

Global Thermodynamics and Heat

Thermodynamics · Answer Key · 18 Questions

1. Which layer of the Earth's atmosphere is primarily heated by the absorption of ultraviolet radiation from the Sun?

- A) Troposphere
- B) Stratosphere**
- C) Mesosphere
- D) Thermosphere

2. In which region of the world does the greenhouse effect primarily regulate global surface temperatures?

- A) The North Pole
- B) The Earth's atmosphere**
- C) The deep ocean
- D) The mantle

3. Geothermal energy, which is used to generate electricity in countries like Iceland, is derived from what internal thermodynamic source?

- A) Solar radiation
- B) Earth's internal heat**
- C) Wind currents
- D) Tidal movement

4. What is the primary thermodynamic process that causes land to warm up faster than water during the day in coastal regions?

- A) Specific heat capacity**
- B) Convection currents
- C) Latent heat fusion
- D) Thermal expansion

5. The process of thermal expansion is responsible for the increase in sea levels as ocean temperatures rise. This is a property of which state of matter?

- A) Liquid water**
- B) Solid ice
- C) Water vapor
- D) Frozen methane

6. Which natural phenomenon is a direct result of the thermodynamic transfer of heat from the Earth's surface to the air, causing it to rise?

- A) Glacier formation
- B) Ocean currents
- C) Convection in the atmosphere**
- D) Sublimation

7. What happens to the density of air in the Sahara Desert when it is heated by intense solar radiation?

- A) It increases
- B) It decreases**
- C) It remains constant
- D) It solidifies

8. The movement of heat via ocean currents, such as the Gulf Stream, is primarily an example of which thermodynamic process?

- A) Conduction
- B) Convection**
- C) Radiation
- D) Insulation

9. At the South Pole, what thermodynamic state is water primarily found in due to the extremely low ambient temperatures?

- A) Liquid
- B) Gas
- C) Solid**
- D) Plasma

10. The Earth's core remains hot primarily due to radioactive decay, which releases energy in the form of what?

- A) Light
- B) Sound
- C) Heat**
- D) Electricity

11. In meteorology, what happens to the temperature of air as it moves from lower altitudes to higher altitudes in the troposphere?

- A) It increases
- B) It decreases**
- C) It stays the same
- D) It becomes superheated

12. Which form of heat transfer is responsible for the Earth receiving energy from the Sun across the vacuum of space?

- A) Conduction
- B) Convection
- C) Radiation**
- D) Absorption

13. What thermodynamic term describes the energy required to change water from a liquid to a gas at a constant temperature?

- A) Latent heat**
- B) Specific heat
- C) Thermal equilibrium
- D) Absolute zero

14. Thermal equilibrium between the atmosphere and the surface is prevented by which factor that creates regional temperature differences?

- A) The Earth's rotation
- B) The Earth's shape
- C) The Earth's atmosphere composition
- D) All of the above**

15. Which material, common in the Earth's crust, has a lower specific heat capacity than water, causing it to heat up faster in the sun?

- A) Granite**
- B) Ice
- C) Snow
- D) Ocean water

16. In thermodynamics, what is the 'absolute zero' temperature point in Celsius?

- A) 0 degrees
- B) 100 degrees
- C) -273.15 degrees**
- D) -32 degrees

17. Which thermodynamic process is responsible for the formation of clouds when moist air rises and cools?

- A) Condensation**
- B) Sublimation
- C) Evaporation
- D) Radiation

18. In a mountain range, the difference in temperature between the base and the peak is an example of what thermodynamic change?

- A) Adiabatic cooling**
- B) Thermal runaway
- C) Chemical equilibrium
- D) Photosynthesis