

Biological Waste Treatment (BBL742)
End-Semester Examination

Full Marks: 25

Time: 100 Minutes

1. Why is it necessary to have information regarding the oxygen transfer efficiency of the aeration unit for a proper design of the activated sludge process? Explain. [3]
2. What is an extended aeration process? How does it differ from a conventional activated sludge process? [3]
3. A small municipality invited proposals for sewage treatment plants from technically competent engineering consultants to treat the 40 million litres of sewage generated by the community every day. While most consultants proposed setting up an effluent treatment plant based on the activated sludge process, one well known consultant proposed setting up an anaerobic treatment plant based on the "upflow anaerobic sludge blanket (UASB)" concept. However, many in the evaluation committee were skeptical because, they argued, how can anaerobic process remove the Biochemical Oxygen Demand, since the entire process is to be carried out in the absence of oxygen. What is your opinion? Why? Explain. [4]
4. Draw a schematic of MTF and label each component of the reactor. What are the major advantages of the MTF? [4]
5. An aeration tank is 30 m long, 12 m wide, and operates at a depth of 5 m. The MLSS concentration in the aeration tank is 2480 mg/L. If the influent flow to the tank is 2.72 MLD with a suspended solids concentration of 110 mg/L, what is the sludge age? (Round to the nearest tenth.) [2]
6. a) Name the key steps involved in quantitative risk assessment of any hazard.
b) Write 3 major advantages and 3 limitations of constructed wetlands.
c) List 4 key factors responsible for promoting antimicrobial resistance proliferation.
d) Write the operations followed in Sequential Batch Reactor in successive order. [2+3+2+2]

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[2+3+2+2]