Theory and Practice of Statistics
Paper Code: ADS-3

Duration: 3 Hours   **Maximum Marks: 100**

INSTRUCTIONS

1. Answers must be written in English.
2. All questions carry equal marks.
3. The answer to each question or part thereof should begin on a fresh page.
4. Your answer should be precise and coherent.
5. The part/parts of the same question must be answered together and should not be interposed between answers to other questions.
6. **Candidates should attempt five questions in all, selecting at least two questions from each part.**
7. If you encounter any typographical error, please read it as it appears in the text-book.
8. Candidates are advised to go through the General Instructions on the back side of the title page of the Answer Script for strict adherence.
9. No continuation sheets shall be provided to any candidate under any circumstances.
10. Candidates shall put a cross (x) on blank pages of the answer script.

Q1. Describe the Multiplicative Law of Probability for independent events. How is it used to determine the probability of the joint occurrence of two independent events? Provide a numerical example to demonstrate this calculation. (20 marks)

Q2. Describe the steps involved in the tabulation of data. How does tabulation aid in the analysis and interpretation of data? Additionally, Compare and contrast primary data with secondary data. Provide examples to illustrate your points. (20 marks)

Q3. Compare and contrast the binomial, Poisson, and normal distributions. Provide examples to illustrate the differences and similarities. (20 marks)

Q4. Define the theory of attributes and discuss its significance in statistical analysis. Provide examples of attribute data. Further, Explain the coefficient of association and its role in measuring the relationship between attributes. How is it calculated and interpreted? (20 marks)

PART B

Q5. For the data points (1,1)(1, 1)(1,1), (2,8)(2, 8)(2,8), (3,27)(3, 27)(3,27), and (4,64)(4, 64)(4,64), determine the polynomial that fits these points using both Lagrange and Newton's methods. Compare the results. (20 marks)

Q6. Describe the key functions of a census in demographic studies. How does census data influence policy-making and resource allocation? Further, Outline the different methods used in conducting a census. Compare the traditional door-to-door method with modern digital methods. (20 marks)

Q7. Explain the Consumer Price Index (CPI) and its purpose. How is the CPI calculated, and what are the key components of the CPI basket? Illustrate with an example of how changes in the CPI reflect changes in the cost of living. (20 marks)

Q8. How can the analysis of trend and seasonal variation be applied in real-world scenarios? Provide an example of how businesses or policymakers might use this analysis to make informed decisions. Discuss how understanding these components can impact forecasting and planning. (20 marks)