

AP-499

- (q) State the principles of stratification in stratified random sampling. Obtain unbiased estimate of population mean under it. 6

12. (a) Discuss systematic sampling with schematic diagram. 4

- (b) Obtain variance of unbiased estimate of population mean under systematic sampling. 4

- (c) Explain the concept of cluster sampling with equal cluster size. 4

OR

13. (p) Explain, how will you select a sample of size n from systematic sampling. 4

- (q) Obtain variance of unbiased estimate of population mean under systematic sampling for a linear trend population. 4

- (r) Show that sample mean provides unbiased estimate of population mean under cluster sampling. 4

B.Sc. Part—III (Semester—V) Examination

5S : STATISTICS

Time : Three Hours]

[Maximum Marks : 80

Note :— ALL questions are compulsory.

1. (A) Fill in the blanks : 2

- (i) Variation due to assignable causes is termed as _____.

- (ii) Ratio of marginal utilities is equal to the ratio of _____.

- (iii) Total number of units in the sample is called _____.

- (iv) _____ allocation is more precise than proportional allocation.

- (B) Choose the correct alternatives (MCQ) : 2

- (i) Marginal utility is :

(a) increasing

(b) diminishing

- (c) constant
- (d) none of these
- (ii) Probability of rejecting a lot of quality $\bar{P}$ is :
- (a) Consumer's risk
- (b) Producer's risk
- (c) AQL
- (d) ASN
- (iii) Simple random sampling is :
- (a) Judgement sampling
- (b) Probability sampling
- (c) Non-probability sampling
- (d) None of these
- (iv) Total number of possible samples of size n drawn from a population of size N in SRSWR is :
- (a) $N \times n$
- (b) N^n
- (c) n^N
- (d) $N + n$

- (ii) SRSWR. 4
- (b) Discuss the principal steps in sample surveys. 4
- (c) Obtain variance of unbiased estimate of population mean under SRSWOR. 4

OR

9. (p) Explain the concept of 'census survey' and 'sample survey'. 4
- (q) How will you draw a simple random sample by using random number table ? Explain. 4
- (r) Obtain variance of unbiased estimate of population mean under SRSWR. 4
10. (a) Explain the concept of stratified random sampling. Obtain variance of unbiased estimate of population mean under it. 6
- (b) Discuss the concept of 'Proportional allocation' in stratified random sampling. Determine strata sample size n_i under proportional allocation. 6

OR

11. (p) Compare Neyman's allocation of stratified random sampling over SRSWOR. Interpret the result. 6

(C) Answer in one sentence :

4

- (i) Express population size N as a product of two positive integers in systematic sampling.
 - (ii) State sample size under proportional allocation of stratified random sampling.
 - (iii) Define OC curve
 - (iv) State natural tolerance limits.
2. (a) Explain 'assignable causes' and 'chance causes' of variation. 4
- (b) Obtain $3\text{-}\sigma$ control limits for $\bar{X}$ chart in SQC. 4
- (c) Discuss in brief 'statistical quality control'. 4

OR

3. (p) What do you mean by 'process control' and 'product control' in SQC ? 4
- (q) Obtain $3\text{-}\sigma$ control limits for p-chart. 4
- (r) Explain outline of general control chart. 4
4. (a) Define :
- (i) Consumer's risk
 - (ii) Producer's risk. 4
- (b) Explain single sampling plan. 4

- (c) Discuss OC curve in sampling plan. 4

OR

5. (p) Define :

(i) AOQ

(ii) AOQL. 4

- (q) Discuss double sampling plan. 4

- (r) State advantages of acceptance sampling by attributes. 4

6. (a) Explain cardinal approach to utility in theory of consumer behaviour problem. 6

- (b) Define :

(i) Complementary commodities

(ii) Competitive commodities

(iii) Income elasticities. 6

OR

7. (p) Explain partial elasticities and cross elasticities of demand. 6

- (q) Explain Pareto's law of income distribution in detail. 6

8. (a) Define :

(i) SRSWOR and