

**2021**

**STATISTICS — HONOURS**

**Paper : CC-11**

**(Statistical Inference - II)**

**Full Marks : 50**

*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words  
as far as practicable.*

1. Answer **any five** questions : 2×5
- (a) State De-Moivre Laplace Central Limit Theorem.
  - (b) Explain the meaning of the term “Point” in Point Estimation.
  - (c) Explain the meaning of the term “factorization” in Factorization Theorem.
  - (d) Explain the meaning of the term “Uniformly” in Uniformly Most Powerful Test.
  - (e) Explain the meaning of the term “Uniformly” in Uniformly Minimum Variance Unbiased Estimator.
  - (f) Explain the meaning of the term “Uniformly” in Uniformly Most Accurate Confidence Set.
  - (g) State two properties of Likelihood Ratio Test.
  - (h) What are Large Sample Tests?
2. Answer **any two** questions : 5×2
- (a) Explain Method of Moments using an example.
  - (b) Give an example of a uniformly most powerful randomized test.
  - (c) Explain the concept of Delta Method with an example.
3. Answer **any three** questions : 10×3
- (a) Explain the concept of convergence of distribution. Give an example of a sequence of discrete random variables  $\{X_n\}$  which converges in distribution to a standard normal random variable. Find a sequence using the above  $\{X_n\}$  which converges in distribution to a normal random variable with mean 5 and variance 20. Justify your answer.
  - (b) State Rao-Blackwell Theorem. Explain it with an example. Discuss its importance in Statistical inference. Discuss another contribution of Rao mentioned above.
  - (c) Give an example (with justification) of a nonrandomized left-tailed Uniformly Most Powerful Test with size  $\delta$ . Find the power function of your test in terms of  $\delta$ . Is it monotonic? Justify. Is your test unbiased? Justify.

**Please Turn Over**

- (d) Describe two large sample test procedures for testing the equality of two proportions on the basis of two samples of different sizes drawn from two binomial populations. Which one would you prefer and why?
  - (e) Derive large sample standard error of sample correlation coefficient and discuss one application of it.
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