

Registration No. :

--	--	--	--	--	--	--	--	--	--

Total number of printed pages – 2

B. Tech  
HSSM 3303 (New)

**Sixth Semester (Back) Examination – 2013**  
**ENVIRONMENTAL ENGINEERING AND SAFETY**

BRANCH : AEIE, BIOMED, CHEM, CIVIL, EC, EEE, ELECTRICAL, ETC, IEE

QUESTION CODE : B257

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
- Differentiate between food chain and food web with suitable examples.
  - Write two objectives of Air Act, 1981 and what is its jurisdiction ?
  - Differentiate between Type I and Type II sedimentation.
  - What are the inorganic components of soil ?
  - Compute the  $p^H$  of a sample of  $0.5 \times 10^{-3} M H_2SO_4$  solution.
  - In wastewater pre-treatment, what is a great channel and what are its types?
  - Name four air pollution control devices for control of suspended particulate matter from an industry.
  - What are the environmental benefits of recycle and reuse technology ?
  - How can you calculate the frequency rate of accidents in an industrial plant ?
  - 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 wastewater and discuss on it. 5
- (b) Data from an unseeded domestic wastewater BOD test are: 5 ml of wastewater 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 labeled diagram of it. 5
- (b) Compute the land fill 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<sup>3</sup>. 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** : 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.