

*Total No. of Questions :8]*

*[Total No. of Printed Pages :4*

**Roll No .**

**MECM - 205**

**M.E./M.Tech., II Semester**

**Examination, June 2016**

**Industrial Pollution Control**

***Time : Three Hours***

***Maximum Marks : 70***

***Note :*** Attempt any five questions. All questions carry equal marks.

1. a) How would you summarize the concerns of the environmental scientist over the interaction between humans and the environment? What major environmental problems you face by through this interaction? What are the solutions? <http://www.rgpvonline.com>
- b) Identify the key pieces of Indian environmental legislation. Compare the state of environmental legislation in India with that in united states.
2. a) What do you understand by air pollution meteorology? What are the meteorological factors of interest? Explain effect of each on air pollution.

- b) Determine the stack height for an industry source emitting 150 kg/day of 1,2- dichlorooctane ( $C_8H_4Cl_2$ ) if a residential complex is sited 1.5 km downwind and the ambient limit should not exceed  $700 \text{ mg/m}^3$ . The neutral conditions (D) occur 85 percent of the time and this is to be design atmospheric condition. The characteristics are:

Gas exit velocity =  $15 \text{ m/s}$

Gas exit temp. =  $150^\circ\text{C}$

Stack tip diameter =  $3 \text{ m}$

Ambient temp. =  $20^\circ\text{C}$

$U_{10} = 4 \text{ m/s}$  (assume  $U_s \sim 6 \text{ m/s}$ )

$Q = 150 \text{ kg/day} = 1.7 \text{ g/s}$ .

3. a) Discuss simple versus complex absorption. How would the choice of an absorbent for absorption be influenced by the use of simple or complex absorption?
- b) A gas stream has a flow rate of  $1500 \text{ Nm}^3/\text{h}$ , a density of  $1.15 \text{ kg/m}^3$  and a viscosity of  $0.018 \text{ CP}$ . It contains particles with a density of  $1200 \text{ kg/m}^3$  and a diameter of  $6 \mu\text{m}$ . If the pressure drop is limited to  $150 \text{ mm Hg}$  and the pressure drop through a cyclone is given by  $\Delta P = 4\delta (V^2)$  where  $\delta = \text{density of the gas, kg/m}^3$  and  $V = \text{inlet gas velocity, m/s}$ . <http://www.rgpvonline.com>

Determine what fraction of particles will be removed;

- i) By one cyclone,
- ii) By four cyclones in series,
- iii) By five cyclones in parallel.

4. a) Design a primary settling tank for an industrial waste water with a  $BOD_5$  of 600 mg/L and an SS of 400 mg/L to achieve a 60 percent SS reduction. The flow rate is 35000 m<sup>3</sup>/day.
- b) For a waste water treatment plant treating 30,000 m<sup>3</sup>/day, compute the total sludge production if a conventional complex mix activated sludge system is used. The influent SS is 350 mg/L and the effluent SS is 40 mg/L.
5. Explain the following :
  - a) Noise standards
  - b) Noise measurements
  - c) Attenuation
  - d) Noise contours
6. a) What is Composting? Write the process requirements of composting. Explain the types of composting systems.
- b) Discuss the design parameters of municipal solid waste landfills. What are the different types of landfills?  
<http://www.rgpvonline.com>
7. a) What are the characteristics of hazardous wastes? Explain the different treatment techniques of hazardous wastes.
- b) Explain LCA. What are the methods used for LCA?

8. Write short notes on following :

- a) Waste minimization by reuse and recycle.
- b) Waste minimization strategy for coal based thermal power plant.
- c) Advanced waste water treatment techniques.
- d) Environmental auditing.

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