SK-120

September-2020

B.Sc., Sem.-VI

CC-309 : Statistics
Statistical Quality Control
(Old Syllabus)

Time : 2 Hours] [**Max. Marks : 50**

Instructions : (1) All Questions in **Section I** carry equal marks.
(2) Attempt any **THREE** questions in **Section I**.
(3) Question 9 in **Section II** is **COMPULSORY**.

Section – I

1. (A) What is SQC ? State its uses. 7

   (B) Write a short note on "Theory of Runs". 7

2. (A) Discuss the causes of variations in a production process. 7

   (B) Explain the concept of 3σ limits in SQC. 7

3. (A) Differentiate between variable charts and attribute charts. 7

   (B) State the main objectives of drawing $\overline{X}$ and R chart. Also explain what conclusions you draw from both the charts. 7

4. (A) Draw the appropriate chart for the following data and give your conclusions. 7

Sample No.	1	2	3	4	5	6	7	8	9	10
$\overline{X}$	12.8	13.1	13.5	12.9	13.2	14.1	12.1	15.5	13.9	14.2
R	2.1	3.1	3.9	2.1	1.9	3.0	2.5	2.8	2.5	2.0

   [Take n = 5, $A_2 = 0.577$, $D_3 = 0$, $D_4 = 2.115$]

   (B) Explain the construction of *p* and *np* charts. Also explain what conclusions you draw from both the charts. 7

5. (A) Define Acceptance Sampling. State its advantages. 7

   (B) Explain the single sampling plan in detail with the help of an example. 7

6.   (A)   Write a short note on Producer's Risk and Consumer's Risk.   **7**

     (B)   What is OC curve ? State its characteristics.   **7**

7.   (A)   Explain the difference between lot inspection and sample inspection.   **7**

     (B)   State the advantages of sampling inspection.   **7**

8.   (A)   Explain the sampling plan for variables when LCL is specified and σ is unknown.   **7**

     (B)   Explain the sampling plan for variables when UCL is specified and σ is known.   **7**

Section – II

9.   Attempt any **four**.   **8**

     (1)   Define Specification Limits.

     (2)   Define Rational Subgrouping in SQC.

     (3)   Define Low Spots in attribute charts.

     (4)   Define AOQ and AOQL.

     (5)   Define ATI.

     (6) $N = 1000$, $n = 80$ and $c = 2$. Explain the given single sampling plan.

     (7)   State the formula for sample size 'n' in sampling plan for variables when UCL is specified and σ is unknown.

     (8)   What do you mean by cost of inspection ?

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Section – I

1.   (A)   What is SQC ? State its uses.   **7**

    (B)   Write a short note on "Theory of Runs".   **7**

2.   (A)   Discuss the causes of variations in a production process.   **7**

    (B)   Explain the concept of 3σ limits in SQC.   **7**

3.   (A)   Differentiate between variable charts and attribute charts.   **7**

    (B)   State the main objectives of drawing $\overline{X}$ and R chart. Also explain what conclusions you draw from both the charts.   **7**

4.   (A)   Draw the appropriate chart for the following data and give your conclusions.   **7**

Sample No.	1	2	3	4	5	6	7	8	9	10
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       [Take n = 5, $A_2 = 0.577$, $D_3 = 0$, $D_4 = 2.115$]

    (B)   Explain the construction of *p* and *np* charts. Also explain what conclusions you draw from both the charts.   **7**

5.   (A)   Define Acceptance Sampling. State its advantages.   **7**

    (B)   Explain the single sampling plan in detail with the help of an example.   **7**

6. (A) Write a short note on Producer's Risk and Consumer's Risk. **7**

   (B) What is OC curve ? State its characteristics. **7**

7. (A) Explain the difference between lot inspection and sample inspection. **7**

   (B) State the advantages of sampling inspection. **7**

8. (A) What is Double Sampling Plan ? State its advantages. Explain the double sampling plan (2000, 50, 1, 100, 4) **7**

   (B) Explain the sampling plan for variables when LCL is specified, when σ is known and when σ is unknown. **7**

Section – II

9. Attempt any **four**. **8**

   (1) Who introduced control charts in SQC based upon the theory of random variations ?

   (2) Who was the pioneer of SQC in India ?

   (3) Define Low Spots in attribute charts.

   (4) Define ATI.

   (5) Define AQL.

   (6) State the formula for sample size 'n' in sampling plan for variables when UCL is specified and σ is unknown.

   (7) What do you mean by cost of inspection ?

   (8) State the formula for sample size 'n' in sampling plan for variables when LCL is specified and σ is known.

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