

This question paper contains 4 printed pages]

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S. No. of Question Paper : **6487**

Unique Paper Code : **2174001211**

Name of the Paper : **GE : Energy and the Environment**

Name of the Course : **B.Sc. (Hons.)/B.Sc. (Prog.)**

Semester : **II/IV**

Duration : **3 Hours**

Maximum Marks : **90**

(Write your Roll No. on the top immediately on receipt of this question paper.)

This question paper consists of 8 questions in all.

Attempt any *six* questions.

All questions carry equal marks.

1. (a) Fill in the blanks (any *five*) :

- (i) gases trap heat in the Earth's atmosphere.
- (ii) The main component of natural gas is
- (iii) energy is obtained from the heat inside the Earth.
- (iv) Solar panels use cells to generate electricity.
- (v) The burning of fossil fuels releases gas.
- (vi) energy is produced from flowing water.

P.T.O.

(b) Match the following :

Column (A)		Column (B)	
(i)	Carbon footprint	(1)	Storage of CO ₂ from industrial sources
(ii)	Wind turbine	(2)	Convert wind energy to electricity
(iii)	Photovoltaic cell	(3)	Derived from organic materials
(iv)	Biofuels	(4)	Converts sunlight into electricity
(v)	Carbon capture	(5)	Measure of total greenhouse gas emission

(c) Assign True/False to the following (any *five*) :

- (i) Steam energy can be used to generate electricity in thermal power plants.
- (ii) Renewable energy sources are always available in unlimited quantity at all times.
- (iii) Nuclear fission produces a large amount of energy from a small amount of nuclear fuel.
- (iv) Carbon capture technology increases atmospheric CO₂ levels.
- (v) Indoor air pollution can be caused by cooking fuels like wood and coal.
- (vi) Ocean currents can be used as a source of energy. 5,5,5

2.
 - (a) What are energy alternatives ? Give details of any *three* alternative energy sources.
 - (b) What is zero-carbon energy ? Discuss its importance with suitable examples.
 - (c) Explain the concept of hidden costs of energy. Discuss its environmental and social impacts. 5,5,5
3.
 - (a) What do you understand by waste to energy generation ? Justify with suitable example.
 - (b) Give the working of nuclear fission based nuclear power station.
 - (c) How is biodiesel obtained from vegetable oil ? Give the reaction involved. 5,5,5
4.
 - (a) Analyze the impact of air pollution on economic productivity in urban areas.
 - (b) Suggest and explain chemical methods to remove particulate matter and toxic gases from industrial emissions.
 - (c) Analyze the major reasons for air pollution in Delhi. Identify the key pollutants present and discuss the impact of any such *two* pollutants on human health. 5,5,5
5.
 - (a) Explain working principle of Photovoltaic cell.
 - (b) What is carbon capture and reuse ? Write its utilization.
 - (c) Discuss the advantages and limitations of wind energy. 5,5,5

6. (a) Discuss “Hydrogen as an alternative future source of energy”.
(b) Explain the utility of hydropower plant. Discuss the potential of hydropower in India.
(c) Give a comparison between nuclear fission and nuclear fusion. 5,5,5
7. (a) What is biogas ? How it can be produced ?
(b) Discuss various sources of geothermal energy. Discuss its merits and limitations.
(c) What is ozone layer depletion ? Describe the role of chlorofluorocarbons (CFCs) in ozone layer depletion. 5,5,5
8. Write short notes on any *three* of the following :
(i) Carbon cycle in its importance
(ii) Green Energy
(iii) Natural gas as fuel
(iv) Indoor pollution. 5,5,5