Principles of Climatology

Climatology · Answer Key · 8 Questions

1. In the Köppen climate classification system, which primary climate group is designated by the capital letter 'B'?

A) Dry (arid and semi-arid) climates

B) Tropical rainy climates

C) Moist mid-latitude climates with mild winters

D) Polar climates

2. Which Milankovitch cycle describes the variation in the shape of Earth's orbit around the Sun over a period of roughly 100,000 years?

A) Axial tilt (Obliquity)

B) Precession

C) Eccentricity

D) Nutation

3. During a classic El Niño event, what primary ocean-atmosphere change occurs across the tropical Pacific Ocean?

A) Stronger trade winds and colder sea surface temperatures in the east

B) Weakened trade winds and warmer sea surface temperatures in the central and eastern Pacific

C) Increased cold-water upwelling along the South American coast

D) A significant drop in global mean sea level

4. Which global atmospheric circulation cell operates between the equator and approximately 30 degrees North and South latitude?

A) Ferrel cell

B) Polar cell

C) Hadley cell

D) Walker cell

5. Carbon dioxide and other greenhouse gases in Earth's atmosphere primarily absorb and re-emit which spectrum of radiation?

A) Ultraviolet radiation

B) Infrared radiation

C) Visible light

D) X-ray radiation

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6. In paleoclimatology, what ratio preserved in ice cores serves as a key proxy for past global atmospheric temperature?

A) Oxygen-18 to Oxygen-16 ratio
B) Carbon-14 to Carbon-12 ratio
C) Nitrogen-15 to Nitrogen-14 ratio
D) Argon-40 to Argon-36 ratio

7. Which of the following Earth surface types has the highest average solar albedo?

A) Open ocean water
B) Fresh snow cover
C) Dense tropical rain forest
D) Bare desert sand

8. Why do oceans heat up and cool down much slower than land masses of comparable size?

A) Ocean water has a lower heat capacity than soil and rock
B) Water has a high specific heat capacity and undergoes fluid mixing
C) Land surfaces reflect far more incoming solar radiation than oceans
D) Oceans receive less total annual solar energy than land masses

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