ASSIGNMENT 1

M.Sc. DEGREE EXAMINATION, MAY - 2020

(Second Year)

STATISTICS

Statistical Quality Control

MAXIMUM MARKS :30

ANSWER ALL QUESTIONS

Q1) a) Explain the role and importance of statistical quality control in industry.

b) Explain the basic principles underlying the control charts.

Q2) a) Discuss the causes of variation in quality.Explain how a control chart helps to control the quality of a manufactured product.

b) Write the procedure of constructing np- chart.

Q3) a) Explain about mid range control chart and standard deviation chart.

b) Derive ARL of a CUSUM chart.

Q4) a) Write the procedure of c-chart with fixed and varying sample sizes.

b) Explain on natural tolerance limits and specification limits.

Q5) Explain the design and construction of EWMA chart. Discuss group control chart.

Q6) Explain CUSUM chart. How do you improve CUSUM responsiveness for large shifts? What are the disadvantages of V-mask procedure?

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ASSIGNMENT 2

M.Sc. DEGREE EXAMINATION, MAY - 2020

(Second Year)

STATISTICS

Statistical Quality Control

MAXIMUM MARKS :30

ANSWER ALL QUESTIONS

Q1) a) Discuss about the producer's risk and consumer's risk with examples.

b) Explain OC curve of and R charts. Discuss the significance of joint study of and R charts.

Q2) a) Difference between single sampling plan and double sampling plan. Also derive OC and ASN functions for single sampling plan.

b) Write the procedure of Dodge and Roaming plans.

Q3) a) What is 6 concept ? Explain it's uses. Also write the principles of total equality management.

b) Explain continuous sampling and chain sampling plans.

Q14) a) Explain the approaches of variable sampling plans with a specified OC curve. Also describe MIL-STD1235b.

b) Explain the role of CSP-2 and CSP-3.

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Q1) a) Define O.R. Explain the significance of O.R. models.

b) Find the optimum solution of the following LPP Minimize $C : 100x_1 + 200x_2$
subject to $x_1 + x_2$ 40, $3x_1 + x_2$ 60, $x_1 + 6x_2$ 60 and x_1, x_2 0 .

Q2) a) Define slack and surplus variables as involved in the L.P.P, How are these variables useful insolving LPP.

b) Solve the using Big - M method the following LPP.
Max $z = -2x_1 - x_2$, subject to $3x_1 + x_2 = 3$, $4x_1 + 3x_2$ 6, $x_1 + 2x_2$ 4 and x_1, x_2 0.

Q3) a) Explain and solve an inventory model with instantaneous discrete random demand with no set - up cost.

b) The annual demand for an item is 3200 units. The unit cost is Rs. 6 and inventory carrying charges 25% for annum. It the cost of one procurement is Rs. 150. Determine (i) EOQ,(ii) No. of order per year (iii) Time between two consecutive order (iv) The optional cost.

Q4) a) Discuss the replacement procedure for items that deteriorate with time.

b) A firm is considering replacement of a machine cost price is Rs. 12,200 and the scrap value is Rs. 200. The maintenance cost an found from experience to the as follows.
year   1   2   3   4   5   6   7   8
Main cost   200 500   800 1200   1800 2500 3200 4000

Q5) a) Explain Minimax, Maximim principle for mixed strategy game.

b) Use dominance principle to reduce the following games to 22 games and hence solve,

ASSIGNMENT 2

M.Sc. DEGREE EXAMINATION, MAY - 2020

(Second Year)

STATISTICS

Operations Research

MAXIMUM MARKS :30

ANSWER ALL QUESTIONS

Q1) a) Explain the difference between pure strategy and mixed strategy.

b) Solve the following game by linear programming approach.

Q2) a) What is Queueing problem ? Explain queueing system, transient and study state.

b) The mean arrival rate to a service center is 3 per hour. The mean service time is found to be 10 min per service. Assuming poisson arrival and exponential service time, find (i) probability of two units in the system. (ii) Expected no. of units in the queue. (iii) Expected time in minutes that customer has to spend in the system.

Q3) a) The mean rate of arrival of planes at an airport during the peak period in 20 hour, but the actual number of arrivals in any hour follows a poisson distribution with the respective averages. When there is congestion, the planes are forced to fly over the field in the stack awaiting the landing of other plans that arrived earlier.

   (i) How many planes would be flying over the field in the stack on an average in good weather are in bad weather?

   (ii) How long a plane would be in the stack and in the process of landing in good and in bad weather.

   (iii) How much stack and landing time to allow so that priority to land out of order would have to be requested only one time in twenty?

b) Show that the distribution of the number of births up to time T in a simple birth process follows the Poisson law.

Q4) a) Distinguish between slack and float.

b) The following are the manpower requirements for each activity in a project.

Activity	1-2	1-3	2-4	2-6	3-4	4-5	4-6	5-7	6-7	7-8
Normal time(days)	10	11	13	14	10	7	17	13	9	1

Man power
| required per day | 2 | 3 | 4 | 3 | 1 | 3 | 3 | 5 | 8 | 11 |

    (i)   Draw the net work and find out total float and free float for each activity.

    (ii)   The contractor stipulates that during the first 26 days only 4 to 5 men and during the remaining days 8 to 11 men only can be made available. Rearrange the activities suitably for levelling the manpower resources statisfying the above conditions.

Q5) a)   Distinguish between resource levelling and   resource smoothing.

    b)   Following are the activities of a project.

Activity	A	B	C	D	E	F	G	H	I
Proceeding-	-	A	A	C	D	B	E,F	G	
Q	4	1	6	2	5	3	3	1	4
m	7	5	12	5	11	6	9	4	19
b	16	15	30	8	17	15	27	7	28

    (i)   Draw the network diagram.

    (ii)   Find out critical path and project duration.

    (iii)   If project manager wishes to be 99% sure that the project is completed on 30th march, 2017, when should he start the project work

ASSIGNMENT 1

M.Sc. DEGREE EXAMINATION, MAY – 2020

(Second Year)

STATISTICS

Econometrics

MAXIMUM MARKS :30

ANSWER ALL QUESTIONS

Q1) a) Define simple regression analysis ? Explain its practical applications.

b) Explain log linear, semi - log and reciprocal modules.

Q2) a) Develop a test statistic for testing the significance of the slop parameter.

b) Explain the properties of the least squares estimators.

Q3) a) Explain the instrumental variable estimation method in the GLM with stochastic regressors.

b) Explain OLS methods of estimation of an infinite distributed log model stating the necessary underlying assumptions.

Q4) a) Explain the properties of OLS estimation and Gauss-Markov theorem.

b) Define R and R^{-2}. Explain the importance of these in the model.

Q5) a) Explain the role of dummy variables in regression models.

b) Explain Chow -Test procedure.

ASSIGNMENT 2

M.Sc. DEGREE EXAMINATION, MAY – 2020

(Second Year)

STATISTICS

Econometrics

MAXIMUM MARKS :30

ANSWER ALL QUESTIONS

Q1) a) Develop a test procedure for testing the general linear hypothesis.

b) Explain about the restricted least squares.

Q2) a) Explain the concept of Heteroscedasticity along with its remedies.

b) What are the assumptions of generalized least squares method.

Q3) a) Describe Goldfield - Glauber test for detection of heteroscedasticity.

b) Describe an estimation method of GLM under heteroscedasticity error terms.

Q4) a) Explain various estimation methods of the regression model under auto-correlation.

b) Define the term Autocorrelation and clearly explain various sources and consequences in   estimating parameters of a given model.

Q5) a) Explain about PROBIT model. How do you estimate the model.

b) Explain Durbin-Watson test for detection of auto - correlation in a regression model and discuss the limitations of the test.

Q1) a)   What is multivariate normal distribution?Explain its properties.

b)   Explain stochastic independence of random   vectors.

Q2) a)   State and prove a necessary and sufficient conditions for one set of random variables and subset consisting of the remaining variables in a P- Variate normal to be independent.

b)   Discuss the sampling form multivariate normal distribution and m.l.e.

Q3) a)   Develop a test statistic for testing the hypothesis that the mean vector is a given vector. Obtain the confidence region for the mean vector.

b)   Derive the null distribution of Hotelling T^2 statistic.

Q4) a)   Evaluate T^2, for testing $H_0 :$ = [3,9] using the data X =

b)   Explain the procedure of MANOVA for one-way classification.

Q5) a)   Explain the concept of factor analysis in detail.

b)   Explain oblique rotation and orthogonal rotation of factors.

ASSIGNMENT 2

M.Sc. DEGREE EXAMINATION, MAY - 2020

(Second Year)

STATISTICS

Multivariate Analysis

MAXIMUM MARKS :30

ANSWER ALL QUESTIONS

Q1) a) State and prove the properties of principle components.

b) What is the principle component? Explain.

Q2) a) What is the discriment analysis? Explain how it is different from factor analysis.

b) Explain Fisher's method for discrimination among several populations.

Q3) a) If B is defined as c for same constant e, verify that e = C is infact an ingen vector of B, where is an covariance matrix.

b) Explain the classification between two multivariate normal distributions.

Q4) a) Explain single linkage, complete linkage and average linkage methods.

b) Discuss about the cluster analysis and similarity measures.

Q5) a) Explain the K- means method in non- hierarchical.

b) Explain the Hierarchical concept of cluster analysis.

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