Registration No. :

Total number of printed pages – 2

Sixth Semester (Special/Back) Examination – 2013

ENVIRONMENTAL ENGINEERING AND SAFETY

BRANCH(S) : AEIE. AUTO, BIOTECH, CHEM, CIVIL, EC, EEE, ELECTRICAL, ETC, IEE

QUESTION CODE : E 295

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 are the biotic components of a forest ecosystem ?

   (b) Name the two environmental laws in India for management of the solid and hazardous wastes.

   (c) What do you mean by pretreatment of waste water ?

   (d) Differentiate between particulate and suspended impurities in raw water with respect to their size.

   (e) Name the two important methods for control of gaseous pollutants in an industry.

   (f) How can you calculate the combustion efficiency and destruction and removal efficiency of an incinerator ?

   (g) Show the elements involved in an effective hazard control system.

   (h) What is oxygen-sag curve ?

   (i) What is the need for integration of safety, health and environment ?

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

2. (a) Write the causes, chemical reactions involved and effect of destruction of ozone layer in the atmosphere.   5

P.T.O.

(b) What is the environmental importance of nitrogen cycle ? Discuss the stages involved in it. 5

3. (a) An air conditioner generates a noise of 75dB for five minutes every hour. If the back ground noise level is 55dB, compute the LAeq 5

(b) What is the need of equalization in waste water treatment ? Discuss the two important types of equalization process. 5

4. What are different types of reactors in water and waste water engineering ? Derive an expression for the final concentration of the reactant in a CSTR following first order kinetics. 10

5. (a) Find out the daily chemical requirement in kg. for a water treatment plant handling a flow of 1200m3 /hr. Optimum dosage for 1 litre as follows;

10ml. of 5gm/l alum solution

5ml of 4gm/l lime solution

2ml of 1gm/l polyelectrolyte solution 5

(b) Write the concept of ALR and DALR. Sketch and explain the following two types of plume dispersion phenomenon;

(i) Looping

(ii) Lofting 5

6. (a) Show the step by step process to be used in the waste reduction techniques with the help of a flow chart. Discuss three benefits of waste minimization. 5

(b) In industrial air emission control study, what do you mean by condensation? Draw a schematic of a condenser and discuss its operating principle. 5

7. (a) Many accidents take place due to improper use of tools and use of defective hand tools and equipments. What precautions are necessary in this regard ? 5

(b) Describe the three-stage safety model to recognize, evaluate and control hazards for electrical safety. 5

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

(a) Air pollution meteorology.

(b) Steps in rotary kiln incinerator for hazardous waste management.

(c) Stages of EIA for environmental clearance in India.

(d) Hazard control measures in petroleum refineries.

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