





## **BRAINWARE UNIVERSITY**

**Term End Examination 2023** Programme - M.Sc.(BT)-2022 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

- 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) Recall what is the function of the  $\omega$  subunit of RNA polymerase?
  - a) Sub unit association

b) Promoter binding

c) Initiation & elongation

- d) Cation binding
- (iii) Select Sickle cell anemia is caused
  - a) When valine is replaced by glutamic acid in beta polypeptide chain
  - c) When glutamic acid is replaced by valine in
  - alpha polypeptide chain
- b) When glutamic acid is replaced by valine in beta polypeptide chain
- d) When valine is replaced by glutamic acid in alpha polypeptide chain

- (iv) Peptidyl transferase
  - a) is a 23s rRNA
  - c) Component of ribosome

- b) Forms peptide bonds
- d) All the three
- (v) If the mutation has a negligible effect on the function of a gene, predict it is known as a
  - a) Silent mutation

b) Frame shift mutation

c) Substitution mutation

- d) Insertion mutation
- (vi) Predict which of the following mechanisms will remove uracil and incorporate the correct base?
  - a) Direct repair

b) Base excision repair

c) Mismatch repair

d) Nucleotide excision repair

(vii)	Identify the function of enzyme involved in base excision repair is			
	<ul> <li>a) Addition of correct base</li> <li>c) Removal of incorrect base</li> <li>Identify an alteration in a nucleotide sequence the</li> <li>acid into a termination codon is</li> </ul>	b) Addition of correct nucleotide d) Removal of phosphodiester bond		
(ix)	<ul> <li>a) Nonsense mutation</li> <li>c) Mutation</li> <li>When we are trying to replicate a single gene in n should be used:</li> </ul>	b) Mutagenesis d) Mutagen nore than one host, estimate what		
(x)	<ul> <li>a) Plasmid vector</li> <li>c) BAC</li> <li>Select in eukaryotic chromatin organization, which nucleosome at the location at which linker DNA expressions.</li> </ul>	b) Shuttle vector d) YAC h one of the histones seals off the nters and leaves the nucleosome?		
(xi)	b) H2A-H2B d) H4 zoologist recovered some tissue from preserved skin of a woolly mammoth. Further enetic analysis requires DNA isolation and increasing its amount. Choose which ONE of the following techniques would be most useful for increasing the amount of DNA?			
(xii)	<ul><li>a) RFLP analysis</li><li>c) Electroporation</li><li>Decide DpnI is used to digest the PCR product du</li></ul>	<ul><li>b) Polymerase chain reaction (PCR)</li><li>d) Chromatography</li></ul>		
	a) DpnI digests irrespective of methylation status of DNA	b) DpnI digests only unmethylated DNA		
(xiii)	c) DpnI digests only methylated DNA Which one of the following is an incorrect biomol	d) DpnI digests GC-rich sequences ecule-modification pair?		
(xiv)	<ul><li>a) Lipid - Palmitoylation</li><li>c) Protein - Glycosylation</li><li>Cite from the following statements is not true about</li></ul>	b) DNA and Protein - Methylation d) RNA - Polyadenylation out the melting temperature ™		
	a) Temperature at which half of the DNA is denatured	b) Tm is approximately 500C for most of DNA	fthe	
(xv)	c) Tm is the characteristic property of DNA d) Tm of the dsDNA is greater than ssDNA 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 c)="" dna="" dna<="" dna<e.coli="" dna<mouse="" dna<t4="" mouse="" satellite="" td=""><td>b) E.coli DNA<t4 dna<="" i<br="" mouse="" satellite="">d) Mouse satellite DNA&lt; T4 DNA<e.coli i<="" td=""><td></td></e.coli></t4></td></e.coli>	b) E.coli DNA <t4 dna<="" i<br="" mouse="" satellite="">d) Mouse satellite DNA&lt; T4 DNA<e.coli i<="" td=""><td></td></e.coli></t4>		
	<b>Group</b> (Short Answer Ty		3 x 5=15	
3. Wi 4. Se 5. Ex	2. Write down a short note about E.coli origin of Replication 3. Write short notes on the followings:- Pribnow Box and TATA Box 4. Select any one inhibitor of translation and its mode of action. 5. Explain why DNA pol I is regarded as a talented enzyme? 6. Conclude the effects of alkali treatment on RNA.			
lue	OR stify why are benign tumors, but not malignant tur		(3)	
Jus	only willy are beingir camors, but not mangituit tur	nois, readily treated by Surgery?	(3)	

## Group-C

	(Long Answer Type Questions)	5 x 6=30
8. 9.	<ul> <li>Cite what is difference between oncogene and tumor suppressor gene?</li> <li>Compile the TNM Staging System to describe the stages of cancer.</li> <li>Justify the process of Site specific base modification editing of RNA.</li> <li>Correlate how topoisomerase is required for nucleosome assembly using covalently close circular DNA (cccDNA).</li> </ul>	
<ul> <li>11. In your own words, interpret the difference between Rho (ρ)-dependent and Rho (ρ)-independent termination of transcription in prokaryotes.</li> <li>12. Justify any two-cancer causing agents.</li> </ul>		(5) (5)
	OR Justify the role of mutation in cancer.	(5)
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