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

Total number of printed pages – 3

B. Tech

HSSM 3303

Fifth Semester Regular Examination – 2014

ENVIRONMENTAL ENGINEERING AND SAFETY

BRANCH(S) : AEIE, BIOMED, CHEM, CIVIL, EC, EEE, ELECTRICAL, ETC, IEE, MINING

QUESTION CODE : H 175

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) What do you mean by functional attributes of an ecosystem ?

(b) Name two regulatory authorities for prevention, control and abatement of environmental pollution in India.

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

(d) What are the different types of pretreatment in water treatment plants ?

(e) What is wind rose and why it is important ?

(f) Write the formula for settling velocity in sedimentation process as per Stock's law.

(g) Enlist the types of incinerators for management of hazardous wastes.

(h) What is flue-gas desulphurization ?

(i) What are the elements involved in effective hazard control system ?

(j) Write the principle of product safety management.

P.T.O.

2. What is meant by primary treatment of waste water and what are its benefits ? Give a clear label diagram of a typical circular primary settling tank and discuss on its design criteria. 10

3. Give a clear labeled diagram of slow sand filtration and rapid gravity filtration units. Distinguish between these two with respect to size of each unit, rate of filtration and efficiency of the filtration units. Design a slow sand filtration unit for a flow of 920 m^3/day and assume the rate of filtration is 0.16 m/h. 10

4. (a) Write the source, path and receiver concept of the noise pollution. If a sound source has a pressure of 2050 µPa, compute the sound intensity level, if air density and speed of sound in air are 1.185 kg/m^3 and 340 m/s respectively. 5

   (b) What is the need of advance water treatment process ? Explain reverse osmosis and ion-exchange method. 5

5. (a) What are different types of reactors in the study of water and waste water engineering ? Draw the diagram and give comparison between Plug Flow Reactor (PFR) and Packed Bed Reactor (PBR). 5

   (b) Compute an approximate quantity of biogas produced in an anaerobic digestion plat with a flow rate of 350 m^3/h. Assume the biodegradation fraction of the organic waste is 0.85 and the COD in waste sludge is 125230 mg/l and neglect the growth rate. 5

6. (a) Write the source, effect and control of green house gases. 5

   (b) Write the working principle of a bag filter and give a clear labeled diagram of it. 5

7. (a) What are the electrical hazards in industrial systems ? Explain the safety precautions against the contact shock, flash shock and burns. 5

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

8. Answer the following questions (any **two**) : 5×2

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

(b) What are different methods for solid waste management and explain the different steps of landfill for management of MSW.

(c) Discuss on different types of environmental audit.

(d) What is a fire pyramid ? Explain about the extinguishing fire.