

Climatology Fundamentals

Climatology · Answer Key · 15 Questions

1. Which atmospheric layer contains the vast majority of the Earth's weather systems and water vapour?

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

2. What is the primary driver of the thermohaline circulation in the world's oceans?

- A) Lunar gravitational pull
- B) Differences in density caused by temperature and salinity**
- C) Surface wind friction
- D) Volcanic geothermal heating

3. The Coriolis effect, which deflects moving air to the right in the Northern Hemisphere, is caused by what?

- A) The Earth's rotation on its axis**
- B) Variations in solar radiation intensity
- C) The shape of mountain ranges
- D) Differences in atmospheric pressure

4. Which greenhouse gas is released naturally through biological processes in wetlands and ruminant digestion, as well as anthropogenic activities?

- A) Nitrous oxide
- B) Chlorofluorocarbons
- C) Methane**
- D) Sulfur hexafluoride

5. What phenomenon describes the periodic warming of central and eastern tropical Pacific waters that alters global weather patterns?

- A) La Niña
- B) The Arctic Oscillation
- C) El Niño**
- D) The Indian Ocean Dipole

6. What is the significance of the 'albedo' effect in climate science?

- A) The rate of carbon sequestration by forests
- B) The reflection of solar radiation by surfaces**
- C) The concentration of ozone in the stratosphere
- D) The trapping of longwave radiation by clouds

7. Which latitude range is characterized by the 'Horse Latitudes,' where high-pressure systems typically result in calm winds and arid conditions?

- A) Equatorial belt
- B) 30 to 35 degrees north and south**
- C) Polar circles
- D) Mid-latitudes of the Southern Ocean

8. What is the primary chemical process by which the ocean absorbs atmospheric carbon dioxide?

- A) Photosynthesis by phytoplankton
- B) Formation of carbonic acid**
- C) Subduction of tectonic plates
- D) Evaporation of surface water

9. Which orbital cycle, identified by Milutin Milankovitch, describes the variation in the shape of Earth's orbit around the Sun?

- A) Precession
- B) Obliquity
- C) Eccentricity**
- D) Axial tilt

10. What do the 'Hadley Cells' represent in global atmospheric circulation?

- A) High-pressure zones at the poles
- B) Large-scale convection currents in the tropics**
- C) Jet streams at the tropopause
- D) Deep-sea current patterns

11. Which gas, while a greenhouse gas, is most abundant in Earth's atmosphere by volume?

- A) Carbon dioxide
- B) Water vapour**
- C) Methane
- D) Nitrous oxide

12. What is the standard time period used by the World Meteorological Organization to define a climate normal?

- A) 10 years
- B) 30 years**
- C) 50 years
- D) 100 years

13. Which feature of the stratospheric ozone layer is most critical for life on Earth?

- A) It traps heat to maintain surface temperatures
- B) It absorbs the majority of ultraviolet-B radiation**
- C) It prevents the escape of oxygen into space
- D) It regulates the speed of trade winds

14. What type of feedback loop occurs when melting sea ice reduces surface reflectivity, leading to further warming and more melting?

- A) Negative feedback
- B) Stabilizing feedback
- C) Positive feedback**
- D) Linear feedback

15. The Intertropical Convergence Zone (ITCZ) is a region where:

- A) Trade winds from both hemispheres meet**
- B) Polar easterlies converge
- C) Westerlies dominate the weather
- D) High-pressure systems permanently reside