

M.Sc. Zoology
First Semester
Bio-Instrumentation and Cell Biology
(MSZ-02)

Duration: 3Hrs.

Full Marks: 70

(PART-B: Descriptive)

Duration: 2 hrs. 40 mins.

Marks: 50

1. Answers the following questions: (any five)

5 × 2 = 10

- a) What is stroke shift?
- b) How are tissues mounted in Microtomy?
- c) Differentiate between Prokaryote and Eukaryotic cells.
- d) Write a note on nerve cells.
- e) What is polyploidy? What are the two different types of polyploidy?
- f) Write a note on nuclear envelope and its function.
- g) Write the application of Thin Layer chromatography in laboratories.

2. Answers the following questions: (any five)

5 × 3 = 15

- a) What are the different sterilization techniques in microbiology?
- b) What is electrophoresis? Describe SDS-PAGE electrophoresis with suitable diagrams.
- c) Describe Beer-Lamberts law with equation.
- d) What is a spectrophotometer? Describe its mode of operation with suitable diagrams.

- e) Write the principal of phase-contrast Microscopy.
- f) What are the functions of Smooth ER and Golgi body?
- g) Write four principles of cell theory.

3. Answers the following questions: (any five)

5 × 5 = 25

- a. What is an ultracentrifuge? How are organelle separated by centrifugation?
- b. Write a note on Cryosurgery with suitable diagram.
- c. What is cryopreservation? How are cells and tissues cryopreserved?
- d. What are the different steps involved in microtomy? Define.
- e. What are the phases of cell cycle? Mention the checkpoints of cell cycle.
- f. Explain the process of mitosis with diagrams.
- g. Discuss the various models of cell membrane with diagrams.

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PART A: Objective

Duration: 20 minutes

Marks – 20

Choose the correct answer from the following.
(put '√' mark on the appropriate answer)

16 × 1 = 16

1. Freeze drying uses
 - a) Vacuum
 - b) Heat
 - c) Hot water
 - d) None
2. Cryopreservation uses-
 - a) Liquid N₂
 - b) Deep freezers
 - c) Both
 - d) None
3. Freeze fractured cells are seen under
 - a) Light microscopy
 - b) SEM
 - c) TEM
 - d) All of the above
4. New cell arises from pre-existing cell. It was stated by
 - a) Schleiden
 - b) Schwann
 - c) R. Virchow
 - d) Purkinje
5. Human erythrocyte lack
 - a) Mitochondria
 - b) nucleus
 - c) Golgi complex
 - d) all
6. The capacity of the somatic cell to give rise to new organism
 - a) Parthenocarypy
 - b) Totipotency
 - c) Neotany
 - d) Padogenesis
7. Nucleoid is found in
 - a) Prokaryotes
 - b) Eukaryotes
 - c) Both
 - d) none
8. To increase surface area, cells of intestine have microprojections, called
 - a) Villi
 - b) Microvilli
 - c) Flagella
 - d) Cilia

9. The liquid present in the space between two adjacent cells is called
- a) Cytoplasm
 - b) Protoplasm
 - c) Intracellular fluid
 - d) Extracellular fluid
10. In human body which of the following cells do not undergo division
- a) Epidermal cells
 - b) Cells of bone marrow
 - c) Nerve cells
 - d) Germ cells
11. Mitosis occurs in
- a) Germ cells
 - b) Nerve cells
 - c) Body cells
 - d) Egg
12. Synapsis occurs in
- a) Diplotene
 - b) Pachytene
 - c) Diakinesis
 - d) Leptotene
13. Meiosis is division mechanism that produces
- a) Two cells
 - b) Two nuclei
 - c) Eight cells
 - d) Four nuclei
14. Colchicines arrest
- a) Spindle fibers
 - b) Nuclear membrane
 - c) Centromere
 - d) None of the above
15. Chromosome duplication occurs in
- a) G1 phase
 - b) G2 Phase
 - c) M phase
 - d) S phase
16. Sexual reproduction requires
- a) Meiosis
 - b) Gamete formation
 - c) Fertilization
 - d) All of the above

Fill in The Blanks:

4 × 1 = 4

17. Agarose gel electrophoresis is a type of electrophoresis used for the separation of _____
18. Tissues fixation is done with the help of _____
19. Electron microscope uses _____
20. Fluorescent microscopy uses fluorescent substances called _____
