

Register No.: Name:

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

FIFTH SEMESTER B.TECH DEGREE EXAMINATION (S), FEBRUARY 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. How are precipitation reactions used in water treatment? Give examples with reactions.
2. What are ion exchange resins? Give the chemical reactions involved during the
 - (i) Softening of water using ion exchange resins.
 - (ii) Regeneration of exhausted ion exchange resin.
3. Differentiate between slow sand filters and rapid sand filters.
4. What are the different operations associated with preliminary treatment of wastewater?
5. Why is sludge conditioning done? Explain any two methods of sludge conditioning.
6. Explain any three techniques used in industrial composting.
7. What are the different units by which the concentration of air pollutants is expressed?
8. What are the effects of air pollution?
9. Mention the advantages and disadvantages of electrostatic precipitators.
10. Differentiate between surface condensers and contact condensers.

PART B***(Answer one full question from each module, each question carries 14 marks)*****MODULE I**

11. a) Explain first stage BOD and second stage BOD. What are the steps involved in the laboratory determination of BOD? (10)
- b) With a neat diagram explain how desalination is achieved by electro dialysis. (4)

OR

12. a) What are the objectives of boiler feed water treatment? (4)
- b) Outline the major treatments required for boiler feed water. (10)

MODULE II

13. a) With the help of neat sketches explain the working of any two types of system used for grit removal in wastewater plants. (10)
- b) With a neat sketch explain the working of a clariflocculator. (4)

OR

14. a) With suitable examples and neat sketches explain suspended growth systems and attached growth systems for biological wastewater treatment. (10)
- b) With a neat sketch explain the working of upflow anaerobic sludge blanket (UASB). (4)

MODULE III

15. a) Find the volume of sludge after digestion for the following data: (10)
- Average sewage flow = 20 MLD
Total suspended solids in raw sewage = 300 mg/L
Assume 65 % of suspended solids settle in primary sedimentation tank.
Moisture content of undigested sludge = 95%
Moisture content of digested sludge = 85%
Specific gravity of raw sludge = 1.02

- b) Explain the various components in the collection of solid waste (4)

OR

16. a) With a neat sketch show the waste generation points in a textile industry. Propose a treatment plan for the wastewater generating from the industry. (10)
- b) Explain the various treatment methods available for hazardous wastes. (4)

MODULE IV

17. a) Explain the dispersion of pollutant in atmosphere using Guassian plume dispersion model. (8)
- b) Explain any two global effects of air pollution. (6)

OR

18. a) What are the meteorological factors influencing air pollution? Explain. (8)
- b) How are air pollutants classified? (6)

MODULE V

19. a) What are the effects of noise on people? Explain the control measures for noise. (8)
- b) Explain the methods for automobile emission control (6)

OR

20. a) With neat sketches explain the working of any two control devices for particulate contaminants. (10)
- b) Outline the advantages and disadvantages of wet collectors. (4)
