

[This question paper contains 7 printed pages]

Your Roll No. :

Sl. No. of Q. Paper : **7539** **I**

Unique Paper Code : 2343010020

Name of the Paper : Research Methodology
(Computer Science)

Name of the Course : **B.Sc. (H) Computer
Science (NEP – UGCF)**

Semester : VI

Time : 3 Hours

Maximum Marks : 90

Instructions for Candidates :

- (a) Write your Roll No. on the top immediately on receipt of this question paper.
- (b) All part of **Question 1 (Section A)** are compulsory.
- (c) Attempt any **four** questions from **Section B**.
- (c) Parts of a question must be answered together.
- (d) Use of scientific calculator is allowed.

P.T.O.

Section - A

1. (a) What are the two assumptions for parametric statistics ? 3
- (b) Define Intellectual property rights. Briefly describe its two categories. 3
- (c) Name the six tools of research. 3
- (d) What do you understand by the term "peer reviewed" ? 3
- (e) What is the difference between positively skewed and negatively skewed distributions ? Show with the help of a diagram. 3
- (f) List the three main indexes within the Web of Science core collection. 3
- (g) In a class of 45 researchers, what is the percentile rank of the researcher who scored the 33rd highest score ? 3
- (h) The correlation score between student's study hours and their exam scores is found to be + 0.85. Interpret this correlation score in terms of direction and strength of the relationship between study hours and exam scores. 3

- (i) Give **one word** for the following : 6
- (i) A logical supposition or an educated guess that guides the research.
 - (ii) An intellectual property right relating to inventions.
 - (iii) Statistics are appropriate for data that are ordinal rather than interval in nature.
 - (iv) Ethical issue arise in journal publishing when personal or institutional interests may influence editorial decisions.
 - (v) Process of reasoning from a general assumption to a specific application.
 - (vi) An interdisciplinary bibliographic database, launched in 2024 by Elsevier, serves as a competitor to Web of Science.

Section - B

2. (a) Briefly explain the **seven** distinct steps of a research cycle. 7

- (b) A journal published 135 articles in 2019, 154 articles in 2020 and 197 articles in 2021. What will be the impact factor and Cite Score of the journal if it receives 2100 citations in 2022 ? 8

3. (a) Differentiate between Type I and Type II errors in hypothesis testing. Illustrate the trade-off between these two errors with the help of a diagram. 7

- (b) Given are the marks of 15 students in a test : 8

97, 77, 90, 97, 72, 54, 97, 91, 63, 30, 99, 75, 83, 97, 69

Calculate the following :

- (i) Mode
 - (ii) Mean
 - (iii) Median
 - (iv) IQR
4. (a) An examiner wants to determine whether a new teaching method improves student performance in computer science. Two groups of students are selected : 7

* Group A is taught using the traditional method.

* Group B is taught using the new method.

After one semester, both groups take the same test. The average scores are analysed using a hypothesis test. The p - value from the test is found to be 0.03. The significance level (α) is set at 0.05.

Based on this, answer the following questions :

- (i) State the null hypothesis and alternate hypothesis.
- (ii) Based on the p - value and (α), should the null hypothesis be rejected ? Explain your reasoning.

What conclusion can be drawn about the effectiveness of the new teaching method ?

- (b) Explain the four different scales of measurement of data with the help of examples. 8

5. (a) A researcher has published 15 papers. The number of citations for each paper is : 1, 9, 30, 5, 23, 11, 15, 6, 7, 9, 3, 5, 19, 10, 21. Calculate the h-index, i10 - index and g - index of this researcher. 7

- (b) Write short notes on the following : 8
- (i) Quantitative Research
 - (ii) Retrospective Research
 - (iii) Inductive Research
 - (iv) Descriptive Statistics
6. (a) At a local coffee shop, customers begin to trickle in shortly after it opens at 6:00 am. As the morning progresses the number of customers steadily increases and reaches the peak around 8:00 am when people are on their way to work. After that the crowd begins to decrease and by mid – morning, the shop is relatively quiet. Draw the curve to represent the information. Based on the shape of the curve, what kind of distribution does this daily pattern of customer visits follow. 7
- (b) What is plagiarism ? How is it different from piracy ? What is self – plagiarism and accidental plagiarism ? 8
7. (a) What do you understand by the term Intellectual Property Rights ? Differentiate between industrial property and copyright and related rights. Mention any two areas of intellectual property covered under the TRIPS Agreement. 7

- (b) Mention any four items included in a checklist for reviewing an article. What are the possible four recommendations a reviewer can provide regarding the acceptance of a submitted research article ? 8
