



## BRAINWARE UNIVERSITY

Term End Examination 2023-2024  
Programme – M.Sc.(MB)-2022/M.Sc.(MB)-2023  
Course Name – Molecular Biology  
Course Code - MMBC201  
( Semester II )

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) Recall, denaturation of DNA molecule can be studied by measuring its absorbance at a wave length
- |           |           |
|-----------|-----------|
| a) 260 nm | b) 560 nm |
| c) 470 nm | d) 570 nm |
- (ii) DNA rich in \_\_\_\_\_ pairs have a higher  $T_m$
- |       |       |
|-------|-------|
| a) GC | b) AT |
| c) TC | d) TG |
- (iii) Select the enzyme that is used in the unwinding of DNA
- |             |                  |
|-------------|------------------|
| a) Ligase   | b) Topoisomerase |
| c) Helicase | d) Exonuclease   |
- (iv) In a given nucleic acid G+A is not equal to C+T content. This indicates that the sample is
- |            |            |
|------------|------------|
| a) AT rich | b) GC rich |
| c) ss DNA  | d) ds DNA  |
- (v) Select the two features of the tRNA molecule associated, in converting the triplet codon to an amino acid, are
- |   |  |
|---|--|
| a) in the T Loop and D stem and loop        | b) in the anticodon loop and D stem loop |
| c) in the anticodon loop and the 3' CCA end | d) none of these                         |
- (vi) select the false statement
- |   |                                  |
|---|----------------------------------|
| a) t RNA binds an amino acid covalently | b) t RNA has many modified bases |
| c) t RNA is present in eukaryotic cells | d) t RNA carries anticodon       |
- (vii) Select where the T $\psi$ C arm- present in
- |          |         |
|----------|---------|
| a) hnRNA | b) mRNA |
|----------|---------|

- c) t RNA  
 (viii) Relate, how is the nucleotide sequence in the anti-codon arm of t-RNA?  
 a) Same as in codon  
 b) Opposite to the codon sequence  
 c) Not constant  
 d) None of these
- (ix) Select in eukaryotes when the DNA replication occurs  
 a) G1 phase  
 b) S phase  
 c) G2 phase  
 d) M phase
- (x) Relate the enzymatic function in base excision repair with  
 a) Addition of correct base  
 b) Addition of correct nucleotide  
 c) Removal of incorrect base  
 d) Removal of phosphodiester bond
- (xi) Show how the nitrogen base is connected with the sugar molecule in a nucleotide?  
 a) Phosphodiester bond  
 b) Glycosidic bond  
 c) Hydrogen bond  
 d) Phosphodiester bond & glycosidic bond
- (xii) In eukaryotes the removal of choose which enzyme I affect the hnRNA synthesis  
 a) RNA polymerase II  
 b) RNA primase  
 c) RNA polymerase III  
 d) RNA polymerase I
- (xiii) Wobble position relates  
 a) Base pairing  
 b) Altered base on code  
 c) Third altered base on codon  
 d) None of these
- (xiv) Relate the Anticodon occurring site  
 a) DNA  
 b) tRNA  
 c) mRNA  
 d) rRNA
- (xv) select the sequence of mRNA that will be translated to a 8 amino acid containing polypeptide chain  
 a) AUGUAAUAGACGAGUAGCGACGAUGU  
 b) AUGAGACGGACUGCAUUGCCCAACCUGA  
 c) AUGCCCAACCGUUAUUC AUGCUAG  
 d) AUGUCGACAGUCUAAAACAGCGGG

### Group-B

(Short Answer Type Questions)

3 x 5=15

2. Identify the key steps of homologous recombination. (3)
3. Explain the significance of RNA transcription in the context of gene expression regulation. (3)
4. State the significance of central dogma. (3)
5. Genetic code is 'degenerate' \_\_\_ dissect it (3)
6. Illustrate the diagram of protein degradation pathways in cell. (3)

OR

Focus on how does signal sequence in N terminal end of newly synthesized polypeptide help in protein shorting (3)

### Group-C

(Long Answer Type Questions)

5 x 6=30

7. Show the mechanism of action of telomerase replication (5)
8. Explain the process of DNA elongation during replication in prokaryotes, focusing on the roles of DNA polymerase III and the leading and lagging strands. (5)
9. Evaluate the significance of PTMs in regulating protein structure, activity, and localization within cells. (5)
10. Some replication errors escape proof reading \_\_\_ Explain it (5)

11. Focus on the experimental approaches and methodologies used to identify and characterize PTMs in proteins. (5)

12. Diagram the spliceosome mediated RNA splicing mechanism (5)

**OR**

Illustrate Polymerase switching and the role of EtBr in unwinding DNA molecules (5)

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