

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -2 EXAMINATION- 2025
M.Sc.-II Semester (BT/BI)

COURSE CODE (CREDITS):20MS1BT216 (2)

MAX. MARKS: 25

COURSE NAME: Research Methodology and Scientific Communication Skills

COURSE INSTRUCTORS: Dr. Gopal Singh Bisht

MAX. TIME: 1 Hour 30 Minutes

*(b) The candidate is allowed to make Suitable numeric assumptions wherever required
For solving problems*

Q.No.	Question	Marks
Q1	<p>Study the given case study and then answer the following question.</p> <p>Case 1</p> <p>Dr. Mahesh is leading a clinical trial to test a new medication for lowering blood pressure. The study design involves recruiting 100 participants who are diagnosed with hypertension. The trial is double-blind, meaning neither the participants nor the researchers know who receives the placebo or the drug. Dr. Mahesh, however, has a strong belief that the medication will be highly effective and is motivated by positive press surrounding the drug's early-stage development.</p> <p>During the trial, Dr. Mahesh notices that the participants who show a slight improvement in their blood pressure are more likely to be those who received the drug, while the placebo group shows no noticeable changes. Dr. Mahesh begins to focus on these positive results, giving more attention to the patients who responded positively and inadvertently downplaying those who show minimal or no response.</p> <p>a) What specific behaviors or actions in Dr. Mahesh's actions suggest confirmation bias?</p> <p>b) How might confirmation bias affect the study's outcomes and scientific validity?</p> <p>c) What strategies can Dr. Mahesh implement to reduce the risk of confirmation bias in this study?</p> <p>d) What potential consequences might arise if Dr. Mahesh fails to address confirmation bias in the results of this trial?</p> <p>Case 2</p> <p>Dr. B is asked to review a manuscript for a journal. He realizes that the research is from his former student, who is now a competitor working on similar topics. Dr. B has an ongoing grant proposal that closely overlaps with the submitted study.</p> <p>a) Is there a conflict of interest here?</p> <p>b) What should Dr. B do upon recognizing this conflict?</p> <p>c) How should journals handle such cases?</p>	7

Q2	Analyze the purpose of sampling in research and critically evaluate its role in ensuring data reliability. Justify the significance of sampling error and its impact on research findings. Compare and contrast different sampling methods, assessing their strengths, limitations, and applicability in various research contexts.	5
Q3	Explain the purpose and significance of a literature review in research. Evaluate its role in establishing a theoretical framework and identifying research gaps. Synthesize the key steps involved in conducting a comprehensive literature review.	4
Q4.	How would you apply the 5 R principles in a research project involving animals? Provide an example of how each principle might be implemented to ensure ethical treatment	3
Q5.	<p>a) What is a hypothesis in research, what are its key characteristics, and how do directional and non-directional hypotheses differ? Explain with example.</p> <p>b) Explain the concepts of independent variable, dependent variable, and constant. Illustrate each with appropriate examples, and analyze how they interact in a scientific experiment.</p>	<p>3</p> <p>3</p>