RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

SECOND YEAR [2018 - 21]
B.A./B.Sc. THIRD SEMESTER (July – December) 2019
Mid-Semester Examination, September 2019

Date : 19/09/2019   **STATISTICS (General)**
Time : 12 noon - 1 pm   **Paper: III**   Full Marks: 25

[Use a separate Answer Book for each group]

Group : A

Answer **any two** questions of the following**:** (2×5)

1. Define Price Index number and Quantity Index number. What are Time Reversal Test and Factor Reversal Test? Which of the indices satisfy those tests?   (1+1+3)

2. Show that harmonic mean of price relatives; weighted by the product of base year quantities and current year prices is the equivalent of an aggregative Index weighted with base year quantities.   (5)

3. Describe the uses of Index numbers and errors in Index numbers.   (5)

Group : B

Answer **any three** questions of the following**:** (3×5)

4. In case of SRSWOR wherein a sample of size n is drawn from a finite population of size N , derive the expression for the standard error of sample mean.   (5)

5. A random sample of size 25 is taken from Normal $\left(\mu, \sigma^2\right)$ with $\mu = 30$ and $\sigma^2 = 16$. Would the probability that the sample mean would lie between 25 and 35 be greater than 0.99?
    [Given $\Phi(3) = 0.998$]   (5)

6. The random variable X follows Binomial (1, p). Let X_1, X_2, ….,X_n be a random sample drawn from it. Find an unbiased estimator of p^2.   (5)

7. i) Show how one may derive an unbiased estimator of the unknown population variance σ^2 from the ordinary sample variance s^2 (i.e sample variance with denominator as the sample size)   (3)

    ii) If T is a consistent estimator of a parameter Θ, then show n*T/(n+1) is also a consistent estimator of Θ , where n is the sample size.   (2)

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