Name: Enrolment No:	UPES UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2019

Course: Environmental Engineering II **Semester: VIIth**
Program: B.Tech (Civil Engineering) **Time 03 hrs.**
Course Code: CEEG 352 **Max. Marks: 100**

Instructions: All questions are compulsory to attempt **SET A**

SECTION A

S. No.		Marks	CO
Q 1	Explain how extended aeration process is different from conventional aeration process in secondary treatment of sewage.	04	CO3
Q 2	Analyze the hourly variation curve for water supply and sewage flow along with its key points.	04	CO1
Q 3	What do you understand by the term "relative stability" and explain its relevance in sewage characterization.	04	CO2
Q 4	State the end products of a sludge digestion process in a sludge digestion tank.	04	CO4
Q 5	Discuss the importance of blank correction in experimental determination of BOD for a sample.	04	CO2
	SECTION B		
Q 1	A sewage sample is found to have a 5 days 20°C BOD of 280 mg/l. If the test temperature be 30°C, in how many days will the same value of BOD will be obtained.	10	CO2
Q 2	Explain the essential differences between Septic and Imhoff tank in sewage treatment. Also describe the constructional and operational details of both units. OR Design an oxidation pond for a residential colony of 3500 persons with an average water demand of 125 liters per capita per day. The sewage generated by the colony is found to have the BOD content of 280 mg/l. Assume any other suitable data according to design guidelines	10 10	CO3 CO3
Q 3	Design a rectangular sedimentation tank (with manual cleaning) for treating the sewage from a city with an average daily water demand of 6 Mld (presuming that activated sludge process is to follow the sedimentation tank). Assume suitable data and figures wherever needed in accordance with design guidelines	10	CO3
Q 4	Discuss the various forces which are likely to act on the sewer pipes in a sewerage system	10	CO1
	SECTION-C		
Q 1	Explain the different ways of expressing loading rates on conventional trickling filters.	06	CO3

	Design suitable dimensions of a conventional circular trickling filter treating sewage having flow of 7 Mld and BOD content=210 mg/l. Also design the central column dimensions of rotary distributor for the above flow taking assumptions according to the design considerations. OR	**14**	**CO3**
	Discuss the most essential parameter considered while designing the continuous flow type sedimentation tank and also its importance.	**08**	**CO3**
	A high rate trickling filter has to be installed for the treatment of sewage flow of 4.2 Mld. The BOD of raw sewage is 230 mg/l and final effluent BOD concentration desired is 25 mg/l. The BOD removal in the primary sedimentation tank is 31% and recirculation ratio for the filter is 1.4. Determine the dimensions of the high rate trickling filter required for the above stated purpose.	**12**	**CO3**
Q 2	Design a digestion tank for the primary sludge with the help of following data: a. Average flow = 18 Mld b. Total suspended solids (TSS) in raw sewage = 280 mg/l c. Moisture content of digested sludge = 85% Assume any other suitable data according to design guidelines	**20**	**CO4**