

**PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)**

**MSc DEGREE EXAMINATION DECEMBER 2025
(First Semester)**

Branch – **APPLIED MICROBIOLOGY**

BIORESEARCH INSTRUMENTATION AND AI

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 type of microscope uses electron beams and magnetic fields to produce an image? a) Light microscope b) Electron microscope c) Simple microscope d) Compound microscope	K1	CO1
	2	The half life of a radioisotope is _____ a) half the time taken for complete decay b) half the time taken for half the decay c) time taken for complete decay d) time taken for half the decay	K2	CO1
2	3	Which part of a spectrophotometer is responsible for selecting a specific wavelength of light? a) Detector b) Monochromator c) Light Source d) Sample Holder	K1	CO2
	4	Which centrifugation depends on buoyant densities? a) Isopycnic centrifugation b) Gradient centrifugation c) Density gradient centrifugation d) Differential centrifugation	K2	CO2
3	5	In thin layer chromatography, the stationary phase is made of _____ and the mobile phase is made of _____ a) Solid, liquid b) Liquid, liquid c) Liquid, gas d) Solid, gas	K1	CO3
	6	Which technique separates charged particles using electric field? a) Hydrolysis b) Electrophoresis c) Protein synthesis d) Protein denaturing	K2	CO3
4	7	What is the term for a fluorescent molecule or dye used in flow cytometry? a) Fluorophore b) Chromogen c) Reporter d) Ligand	K1	CO4
	8	The primary purpose of the ligase chain reaction (LCR) is to: a) Amplify a segment of DNA using a polymerase. b) Join two large molecules together using a ligase enzyme. c) Amplify a specific short DNA probe sequence. d) Detect the presence of a specific protein.	K2	CO4
5	9	What is Artificial Intelligence? a) Artificial Intelligence is a field that aims to make humans more intelligent b) Artificial Intelligence is a field that aims to improve the security c) Artificial Intelligence is a field that aims to develop intelligent machines d) Artificial Intelligence is a field that aims to mine the data	K1	5
	10	What is the goal of Artificial Intelligence? a) To solve artificial problems b) To extract scientific causes c) To explain various sorts of intelligence d) To solve real-world problems	K2	5

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.	How does light microscopy work? – Mention its components and its applications.	K1	CO1
		(OR)		
	11.b.	How do Geiger counters detect radiation? Add notes on its importance.		
2	12.a.	Compute the principle and application of X- ray crystallography.	K3	CO2
		(OR)		
	12.b.	Organize the principle and applications of differential and density gradient centrifugation.		
3	13.a.	Differentiate Ion exchange and gel permission chromatography.	K4	CO3
		(OR)		
	13.b.	Examine the process and importance of drying and crystallization.		
4	14.a.	How are electrochemical biosensors for disease detection? – Discuss.	K5	CO4
		(OR)		
	14.b.	Why is CLIA better than RIA and EIA?- Explain.		
5	15.a.	Develop the foundations and need of Artificial Intelligence.	K6	CO5
		(OR)		
	15.b.	Assemble the types and methods of machine learning in molecular research.		

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 principle, working mechanism and applications of SEM.	K2	CO1
2	17	Describe the procedure and applications of various types of ELISA techniques.	K3	CO2
3	18	Classify the types and significance of Chromatography.	K4	CO3
4	19	Evaluate the molecular methods for detection of drug resistance microbes.	K5	CO4
5	20	How are microbes used in pest management?- Discuss.	K6	CO5