2022

B.A./B.Sc.

Fourth Semester

CORE – 10

STATISTICS

Course Code: STC 4.31

(Statistical Quality Control)

Total Mark: 70 *Pass Mark: 28*

Time: 3 hours

Answer five *questions, taking* one *from each unit.*

UNIT–I

1. (a) Define what is meant by "quality". What are the factors controlling the quality of design? 7
   (b) Write a notes on the benefits of statistical quality control. 7

2. (a) What is statistical process control? Discuss about the seven point tools of statistical process control. 2+6=8
   (b) What is ISO? Mention the outstanding features of ISO: 9000 series of standards. 2+4=6

UNIT–II

3. (a) Explain what are chance and assignable causes of variation in the quality of manufactured product. 4
   (b) How do you set the control limits for R-chart in statistical quality control? 6
   (c) Explain control charts. 4

4. (a) Explain clearly the basis and working of control charts for mean and range. 8
   (b) Explain statistical basis of 3-σ control limits. 3
   (c) Set the control limits for σ-chart. 3

UNIT–III

5. (a) What are the main control charts for attributes? 2
   (b) How will you prepare the control charts for fraction defectives? 8
   (c) When should the control charts for number of defects be constructed? 4

6. (a) How can one decide the sample size for fraction defective charts (p-charts)? 3
   (b) Formulate control limits for c-chart. Give five situations in which c-chart can be used. 8
   (c) Give some comparison between control charts for variables and control charts for attributes. 3

UNIT–IV

7. (a) Write short notes on the following: 6
      (i) Acceptance quality level
      (ii) Lot tolerance percentage defective
      (iii) Average outgoing quality
      (iv) Product control
   (b) Define single sampling inspection plan with illustration. Find the OC, ATI and AOQ function of this plan. 8

8. (a) Write short notes on the following:
      (i) Process average fraction defective
      (ii) Consumer's risk
      (iii) Producer's risk
      (iii) Average amount of total inspection 6
   (b) Define double sampling inspection plan with illustration. Obtain the OC, ASN and ATI of double sampling inspection plan. 8

UNIT–V

9. (a) What do you understand by sequential sampling inspection plan? Describe the sequential probability ratio test (SPRT) with the procedure. 2+6=8

(b) Write a note on the OC of sequential sampling plan and find five points on the OC curve of sequential sampling plan. 5

(c) Writer the correct answer: 1

Sequential process terminates with probability

(a) 0.5 (b) 1

(c) 0 (d) –1

10. (a) Who proposed sequential sampling plan? What are p_0, p_1, α and β in sequential sampling plan? Write down the likelihood ratio function of sequential probability ratio test (SPRT). 1+2+2=5

(b) What is an ASN function? Write a note on ASN function of sequential sampling plan. Also obtain the five points on the ASN curve of sequential sampling plan. 2+3+3=8

(c) State whether *True* or *False*: 1

Sequential sampling requires less inspection of items compared to single and double sampling plan.
