

**ENVIRONMENTAL SCIENCES
(EVSC 2016)**

Time Allotted : 3 hrs

Full Marks : 70

Figures out of the right margin indicate full marks.

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

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

**Group - A
(Multiple Choice Type Questions)**

1. Choose the correct alternative for the following: **10 × 1 = 10**
- (i) Value of Earth's ALBEDO is
(a) 0.21 (b) 0.3021 (c) 0.31 (d) 0.031.
- (ii) The maximum sustainable yield will be obtained when the population is
(a) same as carrying capacity (b) half of the carrying capacity
(c) one third of the carrying capacity (d) one fourth of the carrying capacity
- (iii) Solid waste management involves
(a) collection of solid waste (b) storage of solid waste
(c) disposal of solid waste (d) all of the above
- (iv) Minamata disease is associated with
(a) Mercury (b) Arsenic
(c) Cadmium (d) none of these.
- (v) Kyoto Protocol is related to
(a) ozone layer depletion (b) spm
(c) water pollution (d) greenhouse gases
- (vi) The main product of photochemical smog is
(a) PAN (b) O₃ (c) H₂SO₄ (d) NH₄
- (vii) Which is not an example of renewable energy source?
(a) Solar power (b) Wind power
(c) Hydropower (d) Fossil fuels.
- (viii) Lakes with poor nutrient status are known as
(a) Mesotrophic (b) Oligotrophic
(c) Eutrophic (d) None of these.

- (ix) The saturated value of DO is approximately
(a) 9 mg/lit. (b) 5 mg/lit. (c) 20 mg/lit. (d) 6 mg/lit.
- (x) The noise threshold limit values for 16 hours is
(a) 80 dBA (b) 100 dBA (c) 90 dBA (d) 110 dBA.

Group – B

2. (a) What is 'homeostatic mechanism' of environment?
(b) World population in 1850 has been estimated about 1 billion. It reached about 4 billion in 1975. Use exponential growth rate equation to find the 'Growth Rate Constant' (r) and also calculate the 'Doubling Time' (t_d) value.
(c) Write down the differences between Environmental Impact assessment and Environmental Audit.
(d) What is the usefulness of green chemistry?
(e) Write down the objectives of 'Environmental Protection Act' of India.
2 + 3 + 3 + 2 + 2 = 12
3. (a) How the factor, 'Environmental Resistance' is responsible for changing the 'exponential growth curve' of population into 'logistic growth curve'?
(b) What do you understand by renewable and non-renewable resources? Give examples.
(c) Write a short note on 'Bhopal Gas Tragedy'.
(d) What are the harmful effects of 'Volatile Organic Compounds (VOCs)' used in industries? What are the common alternatives of VOCs?
3 + 3 + 3 + (1 + 2) = 12

Group – C

4. (a) Why are CO₂ and water vapour (H₂O) greenhouse gases, but N₂ and O₂ are not?
(b) How did ozone hole in the Antarctica region form?
(c) What are criteria pollutants? Distinguish between pollutants and contaminants.
(d) Write a short note on catalytic converter.
(e) Why the mode of temperature variation in troposphere is reversed to that of in stratosphere?
2 + 2 + (1 + 2) + 3 + 2 = 12
5. (a) What is black body? Consider the sun as a perfect sphere of radius 6.8×10^8 m. Calculate the energy radiated by the sun in one minute. (Surface temperature of the sun = 5800 K. Stefan's constant = 6.8×10^{-8} Jm⁻² S⁻¹K⁻⁴.)

- (b) How acid rain is formed? What is the effect of acid rain on soil and plants?
- (c) What are the important criterions of atmospheric stability?
- (d) Deduce the chemical formula of CFC-113.

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

Group - D

- 6. (a) Discuss the harmful effects of biodegradable and non-biodegradable pesticides used in agricultural fields.
- (b) Write down the definition of BOD. What are the precautions to be taken during a 5-day BOD test?
- (c) Discuss the working principle of 'Rotating Biological Contractor' used in waste water treatment.
- (d) Write down the sources of generation and the biochemical effects of 'Lead'?

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

- 7. (a) What do you understand by eutrophication? How can it be controlled?
- (b) In a five day test the DO level drops by 3 mg/L of seeded dilution water. A 300 ml BOD bottle filled with 25 ml waste water and the rest seeded dilution water, shows a drop of DO by 8 mg/L in the same time period. What would be the BOD₅ of the waste?
- (c) What is hardness? What are the effects of hardness in water?
- (d) Explain the 'Coagulation' and 'Disinfection' processes in surface water treatment.

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

Group - E

- 8. (a) What are the advantages of recycling process?
- (b) Define composting process of solid waste disposal. What are the advantages of the process?
- (c) What do mean by Decibel?
- (d) What are the harmful effects of noise pollution? How can noise pollution be controlled at source?

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

- 9. (a) Write down the effects of industrial solid waste. How is modern agricultural practice affecting the soil pollution?
- (b) How does sanitary land filling differ from open dumping?

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- (c) What is noise threshold limit value? What is the difference between noise and sound?
- (d) Calculate the intensity of 101dB sound. (Reference intensity = $1 \times 10^{-12} \text{W/m}^2$).
(2 + 2) + 2 + (2 + 2) + 2 = 12

Department & Section	Submission Link
AEIE	https://classroom.google.com/w/MjI1OTcyMTYxMDkw/tc/Mzc0NDU3NDU4MDY4
CHE	https://classroom.google.com/c/MzExOTA4NDQyMjIz/a/Mzc0NDMyMTA0OTEw/details
CSE - A	https://classroom.google.com/c/MzUyOTg3NTY5NTkw/a/MzcxNzkyNzg5OTA5/details
CSE - B	https://classroom.google.com/c/MzUyOTkxNzc0MTYw/a/Mzc0NDI4NjAyMjU5/details
CSE - C	https://classroom.google.com/w/MjI1OTcyMTYxMjA1/tc/Mzc0NDU2MTMxMjM2
ECE - A	https://classroom.google.com/w/MzI2OTM1MDEzNDcx/tc/MzcxODkxNzQyOTA3
ECE - B	https://classroom.google.com/w/MzI3NTI5MzkzMzcz/tc/MzcxODkxNzQyOTE0
ECE - C	https://classroom.google.com/c/MzE3NTMxMjI0NzEz/a/Mzc0NDMxODYwMDI0/details
EE	https://classroom.google.com/c/MzI3OTU5ODY0NDM5/a/Mzc0NDI5MzM2NDE1/details
BACKLOG Classroom link	https://classroom.google.com/c/Mzc0NDQ0OTI0OTI0?cjc=cjluate
BACKLOG Exam link	https://classroom.google.com/c/Mzc0NDQ0OTI0OTI0/a/Mzc0NDQ1NzI3MjQy/details