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Question Paper Code : 10972

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2026.

Fifth/Sixth/Seventh/Eighth Semester

Mechanical Engineering

CME366 — EQUIPMENT FOR POLLUTION CONTROL

(Common to Civil Engineering/Mechanical Engineering (Sandwich))

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is the primary objective of the Water (Prevention & Control of Pollution) Act, 1974?
2. Define "hazardous waste".
3. What is the primary purpose of a flocculator in water treatment?
4. Name two common types of aerators used in water treatment plants.
5. What role does the scrubbing liquid play in a wet scrubber?
6. Mention one commonly used packing media in biofilters.
7. Name two types of centrifuges used for sludge dewatering.
8. What is the main purpose of an incinerator in solid waste management?
9. What is the purpose of sample conditioning in flue gas monitoring?
10. Name two types of particulate matter samplers used in ambient air monitoring.

PART B — (5 × 13 = 65 marks)

11. (a) Discuss the major provisions of the Environment Protection Act, 1986, including the powers to set standards, regulate industries, and control hazardous substances.

Or

- (b) Discuss the penalties and enforcement mechanisms under the Bio-Medical Waste Management Rules.

12. (a) Explain the operational principle of a flash mixer in water treatment. How does it facilitate chemical coagulation?

Or

- (b) Describe sand fillers, adsorption columns and aerators.
13. (a) Discuss the design criteria of cyclone separators, including inlet velocity, cyclone diameter, height-to-diameter ratio, and cone angle.

Or

- (b) Explain the operational principle of an electrostatic precipitator. How does it remove fine particulate matter from industrial gas streams?
14. (a) Explain the working principle of a vacuum filter and its role in sludge dewatering in wastewater treatment.

Or

- (b) Explain the principle and process of pyrolysis for solid waste.
15. (a) Discuss the factors affecting the efficiency of sample preservation in incubators.

Or

- (b) Explain the operational principle of cold storage systems used for solid waste sample preservation. How do they maintain sample integrity over time?

PART C — (1 × 15 = 15 marks)

16. (a) A water treatment plant is experiencing under-dosing of coagulants leading to poor floc formation. Explain the operational and design factors that could be optimized in the chemical dosing system to correct this issue.

Or

- (b) A municipal wastewater plant is generating sludge with 2-3% solids. Explain which dewatering equipment (centrifuge, vacuum filter, or filter press) would be most suitable and justify your choice based on operational principles and design criteria.