Total number of printed pages: 2 **Program (UG)/6th/UCE603**

2023

Environmental Engineering-II

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1.	a)	Elaborate the significance of BOD and COD in wastewater treatment.	2.5×2 = 5
	b)	Define the term catchment area, dry weather flow and time of concentration.	2+2+2 = 6
	c)	Differentiate between unit operation and unit process of a treatment system.	2.5×2 = 5
	d)	What is meant by BOD_5? Why it is important?	2+2 = 4
2.	a)	What are the various wastewater characteristic categories? List out the various characteristics in each category. Describe each of them in detail.	3+6+11=20
3.	a)	At which stage of sewage treatment process, sludge is produced? Describe the sludge formation process.	2+3=5
	b)	List out various laboratory tests to analyse the properties of wastewater.	6
	c)	For WCS, write the methodology for combined WCS, separate WCS and partially combined WCS	3+3+3=9

in a comparative manner.

4.	a)	Describe the Nitrogen Cycle with a neat schematic diagram.	6
	b)	The BOD of sewage incubated for 1day at 30° C has been found to be 150 ppm, what will be the 5 day BOD at 20°C. Assume K=0.12 (base 10) at 20°C.	14
5.	a)	What are the various types of sewerage systems? Explain each of them briefly.	3+3
	b)	A sewer has a catchment area of 70 hectares. Estimate the storm water flow corresponding to a rainfall of 4 cm during a time of concentration of 0.5 hours. Assuming the impervious area is equal to 50% of the total catchment area. Use Lloyed Davis formula.	08
	c)	What are the various stages of a typical wastewater treatment system? Describe each of them briefly.	2+4
6.	a)	Determine the ultimate BOD for a sewage having 5 day BOD at 20 °C as 200 ppm. Assume the de-oxygenation constant as 0.12 per day. Also determine the 2 day BOD for the Sewage.	08
	b)	Describe the 1st stage BOD curve with the help of a neat schematic diagram.	06
	c)	Define BOD, COD, TOD and ThOD	1.5×4 = 6