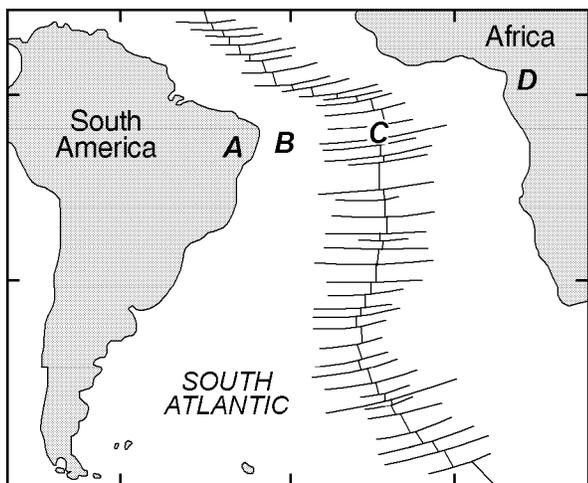


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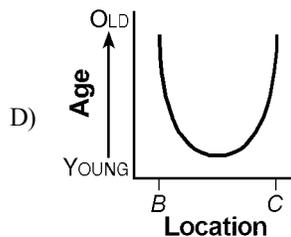
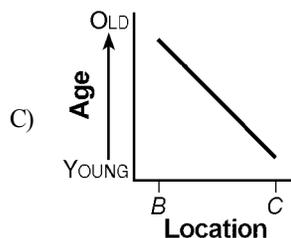
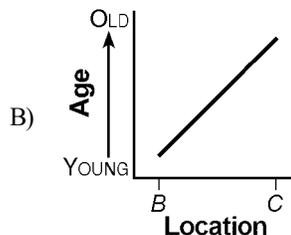
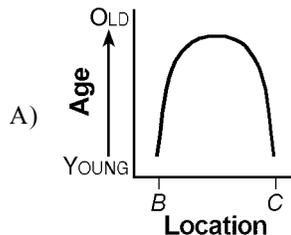
- 1) The primary cause of convection currents in the Earth's mantle is believed to be the
 - A) rotation of the Earth
 - B) subsidence of the crust
 - C) occurrence of earthquakes
 - D) differences in densities of earth materials
- 2) Igneous rock along oceanic ridges is younger than the igneous rock farther from the ridges. This evidence supports the theory that
 - A) the ocean floor is stable
 - B) volcanoes once existed on both sides of the oceanic ridges
 - C) the ocean floor is spreading
 - D) oceanic ridges are areas of subsidence

Questions 3 through 5 refer to the following:

The map below shows the continents of Africa and South America, the ocean between them, and the ocean ridge and transform faults. Locations *A* and *D* are on the continents. Locations *B* and *C* are on the ocean floor.



- 3) Which graph *best* shows the relative age of the ocean-floor bedrock from location *B* to location *C*?



- 4) The *hottest* crustal temperature measurements would most likely be found at which location?
 - A) *A*
 - B) *B*
 - C) *C*
 - D) *D*

5) Which table *best* shows the relative densities of the crustal bedrock at locations *A*, *B*, *C*, and *D*?

Relative Densities of Crust

A)

More Dense	Less Dense
A, B	C, D

Relative Densities of Crust

B)

More Dense	Less Dense
C, D	A, B

Relative Densities of Crust

C)

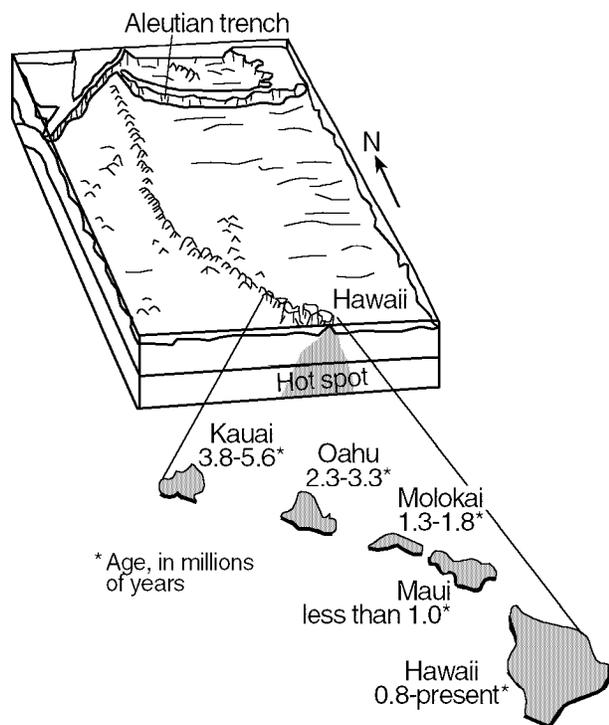
More Dense	Less Dense
B, C	A, D

Relative Densities of Crust

D)

More Dense	Less Dense
A, D	B, C

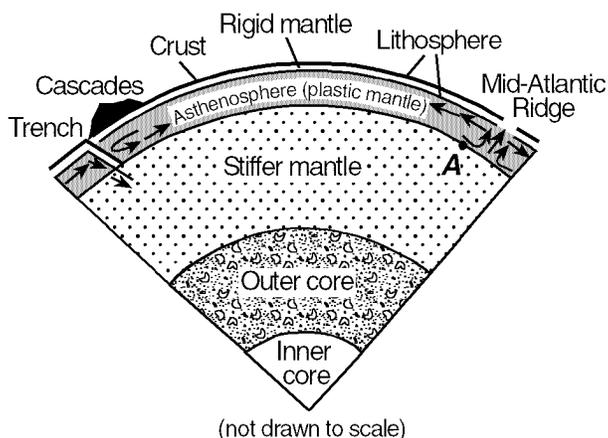
6) The block diagram below shows the bedrock age as measured by radioactive dating and the present location of part of the Hawaiian Island chain. These volcanic islands may have formed as the Pacific Plate moved over a mantle hot spot.



This diagram provides evidence that the Pacific Crustal Plate was moving toward the

- A) east
- B) southwest
- C) south
- D) northwest

7) The diagram below shows a portion of Earth's interior. Point *A* is a location on the interface between layers.



The arrows shown in the asthenosphere represent the inferred slow circulation of the plastic mantle by a process called

- A) conduction
- B) radiation
- C) insolation
- D) convection

8) Which observation provides the *strongest* evidence for the inference that convection cells exist within the Earth's mantle?

- A) Displaced rock strata are usually accompanied by earthquakes and volcanoes.
- B) Sea level has varied in the past.
- C) Heat-flow readings vary at different locations in the Earth's crust.
- D) Marine fossils are found at elevations high above sea level.

9) Which is suggested by the occurrence of higher than average temperature below the surface of the Earth in the area of the Mid-Atlantic Ridge?

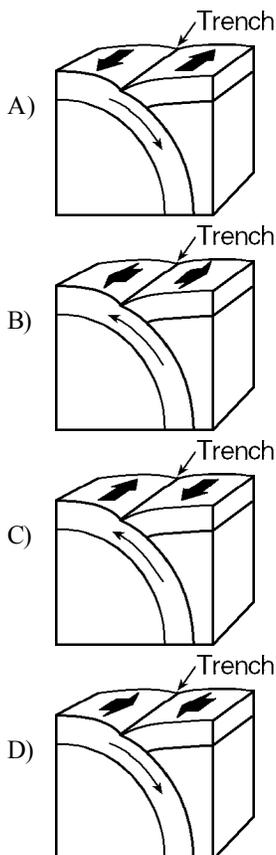
- A) the presence of heat due to orographic effect
- B) the existence of a thinner crust under mountains
- C) a high concentration of magnetism in the mantle
- D) the existence of convection cells in the mantle

Questions 10 and 11 refer to the following:

The map below shows the location of the Peru-Chile Trench.



- 10) In which diagram do the arrows *best* represent the motions of Earth's crust at the Peru-Chile Trench?

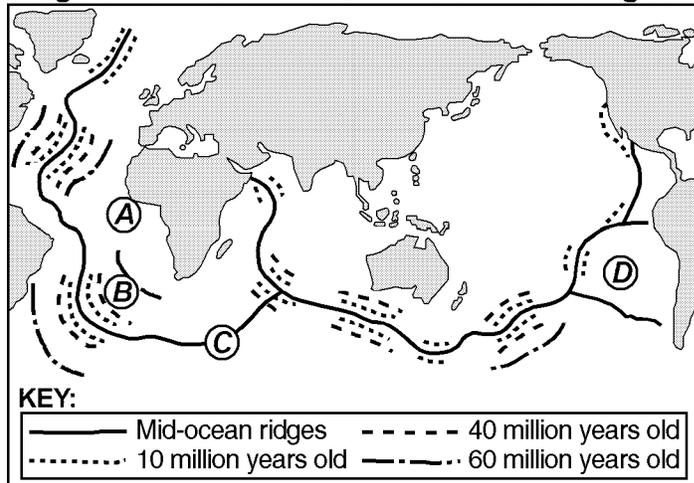


- 11) The Peru-Chile Trench marks the boundary between the
- A) Caribbean Plate and the Scotia Plate
 - B) North American Plate and the Cocos Plate
 - C) Pacific Plate and the Antarctic Plate
 - D) Nazca Plate and the South American Plate

Questions 12 through 14 refer to the following:

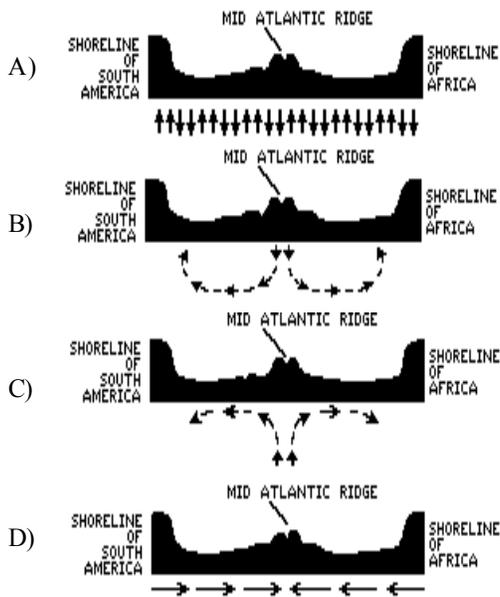
The map below shows the location of mid-ocean ridges and the age of some oceanic bedrock near these ridges. Letters *A* through *D* are locations on the surface of the ocean floor.

Age of Rocks on the Sea Bottom Relative to Ridges



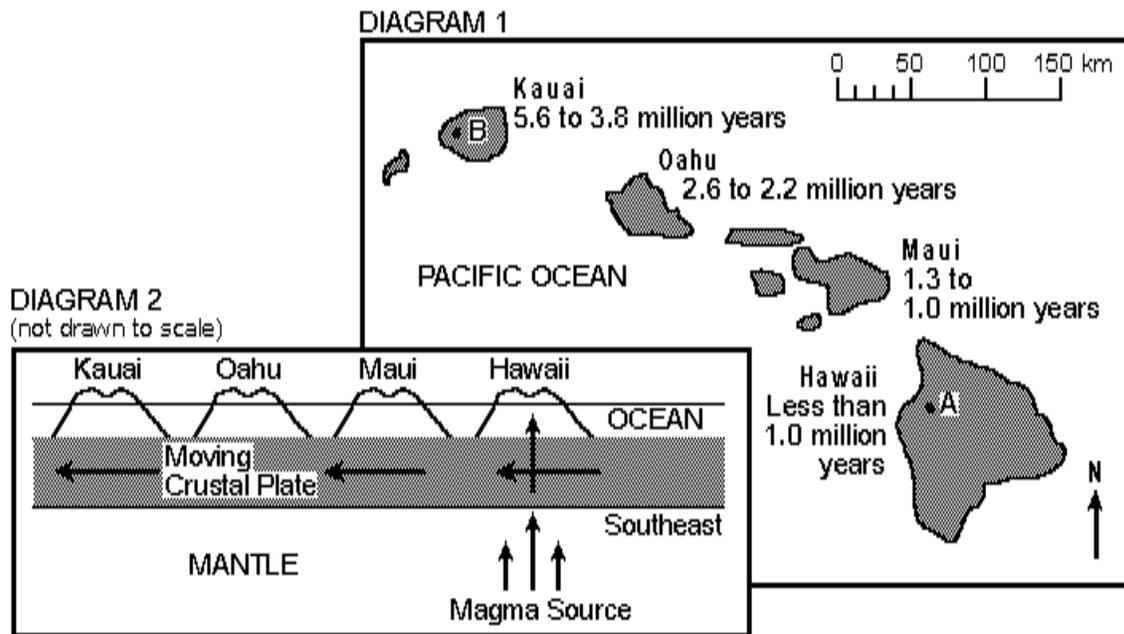
- 12) Rising convection currents in the asthenosphere would most likely be under location
- A) *A*
 - B) *B*
 - C) *C*
 - D) *D*
- 13) What is the most probable age, in millions of years, of the bedrock at location *B*?
- A) 48
 - B) 62
 - C) 5
 - D) 12
- 14) The age of oceanic bedrock on either side of a mid-ocean ridge is supporting evidence that at the ridges, tectonic plates are
- A) locked in place
 - B) converging
 - C) being subducted
 - D) diverging
- 15) At the Aleutian Trench and the Peru-Chile Trench, tectonic plates are generally
- A) diverging
 - B) moving along a transform boundary
 - C) moving over a mantle hot spot
 - D) converging

- 16) Many scientists believe that convection currents in the mantle between South America and Africa caused the separation of the two continents and the formation of the Mid-Atlantic Ridge. Which diagram best represents the currents described in this theory?



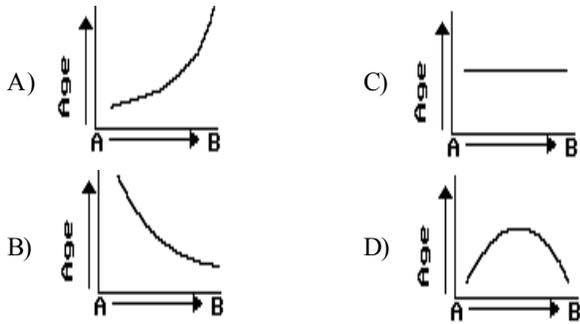
Questions 17 through 21 refer to the following:

Diagram I below is a map showing the location and bedrock age of some of the Hawaiian Islands. Diagram II is a cross section of an area of the Earth illustrating a stationary magma source and the process that could have formed the islands.



- 17) Which of the Hawaiian Islands has the *greatest* probability of having a volcanic eruption
- A) Oahu C) Kauai
- B) Hawaii D) Maui

18) Which graph best represents the ages of the Hawaiian Islands comparing them from point A to point B?



19) Compared to the continental crust of North America, the oceanic crust area of the Hawaiian Islands is probably

- A) thinner and similar in composition
- B) thicker and similar in composition
- C) thicker and different in composition
- D) thinner and different in composition

20) If each island formed as the crustal plate moved over the magma source in the mantle as shown in diagram II, where would the next volcanic island most likely form?

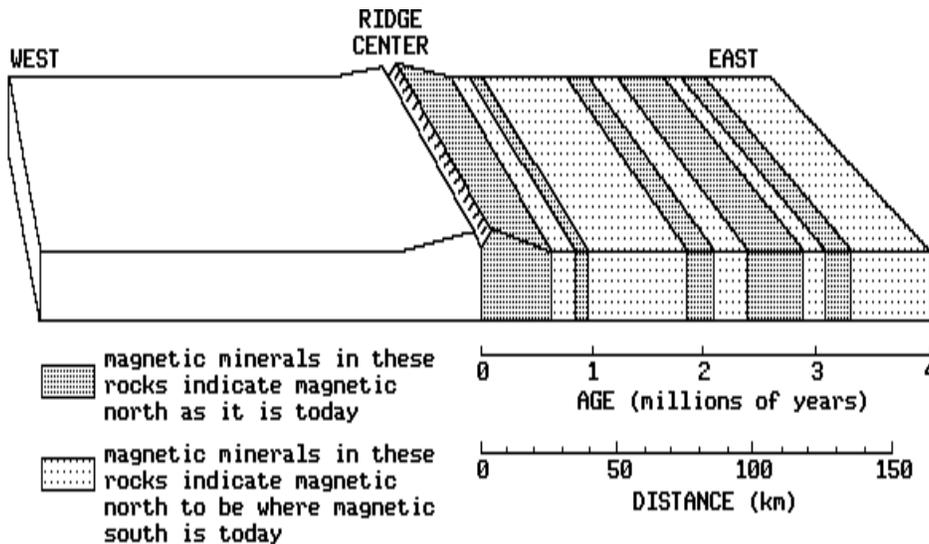
- A) southeast of Hawaii
- B) northwest of Kauai
- C) northeast of Hawaii
- D) between Hawaii and Maui

21) Volcanic activity like that which produced the Hawaiian Islands is usually closely correlated with

- A) frequent earthquake activity
- B) nearness to the center of the ocean
- C) sudden reversals in the Earth's magnetic field
- D) frequent major changes in climate

Questions 22 and 23 refer to the following:

The diagram below shows the magnetic orientation of igneous rock on the seafloor on the east (right) side of a mid-ocean ridge. The pattern on the west (left) side of the ridge has been omitted. The age of the igneous rock and its distance from the ridge center are shown.



22) The occurrence of high-heat flows at the ridge center provides evidence of the

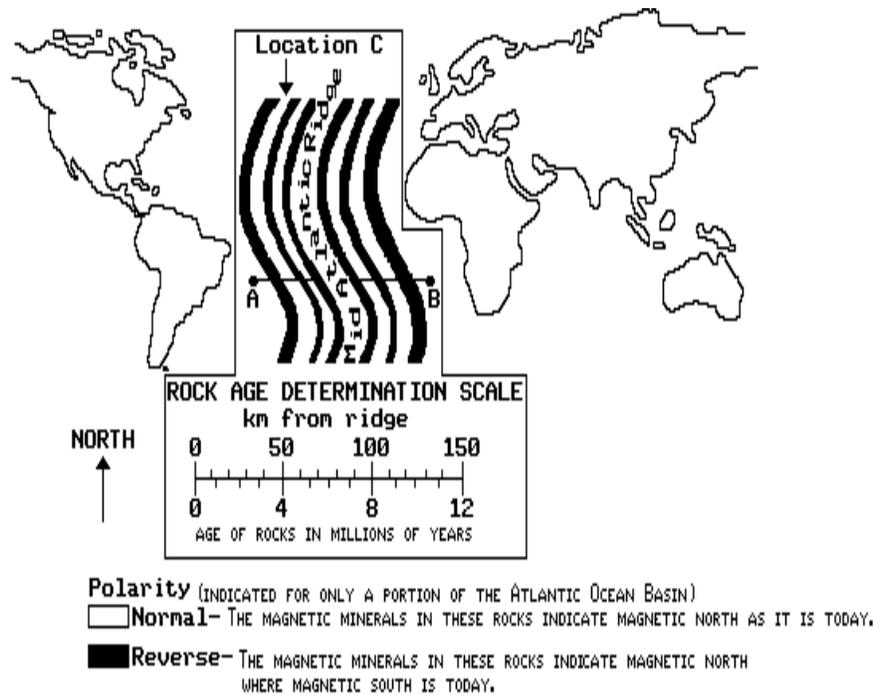
- A) destruction of continental crust
- B) destruction of oceanic crust
- C) existence of rising mantle convection currents
- D) existence of ancestral mountains

23) According to the diagram, what is the approximate rate of seafloor spreading?

- A) 40 km/million years
- B) 2 km/million years
- C) 1 km/million years
- D) 50 km/million years

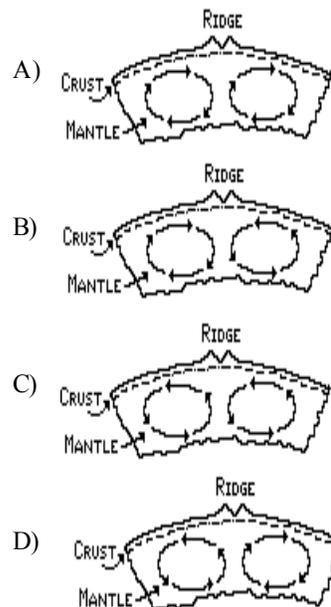
Questions 24 through 27 refer to the following:

The diagram below shows an enlargement of the mid-Atlantic ridge and surrounding in its position with respect to the continents. Magnetic polarity bands of igneous rock parallel to the ridge are illustrated according to the key.



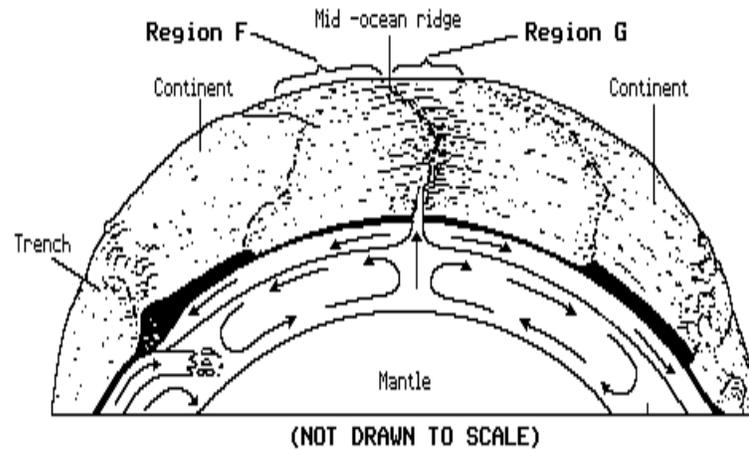
- 24) What are two characteristics of ocean floor rock found at location C?
- A) reverse polarity, continental composition
 - B) normal polarity, oceanic composition
 - C) reverse polarity, oceanic composition
 - D) normal polarity, continental composition
- 25) Ocean floor rock found 20 kilometers west of the ocean ridge would have an approximate age of
- A) 1.6 million years
 - B) 2.0 million years
 - C) 15 million years
 - D) 30 million years

- 26) Which of the cross-sectional diagrams below best represents a model for the movement of rock material below the crust along the mid-Atlantic ridge?



- 27) Along the line from position *A* to position *B*, the comparative age of the rock
- A) continuously decreases from *A* to *B*
 - B) continuously increases from *A* to *B*
 - C) increases from *A* to the mid-Atlantic ridge and then decreases to *B*
 - D) decreases from *A* to the mid-Atlantic ridge and then increases to *B*

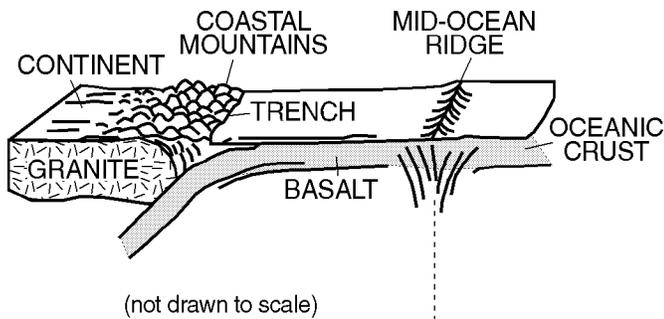
- 28) The diagram below represents a partial cross section of a model of the Earth. The arrows show inferred motions within the Earth.



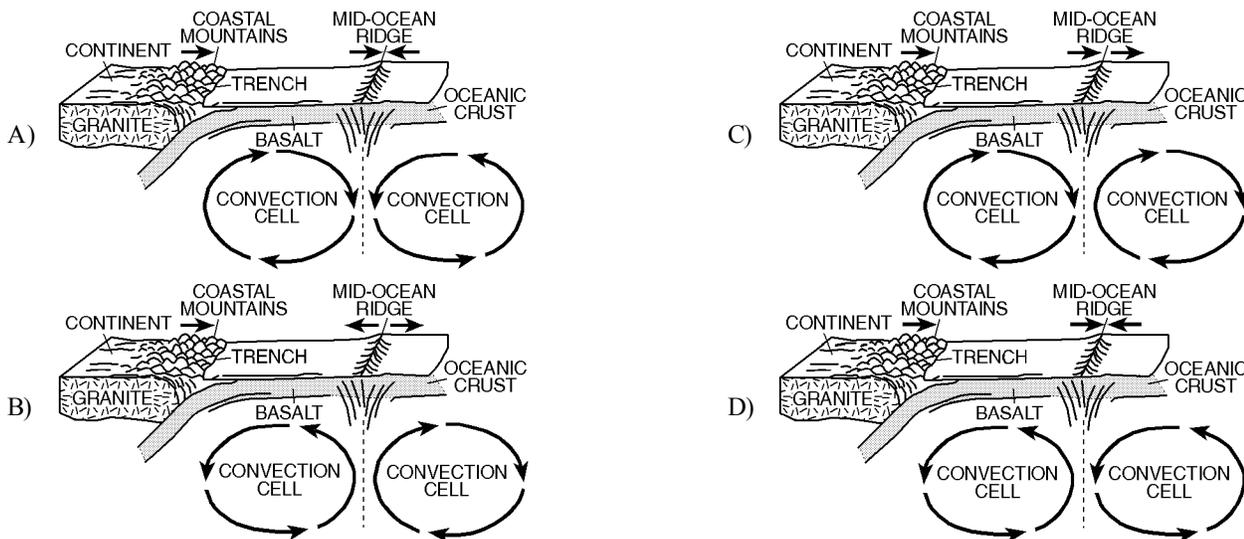
Which property of the oceanic crust in regions *F* and *G* is a result of these inferred motions?

- A) Heat-flow measurements steadily increase as distance from the mid-ocean ridge increases.
- B) The age of the igneous rock increases as distance from the mid-ocean ridge increases.
- C) The crystal size of the rock decreases constantly as distance from the mid-ocean ridge increases.
- D) The temperature of the basaltic rock increases as distance from the mid-ocean ridge increases.

29) The diagram below shows some features of Earth's crust and upper mantle.

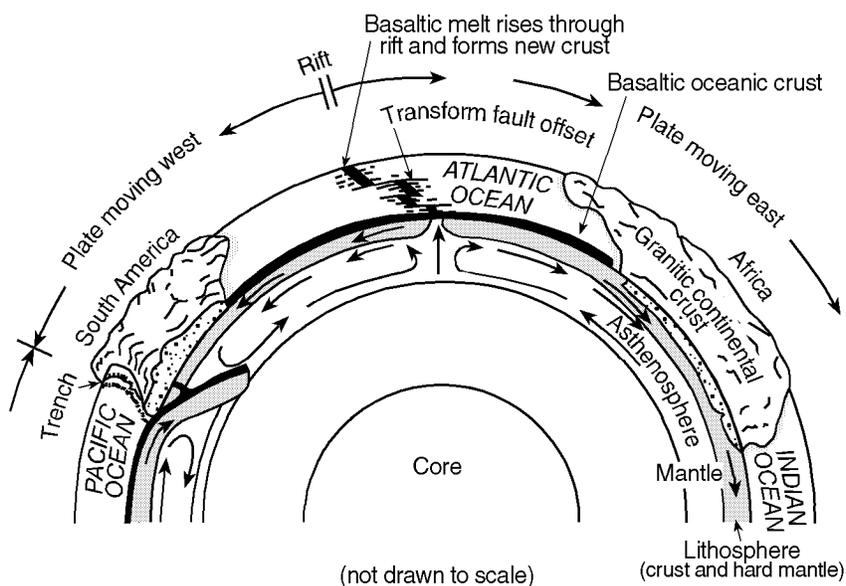


Which model most accurately shows the movements (arrows) associated with the surface features shown in the diagram?

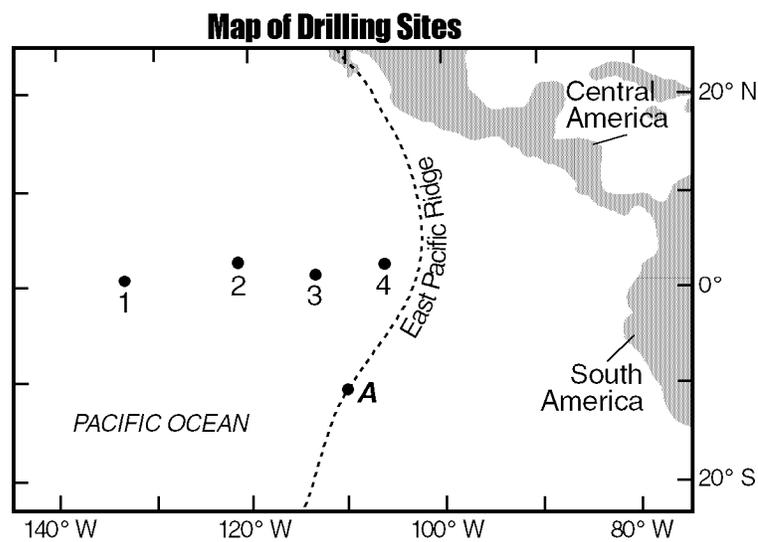


Questions 30 through 32 refer to the following:

The diagram below shows a model of the relationship between Earth's surface and its interior.



- 30) The motion of the convection currents in the mantle beneath the Atlantic Ocean appears to be mainly making this ocean basin
- A) narrower
B) wider
C) deeper
D) shallower
- 31) Mid-ocean ridges (rifts) normally form where tectonic plates are
- A) stationary
B) sliding past each other
C) converging
D) diverging
- 32) According to the diagram, the deep trench along the west coast of South America is caused by movement of the oceanic crust that is
- A) sinking beneath the continental crust
B) colliding with the Atlantic oceanic crust
C) uplifting over the continental crust
D) sinking at the Mid-Atlantic ridge
- 33) The map below shows the locations of deep-sea core drilling sites numbered 1 through 4. The approximate location of the East Pacific Ridge is shown by a dashed line. Point *A* is located on the East Pacific Ridge.



At point *A*, the East Pacific Ridge is the boundary between the

- A) Cocos Plate and the North American Plate
B) Pacific Plate and the Nazca Plate
C) Pacific Plate and the South American Plate
D) South American Plate and the Nazca Plate