JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -3 EXAMINATIONS- 2023
M.Tech-I. Semester (BT)

COURSE CODE (CREDITS):18MIIBT113 (3) MAX. MARKS: 35
COURSE NAME: Research Methodology and Ethics
COURSE INSTRUCTORS: Dr. Gopal Singh Bisht MAX. TIME: 2 Hours

Note: (a) all questions are compulsory. This paper contains two pages.
(b)Marks are indicated against each question in square brackets.
(c) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q1. Answer the following questions. [10]

a) Explain independent variable, dependent variable, and control used in hypothesis by taking suitable example.
b) Explain briefly ethics and guidelines of using animals in scientific research.
c) Describe briefly the precautions that the researcher should take while designing experiments for research.
d) Write any four guidelines for avoiding plagiarism and questionable writing practices.
e) Discuss standard evaluation criteria for reviewing a research paper

Q2. Study the given below case carefully and answer the following questions. [12]

Dr. John Leonard is one of very few molecular biologists working in a particular field. Dr. Leonard receives a paper to review, about a protein called surviving, which he and a graduate student in his laboratory are researching. The article was submitted by Dr. Mark Morris to *Protein Interactions*, a medium-impact journal, and the editor asked Dr. Leonard and two other experts in the field to review the paper. The article suggests a new interaction between surviving and the protein GFX and provides evidence for the fact that both proteins are necessary for the full survival-promoting function of surviving in a cell. The article also describes, though, that if there is too much surviving inside cells they die

But the paper is fraught with problems: poor controls, inconsistent data in figures, and alternative explanations are not considered and claims are overstated. Dr. Leonard gives the paper to his graduate student Melissa Zane, who gives it a detailed critique and recommends significant revisions. Ms. Zane has never reviewed an article before, and Dr. Leonard thinks that doing so would be a good educational experience for her. Ms. Zane notes the finding about too much surviving being toxic to cells, a problem she has had working with the protein, and discusses it with Dr. Leonard. Both agree that they should lower the dosage of surviving in her experiments; the cells actually survive for a week, longer than her experience before, and then they die.

Dr. Leonard submits Ms. Zane's and his own comments about the research to the editor, suggesting that the paper be accepted only after a few more experiments are performed to validate some of the conclusions. One of the other reviewers has comments similar to Dr. Leonard's, and the editor asks Dr. Morris, the author, to make the revisions before he will accept the paper.

But in the next few weeks the interaction between GFX and surviving that is discussed in the paper remains in Dr. Leonard's mind. GFX was not a line of inquiry that Dr. Leonard and Ms. Zane were following in their research. They were focusing on other stimulatory proteins, but

unsuccessfully. Dr. Leonard suggests to Ms. Zane that she add a compound to the cell culture system that stimulates the cell to produce its own GFX, a method that is somewhat different from what was in the paper by Dr. Morris that is under review. The enhancement method works. The cells live for a month.

Ms. Zane and Dr. Leonard draft a paper based on the results, which includes ap-propriate controls. *Science*, a prestigious journal, accepts the paper. Several months later, *Protein Interactions* publishes a revised paper from the laboratory of Dr. Morris. But after Dr. Morris sees the article in *Science* he suspects that Dr. Leonard, who was an anonymous peer reviewer on the paper, might have taken some of the ideas for the *Science* article from his paper under review. Dr. Morris knows that Dr. Leonard hadn't been working on GFX because it was hard to purify, and deduces that he used material in the unpublished manuscript to stimulate GFX activity.

a) What types of conflict of interest might arise when someone is asked to review a paper or grant application?
b) Is it ever appropriate for a peer reviewer to give a paper to a graduate student for review? If so, how should the reviewer do so?
c) Is it appropriate for a peer reviewer to use ideas from an article under review to stop unfruitful research in the reviewer's laboratory?
d) Is it ever appropriate for a reviewer to use ideas from a paper under review, even if the reviewer's method to achieve a result is different from that used in the paper under review? If so, how should the reviewer proceed?
e) What are some of the challenges in the current peer-review process, in which the peer reviewer is anonymous but the author is known to the reviewer?
f) What recourse is there for Dr. Morris if he suspects that his ideas were plagiarised?

Q3. Provide various reasons of getting negative results. Discuss case where it is worthwhile to present/ publish negative results. [3]

Q4.Falsification is probably the most heinous of research misconduct and can cause damage to the perpetrators career but also to those academicians who trust research findings are true. Justify the statement. [5]

Q5. Discuss the importance of research funding? Provide an account of how to write a good research project proposal. [5]