

**RESEARCH METHODOLOGY, BIOETHICS AND IPR  
(BIOT 5103)**

Time Allotted : 3 hrs

Full Marks : 70

*Figures out of the right margin indicate full marks.*

*Candidates are required to answer Group A and  
any 5 (five) from Group B to E, taking at least one from each group.*

*Candidates are required to give answer in their own words as far as practicable.*

**Group - A  
(Multiple Choice Type Questions)**

1. Choose the correct alternative for the following: **10 × 1 = 10**
- (i) Which of the following is not an essential part of report writing?  
 (a) Research methodology (b) Conclusion  
 (c) Reference (d) Observation.
- (ii) The longitudinal approach of research deals with \_\_\_\_\_.  
 (a) short-term research (b) long-term research  
 (c) horizontal research (d) none of (a), (b) and (c).
- (iii) Which of the following can be the source of primary data in research?  
 (a) Survey (b) Experiment  
 (c) Survey and experiment (d) Survey and reference.
- (iv) Self-plagiarism is  
 (a) lifting material that one has previously written and passing it off as his own work  
 (b) talking about yourself too much  
 (c) using somebody else's work and passing it off as your own  
 (d) an epistemological stance.
- (v) Which of the following is not true for random sampling?  
 (a) reasonably accurate  
 (b) free from personal bias  
 (c) economical method of sampling  
 (d) can be applied for all types of data collections.
- (vi) The following cannot be exploited by assigning or by licensing the rights to others  
 (a) Patents (b) Designs  
 (c) Trademark (d) all of (a), (b) and (c).
- (vii) Design does not include  
 (a) composition of lines or colours (b) features of shape  
 (c) mode or principle of construction (d) none of (a), (b) and (c).

- (viii) Trade mark  
 (a) is represented graphically  
 (b) is capable of distinguishing the goods or services of one person from those of others  
 (c) may includes shapes of goods or combination of colours  
 (d) all of (a), (b) and (c).
- (ix) When working with infectious biological material, the best place to perform the work would be  
 (a) In a biological safety cabinet  
 (b) On the laboratory bench  
 (c) On a clean bench, wearing a dust mask  
 (d) In a fume hood.
- (x) Which of the following factors influences the effectiveness of an antimicrobial agent?  
 (a) Composition of the microbial population  
 (b) Concentration of the antimicrobial agent  
 (c) Contact time  
 (d) all of (a), (b) and (c).

**Group - B**

2. (a) Describe the different steps of a research process with a flow diagram.  
 (b) Discuss the major strategies of sample design in a research problem. **6 + 6 = 12**
3. (a) What do you mean by dependent and independent variables?  
 (b) How do extraneous variables affect the research design?  
 (c) Mention the differences between experimental and non-experimental hypothesis testing research. **(2 + 2) + 4 + 4 = 12**

**Group - C**

4. (a) Briefly elaborate on the tests of validity, reliability and practicality of measurement.  
 (b) What is the difference between one-way and two-way ANOVA? Explain with examples. **6 + 6 = 12**
5. (a) Discuss the role of ordinal scale and interval scale in data measurement.

- (b) What are the different methods used for primary data collection?
- (c) Mention the major aspects of a questionnaire used for data collection.

$$4 + 4 + 4 = 12$$

**Group - D**

- 6. (a) What is cloning? Why there is a high failure rate in cloning?
- (b) What are the ethical issues related to cloning?
- (c) Write notes on the following case studies:
  - (i) Neem.
  - (ii) Basmati Rice.

$$(2 + 2) + 4 + (2 + 2) = 12$$

- 7. (a) Describe using a flow chart the procedure for obtaining a patent.
- (b) Who can file a patent application in India? What documents are required for filing a patent?
- (c) Why is it important for publication of patent application?

$$4 + (2 + 2) + 4 = 12$$

**Group - E**

- 8. (a) What are three main ways of gene delivery?
- (b) Describe the setback of gene therapy using 18-year old Jesse Gelsinger along with its ethical issues. Write on Negative and Positive Eugenics.
- (c) What are the positive and negative aspects of genetically modified food?

$$3 + (3 + 3) + 3 = 12$$

- 9. (a) Describe using a diagram how genetically modified organisms are produced.
- (b) Distinguish between hazard and biohazard.
- (c) Explain the classification system of four major hazard groups.

$$4 + 4 + 4 = 12$$