B.Sc. Part–III Semester–V Examination
55 : STATISTICS

Time : Three Hours] [Maximum Marks : 80

N.B.:—All questions are compulsory.

1. (a) Fill in the blanks :

(i) Variations due to _____ causes are inevitable in any production process.

(ii) Every consumer wants to _____ utility.

(iii) In SRSWOR, sample mean is an _____ estimator of population mean.

(iv) Division of population into no. of blocks is called _____. 2

(b) Choose the correct alternative (MCQ) :

(i) In a sampling plan, N indicates :

(a) Sample Size (b) Lot size

(c) Rejection number (d) Acceptance number

(ii) The producer's risk is normally denoted by :

(a) ρ (b) α

(c) β (d) δ

(iii) Selected units are returned back to population in the method :

(a) SRSWR (b) Stratified Sampling

(c) Systematic (d) SRSWOR

(iv) In stratified random sampling each stratum is internally :

(a) Heterogeneous (b) Homogeneous

(c) Partially homogeneous (d) Mixed 2

(c) Answer in **ONE** sentence :

(i) What do you mean by LTPD ?

(ii) Define marginal utility.

(iii) What is a sample ?

(iv) What do you mean by stratification ? 4

2. (A) What is a Control Chart ? Discuss the role of Control Charts in manufacturing process. 4

(B) Explain clearly, the basis and working of control charts for mean and range. 4

(C) Distinguish between process control and product control. 4

OR

3. (P) Explain the two causes of variation in statistical quality control. 4

(Q) Explain the justification for using 3-σ control limits in SQC. 4

(R) Explain construction of C-Chart. 4

4. (A) What do you understand by acceptance sampling procedure ? Define Consumer's and Producer's risk. 6

(B) Explain single sampling plan. Obtain probability of acceptance in single sampling plan. 6

OR

5. (P) Define the following terms :

(i) AOQ

(ii) LTPD

(iii) ASN 6

(Q) Describe the double sampling plan. 6

6. (A) Explain the concept of utility as given by Alfred Marshall. 4

(B) Marginal utility is diminishing, explain with example. 4

(C) Describe the indifference curve approach. 4

OR

7. (P) State the criticism in utility approach. 4

(Q) Define competitive goods and complementary goods. 4

(R) Define the condition of consumer's equilibrium. 4

8. (A) What do you mean by sampling units and sampling frame ? 4

(B) Give the advantages of sample survey over census survey. 4

(C) Show that in SRSWOR,

$$V(Yn) = \left(\frac{N - n}{N \cdot n}\right) s^2$$, where notations have their usual meanings. 4

OR

9. (P) Define :

(i) Population

(ii) Sample 4

(Q) Give the limitations of sampling. 4

(R) Show that in SRSWOR, sample mean square is an unbiased estimator of population mean square. 4

10. (A) Explain the procedure of stratified random sampling with an example. 6

(B) What do you mean by proportional allocation ? Compare stratified sampling with proportional allocation with SRSWOR. 6

OR

11. (P) Explain the concept of stratified random sampling and give its advantages. 6

(Q) Obtain an estimate of population mean and its variance in stratified random sampling. 6

12. (A) Explain the procedure of systematic sampling with example. 4

(B) Compare systematic sampling with SRSWOR. 4

(C) Obtain the sampling variance in case of cluster sampling. 4

OR

13. (P) Obtain sampling variance of mean in systematic sampling. 4

(Q) Compare systematic sampling with stratified random sampling. 4

(R) Define cluster. Show that in cluster sampling, sample mean provides an unbiased estimate of population mean. 4