CS/B.TECH/CHE/ODD/SEM-3/CH (CHE)-301/2017-18



MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL

Paper Code : CH (CHE)-301
BASIC ENVIRONMENTAL ENGINEERING &

Time Allotted: 3 Hours

Full Marks: 70

The figures in the margin indicate full marks.

ELEMENTARY BIOLOGY

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

GROUP - A

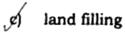
(Multiple Choice Type Questions)

- 1. Choose the correct alternatives for any ten of the following: $10 \times 1 = 10$
 - i) Autecology can also be termed as
 - a) population ecology
 - b) landscape ecology
 - c) community ecology
 - d) none of these.

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- ii) While carrying out BOD test, BOD bottle is stoppered
 - a) to avoid evaporation of water
 - b) to avoid photosynthesis
 - c) to avoid diffusion of atmospheric oxygen
 - d) to avoid diffusion of atmospheric carbon dioxide.
- iii) Which of the following is an example of in situ conservation?
 - a) Deer park
- b) Seed bank
- Wildlife sanctuary
- d) Aquarium.
- iv) Blue baby syndrome is related to
 - a) nitrate

- b) sulphate
- c) phosphate
- d) carbonate.
- v) The main component of photochemical smog is
 - a) water vapour
- b) sulphur dioxide
- c) oxides of nitrogen
- d) all of these.
- vi) The most useful method of disposal of nonhazardous solid waste is
 - a) Open dumping
- b) composting



d) incineration.

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vii) Which of the following can be used for disinfection of water?

a) chlorine

hydrogen peroxide

c) ozone

none of these.

viii) Aircraft noise is measured through

- L₁₀ (18 hour) index b) decibel
- $L_{e}p_{n}$

d)

Biotic factor of ecosystem is

- sunlight
- b) soil
- wind C)
- producer and consumer.

Species with very restricted distribution over relatively small ranges is called

- endangered species b) extinct species
- endemic species
- none of these.

Ozone acts as a protective shield when it resides in

- troposphere a)
- by stratosphere
- mesosphere c)
- ionosphere.

Which one is true for a waste water sample?

- BOD > COD a)
- COD > BOD
- COD = BOD c)

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BOD = I/COD.

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| Turn over

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GROUP - B

(Short Answer Type Questions)

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

What is COD? What are steps involved in COD test? 2 + 3How is it related to BOD?

Describe aquifer. Name different types of aquifers. What is hydraulic gradient? State Darcy's law. 1+2+1+1

How do you define water pollution. How do agricultural chemicals cause water pollution. 2 + 3

Define habital, population, bio-community, ecological niche and species.

a) Explain the Wiens law & its application for explaining green house effect. 1 + 2

b) What is atmospheric radiation window?

GROUP - C

(Long Answer Type Questions)

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

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What are the adverse effects of open dumping of municipal solid wastes on environment?

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- b) How does sanitary landfill differ from open dumping?
- c) 'Compositing is best suited for disposal of biodegradable fraction of municipal solid wastes. Explain the statement.
- d) What is noise pollution? Define decibel. Mention two hazardous effects of noise pollution on public health. 3+3+4+5
- 8. a) What is oxygen sag curve? Explain it by a diagram.
 - Sketch and discuss the typical treatment for surface water to make potable water.
 - c) Discuss the working principle of trickling filter used in the secondary treatment of waste water with suitable diagram.
 - d) A BOD test is run using 50 ml of waste water mixed with 150 ml of pure water. The initial DO of the mixture is 10 mg/1 and after 5 days it becomes 5 mg/1. After a long time the DO remain fixed at 1 mg/1.
 - i) What is BOD5 of waste water? ii) What is the ultimate BOD? iii) What is the remaining BOD after 5 days? iv) What is the reaction rate constant at 20°C? v) What would be the reaction rate constant if measure at 45°C? 2+4+3+6

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- 9. a) Write a short note on the sulphur cycle.
 - Explain in detail about energy flow mechanism of an ecosystem.

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- c) What do you understand by nitrification and nitrogen fixation? Give the examples of microorganism that do fixation of nitrogen. 2+3
- 10. a) What is carrying capacity? What is maximum sustainable yield?
 - b) Discuss logistic population growth model.
 - c) Prove that N = K/2 for maximum sustainable yield, where N = no. of population and k = carrying capacity.
 - d) Suppose a population of butterflies is growing according to the logistic equation. If the carrying capacity is 500 butterflies and r = 0.1 individuals/(individual X month). What is the maximum possible growth rate for the population?
- e) Define aquatic ecosystem with reference to the flora, fauna (primary, secondary and tertiary consumers) and decomposers. 2+3+4+3+3

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14. Write short notes on any three of the following: 3×5

- a) Ventury scrubber
- (b) Earth's albedo
- c) Incineration
- d) Food chain
- Hydrological cycle
 - f) Activated sludge process.