



Mains Practice Question

Q. Discuss the processes through which the earth-atmosphere system maintains heat balance. (150 words)

14 Oct, 2019 GS Paper 1 Geography

Approach

- Explain the concept of heat budget in the introduction.
- Explain different processes which help maintain heat balance of earth.

Introduction

- The sun is the ultimate energy source for the entire universe. Though the sun is continuously radiating energy, the earth as a whole does not accumulate or lose heat. It maintains its temperature. This is popularly known as heat budget or heat balance of the earth.
- This can happen only if the amount of heat received in the form of insolation is equal to the amount lost by the earth in the form of terrestrial radiation.

Body

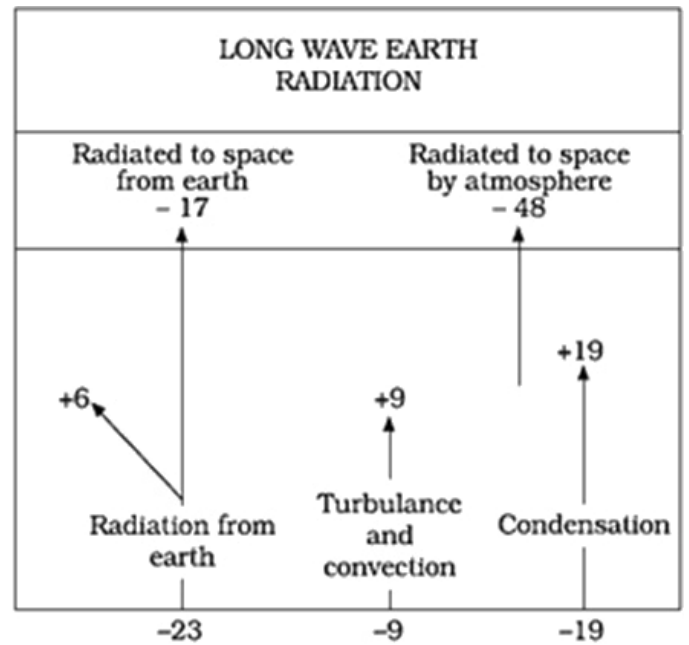
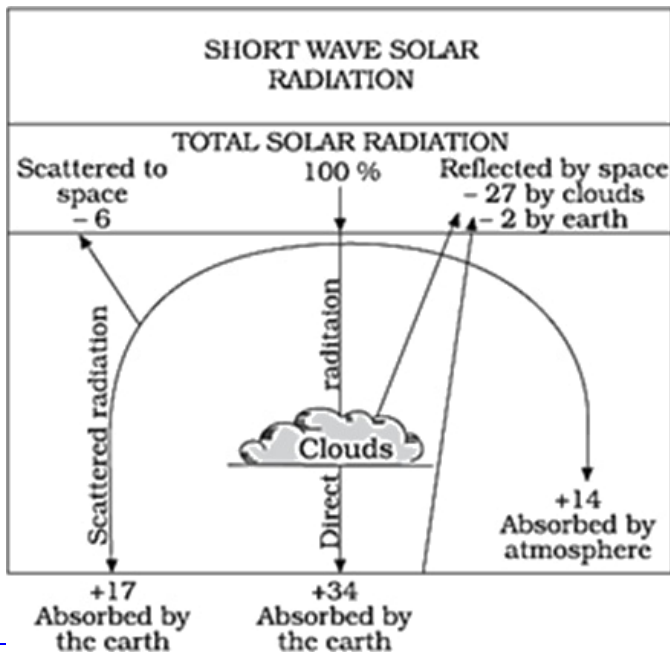
Processes

The energy of the sun reaches earth through radiation and circulates through various processes such as conduction, convection, advection, and terrestrial radiation.

The different ways of heating and cooling of the atmosphere are mentioned below:

- **Terrestrial Radiation:** The earth's surface after being heated up by the insolation, starts to radiate energy to the atmosphere in the form of **long waves**. The long-wave radiation is absorbed by the atmospheric gases particularly by carbon dioxide and other greenhouse gases. Thus, the atmosphere is indirectly heated by the terrestrial radiation.
- **Conduction:** It is the transfer of heat at the zone of contact between earth's surface and atmosphere.
- **Convection:** It is the vertical movement of air which expands and rises after being heated by radiation or conduction at lower layers of atmosphere.
- **Advection:** It is the transfer of heat through horizontal movement of air (wind).

Heat Budget of earth



Conclusion

- This is how earth neither warms or cools down despite the huge transfer of heat and maintains its heat balance.