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NET, IAS, State-SET (KSET, WBSET, MPSET, etc.), GATE, CUET, Olympiads etc. Air Pollution Types of Air Pollution, Control and Causes Are Important Topics For

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Air Pollution

Air pollution refers to the degradation of air quality as measured by biological, chemical, or physical criteria. Air pollution occurs when the concentrations of certain substances become high enough to make our atmospheric environment toxic. Air pollutants can be gaseous, liquid or solid in form, and can come from natural as well as human sources. Examples of natural sources of air pollution include forest fires, pollen, volcanic emissions, and dust. Human sources of air pollutants include emissions from industry, agriculture, forestry, transportation, power generation, and space heating.

Types Of Air Pollution

In general, two types of air pollutants have been recognized: Primary Pollutants: Primary pollutants are consist of materials (dust, gases, liquids and other solids) that enter the atmosphere through natural and human-made events. The main primary pollutants influencing our atmosphere in order of emission (by weight) are carbon monoxide, sulfur oxides, nitrogen oxides, volatile organic compounds, and particulate matter. Volatile organic compounds are organic molecules that are mainly composed of carbon and hydrogen atoms (hydrocarbons). The most common volatile organic compound release into the atmosphere is methane. Methane poses no direct danger to human health; however, It does contribute to global warming through the greenhouse effect. Other volatile organic compounds releases into the atmosphere include benzene, formaldehyde, and

chlorofluorocarbons. Of these chemicals, benzene and formaldehyde are the most dangerous to human health because they are carcinogenic. Particulate matter consists of liquid or solid particles that are small enough to remain suspended in the atmosphere for extended periods of time. Industrial activity and transportation are the major source of this type of air pollution. Particulate matter includes common irritants like smoke, pollen, and dust, which can affect the human respiratory system. In cities, particulate matter may also include particles composed of iron, copper, nickel, and lead. These particles influence the respiratory system immediately, and make breathing difficult for people with chronic respiratory disorders. Airborne lead, formed by the burning of lead gasoline, can accumulate in the tissues and bones of humans and other living organisms. At high levels lead can cause nervous system damage, convulsions, and even death. It is especially dangerous to children and the unborn.

Secondary Pollutants: Secondary pollutants are consist . of primary pollutants that have reacted with each other or with the basic components of the atmosphere to form new toxic substances. In cities, the emissions from cars and industries combine with the help of light energy from the sun to produce photochemical smog. Photochemical smog is extremely toxic to animal and plant life. and damages paint, rubber, and plastics. Finally, air pollution can also occur indoors. In buildings, about 150 different indoor pollutants have been identified. Some of the more common indoor air pollutants include smoke from cigarettes and cooking, radon, formaldehyde, and asbestos. At high concentrations, these pollutants can cause dizziness, headaches, coughing, sneezing, nausea, burning eyes, chronic fatigue like symptoms. Some indoor pollutants, like asbestos and smoke, can cause disease and premature death.

Air Pollution Control

Several different strategies have been used to reduce atmospheric pollution. Some polluters have used a number of techniques to redistribute pollutants to areas not occupied by humans or other forms of life. Smelters and power plants use tall smoke stacks to disperse pollutants at higher levels within the atmosphere. Other atmospheric polluters have relocated their particular industry to remote locations. However, it is very difficult to dilute pollution in finite atmosphere. Sooner or later residual amounts of pollution reach levels that are hazardous to some form of life. Humans have developed a number of technological solutions to atmospheric pollution. Filters have been used to stop particles from reaching the atmosphere. Some power plants use electrostatic precipitators to reduce pollution output by as much as 99% . The addition of limestone with coal in specialized burners can reduce sulfur emissions from this fossil fuel by up to 90% . Catalytic converters in cars and other forms of transportation have been used to reduce emissions of nitrogen oxides, hydrocarbons and carbon monoxide. Many automobile companies are now working on the development of hydrogen powered or electric vehicles to reduce emissions of several pollutants. One of the quickest and most common approaches car companies have used to reduce engine emissions is to increase fuel efficiency. In different countries, cars must be inspected frequently to insure emissions controls are working properly. Indoor pollution can be reduced by the modification of building codes. These modifications can be used to

control materials used in construction and to ensure proper ventilation is set up in the building. Finally, the surest way to control atmospheric pollution is to avoid the creation of the pollutants. Fuel switching; and fuel cleaning can reduce the emissions of sulfur and heavy metals from so called dirty fossil fuels like soft coal. The movement to conserving our fossil fuel energy resources, which began in the 1970s, has been very effective in reducing emissions per person. In conclusion, the following general recommendations for developing a cleaner atmosphere should be adopted by all nations:

Preventing pollution emission rather than controlling it. Improve the energy efficiencies.

Use cleaner fuels.

- The nonpolluting energy sources like solar energy, wind power and hydropower.
- Encourage mass transit and less polluting forms of transportation (e. g. , switch from air travel to rail travel) .
- Slow population growth.
- Include environmental costs in the pricing of energy resources and other activities that produce atmospheric pollution.