

**LMDE/D-23**

**MOLECULAR CELL BIOLOGY**

Paper : BT-103

Time : Three Hours]

[Maximum Marks : 80

**Note :** Attempt Question No. 1 which is compulsory and four others selecting *one* question from each unit. All questions carry equal marks.

**Compulsory Question**

**1.** Explain the following briefly :

- (i) How does signaling by hydrophobic molecules like steroid hormones differ from signaling by peptide hormones?
- (ii) What is the difference between necrosis and programmed cell death?
- (iii) Explain the statement that 'Genetic code is Universal'.
- (iv) What is the 26S proteasome?
- (v) What are enhancers and repressors?
- (vi) What are frameshift mutations?
- (vii) What is the role of Chaperones?
- (viii) What is the role of cyclins and cyclin dependent kinases in the cell cycle? (2×8=16)

## **UNIT-I**

2. (a) Discuss the theories of origin and evolution of life. (8)
- (b) What was Griffith's experiment and why was it important? (8)
3. (a) What is Recombinant DNA? Give a brief account of molecular tools used in recombinant DNA technology. (10)
- (b) What is RNAi and how does it work? (6)

## **UNIT-II**

4. (a) What is the Nuclear Envelope and its function? Briefly describe the components of nuclear envelope. (8)
- (b) Elaborate the mechanism of selective transport of proteins to the nucleus. (8)
5. (a) What is protein sorting and transport? Discuss the mechanisms of vesicular transport. (10)
- (b) What are Lysosomes and how are they formed? (6)

## **UNIT-III**

6. (a) Discuss the structure and function prokaryotic DNA polymerases. (8)

- (b) Explain the mechanism of methyl directed mismatch repair for DNA damage. (8)
7. (a) Describe processing of messenger RNA. (8)
- (b) Explain the process of protein degradation and its significance. (8)

#### UNIT-IV

8. (a) How does the PI 3-Kinase/Akt pathway regulate cellular protein synthesis in response to growth factor stimulation? (8)
- (b) Why does a cell undergo apoptosis? Present a review of apoptosis pathways. (8)
9. (a) What are the characteristics of stem cells? Discuss their therapeutic applications. (8)
- (b) What is cancer and its causes? Discuss the role of molecular biology in cancer prevention and treatment. (8)
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