



P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Sixth Semester, B.E. - Civil Engineering

Semester End Examination; July / Aug. - 2022

Waste Water Collection and Treatment

Time: 3 hrs

Max. Marks: 100

Course Outcomes

The Students will be able to:

CO1: To understand wastewater generation characteristics and need for waste water treatment.

CO2: To study design different unit operations and unit process involved in waste water treatment process.

CO3: To impart knowledge on the various biological treatment processes used in waste water treatment plant.

CO4: To describe different methods for waste water disposal and environmental effects of wastewater.

CO5: To grasp the microbiological processes in the activated sludge process.

Note: I) PART - A is compulsory. Two marks for each question.

II) PART - B: Answer any **Two** sub questions (from a, b, c) for a Maximum of **18 marks** from each unit.

Q. No.	Questions	Marks	BLs	COs	POs
I : PART - A		10			
I a.	Define the term "Wet weather flow".	2	L1	CO1	PO1
b.	Define sewer appurtenance and list the types of sewer materials used.	2	L1	CO2	PO1,2
c.	Define self cleansing velocity.	2	L1	CO3	PO3
d.	Define suspended and attached growth system.	2	L1	CO4	PO3
e.	Define oxidation pond.	2	L1	CO5	PO5
II : PART - B		90			
UNIT - I		18			
1 a.	Define dry weather flow and explain the factors influencing dry weather flow.	9	L1	CO1	PO1
b.	Find the velocity of flow and discharge in a sewer of circular selection having 1 m diameter laid at a gradient of 1 in 500. Use manning's formula taking N = 0.012. Assume sewer is running half full.	9	L3	CO1	PO1
c.	Explain briefly the system of sewerage AND give their merits and demerits.	9	L1	CO1	PO1
UNIT - II		18			
2 a.	Draw a neat typical layout plan showing house drainage connections and explain the maintenance of house drainage.	9	L1	CO2	PO1,2
b.	Explain with a neat sketch, the construction and working of a manhole.	9	L1	CO2	PO1,2
c.	Explain sewer ventilation and list out the requirements of good traps used in house plumbing.	9	L1	CO2	PO1,2

UNIT - III

18

- 3 a. What is meant by self purification of stream? Explain the factors influencing self purification process. 9 L1 CO3 PO3
- b. The BOD of a sewage incubated for one day at 30°C has been found to be 100 mg/l. Find the 5 day 20°C BOD. Assume $K_{20} = 0.12$. 9 L2 CO3 PO3
- c. Mention and explain the various methods of waste water disposal? Write the favorable condition to dispose the waste water by dilution. 9 L1 CO3 PO3

UNIT - IV

18

- 4 a. Explain with a flow diagram a conventional sewerage treatment plant. Discuss the function of each component. 9 L1 CO4 PO7
- b. Design a rectangular sedimentation tank for a population of 90 thousand with rate of water supply 140 liters per capacity per day, 80% of which reaches the treatment plant. Assume peak factor as 1.2 and horizontal velocity of flow 0.3 m/min. check for over flow rate. 9 L4 CO4 PO7
- c. Explain the process of purification of sewage by trickling filter. Also discuss the advantages of recirculation of trickling filter. 9 L1 CO4 PO7

UNIT - V

18

- 5 a. Explain the process of anaerobic sludge digestion. List the factors affecting capacity of digestion. 9 L1 CO5 PO5
- b. Explain the working of a septic tank with a neat sketch. List the advantages and disadvantages of septic tank. 9 L1 CO5 PO5
- c. Explain the oxidation ditch with a neat sketch. Discuss the different types of oxidation ditches. 9 L1 CO5 PO5

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