

PSG COLLEGE OF ARTS & SCIENCE  
(AUTONOMOUS)

MSc DEGREE EXAMINATION DECEMBER 2025  
(Third Semester)

Branch – ENVIRONMENTAL SCIENCE

**MAJOR ELECTIVE COURSE – I : ENVIRONMENTAL ENGINEERING**

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 of the following is a coagulant? a) Na <sub>2</sub> CO <sub>3</sub> b) PAM c) Fe <sub>2</sub> SO <sub>4</sub> d) KOH	K1	CO1
	2	Dissolved Air Flotation mainly depends on a) Air to Solid ratio b) Air to Oil ratio c) Air to grease ratio d) Air to water ratio	K1	CO1
2	3	Which of the following in the waste water is removed by chemical immobilization? a) Dissolved solids b) Metals c) Phosphorous d) BOD	K2	CO2
	4	An activated sludge system contains aerator and ____ a) Mechanical Presser b) Chlorination unit c) screening bars d) Clarifier	K2	CO2
3	5	What are the gases released at the end of UASB treatment process? a) Methane and Carbon monoxide b) Hydrogen sulfide and Ammonia c) Methane and Carbon dioxide d) Carbon dioxide	K1	CO3
	6	MBR membranes are typically made of a) LDPE                                      b) PUF c) PCDF                                      d) PVDF	K2	CO3
4	7	Sunlight is _____ method of disinfection a) Physical b) Electrical c) Chemical d) Mechanical	K1	CO4
	8	At what pH E-Coli bacteria will die in the water a) 8 b) 5 c) <3 d) >9.5	K1	CO4
5	9	How sulfur is removed from the flue gas after coal gasification a) Adsorption                                      b) Absorption c) Filtration                                      d) Solution	K2	CO5
	10	PM sensors often use _____ a) IR and Photo detector b) Electrochemical cells c) Metal oxide semiconductors d) LIDAR	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.	Differentiate the physical, chemical and biological methods of waste water treatment. Provide examples of each.	K4	CO1
		(OR)		
	11.b.	Analyze and describe the purpose and key processes involved in pre-treatment, primary, secondary, and tertiary wastewater treatment stages.		
2	12.a.	Discuss the types of aerobic treatment processes, distinguishing between suspended and fixed growth systems. What are their influencing factors?	K4	CO2
		(OR)		
	12.b.	List out and explain the activated sludge process, detailing the roles of Return Activated Sludge (RAS) and Waste Activated Sludge (WAS).		
3	13.a.	Evaluate and discuss the effects of pH, temperature, and other environmental factors on anaerobic treatment efficiency.	K5	CO3
		(OR)		
	13.b.	Describe the design and principles of anaerobic digesters and septic tanks used in wastewater treatment.		
4	14.a.	Compare and contrast different types of filtration systems: slow sand, rapid sand, high rate, pressure, and dual media filters.	K5	CO4
		(OR)		
	14.b.	Explain the principle of reverse osmosis (RO), types of membranes used, and the importance of pre-treatment before RO.		
5	15.a.	Elaborate the principle and design considerations of minimum stack height and flue gas recirculation in air pollution control.	K5	CO5
		(OR)		
	15.b.	Discuss in detail the working principle and design parameters of settling chambers, cyclone collectors, and fabric filters.		

**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	Inspect, define, and differentiate between unit operations and unit processes in wastewater treatment with relevant examples.	K4	CO1
2	17	Define and analyze the significance of microbial kinetic parameters such as MLVSS, Food to Microbes ratio (F/M), and Mean Cell Residence Time (MCRT).	K4	CO2
3	18	Interpret the working principles and applications of various anaerobic reactors such as packed bed, fluidized bed, and blanket reactors.	K5	CO3
4	19	Assess and interpret common causes of membrane fouling in RO systems and methods for fouling control, including the use of anti-scalants and anti-foulants.	K5	CO4
5	20	Compare and discuss wet and dry scrubbers for gaseous pollutant removal. Elaborate the factors influence their efficiency.	K6	CO5