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Total number of printed pages – 3

B. Tech
HSSM 3303

Sixth Semester Examination – 2013

ENVIRONMENTAL ENGINEERING AND SAFETY

BRANCH : BIOTECH / ELECT / IEE / EEE / CHEM / BIOMED / CIVIL /
MINERAL / MINING / EC / ETC / AEIE / ICE / EIE

QUESTION CODE : A 214

Full Marks – 70

Time : 3 Hours

Answer Question No. 1 which is compulsory and any **five** from the rest.

The figures in the right-hand margin indicate marks.

1. Answer the following questions : 2 × 10
- Differentiate between grazing food chain and detritus food chain.
 - Write two objectives of Water Act, 1974 and what is its jurisdiction.
 - Differentiate between batch reactor and flow reactor.
 - Write the biochemical reaction for the decomposition of organic material present in water.
 - Write the formula for settling velocity in sedimentation process as per Stokes' law.
 - Mention the important meteorological parameters for dispersion of pollutants in the atmosphere.
 - How can you calculate the combustion efficiency and destruction and removal efficiency of an incinerator ?
 - What is exit interview in environmental audit ?

P.T.O.

- (i) What is the difference between safety and health hazards ?
- (j) Name four fire extinguishing techniques.
2. (a) Define ecosystem. Discuss the various structural units of a forest ecosystem with suitable examples. 5
- (b) What is noise ? The average day time noise power level in an industrial area is 67 dB and night time noise power level is 55 dB, find out the equivalent noise power level in the area. Assume the day time and night time as from 6 AM to 9 PM and 9 PM to 6 AM respectively. 5
3. (a) What should be the properties of a good disinfectant ? Briefly discuss various disinfection methods in water treatment practices. 5
- (b) Calculate the amount of sludge solid generated in a water treatment plant with a water flow rate of 45,000 m³/day, inlet suspended solid concentration is 410 mg/l, alum dose is 50 mg/l and the efficiency of water treatment plant is 80%. (1 kg of alum produces 0.26 kg of chemical sludge). 5
4. Give a detail flowchart of the unit processes in municipal waste water treatment and discuss on it. 10
5. (a) Compute an approximate quantity of biogas to be generated in an anaerobic digester handling a flow of 3600 m³/h. Assume the biodegradation factor as 0.85 and measured COD concentration of waste water as 5000 mg/l. 5
- (b) Differentiate between ALR and DALR. Sketch and explain the looping and lofting plume dispersion phenomena. 5
6. (a) Give a clear lay out and preliminary design considerations of landfills in solid waste management. 5
- (b) Show the flow sheet of EIA showing the environmental clearance process in India and discuss on it. 5

7. (a) What do you mean by industrial ergonomics ? Briefly explain the various causes of accidents and their prevention involving hazardous substances. 5
- (b) Describe the three-stage safety model to recognize, evaluate and control hazards for electrical safety. 5
8. Write notes on any **two** of the following : 5 × 2
- (a) Advance water treatment process
- (b) Flue gas desulphurization and NO_x removal in industrial process
- (c) Steps in rotary kiln incinerator for hazardous waste management
- (d) Hazard control measures in integrated steel and pharmaceutical industry.