Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.Tech(FT)/SEM-5/FT-504/2010-11

2010-11

WASTE MANAGEMENT OF FOOD INDUSTRIES

Time Allotted : 3 Hours *Full Marks* : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following : 10 × 1 = 10

   i) The ratio of BOD and COD

      a) depends on organic load

      b) depends on both organic and inorganic load

      c) both (a) and (b)

      d) always constant.

   ii) Pollution load of

      a) distillery waste > tannery waste > waste from vegetable industry

      b) tannery waste > distillery waste > waste from vegetable industry

      c) tannery waste > waste from vegetable industry > distillery waste

      d) waste from vegetable industry > tannery waste > distillery waste.

iii) Disinfection of effluent water is done in

a) primary processing b) secondary processing

c) tertiary processing d) quaternary processing.

iv) Biofilter is used for

a) reduction of pollution load

b) reduction of bad odor

c) reuse of waste water

d) all of these.

v) Biosorption process done by

a) microorganisms b) plant material

c) fruit vegetable wastes d) all of these.

vi) USAB reactor function best at

a) low concentration of soluble wastes

b) laminar flow of the fluid stream

c) all of these

d) none of these.

vii) For a waste water sample which of the relation holds good ?

a) BOD > COD b) BOD < COD

c) BOD = COD d) None of these.

viii) A Trickling Filter media should have

a) high surface area to volume ratio

b) high strength and reliability

c) all of these

d) none of these.

ix) With respect to energy content of incinerated waste which of the following relations is right ?

a) PSW > USW

b) PSW < USW

c) PSW = USW

d) They cannot be compared.

x) Degree of decomposition of solid waste can be measured by

a) final drop in temperature

b) oxygen uptake rate

c) starch-iodine test

d) all of these.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. What are the sources of cannery waste ? Mention in brief the treatment strategy. 2 + 3

3. Briefly describe the sources and treatment strategy of distillery waste. Mention only the disposal method. 4 + 1

4. Why BOD test cannot be completed in 5 days ? Discuss the significance of BOD satisfaction curve. 2 + 3

5. Discuss about the influences of different process conditions on BOD test. 5

6. Point out the advantages and disadvantages of trickling filter over activated sludge process. What do you understand by sloughing of trickling filter ? 4 + 1

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7. a) Calculate the K value when $BOD_5^{20} = BOD_2^{37}$. 5

b) Briefly discuss about primary and quaternary waste process. What are the significance of these processes in waste management. 6

c) What are the sources of sugar industrial waste ? What is the treatment process of sugar industrial waste ? 4

8. a) Briely discuss about water purification process and explain the function of each step. 7

b) What do you mean by biosorption of heavy metals. What is its role in water purification process ? What are the factors, which affect the biosorption process ? 8

9. A food processing industry having a production capacity of 200 tons/day and discharging 1000 gallons of waste water per ton of the product having a BOD_5 (20°C) of

2500 mg/lit. The amount of waste water produced by individual is 50 gallons/day of 500 mg/lit of BOD_5 (20°C)

and waste treated in the same plant. Determine the population equivalent and ultimate BOD. It is given that the *K*-rate for BOD is 0·1/day. 15

10. A 10 m diameter single stage trickling filter at a depth of 6·1 m. Primary effluent with the characteristics given below is applied to the filter. What is the volumetric BOD and TKN loading ? Calculate also specific TNK loading.

Data given are

a) Flow rate = 4000 m3/d

b) BOD = 120 g/m3

c) TSS = 80 g/m

d) TNK = 25 g/m3

e) Specific surface area of the packing material (plastic) = 90 m2/m3. 15

11. What is Rotating Biological Contractors (RBC) ? Discuss the performance and design aspect of RBC and its advantages and disadvantages. 3 + 8 + 4