

KATHMANDU UNIVERSITY

Subject Code: ENVE 101

Internal Examination

FM:20 Time 1 hr

1. Write objectives and or applications of the following treatment units for water or wastewater treatment [5]

- a) Screening and skim tank
- b) Biological process
- c) Sedimentation tank
- d) Grit chamber
- e) Disinfection

2. The population statistics of a town are given below. Estimate the population expected in the year 2044 by geometrical and arithmetical methods. If the velocity of flow is 1.5 m/s a demand is 115 lpcd, determine the discharge in m^3/s for both the population? [2+2+1= 5]

Year	1974	1984	1994	2004	2024	2044 .
Population	70,000	1,00,000	1,50,000	2,10,000	2,50,000	?

3. A well-mixed sewage lagoon (a shallow pond) is receiving $430 m^3 /d$ of untreated sewage. The lagoon has a surface area of 10 ha and a depth of 1.0 m. The pollutant concentration in the raw sewage discharging into the lagoon is 180 mg/L. The organic matter in the sewage decays biologically in the lagoon according to first-order kinetics. The reaction rate constant is $0.70 d^{-1}$. Assuming no other water losses or gains (evaporation, seepage, or rainfall) and that the lagoon is completely mixed, find the steady-state concentration of the pollutant in the lagoon effluent.

4. a). Describe how excess nitrogen and phosphorus leads to eutrophication of lake [3]
b) What do you understand by engineering decisions? [2]