

CS/B.Tech/CE/ME/CSE/IT/AUE/MRE/PE/TT/CT/APM/Odd/Sem-3rd/CH-301/2014-15

CH-301**BASIC ENVIRONMENTAL ENGINEERING AND ELEMENTARY BIOLOGY**

Time Allotted: 3 Hours

Full Marks: 70

*The questions are of equal value.
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. Answer all questions. 10×1 = 10
- (i) For a sample of waste water containing biodegradable and non-biodegradable waste is
- (A) BOD > COD (B) BOD < COD
(C) BOD = COD (D) BOD = 1/COD
- (ii) Natural reservoirs of water below the earth's surface is
- (A) aquiclude (B) aquifer
(C) aquitard (D) aqueduct
- (iii) Lapse rate refers to the rate at which
- (A) population increases in area with increase in temperature
(B) temperature decreases with increase in elevation
(C) temperature decreases with decrease in elevation
(D) none of these
- (iv) BOD test in laboratory is done for
- (A) one day (B) two days
(C) five days (D) eight days

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[Turn over]

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- (v) Synecology can also be termed as
- (A) population ecology (B) landscape ecology
(C) community ecology (D) none of these
- (vi) The catalyst used in catalytic converters is finely divided
- (A) Ni (B) Pt
(C) Pd (D) Fe
- (vii) State the logical sequence of Carbon Cycle in environment is
- (A) photosynthesis-consumer-decompose
(B) photosynthesis-decompose-consumer
(C) decompose-consumer-photosynthesis
(D) consumer-photosynthesis-decompose
- (viii) Temporary hardness of water is due to the presence of
- (A) NO_3^- (B) SO_4^{2-}
(C) Cl (D) HCO_3^-
- (ix) The most toxic chemical as carcinogen is
- (A) carbon tetrachloride (B) vinyl chloride
(C) tetrachloro ethylene (D) trichloro ethylene
- (x) Agenda 21 is related to
- (A) greenhouse gases (B) sustainable development
(C) biodiversity (D) nuclear pollution

GROUP B
(Short Answer Type Questions)

Answer any *three* questions. 3×5 = 15

2. The BOD_5 of waste water is determined to be 150 mg/lit at 20°C. The k value is known to be 0.23 day^{-1} . What would be the BOD_5 if the test was run at 15°C?

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3. (a) What do you mean by Environmental Impact Assessment? 2
 (b) How is it related to the setting up of a new process industry? 3
4. Write down the nitrogen cycle in nature with the help of a suitable block diagram. 3+2
5. Discuss in detail the mechanism of ozone layer depletion. What are the harmful effects of ozone layer depletion? 3+2
6. Discuss briefly the types of food chain. What is food web? 4+1

GROUP C
(Long Answer Type Questions)

Answer any *three* questions. 3×15 = 45

7. (a) What is exponential growth of population? Derive the expression. Find out the doubling time of population following the exponential growth. 3+3
 (b) What are the differences between sulphurous smog and photochemical smog? 3
 (c) What is the main composition of troposphere and stratosphere? 3
 (d) What are catalytic converters? How do they work? 3
8. (a) Describe activated sludge process for treatment of waste water. 5
 (b) Discuss the advantages of Biological Towers over conventional Trickling filters. 5
 (c) Had the Earth been flat instead of being spherical in shape, what would have been its surface temperature, calculated on the basis of zero-dimensional energy balance model? 5
 (Given: $S = 1370 \text{ Wm}^{-2}$, $\sigma = 5.67 \times 10^{-8} \text{ Wm}^{-2} \text{ K}^{-4}$, $\alpha = 0.31$)
9. (a) Define hazardous waste. Write the effects of hazardous wastes on the environment and on the human health. What are endemic species? 2+2+2+1

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- (b) What is solid waste? Write a note on land filling as a method of disposal of solid waste. 2+2
- (c) Which one of the species Hg^0 , Hg^{+1} , Hg^{+2} and CH_3Hg^+ is most toxic and why? The Minamata Chemical company discharges Hg into Minamata Bay, but the fish in the bay were found to contain CH_3Hg^+ . How can you explain this missing link? 2+2
10. (a) Define biodiversity and its various components. What is biodiversity hotspots? Why India is considered as mega biodiversity country? 2+2+2
 (b) Differentiate conservative substance from non-conservative substance. 2
 (c) Define law of conservation of mass. 2
 (d) Define and classify resource. Discuss how depletion of resource is caused by rapid growth of population and technology. 2+3
11. Write short notes on any *three* of the following: 3×5
 (a) Environmental audit
 (b) Eutrophication
 (c) Demography
 (d) Oxidation pond
 (e) Composting
 (f) Earthquake.