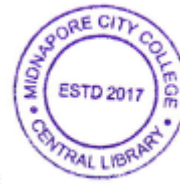


The West Bengal University of Health Sciences
B.Sc. in Medical Microbiology 4th Semester September - October, 2026
Examination

Subject : Molecular Biology

Time : 2 hrs.

Attempt all questions



Full Marks : 50

1. Tick the correct answer :

10 x 1

- a) DNA replication is called semi-conservative because :
 - i) Both strands are newly synthesized.
 - ii) Each daughter DNA has one old and one new strand.
 - iii) Both strands are conserved.
 - iv) Only one strand is synthesized.
- b) In eukaryotic mRNA processing, the 5' cap is made of :
 - i) Poly(A) tail.
 - ii) 7-methyl guanosine.
 - iii) Introns.
 - iv) Exons.
- c) Which of the following is **NOT** a post-translational modification?
 - i) Glycosylation.
 - ii) Phosphorylation.
 - iii) Splicing.
 - iv) Ubiquitination.
- d) In the absence of tryptophan, the trp operon is :
 - i) Repressed.
 - ii) Activated.
 - iii) Attenuated.
 - iv) Silent.
- e) The enzyme that repairs thymine dimers using visible light is :
 - i) DNA ligase.
 - ii) Photolyase.
 - iii) DNA glycosylase.
 - iv) DNA polymerase.
- f) The F plasmid (F factor) in bacterial conjugation carries genes responsible for :
 - i) Antibiotic resistance.
 - ii) Virulence factors.
 - iii) Metabolic functions.
 - iv) All of the above.
- g) An episome is :
 - i) A plasmid integrated into the host chromosome.
 - ii) A defective plasmid.
 - iii) A plasmid with low copy number.
 - iv) A phage genome.
- h) Bacterial conjugation requires :
 - i) Pili.
 - ii) Ribosomes.
 - iii) Lysosomes.
 - iv) DNA polymerase.
- i) Generalized transduction is mediated by :
 - i) Lysogenic phages.
 - ii) Virulent phages.
 - iii) Temperate phages only.
 - iv) Episomes.
- j) The Shine-Dalgarno sequence is important in :
 - i) DNA replication.
 - ii) Transcription initiation.
 - iii) Translation initiation in prokaryotes.
 - iv) RNA splicing.

2. Answer **any four** of the following questions :

4 x 2

- a) What do you mean by polyadenylation of RNA?
- b) Write down the functions of DNA polymerase I and III in DNA replication.
- c) What is R plasmid? Give example
- d) What do you mean by copy number of a plasmid?
- e) Write mechanism of the splicing in brief.
- f) What is tRNA charging?

3. Answer **any four** of the following questions :

4 x 4

- a) Compare inducible vs repressible operons.
- b) Differentiate between leading and lagging strand synthesis.
- c) What is BER and NER?
- d) Write down mismatch repair that occurs after a DNA being damaged.
- e) Write a short note on episomes.
- f) Differentiate between conjugative and non-conjugative plasmids.

4. Answer **any two** of the following questions :

2 x 8

- a) What is operon? Define regulator gene and operator gene. Discuss the significance of the 5' cap in mRNA.
- b) Discuss the process of translation in prokaryotes including initiation, elongation, and termination.
- c) What is plasmid incompatibility? Describe the mechanism of bacterial conjugation with the help of F plasmid.