Registration No. :

Total number of printed pages – 2

B. Tech

HSSM 3303 (New)

Sixth Semester (Back) Examination – 2013
ENVIRONMENTAL ENGINEERING AND SAFETY
BRANCH : BIOTECH
QUESTION CODE : B259
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 a natural ecosystem ?

   (b) What are the objectives of Water (Prevention and Control of Pollution) Act, 1974 ?

   (c) If a sound source has a pressure of 2000 µPa at 10 m distance, compute the sound power in W.

   (d) Write the Indian standard for drinking water quality for colour and turbidity (both desirable and permissible) as per IS: 10500-1991.

   (e) What are the different types of waste water pretreatment ?

   (f) Define wind rose.

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

   (h) Differentiate between screening and scoping in EIA.

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

   (j) Write the need for integration of safety, health and environment.

2. (a) Give a tolerance and resistance level graph of an organism for environmental factors and discuss on it.   5

   (b) Write the causes, chemical reactions involved and effects of destruction of ozone layer in the atmosphere.   5

P.T.O.

3. (a) Discuss the following two advanced water treatment processes :   5
        (i)   Removal of iron and manganese
        (ii) Reverse Osmosis.
    (b) Design a rapid gravity filtration unit to treat 36400 m^3/day. Assume a
         filtration rate of 12 m/h.   5

4. Discuss the different activated sludge process design parameters. Give a
    general flow sheet of sewage treatment plant under aerobic conditions and
    discuss on it.   10

5. (a) Explain the working principle of an electro static precipitator with the help of
         a neat diagram.   5
    (b) Calculate the number of fabric bags required in a bag house handling a gas
         flow of 20 m^3/s. Assume the bag dimension as 0.3 m dia and 0.6 m length.
         Also assume air to cloth ratio as 2 m/min.   5

6. (a) Write the source classification and composition of municipal solid wastes
         and discuss on it.   5
    (b) Give a flow sheet for treatment of hazardous wastes through rotary kiln
         incinerator and mention its functions for incineration.   5

7. (a) What are electrical hazards in industrial systems ? Discuss about the safety
         precautions against contact shocks, flash shocks and burns.   5
    (b) For computing injury rates, write the formula to calculate :   5
        (i)   Frequency rate of disabling injuries.
        (ii)   Incidence rate.
        (iii) Frequency severity index.
        (iv)   Severity rate of disabling injuries.

8. Write short notes on any **four** :   2.5×4
    (a) Stages in water cycle
    (b) Soil chemistry
    (c) Air pollution meteorology
    (d) Transportation of hazardous wastes
    (e) Human error and hazard analysis
    (f) Product safety.

_____