

## Chapter 11:

### Environmental Chemistry- Air

<b>CHAPTER 11:</b> .....	1
ENVIRONMENTAL CHEMISTRY - AIR.....	1
SHORT QUESTIONS (EXERCISE).....	1
THINK TANK & PROJECT.....	4
EXTRA SHORT QUESTIONS (TOPIC WISE).....	8
EXTRA LONG QUESTIONS (TOPIC WISE).....	10
MCQS.....	13

### Short Questions (Exercise)

1. (i) List two main sources of acid rain.

- **Human-made Sources:** Burning of fossil fuels like coal and oil in power plants and industries releases sulfur dioxide ( $\text{SO}_2$ ) and nitrogen oxides ( $\text{NO}_x$ ).
- **Natural Sources:** Volcanic eruptions release large amounts of sulfur dioxide, contributing to acid rain.

**Example:** Power plants emitting  $\text{SO}_2$  are major contributors to acid rain in industrial areas.

1. (ii) List four human activities which contribute to air pollution.

1. **Burning Fossil Fuels:** In vehicles, power plants, and industries, releasing  $\text{CO}$ ,  $\text{NO}_x$ , and particulate matter.
2. **Deforestation:** Reduces  $\text{CO}_2$  absorption, increasing its atmospheric concentration.
3. **Agriculture:** Emissions of methane ( $\text{CH}_4$ ) from livestock and ammonia ( $\text{NH}_3$ ) from fertilizers.
4. **Industrial Emissions:** Factories release  $\text{SO}_2$ , VOCs (volatile organic compounds), and particulates.

**Example:** Vehicular emissions in urban areas like New Delhi contribute to smog.

1. (iii) What is the importance of catalytic converters?

Catalytic converters reduce harmful emissions from vehicle exhaust by converting:

- **Carbon Monoxide ( $\text{CO}$ )** to Carbon Dioxide ( $\text{CO}_2$ ).
- **Nitrogen Oxides ( $\text{NO}_x$ )** to Nitrogen ( $\text{N}_2$ ) and Oxygen ( $\text{O}_2$ ).
- **Hydrocarbons** to Water ( $\text{H}_2\text{O}$ ) and  $\text{CO}_2$ .

**Example:** Modern cars with catalytic converters emit 90% fewer pollutants than older models.

---

1. (iv) What is the role of automobiles in air pollution?

Automobiles are a major source of air pollution as they emit:

- **Carbon Monoxide (CO):** A poisonous gas.
- **Nitrogen Oxides (NO<sub>x</sub>):** Contribute to smog and acid rain.
- **Particulate Matter:** Harmful for respiratory health.

**Example:** Traffic congestion in cities like Los Angeles worsens air quality due to increased emissions.

---

1. (v) Define global warming.

Global warming refers to the **long-term increase in Earth's average temperature** due to excessive greenhouse gases (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O) trapping heat in the atmosphere.

**Example:** The Arctic ice melting is a direct result of global warming.

---

2. Describe sources of air pollutants.

Air pollutants come from various sources:

1. **Natural Sources:** Volcanic eruptions, wildfires, and dust storms.
2. **Anthropogenic Sources:**
  - **Transportation:** Emits CO, NO<sub>x</sub>, and hydrocarbons.
  - **Industrial Processes:** Release SO<sub>2</sub>, VOCs, and particulates.
  - **Agriculture:** Methane emissions from livestock and ammonia from fertilizers.

**Example:** Forest fires in California release CO and particulate matter into the atmosphere.

---

3. Describe acid rain and its effects.

#### **Definition**

Acid rain occurs when SO<sub>2</sub> and NO<sub>x</sub> react with water in the atmosphere to form sulfuric and nitric acids, which fall as precipitation.

#### **Effects**

- **Aquatic Life:** Acidifies water bodies, harming fish and other organisms.
- **Forests:** Damages leaves and leaches nutrients from soil.
- **Buildings:** Corrodes structures made of limestone and marble.

**Example:** The Taj Mahal in India is deteriorating due to acid rain caused by industrial emissions.

---

#### 4. Describe global warming.

##### Definition

Global warming is the gradual rise in Earth's temperature caused by the greenhouse effect due to excessive emissions of CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O.

##### Effects

1. **Melting Ice Caps:** Leading to rising sea levels.
2. **Extreme Weather:** Increased frequency of hurricanes, droughts, and heatwaves.
3. **Biodiversity Loss:** Species are losing habitats due to changing climates.

**Example:** The global temperature has risen by approximately 1°C in the past century.

---

#### 5. What is ground-level ozone? Explain.

Ground-level ozone is a harmful secondary pollutant formed when NO<sub>x</sub> and VOCs react in the presence of sunlight. It is a key component of smog.

##### Effects

- **Health:** Causes respiratory problems and aggravates asthma.
- **Crops:** Reduces crop yields by damaging plant tissues.

**Example:** High levels of ozone in urban areas during summer affect air quality and health.

---

#### 6. Why is global warming often referred to as the greenhouse effect?

Global warming is termed the greenhouse effect because greenhouse gases like CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O trap heat from the sun, much like a greenhouse retains warmth.

##### Justification

- Greenhouse gases form a blanket around Earth, preventing heat from escaping into space.
- This trapped heat raises Earth's temperature over time.

**Example:** Excess CO<sub>2</sub> from burning fossil fuels intensifies the greenhouse effect, causing temperature rise.

---

#### 7. Sulfur dioxide is a common pollutant from burning coal. State two effects caused by this pollutant.

1. **Acid Rain:** SO<sub>2</sub> reacts with water to form sulfuric acid, damaging ecosystems and infrastructure.
2. **Respiratory Issues:** SO<sub>2</sub> irritates the respiratory system, causing asthma and bronchitis.

**Example:** Coal-burning power plants are major SO<sub>2</sub> sources, leading to acid rain in industrial regions.

## Think Tank & Project

1. Dibenzothiophene ( $C_{12}H_8S$ ) is a common sulfur-containing compound of coal. It is responsible for acid rain. Elaborate this statement.

Dibenzothiophene is an organic sulfur compound found in coal. During the combustion of coal, sulfur in this compound is released as **sulfur dioxide ( $SO_2$ )**. When  $SO_2$  is emitted into the atmosphere, it reacts with water, oxygen, and other chemicals to form sulfuric acid ( $H_2SO_4$ ), which falls to the ground as acid rain.

### Effects of Acid Rain

1. **Aquatic Ecosystems:** Acidifies water bodies, harming fish and other organisms.
2. **Forests:** Damages foliage and reduces soil nutrients.
3. **Infrastructure:** Corrodes buildings and monuments made of limestone and marble.

**Example:** Industrial coal-burning in regions like the Midwest USA has caused acid rain that affects neighboring areas.

---

2. There is a dire need to remove sulfur from coal before it is burned. Give reasons.

### Reasons for Removing Sulfur from Coal:

1. **Prevention of Acid Rain:** Sulfur emissions from coal combustion lead to the formation of acid rain, which damages ecosystems and infrastructure.
2. **Reduction in Air Pollution:** Removing sulfur minimizes the release of  $SO_2$ , a major air pollutant that affects human health.
3. **Improved Efficiency:** Cleaner coal combustion results in better energy efficiency and reduced maintenance costs for equipment.

**Example:** Flue-gas desulfurization (FGD) is a technology used in power plants to remove sulfur from emissions and reduce air pollution.

---

3. Examine the option: There are some ways to reduce pollution caused by cars.

### Ways to Reduce Car Pollution:

1. **Use of Catalytic Converters:** Catalytic converters in vehicles transform harmful gases like CO and NOx into less harmful substances.
2. **Shift to Electric Vehicles (EVs):** EVs produce no tailpipe emissions, reducing urban air pollution.
3. **Carpooling and Public Transport:** Reduces the number of vehicles on the road, cutting emissions.
4. **Improved Fuel Efficiency:** Using cleaner fuels like CNG or biodiesel reduces pollution.

**Example:** The introduction of **Euro 6 emission standards** has significantly lowered vehicle pollution levels in Europe.

---

#### 4. Certain human activities are responsible for a significant increase in greenhouse effect. Argue.

##### Argument for Human Activities and the Greenhouse Effect:

1. **Burning Fossil Fuels:** Activities like power generation, transportation, and industrial processes release large amounts of CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O, intensifying the greenhouse effect.
2. **Deforestation:** Clearing forests for agriculture and urbanization reduces CO<sub>2</sub> absorption, increasing atmospheric levels.
3. **Agriculture:** Livestock farming releases methane, a potent greenhouse gas.
4. **Waste Management:** Landfills emit methane due to anaerobic decomposition of organic waste.

**Example:** Deforestation in the Amazon contributes to nearly **20% of global CO<sub>2</sub> emissions** annually.

---

#### 5. As a global citizen, how can you play a part to reduce air pollution at a personal level? Argue.

##### Personal Actions to Reduce Air Pollution:

1. **Adopt Sustainable Transportation:** Use public transport, cycle, or walk to reduce emissions.
2. **Energy Conservation:** Switch to renewable energy sources like solar panels and reduce electricity consumption.
3. **Minimize Waste:** Reduce, reuse, and recycle to lower waste production, cutting landfill emissions.
4. **Plant Trees:** Trees absorb CO<sub>2</sub> and improve air quality.
5. **Promote Awareness:** Educate others about the importance of reducing air pollution.

**Example:** Switching to energy-efficient appliances and planting trees in urban areas can significantly improve air quality.

## Project

### (a) The Gases Contributing to the Problem and Their Sources

Global warming is primarily caused by the excessive presence of greenhouse gases in the atmosphere. These gases trap heat, leading to the gradual increase in Earth's temperature. The main contributors are:

1. **Carbon Dioxide (CO<sub>2</sub>):**
  - **Sources:**
    - Burning fossil fuels (coal, oil, and natural gas) for energy.

- Deforestation, which reduces CO<sub>2</sub> absorption by trees.
- Cement production releases CO<sub>2</sub> as a byproduct.

2. **Methane (CH<sub>4</sub>):**

○ **Sources:**

- Agriculture, especially from livestock digestion (enteric fermentation).
- Landfills, where organic waste decomposes anaerobically.
- Natural gas extraction and leakage during transportation.

3. **Nitrous Oxide (N<sub>2</sub>O):**

○ **Sources:**

- Use of nitrogen-based fertilizers in agriculture.
- Burning fossil fuels and biomass.

4. **Fluorinated Gases (F-gases):**

○ **Sources:**

- Industrial processes and refrigerants.
- Manufacturing of semiconductors and electrical equipment.

---

**(b) Which of These Gases Are Causing the Most Concern?**

1. **Carbon Dioxide (CO<sub>2</sub>):**

- CO<sub>2</sub> accounts for the largest share of greenhouse gas emissions (~76%).
- Its long atmospheric lifetime and wide-scale emission make it the most concerning.

2. **Methane (CH<sub>4</sub>):**

- Methane is 25 times more potent than CO<sub>2</sub> in trapping heat over a 100-year period.
- Although its concentration is lower, its impact on global warming is significant.

3. **Nitrous Oxide (N<sub>2</sub>O):**

- It is 298 times more effective than CO<sub>2</sub> at trapping heat over a 100-year period, causing alarm despite lower emissions.

4. **Fluorinated Gases:**

- These are synthetic and extremely potent greenhouse gases, with global warming potentials thousands of times greater than CO<sub>2</sub>.

---

**(c) Suggest Some Ways to Reduce This Problem**

1. **Reduce Carbon Dioxide Emissions:**

- Shift to renewable energy sources like solar, wind, and hydroelectric power.
  - Promote energy efficiency in industries, homes, and transportation.
  - Encourage reforestation and afforestation to absorb CO<sub>2</sub>.
2. **Lower Methane Emissions:**
- Improve waste management to reduce methane emissions from landfills.
  - Adopt sustainable agriculture practices, such as better livestock feed.
  - Capture methane from oil and gas extraction sites.
3. **Minimize Nitrous Oxide Emissions:**
- Use nitrogen-based fertilizers efficiently in agriculture.
  - Reduce emissions from industrial processes.
4. **Limit Fluorinated Gases:**
- Transition to climate-friendly alternatives in refrigeration and air conditioning.
  - Enforce regulations on the use of synthetic gases in industries.
5. **Promote Global Collaboration:**
- Implement international agreements like the Paris Accord to reduce emissions.
  - Raise public awareness about the impact of global warming and promote individual action.

---

## Conclusion

Global warming is a multifaceted problem that requires urgent attention. By addressing the sources of greenhouse gases and adopting sustainable practices, we can mitigate its effects and protect the planet for future generations. Each individual's effort, combined with government and industrial action, is crucial in tackling this global issue.

## Exera Short Questions (Topic Wise)

### 11.1: Composition of Atmosphere

1. **Question:** What are the main components of the atmosphere?

**Answer:** Nitrogen (~78%), Oxygen (~21%), Argon (~0.93%), CO<sub>2</sub> (~0.04%), and trace gases.

2. **Question:** Why is nitrogen important?

**Answer:** It acts as an inert filler and is essential for plant growth (converted to usable forms in nitrogen cycle).

3. **Question:** How does oxygen support life?

**Answer:** It is vital for respiration and energy production in living organisms.

4. **Question:** What role does CO<sub>2</sub> play in the atmosphere?

**Answer:** It traps heat (greenhouse effect) and is essential for photosynthesis.

**Example:** Greenhouse gases keep Earth's average temperature around 15°C, enabling life.

---

### 11.2: Air Pollutants

1. **Question:** What are primary air pollutants?

**Answer:** Directly emitted pollutants like CO, SO<sub>2</sub>, NO<sub>x</sub>, and particulate matter.

2. **Question:** What are secondary air pollutants?

**Answer:** Pollutants formed in the atmosphere, e.g., ozone (O<sub>3</sub>) formed from NO<sub>x</sub> and VOCs.

3. **Question:** What is particulate matter?

**Answer:** Tiny solid or liquid particles suspended in air, harmful to lungs.

4. **Question:** How does smog form?

**Answer:** From a combination of pollutants like NO<sub>x</sub> and hydrocarbons under sunlight.

**Example:** Smog in cities like Los Angeles leads to respiratory problems.

---

### 11.3: Sources of Air Pollution

1. **Question:** Name two natural sources of air pollution.

**Answer:** Volcanic eruptions (SO<sub>2</sub>) and forest fires (CO, particulate matter).

2. **Question:** What is the largest human-made source of air pollution?

**Answer:** Burning fossil fuels in vehicles and industries.

3. **Question:** How does agriculture contribute to air pollution?

**Answer:** Emissions of CH<sub>4</sub> from livestock and NH<sub>3</sub> from fertilizers.

4. **Question:** How does deforestation contribute to air pollution?

**Answer:** Reduces CO<sub>2</sub> absorption, increasing its atmospheric levels.

**Example:** Deforestation in the Amazon leads to increased CO<sub>2</sub> emissions.



---

#### 11.4: Global Warming

- Question:** What is the greenhouse effect?  
**Answer:** The trapping of heat by greenhouse gases like  $\text{CO}_2$ ,  $\text{CH}_4$ , and  $\text{N}_2\text{O}$ .
- Question:** What are the main contributors to global warming?  
**Answer:** Burning fossil fuels, deforestation, and industrial emissions.
- Question:** How does global warming affect glaciers?  
**Answer:** Causes glaciers to melt, raising sea levels.
- Question:** What are the effects of global warming on weather?  
**Answer:** Increased frequency of extreme events like hurricanes and droughts.

**Example:** The Arctic has lost 40% of its sea ice in the last 30 years.

---

#### 11.5: Acid Rain and Its Effects

- Question:** What causes acid rain?  
**Answer:** Reaction of  $\text{SO}_2$  and  $\text{NO}_x$  with water to form sulfuric and nitric acids.
- Question:** What are the effects of acid rain on plants?  
**Answer:** Damages leaves, reduces photosynthesis, and leaches nutrients from soil.
- Question:** How does acid rain affect aquatic ecosystems?  
**Answer:** Lowers water pH, harming aquatic life.
- Question:** What is the effect of acid rain on buildings?  
**Answer:** Corrodes limestone and marble structures.

**Example:** Taj Mahal's marble is eroding due to acid rain in Agra.

---

#### 11.6: Catalytic Converters

- Question:** What is the function of a catalytic converter?  
**Answer:** Converts harmful gases ( $\text{CO}$ ,  $\text{NO}_x$ ,  $\text{HC}$ ) into harmless ones ( $\text{CO}_2$ ,  $\text{N}_2$ ,  $\text{H}_2\text{O}$ ).
- Question:** Which materials are used in catalytic converters?  
**Answer:** Platinum, palladium, and rhodium.
- Question:** How does it reduce  $\text{NO}_x$  emissions?  
**Answer:** Breaks  $\text{NO}_x$  into nitrogen gas ( $\text{N}_2$ ) and oxygen.
- Question:** Why are catalytic converters important?  
**Answer:** Reduce vehicle emissions and air pollution.

**Example:** Modern cars with catalytic converters produce up to 90% fewer harmful gases.

---

#### 11.7: Strategies to Reduce Environmental Problems

- Question:** What is renewable energy?  
**Answer:** Energy from sources like solar, wind, and hydro, which are sustainable.

2. **Question:** How does afforestation help?  
**Answer:** Plants absorb CO<sub>2</sub>, reducing greenhouse gas levels.
3. **Question:** What is carbon capture technology?  
**Answer:** Captures CO<sub>2</sub> from emissions and stores it underground.
4. **Question:** Why is public awareness important?  
**Answer:** Educated individuals adopt sustainable practices.

**Example:** Sweden recycles over 99% of household waste due to public awareness programs.

## Exera Long Questions (Topic Wise)

### 1. What is the Composition of the Atmosphere, and Why is It Important?

#### Composition of the Atmosphere

The atmosphere is made up of a mixture of gases essential for life on Earth. Its key components include:

- **Nitrogen (78%):** An inert gas, it helps maintain the balance of atmospheric pressure and is crucial for the nitrogen cycle, which supports plant life.
- **Oxygen (21%):** Vital for respiration in living organisms and combustion processes.
- **Argon (0.93%):** A noble gas that remains chemically inert.
- **Carbon Dioxide (0.04%):** A greenhouse gas essential for photosynthesis in plants and plays a key role in regulating Earth's temperature.
- **Trace Gases and Water Vapor:** Includes ozone (O<sub>3</sub>), methane (CH<sub>4</sub>), and water vapor, influencing weather patterns and climate.

#### Importance

The atmosphere protects living organisms by:

1. Shielding against harmful UV rays through the ozone layer.
2. Regulating temperature via the greenhouse effect.
3. Enabling essential biological processes like respiration and photosynthesis.

#### Example

Without CO<sub>2</sub> in the atmosphere, Earth's temperature would drop drastically, making it uninhabitable. The balance of gases ensures life thrives on the planet.

---

### 2. What Are Air Pollutants, and How Do They Impact the Environment?

#### Types of Air Pollutants

Air pollutants are harmful substances that contaminate the atmosphere. They are classified into:

1. **Primary Pollutants:** Emitted directly, such as CO (from vehicle emissions) and SO<sub>2</sub> (from burning fossil fuels).
2. **Secondary Pollutants:** Formed by chemical reactions, e.g., ozone (O<sub>3</sub>) created from NO<sub>x</sub> and hydrocarbons in sunlight.

### Impacts on the Environment

- **Human Health:** Particulate matter (PM<sub>2.5</sub>) can penetrate deep into the lungs, causing respiratory and cardiovascular issues.
- **Environmental Damage:** Acid rain, formed by SO<sub>2</sub> and NO<sub>x</sub>, damages crops, forests, and aquatic ecosystems.
- **Climate Change:** CO<sub>2</sub> and CH<sub>4</sub> contribute to global warming, affecting biodiversity and weather patterns.

### Example

Smog in cities like Beijing results from high concentrations of NO<sub>x</sub> and particulate matter, leading to visibility issues and severe health problems.

### Mitigation Strategies

Adopting cleaner technologies and enforcing air quality regulations can significantly reduce pollution levels.

---

## 3. What Are the Causes and Effects of Global Warming?

### Causes

Global warming is the rise in Earth's average temperature due to increased greenhouse gases (GHGs) in the atmosphere. Key causes include:

1. **Burning Fossil Fuels:** Releases CO<sub>2</sub>, the primary contributor to global warming.
2. **Deforestation:** Reduces carbon sequestration, increasing atmospheric CO<sub>2</sub> levels.
3. **Agriculture:** Emissions of CH<sub>4</sub> from livestock and N<sub>2</sub>O from fertilizers exacerbate the problem.

### Effects

1. **Melting Glaciers and Rising Sea Levels:** Global warming accelerates the melting of polar ice caps, causing sea levels to rise and threatening coastal habitats.
2. **Extreme Weather Events:** Increases in hurricanes, heatwaves, and droughts are directly linked to rising temperatures.
3. **Impact on Biodiversity:** Many species face extinction as their habitats become unsuitable.

### Example

The Arctic has lost 40% of its ice cover in the last 30 years, disrupting ecosystems and increasing global sea levels.

## Solutions

Switching to renewable energy, improving energy efficiency, and adopting afforestation can combat global warming.

---

### 4. What Is Acid Rain, and What Are Its Effects on Ecosystems and Infrastructure?

#### Formation

Acid rain is caused by the reaction of sulfur dioxide ( $\text{SO}_2$ ) and nitrogen oxides ( $\text{NO}_x$ ) with water, oxygen, and other chemicals in the atmosphere to form sulfuric and nitric acids. These acids fall to the ground as precipitation.

#### Effects on Ecosystems

1. **Aquatic Ecosystems:** Acid rain lowers the pH of water bodies, making them unsuitable for aquatic life.
2. **Forests:** It damages tree leaves, leaches nutrients from the soil, and reduces forest productivity.

#### Effects on Infrastructure

Acid rain corrodes buildings and monuments, especially those made of limestone and marble. The reaction of acids with these materials weakens their structure over time.

#### Example

The Taj Mahal in India has suffered discoloration and surface damage due to acid rain caused by nearby industrial emissions.

#### Prevention

Switching to low-sulfur fuels, using catalytic converters, and enforcing environmental regulations can mitigate acid rain's effects.

## MCQS

❑ What is the most abundant gas in the atmosphere?

- a) Oxygen
- b) Nitrogen ✓
- c) Carbon Dioxide
- d) Argon

❑ Which gas is responsible for the greenhouse effect?

- a) Nitrogen
- b) Carbon Dioxide ✓
- c) Oxygen
- d) Argon

❑ What is the approximate percentage of oxygen in the atmosphere?

- a) 18%
- b) 20%
- c) 21% ✓
- d) 22%

❑ Which is a primary air pollutant?

- a) Ozone
- b) Sulfur Dioxide
- c) Nitrogen Oxides
- d) Both b and c ✓

❑ What is a secondary air pollutant?

- a) Carbon Monoxide
- b) Ozone ✓
- c) Nitrogen Oxides
- d) Sulfur Dioxide

❑ What is the main cause of smog?

- a) Oxygen
- b) Vehicular Emissions ✓
- c) Water Vapor
- d) None of these

❑ Which gas is primarily responsible for acid rain?

- a) Sulfur Dioxide ✓
- b) Oxygen
- c) Nitrogen
- d) Methane

❑ What is the pH range of acid rain?

- a) 6-7
- b) 7-8

c) 4-5 ✓

d) 8-9

☐ **What does a catalytic converter reduce?**

a) Oxygen Emissions

b) Nitrogen in Air

c) **Harmful Gases like CO and NOx** ✓

d) Methane Levels

☐ **Which gas is not a greenhouse gas?**

a) Carbon Dioxide

b) Methane

c) **Oxygen** ✓

d) Nitrous Oxide

☐ **What is the key contributor to global warming?**

a) Nitrogen

b) **Carbon Dioxide** ✓

c) Sulfur Dioxide

d) Oxygen

☐ **What is the primary source of methane emissions?**

a) Forest Fires

b) **Agriculture** ✓

c) Factories

d) Burning Fuels

☐ **Which of the following is a natural air pollutant source?**

a) Vehicles

b) **Volcanic Eruptions** ✓

c) Factories

d) Agriculture

☐ **Which process absorbs CO<sub>2</sub> from the atmosphere?**

a) Respiration

b) Combustion

c) **Photosynthesis** ✓

d) Decomposition

☐ **Which human activity is the largest contributor to CO<sub>2</sub> emissions?**

a) Agriculture

b) **Burning Fossil Fuels** ✓

c) Deforestation

d) Industrial Farming

☐ **What is the main component of photochemical smog?**

a) CO<sub>2</sub>

b) **Ozone** ✓

c) Methane

d) Nitrogen

❑ Which type of energy is renewable?

- a) Coal
- b) Oil
- c) Solar ✓
- d) Natural Gas

❑ What is the main harmful effect of particulate matter?

- a) Global Warming
- b) Respiratory Diseases ✓
- c) Acid Rain
- d) Ozone Depletion

❑ What causes the melting of polar ice caps?

- a) Acid Rain
- b) Deforestation
- c) Global Warming ✓
- d) Ozone Depletion

❑ What is the role of forests in reducing CO<sub>2</sub> levels?

- a) Emit CO<sub>2</sub>
- b) Absorb CO<sub>2</sub> through Photosynthesis ✓
- c) Increase CO<sub>2</sub> Levels
- d) None of the Above

❑ Which pollutant causes the yellowing of Taj Mahal?

- a) Methane
- b) Sulfur Dioxide ✓
- c) Oxygen
- d) Carbon Monoxide

❑ What is the chemical formula of ozone?

- a) O
- b) O<sub>2</sub>
- c) O<sub>3</sub> ✓
- d) CO

❑ What is the key factor in the greenhouse effect?

- a) Air Pressure
- b) Wind Speed
- c) Trapping of Heat by Gases ✓
- d) Ocean Currents

❑ What reduces the harmful effects of acid rain?

- a) Increasing SO<sub>2</sub>
- b) Using High-Sulfur Fuels
- c) Installing Scrubbers ✓
- d) Deforestation

❑ What is the effect of acid rain on aquatic life?

- a) Increases Oxygen

b) **Lowers pH of Water** ✓

c) Adds Nutrients to Water

d) Promotes Algae Growth

❑ **What is a key benefit of catalytic converters?**

a) Reduce Fuel Consumption

b) **Reduce Air Pollution** ✓

c) Increase Speed of Vehicles

d) None of the Above

❑ **What is the major consequence of deforestation?**

a) Increase in Oxygen Levels

b) **Increase in CO<sub>2</sub> Levels** ✓

c) Decrease in Methane Levels

d) None of the Above

❑ **Which gas protects Earth from UV radiation?**

a) CO<sub>2</sub>

b) Oxygen

c) Nitrogen

d) **Ozone** ✓

❑ **What is the effect of greenhouse gases on Earth's temperature?**

a) Decrease Temperature

b) No Effect

c) **Increase Temperature** ✓

d) None of the Above

❑ **What is the pH of pure water?**

a) 5

b) 6

c) **7** ✓

d) 8