Tribhuvan University
Institute of Engineering
Examination Control Division
2082

Examination	Model Question		
Level	BE	Full Marks	60
Program	BCH	Pass Marks	24
Year/Part	III/I	Time	3 Hrs.

Subject:- Environmental Pollution and Control **Course Code:- (ENCH 304)**

√ Candidates are required to give their answers in their own words as **far as practicable**.
√ Attempt **all** questions
√ The figures in the margin indicate **Full Marks.**
√ Necessary figure(s) are/is attached herewith.
√ Assume suitable data if necessary

QN	Description	Marks	Chapter No.
1	a. A water contains two nitrogen species. The concentration of NH_3 is 30 mg/L NH_3, and the concentration of NO_3^- is 5 mg/L NO_3^-. What is the total nitrogen concentration in units of mg N/L [4] b. The fluoride concentration in drinking water may be increased to help prevent tooth decay by adding sodium fluoride; however, if too much fluoride is added, it can cause discoloring of the teeth. The optimum dose of fluoride in drinking water is about 0.053 mM. If sodium fluoride (NaF) is purchased in 25 kg bags, how many gallons of drinking water would a bag treat? Assume there is no fluoride already in the water. [4] c. Write short notes on natural pollutants. [4]	12	1 and 2
2	a. What do you mean by thermal pollution? Why is important to avoid? (2) b. What is theoretical COD of biomass? (2) c. A wastewater contains 13 % by mass of biomass ($C_5H_7NO_2$). Calculate the percent by mass of nitrogen in the biomass. Also calculate the percent of nitrogen by mass in the wastewater. [1+2] d. A 25 ml wastewater sample in placed in a dish that weigh 50 g, after evaporation and drying at 103 °C, and cooling in desiccator, the dish weigh 50.02 g. Then the dish is fired at 550 °C for 1 hour, after which the dish weigh 50.005 g. Estimate total solids (TS), volatile solids (VS) and fixed solids (FS) of the water sample.? (3) e. Discuss laboratory BOD measurement in short [2].	12	3
3	a. Assume that the Air Quality Standard for Ozone (MW=48) is 0.075 ppm in 8 hours and for sulfur dioxide (MW=64.06) is 0.14 ppm in 24 hours. (a) What are the AQSs for ozone and sulfur dioxide expressed in $\mu g/m^3$ at 25°C and 1 atm? (b)	12	4

	Assume that a sample of air at 25°C and containing SO_2 gas at a concentration equal to the AQS is raised to 150°C. What is its SO_2 concentration at 150°C in ppm and µg/m3. (2+2) b. Convert a flow rate of 10 Nm^3/h at standard conditions of 0 °C, 1 atm (earlier IUAPC definition) to actual stack gas conditions (180°C, 0.9 atm). (1) c. What are the sources of particulate matter in the atmosphere? Why do you think particle size is important in air pollution? (2+3) d. List SIX criteria pollutants. (2)		
4	a. What sound power level results from combining the following three levels: 68 dB, 79 dB and 75 dB? (2) b. Compute the mean sound level from the following four readings (all dBA): 38, 51, 68 and 78. (2) c. Write THREE controls of noise source by design and explain briefly. (3) d. What do you mean by aerosols? How do they affect the Earth's energy balance? How are they different from greenhouse gases? (1+2+2)	12	5 and 7
5	a. A landfill is to be designed to serve a population of 100000 for a period of 50 years. The solid waste (SW) generation is 4 kg/person/day. The density of the un-compacted SW is 200 kg/m^3 and a compaction ratio of 3.5 is suggested. The ratio of compacted fill (i.e., SW+cover) to compacted SW is 2 m. What is the required landfill volume (in million m^3)? (4) b. How can your municipality gain success in handling municipal solid waste? (4) c. If you were asked to determine **EIGHT** categories of waste for MSW segregation, what would they be? Just list. (4)	12	6

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