Name: **Enrolment No:**	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2022

Course: Environmental Engineering **Semester: IV**
Program: B.Tech (Civil Engineering) **Time 3 hrs.**
Course Code: CIVL2021 **Max. Marks: 100**

Instructions: <u>All questions are compulsory to attempt</u>.

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1.	What do you understand by Chlorine Demand of water and state its relevance?	**4**	**CO2**
Q 2.	What do you understand by primary pollutants and enlist the various important primary pollutants.	**4**	**CO3**
Q 3.	Define the term "refuse" and enumerate its constituents.	**4**	**CO4**
Q 4.	What do you understand by "Water Supply Scheme" and enlist its various components.	**4**	**CO1**
Q 5.	What do you understand by "Sewerage System" and enlist its various components.	**4**	**CO1**
	SECTION B **(4Qx10M= 40 Marks)**		
Q 6.	Analyze sequentially the different stages/processes of wastewater treatment along with their critical points.	**10**	**CO2**
Q 7.	A circular sedimentation tank fitted with standard mechanical sludge remover equipment is to handle 6 million liters per day of raw water. If the detention period of the tank is 4.5 hours and the depth of the tank is 3.8 m, determine diameter of the tank.	**10**	**CO1**
Q 8.	a. State the various methods generally adopted for municipal solid waste disposal. b. Explain the Controlled Tipping method for municipal solid waste disposal along with its key points.	**3** **7**	**CO4**
Q 9.	What do you understand by the term "sound pressure level". Determine the average sound pressure level for various sound pressure levels of 55 dB, 65 dB, 78 dB and 85 dB occurring at a place for a given time period. OR Analyze the different atmospheric stability conditions along with their	**10**	**CO3**

<table>
<tr><td></td><td>critical points.</td><td></td><td></td></tr>
<tr><td colspan="4">SECTION-C
(2Qx20M=40 Marks)</td></tr>
<tr><td>Q10.</td><td>Design an unlined rectangular storm water drain for a catchment area of 110 hectares and maximum rainfall depth is 12 cm obtained in 3 hours rainfall. The classification of the surface of the area is as follows:

<table><tr><th>Percent of total surface area</th><th>Type of surface</th><th>Coefficient of runoff</th></tr><tr><td>30</td><td>Roofs</td><td>0.96</td></tr><tr><td>35</td><td>Pavements</td><td>0.82</td></tr><tr><td>35</td><td>Macadam roads</td><td>0.50</td></tr></table>
The drain is to be constructed in cutting with maximum permissible flow velocity as 0.95 m/sec. Assume data and figures wherever needed according to design guidelines.
OR

A town is having a population of 150000 and average daily water demand of 120 lpcd. Design a rapid sand filter unit 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.</td><td>20</td><td>CO5</td></tr>
<tr><td>Q11.</td><td>Design a sanitary sewer to serve a population of 1,30,000 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 0.88 m/sec during dry weather flow. A self-cleansing velocity of 0.75 m/sec is to be developed.</td><td>20</td><td>CO5</td></tr>
</table>