Register No.: ..... Name: .....

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

FIFTH SEMESTER B.TECH DEGREE EXAMINATION (R,S), DECEMBER 2023
CHEMICAL ENGINEERING
(2020 SCHEME)

Course Code : **20CHT303**

Course Name: **Environmental Engineering**

Max. Marks : **100** **Duration: 3 Hours**

PART A

(Answer all questions. Each question carries 3 marks)

1. Differentiate between grab samples and composite samples.
2. Mention the unit operations involved in the removal of suspended solids present in wastewater.
3. Differentiate between micro flocculation and macro flocculation.
4. List out various disinfection systems used in wastewater treatment.
5. What are the characteristics of hazardous wastes?
6. What is the process of composting in sludge treatment?
7. How does air pollution affect the global environment?
8. What is lapse rate? List out the types of lapse rates.
9. Differentiate between slow sand and rapid sand filters.
10. List out the various types of automobile emissions and its control measures.

PART B

(Answer one full question from each module, each question carries 14 marks)

MODULE I

11. a) State Streeter Phelps equation and explain its significance in detail (8)
    b) The following information is available for a seeded 5-day BOD test conducted on a wastewater sample. 15 ml of the waste water sample was added directly into a 300 ml BOD incubation bottle. The initial DO of the diluted sample was 8.8 mg/L and the final DO after 5 days was 1.9 mg/L. The corresponding initial and final DO of the seeded solution water was 9.1 and 7.9 respectively. What is the 5-day BOD of the waste water sample? (6)

OR

12. a) With a neat diagram explain how desalination is achieved by electro dialysis. (7)

b) What is lime soda softening process in waste water treatment? Mention its limitations and also explain how this method affects the pH of water. (7)

MODULE II

13. a) Differentiate sedimentation and settling and explain the factors that affect the removal efficiency of a sedimentation tank. (7)
b) Explain in detail the advantages of using trickling filters in combination with activated sludge process. (7)

OR

14. a) What is aerobic fluidized bed bioreactor? List out its advantages. (7)
b) With a neat sketch, explain the working of UASB reactors. (7)

MODULE III

15. a) Differentiate between sanitary landfill and open dumping. What makes a landfill a sanitary landfill? (8)
b) What is meant by sludge conditioning and explain any two methods of sludge conditioning? (6)

OR

16. a) Explain in detail, the most preferred method of treatment for dairy wastewater. (8)
b) A high rate aeration system produces 1140 m^3/day of waste sludge. The sludge is wasted directly from the aerator and has a solids content of 3300 mg/L. This sludge is thickened by a dissolved air floatation unit to 3 percent solids. Determine the volume of the thickened sludge. (6)

MODULE IV

17. a) Name and discuss four methods of controlling air pollutant emission at source. (8)
b) What is global warming? Explain in detail the causes and effects of global warming. (6)

OR

18. a) With a neat sketch, explain the behavior of plume. (8)
b) Explain the dispersion of pollutant in atmosphere using Guassian plume dispersion model. (6)

MODULE V

19. a) What are the various control measures for indoor and outdoor noise? (6)
b) With a neat sketch, explain the working of an electrostatic precipitator. (8)

OR

20. a) What is the use of gravitational settling chamber in air pollution control? (5)

b) Explain adsorption, absorption and condensation techniques used for the control of gaseous contaminants. (9)

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