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 :

(i) In process control quality of product can be obtained by _____ charts.

(ii) Worst level of quality that consumer can tolerate is called _____.

(iii) The procedure of partitioning in a given population into homogeneous groups is called _____.

(iv) The optimum allocation method is given by _____. 2

(B) Choose correct alternative from the following :

(i) Generally control charts are classified in two types which are :

(a) Single and double (b) Variable and attribute

(c) Mean and range (d) Defective and non-defective

(ii) Indifference curves slope downward towards :

(a) Left (b) Upward

(c) Downward (d) Right

(iii) In _____ sampling every member of a population has an equal chance of being included in a sample :

(a) Purposive (b) Quota

(c) Random (d) Mixed

(iv) The graphical representation of probability of acceptance of a lot and variation in quality is given by :

(a) ASN curve (b) ATI curve

(c) AOQL curve (d) OC curve 2

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

(i) Which charts are used to deals with variables ?

(ii) What is frame in sampling ?

(iii) Which sampling method is used to select the name of consumers from available phone list ?

(iv) What is called the sample size ? 4

2. (A) Explain the need of SQC in industries. 4

(B) Explain variation occurs in product or process control. 4

(C) Obtain 3σ control limits for $\bar{X}$ chart. 4

OR

3. (P) What do you mean by "process control" and "product control" in SQC ? 4

(Q) Explain 3σ limits in SQC. 4

(R) Explain outline of general control chart. 4

4. (A) Explain the following :

(i) AOQL

(ii) ASN

(iii) LTPD. 6

(B) Explain single sampling plan and OC function. 6

OR

5. (P) Define :

(i) Producer's risk

(ii) Consumer's risk

(iii) Average sample number. 6

(Q) Differentiate between single and double sampling plan. 6

6. (A) Discuss the theory of consumer behaviour and its importance. 4

(B) Define partial elasticity and cross elasticity. 4

(C) Define ordinal utility and cardinal utility. 4

OR

7. (P) Define total utility and marginal utility. 4

(Q) Explain indifference curve with example. 4

(R) Define partial elasticity and cross elasticity. 4

8. (A) Explain the difference between SRSWR and SRSWOR. 4

(B) Show that in SRS each element has an equal probability of being selected in a sample from population. 4

(C) Obtain the variance of unbiased estimate of population mean under SRSWOR. 4

OR

9. (P) Explain the procedure of selecting sample by using random number table. 4

(Q) Discuss the principle steps in sample survey. 4

(R) Explain sampling errors and non-sampling errors. 4

10. (A) Explain the concept of stratified random sampling and obtain variance of sample mean. 6

(B) Compare Neyman's allocation of stratified random sampling over SRSWOR and interpret the result. 6

OR

11. (P) Explain the concept of proportional allocation in stratified random sampling and determine strata sample size n_i under proportional allocation. 6

(Q) Explain the principle advantages of stratification and prove that the greater is the difference in stratum the greater is the gain in efficiency of stratified sampling with proportional allocation over unstratified random sampling. 6

12. (A) Explain systematic sampling with illustrative example. 4

(B) Show that sample mean is an unbiased estimate of population mean under cluster sampling. 4

(C) State application of cluster sampling. 4

OR

13. (P) Compare systematic and cluster sampling. 4

(Q) Obtain an unbiased estimate of population mean in systematic sampling. 4

(R) Explain cluster sampling with advantages. 4