

M.Sc. ZOOLOGY
THIRD SEMESTER (SPECIAL REPEAT)
CELL AND MOLECULAR BIOLOGY-I
MSZ-303 A
[USE OMR SHEET FOR OBJECTIVE PART]

SET
A

Duration: 3 hrs.

Full Marks: 70

Time: 30 mins.

Marks: 20

(Objective)

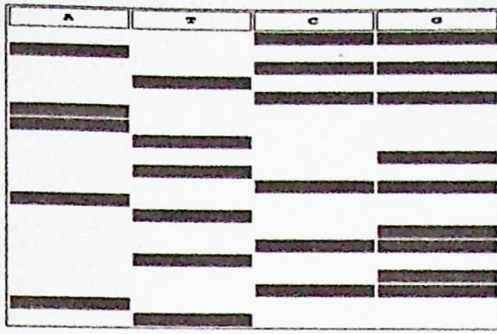
Choose the correct answer from the following:

1 × 20 = 20

- Which of the following molecules cannot get through the plasma membrane directly?
 - Water
 - Starch
 - Amino acids
 - All of these
- The fluidity of the plasma membrane increases with_____.
 - Increase in the saturated fatty acid
 - Increase in the unsaturated fatty acid
 - Increase in the phospholipid content
 - Increase in the glycolipid lipid
- The patches of cholesterol and _____ are referred to as lipid rafts.
 - Phospholipid
 - Glycolipid
 - Sphingolipid
 - None of these
- Which of the following type of intercellular junction proteins allows dissolved molecules and electrical signals to pass between adjacent cells?
 - Tight junctions
 - Gap junctions
 - Desmosomes
 - All of these
- Glycoproteins and Glycolipids are important for_____.
 - Facilitated diffusion
 - Active transport
 - Cell-cell recognition
 - Signal transduction pathways
- Co-transport may involve:
 - Active transport of two solutes through a transport protein
 - Ion diffusion against the electrochemical gradient created by an electrogenic pump
 - First and second messengers in single transduction pathway
 - Transport of one solute against its concentration gradient in tandem with another that is diffusing down its concentration gradient
- The most important function of nuclear envelope is to:
 - Regulate nucleocytoplasmic traffic
 - Protect genetic material
 - Prevent the entrance of active ribosomes into the nucleus
 - Synthesis rRNAs
- Which of the following is correct regarding genomics?
 - It includes mapping of genome
 - It include genome sequencing
 - It includes genome analysis
 - All of these

9. Nucleolus is a prominent acidophilic spherical body in the nucleus. The function is:
- RNA synthesis
 - DNA synthesis
 - Histone synthesis
 - Ribosomal subunit synthesis
10. The number of snoRNAs present in nucleoli are around:
- 300
 - 28
 - 200
 - 45
11. In the mechanism of lipid peroxidation, the superoxides combine with H_2O to form H_2O_2 with the help of an enzyme:
- Superoxide dismutase
 - Peroxide synthetase
 - Superoxide peroxidase
 - Peroxide transferase
12. In the process of lipid peroxidation, free radicals mostly damages following type of lipids-
- Phospholipids
 - Ceramide
 - Sphingomyline
 - Cholesterol
13. Which of the following is NOT a reason for inducing hypoxia in a cell?
- Radiation
 - Chemical and Drugs
 - Nutritional imbalance
 - Dehydration
14. Irreversible cell injury is characterized by:
- Dispersion of ribosomes
 - Lysosomal rupture
 - Cell swelling
 - Cell membrane defects
15. The enzymatic method of DNA sequencing:
- Uses RNA as template
 - Uses ddNTP in which the deoxyribose 3'-OH is present
 - Uses ddNTP in which the deoxyribose 3'-OH is missing
 - Uses different chemical treatment to cleave DNA preferentially at A, T, C or G
16. Which type of DNA cleavage is done in the Maxam Gilbert method?
- Edge
 - Base Specific
 - Interstitial
 - Gene Specific
17. If we have 2 dATPs, 1 dCTP, 1 ddCTP, and 2 ddGTPs in one reaction tube, which of the following strands could be produced from a sample containing the following template strand: 5'-GCTTGGCTTAACCAGATATCCACTG-3' with the following primer: 5'-CAGTGGGAATATCTGGTT-3'?
- 5'-CAGTGGGAATATCTGGTTAAG-3'
 - 5'-CAGTGGGAATATCTGGTTAAGCC-3'
 - 5'-CAGTGGGAATATCTGGTTAAGCCAA-3'
 - All are possible

18.



Based on this figure, which lane contains the shortest DNA strand?
(Assume the anode is at the bottom)

- a. Lane A
 - b. Lane T
 - c. Lane C
 - d. Lane G
19. PAUP is a bioinformatics software used in:
- a. Homology searching
 - b. Phylogenetic tree construction
 - c. Database searching
 - d. Visualising 3D structure of protein
20. Ion channels:
- a. Are opened either by binding of ligands or by changes in electric potential across the membrane
 - b. Require ATP
 - c. Both a and b
 - d. None of these

(Descriptive)

Time : 2 hr. 30 mins.

Marks : 50

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

- | | |
|---|----------|
| 1. What do you mean by DNA sequencing? Explain briefly the Chain termination method of DNA sequencing. How it is different from Chemical degradation method. | 2+6+2=10 |
| 2. What is the significance of nuclear speckles? What is the function of snoRNAs? | 5+5=10 |
| 3. Describe the process of receptor mediated endocytosis. How are ions transported across the plasma membrane? | 5+5=10 |
| 4. What do you mean by mitochondrial eve? Describe in detail about the mt Genome and its significance. | 3+7=10 |
| 5. Define genome mapping. State how you would determine physical map of a particular gene. | 2+8=10 |
| 6. What roles do lamins play in nuclear structure and function? What determines the directionality of nuclear import? | 5+5=10 |
| 7. Why is it advantageous for the plasma membrane to be fluid in nature? Name the specialized proteins that are embedded in the phospholipid bilayer and describe the function of each. | 5+5=10 |
| 8. Write short notes on:
a) Lipid peroxidation
b) Multiple Sequence Alignment | 5+5=10 |

= = *** = =