

Advanced Earth Science

Earth Science · Practice Test · 12 Questions

1. Which metamorphic facies is characteristically defined by the presence of glaucophane under high-pressure and low-temperature conditions?

- A) Greenschist facies
- B) Blueschist facies
- C) Eclogite facies
- D) Granulite facies

2. What primary seismic wave behavior occurs at the Gutenberg discontinuity located at a depth of approximately 2,900 kilometers?

- A) P-waves double in velocity
- B) S-waves completely stop propagating
- C) P-waves reflect without refraction
- D) S-waves accelerate significantly

3. In Bowen's reaction series, which silicate mineral crystallizes first from a cooling basaltic magma along the discontinuous branch?

- A) Pyroxene
- B) Biotite
- C) Amphibole
- D) Olivine

4. In rubidium-strontium (Rb-Sr) geochronology, which isotope ratio is plotted on the x-axis of an isochron diagram?

- A) $^{87}\text{Sr}/^{86}\text{Sr}$
- B) $^{87}\text{Rb}/^{86}\text{Sr}$
- C) $^{87}\text{Rb}/^{87}\text{Sr}$
- D) $^{86}\text{Sr}/^{87}\text{Rb}$

5. What is the approximate orbital period length of Earth's axial tilt (obliquity) variation in Milankovitch cycles?

- A) 21,000 years
- B) 41,000 years
- C) 100,000 years
- D) 400,000 years

6. A pronounced negative europium anomaly in rare-earth element (REE) rock profiles is primarily caused by the removal of which mineral during fractional crystallization?

- A) Quartz
- B) Plagioclase feldspar
- C) Garnet
- D) Zircon

7. What is the name of the current geomagnetic polarity chron that began approximately 780,000 years ago?

- A) Matuyama
- B) Gauss
- C) Brunhes
- D) Gilbert

8. Which atmospheric boundary layer contains the coldest naturally occurring temperatures on Earth, dropping to roughly -90°C?

- A) Tropopause
- B) Stratopause
- C) Mesopause
- D) Thermopause

9. Where is the majority of Antarctic Bottom Water (AABW), the densest water mass in the ocean, primarily produced?

- A) Weddell and Ross Seas
- B) Drake Passage
- C) Subantarctic Front
- D) Agulhas Basin

10. The Afar Triple Junction in East Africa is classified as which specific type of tectonic triple junction?

- A) Ridge-Ridge-Ridge (R-R-R)
- B) Trench-Trench-Trench (T-T-T)
- C) Transform-Transform-Transform (F-F-F)
- D) Ridge-Trench-Transform (R-T-F)

11. In a classical Bouma sequence representing a turbidite sediment layer, which division lies at the very base (Division A)?

- A) Laminated siltstone
- B) Massive to graded sandstone
- C) Parallel-laminated sandstone
- D) Pelagic mudstone

12. On a glaciated roche moutonnée feature, how are the stoss (upstream) and lee (downstream) sides distinctively formed?

- A) Stoss side is steep and plucked; lee side is smooth and abraded
- B) Stoss side is smooth and abraded; lee side is steep and plucked
- C) Both sides are steep and plucked
- D) Both sides are smooth and abraded