0.6 d) 0.3 ()
2. If $r_{12}=0.8, r_{13}=-0.56, \& r_{23}=0.40$ then $r_{12.3}$ is
a) 0.648 b) 0.256 c) 0.759 d) 0.814 ()
3. In a 3^2 factorial experiment conducted in r replicates the degrees of freedom of Residual sum of squares is
a) $8r-1$ b) $8r-8$ c) $8r+1$ d) $8r-7$ ()
4. In 2^{6-2} fractional factorial experiment with generator $I1= ABCE, I2=BCDF$ the alias of ACD are
a) BDE,ACF,ACDF b) BDE,ABF,ACEF c) CDE,ACF,DEF d) None ()
5. In parametric relations of B.I.B.D the one that is not true is
a) $vr=bk$ b) $\lambda(v-1)=r(k-1)$ c) $b \geq v$ d) $b \geq (k+v-r)$ ()
6. The principle of Local Control is not observed the design is
a) R.B.D b) L.S.D c) B.I.B.D d) C.R.D ()
7. The Error sum of squares in L.S.D is
a) TO.S.S-Tr.S.S-BI.S.S b) TO.S.S-Tr.S.S-Row.S.S-Col.S.S c) TO.S.S- Tr.S.S-Col.S.S d) None ()
8. In Split Plot design the $COV(\epsilon_{ijk}, \epsilon_{i'j'k'})$ if $i=i', j=j', k=k'$ is
a) σ^2 b) $\rho\sigma^2$ c) σ^4 d) 0 ()
9. The following B.I.B.D is resolvable
a) $v=4, b=6, r=3, k=2, \lambda=1$ b) $v=5, b=7, r=2, k=2, \lambda=1$ c) $v=4, b=5, r=2, k=2, \lambda=1$ d) None ()
10. In 2^{5-2} fractional factorial experiment the block size would be
a) 16 b) 4 c) 8 d) 32 ()

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

11. If $D(\epsilon) = \Omega\sigma^2$; $\Omega = PP'$, in multiple linear model $\hat{\beta} =$ _____.
12. To test $H_0: \beta = \beta^*$ in case of multiple linear model the F-Statistics is _____.
13. For the multiple linear model $Y = X\beta + \epsilon$ the Total sum of squares (T.S.S) = _____.
14. The estimation of the missing observation in L.S.D is _____.
15. In Yule's notation the plane of regression on X_1 on X_2 and X_3 is _____.
16. The stepwise regression method is based on _____ criterion.
17. In 2^4 factorial experiment the sum of squares of the effect ABCD = _____.
18. In Split plot design with p replicates, q main treatments r sub plot treatments the sum of squares due to the interaction between main and subplot treatments is _____.
19. The relative efficiency of L.S.D over R.B.D is _____.
20. The linear statistical model of two way ANCOVA is _____.

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

21. State Gauss Markoff theorem.
22. What is Multicollinearity?
23. What is the Square of multiple determination?
24. What is the need for variable selection in multiple linear regression model?
25. Compare R.B.D and B.I.B.D.
26. Define P.B.I.B.D.
27. Explain total confounding in factorial experiment.
28. Write ANOVA table of L.S.D.
29. Write the parametric relations in B.I.B.D.
30. What is Youden square design?

**M.Sc. STATISTICS - FINAL
CDE ASSIGNMENT - 2019
PAPER- III : OPERATIONS RESEARCH**

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. If the feasible region of the LPP is empty, the solution is
a. Infeasible b. Unbounded c. Alternative d. None of the above ()
2. Please state which statement is true.
(i) All linear programming problems may not have unique solutions
(ii) The artificial variable technique is not a device that does not get the starting basic feasible solution.
a. Both (i) and (ii) b. (ii) only c. (i) only d. Both are incorrect ()
3. In Simplex algorithm, which method is used to deal with the situation where an infeasible starting basic solution is given?
a. Slack variable b. Simplex method c. M-method d. None of the above ()
4. Any feasible solution to a transportation problem containing m origins and n destinations is said to be
a. Independent b. Degenerate c. Non-degenerate d. Both A and B ()
5. A given TP is said to be unbalanced, if the total supply is not equal to the total _____
a. Optimization b. Demand c. Cost d. None of the above ()
6. What do we apply in order to determine the optimum solution ?
a. LPP b. VAM c. MODI Method d. None of the above ()
7. In 2×2 games without saddle point which method is suitable
a. arithmetic b. graphical c. linear programming d. none of the above ()
8. The critical path satisfy the condition that
a. $E_i = L_i$ & $E_j = L_j$ b. $L_j - E_i = L_i - E_j = c(\text{constant})$ c. $L_j - E_i = L_i - L_j$ d. All the above ()
9. Mixed integer programming problem can be solved by
a. Gomory's b. Branch and Bound c. Capital Budget Method d. all the above ()
10. The optimal solution to n-jobs through m machines can be obtained by following conditions
a. $\text{Min}\{M_{1j}\} \geq \text{Max}\{M_{ij}; i=2,3,\dots,m-1\}$ b. $\text{Min}\{M_{mj}\} \geq \text{Max}\{M_{ij}; i=2,3,\dots,m-1\}$
c. either a or b d. both a & b ()

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

1. Any feasible solution which optimizes (minimizes or maximizes) the objective function of the LPP is called its _____.
2. Any solution to a LPP which satisfies the non-_____ negativity restrictions of the LPP is called its _____.
3. A basic solution which also satisfies the condition in which all basic variables are nonnegative is called _____.
4. A feasible solution is called a basic feasible solution if the number of nonnegative allocations is equal to _____.
5. If the total supply is less than the total demand, a dummy source (row) is included in the cost matrix with _____.
6. Activity which starts only after finishing other activity is called _____.
7. If in game the gains to one player are exactly equal to the losses of another player, so that sum of gains and losses equals zero is called _____.
8. In queueing models in which only arrivals are counted and no departure takes place are called _____.
9. A LPP in which some, but not all, of the decision variables are required to have interger values is called a _____.
10. The time interval between starting the first job and completing the last job including the idle time in a particular order is called _____.

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

21. Write the general mathematical model of linear programming problem.
22. Explain Slack, Surplus and Artificial variable.
23. Convert following primal to dual : $\text{Min } Z = X_1 + X_2 + X_3$
Subject to the constraints $X_1 - 3X_2 + 4X_3 \leq 5$; $X_1 - 2X_2 \leq 3$; $2X_2 - X_3 \geq 4$; $X_1, X_2, X_3 \geq 0$
24. Explain feasibility in transportation problem.
25. Explain Hungarian method in shortly
26. Explain Minimax and Maximin principles for saddle point.
27. Define critical path ?
28. Define PERT and give the formula for Expected activity time (t_e) variance of activity time.
29. Write density function $f(t)$ for inter-arrival time in Queueing system.
30. Explain the concept of Integer Programming Problem

M.Sc. STATISTICS - FINAL
CDE ASSIGNMENT - 2019
PAPER- IV : STATISTICAL QUALITY AND PROCESS CONTROL & TIME SERIES
ANALYSIS

1 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. Variance of a Time series can be stabilized by _____ transformation
a. No such is available b. Square root c. Logarithmic d. b and c both ()
7. Limits for Auto Correlation function are _____
a. $[-1, 1]$ b. $[0, 1]$ c. $(-\infty, \infty)$ d. $[0, \infty)$ ()
8. There are _____ parameters in MA(q) model
a. $q+1$ b. 2 c. $q+2$ d. q ()
9. The sample size For analyzing AR(p) model should be _____
a. $=p$ b. $> p$ c. $< p$ d. None ()
10. The assumption in estimating the ARMA(p, q) model is _____
a. $q > p+1$ b. $p > q+1$ c. $q=p$ d. $q=p+1$ ()

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

11. P-chart is _____ sensitive than \bar{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. The ACF ρ_k is significant when _____.
17. The mathematical model for AR(2) model is _____.
18. Inverted form of ARIMA model is _____.
19. The Portmanteau's statistic $Q =$ _____.
20. Error in forecast $e_{t+1} =$ _____.

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 \bar{X} and R charts.
26. Define Time series.
27. Define ACF.
28. Define White noise process.
29. Define Sample spectrum.
30. State the steps involved in Box Jenkins methodology.