



ENVIRONMENTAL ISSUES

CHAPTER SNAPSHOT

- 13.01 Pollution
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its Implementation
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- 13.10 Global Environment Change
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- 13.14 Ecosan Toilets
- 13.15 Peoples Participation in
Conservation of Forests



Evaluation

- Right to Clean Water is a fundamental right, under the Indian Constitution
(a) Article 12 (b) Article 21
(c) Article 31 (d) Article 41
[Ans. (b) Article 21]
- With which of the following, the Agenda 21' of Rio Summit, 1992 is related to?
(a) Sustainable development
(b) Combating the consequences of population
(c) Mitigation norms of Green House Gases (GHGs) emission
(d) Technology transfer mechanism to developing countries for 'clean-energy' production.
[Ans. (b) Combating the consequences of population]
- Which among the following awards instituted by the Government of India for individuals or communities from rural areas that have shown extraordinary courage and dedication in protecting Wildlife?
(a) Indira Gandhi Paryavaran Puraskar
(b) Medini Puruskar Yojana
(c) Amrita Devi Bishnoi Award
(d) Pitambar Pant National Award
[Ans. (a) Indira Gandhi Paryavaran Puraskar]
- The 'thickness' of Stratospheric Ozone layer is measured in/on:
(a) Sieverts units
(b) Dobson units
(c) Melson units
(d) Beaufort Scale [Ans. (b) Dobson units]
- Which among the following is the most abundant Green-House-Gas (GHG) in the earth's atmosphere?
(a) Carbon dioxide
(b) Water Vapour
(c) Sulphur Dioxide
(d) Tropospheric Ozone
[Ans. (b) Water Vapour]
- As per 2017 statistics, the highest per capita emitter of Carbon dioxide in the world is
(a) USA (b) China
(c) Qatar (d) Saudi Arabia
[Ans. (b) China]
- The use of microorganism metabolism to remove pollutants such as oil spills in the water bodies is known as
(a) Biomagnification (b) Bioremediation
(c) Biomethanation (d) Bioreduction
[Ans. (d) Bioremediation]
- The Ozone Day is observed every year on September 16 as on this day in 1987 the was signed for launching efforts to arrest the depletion of the fragile ozone layer in the stratosphere that prevents the harmful ultra-violet rays of the sun from reaching the earth. Fill the correct word in blank.
(a) Montreal Protocol (b) Geneva Protocol
(c) Kyoto Protocol (d) Nagoya Protocol
[Ans. (a) Montreal Protocol]
- Which among the following always decreases in a Food chain across tropic levels?
(a) Number
(b) Accumulated chemicals
(c) Energy
(d) Force
[Ans. (c) Energy]
- In the E-waste generated by the Mobile Phones, which among the following metal is most abundant?
(a) Copper (b) Silver
(c) Palladium (d) Gold
[Ans. (a) Copper]
- The Hydrochlorofluorocarbons (HCFCs) are the compounds which have the following molecules:
(a) Hydrogen (b) Carbon
(c) Chlorine (d) Fluorine
[Ans. (c) Chlorine]
- SMOG is derived from:
(a) Smoke (b) Fog
(c) Both A and B (d) Only A
[Ans. (c) Both A and B]

**13. Excess of fluoride in drinking water causes:**

- (a) Lung disease
- (b) Intestinal infection
- (c) Fluorosis
- (d) None of the above

[Ans. (c) Fluorosis]

14. Expand (i) CFC (ii) AQI (iii) PAN**Ans. (i) CFC** - Chlorofluorocarbon**(ii) AQI** - Air Quality Index**(iii) PAN** - Peroxyacetyl Nitrate**15. What is SMOG and how it is harmful for us?**

Ans. Smog is a type of air pollution caused by tiny particles in the air. The word comes from a mixture of the words smoke and fog.

(i) Smog generally refers to photochemical smog, which is created when sunlight reacts with nitrogen oxides and volatile organic compounds found in fossil fuel emissions from automobiles, factories and power plants.

(ii) These reactions create ground-level ozone and particulate matter, reducing visibility. Smog can make breathing more difficult, especially for people with asthma.

(iii) Smog also affects plants and animals. It damages crops as well as causes health problems in pets, farm animals and human beings. Smog has also been known to cause corrosive damage to buildings and vehicles.

16. List all the wastes that you generate, at home, school or during your trips to other places. Could you very easily reduce the generation of these wastes? Which would be difficult or rather impossible to reduce?**Ans.**

| S.No | Place | Waste generated | Mode of reduction |
|-------------|-------------------------|---|---|
| i. | Home: Kitchen | a) Vegetable/Fruit/Food waste | They can be composted to form manure. |
| | | b) e-waste | a) Reduce usage b) Recycle through e-waste recycling units |
| | | c) Paper waste | a) Recycling units b) Reuse waste paper as much as possible |
| | | d) Used items: Cup boards, Old washing machines and old fridge | Recycling units |
| ii. | School | a) Stationary waste/Paper waste | Segregate and sent to recycling unit |
| | | b) e-waste | Recycling units |
| | | c) garden waste | can be composted |
| iii. | Trips | a) Plastic cups / Water bottles / Plates | <ul style="list-style-type: none"> • Avoid plastic usage • Use ecofriendly plates/cups • Throw waste in garbage dry meant for the same in hotels/trains/public places. |

If Judiciously planned, we can reduce usage of non-biodegradable materials especially plastics



17. Discuss the causes and effects of global warming. What measures need to be taken to control global warming?

Ans. Green House Effect and Global warming :

Natural environment and climate are dynamic and keep changing over course of time. Reasons for climate change

- Human population growth
- Industrialization
- Associated anthropological activities the changes.

Impact on Global warming :

- Large-scale changes of global environment can lead to hazards, which may include climate change, stratospheric ozone depletion, changes in ecosystems due to loss of biodiversity, changes in hydrological systems and the supplies of freshwater, land degradation, urbanization, and stress on food-producing systems.
- Greenhouse gases (GHG) water vapour, carbon dioxide, methane, nitrous oxide, ozone and some artificial chemicals such as chlorofluorocarbons (CFCs) causes greenhouse effect. The absorbed energy warms the atmosphere and the surface of the Earth.
- Global warming will have significant impact on people and nature. As global average temperatures rise, precipitation patterns could be affected. Extreme wet and dry conditions can be expected (flooding and desertification). Coastal areas shall become more vulnerable to storm surges as sea level rises. Plant and animal species will migrate or disappear in response to climate change.
- Global warming can directly affect the flora and fauna. This could also result in shortage of food and even lead to food crisis; and affect the health of the people and organisms.

Control Measures:

The UNO has several measures to control or reduce pollution. Through various conventions organized by UNO, the countries assured to take steps to control or reduce emissions by factories and automobiles.

18. What would Earth be like without the greenhouse effect?

Ans. The naturally occurring green house gases in the air, mainly carbon dioxide, methane and water vapour trap radiation from the sun and act like a thermal blanket around our planet earth. Without the greenhouse gases, the earth would have an average temperature of -18°C and be covered in ice. The green house effect keeps the earth warm enough to sustain life.

19. Write notes on the following:

(a) Eutrophication

(b) Algal Bloom

Ans. (a) Eutrophication :

When run-off from land containing nutrients reaches water bodies like lakes, it results in dense growth of plant life. This phenomenon is called Eutrophication. Nutrients stimulate the growth of algae, water hyacinth and this covers the water surface which is called Eutrophication.

(b) Algal Bloom :

It can cause clogging of canals, rivers and lakes as well displacing native plants. It causes unsightly foam and unpleasant odours and deprives the water of dissolved oxygen. This also affects the aquatic animals living in the ecosystem.

20. What effect can fertilizer runoff have on an aquatic ecosystem?

Ans. (i) When non-degradable substances enter the food chain, they do not get metabolized and instead get transferred up the trophic levels of the food chain. During this process, they show an increase in concentration which is referred to as biomagnification. This results in increased toxicity and may even be lethal

(ii) When run-off from land containing nutrients reaches water bodies like lakes, it results in dense growth of plant life. This phenomenon is called Eutrophication.

(iii) Natural aging of lakes also leads to nutrient enrichment of its water. In a lake, the water is cold and clear (oligotrophic stage), supporting little life.

(iv) With time, streams draining into the lake introduce nutrients such as nitrates and phosphates, which encourage the growth of aquatic organisms.



- (v) Aquatic plants and animal life grow rapidly, and organic remains begin to be deposited on the lake bottom (mesotrophic stage).
- (vi) Pollutants from anthropogenic activities like effluents from the industries and homes can radically accelerate the aging process. This phenomenon is known as **Cultural or Accelerated Eutrophication**.
- (vii) Nutrients stimulate the growth of algae, water hyacinth and can cause clogging of canals, rivers and lakes as well as, displacing native plants. It causes unsightly foam and unpleasant odours, and deprives the water of dissolved oxygen.

21. How can we control eutrophication?

- Ans. (i)** It is a method of farming system which primarily aims at cultivating the land and raising crops in such a way, so as to keep the soil alive and in good health by use of organic wastes (crop, animal and farm wastes, aquatic wastes) and other biological materials along with beneficial microbes (biofertilizers) to release nutrients to crops for increased sustainable production in an eco-friendly pollution free environment.
- (ii)** Use of fertilizer pesticides will always lead to surface run off. One only way to prevent surface run off will be to resort to organic farming.

22. Why does ozone hole form over Antarctica?

- Ans.** Ozone hole is the area above Antarctica, where the ozone layer is the thinnest.

23. Mention the causes of enhanced use of ultraviolet radiation.

- Ans. Effects:** UV rays may penetrate deep into the skin and can lead to premature skin aging and wrinkling of skin; suppression of the immune system, skin cancer (melanoma) and chronic effects leading to eye damage. DNA damage can result from free radicals and reactive oxygen and photons can damage the DNA itself.

24. Discuss the role of women in protection and conservation of forests.

- Ans. (i)** Amrita Devi was a brave lady from Khejarli Village of Jodhpur District, Rajasthan. She sacrificed her life to maintain Bishnoi Dharma. In 1730, Maharaja Abhay Singh,

ruler of Marwar, Rajasthan state wanted to log green Khejri (*Prosopis cineraria*) trees to burn lime for the construction of his new palace. Since there was a lot of greenery in the Bishnoi villages even in the middle of Thar Desert, the king ordered his men to get the wood from Khejri trees. When she came to know about the cutting of trees by the King's men, she and many others had hugged the Khejri trees to save from cutting. But king's men killed Amrita Devi along with more than 363 other Bishnois. It was a Tuesday, black Tuesday in Khejarli. This incident took place to save trees and is recorded in India's history.

- (ii)** To commemorate her bravery, the Government of Rajasthan and Madhya Pradesh have initiated the prestigious state level award named as 'Amrita Devi Bishnoi Smriti Award' for excellent contribution to the protection and conservation of wildlife.

25. Discuss the role of an individual to reduce environmental pollution.

- Ans.** An individual should become aware of the impact of pollution and can do the following in reducing environmental pollution.

- (i)** Use water judiciously
- (ii)** Take up measures like using bicycle for short distances. **Eg.** Go for car parking etc., to reduce fuel usage.
- (iii)** Less use of Air conditioners
- (iv)** Plant trees/have gardens/Terrace gardening
- (v)** Go in for organic farming
- (vi)** Take steps to avoid noise pollution such as less usage of loud speakers
- (vii)** Eco-friendly ways of celebrating festivals.
- (viii)** Recycle wastes by using kitchen water for gardening, converting kitchen waste to compost.
- (ix)** Dispose e-waste through proper recycling channels.
- (x)** Avoid usage of plastics to the maximum possible extent.

26. How does recycling help reduce pollution?

- Ans.** Recycling is one of the techniques in waste management. For some other purpose recycling is the process of converting waste materials into new materials and objects.



- (i) As it saves energy, it also prevents the emission of many greenhouse gases which helps to tackle climate.
- (ii) It reduces the energy required in disposing waste.
- (iii) Using recovered material generates less solid waste.
- (iv) It reduces all kinds of pollution caused by extraction and processing of new raw materials wherein recycled materials can be substituted. i.e. It can prevent the waste of potentially useful material.
- (v) It also has a positive economic impact on the users. Refuse, Reduce, Reuse and Recycle mantra is the best available remedy for plastic waste pollution.

27. What is the primary purpose of the Kyoto Protocol?

Ans. The main goal of the Kyoto protocol is to control emissions of the main Anthropogenic (human-emitted) green house gases (GHGs) in ways that reflect underlying national difference in GHG emission, wealth and capacity to make the reductions.

28. In what way Payang conserves the forest.

Ans. The 'Forest man of India', Jadav Payeng who created 1,360 acres of dense and defiant forest was born in Arunasapori (a river island on the Brahmaputra). He had just completed his Class X exams in 1979 when he started to sow the seeds and shoots on the eroded island covered with sand and silt. Thirty-six years later he had converted the once unproductive land into a forest. Payeng's forest is now home to five Royal Bengal tigers, over a hundred deer, wild boar, vultures, and several species of birds. For his remarkable initiative, the Jawaharlal Nehru University invited Payeng in 2012 on Earth Day and honoured him with the title of the 'Forest Man of India'. Later, the President APJ Abdul Kalam felicitated him with a cash award in Mumbai. The same year, he received the 'Padma Shri'.

29. Discuss briefly the following :

- i. Catalytic converter
- ii. Greenhouse gases
- iii. Ecosan

Ans. (i) Catalytic converter:

It is a device incorporated in the exhaust system of a motor vehicle containing a

catalyst for converting pollutant gases into less harmful ones. It is a measure to control air pollution.

(ii) Greenhouse gases

Water vapour, Carbon dioxide, Methane, Nitrous oxide, Ozone, Chlorofluorocarbon and Hydrofluorocarbon are the major Green house gases. When sun rays fall on the earth, a part of it is reflected back to space. But this is absorbed by the green house gases. They act like a thermal blanket and keep the earth warm. Without the greenhouse effect, the earth will have a temperature as less as -18°C . This is a natural phenomenon.

(iii) Ecosan

About 150 liters of wastewater at an average is generated by an Indian individual daily, and a large amount of it is generated from toilets. Ecological sanitation (EcoSan) is a sustainable system for handling human excreta by using dry composting toilets. EcoSan toilets not only reduce wastewater generation but also generate the natural fertiliser from recycled human excreta, which forms an excellent substitute for chemical fertilisers. This method is based on the principle of recovery and recycling of nutrients from excreta to create a valuable supply for agriculture. 'EcoSan' toilets are being used in several parts of India and Sri Lanka.

30. What are some solutions to toxic dumping in our oceans?

Ans. Toxic dumping involves depositing all the waste materials from factories and industries, tankers and ships and disposing sewage waste materials into the oceans and seas. Some of them may be toxic. Ways to prevent ocean pollution are:

- (i) Avoid plastic usage. It is the single largest threat to oceans.
- (ii) Avoid products containing microbeads. (Microbeads are extremely small piece of plastic material manufactured for various applications like personal care products, cosmetics, etc.)
- (iii) Fat sustainable
- (iv) Reduce energy usage
- (v) Practice proper disposal of hazardous materials.



(vi) Practice organic methods agriculture and less usage of chemical fertilizers/pesticides, etc.

(vii) Beach clean up campaigns to be organized and make every individuals to practice hygienic methods of waste disposal in beaches.

31. Describe how deforestation might contribute to global warming.

Ans. (i) When trees are cut down and burnt or allowed to rot, their stored carbon is released into the air as carbon dioxide. This adds to the carbon dioxide content of the air. Carbon dioxide is a major green house gas. The increase in concentration of carbon dioxide in the air increases the green house effect and thereby causes global warming. It has been estimated that 25-30% of the green house gases released into the atmosphere each year is because of deforestation.

(ii) Trees act as carbon sink since they utilize carbon dioxide for photosynthesis. When trees are cut down, the the carbon footprint increases. This in turn leads to global warming.

32. How does forest conservation help to reduce air pollution?

Ans. (i) The alteration or changes in the composition of the earth's atmosphere by natural or human activities is called air pollution.

(ii) Increase in carbon dioxide concentration of air is also a form of air pollution. The normal CO_2 concentration in the atmosphere is only about 0.03%. Deforestation is one of the major contributions for increase in carbon dioxide of the air. Forests act as carbon sink by utilising the atmospheric carbon dioxide for photosynthesis.

(iii) When forests are cut down, the concentration of the atmosphere increases. This leads to global warming or green house effect which is an effect of air pollution.

(iv) Thus by forest conservation, we can reduce the carbon foot print by increased trapping of atmospheric CO_2 and thereby reducing global warming. This leads to reduced levels of air pollution.

Additional Questions

CHOOSE THE CORRECT ANSWER

1 Mark

I. CHOOSE THE CORRECT OPTIONS FOR THE BELOW QUESTIONS

1. _____ is an example for a non persistent pollutant.

- (a) DDT (b) Vegetable waste
(c) Plastic (d) Mercury

[Ans. (b) Vegetable waste]

2. Oil spills can lead to _____

- (a) increase of BOD
(b) decrease of BOD
(c) No change in BOD
(d) None of the above

[Ans. (a) increase of BOD]

3. The tolerable level of sound is _____

- (a) 140 db (b) 120 db
(c) 100 db (d) 2220 db

[Ans. (b) 120 db]

4. _____ is not a method of waste water treatment.

- (a) oxidation ponds
(b) Anaerobic lagoons
(c) Catalytic converter
(d) Anaerobic bioreactor

[Ans. (c) Catalytic converter]

5. Incineration is the best method to dispose _____.

- (a) Agricultural waste (b) Sewage
(c) Medical waste (d) Oil spills

[Ans. (c) Medical waste]

34. Algal bloom is caused due to enrichment of water bodies with _____

[Ans. nutrients]

35. Man made activities causing pollution are described as _____

[Ans. anthropogenic activities (or) anthropological activities]

36. Oxidation pond is a _____ method of waste water treatment.

[Ans. biological]

37. Root zone wastewater treatment is a method of _____ of waste water.

[Ans. phytoremediation]

38. Ozone consists of _____ oxygen atoms

[Ans. three]

39. _____ was discovered by Charles Fabry and Henri Buisson.

[Ans. Ozone layer]

40. _____ causes ozone depletion

[Ans. FC Chlorofluorocarbon]

41. Skin cancer is called _____

[Ans. melanome]

VERY SHORT ANSWERS

2 Marks

1. How are pollutants classified?

Ans. Pollutants are classified into: Non degradable and degradable pollutants. Degradable pollutants are further classified as rapidly degradable and slowly degradable.

2. Define air pollution.

Ans. The alteration or changes in the composition of the earth's atmosphere by natural or human activities (anthropogenic factors) are referred as air pollution.

3. What is AQI?

Ans. Air Quality Index (AQI) is a number used by government agencies to communicate to the public how polluted the air is at a given time.

4. What is 4 'R'?

Ans. 4 'R' refers to refuse, reduce, reuse and recycle. It is the best available remedy for plastic waste pollution.

5. Name two major International environmental conventions.

Ans. (i) 1992: Earth summit, Rio de Janeiro. Agenda 21, otherwise called Rio conference, Brazil

(ii) 1997: Kyoto Protocol, Japan.

6. What is Ozone?

Ans. Ozone is found in the layer of the atmosphere called stratosphere. It acts as a protective covering that absorbs ultraviolet radiation from the sun. It is found about 15 and 50 kilometers from the ground level.

7. How are sources of water pollution classified?

Ans. Sources of water pollution can also be classified in three ways. They are municipal wastes, industrial wastes and agricultural wastes.

| Air Quality Index | | |
|-------------------|--------------------------------|--------|
| AQI | Air Pollution Level | Colour |
| 0-50 | Good | |
| 51-100 | Moderate | |
| 101-150 | Unhealthy for sensitive Groups | |
| 151-200 | Unhealthy | |
| 201-300 | Very Unhealthy | |
| 301 + | Harzardous | |

SHORT ANSWERS

3 Marks

1. What are particulate matter?

Ans. Particulate matters are tiny particles of solid matter suspended in a gas or liquid. Combustion of fossil fuels, fly ash produced in thermal power plants, forest fires, asbestos mining units, cement factories are the main sources of particulate matter pollution.

2. Name the main sources of air pollution.

Ans. (i) Transport sources – cars, buses, airplanes, trucks and trains

(ii) Stationary sources – power plants, incinerators, oil refineries, industrial facilities and factories

(iii) Area sources – agricultural - wood / stubble burning and fireplaces

(iv) Natural sources – wind-blown dust, wildfires and volcanoes.

3. How is carbon monoxide produced?

Ans. Carbon monoxide (CO) is produced mainly due to incomplete combustion of fossil fuels. Automobiles are major causes of CO pollution in large cities and towns automobile exhausts, fumes from factories, emission from power plants, forest fires and burning of fire-wood contribute to CO pollution.