

M.Sc. BIOTECHNOLOGY
First Semester (Repeat)
CELL & MOLECULAR BIOLOGY
(MBT - 101)

Duration: 3Hrs.

Full Marks: 70

Part-A (Objective) =20
Part-B (Descriptive) =50

(PART-B: Descriptive)

Duration: 2 hrs. 40 mins.

Marks: 50

Answer any four from Question no. 2 to 8
Question no. 1 is compulsory.

1. What is cell cycle? Describe the regulation involve in it. (2+8=10)
2. Write short notes on *any two* of the following: (5×2=10)
 - a) Chloroplast
 - b) Golgi complex
 - c) RNA interference
 - d) Genetic codes
3. Describe the structure and function of ATP synthase. (10)
4. Why is the primer-template junction an obligate requirement of DNA replication?
How does DNA polymerase increase the fidelity of DNA replication? (2+8=10)
5. What is an inducible operon? Explain with an example. (2+8=10)
6. What are microtubules and microfilament? Describe the organisation of microtubules. (5+5=10)
7. What are the different types of cell communication? Explain the role of G protein in signal transduction. (5+5=10)
8. Why is DNA repair system important for the survival of an organism? Describe two repair mechanism used by prokaryotes to rectify damage in their DNA. (2+8=10)

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Duration: 20 minutes

Marks – 20

(PART A - Objective Type)

I. Choose the correct answer:

1×20=20

- Which protein is involved in tumor suppression?
a) p53 b) s15
c) Rab d) All of the above
- Methylation of Histone-3 proteins takes place at the amino acid residue:
a) Lysine b) Tyrosine
c) Serine d) Tryptophan
- In bacteria, the genes that code for the enzymes of a metabolic pathway are usually arranged consecutively to form a functional unit called:
a) an inducible system b) an end-product repression system
c) an operon d) a consecutive enzyme system
- Isotopes used for proving semi-conservative nature of DNA replication are:
a) N¹⁴ and P³¹ b) N¹⁴ and N¹⁵
c) N¹⁴ and C¹⁴ d) C¹⁴ and P³¹
- The name of the protein involve in outer membrane transportation in mitochondria is
a) TOM b) TIM
c) Both d) Rab
- Which of the following organelle has DNA?
a) Mitochondria b) Golgi complex
c) Ribosomes d) Nucleus
- Which of the following is involved in RNA interference?
a) siRNA b) riRNA
c) cRNA d) snRNA
- Movement of segment of DNA from one site of genome to another is called:
a) mutation b) cleavage
c) reversion d) transposition
- Jak kinase is involved in:
a) cell cycle b) cell adhesion
c) cell elongation d) cell signalling

- Synthesis of mRNA on DNA template is:
a) unidirectional.
b) bidirectional.
c) bidirectional with the help of primers.
d) unidirectional with the help of primers.
- Which of the following property is not associated with DNA polymerase 1?
a) 5' to 3' exonuclease activity b) 5' to 3' endonuclease activity
c) 3' to 5' exonuclease activity d) 5' to 3' polymerase activity
- Mature eukaryotic mRNAs have a 5' cap that is residue of:
a) 2-methylguanosine b) 3-methylguanosine
c) 5-methylguanosine d) 7-methylguanosine
- Which of the following is an epigenetic factor for gene expression in eukaryotes?
a) recombination b) DNA methylation
c) protein phosphorylation d) DNA protein interaction
- If a genetic code is degenerate, it means that:
a) a given base triplet can code for more than one amino acid.
b) there is no punctuation in the code sequences.
c) the third base in a codon is not important in coding.
d) a given amino acid can be coded by more than one base triplet.
- The genome of the bacteria is also known as:
a) nucleus b) nucleoid
c) neoplasm d) chromatin
- Which of the following is not true for microtubules?
a) They are cytoskeleton b) Provide cell shape and motility
c) They are made up of protein d) They are non polar
- Which of the following is also known as selfish DNA?
a) Transposons b) miRNA
c) siRNA d) shRNA
- The junction that does not allow even the water molecules to pass is known as:
a) tight junction b) desmosomes
c) plasmodesmata d) gap junction
- The expression of the *trp* operon in *E. coli* is regulated in parts by the availability of the amino acid tryptophan. This regulatory process is referred to as:
a) attenuation b) translational read-through
c) antitermination d) non-sense suppressor
- CDK is associated with:
a) cell signalling b) cell cycle
c) transcription d) translation
