CS/B.TECH (APM(N)/CE(N)/CSE(N)/IT(N)/MRE(N)/PE(N
/ME(N) /TT(N)/CT(N)/AUE(N))/SEM-3/CH-301/2011-1

2011

BASIC ENVIRONMENTAL ENGINEERING & 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 : $10 \times 1 = 1$

i) Natural reservoirs of water below the earth's surface is
   a) aquiclude b) aquifer
   c) aquitard d) aquiduct.

ii) The catalyst used in catalytic converters is finely divide
   a) Ni b) Pt
   c) Pd d) Fe.

iii) A food web consists of
   a) a part of a food chain
   b) multi-linear food chain
   c) a set of different producers & consumers
   d) interlocking food chains.

iv) In an ecological pyramid, the energy utilisation from the base to the top
   a) progressively decreases
   b) progressively increases
   c) remains constant
   d) none of these.

v) 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.

vi) Addition of two sound levels, 100 dB each, gives the resultant sound level of
   a) 100 dB b) 200 dB
   c) 103 dB d) 153 dB.

vii) For air stability, we must have
   a) Dry Adiabatic Lapse Rate = Ambient Lapse Rate
   b) Dry Adiabatic Lapse Rate > Ambient Lapse Rate
   c) Dry Adiabatic Lapse Rate < Ambient Lapse Rate
   d) none of these.

viii) The hottest region of the atmosphere is
   a) troposphere b) mesosphere
   c) stratosphere d) thermosphere.

ix) The pollutant primarily responsible for photochemical smog is
   a) water vapour b) sulphur dioxide
   c) oxides of nitrogen d) ozone.

x) Anaerobic digestion of carbon containing material produces mainly
   a) CO_2 only b) CH_4 only
   c) both (a) and (b) d) H_2S.

GROUP – B
(Short Answer Type Questions)

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

2. "Through the ecosystem, the inorganic nutrients are recycled but the flow of energy is unidirectional." Justify the statement.
3. "Composting is best suited for disposal of biodegradable fraction of municipal solid waste." Explain the statement.
4. "Incineration cannot be suggested as a disposal method for Kolkata Municipal solid waste." Explain the reason if you are satisfied with the statement.
5. Name the different equipment for controlling air pollution due to suspended particulate matter (SPM). Mention the suitability of use of any one equipment. 3 + 2
6. Draw a flowsheet of a water treatment plant for treating surface water to confirm public water supply standard.

GROUP – C
(Long Answer Type Questions)

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

7. a) Define noise pollution and L_{10} (18 hrs) index. 4
   b) Express the measuring unit of sound intensity level in mathematical form. 3
   c) Intensity of a sound source is $10^{-3} WM^{-2}$. Find the intensity level of the sound. Given that reference intensity is $10^{-12} WM^{-2}$. 4
   d) What do you mean by noise threshold limit ? 2
   e) What is dBA scale ? 2
8. a) What are the adverse effects of open dumping of municipal solid wastes on environment ? 5
   b) How does sanitary landfill differ from open dumping ? 5
   c) Why is clay preferred as cover material in sanitary landfill ? 2

   d) What do you mean by liner ? 1
   e) Name some materials used as liner. 1
   f) Where are the liners generally used ? 1
9. a) What is dissolved oxygen ? 2
   b) Why is it considered as an important water quality parameter to know the health of a water body ? 3
   c) What is the minimum DO level that should be maintained in a water body for the safety of the aquatic species ? 1
   d) Discuss the Winkler method of analysis of DO in the laboratory. 5
   e) What is azide modification of basic Winkler's method ? 2
   f) Discuss fresh, stale and septic waste water with reference to DO present in the sample. 2
10. a) Discuss the scope of Environmental Engineering in maintaining the environmental quality. 6
   b) What is the carrying capacity of environment ? 2
   c) What do you mean by environmental resistance ? 2
   d) Write down the different components in an aquatic ecosystem. 5
11. Write brief notes on any *three* of the following : 3×5
   a) Suspended growth culture and attached growth culture
   b) Difference in the sludge constituents generated from primary clarifier and secondary clarifier in a waste water treatment plant.
   c) Difference in unit operations and unit process.
   d) Algae-bacteria symbiosis in facultative stabilisation pond
   e) Step function response.

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