M.Sc. DEGREE II SEMESTER EXAMINATION IN
ENVIRONMENTAL TECHNOLOGY
OCTOBER 2001

ENVIRONMENTAL ENGINEERING

Time : 3 Hours   Maximum Marks: 50

PART - A
(Answer *ANY FIVE* questions)
(All questions carry *EQUAL* marks)

(5 x 2 = 10)

I. 1.   List the different water borne diseases.

2.   Draw a neat sketch to show the layout of a conventional water treatment plant.

3.   Define Food to Microorganism ratio as applied in activated sludge process.   Explain its significance in the process efficiency of the reactor.

4.   Sketch the different behaviours of plumes under different conditions of stability.

5.   Write a short note on indoor air quality.

6.   Write a short note on measurement of noise pollution.

PART - B
(Answer *ANY FIVE* questions)
(All questions carry *EQUAL* marks)

(5 x 3 = 15)

II. 1.   Explain the adverse effects of the following if excess present in domestic water supplies (i) Hardness, (ii) Nitrates, (iii) Iron.

(Turn Over)

2. The pH of well water is 5.2. Is this water acceptable for drinking purposes? Suggest a solution by which the well water can be used as drinking source.

3. What is Eutrophication in lakes? Explain any one method by which this can be prevented.

4. Explain with neat sketches different air sampling methods.

5. Compare the advantages and disadvantages of electrostatic precipitators and wet collectors.

6. Explain the different sources of hazardous wastes.

PART - C
(Answer *ANY FIVE* questions)
(All questions carry *EQUAL* marks)

(5 x 5 = 25)

III. Give the water quality standards for domestic and industrial water supplies.

IV. Prove that depth is not a measure of effective removal of particles in an ideal sedimentation tank.

Find the settling velocity of a discrete particle in the water when the Reynold's number is less than 0.5. The diameter and specific gravity of particle is 5×10^{-3} cm. and 2.65 respectively. The water temperature is 20°C. Kinematic viscosity of water at 20°C is 1.01×10^{-2} cm^2/sec.

V. Design an activated sludge process reactor to treat 5 mld of organic waste having a soluble BOD of 250 mg/l. The effluent BOD is to be equal to or less than 20 mg/l. The following conditions are applicable:-

Temperature : 20°C
Return sludge concentration : 10000 mg/l
MLSS : 3500 mg/l
MCRT : 10 days.

Assume any other data suitably.

VI. Derive from first principles an equation for estimation of pollutant concentration for elevated sources with reflection.

VII. The traffic density for a highway is 12000 vehicles per hour and the average vehicle speed is 80 km/hr. The average CO emission per vehicle is 40 gm/sec. Estimate CO concentration 100, 250, 500 and 1000 meters down wind of the highway if the wind speed normal to the highway is 2m/sec. Assume neutral conditions.

VIII. Explain the different ways for management of solid waste from domestic origin.

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