Indian Statistical Institute
Documentation Research and Training Centre

MS(LIS) 2023-25, Semester III
Paper 14: Elements of Statistics and Research Methodology
Date: 13/11/2024

Time: 10.00 - 13.00

Maximum Marks: 100

Note: Read the instructions carefully. Scientific calculators are allowed.

Part A: Attempt any five questions. Each question carries equal marks. **(5*5)**

1. What is Hypothesis? Explain Characteristics of Hypothesis.
2. Explain The level of significance and Decision rule.
3. What are Type I and Type II errors?
4. What are One-tailed and Two-tailed tests?
5. Explain the procedure for hypothesis testing with examples.
6. What is sampling in research? What are the various methods used to select a sample from a population?

Part B: Attempt all three questions. **(10*3)**

1. What is the Z-test, T-test and F-test? Write down the Difference between them.
2. What is h-index and g-index and how to calculate this?
3. A factory has a machine that dispenses 80 ml of fluid in a bottle. An employee believes that the average amount of fluid is not 80 ml. Using 40 samples, he measured the average amount dispensed by the machine is 78 ml with a standard deviation of 2.5.

   a) state the null and alternative hypothesis and b) At a 95% confidence level, is there enough evidence to support the idea that the machine is not working properly?

Part C: Attempt any three questions. **(15*3)**

1. Explain the different types of Journal level metrics ie. Impact Factor, SNIP, SJR, IPP, Cite Score, with examples.
2. What is Null and Alternative Hypothesis? Difference between Null and Alternative Hypothesis. Explain with examples.
3. A company wanted to compare the performance of its call centre employees in two different centres located in two different parts of the country – Hyderabad, and Bengaluru, in terms of the number of tickets resolved in a day (hypothetically speaking). The company randomly selected 30 employees from the call centre in Hyderabad and 30 employees from the call centre in Bengaluru.
   The following data was collected: The co. wants to determine if the performance of the employees in Hyderabad is different from the performance of the employees in the Bengaluru Center.
   Hyderabad: $\bar{x}1 = 750$, $\sigma 1 = 20$
   Bengaluru: $\bar{x}2 = 780$, $\sigma 2 = 25$
4. What is an observation method in data collection, and what are its different types? Give examples of each type and discuss their advantages and disadvantages.