R-16

Code:3115

Faculty of Sciences

B.Sc. (Statistics) III-Year, CBCS-V Semester Examinations, 2018-19

Paper –V (Sampling Theory, Time Series, Index Numbers and Demand Analysis)

Time: 3 Hours: Max Marks: 60

Section –A

I. Answer any three of the following questions. (3 X 5=15 Marks)

1. Explain Sampling and Non-Sampling Errors.
2. In SRSWOR, prove that Sample mean is an unbiased estimate of population mean.
3. Explain the method of Proportional allocation and Optimum allocation.
4. Explain the additive and multiplicative model of time series.
5. Explain Pareto's law of Income distribution.
6. Fisher's Index Number is Ideal Index Number. Explain?

Section –B

II. Answer the following questions. (3 X 15= 45 Marks)

7. (a) (i) In SRSWOR the sample mean square is an unbiased estimate of the population Mean square.
   (ii) Explain Lottery method of randomization.

(OR)

(b) Derive variances of sample mean under SRSWOR and SRSWR and show that $V(\bar{y}_n)_{WOR} \leq V(y_n)_{WR}$

8. (a) Compare the efficiency of systematic sampling with that of simple Random sampling procedure of Populations with linear trend.

(OR)

(b) (i) Define the Time Series and Explain the various components of Time series.

(ii) Fit a Straight line trend by the method of least squares to the following data and estimate the sales for the year 1984.

Year	1976	1977	1978	1979	1980	1981	1982	1983
Sales	380	400	650	720	690	600	870	930

9. (a) (i) Define price elasticity's of Demand and Supply. Explain Leontief's method of estimating Demand function from Time series data.
   (ii) If the Demand function is $p= 5-3x^2$ for what value of x the elasticity of Demand is unity.

(OR)

(b) (i) Define Index Numbers and explain what are the problems involved in the construction of Index Numbers.
   (ii) Define Cost of Living Index numbers and write its 3 uses.

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R-16

Code:3115E1

Faculty of Sciences

B.Sc. (Statistics) III-Year, CBCS-V Semester Examinations, 2018-19

Paper –VI A - (Statistical Quality Control and Reliability)

Time: 3 Hours: Max Marks: 60

Section –A

I. Answer any three of the following questions. (3 X 5=15 Marks)

1. Explain i) Assignable causes of variation ii) Chance causes of variation.
2. Explain in detail construction of Standard Deviation chart.
3. Process capability index.
4. What are Specification limits and tolerance limits?
5. Explain the concept of AQL and LTPD.
6. Explain Hazard Rate Function.

Section –B

II Answer the following questions. (3 X 15= 45 Marks)

7. (a) (i) What is statistical Quality Control ? Explain the **3-σ** Control limits.

   (ii) Name the two most common charts coming under the category of control Charts for variables and explain the procedure for contraction of such charts.

   (OR)

   (b) (i) Distinguish between control charts of Variables and control charts for Attributes.
   (ii) Explain the contraction of P-Chart.

8. (a) Distinguish between defect and defective. Explain the construction of C-Chart for fixed sample size. Write the various applications of C-Chart

   (OR)

   (b) (i) Explain the construction C-chart with varying sample sizes (u-chart).
   (ii) The following table shows the number of missing rivets observed at the time of 15 Aircrafts. Find the control limits for number of defects chart and Comment on the state of control.

Air Craft No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
No. of Missing Rivites	7	12	3	20	21	5	4	l3	10	8	0	9	6	7	20

9. (a) (i) What is Acceptance Sampling Plan? Write the merits and demerits of Acceptance Sampling Plans
   (ii) Explain double sampling plan. Obtain O.C.curve for this plan.

   (OR)

   (b) (i) What is Reliability? Explain Memory less property in reliability system.
   (ii) Explain Reliability of parallel system.

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