# BRAINWARE UNIVERSITY

## Term End Examination 2023-2024
## Programme – M.Sc.(BT)-2022/M.Sc.(BT)-2023
## Course Name – Molecular Biology
## Course Code - MBTC202
## ( 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) Identify in Prokaryotes, the ribosomal binding site on mRNA is called

a) Hogness sequence b) Shine-Dalgarno sequence
c) Pribnow sequence d) TATA box

(ii) Select the function of the sigma factor in transcription__

a) Helicase action b) Transcription initiation
c) Transcription elongation d) Transcription termination

(iii) Identify the β subunit of DNA polymerase has a function of

a) Promoter binding b) DNA Strand binding as a Clamp
c) Cation binding d) Termination

(iv) Identify Kozak sequence is associated with which function____

a) Transcription b) DNA replication
c) DNA repair d) Tranalation

(v) Relate the following statement that is not true about the melting temperature ™

a) Temperature at which half of the DNA is denatured b) Tm is approximately 50OC for most of the DNA
c) Tm is the characteristic property of DNA d) Tm of the dsDNA is greater than ssDNA

(vi) Relate the Cot1/2 value of any DNA with

a) Concentration of complementary ssDNA in the solution b) Complexity of the DNA
c) Both a and b d) None of the these are related

(vii) The mouse satellite DNA, T4 DNA and E.coli DNA were separately denatured. Their renaturation kinetics were studied and compared. Predict the expected order of their

renaturation rate is

a) T4 DNA<E.coli DNA<Mouse satellite DNA
b) E.coli DNA<T4 DNA< Mouse satellite DNA
c) Mouse satellite DNA<E.coli DNA<T4 DNA
d) Mouse satellite DNA< T4 DNA<E.coli DNA

(viii) Which of the following types of genetic manipulations allow a researcher to experimentally increase gene expression in a mouse model?

a) Knockin
b) Conditional knockout
c) Transgenic
d) Knockout

(ix) Which of the following statement is Incorrect about SnRNA?

a) It is small nuclear RNA
b) It helps in RNA splicing
c) It is also called snurps
d) It functions in RNA editing

(x) On the ribosome, mRNA binds __ and the peptidyl transferase reaction occurs __.

a) between the subunits; on the large subunit of the ribosome.
b) between the subunits; on the small subunit of the ribosome.
c) to the large subunit; on the small subunit of the ribosome.
d) to the small subunit; on the large subunit of the ribosome.

(xi) The pathway of a tRNA during polypeptide elongation on the ribosome is:

a) A site --> P site --> E site.
b) P site --> A site --> E site.
c) A site --> P site --> entry site.
d) P site --> entry site --> exit site.

(xii) Autonomously replicating sequence (ARS) is a characteristic feature of

a) Plasmid vectors
b) Phage vectors
c) E. coli vectors
d) Yeast vectors

(xiii) Following RNAse are used for RNA processing except one, mark that?

a) RNAse P
b) SnRNP
c) RNAse E
d) RNAse G

(xiv) Apoptotic bodies can be distinguished from the rest of the cells with the presence of these on the surface

a) phosphatidyl tyrosine
b) phosphatidylinositol
c) phosphatidylcholine
d) phosphatidylserine

(xv) Wobble position relates

a) Base paring
b) Altered base on code
c) Third altered base on codon
d) None of these

## Group-B

(Short Answer Type Questions) 3 x 5=15

2. Show two differences between bacterial and Eukaryotic DNA polymerase II. (3)
3. Define chromosomal compaction with proper drawing (3)
4. Describe the techniques you would use to distinguish between facultative and constitutive heterochromatin. (3)
5. Write is role of initiation factors in translation (3)
6. Predict the consequences if codons were four bases long, how many codons would exist in a genetic code? (3)

**OR**

Predict how the genetic code present in mitochondria is different from the universal genetic code? (3)

## Group-C

(Long Answer Type Questions) 5 x 6=30

7. Explain structure of DNA Pol III holoenzyme. (5)
8. Distinguish between 'σ' and 'θ' model of DNA Replication. (5)
9. Write the function of the small nuclear RNA (snRNA) components of the spliceosome? (5)
10. Explain summary of the steps of translation elongation. (5)
11. Focus your thought on the importance of chaperone in protein folding. (5)
12. Design the diagnostic steps in meta-analysis of breast cancer diseases. (5)

**OR**

Justify the roles of detergents, chloroform, sodium salts of EDTA and isopropyl alcohol in nucleic acid isolations (5)

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