ENVIRONMENTAL SCIENCES (EVSC 2016)

Time Allotted : 3 hrs

1.

Full Marks: 70

 $10 \times 1 = 10$

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and <u>any 5 (five)</u> from Group B to E, taking <u>at least one</u> from each group.

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

Group – A (Multiple Choice Type Questions)

Choose the correct alternative for the following:

011000				
(i)	The saturated value of Dissolved Oxygen i (a) 9 mg/lit (c) 20 mg/lit	is approximately (b) 5 mg/lit (d) 6 mg/lit.		
(ii)	Which one is not a green house gas? (a) Water vapour (c) Carbon dioxide	(b) Nitrogen (d) Methane.		
(iii)	Value of Earth's ALBEDO is (a) 0.21 (c) 0.31	(b) 0.11 (d) 0.41.		
(iv)	Anaemia can be caused due to the toxic ef (a) Hg (c) Cd	ffect of (b) As (d) Pb.		
(v)	The Environmental Protection Act of Indi (a) 1984 (c) 1986	a was enacted in the year (b) 1982 (d) 1985.		
(vi)	Ozone is a pollutant when present in (a) troposphere (c) mesosphere	(b) stratosphere (d) ionosphere.		
(vii)	Which of the poisonous gas was released (a) Arsenic pentafluoride (c) Methyl isocyanate	during Bhopal Gas Tragedy? (b) Chlorine (d) Carbon monoxide.		
(viii)	Lakes with moderate nutrient status are k (a) mesotrophic (c) eutrophic	known as (b) oligotrophic (d) none of (a), (b) & (c).		

B.TECH/AEIE/CHE/CSBS/CSE/CSE(AI&ML)/ECE/EE/4TH SEM/EVSC 2016/2023

- The noise threshold limit value is 8 hours for the sound of loudness: (ix) (b) 100 dBA (c) 90 dBA (d) 110 dBA. (a) 80 dBA
- The best method of biomedical waste disposal is (x) (a) Incineration (b) Composting (c) Landfill (d) All of (a), (b) & (c).

Group-B

- 2. Following logistic growth of population, derive the expression for logistic (a) growth rate constant $r = (1/t^*) \ln (K/N_0 - 1)$. [CO3, IOCQ]
 - Give a brief account of room temperature ionic liquid. [CO6, LOCQ] (b)
 - Name the steps involved in an environmental impact assessment process? (c)
 - [CO2, LOCQ] What is green chemistry? What are the main concepts of green chemistry? (d)

[CO6, LOCQ]

4 + 2 + 2 + (2 + 2) = 12

- 3. In how many categories can resources be classified? (a) [CO1, LOCQ]
 - Following exponential growth model show that doubling time and half life time (b) of a population will be numerically equal when the growth rate constant and decay rate constant have same value? [CO3, IOCQ]
 - (c) What do you mean by 'Maximum sustainable yield'? Prove that the maximum sustainable yield will be obtained when population becomes half the carrying [CO6, IOCQ] capacity.
 - (d) What are the objectives of Environmental Protection Act of India? [CO6, LOCQ] 2 + 3 + (1 + 3) + 3 = 12

Group - C

			(1+3)+4+4=12
	(c)	Give an account of ozone layer depletion.	[CO3, LOCQ]
	(b)	Briefly discuss the causes and effects of global warming.	[CO3, LOCQ]
		atmospheric stability in terms of lapse rate.	[CO5, LOCQ]
4.	(a)	What do you mean by adiabatic lapse rate? Write down th	e three conditions for

- 5. (a) What is PAN? Using a schematic diagram describe PAN formation. [CO3, LOCQ] Write short notes on: (i) Catalytic converter and (ii) Montreal protocol. (b)
 - [CO5, LOCQ] What do you understand by suspended particulate matter? (c) [CO2, LOCQ] [CO2, HOCQ]
 - Deduce the chemical formula of CFC-115. (d)

(1+3) + 4 + 2 + 2 = 12

Group - D

Write down the sources of generation of Lead (Pb) in water and describe its 6. (a) biochemical effects. [CO3, LOCQ]

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- What is dissolved oxygen in water? What are the importances of dissolved (b) oxygen (DO) as water quality parameter? *[CO1. LOCO]*
- Describe the two types of Eutrophication in lakes. How can Eutrophication be (c) controlled? [CO1, LOCQ]

4 + (1 + 2) + (2 + 3) = 12

- Considering biodegradation of organic matter as first order reaction show that 7. (a) $BOD_t = C_0(1-e^{-kt})$, where terms have their usual meanings. [CO6. [OCO]
 - Describe using suitable diagram how an "Trickling Filter" is used in secondary (b) treatment of waste water. *[CO6. HOCO]*
 - What do you mean by thermal pollution of water? Write down the effects of (c) thermal pollution of water. [CO5, LOCQ]
 - Why hard water cannot be used in laundries and boilers? (d)

3 + 3 + 4 + 2 = 12

[*CO*4, *LOCQ*]

Group - E

- 8. Briefly discuss the working principle of modern sanitary landfill mentioning (a) advantages and disadvantages. [CO5, LOCQ] [CO5, LOCQ]
 - How will you convert waste to wealth? (b)
 - Mention the various steps involved in the technical process for controlling noise (C) pollution. [CO6, LOCQ]

$$(2+2+2)+3+3=12$$

- 9. Calculate the intensity of 110dB sounds. (Reference intensity = $1 \times 10^{-12} \text{ w/m}^2$). (a) *[CO3, HOCQ]*
 - (b) Classify traffic noise mentioning the respective scale involved in measuring the noise levels. [CO5. LOCO]
 - (c) Discuss incineration process mentioning advantages and disadvantages.
 - [CO6, LOCQ] What are the biomedical wastes? What is the best way to dispose biomedical (d) wastes? [*C*05, *L*0*CQ*]

2 + 3 + 3 + (1 + 3) = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	78.12	14.58	7.29

Course Outcome (CO):

After the completion of the course students will be able to

- CO 1. Understand the natural environment and its relationships with human activities.
- CO 2. Characterize and analyze human impacts on the environment.
- CO 3. Integrate facts, concepts, and methods from multiple disciplines and apply to environmental problems.

B.TECH/AEIE/CHE/CSBS/CSE/CSE(AI&ML)/ECE/EE/4TH SEM/EVSC 2016/2023

- CO 4. Educate engineers who can work in a multi-disciplinary environment to anticipate and address evolving challenges of the 21st century.
- CO 5. Understand and implement scientific research strategies, including collection, management, evaluation, and interpretation of environmental data.
- CO 6. Design and evaluate strategies, technologies, and methods for sustainable management of environmental systems and for the remediation or restoration of degraded environments.

*LOCQ: Lower Order Cognitive Question; IOCQ: Intermediate Order Cognitive Question; HOCQ: Higher Order Cognitive Question.