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CB – 176

IV Semester B.Sc. Examination, August/September 2023
(CBCS) (Repeaters) (2018 – 19 and Onwards)
STATISTICS
Paper – IV : Statistical Inference – II

Time : 3 Hours

Max. Marks : 70

Instructions : 1) Answer **any 10** sub-divisions from Section – **A** and any **five** questions from Section – **B**.
2) Scientific calculators are **allowed**.

SECTION – A

Answer **any 10** sub-divisions of the following :

(10×2=20)

1. a) Define alternative hypotheses.

   b) What do you mean by randomized test ?

   c) Write the test statistic for testing equality of proportions.

   d) Give the test statistic for equality of two means.

   e) State the assumptions involved in F-test.

   f) Write the expression for χ^2-test statistic used in testing independence of attributes in a (2 × 2) contingency table.

   g) In what way parametric test is different from non-parametric test ?

   h) Explain the test for randomness.

   i) Mention sign test statistic for one sample.

   j) Define runs. Find the number of runs from the following sequence :

   PPPFFPFFFFPFPP

   k) Write the test statistic used in Spearman's rank correlation coefficient in NP test.

   l) What is the need for sequential test ?

P.T.O.

SECTION – B

Answer **any five** questions from the following : (5×10=50)

2. a) Given the following function :

$$f(x, \theta) = \begin{cases} \dfrac{1}{\theta}, & 0 \le x \le \theta \\ 0, & \text{otherwise} \end{cases}$$

   Find the probabilities of type I and II errors and power of the test for testing the hypothesis $H_0 : \theta = 1$ Vs $H_1 : \theta = 2$, if the critical region is $X \le 0.5$.

   b) State Neyman Pearson lemma. (7+3)

3. a) The hypothesis $H_0 : \theta = 2$ is accepted against $H_1 : \theta = 5$ if $x \le 3$ when X has an exponential distribution with mean θ. Find type I and type II error probabilities of the test.

   b) Define most powerful test. (7+3)

4. a) Explain the test procedure for testing equality of means of two normal populations with equal variances.

   b) Explain the test procedure for testing $H_0 : P = P_0$ Vs $H_1 : P \ne P_0$ where P is the binomial population proportions. (5+5)

5. a) Explain the χ^2 test of goodness of fit.

   b) Discuss 'F' test for testing multiple correlation coefficient. (5+5)

6. a) Explain the χ^2 test of independence of attributes.

   b) Describe the test procedure for testing regression coefficient. (5+5)

7. a) Explain paired 't' test.

   b) Explain Yate's correlation. (5+5)

8. a) Describe Wilcoxon signed rank test for paired samples.

   b) Explain median test. (5+5)

9. a) Describe SPRT for testing $H_0 : \mu = \mu_0$ Vs $H_1 : \mu = \mu_1$ for $N(\mu, \sigma^2)$ distribution.

   b) Describe SPRT for testing n and p of B(n, p). (5+5)