Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.TECH(CHE-N)/SEM-3/CH(CHE)-301/2011-12

2011

BASIC ENVIRONMENTAL ENGG. AND ELEMENTARY BIOLOGY

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 the following : 10 × 1 = 10

   i) Which of the following is non-point source of water pollution ?

      a) Factories

      b) Urban and Sub-urban land

      c) Sewage treatment plant

      d) None of these.

   ii) Which of the following is a Micronutrient ?

      a) Sulpher b) Carbon

      c) Potassium d) Iron.

iii) Permissible sound level in a commercial area in day time is

a) 90 dB b) 65 dB

c) 80 dB d) none of these.

iv) Adiabetic lapse rate is

a) 0·8°C/100 m b) 0·7°C / 100 m

c) 1°C / 100 m d) none of these.

v) As per the CBCB standard for discharge of treated municipal waste water into inland surface water is

a) 150 mg/L b) 30 mg/L

c) 50 mg/L d) none of these.

vi) Colour of textile waste water can be measured in which of the following units ?

a) NTU b) Hazen

c) Lumen d) Nanometer.

vii) According to United Nations the year 2011 is dedicated as the International year of

a) Water Management b) Forests

c) Noise Pollution d) Bio-diversity.

viii) Photochemical smog gives rise to

a) carbon dioxide b) carbon monoxide

c) PAN d) PM -2.

ix) The size of RSPM is

a) 10 μ b) 20 μ

c) 2·5 μ d) none of these.

x) The use of Poly Aluminium Chloride in drinking water plant is restricted now as

a) it increases sludge volume

b) it retards precipitation

c) the material has carcinogenic effect

d) lacks in anti-bacterial effect.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. a) A pollutant may be considered as resource out of place. Explain this statement.

   b) In the above context name some pollutants present in municipal waste water which may be regarded as resources in some other places. 2 + 3

3. a) Explain the relationship between the adiabatic lapse rate of a rising plume of stack gas and the ambient lapse rate.

   b) Explain briefly the principle of catalytic converter. 3 + 2

4. a) Define Biochemical Oxygen Demand. How does it reflect the amount of organic matter present in a waste water indirectly ?

   b) What do you mean by Theoretical Oxygen Demand ? Find the Theoretical Oxygen Demand value of 1000 mg/l of Lactose ($C_{12}H_{22}O_{11}$, H_2O, Mol, wt. = 360) solution.

   Given : $C_{12}H_{22}O_{11}$, $H_2O + 12O_2 = 12CO_2 + 12H_2O$ 2 + 3

5. State and explain few salient points of Disaster Management cycle with the help of a diagram. 5

6. a) What is Sanitary Land fill ?

   b) What component of Municipal solid waste would be preferred to be disposed of by Sanitary Land fill Method ?

   c) Which fraction of solid waste is generally subjected to composting ?

   d) What is the approximate calorific value of Kolkata Municipal solid waste ? 2 + 1 + 1 + 1

7. a) Define noise.

   b) What is dBA ?

   c) Enumerate few steps to control in-house noise pollution. 1 + 1 + 3

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

8. a) Microbial growth is a good example of autocatalytic reaction. Discuss the statement.

   b) With reference to atmospheric stability, describe briefly under which condition of atmosphere it becomes unstable.

   c) Write short notes on biosphere. 5 + 5 + 5

9. a) Name five different categories of proteins and describe the enzymes which represent the largest class of protein.

   b) How autotrophic bacteria differs from heterotrophic bacteria with regard to their carbon source and energy source ? 10 + 5

10. a) Define Macronutrients and Micronutrients with suitable examples.

    b) What are growth factors ?

    c) Describe the TCA cycle briefly giving examples.

d) Briefly give an overview of the light phase and dark phase of photosynthesis with reactions. 4 + 3 + 4 + 4

11. a) Enumerate the differences between prokaryotic and eukaryotic cells.

b) Describe the structure of deoxyribonucleotide with a diagram.

c) Write the salient steps of Environmental Impact Assessment. 5 + 5 + 5