

(AUTONOMOUS)
MSc DEGREE EXAMINATION MAY 2026
(First Semester)

Branch –ENVIRONMENTAL SCIENCE

INSTRUMENTATION METHODS FOR ENVIRONMENTAL SAMPLES

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	Difference between accuracy and precision is a) The accuracy of a measurement is a measure of how close is the measured value to the true value b) Precision gives what resolution or limit the quantity is measured c) Only A is correct d) Both A and B are correct	K1	CO1
	2	The lowest concentration of an analyte that can be determined with acceptable precision and accuracy is: a) LOD b) LOQ c) LOB d) LR	K1	CO1
2	3	An electron microscope uses the following principle? a) Electron Beam b) Magnetic field c) Electron beams and magnetic fields d) Light waves	K2	CO2
	4	ICP-MS is used to detect a) Trace metals b) Non-metals c) Only A is correct d) Both A and B are correct	K2	CO2
3	5	Advantages of LC-MS over HPLC is a) LC-MS identifies compounds by their molecular mass b) Less expensive c) Can detect trace metals d) Can analyze micro organic compounds	K1	CO3
	6	On what aspect XRD is efficient in environmental science a) It can detect all elements except hydrogen and helium b) It is crucial for identifying specific mineral phases in soils and sediment samples c) It can analyze atmospheric particulate matter (PM) d) It can also detect organic phases	K2	CO3
4	7	Which of the following provides continuous measurements of PM mass concentration on real-time a) Beta ray attenuation monitor b) Low volume air sampler c) Nephelometry monitors d) Aerosol particle counters	K1	CO4
	8	A CO ₂ gas analyzer uses one of the following principle a) Laser b) Raman effect c) Thermal-optical transmittance d) Non-Dispersive Infrared (NDIR)	K1	CO4
5	9	Which one of the following is non-ionizing radiation? a) Gamma rays b) X-rays c) Radon gas d) Cellphone and wifi signals	K2	CO5
	10	XGBoost is a _____ a) is a GIS software to generate thematic maps b) is statistical software to analyse air pollution c) is a Machine learning model to predict pollution levels d) is an instrument to measure wind dispersion	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.	How important is LOQ and LOD values in environmental experimental studies?	K3/K4	CO1
	(OR)			
	11.b.	Does microwave digestion offers advantage to other digestion system? Justify.		
2	12.a.	Elucidate the significance of detecting microplastics using fluorescence microscopy.	K3/K4	CO2
	(OR)			
	12.b.	Pick out the limitations of Atomic Absorption Spectroscopy.		
3	13.a.	Bring out the main applications of Ion-exchange chromatography in environmental samples.	K5	CO3
	(OR)			
	13.b.	Identify and explain the methods to separate, analyze, and map DNA fragments by size.		
4	14.a.	Illustrate the working principle of stack monitoring equipment.	K5	CO4
	(OR)			
	14.b.	List out the important meteorological parameters and the instruments for its analysis.		
5	15.a.	Compare Geiger-Muller Counter and Scintillation detectors.	K6	CO5
	(OR)			
	15.b.	Can IoT be integrated in municipal solid waste management? Demonstrate the framework.		

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	Elaborate the solvent extraction principle, process, selection of solvents, procedure and its applications.	K4	CO1
2	17	Discuss the key components and working principle of a Transmission Electron Microscope (TEM).	K4	CO2
3	18	Evaluate and compare XRD and XRF techniques in detail.	K5	CO3
4	19	Explain chemiluminescent method for detection of NO _x with operating principle.	K5	CO4
5	20	Has the radiocarbon dating improved over the years? Trace the developments with advantages.	K6	CO5

Z-Z-Z

END