


Name:			
Enrolment No:			
UPES End Semester Examination, May 2023			
Course: Environmental Engineering Program: B.Tech. Civil Engineering Course Code: CIVL 2021		Semester: IV Time: 03 hrs. Max. Marks: 100	
Instructions: <u>All questions are compulsory.</u>			
SECTION A (5Qx4M=20Marks)			
S. No.		Marks	Course Outcome (CO)
Q 1	a. What are secondary air pollutants? b. The important four secondary pollutants are _____, _____, _____, and _____.	04	CO3
Q 2	a. Define the term “refuse”. b. The various constituents of refuse are _____, _____, _____, and _____.	04	CO4
Q 3	Enlist the various components of water supply scheme and sewerage system.	04	CO1
Q 4	State the various noise rating systems along with their key points.	04	CO3
Q 5	Define the terms: a. Dissolved Oxygen (DO), b. Biochemical Oxygen Demand (BOD) c. First stage BOD and d. Chemical Oxygen Demand (COD).	04	CO1
SECTION B (4Qx10M= 40 Marks)			
Q 6	Explain sequentially the various processes of wastewater treatment along with their salient features.	10	CO2
Q 7	What is “Inversion” in regard to atmospheric stability? Discuss the various inversion types with their key points. OR What is “sound pressure level”? Determine the average sound pressure level for 55 dB, 65 dB, 73 dB and 82 dB sound levels occurring at a place for a given time period.	10	CO3

Q 8	Explain the Controlled Tipping method for municipal solid waste disposal with their salient points.	10	CO4															
Q 9	A circular sedimentation tank fitted with standard mechanical sludge remover equipment is to handle 6 MLD of raw water. If the detention period of the tank is 4.5 hours and the depth of the tank is 3 m, determine the diameter of the tank.	10	CO1															
SECTION-C (2Qx20M=40 Marks)																		
Q10	<p>Design a sanitary sewer to serve a population of 1,10,000 with the daily per capita water supply allowance of 130 liters. The slope available for the sewer to be laid is 1 in 900 with $n=0.012$. The dry weather flow may be taken as 1/3 of the maximum discharge and proportionate velocity is 0.95 m/sec. A self-cleansing velocity of 0.75 m/sec is to be developed.</p> <p style="text-align: center;">OR</p> <p>A town has a population of 1,50,000 and average daily water demand of 120 lpcd. Design a rapid sand filter for the above city requirement with details of under drainage system and back water washing including wash water gutter arrangement. Assume suitable data and figures wherever needed according to design guidelines.</p>	20	CO5															
Q11	<p>Design an unlined trapezoidal storm water drain for a catchment area of 100 hectares and maximum rainfall depth is 12 cm obtained in 3 hours rainfall. The classification of the surface of the area is as follows:</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Percent of total surface area</th> <th>Type of surface</th> <th>Coefficient of runoff</th> </tr> </thead> <tbody> <tr> <td>35</td> <td>Roofs</td> <td>0.97</td> </tr> <tr> <td>20</td> <td>Pavements</td> <td>0.83</td> </tr> <tr> <td>30</td> <td>Macadam roads</td> <td>0.52</td> </tr> <tr> <td>15</td> <td>Lawns</td> <td>0.11</td> </tr> </tbody> </table> <p>The drain is to be constructed in cutting with maximum permissible flow velocity as 0.85 m/sec. Assume data and figures wherever needed according to design guidelines.</p>	Percent of total surface area	Type of surface	Coefficient of runoff	35	Roofs	0.97	20	Pavements	0.83	30	Macadam roads	0.52	15	Lawns	0.11	20	CO5
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