53 (FPT 501) FIWM

2015

FOOD INDUSTRY WASTE MANAGEMENT

Paper : FPT 501

Full Marks : 100

Time : Three hours

**The figures in the margin indicate
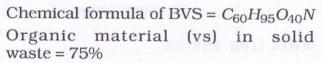full marks for the questions.**

*Answer **any five** questions out of seven.*

1. *(a)* Define solid waste management. Explain different sources and types of solid wastes. 8

   (b) Discuss the various steps involved in vermicomposting technique. 8

   (c) Write the various advantages and disadvantages of vermicomposting technique. 4

2. *(a)* Explain the various types of aerobic composting process. 12

(b) Discuss about the advantages of anaerobic treatment of liquid waste over aerobic treatment methods.   8

3. Write notes on *(any four)* of the following :
                                                    4×5

    (a) Pyrolysis

    (b) Incineration

    (c) BOD

    (d) UASB

    (e) Coagulation

    (f) Flocculation.

4. *(a)* What is Rotating Biological Contactor (RBC) ? Discuss the performance aspects of RBC.   15

    (b) Discuss the advantages and disadvantages of RBC.   5

5. Describe the various steps and various methods used in industry to prepare drinking water from waste-water.   20

6. *(a)* Estimate theoretically the volume of biogas that can be produced by anaerobic treatment of 1000*kg* of solid waste by using the following data :

Chemical formula of BVS = $C_{60}H_{95}O_{40}N$

Organic material (vs) in solid waste = 75%

Moisture content = 20%

Biodegradable volatile solid (BVS) = 95% (Dry basis)

Specific wt. of methane is $0.7112 kg/m^3$

Specific wt. of CO_2 is $1.9607 kg/m^3$

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(b) In a BOD determination 6ml of waste-water is mixed with 294ml of diluting water containg $9.1 ml/l$ of DO. After 5 days incubation at 20°C, the DO content of the mixture is $2.8 mg/l$. Calculate the BOD_5 of the wastewater and ultimate BOD. 6

7. *(a)* Describe briefly the major steps involved in activated sludge process. What is solid retention time (SRT) ? How can you define mean cell residence time (MCRT). 12

(b) Determine the 1-day BOD and ultimate first stage BOD for a waste-water, whose 5-day 20°C BOD is $300 ml/l$. The reaction constant K (base *e*) = $0.23 d^{-1}$. What would have been the 5-day BOD, if the test had been conducted at 25°C. 8

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