Exam.Code:1034
Sub. Code: 7879

1129

M.E. (Biotechnology) Third Semester

Elective – IV

MEBIO-302: Biological Waste Water Engineering

Time allowed: 3 Hours **Max. Marks: 50**

NOTE: Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Unit. State clearly your assumptions.

x-x-x

I. Answer the following briefly:-

a) BOD test and its significance.

b) Define COD and Ultimate BOD.

c) Engineered in situ bioremediation.

d) Biosorption. (5x2)

e) Aerated lagoons.

UNIT – I

II. Describe the aerobic process of waste water treatment processes. Give the details about aerobic reactors. (10)

III. a) Design a trickling filter to treat waste water released from fruit-processing unit.
The following data are given:
Flow rate of waste water = 18,000 m^3/d
Influent BOD = 400 mg/L
Effluent BOD = 25 mg/L
Temperature Data: a) summer = 30°C
b) Winter = 15°C

The following data have been experimentally determined:

BOD removal rate constant at 25°C = 0.1 d^{-1}
Temperature correction coefficient = 1.08
Specific area of conventional filter packing material = 100 m^3/ m^2
Filter height = 12m
Any other data may be assumed if required, give reasons.

b) Calculate the 15 days BOD of waste water sample at 30 °C if 5 days BOD at 20 °C is 200 mg/lit. Where $K_{20}0_C$ =0.23 d^{-1} and θ = 1.056

c) Discuss merit and demerit of activated sludge process and trickling filter. (5,3,2)

IV. Explain the following:-

a) BOD Kinetics

b) Waste water characteristics (2,5,3)

c) Purpose of sedimentation in sewage treatment.

P.T.O.

UNIT – II

V. Describe the merits and demerits about anaerobic waste water treatment and discuss the mechanism of anaerobic treatment processes. Explain the different type of anaerobic reactors. (10)

VI. What are the industrial wastes? Write in detail their bioremediation methods. (10)

VII. Write a notes on:-

a) Bio augmentation.

b) Ex-Situ Bioremediation.

c) Bio-filtration. (3,4,3)

x-x-x