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**12. AIR POLLUTION & METHODS TO REDUCE AIR POLLUTION**

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**SOLUTIONS**

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**TEACHING TASK**

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**JEE MAINS LEVEL QUESTIONS**

1. Which of the following is not an air pollutant? **(FA & SA- 2 Marks)**  
A)  $N_2$                       B)  $N_2O$                       C) NO                      D) CO

**Answer:A**

Solution:Nitrogen gas ( $N_2$ ) makes up about 78% of the atmosphere and is not considered a pollutant.

2. Acid rain is caused by  
A) Nitric acid                      B) Sulphur dioxide  
C) Both A&B                      D) None

**Answer:C**

Solution:Acid rain is caused by sulfur dioxide ( $SO_2$ ) and nitrogen oxides ( $NO_x$ ), which form sulfuric acid and nitric acid in the atmosphere.

3. Who studies about the weather? **(FA & SA- 3Marks/4 Marks)**  
A) Cardiologist      B) Psychologist      C) Metrologist      D) None

**Answer:C**

Solution:A meteorologist studies weather and atmospheric conditions.

4. Which source of energy do not cause pollution?  
A) Petroleum      B) Sun                      C) Foresil Fuels      D) Nuclear energy

**Answer:B**

Solution:Solar energy is renewable and does not cause pollution during use.

5. The holes in ozone layer are formed by  
A) hydrocarbons                      B) bromo carbons  
C) fluro carbons                      D) Chlorofluoro carbons

**Answer:D**

Solution:CFCs release chlorine atoms that destroy ozone in the stratosphere.

6. Most dangerous metal pollutant of automobile exhausts is  
A) Lead                      B) Copper                      C) Soil                      D) All

**Answer:A**

Solution: Lead from automobile exhaust (before unleaded petrol) is a dangerous metal pollutant.

7. Which of the following pollutants are responsible for the cause of SMOG?  
**(FA & SA- 5Marks/8 Marks)**

- A) From incinerators  
C) Both A& B

- B) Emissions from vehicles  
D) None of these

**Answer:C**

Solution:Smog is caused by emissions from vehicles and industrial processes (including incinerators).

8. Which of the following is called the secondary air pollutant?  
A) PANs  
C) Carbon monoxide
- B) Ozone  
D) Nitrogen dioxide

**Answer:A,B**

Solution: Secondary air pollutants are not emitted directly, but form when primary pollutants react in the atmosphere.

Examples:

Ozone ( $O_3$ ) — forms from  $NO_x$  and VOCs in sunlight → secondary pollutant.

PANs (Peroxyacyl nitrates) — also secondary pollutants.

Carbon monoxide (CO) — primary pollutant.

Nitrogen dioxide ( $NO_2$ ) — can be primary or secondary, but often classified as primary when directly emitted.

9. Which of the following particles is called the particulate pollutant?  
A) Ozone  
B) Radon  
C) Fly ash  
D) Ethyles

**Answer:C**

Solution:Fly ash is a particulate pollutant from combustion processes.

10. Which of the following agents is responsible for turning the Taj Mahal yellow?  
A) Sulphur  
B) Chlorine  
C) Sulphur  
D) Sulphur dioxide

**Answer:D**

Solution: $SO_2$  from industrial emissions leads to acid rain and discoloration of the Taj Mahal.

### JEE ADVANCED LEVEL QUESTIONS

**Multicorrect answer type:**

11. Which of these following statements true about smog?  
A) SMOG is derived from the fog  
B) SMOG is derived from smoke  
C) SMOG is derived from water vapour  
D) All of these

**Answer:A,B**

Solution:A) SMOG is derived from the fog → Partly true — “smog” originally from “smoke + fog”.

B) SMOG is derived from smoke → True — contains smoke/particulates.

C) SMOG is derived from water vapour → False — not primarily from water vapor.

D) All of these → False, since C is false.

12. Identify the true statements in the following?

- A) Green house effect is responsible for global warming
- B) Ozone layer does not permit infrared radiation from the sun to reach on the earth
- C) Acid rain is mostly because of nitrogen and sulphur
- D) Chloro fluorocarbons are responsible for ozone layer depletion

**Answer:A,C,D**

Solution:A) Greenhouse effect is responsible for global warming → True

B) Ozone layer does not permit infrared radiation → False (it blocks ultraviolet, not infrared)

C) Acid rain is mostly because of nitrogen and sulphur → True ( $\text{NO}_x$  and  $\text{SO}_2$  form acids)

D) Chlorofluorocarbons are responsible for ozone layer depletion → True

### Statement Type

A) Both statement I and II are correct and statement II is correct explanation of statement I.

B) Both statement I and II are correct and statement II is not correct explanation of statement I.

C) Statement I is correct and statement II is incorrect.

D) Statement I is incorrect and statement II is correct.

13. **Statement I** : For green house effect, presence of green plants is essential.

**Statement II** : Chlorophyll of the green plants causes green house effect.

**Answer:D**

Solution:Statement I: For greenhouse effect, presence of green plants is essential.

The greenhouse effect is due to gases like  $\text{CO}_2$ ,  $\text{CH}_4$ , and water vapour — not because of plants.

Statement II: Chlorophyll of green plants causes greenhouse effect.

Also false — chlorophyll helps in photosynthesis, not in trapping heat

14. **Statement I** : We feel colder on mountains than on plains.

**Statement II** : Temperature decreases with altitude.

**Answer:A**

Solution:Statement I: True — temperature drops with altitude.

Statement II: True — and it explains why we feel colder on mountains.

### Comprehension Type :

The pollutants that directly cause air pollution are known as primary pollutants examples  $\text{SO}_2$ ,  $\text{CO}_2$ ,  $\text{CO}$ . The pollutants formed by intermingling and reaction of smoke and fog is a secondary pollutant.

15. The pollutants formed by reaction with other substance are
- A) primary pollutants
  - B) Secondary pollutants
  - C) Both A&B
  - D) None

**Answer:B**

Solution:Pollutants formed by reaction with other substances (e.g., smoke + fog → smog) are called secondary pollutants

16. Examples for primary pollutants

- A)  $\text{SO}_3$                       B)  $\text{H}_2\text{SO}_4$                       C)  $\text{CO}_2$                       D) All of these

**Answer:C**

Solution:

Primary pollutants are those directly released into the air — like  $\text{SO}_2$ ,  $\text{CO}_2$ , CO, NO, etc.

$\text{SO}_3 \rightarrow$  (formed secondarily from  $\text{SO}_2$  oxidation)

$\text{H}_2\text{SO}_4 \rightarrow$  (formed from  $\text{SO}_3 + \text{H}_2\text{O} \rightarrow$  secondary)

$\text{CO}_2 \rightarrow$  (directly released from combustion)

**Integer type:**

17. Number of carbon atoms in carbon monoxide is \_\_\_\_\_

**Answer:1**

Solution:Carbon monoxide has the chemical formula CO.

That means it contains 1 carbon atom.

**Matrix matching type**

18.                      Column I
1. Green house gas
  2. Acid rain
  3. Freon
  4. Temperature

- Column II
- A) Thermometer
  - B)  $\text{pH} < 7$
  - C)  $\text{CO}_2$
  - D)  $\text{CCl}_2\text{F}_2$

**Answer:1-C,2-B,3-D,4-A**

Solution:

1. Green house gas
2. Acid rain
3. Freon
4. Temperature

- C)  $\text{CO}_2$
- B)  $\text{pH} < 7$
- D)  $\text{CCl}_2\text{F}_2$
- A) Thermometer

## LEARNERS TASK

### CONCEPTUAL UNDERSTANDING QUESTIONS (CQU'S)

1. The layer that protecting the life on the earth from U.V radiation is
- A)  $\text{O}_2$  layer                      B)  $\text{NO}_2$  layer                      C)  $\text{CO}_2$  layer                      D)  $\text{O}_3$  (ozone) layer

**Answer:D**

Solution:The ozone layer in the stratosphere absorbs harmful UV radiation.

2. Most of the  $\text{CO}_2$  pollution is caused by
- A) line industry    B) motor vehicles    C) Petroleum                      D) fertilizer factory

**Answer:B**

Solution:Motor vehicles are a major source of  $\text{CO}_2$  emissions globally.

3. Ozone layer is harmful when present in
- A) Troposphere, stratosphere                      B) Troposphere, mesosphere
- C) Stratosphere, mesosphere                      D) Both B & C

**Answer:A**

Solution:Ozone is harmful in the troposphere (as a pollutant) but protective in the stratosphere.

4. The layer of air present around the earth is called  
A) Atmosphere B) Hydrosphere C) Lithosphere D) Biosphere

**Answer:A**

Solution:The layer of air surrounding the Earth is the atmosphere.

5. The gas used as refrigerant is  
A) Freon B) Fluorine C) Neon D) None

**Answer:A**

Solution:Freon (a type of CFC) was historically used as a refrigerant.

6.  $\text{SO}_2$  &  $\text{NO}_2$  are important pollutants of  
A) water B) air C) soil D) All of these

**Answer:B**

Solution: $\text{SO}_2$  and  $\text{NO}_2$  are major air pollutants.

7. Burning of fossil fuels is the main source of  
A) nitrogen B) carbon dioxide C) Nitrous oxide D) Sulphur dioxide

**Answer:B**

Solution:Burning fossil fuels is the primary source of excess  $\text{CO}_2$  in the atmosphere.

8. The Taj Mahal is being affected by  
A) Noise pollution B) Water pollution C) Air pollution D) None

**Answer:C**

Solution:The Taj Mahal is affected by air pollutants like  $\text{SO}_2$ .

9. Name the gas used in refrigerators, AC, etc which causes serious damage to ozone layer.  
A) CFCs B) LPCs C) MFCs D) DPCs

**Answer:A**

Solution:Chlorofluorocarbons (CFCs) damage the ozone layer.

10. Bhopal gas tragedy in 1984 was caused due to  
A) Air pollution B) Leakage of toxic gas  
C) Water pollution D) None

**Answer:B**

Solution:The Bhopal gas tragedy was caused by a leak of methyl isocyanate.

**JEE MAINS LEVEL QUESTIONS**

1. Which of the following cause acid rain? **(FA & SA- 2Marks)**  
A) Carbon dioxide B) Sulphur dioxide  
C) Carbon monoxide D) Nitrogen

**Answer:B**

Solution:  $\text{SO}_2$  is a major cause of acid rain, forming sulfuric acid in the atmosphere.

2. Which of these is not a pollutant unless present in excess?

- A) Sulphur dioxide                      B) Carbon dioxide  
C) Carbon monoxide                      D) Nitrogen dioxide

**Answer: B**

Solution:  $\text{CO}_2$  is a natural component of air and only becomes a pollutant in excess amounts (greenhouse effect).

3. Marble cancer is caused by

**(FA & SA- 3Marks/4 Marks)**

- A) Virus                      B) Acid rain                      C) Bacteria                      D) CFCs

**Answer: B**

Solution: Marble cancer refers to the corrosion of marble (e.g., Taj Mahal) due to acid rain.

4. Which of the following is not a source of air pollution?

- A) Wind mill                      B) Burning of fire wood  
C) Power plant                      D) Automobile exhaust

**Answer: A**

Solution: Wind mills generate electricity without emitting air pollutants.

5. Which of the following gas is considered green house gas

- A) Methane                      B) Nitrous oxide                      C) Water vapour                      D) All of these

**Answer: D**

Solution: Methane, nitrous oxide, and water vapor are all greenhouse gases.

6. What type of precautions should be taken to survive when the ozone level is high?

- A) Drive less                      B) Stay hydrated                      C) Both A & B                      D) Go for a long walk

**Answer: C**

Solution: High ozone levels (smog) require driving less to reduce exposure and staying hydrated.

7. The major photochemical smog is \_\_\_\_\_

- A) Hydrogen peroxide                      B) Chlorofluorocarbon  
C) Peroxyacetyl nitrate                      D) All of these

**Answer: C**

Solution: PANs are a major component of photochemical smog.

8. Which of the following diseases are caused by smog?

- A) Rickets                      B) Bronchitis  
C) Breathing problems                      D) All of these

**Answer: D**

Solution: Smog can cause rickets (reduced sunlight → Vitamin D deficiency), bronchitis, and breathing problems.

9. Smoke, fumes, ash, dust, nitric oxide and sulphur dioxide are the main sources of \_\_\_\_\_  
**(FA & SA- 5Marks/8Marks)**  
 A) Primary pollutant                      B) Secondary pollutant  
 C) Bio-degradable pollutants          D) None

**Answer:A**

**Solution:**Smoke, fumes, ash, dust, NO, and SO<sub>2</sub> are directly emitted as primary pollutants.

10. Increased levels of air pollution results in \_\_\_\_\_  
 A) Soil erosion  
 B) Global warming  
 C) Respiratory problems  
 D) All of these

**Answer:D**

Solution: Air pollution can cause soil erosion (via acid rain), global warming, and respiratory problems.

## JEE ADVANCED LEVEL QUESTIONS

**Multi correct answer type:**

11. Find the incorrect statement about air quality index?
- A) It indicates the colour of air
  - B) It predict ozone level in your air
  - C) It determines the intensity of sound & sound pollution
  - D) It estimates air pollution mainly sulphur content in the air

**Answer:A,C**

Solution: AQI does not indicate the colour of air or measure sound pollution. It actually measures levels of air pollutants like  $O_3$ ,  $SO_2$ ,  $NO_2$ ,  $CO$ ,  $PM_{2.5}$ ,  $PM_{10}$  etc.

Statements B and D are correct because AQI predicts ozone level and estimates air pollution (including sulphur compounds)

12. Which of the following process increase the amount of CO<sub>2</sub> in air?  
A) Decay of vegetation                      B) Breathing  
C) Photosynthesis                          D) Burning of petrol

**Answer:A,B,D**

Solution: A) Decay of vegetation → Yes — releases CO<sub>2</sub>.

B) Breathing → Yes — releases CO<sub>2</sub>.

C) Photosynthesis  $\rightarrow$  No — consumes  $\text{CO}_2$ .

D) Burning of petrol  $\rightarrow$  Yes — releases  $\text{CO}_2$ .

**Statement Type:**

13. **Statement I** : Ozone layer protects life on earth from harmful radiation
- A) Both statement I and II are correct and statement II is correct explanation of statement I.
  - B) Both statement I and II are correct and statement II is not correct explanation of statement I.
  - C) Statement I is correct and statement II is incorrect.
  - D) Statement I is incorrect and statement II is correct.

**Statement II** : CFC damages the ozone layer.

**Answer:B**

Solution:

Statement I: Correct — The stratospheric ozone layer absorbs most of the sun's harmful ultraviolet (UV) radiation.

Statement II: Correct — CFCs release chlorine atoms that catalyze ozone depletion.

Does Statement II explain Statement I: No — Statement II explains what damages the ozone layer, not how the ozone layer protects life.

**Comprehension Type:**

Green house effect is the warming absorption of solar energy by  $\text{CO}_2$  gas,  $\text{NO}_2$ , methane and water vapour present near the earth's surface and then its coming back to the earth.

14. Green house effect is nothing but \_\_\_\_\_

A) Cooling of the earth

B) Warming of the earth

C) Rain fall on earth

D) None

**Answer:B**

Solution: It is the trapping of heat by greenhouse gases, leading to warming of the earth

15. Temperature effect in global warming

A) Increases

B) Decreases

C) Remain same

D) Cannot say

**Answer:A**

Solution: Global warming means the Earth's average temperature increases

**Integer type:**

16. How many types of air pollutants are there \_\_\_\_\_.

**Answer:2**

Solution: Typically, air pollutants are classified into two main types:

Primary pollutants — emitted directly into the air (e.g.,  $\text{CO}$ ,  $\text{SO}_2$ ,  $\text{NO}_x$ ).

Secondary pollutants — formed by chemical reactions in the atmosphere (e.g.,  $\text{O}_3$ , PANs,  $\text{H}_2\text{SO}_4$ ).

**Matrix matching type :**

17

Column I
a) sulphur dioxide
b) carbon dioxide
c) carbon monoxide
d) chlorofluoro carbons

Column II
i) damage ozone layer
ii) reduces oxygen
iii) acid rain
iv) green house gas

**Answer:a-iii,b-iv,c-ii,d-i**

Solution:

a) sulphur dioxide
b) carbon dioxide
c) carbon monoxide
d) chlorofluoro carbons

iii) acid rain
iv) green house gas
ii) reduces oxygen
i) damage ozone layer



## KEY

TEACHING TASK									
JEE MAINS LEVEL QUESTIONS									
1	2	3	4	5	6	7	8	9	10
A	C	C	B	D	A	C	A,B	C	D
JEE ADVANCED LEVEL QUESTIONS									
11	12	13	14	15	16	17	18		
A,B	A,C,D	D	A	B	C	1	1-C,2-B,3-D,4-A		
LEARNERS TASK									
CONCEPTUAL UNDERSTANDING QUESTIONS (CQU'S)									
1	2	3	4	5	6	7	8	9	10
D	B	A	A	A	B	B	C	A	B
JEE MAINS LEVEL QUESTIONS									
1	2	3	4	5	6	7	8	9	10
B	B	B	A	D	C	C	D	A	D
JEE ADVANCED LEVEL QUESTIONS									
11	12	13	14	15	16	17			
A,C	A,B,D	B	B	A	2	a-iii,b-iv,c-ii,d-i			