

BACHELOR OF CHEMICAL ENGG.EXAMINATION, 2019

(4th Year, 2nd Semester)

ENVIRONMENTAL BIOTECHNOLOGY

Time;Three hours

Full Marks:100

Answer all of the following questions

All questions carry equal marks.

1. Mention different bio-kinetic parameters. How it can be evaluated to design a activated sludge process? How activated sludge process can be modified through air supply? (2+8)+15
2. A completely mixed activated sludge process is to be used to treat waste water flow of 500m³/hr having a soluble BOD₅ of 250mg/l. The concentration of soluble BOD₅ escaping treatment is 10 mg/l. Design criteria are as follows: 25
 $Y=0.5$, $k= 5 \text{ day}^{-1}$, $K_d=0.06 \text{ day}^{-1}$, $K_s=100 \text{ mg/l}$, and the concentration of MLVSS (X)= 2000mg/l.
Compute (1) Treatment efficiency (2) Mean cell residence time θ_c (3) Hydraulic retention time θ (4) Volume of the aeration tank. (5) F/M ratio.
If air is supplied at 25⁰C and O₂ transfer efficiency is 10 % calculate volume of air supplied to plant assuming BOD₅ is 67.5% of the ultimate BOD.
3. What is bioremediation? Briefly describe the mechanism of biodegradation pathways of aliphatic and aromatic compound. 5+20
4. Discuss the environmental factors that can affect biodegradation. 25