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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.

<u>*Note:*</u> *I) PART - A is compulsory.* **Two** *marks for each question.*
    II) PART - B: Answer any <u>**Two**</u> *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 30ºC has been found to be 100 mg/*l*. Find the 5 day 20ºC 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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