**Subject Name: AIR POLLUTION CONTROL**

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**Year and Sem, Department: III/I CE**

**Unit-I: (Air pollution)**

**Important points / Definitions:**

* **Air pollution** is a mixture of solid particles and gases in the **air**. Car emissions, chemicals from factories, dust, pollen and mold spores may be suspended as particles. Ozone, a gas, is a major part of **air pollution** in cities. When ozone forms **air pollution.**
* **Natural air pollutants** include radon, fog and mist, ozone, ash, soot, salt spray, and volcanic and combustion gases. Radon is a radioactive gas that seeps from the ground in some areas, and fog and mist are both dense water vapor at ground level that obscures vision.
* **Power plants**, factories, cars and trucks emit **carbon dioxide**, **carbon monoxide**, hydrocarbons, **sulfur dioxide**, nitrogen dioxides and **particulate matter** that consists of fine particles suspended in the air. Burning oil, coal, gasoline and other fossil fuels is a major cause of man-made air pollution

**I.SHORT ANSWER QUESTIONS[2M]**

1. Define air pollution and briefly explain its importance of study?
2. What is Acid Rain? List the historic monuments that effected by Acid Rains
3. Write a short note on effects of air pollution on human health?
4. What are the causes of acid rain, with chemical process involved in it?
5. Discuss the remedial measures for the causes of acid rain?
6. What are the effects of acid rain on vegetation?
7. Explain the causes of ozone layer depletion in stratosphere?
8. Explain the effects of ozone layer depletion in stratosphere?
9. Write short notes on Global warming, with its impact on environment?
10. Write short notes on ozone layer depletion and effects of ozone layer depletion?
11. Briefly explain the effects of air pollution on Plants, with suitable examples?
12. Briefly explain the effects of air pollution on Animals?
13. Briefly explain the effects of air pollution on Materials?
14. Explain primary air pollutants with examples?
15. Explain secondary air pollutants with examples?

**II.LONG ANSWER QUESTIONS [5M]**

1. Discuss the different sources of air pollutants in detail?
2. Briefly explain the effects of air pollution on,

(i) Human health (ii) Plants (iii) Animals (iv) Materials

1. Write briefly the effect of air pollution on monuments in India.Discuss its causes for damage?
2. Enumerate classification air pollutants. With suitable example and possible remedies?
3. List some common indoor air pollutants, With suitable example and possible remedies?
4. List some common outdoor air pollutants, With suitable example and possible remedies?
5. Explain air pollution due to automobiles. With suitable example and possible remedies?
6. Explain briefly on air pollution episodes of London smog and Bhopal gas tragedy?
7. Explain primary and secondary air pollutants with examples?
8. Explain briefly the harmful effects of sulphur dioxide on human being and plants?
9. Describe the phenomenon of "greenhouse effect", due to carbon dioxide?
10. Discuss the following cases of air pollution episodes Bhopal Gas Tragedy?
11. Discuss the following cases of air pollution episodes Los Angeles Smog?
12. Describe the classification of Air Pollutants in detail?
13. Brief the Heat Island Compendium. With flow diagram mention its stages?
14. What are the effects of air pollution? Elaborate

**CHOOSE THE CORRECT ANSWER**

1. 1. Which of these is NOT a primary pollutant?  
   a)Carbon monoxide b)Carbon dioxide  
   c)Ground level ozone d)Oxygen  
   View Answer
2. Answer: d  
   Explanation: Ozone is not a primary pollutant since it is formed by the photo-chemical reaction of oxygen with the UV rays and not directly discharged into the atmosphere by a source.
3. What percentage of pollutants is gaseous in nature?  
   a) 75% b) 80%  
   c) 99.9% d) 90%  
   View Answer

Answer: d  
Explanation: Nearly 90% of the air pollutants are gases.

1. Which of the following is an inorganic pollutant?  
   a) Carbon monoxide b) Carbonyl compounds  
   c) Aromatic hydrocarbons d) None of the mentioned  
   View Answer

Answer: a  
Explanation: Organic pollutants are those which primarily contain hydrogen and carbon. Carbon Monoxide is inorganic since it does not contain hydrogen.

1. Which of these belongs to the category of criteria pollutants?  
   a) Ozone b) Lead  
   c) Carbon monoxide d) All of the mentioned  
   View Answer

Answer: d  
Explanation: Criteria pollutants are those pollutants which are classified and standardized because of their high potency to cause harm.

1. Which of the following are classified as major sources to air pollution?  
   a) Fuel consumption by local citizens b) Sewage treatment plants  
   c) Dry cleaning and laundries d) None of the mentioned  
   View Answer

Answer: b  
Explanation: Sewage treatment plants pose as a major contributor to air pollution because of the discharge of gases such as methane, oxides of sulphur and nitrogen.

1. Which is the most abundant hydrocarbon in the atmosphere?  
   a) Methane b) Carbonyl sulphide  
   c) Ethane d) None of the mentioned
2. What does the abbreviation VOC stand for?  
   a) Versatile Oxygenated Compounds b) Volatile Oxygenated Compounds  
   c) Volatile Organic Carbons d) Volatile Organic Compounds
3. What is the range of vapour pressure of VOCs?  
   a) High vapour pressure b) Low vapour pressure  
   c) Depends on the concentration of VOCs d) Depends on the type of VOCs

Answer: b  
Explanation: Generally, VOCs have low vapour pressure enabling them to exist in atmosphere as gases.

1. Which is the largest-volume manufactured organic chemical?  
   a) Ethylene b) Ethane  
   c) Formaldehyde d) Carbonic acid

Answer: a  
Explanation: Ethylene. It is not toxic to human beings or animals, but has adverse effects on plants when present at very small concentrations as well and hence acts as an air pollutant.

1. What does PAH stand for in terms of organic chemistry?  
   a) Polynuclear Aromatic Hydrocarbons b) Polyethylene Acetic Hydride  
   c) Polycyclic Acetic Hydrocarbons d) Polynuclear Aromatic Hydrides  
    Answer: a  
   Explanation: Polynuclear Aromatic Hydrocarbons such as Benzo-(a)-pyrene, is a type of pollutant that is released from burning cigarette
2. Narmada Bachavo Andolan is fighting against **Ans(d)**

a. Deforestation b. Water pollution

c. Air pollution d. Construction of dam

1. March 21st of every year is celebrated as **Ans(d)**

a. World health day b. Earth day

c. World population day d. World forest day

1. March 6th of every year is declared as **Ans(a)**

a. Hiroshima day b. Earth day

c. World population day d. World heritage day

1. June 5th of every year is declared as **Ans(c)**

a. Population day b. Earth day

c. Environment day d. World health day

1. April 22nd is celebrated as **Ans(a)**

a. Earth day b. Heritage day

c. Health day d. Wild life day

1. In 1950, (with 10 million population) \_ \_ \_ \_ \_ \_ \_ \_ city is considered as only mega city **Ans(d)**

a. London b. Paris

c. Egypt d. New York

1. . \_ \_ \_ \_ \_ \_ \_ \_ fever will result due to the biting of Anopheles mosquito **Ans(d)**

a. Yellow b. Dengue

c. Chicken Gunya d. Malaria

1. Diarrhea will result due to \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ pollution **Ans(a)**

a. water b. noise

c. air d. radioactive

1. Malaria fever results due to  **Ans(d)**

a. Un hygienic food b. Mosquito bite

c. Radio active pollution d. Contamination of water by lead

**Unit-II: (Effects Of Air Pollutants On Man, Material And Vegetation)**

**Important points / Definitions:**

* the main consequences of **air pollution** are **global** warming, acid rain, smog, ozone depletion etc. ... According to W.H.O. report **air pollution** causes about 2 million premature deaths worldwide per year. The Clean **Air** Act is a superb representation of the government's role in **air pollution** prevention.
* **Acid rain** is a **rain** or any other form of **precipitation** that is unusually **acidic**, meaning that it has elevated levels of hydrogen ions (low pH). ...
* **Acid rain** is caused by emissions of sulfur dioxide and nitrogen oxide, which react with the water molecules in the atmosphere to produce **acids**

**SHORT ANSWER QUESTIONS [2M]**

1. Write short notes on Meteorology and air Pollution?
2. How many parts are involved in air pollution and what are they?
3. What is Radiation? How it is related to air pollution
4. What is Conduction? How it is related to air pollution
5. What is Convection? How it is related to air pollution
6. How „Heat island‟ forms over urban areas? Give its importance and its impact
7. What is Dispersion of contaminants in air Pollution?
8. Which is the most commonly used model for the dispersion of gaseous air

pollutants and who developed it?

1. What are the principles on which the Gaussian model is based?
2. What is the importance of atmosphere?

**LONG ANSWER QUESTIONS[5M]**

1. Explain with a neat sketches, how plume behave in different atmospheric stability condition?
2. Explain with neat sketches, how different atmospheric conditions give rise to different kinds of plumes?
3. Explain the terms (i) Environmental Lapse Rate (ii) Adiabatic Lapse rate (iii) Wind Rose (iv) Inversions?
4. Define Wind rose. Explain the importance of wind rose in air pollution studies?
5. Discuss the factors to be considered for locating an industrial plant with reference to the air pollution?
6. Explain the importance of proper planning and zoning of industrial and residential areas from the point of air pollution control?
7. List the meteorological parameters that influence the dispersion of pollutants in atmosphere?
8. Write a note on Atmospheric stability and temperature inversions?
9. What is a wind rose diagram? Explain with a neat sketch?
10. Explain different environmental lapse rates and their effects on dispersion of air pollutants?
11. Sketch and explain different kinds of plumes depending upon different environmental conditions (any four)?
12. Explain characteristics of Atmosphere in terms of Air Pollution and Control?

**CHOOSE THE CORRECT ANSWER**

1. How does carbon monoxide affect the human body?  
a) It does not allow binding of oxygen with haemoglobin  
b) It reduces the surface area of the alveoli and disrupts gaseous transfers  
c) It causes the liver to malfunction, increasing bile secretion  
d) It reduces the body’s tendency to absorb water thereby making us feel dehydrated  
View Answer

Answer: a  
Explanation: Carbon monoxide has higher affinity to bind with haemoglobin and does not allow binding of oxygen.

2. What is the Haldane equation used for?  
a) To measure the amount of oxygen converted to ozone for a given wavelength of UV light  
b) To measure the ratio of affinity of carbon monoxide and oxygen to bind to a haemoglobin molecule  
c) To measure the percentage of carbon monoxide that is oxidised to carbon dioxide in various levels of oxygen  
d) To calculate the percentage of oxygen addition and carbon dioxide removal during respiratory action  
View Answer

Answer: b  
Explanation: Haldane equation is used to measure the ratio of affinity of carbon monoxide and oxygen to bind to a haemoglobin molecule.

3. How does nitrogen affect the human body?  
a) Increases vulnerability to pathogens b) Destroys the macrophages  
c) Injures the defence mechanism of the lungs d) All of the mentioned  
View Answer

Answer: d  
Explanation: Nitrogen dioxide destroys macrophages and injures lung’s defence mechanism thereby making us more vulnerable to air-borne pathogens.

4. Which of the following is the current major contributor to lead air pollution?  
a) Motor vehicles b) Metal processing centres  
c) Waste incinerators d) Lead acid battery manufacturing units  
View Answer

Answer: b  
Explanation: Metal processing, namely lead smelting is the major cause for presence of lead in air.

5. How does lead affect the human body?  
a) Increases blood pressure b) Damages the cerebellum, liver and kidney  
c) Leads to reproductive disorders and osteoporosis d) All of the mentioned

Answer: d  
Explanation: Lead has extreme effects on the human body like increase in blood pressure and damage the organs and reproductive system.

6. Which of the following belongs to class of extremely toxic dioxin compound(s)?  
a) Polychlorinated dibenzo-p-dioxins b) Polychlorinated dibenzofurans  
c) Polychlorinated biphenyls d) All of the mentioned

Answer: d  
Explanation: PCDDs, PCDFs and PCBs are all persistent organic pollutants with extremely high toxicity released as industrial by-products.

7. Which of the following compounds was earlier produced for the utility of transformers?  
a) PDD b) PCDF  
c) PCB d) TCDD

Answer: c  
Explanation: Polychlorinated biphenyls were used for transformer purposes, but now it is prohibited due to its adverse environmental impact.

8. Crocidolite, actionide and amosite belong to which of the following category of pollutants?  
a) Particulate matter b) Asbestos  
c) Dioxins d) Cigarette smoke

Answer: b  
Explanation: Crocidolite, actionide and amosite are amphiboles which is a type of asbestos.

9. Which of the following plants is extremely sensitive towards sulphur dioxide?  
a) Onion b) Potato  
c) Corn d) Tomato

Answer: d  
Explanation: Tomato is sensitive towards sulphur dioxide whereas onion, potato and corn are relatively tolerant.

10. TCDD is a human carcinogen.  
a) True b) False

Answer: a  
Explanation: TCDD – 2,3,7,8-tetrachlorodibenzo-p-dioxin, is extremely dangerous and regarded as human carcinogen.