

Please check that this question paper contains 09 questions and 02 printed pages within first ten minutes.

MORNING

[Total No. of Questions: 09]

11 MAY 2023

[Total No. of Pages: 02]

Uni. Roll No.

Program: B.Tech. (Batch 2018 onward)

Semester: 5th

Name of Subject: Environmental Engineering

Subject Code: PCCE-112

Paper ID: 16389

Scientific calculator is Allowed

Time Allowed: 03 Hours

Max. Marks: 60

NOTE:

- 1) Parts A and B are compulsory
- 2) Part-C has Two Questions Q8 and Q9. Both are compulsory, but with internal choice
- 3) Any missing data may be assumed appropriately

Part – A

[Marks: 02 each]

Q1.

- a) Define coagulation.
- b) Define *sloughing* in trickling filters.
- c) Name two methods used for bacteriological examination of water.
- d) What is smog? Enlist any two impacts of it on environment.
- e) What are the sources and impacts of nutrients in water bodies.
- f) Define Integrated Solid Waste Management.

Part – B

[Marks: 04 each]

- Q2.** Differentiate between BOD and COD.
- Q3.** Describe functional elements of Solid Waste Management system.
- Q4.** Explain any two types of Pond systems for wastewater treatment.
- Q5.** Explain in detail the two methods of Solid Waste Collection systems.
- Q6.** Determine the 1 day BOD and ultimate first stage BOD for a wastewater whose 5 day 20°C BOD is 200 mg/L. The reaction rate constant k (base e) = 0.23 per day.
- Q7.** Estimate the moisture content of a solid waste sample of 100kgs with the following composition:

Component	Percent by mass	Moisture Range (%)
Food wastes	15	50-80
Paper	45	4-10
Cardboard	10	4-8
Plastics	10	1-4
Yard wastes	10	30-80
Wood	5	15-40
Tin Cans	5	2-4

Part – C

[Marks: 12 each]

Q8. Write short notes on the following related to the water treatment:

- a) Filtration
- b) Water softening
- c) Ion exchange process
- d) Disinfection

OR

Design a complete mixed activated sludge process aeration tank for treatment of 4 MLD wastewater having BOD concentration of 180 mg/L. The effluent should have soluble BOD of 20 mg/L or less. Consider the following: $MLVSS/MLSS = 0.8$, Return sludge SS concentration = 10000 mg/L, $MLVSS$ in aeration tank = 3500 mg/L, Mean cell residence time adopted in design is 10 days. (Assume: $Y = 0.5$ mg/mg, $k_d = 0.06$ per day).

Q9. Why is it important to control the movement of gases and leachate in landfills? Explain the facilities that are provided for the control of both components.

OR

Explain the following related to the air pollution control:

- a) Method of air sampling
- b) Electrostatic precipitator
- c) Wet scrubbers
