Photo chemical smog :

Photo chemical smog is a type of air pollution formed when sunlight interacts with nitrogen oxides (NOx) and volatile organic compounds (VOCs) in the atmosphere.
It is often called “Los Angeles Smog” because of its first serious observation in California during the 20th century. Unlike classical smog(London smog),which is sulfur-based, photo chemical smog is oxidizing in nature and dominated by ozone (O_3).

2. Formation of Photochemical Smog

- Sunlight triggers a series of photochemical reactions.
- NO_2 absorbs sunlight and splits into NO and a free oxygen atom(O). The oxygen atom reacts with O_2 to form ozone (O_3).
- VOCs and peroxy acetyl nitrates(PANs) stabilize ozone and form secondary pollutants.
- Result: a toxic brownish haze with high concentrations of ozone and other oxidants.

3. Major Components of Photochemical Smog

- Primary Pollutants: NOx (fromvehicles, powerplants), VOCs(from fuels,solvents, paints).
- SecondaryPollutants:
  - Ozone(O_3): Keyoxidizing agent,harmful at ground level.
  - Peroxy acetyl Nitrates(PANs):Cause eye irritation and plant damage.
  - Aldehydes: Cause respiratory problems.

4. Effects on Public Health

- Eye irritation, headaches, and throat discomfort.
- Aggravation of asthma and chronic respiratory diseases.
- Reduced lung capacity and damage to lung tissues.
- Long-term exposure may increase risk of cardiovascular and pulmonary disorders.

5. Effects on the Environment

- Ozone damages crop yield sand reduces photosynthesis.
- PANs harm forests and sensitive plant species.
- Smog reduces visibility, affecting transport and daily life.
- Accelerates degradation of rubber, plastics, and building materials.

6. Control Measures

- Reducing vehiculare missions through catalyt converters.
- Promoting public transport and non-motorized mobility.

- Adoption of cleaner fuels (CNG,electricity,hydrogen).
- Regulation of industrial emissions of NOx and VOCs.
- Urban planning for reduced traffic congestion.

7. Conclusion

Photo chemical smog is a modern air pollution problem that directly results from rapid Urbanization and industrialization.It sharmful impacts on public health,agriculture,and the urban environment demand immediate mitigation strategies.

Acombination of regulatory control,technological solutions,and public awareness is essential to reduce smog formation and ensure healthier living conditions