



BRAINWARE UNIVERSITY

Term End Examination 2023-2024 Programme - M.Sc.(MLT)-2023 Course Name – Medical Molecular Biology & Biotechnology Course Code - MMTC02001 (Semester II)

Time: 2:30 Hours Full Marks: 60

[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 the enzyme responsible for unwinding the DNA double helix during replication: b) DNA ligase a) DNA polymerase d) Primase c) Helicase (ii) Which organ is primarily affected by Cystic Fibrosis? b) Lungs a) Liver d) Pancreas c) Kidneys (iii) Identify the purpose of SDS in SDS-PAGE electrophoresis? b) To coat proteins with a negative charge a) To denature proteins d) To amplify protein fragments c) To increase protein size (iv) Apply the knowledge Newborn screening tests are typically performed within what timeframe after birth? b) Within 48 hours a) Within 24 hours d) Within 1 month c) Within 1 week (v) Analyze which step is NOT part of the DNA gel electrophoresis process?
 - a) Denaturation

c) Running an electric current through the gel

- b) Loading DNA samples onto the gel d) PCR amplification
- (vi) Choose What does the intensity of DNA bands on a gel indicate?
 - a) The size of the DNA fragments

- b) The concentration of DNA fragments
- c) The charge of the DNA fragments
- d) The shape of the DNA fragments
- (vii) Categorize Karyotyping is often used to detect
 - a) Single gene mutations

b) Chromosomal abnormalities

c) Protein levels

d) Mitochondrial DNA mutations

/,,;;	i) What does light emit as a side scatter (SSC)) measure?	
(VII	a) Cell size	b) Cell granularity / complexity	
	a) Call surface marker fluorescence	d) Optics	
(ix	Identify the type of data that MALDI-TOF mass spectrometry provides.		
	a) Structural information	b) Nucleotide sequences	
	c) Cell morphology	d) Cellular functions	
(x)	Identify the correct statement about MALE		
	a) It is used to measure the charge of ions.c) It ionizes and analyzes large biomolecule	es, d) It operates by passing ions through a	
	such as proteins	magnetic field.	
(xi)	Select the technique used in metabolomics their mass and charge:	s to separate and identify metabolites based on	
	a) Gas chromatography-mass spectrometry (GC-MS)	1 orymerase anam reasons (
(xii)	c) X-ray crystallography In metabolomics, what is a metabolite?	d) Nuclear magnetic resonance (NMR)	
	a) A small molecule involved in metabolism	b) A large protein structure	
	c) A type of lipid	d) A genetic sequence	
(xiii)	Homozygosity and heterozygosity of an inc		
	a) Back cross	b) Self-fertilization	
/\	c) Test cross	d) All of the above ctron beam's interaction with the sample in	
(XIV)	SEM:		
	a) Transmission	b) Reflection	
, ,	c) Absorption	d) Scattered electron	
(xv)	Home pregnancy test kit is an example of:		
	a) Sandwich ELISA	b) Indirect ELISA	
	c) Competitive ELISA	d) Direct ELISA	
		Group-B	
	(Short An	swer Type Questions)	3 x 5=15
2. Wi	ite a short note on Xeroderma pigmentosu	im	(3)
What is Codon and Anticodon			(3)
I. Su	mmarize the basic principle behind FISH te	chnology?	(3)
5.		Mark that was a second of the second	(3)
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Infer the possible characteristics features from SEM micrographs.

- 6. Differentiate between Telomers and Telomerase
- OR
- Correlate Point-mutation with molecular biology diagnosis

(3)

(3)

Group-C

(Long Answer Type Questions)

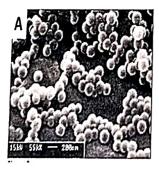
5 x 6=30

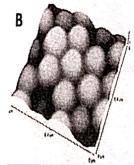
7. Explain the sample preparation of SEM before imaging

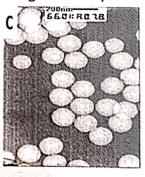
(5)

(5)

- 8. FTIR spectrum of a compound. Interpret the spectrum, identifying the major peaks and possible functional groups present.
 - 0.8 0.6 -
- 9. Provide examples of applications of ELISA in research, clinical diagnostics, and industry. (5)
- 10. What are the genetic implications of Thalassemia?
- (5)
- 11. In a population of cats, the allele for black fur (B) is dominant over the allele for white fur (b). (5) If 64% of the cats in the population have black fur, what percentage of the population is heterozygous for fur color?
- 12. Identify the microscopic image from the following and interpret its one charcateristic feature. (5)







Interpret the flow cytommetry curve with possible explanation.

