



Name :

Roll No. :

Invigilator's Signature :

CS / B.TECH(CHE-NEW) / SEM-8 / CHE-803 / 2011

2011

ENVIRONMENTAL ENGINEERING

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following :

10 × 1 = 10

- i) What is the major constituents of waste/polluted water discharged from textile, pulp & paper, tanning, distillery, dairy and meat packing industries ?
- a) Radioactive substances
 - b) Natural organic products
 - c) Inorganic pollutants
 - d) None of these.



- ii) Which of the following industries discharge mercury as a pollutant ?
- a) Chloro-alkali industry
 - b) Tanneries
 - c) Beverage plant
 - d) Phosphoric acid plant.
- iii) The biological decomposition of organic substances in wastes controlled conditions is called
- a) incineration
 - b) biological oxidation
 - c) composting
 - d) none of these.
- iv) The municipal waste disposal method using earthworm is
- a) Composting
 - b) Vermicomposting
 - c) Land filling
 - d) None of these.
- v) The most commonly used chemical coagulant in water treatment is
- a) ferrous sulphate
 - b) alum
 - c) lime
 - d) hydrazine.



- vi) Minimum value of BOD/COD for favourable biological treatment is
- a) 0.6
 - b) 0.7
 - c) 0.8
 - d) 0.9.
- vii) The main industrial source of emission of hydrogen sulphide air pollutant is
- a) petroleum refineries
 - b) coal based thermal power plants
 - c) pulp and paper plant
 - d) metallurgical roasting & smelting plant.
- viii) For existence of aquatic life in water, the dissolved oxygen content in it, should not be less than ppm.
- a) 10000
 - b) 5
 - c) 500
 - d) 1000.
- ix) Reverse osmosis is
- a) primary waste water treatment process
 - b) secondary waste water treatment process
 - c) tertiary waste water treatment process
 - d) none of these.



- x) Radioactive solid nuclear wastes are disposed off by
- a) high temperature incineration
 - b) pathological incineration
 - c) pyrolysis
 - d) underground burial in concrete containers.
- xi) The use of Polyaluminum chloride in drinking water plant is restricted now as
- a) it increases sludge volume
 - b) it retards precipitation
 - c) the material is carcinogenic in the long run
 - d) it has no anti-bacterial effect.
- xii) The waste liquor from waste paper based paper mill
- a) contains lignin
 - b) does not contain lignin
 - c) has BOD level < 40 mg/L
 - d) none of these.



GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

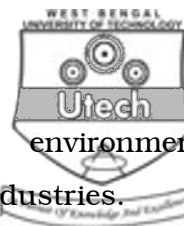
2. Write down the different collection systems of gaseous air pollutants. Discuss the method of absorption of gaseous pollutants in liquids. $2 + 3$
3. What is bioremediation ? Explain how this method is helpful for handling solid waste in eco-friendly manner. $2 + 3$
4. Write notes on Vermiculture and its application in soil conditioning.
5. Describe the process of activated sludge method for treating sewage and its advantages and disadvantages. $3 + 2$
6. Define radioactive waste. Discuss the method of radio-active waste management. $1 + 4$

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. a) In what way does land fill protect the environment ?
b) What are the advantages and disadvantages of land fill ?
c) What are incineration and composting ? What are their advantages ? $4 + 3 + (5 + 3)$



8. Discuss in detail the methodology of environmental management in petrochemical and refinery industries. 15

9. a) Explain the principles & operation of cyclone separator for removing particulate matters.

b) Derive the equation for Polytrophic model where temperature decreases with altitude linearly with a slope of $-(n-1)g/nR$.

c) Define Dry adiabatic lapse rate and Wet adiabatic lapse rate. 6 + 5 + 4

10. a) Discuss any one of the waste water treatment alternatives :

i) Extended Aeration system

ii) Root Zone/Reed Bed treatment

iii) Trickling Filter.

b) Compute L and k using Fujimoto method for the following BOD data reported for a stream receiving some treated effluent :

t, d	2	4	6	8	10	
$y, mg/L$	11	18	22	24	26.	8 + 7

11. a) Describe the methodology of conducting 5 Day BOD test.

b) Discuss the solvent extraction technique for recovery of phenol from waste water.

c) How do you recover energy from solid waste ? 5 + 6 + 4



12. Write technical notes on any *two* of the following :

- a) Water (Prevention and Control of Pollution) Act, 1974.
- b) Treatment of liquid waste from dairy industries.
- c) Environmental management in pulp and paper industries.
- d) Environmental impact assessment methodologies.

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