

(PART-B : Descriptive)

Time: 2 hrs. 40 min.

Marks: 50

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

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| 1. Write short notes on:
a) DNA finger printing.
b) G-coupled receptor. | 5x2=10 |
| 2. a. Explain with a labelled diagram the working principle of a fluorescence microscopy.
b. State the differences between light microscope and electron microscope. | 7+3=10 |
| 3. Why agar is considered as a solidifying agent for culture media preparation? Discuss the different types of culture media. | 2+8=10 |
| 4. Who invented the microtome? What is the principle of microtome? Why paraffin wax is used in microtome sectioning? | 1+5+4=10 |
| 5. What is cell-cell interaction? Mention in brief about the different cell adhesion proteins. | 3+7=10 |
| 6. Define radioactive isotope. State how is the autoradiography useful in identifying various biological molecules. | 4+6=10 |
| 7. Describe how membrane carbohydrates present in human RBC plasma membrane play a crucial role in determining blood group. Discuss briefly the properties of three classes of membrane protein and how they vary among themselves. | 5+5=10 |
| 8. What are the different functions of Cytoskeleton? Explain with proper illustration the structural organisation of Microtubule. | 4+6=10 |

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**M.Sc. ZOOLOGY
FIRST SEMESTER
BIO-INSTRUMENTATION & CELL BIOLOGY
MSZ-102**

(Use separate answer scripts for Objective & Descriptive)

Duration : 3 hrs.

Full Marks : 70

(PART-A : Objective)

Time : 20 min.

Marks : 20

Choose the correct answer from the following:

1X20=20

- Mitotic anaphase differs from metaphase in possessing:
 - Same number of chromosomes and same number of chromatids.
 - Half number of chromosomes and half number of chromatids.
 - Half number of chromosomes and same number of chromatids
 - Same number of chromosomes and half number of chromatids.
- As compared to light microscope, the resolving power of electron microscope is:
 - 5 times
 - 10 times
 - 100 times
 - 1000 times
- Which of the following is a solidifying agent for media?
 - Beef extract
 - Peptone
 - Agar
 - Yeast extract
- Western blotting is the technique for the detection of:
 - Specific DNA in the sample
 - Specific RNA in the sample
 - Specific protein in the sample
 - All of the above
- Excess CO₂ suppress cell growth and productivity by:
 - Inhibiting respiration.
 - Altering intracellular pH by diffusing across cell membrane.
 - Both (a) and (b).
 - Altering pH of the medium.
- Carnoy's solution is a mixture of.....
 - Aqueous chromic acid, Aqueous acetic acid and Distilled water.
 - Ethyl alcohol, Glacial acetic acid and Commercial formalin.
 - Ethanol, Glacial acetic acid and Chloroform.
 - Aqueous alcohol, Aqueous acetic acid and Distilled water.
- Junction that prevents two cell compartments from mixing is.....
 - Gap Junction
 - Desmosomes
 - Cell Junction
 - Tight Junction
- The role of tissue differentiation is mediated mainly by.....
 - Cadherins
 - Selectins
 - Mucins
 - Integrins
- Synaptic signaling involves:
 - Endocrine signals
 - Paracrine signals
 - Autocrine signals
 - Neurotransmitters
- Binding of epinephrine to a G protein linked receptor causes adenylyl cyclase to produce large amounts of.....
 - G protein
 - cAMP
 - Phospholipase C
 - Inositol triphosphate

11. Plasmodesmata:

- a. Encircle cells of a tight junction like a belt.
- b. Connect to intermediate fibers of the cytoskeleton.
- c. Connect the cytoplasm of one plant cell to that of another.
- d. Is the name given to desmosomes of plant cells.

12. Most abundant lipid in plasma membrane is:

- a. Cholesterol
- b. Phospholipids
- c. Sphingolipids
- d. Glycolipids

13. In plasma membrane, carbohydrate present on the:

- a. Both layer of lipid
- b. Only on non-cytoplasmic side of lipid bilayer
- c. Only on cytoplasmic side of lipid bilayer
- d. None of the above

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. 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

16. 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

17. All the following are thermostable polymerases except:

- a. Taq polymerase
- b. Vent polymerase
- c. DNA polymerase
- d. Pfu polymerase

18. The transmittance of light is:

- a. Directly proportional to absorption light.
- b. Inversely proportional to absorption light.
- c. Directly proportional to that of the monochromatic light.
- d. Inversely proportional to that of the monochromatic light.

19. 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 tubulin subunits in the spindle microtubule causing disassembly to free units.

- a. R,S,T
- b. Q,R,S
- c. P,R,S
- d. P,Q,R

20. Kinesin and Dynein:

- a. Are two subunits of microtubules.
- b. Are motor proteins that generate sliding of the sarcomere.
- c. Create the crawling of motion of Amoeba.
- d. Are motor proteins that generate movement associated with microtubules.

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