

GEOLOGY 12
CHAPTER 9 WS #2
PLATE TECTONICS

KEY

- Supporting evidence for continental drift includes all of the following EXCEPT:
A. matching of continental edges
B. the existence of transform faults
C. finding cold-climate fossils in equatorial regions
D. polar-wander curves
- The average thickness of the oceanic crust is _____ kilometers.
A. 5 B. 50 C. 500 D. 5,000
- The weak or plastic zone just below the brittle plates is the
A. asthenosphere B. lithosphere C. crust D. mantle
- Magnetic minerals in a magma
A. tend to align themselves parallel to the earth's magnetic field
B. all have the same Curie temperature
C. cause magma to flow toward the magnetic poles
D. all of these choices
- The magnetic stripes of the sea floor
A. record the recent reversal history of the earth's magnetic field
B. show a symmetric pattern on either side of a spreading ridge
C. are created as magma crystallizes at ridges
D. all of these choices
- The oldest rocks recovered from the sea floor are about _____ years old.
A. 200 B. 200,000 C. 200 million D. 2 billion
- All of the following are characteristic of convergent plate boundaries EXCEPT
A. subduction zones B. earthquakes C. transform faults D. island arcs
- The oldest rocks on the continents are much older than the oldest rocks on the sea floor. Why?
A. The seafloor rocks are too warm to preserve old ages.
B. Sea floor rocks are buried by younger sediments.
C. Oceanic lithosphere is readily subducted and destroyed; continental lithosphere is not.
D. All of these choices.
- The rate and direction of plate movements can be determined using
A. ages of sea floor rocks at various distances from a spreading ridge
B. polar-wander curves
C. tracking the volcanic "footprints" of hot spots
D. all of these choices.

10. A hot spot is
 - A. an isolated area of active volcanism away from a plate boundary
 - B. an area of intensive earthquake activity
 - C. an area in which subduction is causing partial melting
 - D. a zone of continent-continent collision

11. A typical rate of plate motion would be
 - A. 1-2 millimeters per year
 - B. 1-2 centimeters per year
 - C. 1 –2 meters per year
 - D. 1-2 kilometers per year

12. A possible driving force for plate tectonics is
 - A. magnetic reversals
 - B. convection in the asthenosphere
 - C. convection in the lithosphere
 - D. polar wandering

13. Studies of past plate motions indicate that
 - A. any two adjacent plates must move in the same direction, to avoid plates breaking up
 - B. once they begin to move, plates always continue to move in the same direction
 - C. plate movements have occurred for hundreds of millions, probably billions, of years
 - D. all of these choices

14. The rocks of the continents are recycled into the mantle by
 - A. continent-continent collision
 - B. weathering and subduction of sediments
 - C. metamorphism in the lithosphere
 - D. sea floor subduction

15. Lithospheric plate motion may be driven by
 - A. convection cells within the asthenosphere
 - B. the weight of subsiding portions of the lithosphere
 - C. convection cells within the lithosphere
 - D. none of these choices

16. The orientation of the Hawaiian Island group
 - A. shows the direction of movement of the Pacific Plate
 - B. is a function of a rift zone
 - C. is defined by the edge of the Pacific Plate
 - D. has no significance

17. Two centimeters of continental drift per year for 100 million years
 - A. would amount to 2,000 kilometers
 - B. would amount to 4,000 kilometers
 - C. is highly unlikely to have occurred in the geologic past
 - D. would be an insufficient amount of plate movement to allow reconstruction of Pangaea.

18. Which of the following are associated with subduction zones?
 - A. earthquakes
 - B. volcanoes
 - C. island arcs
 - D. all of these choices

19. The San Andreas Fault is an example of a
 - A. subduction fault
 - B. rotating fault
 - C. divergent margin
 - D. transform fault

20. The Curie temperature of a magnetic mineral is
- A. above the melting point of that mineral
 - B. the same as the melting point of that mineral
 - C. the temperature above which magnetic properties are lost
 - D. the same for all magnetic minerals
21. Magma escaping from a rift under the ocean eventually cools and forms basaltic rock which is
- A. reversely magnetized
 - B. normally magnetized
 - C. magnetized in the prevailing direction of the earth's magnetic field
 - D. magnetized 90 degrees from the prevailing direction of the earth's magnetic field
22. Compared to basalts farther away from a mid-ocean ridge, those basalts collected closest to a ridge are
- A. younger
 - B. more radioactive
 - C. older
 - D. more fine-grained
23. The asthenosphere behaves
- A. rigidly
 - B. plastically
 - C. fluidically
 - D. as a liquid
24. The average depth of the asthenosphere is about
- A. 50 kilometers
 - B. 5 kilometers
 - C. 5,000 kilometers
 - D. 500 kilometers
25. The layer above the asthenosphere is the
- A. upper mantle
 - B. stratosphere
 - C. lithosphere
 - D. ionosphere
26. Climatic evidence for continental drift
- A. includes the fact that ancient climates appear to have been very different from the current climate of the same region
 - B. is, in part, based on the types of sedimentary rocks that formed in the past
 - C. considers types of plant fossils found in sedimentary rocks
 - D. all of these choices
27. Support for the theory of continental drift includes
- A. direct evidence of land bridges between continents
 - B. distributions of similar fossils on adjacent continents
 - C. different rock strata on adjacent continents
 - D. none of these choices
28. Continental drift
- A. was a readily accepted concept
 - B. is not viable today because of the lack of evidence
 - C. is now supported by the broader theory of plate tectonics
 - D. was first proposed in the eighteenth century

29. Polar-wander curves indicate
- A. the apparent movement of the magnetic poles relative to a continent
 - B. the actual movement of the magnetic poles through time
 - C. the predicted movement of the magnetic poles in future years
 - D. none of these choices
30. When two continents collide
- A. one is subducted beneath the other
 - B. neither is completely subducted, but both are thickened and extensively deformed
 - C. earthquakes are rare occurrences
 - D. due to resistance of the continental mass, directions of plate movements are reversed
31. A mid-ocean spreading ridge is associated with
- A. a divergent plate margin
 - B. a convergent plate margin
 - C. a transform boundary
 - D. intraplate mantle hot spots
32. The term "lithosphere"
- A. refers to a rigid outer layer of the earth that includes the crust and upper mantle
 - B. is of constant thickness throughout the world
 - C. is a thick outer layer of the earth, generally 500 km thick
 - D. underlies the rigid asthenosphere
33. Evidence for sea floor spreading includes
- A. the age distribution of sea floor rocks
 - B. magnetic stripes on the ocean floor
 - C. magnetic stripes on the ocean floor and the age distribution of sea floor rocks
 - D. none of these choices
34. Rates of spreading at sea floor ridges are usually in the range of
- A. a few meters per year
 - B. a centimeter per million years
 - C. a few centimeters a year
 - D. a centimeter per thousand years
35. All of the following are characteristic of divergent boundaries EXCEPT:
- A. transform faults
 - B. rifting
 - C. volcanic activity
 - D. island arcs
36. The Red Sea
- A. formed from continental rifting.
 - B. is a shallow sea that is slowly disappearing due to convergence.
 - C. was formed following the Pleistocene due to a dam made of ice-deposited sediment.
 - D. is an intraplate sea.

37. The name given to the large landmass that comprised the continents of the southern hemisphere after the breakup of the original supercontinent is
- A. Pangaea
 - B. Laurasia
 - C. Gondwanaland
 - D. Micronesia
38. Iceland is an example of a(n)
- A. above sea-level expression of a divergent boundary.
 - B. stalled convergent boundary.
 - C. intraplate hot spot.
 - D. extinct volcano.
39. The best possible explanation for the driving force for plate movement is
- A. convection in the asthenosphere.
 - B. convection deep in the mantle.
 - C. the downward pull of gravity on down-going slabs of lithosphere in subduction zones.
 - D. a combination of all of the above.
40. Professor Hess of Princeton University suggested the possibility of sea-floor-spreading. Which of the following describes his proposal?
- A. The sea floor had split and spread away from its ridges.
 - B. The ocean floor had spread toward continents but the continents remained stationary.
 - C. Continents, not ocean floor, had pulled apart.
 - D. None of the above
41. Mountain ranges are produced from
- A. divergent plate boundaries.
 - B. convergent plate boundaries.
 - C. parallel plate movement.
 - D. Intraplate fault zones.
42. Some of the world's mountain belts, such as the Rockies, are not along active earthquake belts. This observation seems to contradict the idea that plate collisions can create mountains. A likely explanation of this observation is that these mountains
- A. are thick deposits of basalt.
 - B. were formed by layers of sediment.
 - C. are the sites of ancient collision boundaries.
 - D. are points where new plate boundaries

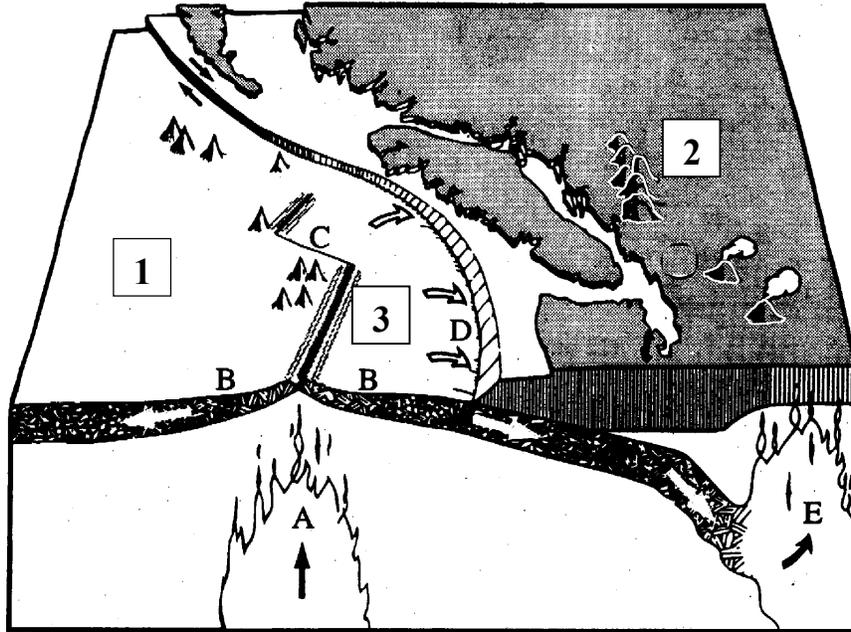
WRITTEN RESPONSE

1. Explain why extremely ancient sea floor rocks are absent from ocean plates.

**THEY HAVE BEEN DESTROYED OR RECYCLE DUE TO PLATE MOVEMENTS.
(THE ROCK CYCLE)**

2. The diagram below shows the plate tectonic situation around the coast of British Columbia. Explain the labeled **geological processes** and **features** which are shown in this diagram.

**Simplified cross section of
South Western British Columbia**



- Location B: **geological processes = DIVERGING BOUNDARY OR PLATES**
features = SPREADING RIDGE / RIFT VALLEY
- Location C: **geological processes = DIVERGING BOUNDARY OR PLATES**
features = TRANSFORM FAULT / SLIDING BOUNDARY
- Location D: **geological processes = SUBDUCTION BOUNDARY / CONVERGING PLATES**
features = TRENCH
- Location E: **geological processes = MELTING OF SUBDUCTING PLATE / VOLCANISM**
features = VOLCANOES AND EARTHQUAKES

Identify the tectonic plates by name.

- Plate 1 **THE PACIFIC PLATE**
- Plate 2 **THE NORTH AMERICAN PLATE**
- Plate 3 **THE JUAN DE FUCA PLATE**