

Reg. No. :

Question Paper Code : 51052

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2023.

Seventh Semester

Biomedical Engineering

OCY 751 – WASTE WATER TREATMENT

(Common to : Computer Science and Engineering / Computer and Communication Engineering / Electronics and Communication Engineering / Electronics and Telecommunication Engineering / Medical Electronics / Information Technology)

(Regulations 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are water quality indices?
2. Why mixing or agitation is required in water treatment processes?
3. State Darcy's law.
4. Write the role of lime soda in water softening process.
5. How adsorption removes taste and odour in wastewater?
6. Highlight the significance of Langelier index.
7. Why pretreatment stages are essential in an effluent treatment plant?
8. Give the working principle of a trickling filter with an illustration.
9. Show the various types of adsorption isotherms in an equilibrium plot.
10. How the sludge from a treatment plant can be disposed?

PART B — (5 × 13 = 65 marks)

11. (a) Outline the physical, chemical and biological treatment processes involved in the wastewater treatment process.

Or

- (b) Explain how coagulation and flocculation can influence the wastewater treatment and add a brief note on the destabilization of colloids?

12. (a) Give a detailed account on the various design considerations of the filtration process involved in an industrial water treatment plant.

Or

- (b) How do you soften water using lime soda and zeolite and compare their efficacy in the removal of hardness in respect to their reaction chemistry?

13. (a) Elaborate the role of activated carbon in the removal of color from the wastewater and write a short note on its operational variables.

Or

- (b) Explain the methods involved in the prevention and control of corrosion and highlight the influencing factors affecting the rate of corrosion.

14. (a) Sketch the schematic representation of an aerated lagoons and elaborate the operation and maintenance of waste stabilization ponds.

Or

- (b) Describe the process of microbe assisted decomposition in the absence of oxygen with an illustration of anaerobic digester.

15. (a) Discuss the working principle and operational methods of ion exchange processes adopted in the wastewater treatment.

Or

- (b) Elucidate the reaction mechanisms of an advanced oxidation process in the removal of organic contaminants in the wastewater.

PART C — (1 × 15 = 15 marks)

16. (a) A dark colored with pungent smelt industrial effluent was observed to contain an elevated levels of iron and manganese ions. Suggest a treatment plan and strategy with a neat process flow diagram.

Or

- (b) A discharge from an oil industry is observed to be highly viscous due to the suspension of colloidal particles. Propose a treatment operation with the possible combinations of various unit operations to be adopted for the removal of colloids.