MSc DEGREE EXAMINATION MAY 2026

(First Semester)

Branch- **BIOCHEMISTRY**

ANALYTICAL BIOCHEMISTRY

Time: Three Hours Maximum: 75 Marks

SECTION-A (10 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** marks (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	What are the two dimensions used in 2D gel electrophoresis? a) Size and shape b) Isoelectric point and molecular weight c) Charge and solubility d) pH and polarity	K1	CO1
	2	Which method is traditionally used to extract oils from seeds? a) Ammonium sulfate precipitation b) Soxhlet extraction c) Ethanol precipitation d) Ultracentrifugation	K2	CO1
2	3	Mention the factor which does not generally affect enzyme activity measurements a) Temperature b) pH c) Substrate concentration d) Color of the test tube	K1	CO2
	4	Which centrifugation technique separates particles solely based on buoyant density? a) Differential centrifugation b) Isopycnic centrifugation c) Rate-zonal centrifugation d) Analytical centrifugation	K2	CO2
3	5	Which of the following is NOT a common type of HPLC? a) Normal-phase HPLC b) Reverse-phase HPLC c) Ion-exchange HPLC d) Gas-phase HPLC	K1	CO3
	6	Which solvent is commonly used in NMR spectroscopy? a) Water b) Deuterated solvents c) Ethanol d) Acetone	K2	CO3
4	7	The main difference between SEM and TEM is a) SEM provides 3D surface images, TEM provides internal structure b) SEM uses X-rays, TEM uses visible light c) SEM requires vacuum, TEM does not d) SEM has higher resolution than TEM	K1	CO4
	8	Which technique can provide elemental composition information? a) SEM with EDS b) TEM without detectors c) XRD only d) FTIR	K2	CO4
5	9	Which mutation is detected in sickle cell anemia using nucleic acid probes? a) GAG → GTG (glutamic acid to valine) in β-globin gene b) Deletion of α-globin gene c) Insertion in Factor VIII gene d) BCR-ABL fusion gene	K1	CO5
	10	Which type of DNA damage would be best detected using an alkaline Comet Assay (pH >13)? a) Single-strand breaks and alkali-labile sites b) Double-strand breaks only c) DNA methylation d) RNA degradation	K2	CO5

Cont...

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Point out the traditional extraction methods of oils.	K1	CO1
		(OR)		
	11.b.	Indicate the techniques of capillary electrophoresis.		
2	12.a.	Elaborate the significance of radiometric methods in enzyme monitoring techniques.	K2	CO2
		(OR)		
	12.b.	State the principle of centrifugation.		
3	13.a.	Outline the instrumentation of GC.	K3	CO3
		(OR)		
	13.b.	Point out the applications of Mass Spectrometry in Proteomics.		
4	14.a.	Discuss the working principle of SEM.	K4	CO4
		(OR)		
	14.b.	Enumerate the principle and applications of DLS.		
5	15.a.	Narrate the diagnostic applications of nucleic acid probes in hemophilia	K5	CO5
		(OR)		
	15.b.	Interpret the techniques of DNA fragmentation assay.		

SECTION -C (30 Marks)

Answer **ANY THREE** questions

ALL questions carry **EQUAL** Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Write the methods of extraction, identification, purification and characterization of proteins.	K1	CO1
2	17	Narrate the instrumentation set up of analytical ultracentrifuge.	K2	CO2
3	18	Illustrate the principle, components and applications of electron spin resonance.	K3	CO3
4	19	Discuss how FTIR can be applied in material analysis.	K4	CO4
5	20	Summarize the mechanism of CRISPR/Cas9 gene editing tool.	K5	CO5

Z-Z-Z END