

M.Sc. ZOOLOGY
FOURTH SEMESTER
CELL AND MOLECULAR BIOLOGY-III
MSZ-401(A)
(USE OMR FOR OBJECTIVE PART)

SET
A

Duration: 3 hrs.

Full Marks: 70

Time: 30 min.

(Objective)

Marks: 20

1X20=20

Choose the correct answer from the following:

1. Apoptosis can't kill which of the following?
 - a. Cell infected with viruses
 - b. Cell with DNA damage
 - c. Cancer cells
 - d. Immune cells
2. Changes in intracellular substances during ageing include
 - a. increased cross linkages of collagen
 - b. loss of elasticity in elastic tissues
 - c. loss of resilience in connective tissue
 - d. all of above
3. Mutation in which cell organelle leads to defect in energy production and formation of ROS?
 - a. Nucleus
 - b. Mitochondria
 - c. Golgi body
 - d. Rough ER
4. What is angiogenesis?
 - a. Differentiation process
 - b. Growth factors
 - c. Contact inhibition
 - d. Blood vessel formation
5. Oncogenes are the cancer causing genes in the cell but they do not express usually. This is because of the presence of -
 - a. Proto oncogene
 - b. Tumour Promoter gene
 - c. Tumour suppressor gene
 - d. Transposons
6. The gene responsible for apoptosis in *C. elegans* is
 - a. Caspase-8
 - b. CED-3
 - c. TNF
 - d. FAD
7. The G-protein coupled receptors have theiroutside the cell.
 - a. amino terminus
 - b. carboxyl terminus
 - c. alpha helices
 - d. beta helices
8. The inactive conformation of a G-protein coupled receptor is stabilized by
 - a. covalent interactions
 - b. hydrogen binding
 - c. non-covalent interactions
 - d. ionic interactions

9. The drug colchicine promotes microtubule
 - a. disassembly
 - b. assembly
 - c. acidification
 - d. condensation
10. The identification of actin filaments in a cell can be done by using the protein
 - a. myosin
 - b. kinesin
 - c. globulin
 - d. vimentin
11. What is the basis for the classification of the family of receptor tyrosine kinases into subfamilies?
 - a. Differences in the structure of the extracellular domain
 - b. Differences in the number of the extracellular domain
 - c. Differences in the function of the extracellular domain
 - d. Differences in the structure of the intracellular domain
12. In Sanger sequencing, what causes chain termination?
 - a. Heat
 - b. DNA ligase
 - c. Dideoxynucleotides (ddNTPs)
 - d. Restriction enzymes
13. What is the main principle behind shotgun sequencing?
 - a. Sequencing entire chromosomes in one read
 - b. Cutting DNA into random fragments and assembling them
 - c. Using RNA to make DNA
 - d. Reading DNA by protein translation
14. What percentage of the human genome actually codes for proteins?
 - a. 2%
 - b. 80%
 - c. 100%
 - d. 50%
15. Which enzyme is commonly used in PCR to withstand high temperatures?
 - a. Taq polymerase
 - b. DNA ligase
 - c. RNA polymerase
 - d. EcoRI
16. In which type of PCR is a second round of amplification performed using primers internal to the first set?
 - a. Real-Time PCR
 - b. Nested PCR
 - c. Digital PCR
 - d. Touchdown PCR
17. What is the first step in performing a DNA microarray experiment?
 - a. DNA extraction
 - b. Hybridization of probes
 - c. RNA extraction and conversion to cDNA
 - d. Washing of the chip

18. What is produced when a restriction enzyme makes staggered cuts in DNA?
- a. Double helix
 - b. Blunt ends
 - c. Sticky ends
 - d. RNA primers
19. Flow cytometry is used to
- a. Amplify DNA sequences
 - b. Culture microbes
 - c. Analyze properties of cells and particles
 - d. All of the above.
20. pBR322 is an example of a:
- a. Yeast vector
 - b. Bacterial plasmid vector
 - c. Viral vector
 - d. Mammalian expression vector

(Descriptive)

Time : 2 hrs. 30 min.

Marks : 50

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

- | | |
|--|--------|
| 1. Write short notes on:
a) Plasmid vector
b) DNA microarray | 5+5=10 |
| 2. Differentiate malignant tumor with benign tumor. Explain the development of cancer cell with proper illustrations | 4+6=10 |
| 3. Discuss different techniques used for gene isolation and their applications | 6+4=10 |
| 4. What do you mean by apoptosis? Explain the intrinsic pathway of apoptosis with proper diagram. | 2+8=10 |
| 5. Describe the principle and procedure of PCR technique. What is the difference between Nested PCR and RT-PCR. | 6+4=10 |
| 6. Describe the working mechanism of flow cytometry and write two applications of it. | 8+2=10 |
| 7. Discuss the basic structure and working mechanism of Receptor Tyrosine Kinase. | 10 |
| 8. Describe the structure and dynamics of Intermediate Filaments with necessary diagrams. | 10 |

== *** ==