AQ – 2757

Second Semester M. Tech. (Chemical Engg.) Examination

ENV. ENGG. AND WASTE MANAGEMENT

Elective – II

2 CE 6

P. Pages : 2

Time : Three Hours] [Max. Marks : 80

Note : (1) All questions carry marks as indicated.
(2) Due credit will be given to neatness and adequate dimensions.
(3) Assume suitable data wherever necessary.
(4) Diagrams and Chemicals equations should be given wherever necessary.
(5) Illustrate your answer wherever necessary with the help of neat sketches.
(6) Any **Six** from all.

1. What are the objectives and methodologies adopted for planning a pollution control department ? 13

2. How will you plan pollution control projects by using 'Programme Evalution and Review Technique' (PERT) ? 14

3. (a) Calculate the number of cyclones required to treat a flow of 60 m^3/sec with an inlet velocity of 15 m/sec. The diameter of cyclone is 1.8 m.

   (b) Find the length of simple gravity collector required to remove 90% of 50 µm diameter particles of density 2.0 g/cc. The bulk gas velocity is 0.5 m/s and the chamber is 3 m in height. Calculate the length if two trays are used for same efficiency. 7

4. What are the gaseous pollutants ? Discuss the various methods of controlling gaseous pollutants. 13

5. Briefly discuss the various unit operations and their application in environmental pollution control. 13

6. How are the solid wastes classified ? Discuss the characteristics and objectives of solid waste management. 13

7. (a) Design a tubular ESP to 10,000 m^3/hr of a gaseous stream from a paper mill for an efficiency of (a) 90% (b) 99% and (c) 99.9%. Assume an effective migration velocity of 0.075 .m/sec. 7

(b) A dairy is mainly involved in the operation of bottling of milk, making of ice-creams and limited production of cheese. Work out the BOD producer per 1,000 kg of milk processed and its population equivalent from the following data :
Quality of milk processed daily – 15000 kg
Waste–water produce daily – 240m^3
BOD of waste water – 1400 mg/l 7

8. (a) Design a parelle type electrostatic precipitator with 10 channels to handle 10000 m^3/hr of gas for efficiency of (a) 90% (b) 99% and (c) 99.9% 6

(b) Natural gas (Methan CH_4) is burned in atmospheric air. The analysis of product on a dry basic was found to be : 10.0% CO_2, 2.37%O_2, 0.53% Co and 87.10% N_2. Find AFR % theoretical air and the combustion equation. 7

9. How would you plan for air quality, risk assesment and pollution control in industrial air pollution ? 13

10. What are the main objectives of the secondary waste–water treatment ? Describe briefly the various treatment methods. 13