

BACHELOR OF ENGINEERING IN (F. T. B. E.) EXAMINATION, 2019

(4th Year, 2nd Semester)

WASTE TREATMENT ENGINEERING

Time : Three hours

Full Marks : 100

1. Answer the following questions very specifically and to the point: (Any Four) (2.5 x 4 =10)

- What do you mean by water pollution ?
- What are the types of water pollutants and their effects on environment?
- Differentiate between seeding and acclimatization.
- What is the significance of the term BOD ?
- What is the significance of the term COD?

2. Answer any two from the following questions: (2 x 5=10)

- When coliform are discovered in water, why a fecal coliform test is done to detect the other pathogenic micro organisms?
- What is water polishing and why it is done ?
- What happen when a large amount of waste water is thrown on flowing water(like river),what are the changes will occur ?

3. Answer any one from the following questions: (15)

- Establish the mathematical model for the BOD curve considering the concept of kinetic relationship
- Discuss the process of Biochemical stabilization of waste .
- When electro dialysis process is recommended to separate dissolved materials and how these materials are separated?

4. Answer any One from the following questions : (15)

- Draw a generalized simplified scheme for disposal of collected wastes of domestic and industrial origin.
- How biomass is separated? How activated sludge is produced and why it is called so ?
- Calculate the vessel dispersion number ($\frac{D}{uL}$) for a closed vessel of an activated sludge process represented by the Dispersion Model and having the following concentration reading :

Time, t(min)	0	5	10	15	20	25	30	35
Tracer Output concentration (gm/lit of fluid)	0	2	4	6	4	3	2	1

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5. Answer any One from the following questions : (15)

- a) Discuss the operational principles of Trickling filter and Lagoons for purification of waste water.
- b) Discuss the different Anaerobic digestion system of sludge .
- c) How can you go for stage wise purification of waste water coming from petrochemical industries having toxic chemicals like cyanamides.

6. Answer any One from the following questions : (15)

a) How can you prove that $C = 5.62 (e F - 1.42 d X / dt)$; where C is the amount of methane gas produced per day at standard condition in cu ft from stabilization of a sludge . Other terms bear usual meaning.

b) Determine the liquid volume before and after digestion for 1000 lb (dry basis) of primary sludge with the following characteristics :

	Primary	Digested
Solids%	5	10
Volatile matter %	60	60
Specific Gravity of fixed solids	2.5	2.5
Specific gravity of volatile solids	1.0	1.0

c) With the help of a neat sketch explain the formation of different layers during the sedimentation of sludge.

7. Answer any Two from the following questions : (10 x2 = 20)

- a) With example explain the principles associated with attached growth and suspended growth for treatment of waste water.
- b) Derive a relation between terminal velocity and diameter of the waste particles during the discrete settling .
- c) Discuss the role of dissolved oxygen in the purification of waste water. Show the profile of D.O. in the stream when waste water is thrown in to the stream (oxygen sag curve)