Faculty of Science

B.Sc (Electronics) III-Year, CBCS –V Semester

Backlog Examinations –June/July, 2022

PAPER: Applied Statistics-I

Time: 3 Hours   Max Marks: 80

Section-A

I. Answer any *eight* of the following   (8x4=32 Marks)
1. Explain Sampling and Non-Sampling Errors.
2. Explain Census survey versus Sample survey.
3. Derive the variance of sample mean under SRSWOR.
4. Find the Efficiency of Systematic sampling over Simple random sampling.
5. Prove that Variance of the Systematic sample mean is given by
   $$V(y_{sys}) = S^2_{wst} \, (k-1)/nk \, [\, 1+(n-1)\rho_{wst} \,]$$
6. A population of size 800 is divided in to 3 strata their sizes & Std. Deviations are given below.

Stata	I	II	III
Size	200	300	300
S.D.	6	8	12

   A Stratified random sample of size 120 is to be drawn from population. Determine the sizes of samples from the three strata in case of (i) Proportional Allocation (ii) Optimum Allocation.
7. Explain the additive and multiplicative models in Time series.
8. Explain measurement of Trend by Graphical method.
9. Fitting of modified exponential curve.
10. Explain statistical basis of Schwartz Control charts.
11. Explain the statistical basis and construction of np – Chart.
12. Explain 3-σ control limits.

Section-B

II. Answer the following   (4x12=48 Marks)
13.(a) Explain in detail the principal steps involved in a sample survey.
       (OR)
   (b) In SRSWOR the sample mean square is unbiased estimate of the population mean square. i.e, $E(s^2) = S^2$
14. (a) Comparison of variances Simple Random Sampling with Stratified random sampling under Proportional allocation and Optimum allocation.
       (OR)
   (b) Compare the efficiency of systematic sampling with that of simple random Sampling Procedure of Populations with linear trend.
15. (a) (i) Define Time series and explain the various components of Time series.
       (ii) Fit a Straight-line trend by the method of least squares.

Year	1993	1994	1995	1996	1997
Sales	25	46	69	60	30

       (OR)
   (b) Explain the measurement of seasonal variations by Ratio to trend method and Ratio to moving average method.
16. (a) (i) Defining SQC and discuss the role of 4 M's in SQC.
       b (ii) Explain the procedure for the construction of R-Chart.
       (OR)
   (b) (i) Distinguish between control charts for variables and control charts for attributes.
       (ii) Explain the construction of C-Chart for fixed and variable sample sizes.

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Faculty of Science

B.Sc (Statistics) III-Year, CBCS –V Semester Regular Examinations –Jan, 2023

PAPER: Applied Statistics-I

Time: 3 Hours   Max Marks: 80

Section-A

I. Answer any *eight* of the following questions   (8x4=32 Marks)
   1. Explain Sampling and Non-Sampling Errors.
   2. Discuss the advantages and disadvantages of sampling.
   3. Explain mixed sampling methods.
   4. Explain method of Optimum allocation.
   5. Find the Efficiency of Systematic sampling over Simple random sampling.
   6. Find the Variance of the Sample Mean in Stratified Random Sampling.
   7. Explain Time series and discuss its components.
   8. Explain Semi average method to measure trend.
   9. Explain Ratio to trend method to measure the seasonal variations.
   10. Explain statistical basis of Schwartz Control charts.
   11. Explain the construction of Mean chart.
   12. Define process control and product control with examples.

Section-B

II. Answer the following questions   (4x12=48 Marks)
   13.(a) Elaborate Census survey versus Sample survey in detail.

   (OR)

   (b) In simple random sampling with replacement, estimate population proportion. Extract its variance.

   14.(a) If the population of consists of a linear trend, $Y_i = i$; $i = 1, 2, …, k$, then prove that

   $$V(\bar{y}_{st}) \leq V(\bar{y}_{sys}) \leq V(\bar{y}_n)_R$$

   (OR)

   (b) Compare Simple Random Sampling with Stratified random sampling in detail.

   15.(a) Explain the various models of Time series.

   (OR)

   (b) Fit a second degree parabola trend by the method of least squares to the following data.

Years	2005	2006	2007	2008	2009
Sales('000)	10	12	14	10	8

   16.(a) (i) Defining SQC and discuss the role of 4 M's in SQC.
           (ii) Explain the procedure for the construction of R-Chart

   (OR)

   (b) Explain the construction of C-Chart for fixed and variable sample sizes.

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Faculty of Science

B.Sc (Statistics) III-Year, CBCS –V Semester Backlog Examinations –June, 2023

PAPER: Applied Statistics - I

Time: 3 Hours   Max Marks: 80

Section-A

I. Answer any *eight* of the following questions   (8x4=32 Marks)
1. Explain the concept of mixed sampling
2. Explain the sources of non-sampling errors
3. Explain the lottery method of drawing simple random samples
4. Define the advantages and disadvantages of stratified random sampling
5. Explain the optimum allocation
6. Suppose N=12, K=3 and n=4 Draw the linear systematic samples
7. Explain the importance of time series
8. Explain the semi-average method in estimating trend values
9. Explain how you fit modified exponential curve
10. Explain the concept of 3σ-control limits
11. Define fraction defective and write the control limits for p-chart with varying n
12. Explain the applications of c- chart

Section-B

II. Answer the following questions   (4x12=48 Marks)
13.(a) Define sampling and explain the principle steps in conducting sample survey

(OR)

(b) Under SRSWOR show that $E(s^2) = S^2$

14.(a) Define systematic sampling, Explain its advantages and Disadvantages

(OR)

(b) When population is linear Show that $\mathbf{V_{st}} \le \mathbf{V_{sys}} \le \mathbf{V_{ran}}$

15.(a) Define Time series and explain its components in detail

(OR)

(b) Explain the ratio to trend method to find the seasonal variations

16.(a) Define Quality and Explain the statistical basis for control charts

(OR)

(b) Define variable control charts and derive the control limits for $\bar{x}$ and R chatrs

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Faculty of Science
B.Sc (Statistics) III-Year, CBCS –V Semester Backlog Examinations –June, 2023
(for data science students only)
PAPER: Analytical Statistics-I

Time: 3 Hours

Max Marks: 80

Section-A

I. Answer any *eight* of the following questions   (8x4=32 Marks)
  1. Define Sampling and Non-Sampling errors.
  2. Define Lottery method to draw a simple random sample.
  3. Define Proportional and Optimum allocations.
  4. What is Time Series? Give two examples.
  5. Explain multiplicative time series model.
  6. Explain the procedure for fitting of modified exponential curve.
  7. Write short notes for construction of control chart for Range.
  8. Define Assignable causes and Random causes.
  9. Write down the applications of C-chart.
  10. Define Replication, Local control.
  11. Define L.S.D. Give its layout.
  12. What are the assumptions of ANOVA.

Section-B

II. Answer the following questions   (4x12=48 Marks)
  13.(a) Prove that in SRSWR the sample mean is an unbiased estimator of the population mean and sample mean square is an unbiased estimator of population mean square.

(OR)

  (b) Explain Systematic Sampling.

  14.(a) How to fit Logistics curves. Explain.

(OR)

  (b) Explain Link Relative Method. Give its importance.

  15.(a) Give detail explanation of construction of control charts for variables.

(OR)

  (b) Explain how to construct np-chart in details.

  16.(a) Explain Two-Way ANOVA in detail.

(OR)

  (b) Compare and contrast RBD over CRD.

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