Q. Code: 989008

Reg. No. | | | | | | | | | | | | | |

B.E./ B. TECH.DEGREE EXAMINATIONS, MAY 2024

Sixth Semester

CE18602 - WASTEWATER ENGINEERING

(Civil Engineering)

(Regulation 2018/2018A)

TIME:3 HOURS **MAX. MARKS: 100**

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	Calculate sewage generation, classify the characteristics and composition of sewage and compute the sizes of sewerage system components.	**3**
CO 2	Compute the sizes of the units and discuss the unit operations and processes that are used in primary treatment of sewage and onsite sanitation.	**3**
CO 3	Compute the sizes of the units and explain the unit operations and processes that are involved in secondary treatment of sewage.	**3**
CO 4	Describe the advanced sewage treatment technology and reuse of sewage.	**2**
CO 5	Describe the self-purification process of streams and calculate the sludge generation and explain the sludge management.	**2**

PART- A(10x2=20Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	Identify the significance of BOD/COD ratio.	**1**	**2**
2.	Enlist the impacts of nutrients on water bodies.	**1**	**2**
3.	What is meant by detritus tank?	**2**	**2**
4.	List out the functions of primary settling tank.	**2**	**2**
5.	Discuss the term re-circulation factor in trickling filter.	**3**	**2**
6.	Identify the modified forms of conventional Activated Sludge Process.	**3**	**2**
7.	Explain how gas liquid and solids are separated from effluent in upflow anaerobic sludge blanket reactor.	**4**	**2**
8.	List out the advantages of sequencing batch reactor.	**4**	**2**
9.	Discuss how sewage can be used for farming?	**5**	**2**
10.	What are the compositions of sludge before it is thickened?	**5**	**2**

PART- B (5x 14=70Marks)

		Marks	CO	RBT LEVEL
11. (a)	Discuss in detail the various sewer appurtenances with neat sketches.	**(14)**	**1**	**3**
	(OR)			
(b)	BOD of a sewage incubated for 3 days at 27^0 C was found to be 285 mg/l. Find the value of 5 day 20^0 C BOD. Assume deoxygenating constant at 20^0 C as 0.16 per day.	**(14)**	**1**	**3**

12. (a)	Explain the various unit operations and processes involved in a STP with the help of process flow diagram.	**(14)**	**2**	**3**
	(OR)			
(b)	Design a septic tank with dispersion pit for a hostel with a population of 200 and peak discharge of 150 lit per min. Assume suitable design criteria.	**(14)**	**2**	**3**
13. (a)	Explain the working principle of oxidation pond with advantages and disadvantages and draw the typical process flow diagram.	**(14)**	**3**	**3**
	(OR)			
(b)	Design a complete mixed activated sludge process aeration tank for treatment of 4 MLD sewage 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.	**(14)**	**3**	**3**
14. (a)	With a neat sketch explain the working principle of Membrane Bioreactor and UASB reactor.	**(14)**	**4**	**2**
	(OR)			
(b)	Explain the various treatment methods available for extracting the biological nitrogen and biological phosphorous from effluent.	**(14)**	**4**	**2**
15. (a)	Name the various actions involved in the self-purification process of a stream and explain them briefly.	**(14)**	**5**	**2**
	(OR)			
(b)	Explain in detail about the working and design principles of gravity thickening.	**(14)**	**5**	**2**

PART- C (1x 10=10Marks)

(Q.No.16 is compulsory)

		Marks	CO	RBT LEVEL
16.	Design a screen chamber for a proposed sewage treatment plant of 50 MLD.	**(10)**	**1**	**2**

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