Registration No. : | | | | | | | | | | |

Total number of printed pages – 3

B. Tech

HSSM 3303

Fifth Semester Examination – 2013

ENVIRONMENTAL ENGINEERING AND SAFETY

BRANCH : CHEM, AEIE, EC, IEE, MINING, ICE, EIE, ETC, MINERAL, CIVIL, ELECTRICAL, BIOMED, EEE

QUESTION CODE : C-357

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) Mention the structural units of a grassland ecosystem.

   (b) Write three important roles of Central Pollution Control Board for implementation of environmental laws in India.

   (c) Determine the pH of 0.5×10^{-5} M $Ca(OH)_2$ solution in water.

   (d) What is Reverse Osmosis and write its application.

   (e) Why recycling of activated sludge is maintained in activated sludge process of waste water treatment ?

   (f) What are grit channels and name two common types of grit collection devices.

   (g) What is three T's in incineration ?

   (h) What is SWOT analysis in the study of environmental audit ?

P.T.O.

(i) Write the important ways that affects the occupational health more.

(j) What is occupational hygiene ?

2. (a) What is environmental gradient ? Draw the universal tolerance curve for tolerance level of environmental factors. 5

(b) Draw a clear vertical temperature profile of earth's atmosphere regions. Discuss about the different layers of atmosphere. 5

3. (a) Explain the chlorine demand and breakpoint chlorination with the help of a graph. 5

(b) If the average day time noise power level in an industrial area is 67dB and night time noise power level is 55 dB, find out the equivalent noise power level in that area. Assume day time as 6 AM to 9 PM and night time as 9 PM to 6 AM. 5

4. Distinguish between slow sand and rapid sand filtration with reference to :

(a) pretreatment

(b) size of each unit

(c) rate of filtration

(d) efficiency

Compute the amount of sludge (dry basis) generated dally in kg from a water treatment plant handling a flow of 750 m^3/hour with a suspended solid concentration 350 mg/l, optimum alum doses to the WTP is found to be 40 mg/l and treatment plant efficiency is 85%. Also compute the effluent suspended solid concentration. 10

5. (a) Derive the bio-kinetic equation for biomass production and substract utilization in activated sludge process using Monod model. 5

(b) Explain the concept of ALR and DALR. Sketch and discuss the Looping and Lofting plum dispersion phenomena. 5

6. (a) Discuss the basic steps involved in a Rotary Kiln incinerator for treatment of hazardous wastes. 5

(b) Discuss the national and international protocols and concerns in the study of occupational health and safety. 5

7. (a) Give the classification of human errors. Discuss how human error leads to accidents in an industry. 5

(b) What are hydrocarbons ? Explain the safety handling and storage of hydrocarbons. 5

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

(a) Atmospheric chemistry

(b) Noise measurement and standard

(c) Chemical properties of MSW

(d) OH and SMS documentation.