Time: 10.00 - 13.00
Maximum Marks: 60

Note: Read the instructions carefully. The Question Paper consists of three parts A, B and C. Scientific calculators are allowed.

Part A: Attempt all questions. Each question carries five marks each.   5*5

1. What is Type I and Type II error?
2. Explain the procedure for hypothesis testing.
3. Let's say we need to compare the performance of two call centres in terms of average call lengths. Find out if the difference is statistically significant or the difference is a chance occurrence.

   Null hypothesis, H0: There is no difference between the average call length between two call centres.

   Alternate hypothesis, Ha: There is a difference between the average call length and hence the performance. We randomly select 20 calls from each call centre and calculate the average call lengths. The two call centres seem to have different average call lengths. Is this difference statistically significant?

   Call Center A: Sample mean, $\bar{X}_1$ = 122 seconds, SD, S_1 = 15 seconds, n_1 = 20

   Call Center B: Sample mean, $\bar{X}_2$ = 135 seconds, SD, S_2 = 20 seconds, n_2 = 20

   We will use a 95% confidence level and $\alpha = 0.05$.

4. Explain the procedure of the interview method, its advantages and limitations.
5. What is variable? Describe the dependent, independent and extraneous variables with examples.

Part B: Attempt any three questions.   5*3

1. What are the Z-test, T-test and F-test? Write down the Difference between them.
2. What is the Journal Impact factor? How should we calculate it? Explain with examples.
3. What is h-index and g-index and how to calculate this?
4. In the population, the average IQ is 100 with a standard deviation of 15. A team of

scientists wants to test a new medication to see if it has either a positive or negative effect on intelligence, or no effect at all. A sample of 30 participants who have taken the medication has a mean of 140. Did the medication affect intelligence? Confidence level is 95%

Part C: Attempt any two questions.   **10*2**

1. What is Null and Alternative Hypothesis? Differentiate between Null and Alternative Hypothesis. Explain with examples.
2. Explain five types of Journal level metrics.
3. What is an observation method in data collection? Explain its types with examples, and highlight the pros and cons of its types.
4. What is sampling in research? Describe the various types of sampling methods with examples.