SET A

M.Sc. ZOOLOGY
FIRST SEMESTER (SPECIAL REPEAT)
BIOINSTRUMENTATION & CELL BIOLOGY
MSZ-102

[USE OMR SHEET FOR OBJECTIVE PART]

Duration: 3 hrs. **Full Marks: 70**

(Objective)

Time: 30 mins. **Marks: 20**

Choose the correct answer from the following: ***1×20=20***

1. 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

2. When used in *in situ* hybridization, RNA probes are_____ to the sample's RNA.
   a. Complementary
   b. Identical
   c. Supplementary
   d. Similar

3. Lipid anchored proteins are bound to membrane by a complex oligosaccharide linked to a molecule of:
   a. Phosphatidylcholine
   b. Phosphatidylinositol
   c. Phosphatidylserine
   d. Phosphatidic acid

4. 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

5. Most abundant lipid in plasma membrane is:
   a. Cholesterol
   b. Phospholipids
   c. Sphingolipids
   d. Glycolipids

6. As compared to light microscope, the resolving power of electron microscope is:
   a. 5 times
   b. 10 times
   c. 100 times
   d. 1000 times

7. Western blotting is the technique for the detection of:
   a. Specific DNA in the sample
   b. Specific RNA in the sample
   c. Specific protein in the sample
   d. All of the above

8. In ELISA which of the following molecule is adsorbed on the solid microtiter plate?
   a. Antibody
   b. Antigen
   c. Both a and b
   d. None of the above

9. In flow cytometry the side scattering of the cell is related to_____ of the cell.
   a. Granularity
   b. Size
   c. Shape
   d. All of the above

10. 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

11. Accuracy of flow cytometry is due in part to what technique?
   a. Hydrodynamic focusing
   b. Antigen –antibody reaction
   c. Fluorescence
   d. None of these

12. Which of the following is used in electron microscope?
   a. Electron beams
   b. Magnetic fields
   c. Light waves
   d. Electron beams and magnetic fields

13. Cryopreservation is a technique used for preservation of:
   a. Tissues
   b. Semen
   c. Embryo
   d. All of these

14. In which stage of meiosis synapsis takes place?
   a. Pachytene
   b. Zygotene
   c. Diplotene
   d. Metaphase I

15. The technique of breaking a frozen specimen to reveal internal structures:
   a. Cryosurgery
   b. Freeze fracture
   c. Freeze etching
   d. Cryofixation

16. 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

17. Junction that prevents two cell compartments from mixing is_____.
   a. Gap Junction
   b. Desmosomes
   c. Cell Junction
   d. Tight Junction

18. Synaptic signaling involves:
   a. Endocrine signals
   b. Paracrine signals
   c. Autocrine signals
   d. Neurotransmitters

19. Which of the following is a metachromatic stain?
   a. Janus green- B
   b. Fuchsine
   c. Azure B
   d. Toluidine blue

20. 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

-- --- --

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. State the differences between mitosis and meiosis cell division. What is cryopreservation and how is it useful in In vitro fertilization technique. Mention the principle of flow cytometry. 5+3+2=10

3. Discuss elaborately with illustrative diagram the lipid composition of plasma membranes. Write a note on its asymmetric distribution in both the layers. 6+4=10

4. Write a note on Cross-linking fixative. Discuss the different factors affecting fixation process. 5+5=10

5. a) Explain the various types of immunoprecipitation techniques. 6+4=10
   b) State the differences between light microscope and electron microscope.

6. Describe in details the different types of ELISA techniques. 10

7. What do you mean by amphipathic molecule? Write a note on different bimolecular component present in plasma membrane. 2+8=10

8. State briefly about the radioactivity. Write the process of autoradiography and its application in biology. 2+8=10

= = *** = =