

M.Sc. ZOOLOGY
FOURTH SEMESTER
CELL & MOLECULAR BIOLOGY II
MSZ – 402A

(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

- Which of the following plasma membrane receptors activate signalling pathways usually by forming molecular dimers that result in protein phosphorylation reactions upon binding of their specific ligand?
 - Steroid hormone receptors
 - Receptor tyrosine kinases
 - Ligand-gated ion channels
 - G protein-coupled receptors
- Which of the following catalyzes the cutting of PIP₂ into 2 moles of IP₃ and diacylglycerol in cell signaling?
 - Phosphokinase C
 - Phospholipase C
 - Lipokinase
 - Phosphodiesterase C
- Which of the following is not a direct function of cAMP?
I. Amplification of signal II. Phosphorylation of molecules III. Activation of kinases
 - I and III
 - only I
 - I, II & III
 - only II
- Neurofibrillary tangles, found in the brain cells of persons with neurodegenerative disorders consists of _____
 - Intermediate filaments
 - Microtubule-associated proteins
 - Microtubules
 - Phospholipids.
- Which of the following are intracellular second messengers?
 - Acetylcholine
 - Glycine
 - IP₃
 - Glutamate
- Which of the following is the basic requirement of PCR reaction?
 - Two oligonucleotide primers
 - DNA segment to be amplified
 - A heat-stable DNA polymerase
 - All of the above
- Primers used for the process of polymerase chain reaction are _____.
 - Single-stranded RNA oligonucleotide
 - Single-stranded DNA oligonucleotide
 - Double-stranded RNA
 - Single-stranded DNA oligonucleotide oligonucleotide
- Why are copy numbers important in a cloning experiment?
 - Maximum expression
 - Ease of manipulation
 - Cost efficiency
 - Availability of stock

9. The Ti plasmid is found in
- Agrobacterium*
 - Yeast as a 2mm plasmid
 - Rhizobium* of the roots of leguminous plants
 - Azotobacter*
10. A single-stranded, radiolabelled molecule of nucleic acids is called
- plasmid
 - vector
 - probe
 - selectable marker
11. Genome wise gene expression analysis is performed using
- DNA microarrays
 - Northern analysis
 - Real Time PCR
 - None of the above
12. The locations in human genome which differ by single base difference is called
- Single nucleotide mutation
 - Single nucleotide polymorphism
 - RFLP
 - Single nucleotide polymorphogenesis
13. Which of the following methodology is used to identify all the genes that are expressed as RNA in Human Genome Project (HGP)?
- Sequence Annotation
 - Expressed Sequence Tags
 - Karyotyping
 - Ammonification
14. A cell may make different sets of proteins at different times or under different conditions
- TRUE
 - FALSE
15. Apoptosis can't kill which of the following?
- Cell infected with viruses
 - Cell with DNA damage
 - Cancer cells
 - Immune cells
16. Changes in intracellular substances during aging includes
- Increased cross linkages of collagen
 - loss of elasticity in elastic tissues
 - loss of resilience in connective tissue
 - All of above
17. Mutation in which cell organelle leads to defect in energy production and formation of ROS?
- Nucleus
 - Mitochondria
 - Golgi body
 - Rough ER
18. Cancer is often the result of activation of ____ to ____ and the inactivation of ____ genes.
- oncogenes, tumor-suppressor genes, proto-oncogenes
 - proto-oncogenes, oncogenes, tumor-suppressor genes
 - oncogenes, proto-oncogenes, tumor-suppressor genes
 - proto-suppressor genes, suppressors, oncogenes
19. Oncogenes are the cancer causing genes in the cell but they do not express usually. This is because of the presence of -
- Proto oncogene
 - Tumour Promoter gene
 - Tumour suppressor gene
 - Transposons

20. The gene responsible for apoptosis in *C.elegans* is -----?
- a. Caspase-8
 - b. CED-3
 - c. TNF
 - d. FAD

PART-B : Descriptive

Time : 2 hrs. 40 min.

Marks : 50

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

1. What do you mean by apoptosis? Explain the intrinsic pathway of apoptosis with proper diagram. 2+8=10
2. What are receptor tyrosine kinases? Explain with diagram the working mechanism of RTK. 2+8=10
3. Write a note of the dynamics of Intermediate filament? Describe the structural significance of kinesin molecule in its role as motor protein 5+5=10
4. What is chromosome painting? Discuss the different uses of DNA microarray technique. 2+8=10
5. Discuss in details with examples about the different DNA modifying enzymes. Write the principle of PCR. 8+2=10.
6. Describe in details the splicing mechanism of intron. Write the significance of splicing. 8+2=10
7. Differentiate malignant tumor with benign tumor. Explain the development of cancer cell with proper illustrations 5+5=10
8. Discuss about the different tools used in human genome project. What were the goals of human genome project? 7+3=10

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