

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.

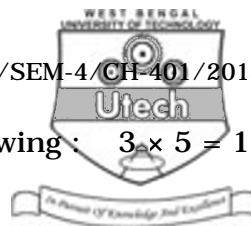
b) What is noise ? Explain the sources of noise pollution.

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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