

KATHMANDU UNIVERSITY
End Semester Examination
14 January 2024

Marks Scored:

Level : B.Tech.

Year : IV

Exam Roll No. :

Time: 30 mins.

Course : ENVE 432

Semester : I

F. M. : 20

Registration No.:

Date :

SECTION "A"

[20Q. × 1 = 20 marks]

Choose and encircle the most appropriate answers from the given choices

1. Consider there are high concentrations of algae in effluent from secondary clarifiers following biological wastewater treatment. If you're to suggest the correct type of screen, which of the following screens you would propose for the removal of algae:
a. Bar rack b. Medium screens c. Fine screens d. Microstrainers
2. Which one of the following oxidants has the least oxidation potential?
a. Ozone (O₃) b. OH⁻ c. Cl₂ d. O₂
3. In the which of the membrane process operation, feed flow is perpendicular to the membrane surface:
a. Cross-flow operation b. Dead-end operations
c. Co-current flow operations d. Counter-current flow operations
4. The population equivalent of an industrial site with daily wastewater generation of 0.2 MLD, BOD₅ = 650 mg/L and considering a per capita BOD contribution of 40 g/day is:
a. 3325 b. 1250 c. 3250 d. 2250
5. What is the log removal value (LRV) achieved in a wastewater disinfection unit, with influent having an *E. coli* concentration of 1 × 10⁶ CFU/100 mL and final effluent having an *E. coli* concentration of 500 CFU/100 mL?
a. 2.3 b. 4.3 c. 3.3 d. 1.3
6. For a grit chamber, if the recommended velocity of flow is 0.25 m/sec and the detention period is 1 minute, the length of the tank is
a. 12 m b. 15 m c. 18 m d. 30 m
7. The vertical and diurnal patterns are used to fix the depth of the facultative ponds (H). In which of the following conditions, the oxypause takes place in a shallow place in comparison to the entire pond depth which makes the pond more anaerobic than aerobic:
a. If H < 1 m b. If H > 1 m c. If H < 1.8 m d. If H > 1.8 m
8. What type of process is needed in the reactor (A) during the enhanced biological phosphorous removal (EBPR) process?



- a. Oxic b. Aerobic c. Anoxic d. Anaerobic

9. A 15,000 kg/day of primary sludge produced is to be thickened in a gravity thickener. The calculated total surface area required for a gravity thickener with a solid loading rate of 150 kg/m²/day is:
 a. 150 m² b. 100 m² c. 200 m² d. 250 m²
10. A floatation process can be used in which of the following sludge handling process?
 a. Thickening b. Stabilization c. Disposal d. Dewatering

Fill in the blanks with appropriate words.

11. Measured alkalinity in water is typically expressed as
12. The electric potential on the external boundary of the Stern layer versus the bulk electrolyte is referred to as.....
13. A surface loading rate in a grit chamber can be expressed as
14. For primary sedimentation tanks, a typical overflow rate ranging from m³/(m²·d) is assumed as for average flowrate.
15. In an activated sludge process, the sludge stream that is recycled back to the aeration tank is referred to as
16. During the denitrification process, bacteria uses nitrate/nitrite as an electron acceptor and an external or supplementary carbon source in the form of methanol or acetate is added to the process.
17. The SVI value of mL/g generally indicates well-settling sludge. However, the concentration of solids must be accounted for while comparing the settleability of two sludge.
18. Too-high organic loading rates normally result in excessive volatile fatty acid (VFA) production in the digester with a consequent in pH.
19. The theoretical methane produced at STP is 0.35 L per gram of COD. Considering that carbon dioxide and methane are the major components in biogas and if the methane content is 70%, then liters of biogas can be produced per g COD.
20. An absorption describes the relation between the amount or concentration of adsorbate that accumulates on the adsorbent and the equilibrium concentration of dissolved adsorbate.