JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -3 EXAMINATIONS- 2025
M.Tech-I Semester (BT)

COURSE CODE (CREDITS):18M11BT113 (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.*
(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q.No	Question	Marks
Q1	Explain the concepts of fabrication, falsification, and plagiarism in science. Why are they considered serious research misconduct? Propose methods that researchers and institutions can adopt to prevent such unethical practices.	[3.5+3.5]
Q2	A postgraduate student, Meera, is preparing a literature review for her thesis. While searching online, she finds a well-written report on a research blog. Thinking the blog is "informal," she copies several paragraphs directly into her review without citation. When her supervisor runs the document through plagiarism detection software, the copied sections are flagged. Meera argues that the content was freely available on the internet and therefore did not require citation. The department must now decide whether this constitutes plagiarism and whether Meera has violated copyright law. a) Is online content automatically free to use, or is it academic dishonesty? b) Does copying without citation violate both plagiarism and copyright rules?	[3.5+3.5]
Q3.	Discuss the principles of biosafety and bioethics in the context of handling genetically modified organisms (GMOs). Asses Cartagena Protocol on Biosafety regulate the transboundary movement of living modified organisms (LMOs), and why is it important for global biosecurity?	[3.5+3.5]
Q4.	Dr. Aditi Sharma, a senior researcher in the Department of Biotechnology at a reputed university, plans to submit a research grant proposal to a national funding agency—Indian Council of Medical Research (ICMR). Her research aims to develop a rapid, low-cost diagnostic biosensor for early detection of multi-drug resistant tuberculosis (MDR-TB). The proposed biosensor is expected to provide results within 20 minutes and cost less than ₹150 per test, making it suitable for rural healthcare centers. Before preparing the proposal, Dr. Sharma forms a multidisciplinary team consisting of a biomedical engineer, a microbiologist, a statistician, and a clinical physician from a government hospital who agrees to provide patient sample support. She plans a three-year study divided into phases—design and prototype development, laboratory validation, and clinical evaluation. The estimated budget is ₹1.8 crores, which includes equipment procurement, manpower salaries, contingency, travel, and clinical trial expenses. However, during the internal review by the university's Research Advisory Committee (RAC), some concerns are raised: 1. The reviewers question whether the preliminary data provided is sufficient to	

	justify feasibility. 2. They suggest improving the risk-management plan since biosensor sensitivity could fail at clinical scale. 3. Ethical approval for clinical sample collection has not yet been documented. 4. The committee also advises exploring potential industry collaborations for technology transfer after project completion. Facing a strict submission deadline, Dr. Sharma must revise and resubmit the proposal within five working days. She decides to address reviewer comments by generating more detailed pilot data from previously collected open-access genomic datasets rather than waiting for new samples. She also drafts a strengthened risk-mitigation plan including alternative biosensing materials if prototype performance is low. Additionally, she consults the Institutional Ethics Committee to obtain a conditional ethical clearance certificate, which meets funding requirements. She initiates communication with a medical device manufacturing company to explore technology translation and adds a letter of intent to the proposal. The revised proposal appears stronger and is resubmitted on time. RAC members appreciate the modifications and approve it for submission to ICMR. a) Evaluate the strengths and weaknesses of Dr. Sharma's original grant proposal before revision. b) Was the RAC justified in suggesting improvements before submission? Provide rationale. c) Design a revised risk-management plan for this project including two alternative strategies d) Propose a regulatory and commercialization roadmap for successful technology translation for this project.	[2] [2] [3] [3]
Q5.	Given a hypothesis: *"Nano-herbal formulations are more effective than standard antifungal creams in reducing recurrence of dermatophytosis,"* analyze the independent and dependent variables, and identify the population and sample that would be appropriate for testing this hypothesis.	[4]