AS–1459

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

STATISTICS

Time : Three Hours] [Maximum Marks : 80

Note :— All questions are compulsory.

1. (A) Fill in the blanks :

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

(ii) Neyman's Allocation is also known as _____.

(iii) UCL and LCL are drawn as _____ lines.

(iv) Marginal utility is always in _____ order. 2

(B) Choose the correct alternatives (MCQ) :

(i) The number of individuals in a sub group is called :

(a) Cluster size (b) Population size

(c) Sample size (d) Stratum size

(ii) Rejecting a lot with good quality is called :

(a) Producer's risk (b) Consumer risk

(c) AOQ (d) LTPD

(iii) $\bar{x}$ and R-charts are used to find out :

(a) Cost control (b) Process control

(c) Production control (d) Material control

(iv) In SRSWOR, the sampling unit may be included in the sample :

(a) Only once (b) Only twice

(c) More than one (d) None of the above 2

(C) Answer the following in **one** sentence :

(i) Define Simple Random Sampling.

(ii) Define sampling frame.

(iii) What do you mean by Marginal Utility ?

(iv) Write down the name of control charts for variables. 4

2. (A) Explain the terms :

(i) Process control

(ii) Product control. 4

(B) Obtain 3-sigma limit for $\bar{x}$ – chart. 4

(C) State general outline of control charts. 4

OR

3. (P) Explain the construction of np-chart. 4

(Q) Explain the causes of variation. 4

(R) State applications of c-chart. 4

4. (A) What do you mean by Acceptance Sampling Plan ? Also define :

(i) Producer's risk

(ii) Consumer's risk. 6

(B) Explain double sampling plan. 6

OR

5. (P) Explain the following terms :

(i) ASN

(ii) AOQL

(iii) AQL. 6

(Q) Describe single sampling plan with O.C. function. 6

6. (A) What do you mean by indifference curve ? 4

(B) Explain the theory of consumer behaviour. 4

(C) Explain total utility and marginal utility. 4

OR

7. (P) Explain utility function. 4

(Q) What do you mean by Partial elasticity of demand ? 4

(R) Explain cardinal and ordinal approach to utility. 4

8. (A) Discuss sampling and non-sampling errors. 4

(B) Show that sample mean is unbiased estimate of population mean under SRSWOR. 4

(C) Distinguish between SRSWOR and SRSWR. 4

OR

9. (P) Explain the concept of census survey and sample survey. 4

(Q) Obtain various of unbiased estimate of population mean under SRSWOR. 4

(R) Define :

(i) SRSWOR

(ii) SRSWR. 4

10. (A) Explain the concept of stratified random $(\bar{y}_w)_{st}$ sampling and prove that sample mean is an unbiased estimator of population mean $\bar{y}_N$. 6

(B) Obtain variance of unbiased estimate of population mean under stratified random sampling. 6

OR

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

(Q) Explain in detail allocation of sample sizes under proportional allocation and Neyman's allocation of stratified sampling. 6

12. (A) Define systematic sampling with diagram. 4

(B) Define cluster sampling and obtain its mean. 4

(C) Prove that :

$$V(\bar{Y}_{sys}) = \frac{N-1}{N} s^2 - \frac{(n-1)}{n} s^2_{wsy}$$

where, $s^2_{wsy} = \frac{1}{k(n-1)} \sum\sum (y_{ij} - \bar{y}_i)^2$ is the mean square with the same systematic sample. 4

OR

13. (P) State merits and demerits of systematic sampling. 4

(Q) In cluster sampling, prove that :

$$v(\bar{\bar{y}}) = \frac{N-n}{N-n} s^2_b,$$

where notations have their usual meanings. 4

(R) Give advantages and disadvantages of cluster sampling. 4