AD-136

April-2023

B.Sc., Sem.-VI

309 : Statistics

(Statistical Quality Control)

Time : 2.30 Hours]   **[Max. Marks : 70**

1. Write the following :   **14**

   (i) Write a note on theory of runs. Discuss its application in detecting lack of control.

   (ii) What do you understand by Statistical Quality Control ? Point out its usefulness in industries.

   OR

   (i) Explain different types of causes of variation in quality control along with some illustrations.   **14**

   (ii) Explain control, specification and tolerance limits with suitable illustration.

2. Write the following :   **14**

   (i) Describe the construction and uses of $\overline{X}$ and R chart.

   (ii) Describe an Operating Characteristic curve of a control chart.

   OR

   (i) Explain in brief construction of 3σ-limits for U Chart.   **14**

   (ii) Explain in brief construction and use of p-chart and np-chart.

3. Write the following :   **14**

   (i) Explain acceptance sampling plans for attributes. Discuss its advantages and dis-advantages.

   (ii) Explain in detail (a) AQL, (b) LTPD, (c) Producer's Risk, (d) Consumer's Risk, (e) AOQ.

   OR

   (i) Explain double sampling inspection plan. Define OC, AOQ for double sampling plan.   **14**

   (ii) Explain ideal OC curve in detail. State various properties of OC curve.

4. Write the following :   **14**
    (i) Explain acceptance sampling plans for variables. Discuss its advantages and disadvantages.
    (ii) Derive a sampling plan for variables when the upper specification limit (U) is known and the lot standard deviation(σ) is unknown.

                                        OR
    (i) Explain the difference between acceptance sampling plans for attributes and variables.   **14**
    (ii) Derive a sampling plan for variables when the upper specification limit (L) is known and the lot standard deviation (σ) is known.

5. Attempt any **seven** out of **twelve** :   **14**
    (i)   Under what situation we use modified control limits ?
    (ii)   State the control limits for c-chart when the subgroup size is not constant,
    (iii) Which distribution is used in single sampling plan ?
    (iv)   What do you mean by defect and defective ?
    (v)   Give some examples of Chance and Assignable causes,
    (vi)   Give general 3σ limits,
    (vii) What is sequential sampling plan ?
    (viii) What is the formula for probability of acceptance using binomial distribution for OC curve ?
    (ix)   Define ASN.
    (x)   How can you find P_a, when the values of AOQ, α and β are specified ?
    (xi)   When the sample size is 4, what will be the LCL for .R-chart ?
    (xii) p and np charts are based on which distribution ?

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