Total number of printed pages-02

3(Sem-8/FYUGP)BNC(A)/DSCI

2025

STATISTICS

(Discipline Specific Core)

Paper Name: Statistical Inference-2

Paper Code: **STA-DSC-244**

Full Marks: 45

Time: Two Hours

(*The figures in the margin indicate full marks for the questions)*

1. Answer the following questions: 1x4=4

a) Critical region is also known as----------. **(Fill in the blank)**

b) Define type – I error.

c) State any one property of likelihood ratio test.

d) Non-parametric test does not make any assumption regarding the form of population. **(State true or false)**

2. Answer any three of the following questions: 2x3=6

a) Define simple and composite hypothesis with example.

b) What are the properties of good estimator?

c) Write the advantages of non-parametric methods over parametric methods.

d) Define Uniformly Most Powerful (UMP) test.

3. Answer any three of the following questions: 5x3=15

a) Differentiate between null and alternative hypothesis with an example.

b) State and prove Neyman Pearson lemma.

c) Describe briefly the method of moments for estimation.

d) Write a note on Kolmogorov-Smirnov test for one sample.

e) State and prove the invariance property of consistent estimator.

4. Answer any two of the following questions: 10x2=20

a) Explain the likelihood ratio test. Let x_1, x_2, x_3, ---------, x_n be a random sample from N (μ, σ^2), where σ^2 is known. Develop likelihood ratio test for H_0: $\mu = \mu_0$ against H_1: $\mu > \mu_0$. 4+6=10

b) State and prove Cramer-Rao inequality. Also mention the regularity conditions involved. 2+5+3=10

c) (i) Define a run. Mention the certain assumptions associated with non-parametric test. 2+3=5

(ii) Write a note on sign test for sample. 5

****