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## Mains Practice Questions

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**Q.** What do you understand by the phenomenon of the inversion of temperature? Examine how does it impact the atmosphere and the weather.(150 words)

28 Sep, 2020 GS Paper 1 Geography

### **Approach**

- In the introduction, define the term temperature inversion.
- Explain the favourable conditions that lead to temperature inversion.
- Discuss the impact of temperature inversion on the atmosphere and the weather.
- Conclude by summarising your answer.

### **Introduction**

- Temperature inversion is a reversal of the normal behavior of temperature in the troposphere. Under this meteorological phenomenon a layer of warm air lies over the cold air layer.
- It is caused in static atmospheric conditions while some times, it occurs due to horizontal or vertical movement of air.
- Temperature inversion is usually of short duration but quite common nonetheless

### **Body**

#### **Favourable conditions for temperature inversion**

- **Long winter nights:** Loss of heat by terrestrial radiation from the ground surface during night may exceed the amount of incoming solar radiation.
- **Cloudless and clear sky:** Loss of heat through terrestrial radiation proceeds more rapidly without any obstruction.
- **Dry air near the ground surface:** It limits the absorption of the radiated heat from the Earth's surface.
- **Slow movement of air:** It results in no transfer or mixing of heat in the lower layers of the atmosphere.
- **Snow covered ground surface:** It results in maximum loss of heat through reflection of incoming solar radiation.

#### **Effects on atmosphere and weather**

- Temperature inversion determines the precipitation, forms of clouds, and also causes frost due to condensation of warm air due to its cooling.
- **Dust particles hanging in the air:** Due to inversion of temperature, air pollutants such as dust particles and smoke do not disperse on the surface.
- **Stops the movement of air:** It causes the stability of the atmosphere that stops the downward and upward movement of air.
- **Less rainfall:** Convection clouds can not move high upwards so there is less rainfall and no showers. So, it causes a problem for agricultural productivity.
- **Lower visibility:** Fog is formed due to the situation of warm air above and cold air below, and hence visibility is reduced which causes disturbance in transportation.

- **Thunderstorms and tornadoes:** Intense thunderstorms and tornadoes are also associated with inversion of temperature because of the intense energy that is released after an inversion blocks an area's normal convection patterns.
- Diurnal variations in temperature tend to be very small.

### **Conclusion**

To conclude, temperature inversion might be a desirable phenomena when it comes to cooler air temperatures, and comfort after an extremely hot and oppressive day, the after-effects on air quality are certainly not desirable.