

M.Sc. ZOOLOGY
FIRST SEMESTER (REPEAT)
BIO-INSTRUMENTATION & CELL BIOLOGY
MSZ-102
[USE OMR FOR OBJECTIVE PART]

SET
A

Duration: 3 hrs.

Full Marks: 70

(Objective)

Time: 30 mins.

Marks: 20

Choose the correct answer from the following:

1 × 20 = 20

- In flow cytometry the side scattering of the cell is related toof the cell.
 - Granularity
 - Size
 - Shape
 - All of the above
- Name the drug which depolymerizes microtubule to tubulin subunit.
 - Cytochalasin D
 - Colchicines
 - Latrunculin
 - Phalloidin
- Plasmodesmata:
 - Encircle cells of a tight junction like a belt
 - Connect to intermediate fibers of the cytoskeleton
 - Connect the cytoplasm of one plant cell to that of another
 - Is the name given to desmosomes of plant cells
- Which of the following is a metachromatic stain?
 - Janus green- B
 - Fuchsin
 - Azure B
 - Toluidine blue
- The..... surrounds the cell like a belt, preventing the passage of substance between the cells.
 - Gap junction
 - Desmosomes
 - Hemidesmosomes
 - Tight junctions
- The limit of magnification of the light microscope is:
 - 100X
 - 20,000X
 - 1500X
 - 100,000X
- During which stage of prophase I, crossing over takes place?
 - Pachytene
 - Zygotene
 - Leptotene
 - Diplotene
- In ELISA which of the following molecule is adsorbed on the solid microtiter plate?
 - Antibody
 - Antigen
 - Both a and b
 - None of the above
- What is the role of DMSO in cryopreservation?
 - Preservative
 - Cryoprotectant
 - Both a and b
 - None

10. Carnoy's solution is a mixture of:
- | | |
|--|---|
| a. Aqueous chromic acid, Aqueous acetic acid and distilled water | b. Ethyl alcohol, Glacial acetic acid and commercial formalin |
| c. Ethanol, Glacial acetic acid and Chloroform | d. Aqueous alcohol, Aqueous acetic acid and distilled water |
11. Which of the following statements are true in case of fluid-mosaic model for cell membranes?
- P. Between 5-8 nm thick and appear trilaminar when viewed in cross section under electron microscope
 Q. Less than 1 nm thick and consist of a layer of protein sandwiched between two layers of phospholipids
 R. In the lipid bilayer, proteins are embedded at irregular intervals and held by hydrophilic interactions between lipids and hydrophilic domains of proteins.
 S. The protein domains exposed on one side of the lipid bilayer are different from those exposed on the other side.
- | | |
|--------|--------|
| a. P,Q | b. P,S |
| c. Q,S | d. P,R |
12. When used in *in situ* hybridization, RNA probes are..... to the sample's RNA.
- | | |
|------------------|--------------|
| a. Complementary | b. Identical |
| c. Supplementary | d. Similar |
13. Lipid anchored proteins are bound to membrane by a complex oligosaccharides linked to a molecule of:
- | | |
|------------------------|-------------------------|
| a. Phosphatidylcholine | b. Phosphatidylinositol |
| c. Phosphatidylserine | d. Phosphatidic acid |
14. A polar molecule:
- | | |
|---|---|
| a. Is slightly negative at one end and slightly positive at one end | b. Has an extra electron, giving it a negative charge |
| c. Has an extra neutron, making it weight more | d. Has covalent bond |
15. In a given thermal cycler the temperature gradient is arranged as:
- | | |
|-------------------|-------------------|
| a. 72°C 94°C 50°C | b. 94°C 72°C 50°C |
| c. 50°C 94°C 72°C | d. 94°C 50°C 72°C |
16. Which of these has not been used as an RNA probe?
- | | |
|------------------------|-----------------------|
| a. Fluorescence probes | b. Radioactive probes |
| c. Non- radioactive | d. Cellular probes |
17. Identify the correct set of three statement for cytoskeletal protein filaments from the following list:
- P. Microfilament is about 8 nm wide
 Q. Microfilament is about 25 nm wide
 R. Intermediate filaments have size intermediate between microfilament and microtubules
 S. Protofilaments of microtubules are composed of alpha/beta tubulin heterodimer
 T. Colchicine binds to the actin subunits in the microfilament causing disassembly to free units
- | | |
|----------|----------|
| a. R,S,T | b. Q,R,S |
| c. P,R,S | d. P,Q,R |
18. Cell shape and cellular motility is determined by the.....
- | | |
|----------------|--------------------------|
| a. Centrioles | b. Intermediate filament |
| c. Microtubule | d. Microfilaments |

19. What is treadmilling?
- a. Depolymerization of microtubule
 - b. The breaking of heterodimer chain
 - c. Arrangement of microtubules
 - d. Addition of tubulin heterodimer
20. Synaptic signaling involves:
- a. Endocrine signals
 - b. Paracrine signals
 - c. Autocrine signals
 - d. Neurotransmitters
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(Descriptive)

Time : 2 hr. 30 mins.

Marks : 50

[Answer question no.1 & any four (4) from the rest]

- | | |
|--|--------|
| 1. What is cell-cell interaction? Mention in brief about the different cell adhesion proteins. | 3+7=10 |
| 2. Discuss the different kinds of immunoprecipitation techniques. What is the basic principle of ELISA? | 7+3=10 |
| 3. What are cytoskeletons? Write the structural organization of Microtubule, Microfilament and Intermediate filaments with suitable diagrams. | 2+8=10 |
| 4. Explain with a labelled diagram the working principle of fluorescence microscope. Write the differences between light microscope and electron microscope. | 6+4=10 |
| 5. What do you mean by amphipathic molecule? Write a note on different bimolecular component present in plasma membrane. | 2+8=10 |
| 6. Write a note on Cross-linking fixative. Discuss the different factors affecting fixation process. | 5+5=10 |
| 7. What is meant by blotting technique? Describe in detail about the Southern blotting technique. | 2+8=10 |
| 8. State briefly about the radioactivity. Write the process of autoradiography and its application in biology. | 2+8=10 |

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