

Name : .....

Roll No. : .....

Invigilator's Signature : .....

**CS/B.Tech/NEW/ICE/ECE/EE/EEE/EIE/PWE/BME/SEM-4/CH-401/2013**

**2013**

**BASIC ENVIRONMENTAL ENGINEERING 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 any *ten* of the following :

10 × 1 = 10

- i) Energy flow in the ecosystem is
  - a) unidirectional
  - b) cyclic
  - c) unidirectional or cyclic
  - d) cannot be said.
- ii) The full form of ESP is
  - a) Electrostatic precipitator
  - b) Electrostatic producer
  - c) Electron source precipitator
  - d) none of these.



- iii) Which one of the following is true for a waste water sample ?
- a)  $BOD > COD$
  - b)  $COD > BOD$
  - c)  $BOD = COD$
  - d)  $BOD = 1 / COD$ .
- iv) Air pollutant which reduces oxygen carrying capacity of hemoglobin is
- a) carbon monoxide
  - b) ammonia
  - c) hydrogen sulphide
  - d) none of these.
- v) The cause of eutrophication is
- a) increase of pathogens
  - b) increase of BOD
  - c) increase of algae's productivity
  - d) increase of DO.
- vi) Minamata disease occurs due to
- a) arsenic pollution
  - b) lead pollution
  - c) mercury pollution
  - d) cadmium pollution.



vii) Montreal protocol is related to

- a) land pollution
- b) noise pollution
- c) production and use of CFCs
- d) increase of population.

viii) Blue baby syndrome is related to

- a) nitrate
- b) sulphate
- c) phosphate
- d) carbonate.

ix) In nephrotoxicity the targeted body part is

- a) kidney
- b) liver
- c) lungs
- d) brain.

x) Clinical wastes may be disposed of using the method

- a) composting
- b) incineration
- c) sanitary landfill
- d) open dumping.



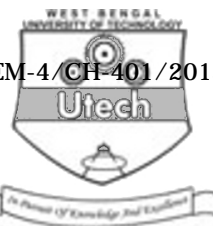
- xi) Railway traffic noise is measured by
- $L_{10}$  ( 18 hour index )
  - $L_{epn}$
  - $L_{eq}$
  - none of these.
- xii) The main constituent of London fog is
- carbon monoxide
  - hydrogen sulphide
  - carbon dioxide
  - oxides of sulphur.

### GROUP – B

#### ( Short Answer Type Questions )

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

- What are greenhouse effect and global warming ? Write down the different measures to control global warming.  
What is atmospheric radiation window ?  $2 + 2 + 1$
- What is eutrophication ? How do you control eutrophication ?  $2 + 3$
- Define biogeochemical cycle. Give a brief account of carbon cycle.  $1 + 4$
- What is lapse rate ? Discuss the plume behaviour at different atmospheric conditions.  $1 + 4$
- What do mean by environmental impact assessment ? How is it related to the setting up of a new process industry ?  $2 + 3$



**GROUP - C**

**( Long Answer Type Questions )**

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

7. a) What is meant by hardness of water ?  
b) What is Trickling filter ?  
c) What are the methods of water softening ?  
d) What do you mean by Biochemical Oxygen Demand ( BOD ) ?  
e) Prove that  $BOD_t = L_0 ( 1 - e^{-kt} )$  where  $L_0$  is the initial concentration of dissolved oxygen,  $k$  is the rate constant of degradation of organic waste.
- $2 + 2 + 5 + 2 + 4$
8. a) Show if population growth is logistic, then maximum sustainable yield is obtained when population is at half its carrying capacity *i.e.*,  $N = k/2$ .  
b) The increase in population from 1 million to 10 million took 200 years. For exponential growth at constant rate, find out the growth rate constant.  
c) What is maximum mixing depth and ventilation coefficient ?  
d) What is temperature inversion ?  
e) Define food chain.
- $4 + 3 + 4 + 2 + 2$



9. a) What is SPM ? Mention any three control measures which can be taken to control these pollutants.

b) What are the harmful effects of depleted ozone layer ?

c) What is toxicity ? How do heavy metals interact with enzymes ?

d) How does sanitary landfill differ from open dumping ?

3 + 4 + 4 + 4

10. a) What is acid rain ? Write down the causes, reactions and effects of acid rain.

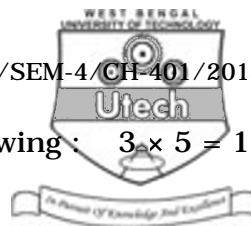
b) What is noise ? Explain the sources of noise pollution.

What are the physiological impacts of noise pollution ?

How can the noise be controlled at the source ?

c) What is solid waste ? Write a note on composting as method of solid waste.

4 + 6 + 5



11. Write short notes on any *three* of the following :  $3 \times 5 = 15$

- a) Electrostatic precipitator
- b) Cyclone separator
- c) Environmental audit
- d) Environmental Protection Law
- e) Air Pollution Control Act.

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