

(PART-B : Descriptive)

Time : 2 hrs. 40 min.

Marks : 50

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

1. Why cancer cells are said to be monoclonal in origin? Write the differences between a normal cell & a cancer cell. Explain with diagram, the development of Cancer cell from normal cell. 2+3+5=10
2. What is apoptosis? What are the different pathways of apoptosis? Explain with proper illustration about intrinsic pathway of apoptosis. 2+2+6=10
3. a. How will you perform the amplification of a DNA fragment with the help of a PCR apparatus? 6+4=10
b. Write a detailed note on the applications of PCR.
4. What is flow cytometry? Explain how it is used in cell sorting and analyzing the apoptotic cells. 2+8=10
5. What is Human Genome Project (HGP)? How it has been achieved? Write its salient features. 2+3+5=10
6. Write short notes on: 5+5=10
a. Gene isolation.
b. Genome libraries.
7. Write a note on Ion- channel linked receptors. Describe the working mechanism of Acetylcholine receptor. 5+5=10
8. Explain the ultra structure of Kinesin molecule with diagram. Explain the role of Microtubules as agents of Intracellular motility. 4+2+4=10

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

(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

1. A membrane transport is said to be a carrier protein if:
 - a. It forms an open pore through which a molecule can diffuse.
 - b. An electrochemical gradient is necessary for transport to occur.
 - c. It only allows transport down a concentration gradient.
 - d. It binds to the molecule and changes shape during transport.
2. The substrate for restriction enzyme is:

a. Single stranded RNA	b. Double stranded RNA
c. Cell wall proteins	d. Double stranded DNA
3. To be a vector, a plasmid does not require:

a. An origin of replication	b. An antibiotic resistance gene
c. A restriction site	d. To have a high copy number
4. The original enzyme used in PCR reaction is:

a. DNA polymerase	b. RNA polymerase
c. Taq polymerase	d. All of the above
5. Rapid method of chromosome identification in intersex is:

a. FISH	b. PCR
c. Karyotyping	d. None of the above
6. What roles in regulating the intrinsic pathway of apoptosis are played by the Bcl-2 protein family members Bax & Bcl-2?
 - a. Bax inhibits apoptosis while Bcl-2 stimulates apoptosis.
 - b. Bax stimulates apoptosis while Bcl-2 inhibits apoptosis.
 - c. Both Bax & Bcl-2 inhibit apoptosis.
 - d. Both Bax & Bcl-2 stimulates apoptosis.
7. Which of the following are killed by extrinsic apoptosis pathway?
 - a. Cells with damaged DNA.
 - b. Developing nerve cells that fail to make profitable connections.
 - c. Irradiated cells.
 - d. Virus infected cells.
8. Which of the following statement about aging is not true?
 - a. Mutation rate in mitochondria is 10-20 times faster than the nuclear DNA mutation rate.
 - b. Vitamin A & C are inhibitors of ROS.
 - c. Mutation in *methuselah* gene in *Drosophila* stimulates production of ROS.
 - d. Both b & c.

9. Which of the following statement about 'Rb' tumor suppressor protein is corrected?
- Rb is activated when phosphorylated by Cdk.
 - Rb finds the transcription factor E2F and thus prevents the cell from entering S-phase.
 - Rb is a transcription factor.
 - All the above statement.
10. Which of the following is a characteristic of a malignant rather than a benign tumour?
- Undergoes metastasis.
 - Develops a blood supply.
 - Cells divide an ultimate number of times.
 - Grows without needing a growth signal.
11. Genomic library is normally made by:
- α phage vector
 - λ phage vectors
 - β phage vectors
 - γ phage vectors
12. Long probes are usually made by:
- Gene expression
 - Cloning
 - Hybridization
 - PCR
13. Cutting certain genes out of molecules of DNA requires the use of special:
- Degrading nucleases
 - Restriction endonucleases
 - Eukaryotic enzymes
 - Viral enzymes
14. The enzyme used in the polymerase chain reaction is:
- Restriction endonuclease
 - Reverse transcriptase
 - DNA polymerase
 - RNA polymerase
15. The human genome project began as researchers mapped _____ and sites of cytogenetic abnormalities.
- RFLPs
 - Lods
 - PCRs
 - VNTRs
16. Which out of the following statements is true about G-protein couple receptors?
- The N-terminal chain is extracellular and C-terminal chain is intracellular.
 - It contains 5 trans-membrane hydrophobic sections.
 - There are more extracellular loops than intracellular loops.
 - The binding region for G-protein involves 2 extracellular loops.
17. Which out of the following is not involved in signal transduction by β -adrenergic receptor pathway?
- GTP
 - ATP
 - cAMP
 - cGMP
18. Which of the following statements is not true about a ligand-gated ion channel receptor?
- Ligand-gated ion channel receptors are present in the cell membrane.
 - Neurotransmitters can act as the chemical messengers for ligand-gated ion channels.
 - Ligand-gated ion channels consist of five glycoproteins.
 - Differences in membrane potential affect whether ligand-gated ion channel receptors open or close.
19. Which second messenger signals the release of Ca^{++} from the endoplasmic reticulum?
- Cyclic AMP
 - Cyclic GMP
 - 1,2 diacyl glycerol
 - Inositol triphosphate
20. The intermediate filament present in nail and hair is a type I IF protein made of:
- Lamins
 - Vimetins
 - Keratins
 - Tubulins