UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2021

Course: Environmental Engineering **Semester: V**
Program: B.Tech (Civil Engineering) **Duration: 3 hrs.**
Course Code: CIVL 3055 **Max. Marks: 100**

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

SECTION A (20 Marks)

S. No.	**Question**	**Marks**	**CO**
Q 1.	Characterize the term "per capita demand" and state its relevance.	**4**	**CO1**
Q 2.	What do you understand by primary and secondary pollutants in atmosphere?	**4**	**CO3**
Q 3.	Enlist the various additions and subtractions generally done from water supply for estimation of sewage discharge.	**4**	**CO1**
Q 4.	Define the terms: Biochemical Oxygen Demand (BOD) and Dissolved Oxygen (DO).	**4**	**CO2**
Q 5.	What do you understand by "refuse" and enlist the various constituents of a refuse.	**4**	**CO4**
	SECTION B (40 Marks)		
Q 6.	What do you understand by the terms "Equivalent noise level" and Sound pressure level". Determine the Equivalent noise level for fluctuating noise level of 70 minutes in which 60 dB lasting for 40 minutes, followed by 40 dB lasting for 20 minutes, followed by 30 dB lasting for 10 minutes.	**10**	**CO3**
Q 7.	Explain the various composting methods generally used for municipal solid waste disposal in rural areas of India.	**10**	**CO4**
Q 8.	Enlist sequentially the different steps/processes adopted for wastewater treatment along with their functions and key points. OR A circular sedimentation tank fitted with standard mechanical sludge remover equipment is to handle 4.5 million liters per day of raw water. If the detention period of the tank is 5 hours and the depth of the tank is 3.5 m, determine the diameter of the tank.	**10** **10**	**CO2** **CO2**
Q 9.	Explain the various stability conditions of the environment in respect to the relative comparison of Environmental lapse rate and Adiabatic lapse rate.	**10**	**CO3**
	SECTION-C (40 Marks)		
Q10.	The drainage area of one sector of a town is 30 hectares and maximum rainfall depth is 20 cm obtained in 5 hours rainfall. The classification of the surface of the area is as follows:	**20**	**CO5**

	Percent of total surface area	**Type of surface**	**Coefficient of runoff**
	25	Roofs	0.90
	30	Pavements	0.85
	15	Paved yards	0.80
	10	Macadam roads	0.40
	10	Lawns	0.10
	10	Wooded area	0.05
	Design an unlined rectangular storm drainage section for runoff discharge from this area. Assume n = 0.013 and slope to be 1 in 450. OR 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=0.013. 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.	**20**	**CO5**
Q11.	A city is having a population of 115000 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.	**20**	**CO5**