Registration No. :

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B. Tech
HSSM 3303

Sixth Semester Regular Examination – 2014

ENVIRONMENTAL ENGINEERING AND SAFETY

BRANCH : AEIE, BIOMED, BIOTECH, CHEM, CIVIL, EC, EEE, EIE, ELECTRICAL, ETC, MINERAL

QUESTION CODE : F 280

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

(a) Differentiate between food chain and food web with suitable examples.

(b) Write two objectives of Air Act, 1981 and what is its jurisdiction ?

(c) Differentiate between Type I and Type II sedimentation.

(d) What are the inorganic components of soil ?

(e) Compute the pH of a sample of 0.5×10^{-3} M H_2SO_4 solution.

(f) In wastewater pre-treatment, what is a great channel and what are its types ?

(g) Name four air pollution control devices for control of suspended particulate matter from an industry.

(h) What are the environmental benefits of recycle and reuse technology ?

(i) How can you calculate the frequency rate of accidents in an industrial plant ?

(j) What is meant by product safety ?

2. (a) Write the importance of oxygen cycle in nature. Discuss the different steps of oxygen cycle with the help of a flow sheet. 5

(b) What is meant by environmental gradients ? Explain the tolerance level of environmental factors with the help of a graph. 5

P.T.O.

3. (a) Compute the equivalent noise power level L_{Aeq} in a locality having three noise sources : 50 dB (A) acting for 20 minutes, 67 dB (A) acting for 30 minutes and 85 dB (A) acting for 10 minutes during one hour. 5

(b) Discuss the causes, effect and control of acid rain. 5

4. What is the need of coagulation in water treatment plant and what are the commonly used coagulants ? Determine the daily requirement of alum, lime and polyelectrolyte to coagulate a flow of 200 L/s, if the jar test indicates that optimum coagulation occurs, when 1 liter of water is dosed with 3 ml of 10 g/l alum solution, 1.8 ml of 5 gm/L suspension of lime and 0.2 mg/L of polyelectrolyte. 10

5. (a) Give a flow sheet for pre-treatment processes required for municipal waste water and discuss on it. 5

(b) Data from an unseeded domestic waste water BOD test are : 5 ml of waste water in 300 ml bottle, initial DO and 5 days DO of sample equal to 7.8 mg/L and 4.3 mg/L respectively. Compute : 5

(i) 5-days BOD

(ii) Ultimate BOD, assuming k (base e) of 0.23/day.

6. (a) Write the principle of a bag-filter. Give a clear labelled diagram of it. 5

(b) Compute the landfill area required for 20 years for a city population of 7 lakh. Assume the solid waste generation as 0.5 kg/capita/day and density of solid waste as 500 kg/m^3. 5

7. (a) Define system safety engineering. What do you understand by system safety techniques and what are the stages associated with system safety ? 5

(b) How the hazards are evaluated ? Discuss the hazard control measures in petroleum refineries. 5

8. Write short notes on any **two** of the following : 5×2

(a) Structural units of grassland ecosystem

(b) Ambient and adiabatic lapse rates

(c) Types of incinerators in hazardous waste management

(d) Safety handling and storage of hazardous materials.