


Name:			
Enrolment No:			
<b>UNIVERSITY OF PETROLEUM AND ENERGY STUDIES</b> <b>End Semester Examination, May 2022</b>			
<b>Course: Environmental Engineering II</b> <b>Program: B.Tech (Civil Engineering)</b> <b>Course Code: HSFS 3021P</b>		<b>Semester: VI</b> <b>Time 3 hrs.</b> <b>Max. Marks: 100</b>	
<b>Instructions: All questions are compulsory to attempt.</b>			
<b>SECTION A</b> <b>(5Qx4M=20Marks)</b>			
S. No.		Marks	CO
Q 1.	Enlist the different processes of preliminary sewage treatment.	4	CO4
Q 2.	Discuss the importance of blank correction in experimental determination of BOD for a sample.	4	CO1
Q 3.	State the end products of a sludge digestion process in a sludge digestion tank.	4	CO2
Q 4.	Compare the hourly variation curve for water supply and wastewater flow along with its key points.	4	CO3
Q 5.	Enlist the various forces that are likely to act on the sewer pipes in a sewerage system.	4	CO3
<b>SECTION B</b> <b>(4Qx10M= 40 Marks)</b>			
Q 6.	Design a septic tank for a small colony of 350 persons provided with an assured water supply from the municipal load works at a rate of 115 liters per capita per day. Assume suitable data wherever needed in accordance with design guidelines. OR Explain the essential differences between Septic and Imhoff tank in sewage treatment. Also, discuss the constructional and operational details of both units.	10	CO4
Q 7.	Design a rectangular sedimentation tank (with mechanical cleaning) for treating the wastewater generated from a city with an average daily water demand of 10 Mld. Assume suitable data and figures wherever needed in accordance with design guidelines	10	CO4
Q 8.	Analyze the egg shaped sewer section along with its critical points and relevance in sewerage system.	10	CO3
Q 9.	A wastewater sample is found to have a 5 days 20°C BOD of 250 mg/l. If the test temperature be 28°C, in how many days will the same value of BOD will be obtained.	10	CO1

**SECTION-C**  
**(2Qx20M=40 Marks)**

Q10.	<p>Design a suitable digestion tank for the primary sludge with the help of following data: Average flow = 20 Mld, Total suspended solids (TSS) in raw sewage = 260 mg/l and Moisture content of digested sludge = 87%. Assume any other suitable data according to design guidelines.</p>	<b>20</b>	<b>CO2</b>
Q11.	<p>a. Discuss the most essential parameter considered while designing the continuous flow type sedimentation tank and also its importance.</p> <p>b. A high rate trickling filter has to be installed for the treatment of sewage flow of 4 Mld. The BOD of raw sewage is 200 mg/l and final effluent BOD concentration desired is 20 mg/l. The BOD removal in the primary sedimentation tank is 30% and recirculation ratio for the filter is 1.2. Determine the dimensions of the high rate trickling filter required for the above stated purpose.</p> <p style="text-align: center;">OR</p> <p>a. Explain the various ways of expressing loading rates on trickling filter.</p> <p>b. Design suitable dimensions for a conventional circular trickling filter treating sewage having flow of 10 Mld and BOD content=280 mg/l. Also, design the central column dimensions of rotary distributor for the above flow taking assumptions according to the design considerations.</p>	<p><b>08</b></p> <p><b>12</b></p> <p><b>05</b></p> <p><b>15</b></p>	<b>CO4</b>