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25BCP102

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc DEGREE EXAMINATION DECEMBER 2025
(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	Which method is commonly used for nucleic acid extraction from cells? a) Folch method b) Phenol-chloroform extraction c) Ammonium sulfate precipitation d) Gel filtration	K1	CO1
	2	Which of the following statements is TRUE for alkaloid extraction? a) Alkaloids are neutral compounds and soluble in water without pH adjustment b) Alkaloids are basic and often extracted as salts in acidic medium c) Alkaloids are hydrophobic and extracted only with hexane d) Alkaloids are extracted only after enzymatic hydrolysis	K2	CO1
2	3	Select the enzyme monitoring technique used in the radioactive isotopes a) Fluorometry b) Radiometric assay c) Spectrophotometry d) Calorimetry	K1	CO2
	4	Which unit is used to express sedimentation rate in analytical centrifugation? a) Svedberg unit b) Dalton c) Angstrom d) Newton	K2	CO2
3	5	Ion-exchange chromatography separates molecules based on: a) Charge b) Size c) Hydrophobicity d) Volatility	K1	CO3
	6	Which type of secondary structure gives a characteristic CD spectrum with negative peaks at 222 nm and 208 nm? a) Alpha-helix b) Beta-sheet c) Random coil d) Triple helix	K2	CO3
4	7	Which of the following techniques is commonly used to measure zeta potential? a) Dynamic light scattering b) Electrophoretic light scattering c) Nuclear magnetic resonance d) UV-Vis spectrophotometry	K1	CO4
	8	What is the basis of Field-Flow Fractionation? a) Separation of molecules based on diffusion behavior under an external field b) Sedimentation in a centrifugal field c) Adsorption on a stationary phase d) Magnetic susceptibility	K2	CO4
5	9	Hemophilia B is associated with mutations in: a) Factor VIII gene b) Factor IX gene c) β-globin gene d) Chromosome 22	K1	CO5
	10	Which component directs Cas9 to the specific target sequence? a) crRNA-tracrRNA complex b) PAM sequence c) DNA polymerase d) RNA polymerase	K2	CO5

Cont...

SECTION - B (35 Marks)

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

Module No.	Question No.	Question	K Level	CO
1	11.a.	Outline the fermentation-based carbohydrate extraction in the field of Ayurveda.	K1	CO1
		(OR)		
	11.b.	Enumerate the extraction methods of alkaloids.		
2	12.a.	Discuss the UV-Visible spectrophotometry as an enzyme monitoring technique.	K2	CO2
		(OR)		
	12.b.	Classify the types of rotors used in centrifuges.		
3	13.a.	Discover the principle and applications of affinity chromatography.	K3	CO3
		(OR)		
	13.b.	Show the principle and applications of Flow cytometry.		
4	14.a.	Explain the principle and applications of Field Flow Fractionation.	K4	CO4
		(OR)		
	14.b.	Diagnose the advantages and limitations of using exosomes in biomedical research compared to synthetic nanoparticles.		
5	15.a.	Evaluate the diagnostic applications of nucleic acid probes in sickle cell anemia and thalassemia.	K5	CO5
		(OR)		
	15.b.	Assess the principle and steps involved in the Comet 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	Describe the importance of isoelectric focusing for the separation of DNA fragments.	K1	CO1
2	17	Explain the steps involved in differential centrifugation.	K2	CO2
3	18	Illustrate the principle, components and applications of HPLC.	K3	CO3
4	19	Distinguish the SEM and TEM.	K4	CO4
5	20	Summarize the technique and applications of DNA Foot printing.	K5	CO5

Z-Z-Z END