



## BRAINWARE UNIVERSITY

Term End Examination 2025-2026

Programme – B.Sc.(MLT)-2022/B.Sc.(MLT)-2023

Course Name – Medical Molecular Biology & Biotechnology

Course Code - BMLTC603

( Semester VI )

Full Marks : 60

Time : 2:30 Hours

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

### Group-A

(Multiple Choice Type Question)

1 x 15=15

1. Choose the correct alternative from the following :

- (i) Which polymerase has proofreading ability?
  - a) DNA Polymerase I
  - b) Primase
  - c) RNA Polymerase
  - d) Reverse Transcriptase
- (ii) Which type of mutation results in a premature stop codon?
  - a) Missense
  - b) Nonsense
  - c) Silent
  - d) Frameshift
- (iii) Which enzyme removes RNA primers?
  - a) Helicase
  - b) DNA Polymerase I
  - c) DNA Polymerase III
  - d) Ligase
- (iv) In eukaryotes, DNA replication occurs during:
  - a) G1 phase
  - b) S phase
  - c) G2 phase
  - d) M phase
- (v) Identify the primary protein component of the nucleosome:
  - a) RNA polymerase
  - b) Histone proteins
  - c) DNA polymerase
  - d) Ligase
- (vi) Which type of RNA polymerase transcribes rRNA in eukaryotes?
  - a) RNA Polymerase I
  - b) RNA Polymerase II
  - c) RNA Polymerase III
  - d) RNA Polymerase IV
- (vii) Small nuclear RNAs (snRNAs) are essential for:
  - a) Ribosome assembly
  - b) RNA splicing
  - c) DNA replication
  - d) mRNA degradation
- (viii) Which structure removes introns from pre-mRNA?
  - a) Spliceosome
  - b) Exonuclease
  - c) Ribosome
  - d) Helicase
- (ix) How does wobble base pairing contribute to translation?

- a) Enhances the accuracy of translation      b) Allows a single tRNA to recognize multiple codons
- c) Stops protein synthesis      d) Binds aminoacyl-tRNA synthetase to ribosomes
- (x) Which model explains homologous recombination in prokaryotes?
- a) Holliday model      b) Conservative model
- c) Rolling-circle model      d) Semiconservative model
- (xi) What is the role of oncogenes in cancer?
- a) Promote cell cycle arrest      b) Suppress apoptosis
- c) Enhance cell proliferation      d) Repair DNA damage
- (xii) What is the function of caretaker genes?
- a) Promote mutations      b) Maintain genomic stability
- c) Inhibit cell differentiation      d) Activate oncogenes
- (xiii) What type of mutation in proto-oncogenes leads to cancer?
- a) Frameshift mutation      b) Loss-of-function mutation
- c) Gain-of-function mutation      d) Silent mutation
- (xiv) Which type of RNA carries amino acids to the ribosome during translation?
- a) mRNA      b) tRNA
- c) rRNA      d) snRNA
- (xv) What is the function of tumor suppressor genes?
- a) Promote cell growth      b) Repair DNA damage
- c) Inhibit apoptosis      d) Induce mutations

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#### Group-B

(Short Answer Type Questions)

3 x 5=15

2. Describe the elongation phase of translation. (3)
3. State the function of DNA polymerase. (3)
4. Explain the wobble hypothesis and its significance. (3)
5. Describe how angiogenesis contributes to tumor growth. (3)
6. Compare euchromatin and heterochromatin based on structure and function. (3)

OR

Analyze the clinical implications of chromatin remodeling defects in human diseases. (3)

#### Group-C

(Long Answer Type Questions)

5 x 6=30

7. Write about the experiments by which DNA is established as genetic material (5)
8. Describe the role of DNA polymerase  $\alpha$ ,  $\delta$ , and  $\epsilon$  in eukaryotic DNA replication. (5)
9. Explain the structure and composition of the nucleosome. (5)
10. Write the differences between prokaryotic and eukaryotic transcription. (5)
11. Evaluate the impact of immunotherapy in cancer treatment. (5)
12. Evaluate the medical significance of mismatch repair defects in cancer development. (5)

OR

Compare and contrast homologous recombination and non-homologous end joining in DNA double-strand break repair. (5)

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