

Advanced Climatology Assessment

Climatology · Practice Test · 12 Questions

1. Which atmospheric layer contains approximately 80% of the total mass of the Earth's atmosphere and is the primary site of weather phenomena?

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

2. What is the primary driver of the thermohaline circulation, often referred to as the 'Global Ocean Conveyor Belt'?

- A) Tidal forces from the Moon
- B) Differences in density caused by temperature and salinity
- C) Prevailing trade winds
- D) The Coriolis effect on surface currents

3. During a negative phase of the Arctic Oscillation, what is the most likely outcome for Northern Europe and the Eastern United States?

- A) Unusually mild and wet winters
- B) Increased hurricane activity
- C) Increased frequency of cold air outbreaks
- D) Stabilization of the polar vortex

4. Which feedback mechanism occurs when warming leads to a decrease in surface albedo, thereby accelerating further warming?

- A) Water vapor feedback
- B) Ice-albedo feedback
- C) Cloud-radiative feedback
- D) Lapse rate feedback

5. The 'Keeling Curve' is a graph that plots the ongoing change in the concentration of which gas in the Earth's atmosphere?

- A) Methane
- B) Nitrous oxide
- C) Carbon dioxide
- D) Chlorofluorocarbons

6. What is the definition of a 'proxy' in the context of paleoclimatology?

- A) A computer simulation of past climates
- B) A physical, chemical, or biological imprint of past climate
- C) A direct instrumental measurement taken before 1850
- D) A statistical correlation between solar cycles and rainfall

7. Which phenomenon is defined by the reversal of the Walker Circulation across the equatorial Pacific Ocean?

- A) La Niña
- B) The Pacific Decadal Oscillation
- C) El Niño
- D) The Indian Ocean Dipole

8. What is the primary cause of the 'stratospheric cooling' trend observed while the troposphere is warming?

- A) Depletion of stratospheric ozone
- B) Increased greenhouse gas concentrations trapping heat in the troposphere
- C) Changes in solar irradiance
- D) Increased volcanic aerosol loading

9. Which of the following is considered a 'short-lived climate forcer' that has a significant warming effect but remains in the atmosphere for only days to weeks?

- A) Carbon dioxide
- B) Nitrous oxide
- C) Black carbon
- D) Sulfur hexafluoride

10. The 'Köppen climate classification system' primarily categorizes different climate types based on which two variables?

- A) Latitude and longitude
- B) Annual and monthly averages of temperature and precipitation
- C) Wind speed and atmospheric pressure
- D) Soil moisture and vegetation type

11. What is the function of the 'Coriolis effect' in global wind patterns?

- A) It generates the heat required to create thermal convection
- B) It causes moving air to deflect to the right in the Northern Hemisphere
- C) It creates the high-pressure systems found at the equator
- D) It reduces the speed of jet streams

12. In the study of climate, what does the term 'radiative forcing' measure?

- A) The rate of ozone depletion in the upper atmosphere
- B) The difference between incoming solar radiation and outgoing infrared radiation
- C) The speed at which glaciers melt in polar regions
- D) The percentage of solar energy reflected by cloud cover