

2022

## STATISTICS — GENERAL

Paper : GE/CC-4

(Applications of Statistics)

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
- Consider a population containing four units {1, 2, 3, 4}. Write all possible simple random samples without replacement.
  - Define Simple Random Sampling.
  - What is proportional allocation in Stratified Sampling?
  - What is Cost of Living Index number?
  - What are different components of a time series?
  - Define Crude Death Rate.
  - What is Live Birth?
  - Write down two formulae for price index.
2. Answer *any two* of the following : 5×2
- Distinguish between seasonal and cyclical components of a time series, with an example.
  - Distinguish between probabilistic and non-probabilistic samplings with examples.
  - Give brief description of a complete *Life Table*.
3. Answer *any three* of the following :
- For a simple random sample of size  $n$  without replacement from a population of size  $N$ , show that the sample mean is an unbiased estimator of population mean. Also derive the standard error of the sample mean. 4+6
  - Describe Stratified Sampling Scheme. In this context, explain the idea of optimum allocation. 5+5
  - Define Fisher's Index Number. Show that Fisher's Index Number satisfies 'Time Reversal' and 'Factor Reversal' Tests and comment. 2+6+2
  - Describe two methods of determining trend equation of a time series data. 5+5
  - Define GRR and NRR as measures of population growth and compare their performances. Interpret the case :  $GRR = 1.59$ . Also argue that  $GRR > NRR$ . 6+2+2

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