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Question Paper Code: U4104

B.E./B.Tech. DEGREE EXAMINATION, NOV 2024

Fourth Semester

Civil Engineering

21UCE404 WASTE WATER ENGINEERING

(Regulations 2021)

Duration: Three hours Maximum: 100 Marks

Answer All Questions

PART A - (10 x 1 = 10 Marks)

1. The following is the physical characteristic of sewage CO1- U

   (a) Turbidity (b) Colour (c) Odour (d) All the above.

2. A _____ is an inclined pipe which is connected to the underground sewer. CO1- U

   (a) Catch basin (b) Clean - Outs (c) Flushing Tank (d) Inverted siphons.

3. Detention time for septic tank is, CO1- U

   (a) 4-6 hour (b) 20-30 days (c) 2-6 weeks (d) 12-36 hour

4. The maximum spacing of steel bars in coarse screens used for the treatment of sewage is, CO1- U

   (a) 10mm (b) 20mm (c) 30mm (d) 50mm

5. The waste stabilization ponds can be CO1- U

   (a) aerobic (b) anaerobic (c) facultative (d) all the above

6. Recirculation of sewage is adopted in ____ Trickling filters CO1- U

   (a) High rate (b) Low rate (c) Medium rate (d) Conventional

7. Energy may be recovered from sludge as _____ CO1- U

   (a) LPG (b) Methane gas (c) Air (d) Hydrogen gas

8. Water reclamation processes essentially involve CO1- U

(a) Reuse of treated wastewater

(b) Recycling of treated wastewater

(c) Production of usable quality water by treating wastewater

(d) All of these

9. The moisture content of sludge is reduced from 90% to 80% in a sludge digestion tank. The percentage decrease in the volume of sludge, is CO1- U

a) 25% b) 50% c) 10% d) 5%

10. The biogas composed of CO1- U

(a) O_2 and CO_2 (b) CO_2 and NO_2 (c) CH_4 and O_2 (d) CH_4 and O_2

PART – B (5 x 2= 10 Marks)

11. A sewer of 0.6m dia laid at a gradient of 1 in 400 runs full. Using Crimp and Brudge's formula, Calculate the velocity of flow and the discharge. CO2- App

12. What are the differences in the functions of screen chamber and grit chamber in sewage treatment? CO1- U

13. Suggest the different biological treatment process of wastewater treatment. CO1- U

14. In what principle do membrane bio reactors treat wastewater? CO1- U

15. Mention the different zones of pollution in a river stream. CO1- U

PART – C (5 x 16= 80 Marks)

16. (a) You have been given with a wastewater sample that has to be tested. Outline the various physical, chemical characteristics of sewage with their environmental significance CO1- U (16)

Or

(b) A sewer system has to be laid for a developing city. For effective functioning of this system, suggest the different sewer appurtenances with neat sketch. CO1- U (16)

17. (a) It is mandatory that you have to remove the organic matter from the effluent sent out after the removal of the inorganic floatable grits, elaborate in detail with diagram about the principle, construction details and process involved in carrying out the above mentioned process CO1- U (16)

Or

	(b)	Suggest some cost effective ideas to remove the anthropogenic wastes generated at your residence along with the working principle, construction process and also draw the layout of the same	CO1- U	(16)
18.	(a)	Enumerate the various methods that can be adopted for secondary treatment of sewage. Suggest a suitable treatment method which removes 75% of BOD and suspended solids. Explain the process with neat sketch.	CO2- App	(16)
		Or		
	(b)	Design a high rate trickling filter for treating sewage of 22 ML/d with a raw sewage BOD5 of 320 mg/L. Assume a recirculation ratio of 1.5 and efficiency of the PST as 35% and filter as 75%. Use NRC equation.	CO2- App	(16)
19.	(a)	i) Explain the Reclamation and Reuse of Sewage. ii) Explain in detail about constructed Wetland.	CO1- U	(16)
		Or		
	(b)	Compare MBBR and MBR techniques for wastewater treatment	CO1- U	(16)
20.	(a)	With a neat sketch, elaborate sludge dewatering and thickening process.	CO1- U	(16)
		Or		
	(b)	Discover how UASB is related with treatment of waste water. Write in detail about the UASB reactor with neat sketch, advantages and disadvantages. Explain its function and operation.	CO1- U	(16)