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Reg. No.

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V Semester B.Sc. Degree Examination, March/April - 2024

STATISTICS - VI

Statistical Quality Control and Statistical Inference - II

(NEP Scheme Freshers)

Paper : 6



Time : 2½ Hours

Maximum Marks : 60

Instructions to Candidates:

1. Answer any Five sub-divisions from Section A and Five questions from Section - B.
2. Scientific calculators are permitted.

SECTION - A

I. Answer any FIVE sub divisions from the following. (5×3=15)

1. a. What is statistical quality control (SQC)? State its benefits.
b. Distinguish between R and S charts. Why R - chart is preferred to S - Chart in SQC?
c. What are process capability and process capability ratio? Explain.
d. What is an ideal OC curve?
e. Define the terms : AQL, LTPD, AOQ.
f. Explain single sampling plan.
g. State MLR property of a probability distribution.
h. Show that the family of poisson $P(\lambda)$ distribution posses MLR property.
i. What is non - parametric test? Distinguish between Parametric and non - parametric tests.

SECTION - B

II. Answer any FIVE questions from the following. (5×9=45)

2. a. Explain the rationale behind the setting of control limits of a control chart.
b. Describe the steps involved in the construction of charts for mean and Range. (3+6)
3. a. Distinguish between defect and defective with examples.
b. Discuss the construction of stabilized p chart.
c. What is u-chart? Explain basis, construction and interpretation of u-chart. (2+3+4)

[P.T.O.]



4. a. Define producer's risk and obtain its expression for single sampling plan, stating the O.C. function for single sampling plan.
b. Derive expressions of AOQ and ATI functions of single sampling plan. (4+5)
 5. a. Obtain UMP test of level α for testing $H_0 : \theta \leq \theta_0$ against $H_1 : \theta > \theta_0$ in Bernoulli $B(1, \theta)$ distribution with mean θ based on a random sample of size n . Also obtain an expression for the power function.
b. Obtain UMP test of level α for testing $H_0 : \mu \leq \mu_0$ against $H_1 : \mu > \mu_0$ in $N(\mu, 1)$ family of distribution. (5+4)
 6. a. Explain Likelihood ratio test.
b. Derive likelihood ratio test for testing $H_0 : \mu = \mu_0$ against $H_1 : \mu \neq \mu_0$ in $N(\mu, \sigma^2)$ family (σ^2 is known). (2+7)
 7. a. Explain Kolmogorov - Smirnov test for two sample test.
b. Explain Wilcoxon signed rank test for one and paired samples. (4+5)
 8. a. Explain the test for independence based on Spearman's rank correlation coefficient.
b. Explain Median test. (4+5)
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