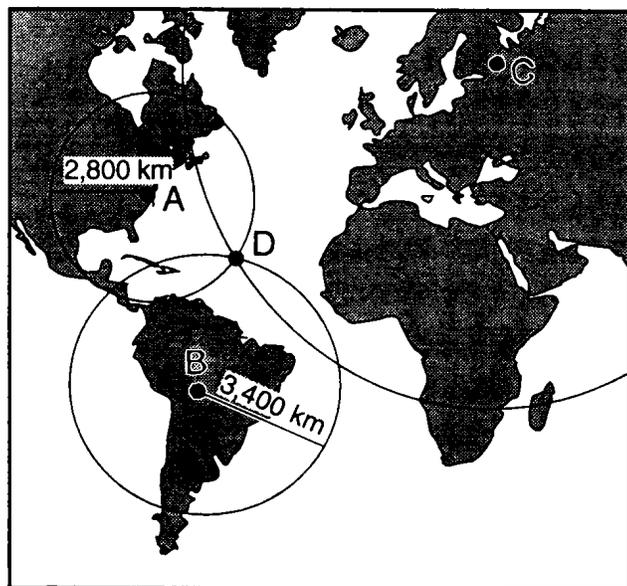
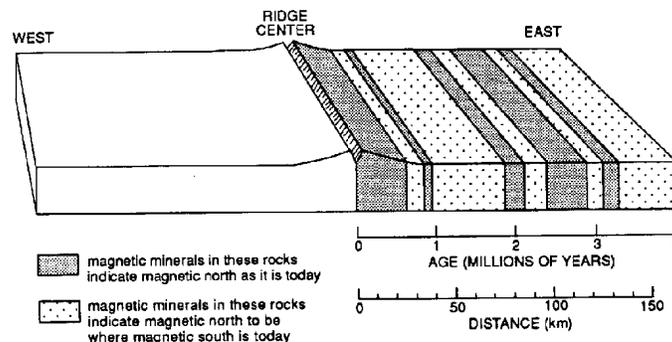


Base your answers to questions 1 through 4 on the map below, which shows seismograph recording stations at locations *A*, *B*, and *C*. Location *D* is an earthquake epicenter. The distances from locations *A* and *B* to this epicenter are given in kilometers.



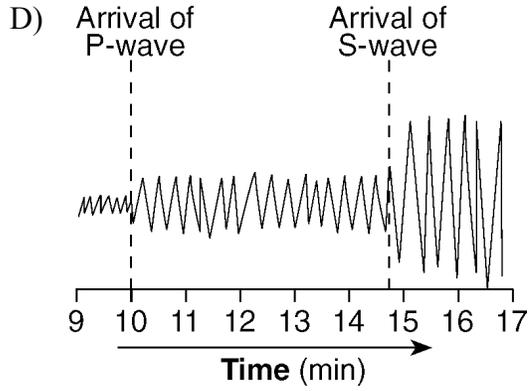
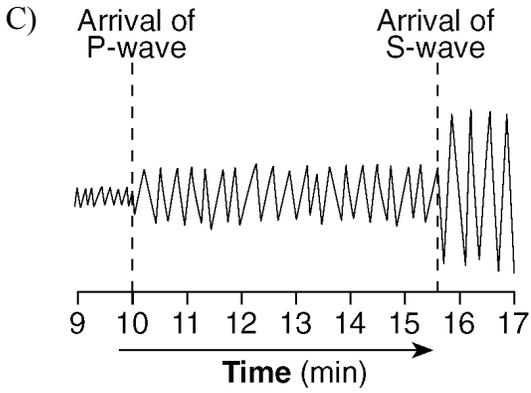
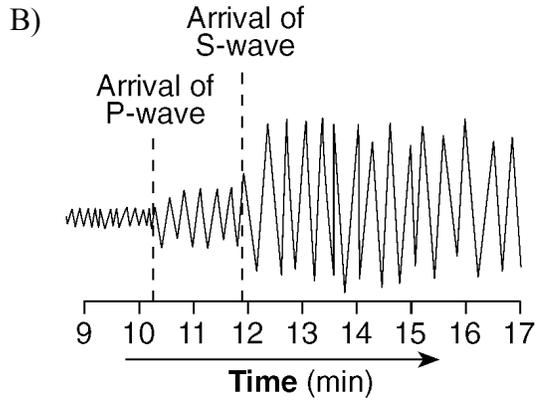
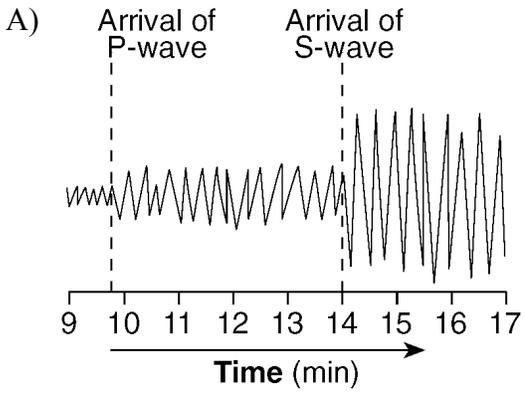
- At which location is the arrival-time difference between the *P*-wave and the *S*-wave greatest?  
A) *A*    B) *B*    C) *C*    D) *D*
- Approximately how long did the *S*-wave take to travel from the epicenter to location *A*?  
A) 11 min 15 sec    B) 9 min 35 sec  
C) 5 min 20 sec    D) 4 min 20 sec
- How does the age of the ocean-floor bedrock change as the distance east or west of location *D* increases?  
A) The age decreases, because *D* is in an oceanic trench.  
B) The age decreases, because *D* is on a mid-oceanic ridge.  
C) The age increases, because *D* is in an oceanic trench.  
D) The age increases, because *D* is on a mid-oceanic ridge.
- If seismograph station *B* receives the first *P*-wave at 09:35:20, at what time did the earthquake occur?  
A) 09:05:00    B) 09:06:15  
C) 09:29:05    D) 09:33:25

Base your answers to questions 5 and 6 on the diagram below which 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.

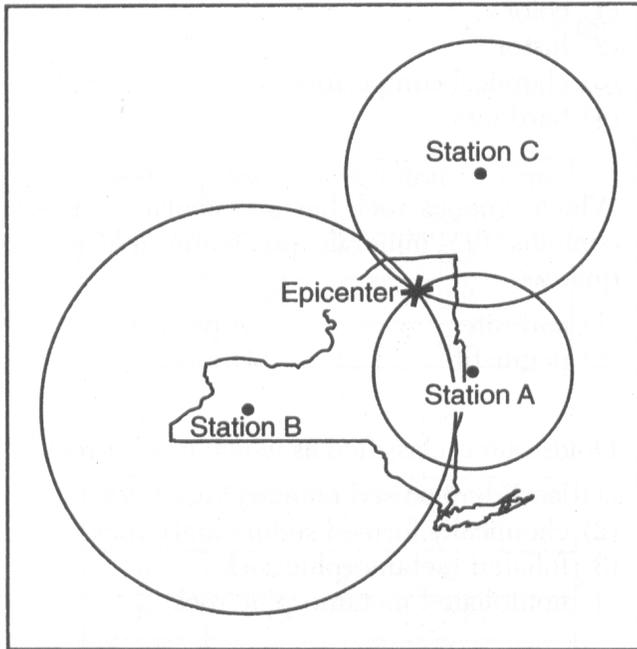


- Which diagram below best represents the pattern of magnetic orientation in the seafloor on the west (left) side of the ocean ridge?  
A)    B)   
C)    D)
- The occurrence of high-heat floors at the ridge center provides evidence of the  
A) destruction of oceanic crust  
B) destruction of continental crust  
C) existence of ancestral mountains  
D) existence of rising mantle convection currents
- The large coal fields found in Pennsylvania provide evidence that the climate of the northeastern United States was much warmer during the Carboniferous Period. This change in climate over time is best explained by the  
A) movements of tectonic plates  
B) effects of seasons  
C) changes in the environment caused by humans  
D) evolution of life
- Which part of Earth's interior is inferred to have convection currents that cause tectonic plates to move?  
A) rigid mantle    B) asthenosphere  
C) outer core    D) inner core

9. Which seismogram was recorded approximately 4,000 kilometers from an earthquake epicenter?



10. The map below shows the location of an earthquake epicenter in New York State. Seismic stations *A*, *B*, and *C* received the data used to locate the earthquake epicenter.

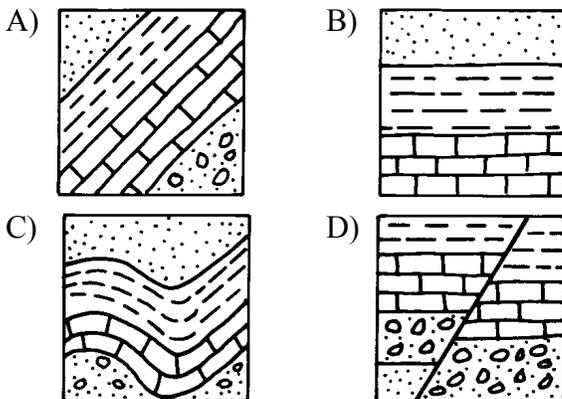


The seismogram recorded at station *A* would show the

- A) arrival of *P*-waves, only
  - B) earliest arrival time of *P*-waves
  - C) greatest difference in the arrival times of *P*-waves and *S*-waves
  - D) arrival of *S*-waves before the arrival of *P*-waves
11. The first *S*-wave arrived at a seismograph station 11 minutes after an earthquake occurred. How long after the arrival of the first *P*-wave did this first *S*-wave arrive?

- A) 3 min 15 s
- B) 4 min 55 s
- C) 6 min 05 s
- D) 9 min 00 s

12. The diagrams below show cross sections of exposed bedrock. Which cross section shows the *least* evidence of crustal movement?



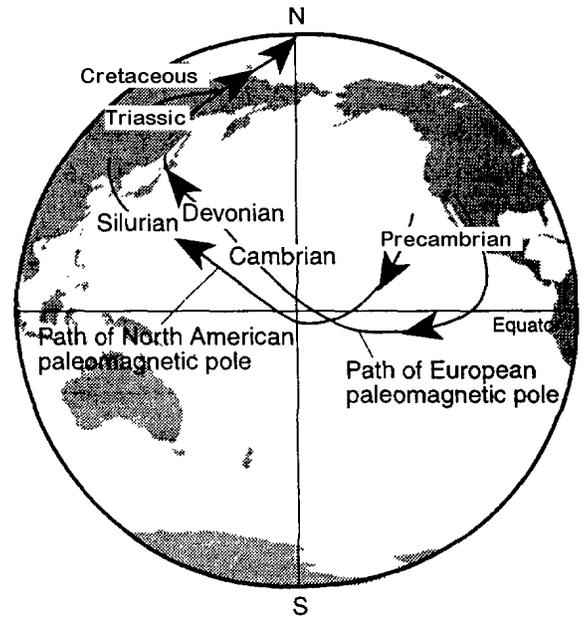
13. A seismograph station recorded the arrival of the first *P*-wave at 7:32 p.m. from an earthquake that occurred 4000 kilometers away. What time was it at the station when the earthquake occurred?

- A) 7:20 p.m.
- B) 7:25 p.m.
- C) 7:32 p.m.
- D) 7:39 p.m.

14. A *P*-wave takes 8 minutes and 20 seconds to travel from the epicenter of an earthquake to a seismic station. Approximately how long will an *S*-wave take to travel from the epicenter of the same earthquake to this seismic station?

- A) 6 mm 40 sec
- B) 9 mm 40 sec
- C) 15 mm 00 sec
- D) 19 mm 00 sec

15. The arrows on the map below show the apparent changes in the position of Earth's magnetic North Pole throughout geologic time, as recorded in the igneous rocks of Europe and North America.



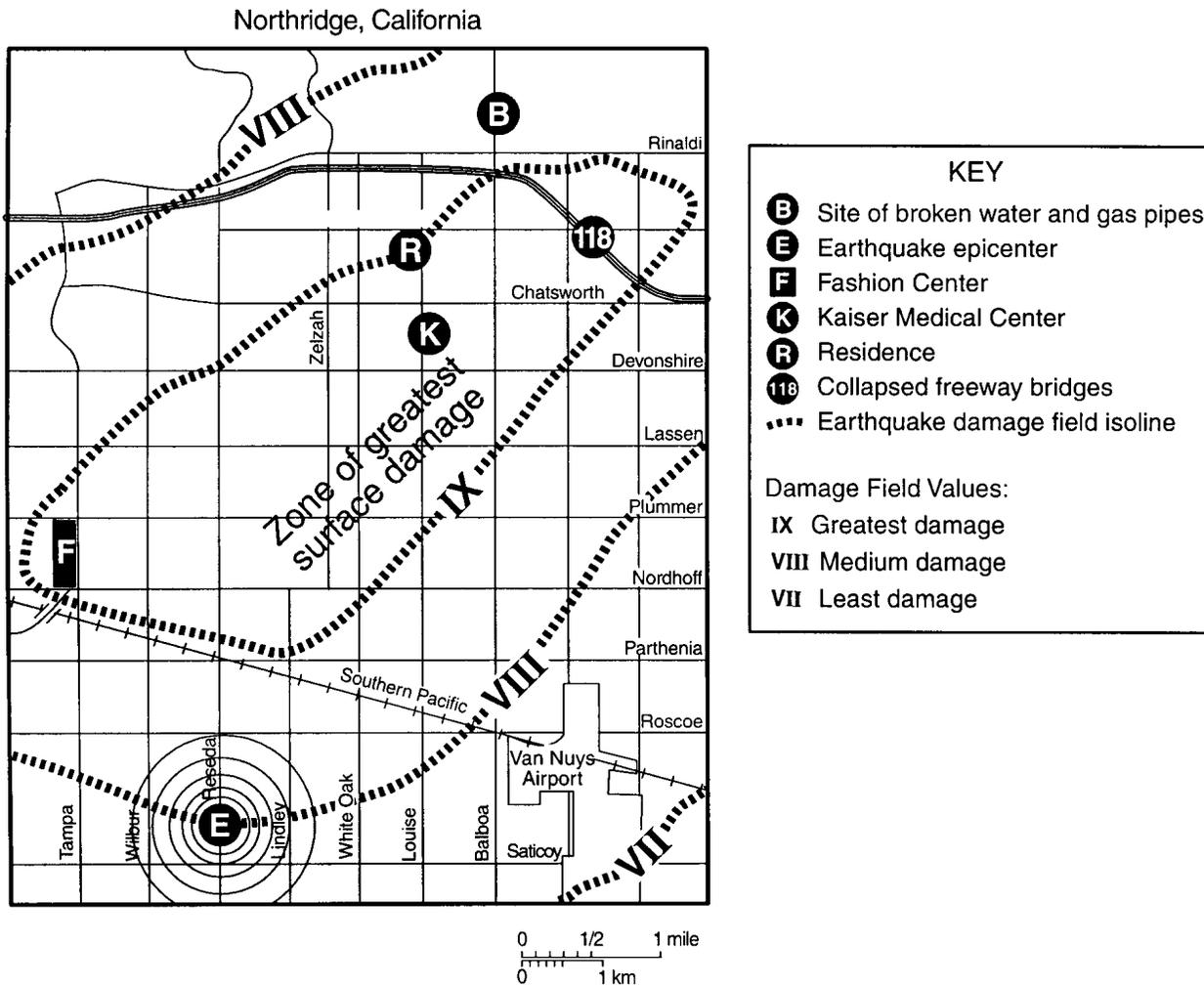
This evidence best supports the concept of

- A) the heliocentric solar system
- B) the Coriolis effect
- C) planet orbit eccentricity
- D) plate tectonics

16. A seismic station 4000 kilometers from the epicenter of an earthquake records the arrival time of the first *P*-wave at 10:00:00. At what time did the first *S*-wave arrive at this station?

- A) 9:55:00
- B) 10:05:40
- C) 10:07:05
- D) 10:12:40

Base your answers to questions 17 through 19 on the map below which shows part of the earthquake damage field that resulted from the earthquake that occurred in Northridge, in southern California, in January 1994. Several sites associated with the earthquake and earthquake damage are shown.



17. Which information would have been most useful for locating the earthquake epicenter?

- A) the difference between the arrival times of the *P*-wave and the *S*-wave
- B) the arrival time of the *S*-wave
- C) the velocity of the *P*-wave
- D) the location of damage from the earthquake

18. Which crustal plate boundary is most closely associated with this earthquake?

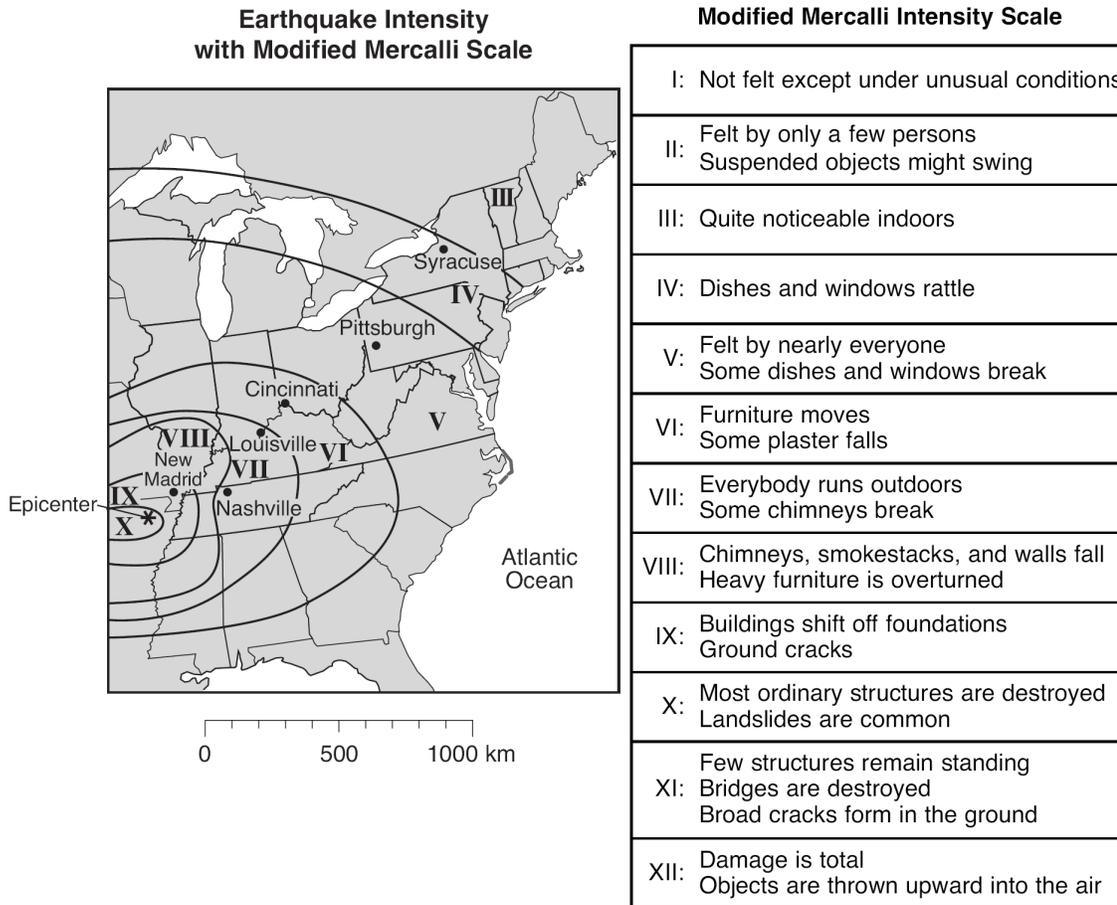
- A) Cocos Plate — Pacific Plate
- B) Cocos Plate — Nazca Plate
- C) North American Plate — Nazca Plate
- D) North American Plate — Pacific Plate

19. The greatest surface damage occurred in zone IX because

- A) the regional seismograph stations were closest to zone IX
- B) of local conditions at zone IX
- C) zone IX was reached first by earthquake waves
- D) zone IX was at the epicenter of the earthquake

Base your answers to questions 20 and 21 on

the map and the modified Mercalli scale shown below. The map shows the intensities of the earthquake that occurred slightly southwest of New Madrid, Missouri, on December 16, 1811. The epicenter of this earthquake is represented by \*. The Roman numerals on the map show zones of earthquake intensities determined by using the modified Mercalli scale.



20. Which location would most probably have issued the report: “Many structures shifted off foundations”?

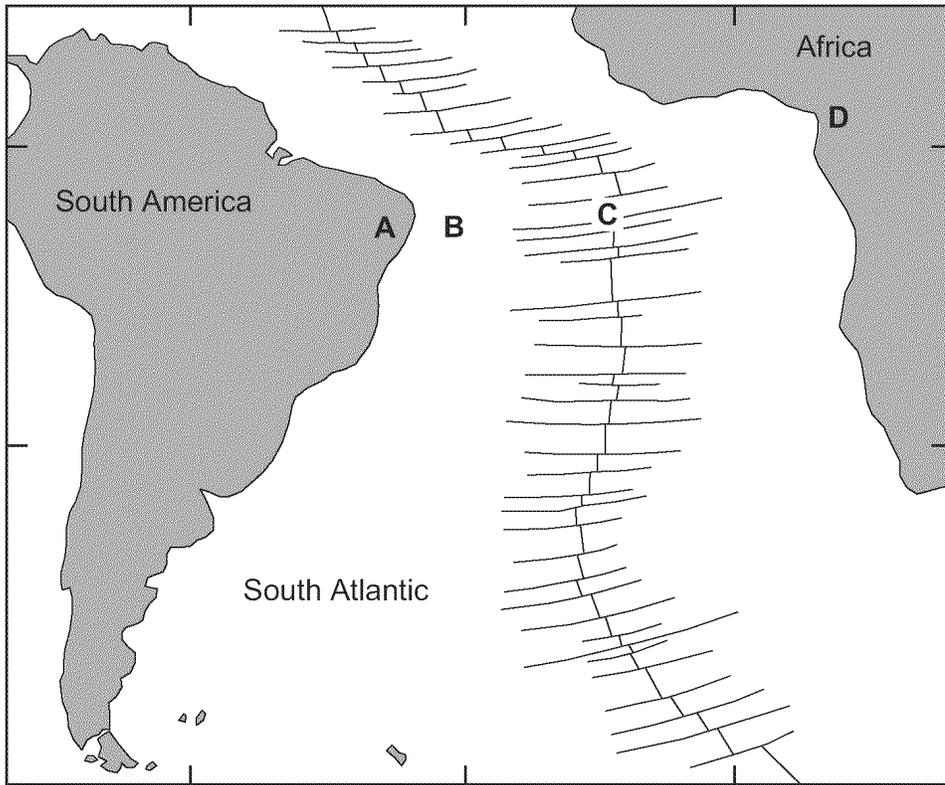
- A) New Madrid    B) Syracuse    C) Pittsburgh    D) Nashville

21. The intensity numbers shown on the map were determined by

- A) the arrival time of the first *P*-wave recorded at each city  
 B) the recorded time difference in the arrival of the first *P*-wave and *S*-wave at each city  
 C) observations made at different locations during and after the earthquake  
 D) observations made only at the earthquake epicenter

## Regents Review #8

Base your answers to questions 22 through 24 on the map below. The map 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.



22. The hottest crustal temperature measurements would most likely be found at location

- A) *A*                      B) *B*                      C) *C*                      D) *D*

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

A) **Relative Densities of Crust**

| More Dense | Less Dense |
|------------|------------|
| A, B       | C, D       |

B) **Relative Densities of Crust**

| More Dense | Less Dense |
|------------|------------|
| B, C       | A, D       |

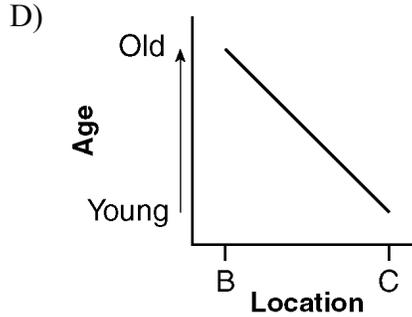
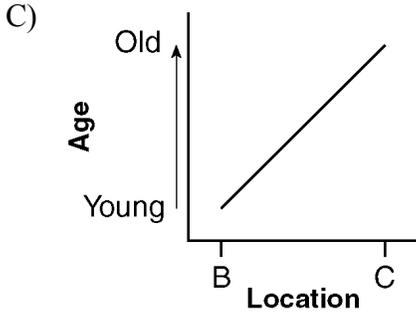
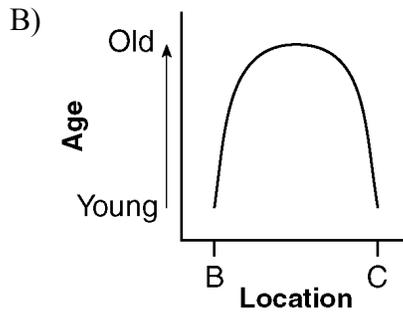
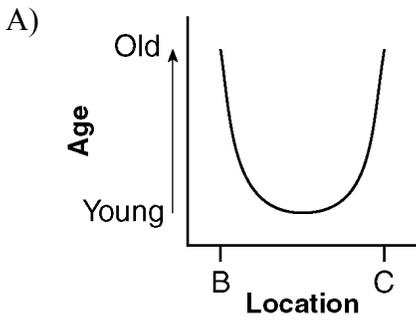
C) **Relative Densities of Crust**

| More Dense | Less Dense |
|------------|------------|
| C, D       | A, B       |

D) **Relative Densities of Crust**

| More Dense | Less Dense |
|------------|------------|
| A, D       | B, C       |

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



25. The theory of continental drift suggests that the

- A) continents moved due to changes in the Earth's orbital velocity
- B) continents moved due to the Coriolis effect caused by the Earth's rotation
- C) present-day continents of South America and Africa are moving toward each other
- D) present-day continents of South America and Africa once fit together like puzzle parts

26. Compared to Earth's continental crust, Earth's oceanic crust is

- A) thinner and more dense
- B) thinner and less dense
- C) thicker and more dense
- D) thicker and less dense

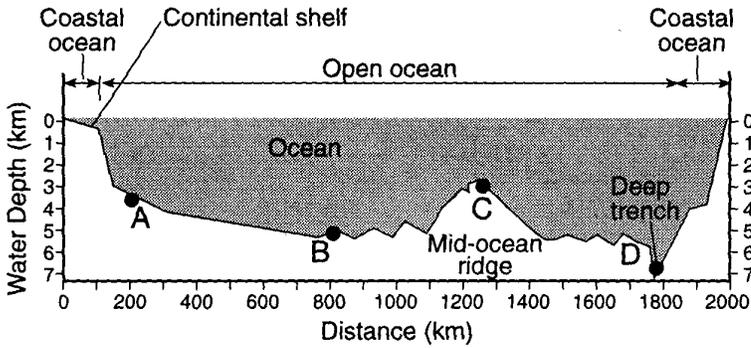
27. Active volcanoes are most abundant along the

- A) edges of tectonic plates
- B) eastern coastline of continents
- C) 23.5° N and 23.5° S parallels of latitude
- D) equatorial ocean floor

28. Based on the theory of plate tectonics, it is inferred that over the past 250 million years North America has moved toward the

- A) northwest
- B) southwest
- C) southeast
- D) northeast

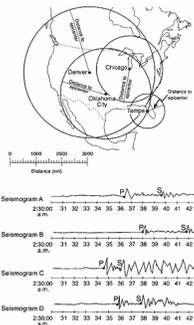
29. The cross section below shows the ocean floor between two continents. Points A through D represent locations on the ocean floor where samples of oceanic crust were collected.



The youngest rock sample most likely was collected from location

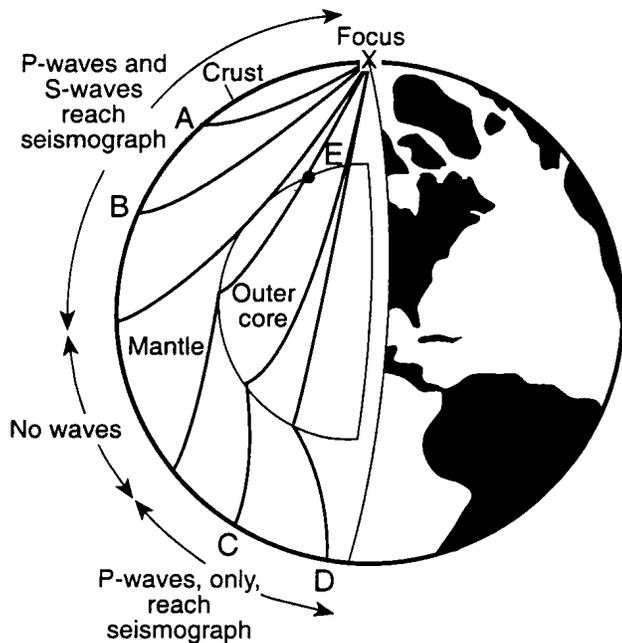
- A) A                      B) B                      C) C                      D) D

Base your answers to questions 30 through 32 on the map and seismograms below. The map shows seismic stations in Chicago, Denver, Oklahoma City, and Tampa that recorded data from an earthquake. Seismograms A, B, C, and D show, in Greenwich time, the arrival times of the earthquake waves at the four stations.



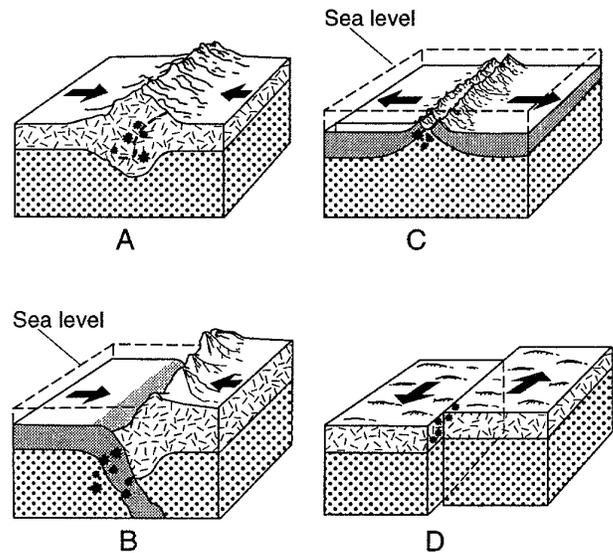
30. The *P*-wave generated by this earthquake took 2 minutes and 40 seconds to reach one of the seismic stations. Approximately how long did the *S*-wave take to reach this same seismic station?
- A) 1 minute 20 seconds  
 B) 2 minutes 40 seconds  
 C) 3 minutes 30 seconds  
 D) 4 minutes 50 seconds
31. What was the origin time of this earthquake?
- A) 2:33:00 a.m.              B) 2:34:40 a.m.  
 C) 2:35:40 a.m.              D) 2:37:00 a.m.
32. Which seismogram was recorded at Tampa?
- A) seismogram A              B) seismogram B  
 C) seismogram C              D) seismogram D

Base your answers to questions 33 and 34 on the diagram below, which shows a cutaway view of Earth in which the interior layers are visible. The paths of earthquake waves generated at point *X* are shown. *A*, *B*, *C*, and *D* are locations of seismic stations on Earth's surface, and point *E* is located in Earth's interior.



33. Both *P*-waves and *S*-waves were received at seismic stations *A* and *B*, but only *P*-waves were received at seismic stations *C* and *D*. Which statement best explains why this occurred?
- A) *S*-waves are much weaker than *P*-waves.  
 B) *S*-waves travel faster than *P*-waves.  
 C) The liquid outer core prevents *S*-waves from traveling to seismic stations *C* and *D*.  
 D) The solid outer core prevents *S*-waves from traveling to seismic stations *C* and *D*.
34. The actual rock temperature at point *E* is inferred to be approximately
- A) 1,500°C                      B) 2,900°C  
 C) 5,000°C                      D) 6,200°C
- 
35. An earthquake's *P*-wave arrived at a seismograph station at 02 hours 40 minutes 00 seconds. The earthquake's *S*-wave arrived at the same station 2 minutes later. What is the approximate distance from the seismograph station to the epicenter of the earthquake?
- A) 1,100 km                      B) 2,400 km  
 C) 3,100 km                      D) 4,000 km

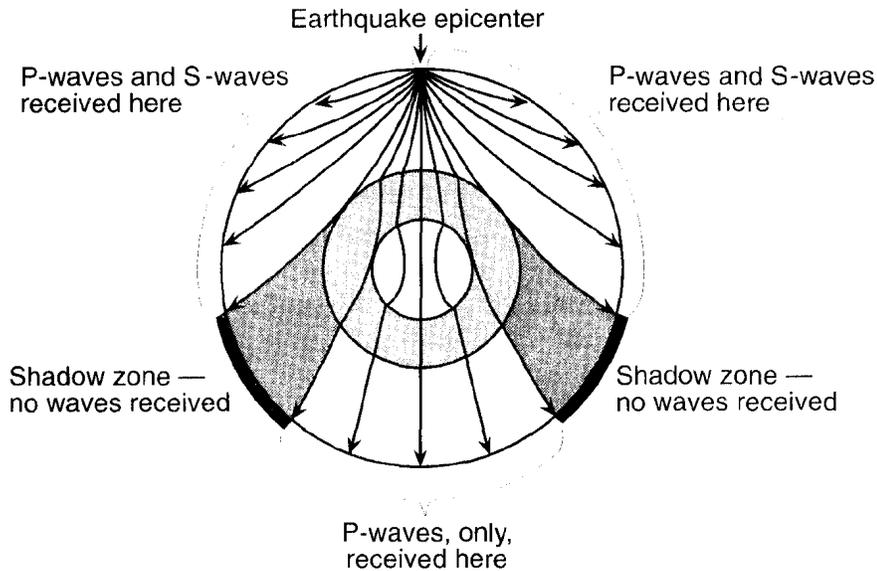
Base your answers to questions 36 and 37 on the diagrams below of geologic cross sections of the upper mantle and crust at four different Earth locations, *A*, *B*, *C*, and *D*. Movement of the crustal sections (plates) is indicated by arrows, and the locations of frequent earthquakes are indicated by \*. Diagrams are not drawn to scale.



| Key |                             |
|-----|-----------------------------|
|     | Mantle                      |
|     | Continental crust (granite) |
|     | Earthquake focus            |
|     | Oceanic crust (basalt)      |
|     | Direction of plate movement |

36. Which location best represents the boundary between the African plate and the South American plate?
- A) *A*    B) *B*    C) *C*    D) *D*
37. Which diagram represents plate movement associated with transform faults such as those causing California earthquakes?
- A) *A*    B) *B*    C) *C*    D) *D*
- 
38. Fossils of marine plants and animals are found in the bedrock of mountains many thousands of feet above sea level. The most likely reason for this observation is that
- A) the mountains were part of a mid-ocean ridge  
 B) the ocean level has dropped several thousand feet  
 C) forces within the Earth caused uplift  
 D) transported materials were deposited at high elevations

39. Base your answer to the following question on the cross section below, which shows the paths of seismic waves traveling from an earthquake epicenter through the different layers of Earth's interior.



No *P*-waves or *S*-waves are received in the shadow zone because

- A) *P*-waves are absorbed and *S*-waves are refracted by Earth's outer core
- B) *P*-waves are refracted and *S*-waves are absorbed by Earth's outer core
- C) both the *P*-waves and *S*-waves are refracted by Earth's outer core
- D) both the *P*-waves and *S*-waves are absorbed by Earth's outer core

Base your answers to questions 40 through 42 on the data table below, which gives information collected at seismic stations *W*, *X*, *Y*, and *Z* for the same earthquake. Some of the data have been omitted.

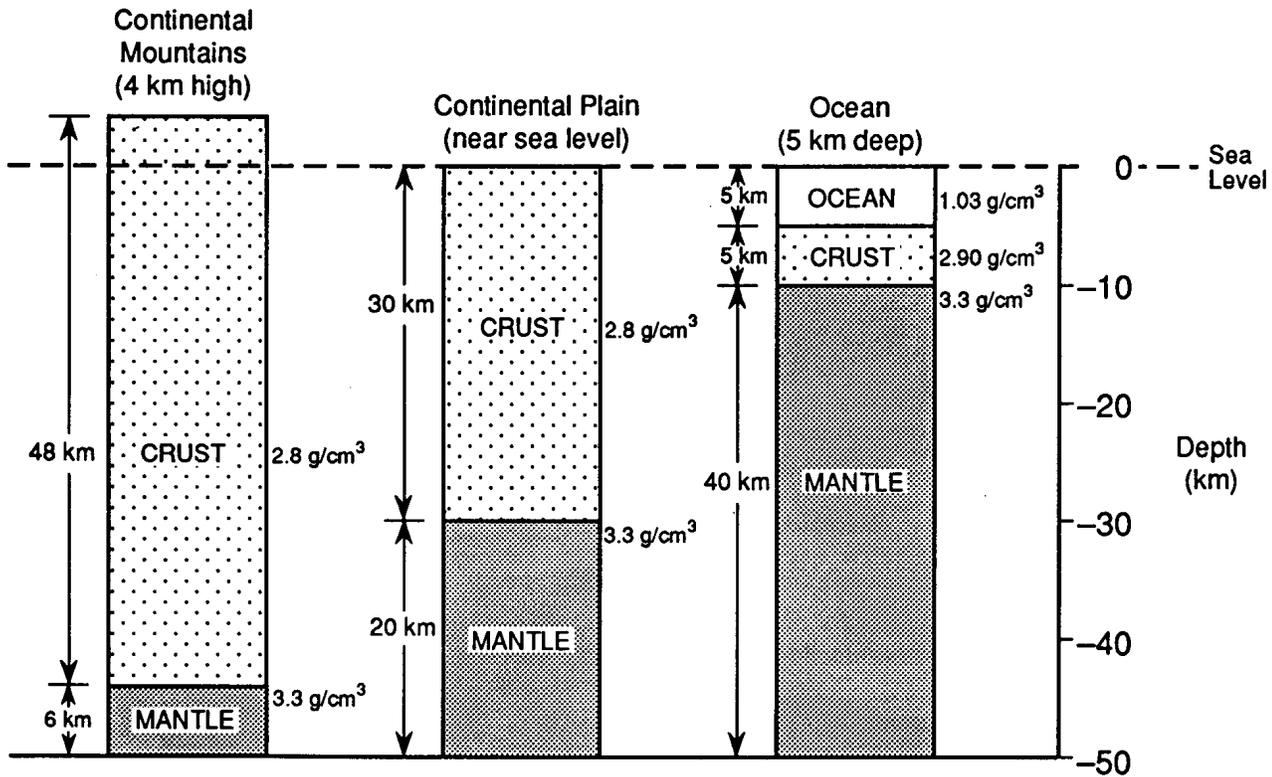
**Data Table**

| Seismic Station | P-Wave Arrival Time (h:min:s) | S-Wave Arrival Time (h:min:s) | Difference in Arrival Times (h:min:s) | Distance to Epicenter (km) |
|-----------------|-------------------------------|-------------------------------|---------------------------------------|----------------------------|
| W               | 10:50:00                      | no S-waves arrived            |                                       |                            |
| X               | 10:42:00                      | 10:46:40                      |                                       |                            |
| Y               | 10:39:20                      |                               | 00:02:40                              |                            |
| Z               | 10:45:40                      |                               |                                       | 6200                       |

- 40. At what time did the *S*-wave arrive at station *Y*?  
 A) 10:36:40      B) 10:39:20      C) 10:42:00      D) 10:45:20
- 41. Which seismic station was farthest from the earthquake epicenter?  
 A) *W*      B) *X*      C) *Y*      D) *Z*
- 42. What is the most probable reason for the absence of *S*-waves at station *W*?  
 A) *S*-waves were not generated at the epicenter.  
 B) *S*-waves cannot travel through liquids.  
 C) Station *W* was located on solid bedrock.  
 D) Station *W* was located on an island.

## Regents Review #8

Base your answers to questions 43 through 46 on the diagram below which represents three cross sections of the Earth at different locations to a depth of 50 kilometers below sea level. The measurements given with each cross section indicate the thickness and the density of the layers.



43. Which material is most likely to be found 20 kilometers below sea level at the continental mountain location?
- A) basalt                      B) granite                      C) shale                      D) limestone
44. The division of the Earth's interior into crust and mantle, as shown in the diagram, is based primarily on the study of
- A) radioactive dating                      B) seismic waves  
C) volcanic eruptions                      D) gravity measurements
45. Which statement about the Earth's mantle is confirmed by the diagram?
- A) The mantle is liquid.  
B) The mantle has the same composition as the crust.  
C) The mantle is located at different depths below the Earth's surface.  
D) The mantle does not exist under continental mountains.
46. Compared with the oceanic crust, the continental crust is
- A) thinner and less dense                      B) thinner and more dense  
C) thicker and less dense                      D) thicker and more dense

47. In which layer of Earth's interior is the pressure inferred to be 1.0 million atmospheres?

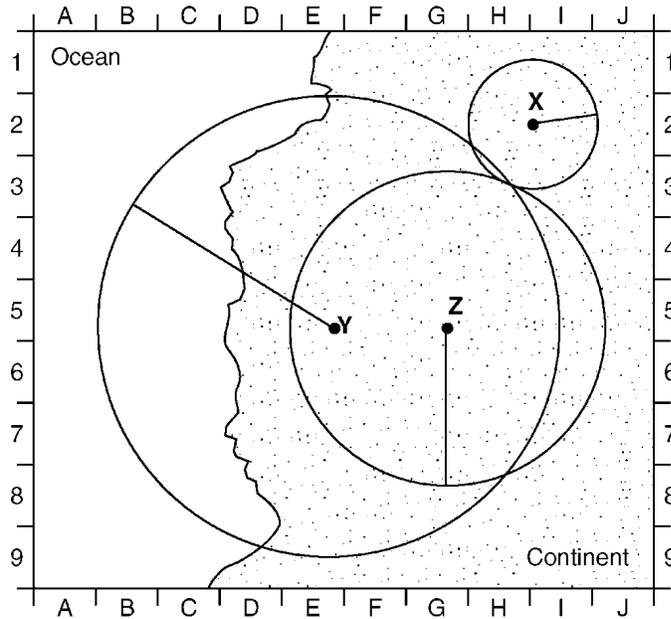
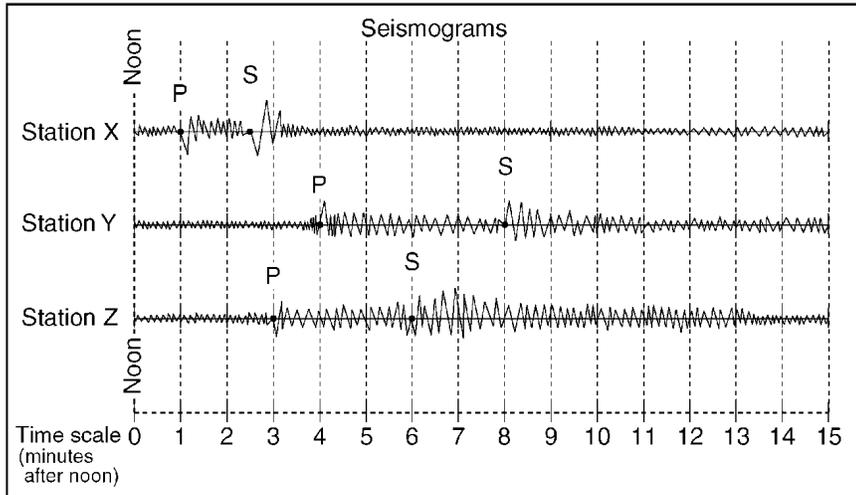
- A) outer core                      B) inner core  
C) rigid mantle                      D) stiffer mantle

48. Earth's inner core is inferred to be solid based on the analysis of

- A) seismic waves  
B) crustal rocks  
C) radioactive decay rates  
D) magnetic pole reversals

# Regents Review #8

Base your answers to questions 49 and 50 on the diagram and map below. The diagram shows three seismograms of the same earthquake recorded at three different seismic stations, X, Y, and Z. The distances from each seismic station to the earthquake epicenter have been drawn on the map. A coordinate system has been placed on the map to describe locations. The map scale has not been included.



49. Approximately how far away from station Y is the epicenter?  
 A) 1,300 km      B) 2,600 km      C) 3,900 km      D) 5,200 km

50. On the map, which location is closest to the epicenter of the earthquake?  
 A) E-5      B) G-1      C) H-3      D) H-8

51. According to tectonic plate maps, New York State is presently located

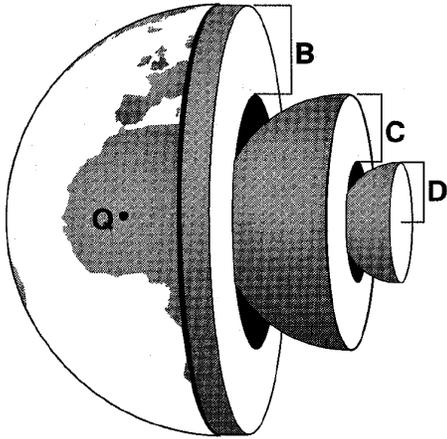
- A) at a convergent plate boundary  
 B) above a mantle hot spot  
 C) above a mid-ocean ridge  
 D) near the center of a large plate

52. A seismic station receives a P-wave at 12:07 a.m. and an S-wave at 12:12 a.m. The station's distance from the epicenter is approximately

- A) 2,600 km      B) 3,400 km  
 C) 4,000 km      D) 8,800 km

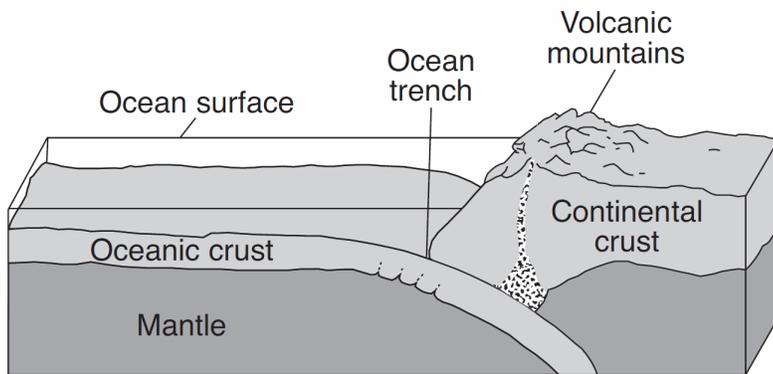
## Regents Review #8

Base your answers to questions 53 and 54 on the diagram of Earth shown below. Letters *B*, *C*, and *D* represent layers of Earth. Letter *Q* represents a location on Earth's surface.



53. Which letter best represents Earth's mantle?
- A) *Q*                      B) *B*                      C) *C*                      D) *D*
54. What is the probable density of the granitic bedrock at *Q*?
- A) 1.0 g/cm<sup>3</sup>              B) 2.7 g/cm<sup>3</sup>              C) 3.0 g/cm<sup>3</sup>              D) 5.5 g/cm<sup>3</sup>
- 

55. The block diagram below shows the boundary between two tectonic plates.

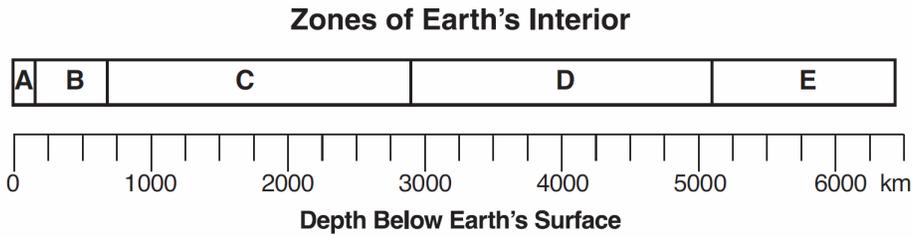


(Not drawn to scale)

Which type of plate boundary is shown?

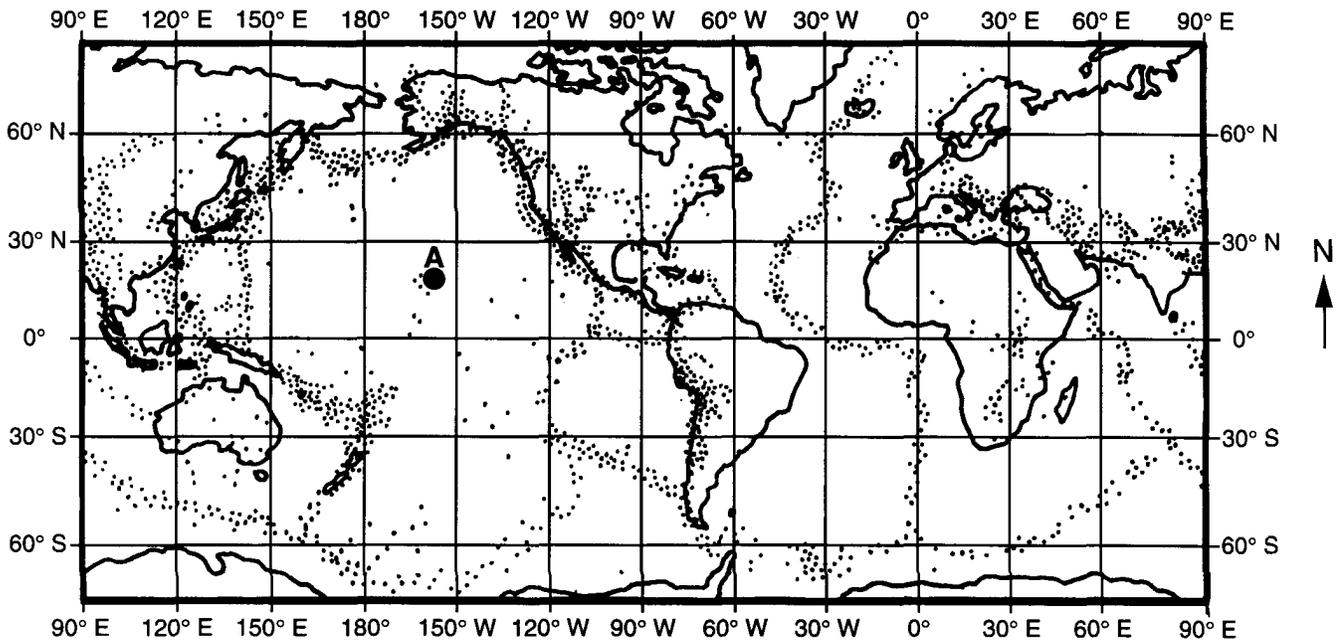
- A) divergent              B) convergent              C) transform              D) complex
- 
56. A seismic station recorded the arrival of a *P*-wave at 10:00:00 a.m. The *S*-wave arrival was recorded at 10:04:20 a.m. What is the approximate distance between the earthquake epicenter and the seismic station?
- A)  $1.1 \times 10^3$  km              B)  $2.2 \times 10^3$  km  
C)  $2.9 \times 10^3$  km              D)  $7.2 \times 10^3$  km
57. An earthquake shear wave generally travels faster as the wave moves deeper into Earth's interior because greater depths have
- A) less confining pressure  
B) lower melting points  
C) greater rock density  
D) greater rock temperatures

Base your answers to questions 58 through 61 on the diagram below, which represents zones of Earth's interior, identified by letters *A* through *E*. The scale shows depths below Earth's surface, measured in kilometers.



58. Which zone is characterized by partially melted rock and large-scale convection currents?  
 A) zone *A*                      B) zone *B*                      C) zone *C*                      D) zone *E*
59. *S*-waves produced by an earthquake are transmitted through zones  
 A) *A* and *B*, but not zones *C*, *D*, and *E*                      B) *A*, *B*, and *C*, but not zones *D* and *E*  
 C) *C*, *D*, and *E*, but not zones *A* and *B*                      D) *D* and *E*, but not zones *A*, *B*, and *C*
60. The Moho is a boundary located in zone  
 A) *A*                      B) *B*                      C) *E*                      D) *D*
61. Which zone of Earth's interior has a density closest to the densities of the other terrestrial planets?  
 A) zone *A*                      B) zone *E*                      C) zone *C*                      D) zone *D*

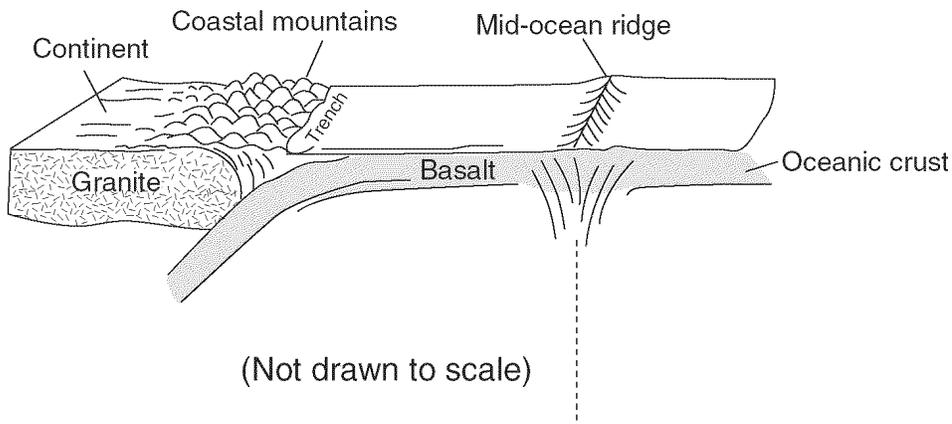
62. Base your answer to the following question on the map below. Dots on the map show the distribution of major earthquake epicenters. The shaded circle labeled *A* represents a location on Earth's surface.



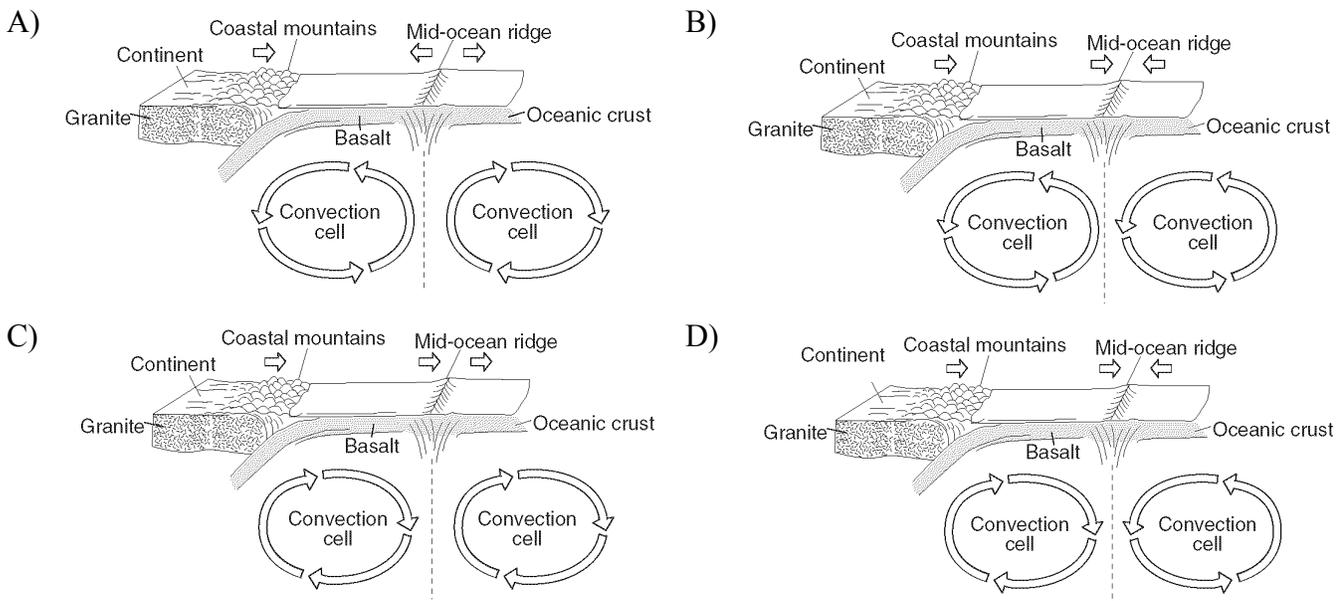
Location *A* is best described as an area that is

- A) within a rift valley at a mid-ocean ridge  
 B) at the boundary between two diverging plates  
 C) within a deep-sea trench between two converging plates  
 D) above a mantle hot spot near the center of a crustal plate

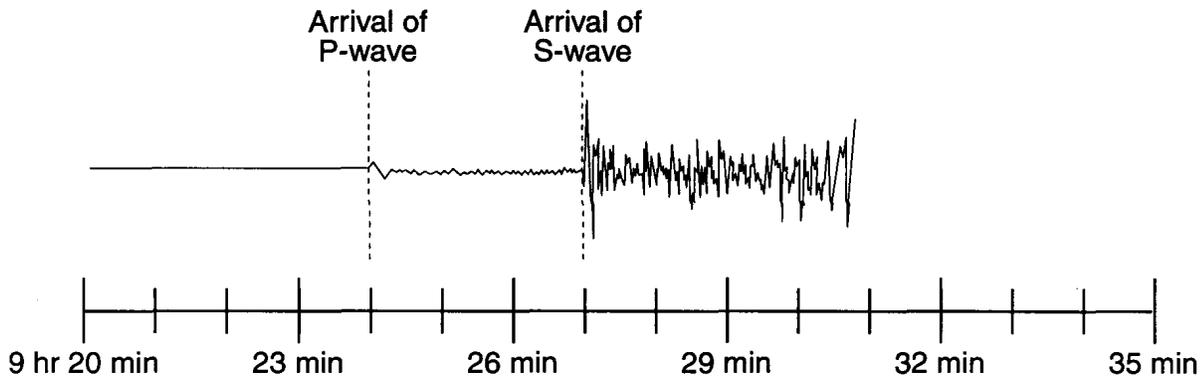
63. The diagram below shows some features of Earth's crust and upper mantle.



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



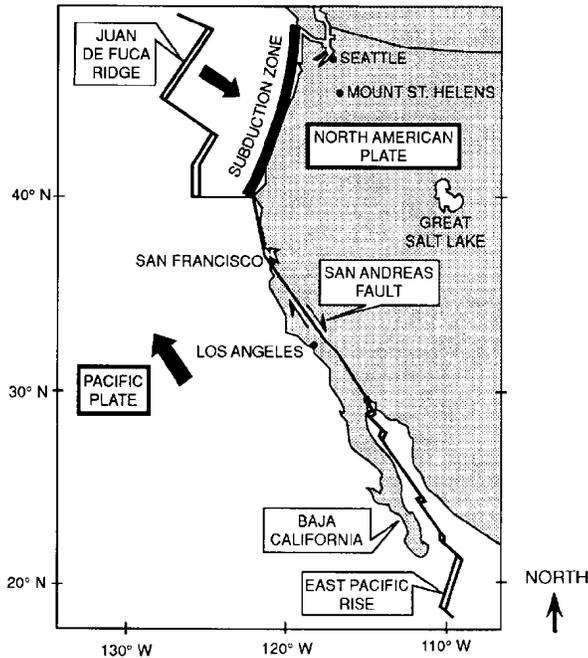
64. The seismogram below shows the arrival times of an earthquake's *P*-wave and *S*-wave recorded at a seismic station in Portland, Oregon.



What was the distance from Portland to the earthquake's epicenter?

- A) 1800 km      B) 2500 km      C) 3200 km      D) 4100 km

Base your answers to questions 65 through 68 on the map below, which shows crustal plate boundaries located along the Pacific coastline of the United States. The arrows show the general directions in which some of the plates appear to be moving slowly.

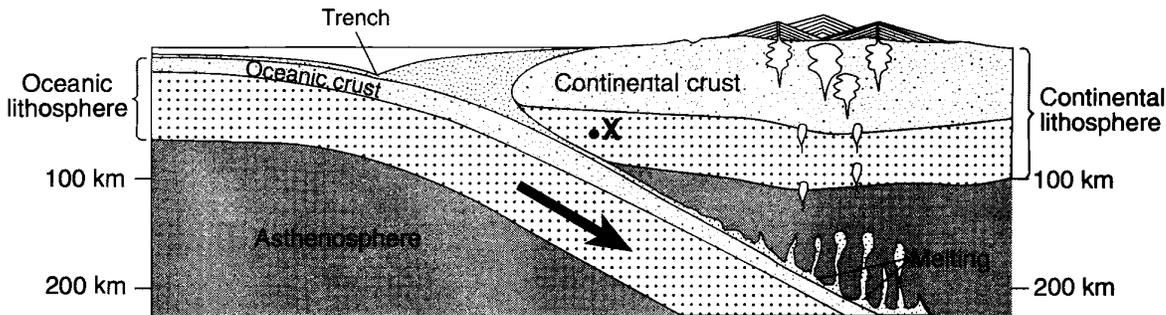


65. The best way to find the direction of crustal movement along the San Andreas fault is to
- study the Earth's present magnetic field
  - observe erosion along the continental coastline
  - measure gravitational strength on opposite sides of the fault
  - match displaced rock types from opposite sides of the fault
66. What would a study of the East Pacific rise (a mid-ocean ridge) indicate about the age of the basaltic bedrock in this area?
- The bedrock is youngest at the ridge.
  - The bedrock is oldest at the ridge.
  - The bedrock at the ridge is the same age as the bedrock next to the continent.
  - The bedrock at the ridge is the same age as the bedrock at the San Andreas fault.

67. Geologic studies of the San Andreas fault indicate that
- many earthquakes occur along the San Andreas fault
  - the North American plate and the Pacific plate are locked in dynamic equilibrium
  - the subduction zone is the boundary at which the crustal plates are drifting apart
  - the age of the bedrock increases as distance from the fault increases
68. Which features are most often found at crustal plate boundaries like those shown on the map?
- meandering rivers and warm-water lakes
  - plains and plateaus
  - geysers and glaciers
  - faulted bedrock and volcanoes
- 
69. Useful information regarding the composition of the interior of the Earth can be derived from earthquakes because earthquake waves
- release materials from within the Earth
  - travel through the Earth at a constant velocity
  - travel at different rates through different materials
  - change radioactive decay rates of rocks
70. Through which materials can *P*-waves travel?
- solid rock, only
  - magma and water, only
  - magma, water, and natural gas, only
  - solid rock, magma, water, and natural gas
71. What is the average velocity of an earthquake's S-wave in its first 4 minutes of travel?
- |               |               |
|---------------|---------------|
| A) 1 km/min   | B) 250 km/min |
| C) 500 km/min | D) 4 km/min   |
72. Which observation about the Mid-Atlantic Ridge region provides the best evidence that the seafloor has been spreading for millions of years?
- The bedrock of the ridge and nearby seafloor is igneous rock.
  - The ridge is the location of irregular volcanic eruptions.
  - Several faults cut across the ridge and nearby seafloor.
  - Seafloor bedrock is younger near the ridge and older farther away.

## Regents Review #8

Base your answers to questions 73 and 74 on the cross section below, which shows the boundary between two lithospheric plates. Point X is a location in the continental lithosphere. The depth below Earth's surface is labeled in kilometers.



(Not drawn to scale)

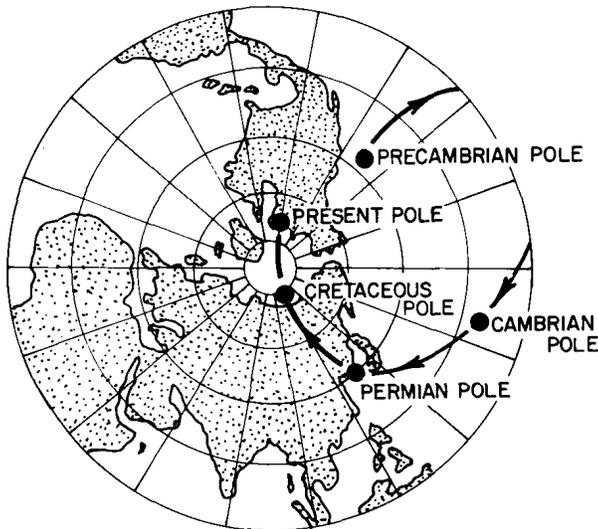
73. Point X is located in which Earth layer?

- A) rigid mantle    B) stiffer mantle    C) asthenosphere    D) outer core

74. Between which two lithospheric plates could this boundary be located?

- A) South American Plate and African Plate    B) Scotia Plate and Antarctic Plate  
C) Nazca Plate and South American Plate    D) African Plate and Arabian Plate

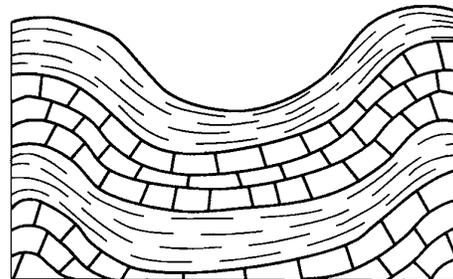
75. The map below shows the position of the north magnetic pole at various times in the past.



These positions have most likely been determined by using

- A) compass readings on various continents today  
B) magnetic properties of rocks formed during various geologic times  
C) seismic waves traveling through the Earth's interior  
D) fossils found in bedrock formed during various geologic times

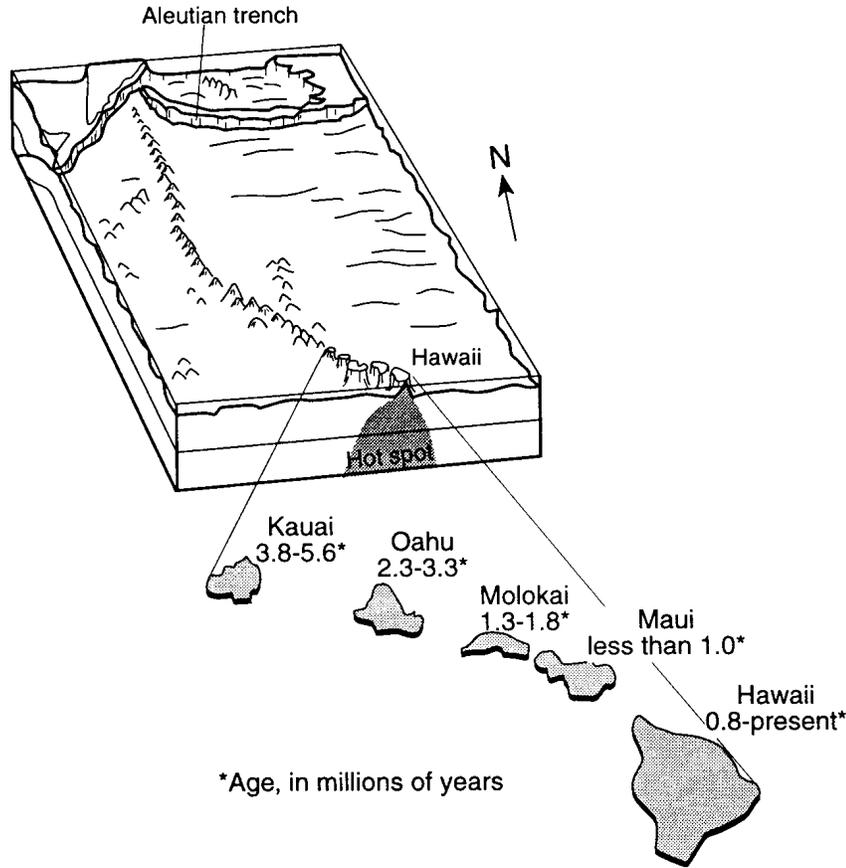
76. The cross section below shows a portion of Earth's crust.



Which observation provides the most direct evidence that crustal plate collision has occurred near this region?

- A) alternating layers of shale and limestone bedrock  
B) absence of an igneous intrusive rock  
C) different thicknesses of the sedimentary layers  
D) folding of the sedimentary layers

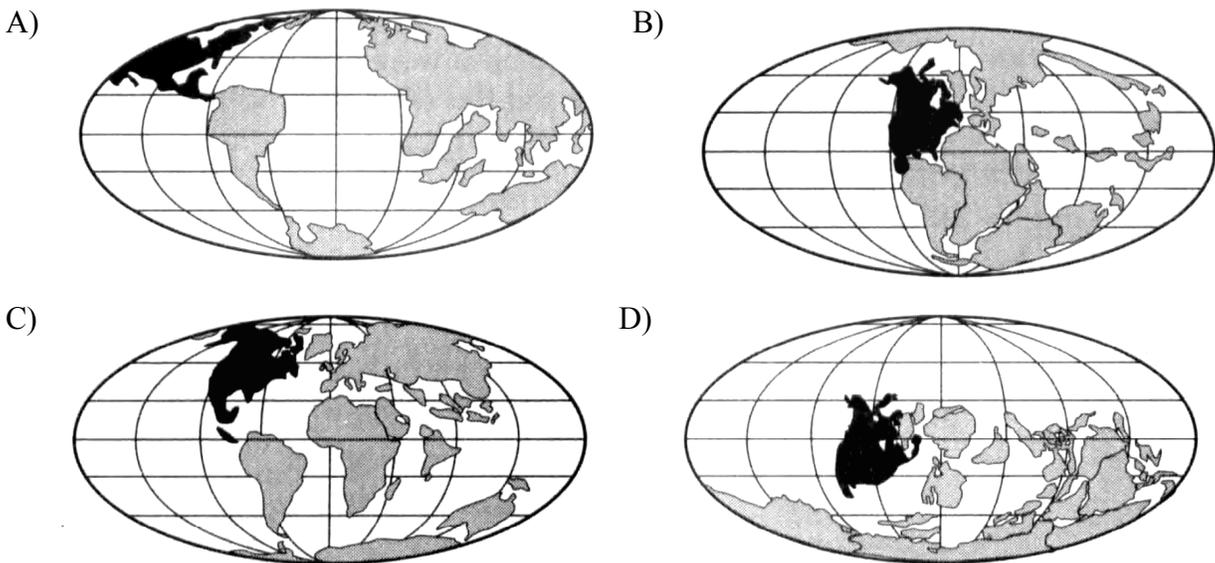
77. The block diagram below shows the bedrock age as measured by radioactive dating and the present location of part of the Hawaiian Island chain. These volcanic islands may have formed as the Pacific Plate moved over a mantle hot spot.



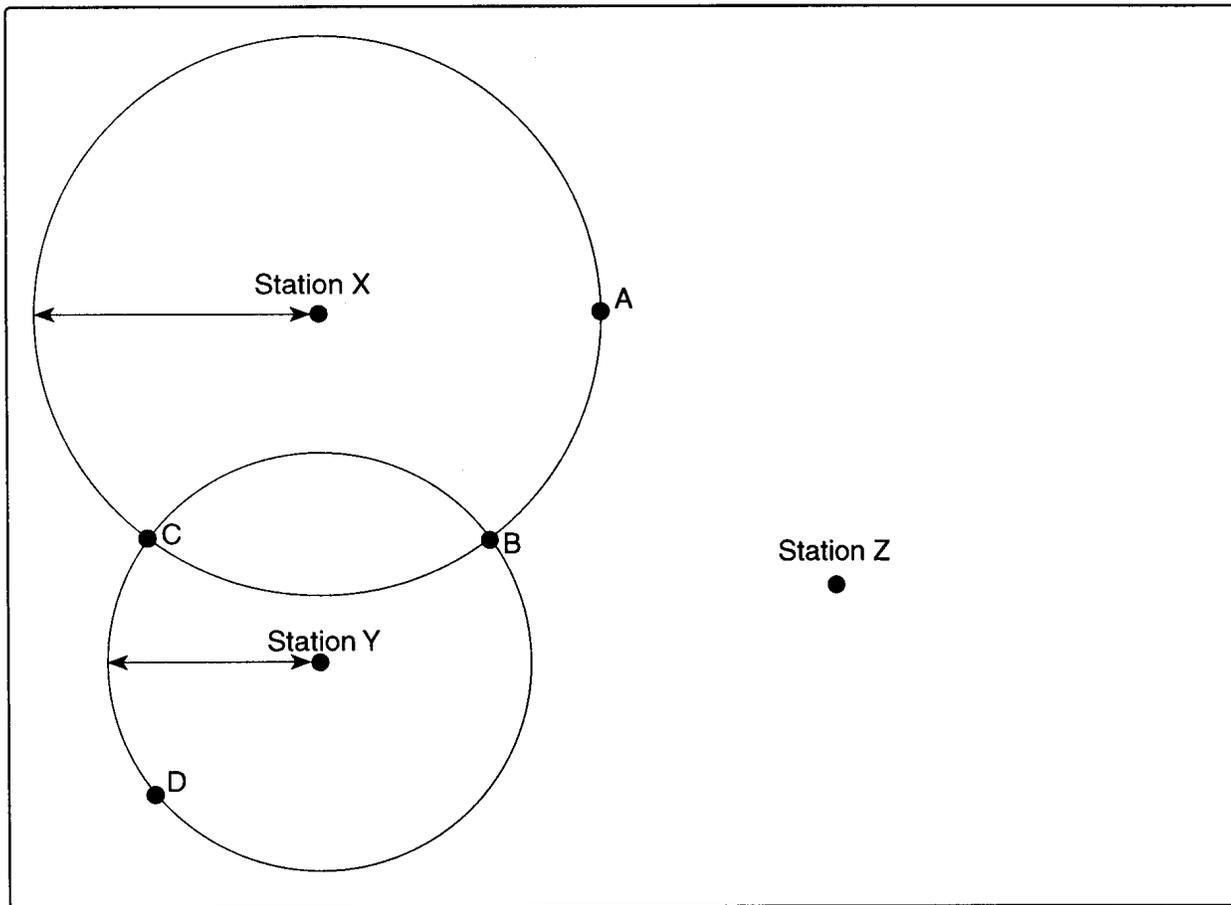
This diagram provides evidence that the Pacific Crustal Plate was moving toward the

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

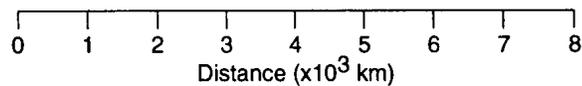
78. Which map best indicates the probable locations of continents 100 million years from now if tectonic plate movement continues at its present rate and direction?



Base your answers to questions 79 through 83 on the map below, which shows seismic stations *X*, *Y*, and *Z* that have recorded seismic waves from the same earthquake. The distances from seismic stations *X* and *Y* to the earthquake epicenter have been drawn on the map. Locations *A*, *B*, *C*, and *D* represent possible earthquake epicenters. The distance from seismic station *Z* to the earthquake epicenter has been deliberately omitted.



(Drawn to scale)

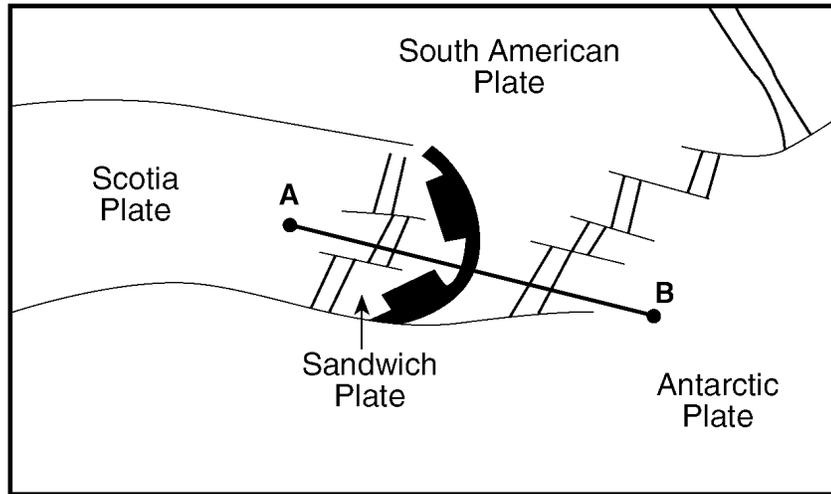


79. How long did the *P*-wave take to travel from the earthquake epicenter to station *Y*?  
 A) 2 min 10 sec    B) 3 min 40 sec    C) 4 min 0 sec    D) 5 min 40 sec
80. How far is station *X* from the earthquake epicenter?  
 A) 5,200 km    B) 2,400 km    C) 3,000 km    D) 4,000 km
81. Station *Z* recorded a time difference of 6 minutes 40 seconds between the arrival of the *P*-waves and the arrival of the *S*-waves. The earthquake epicenter was located closest to location  
 A) *A*    B) *B*    C) *C*    D) *D*
82. Compared to the speed of *S*-waves in a given Earth material, the speed of *P*-waves is  
 A) always slower    B) always faster  
 C) always identical    D) sometimes slower and sometimes faster

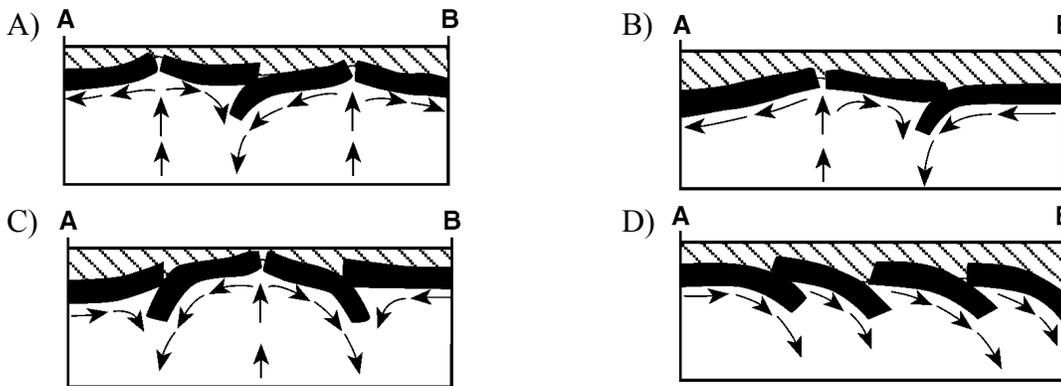
83. If the earthquake's focus was 2 kilometers below Earth's surface, the earthquake occurred in the

- A) lithosphere      B) asthenosphere      C) stiffer mantle      D) outer core

84. On the map below, line *AB* is drawn across several of Earth's tectonic plates in the South Atlantic Ocean.



Which cross section best represents the plate boundaries and mantle movement beneath line *AB*?



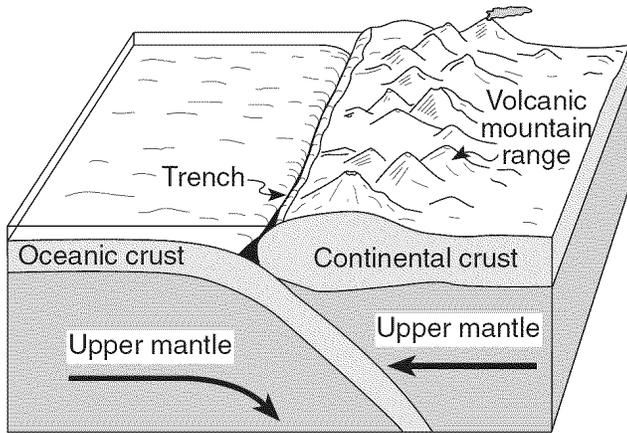
85. Fossils of organisms that lived in shallow water can be found in horizontal sedimentary rock layers at great ocean depths. This fact is generally interpreted by most Earth scientists as evidence that

- A) the cold water deep in the ocean kills shallow-water organisms  
 B) sunlight once penetrated to the deepest parts of the ocean  
 C) organisms that live in deep water evolved from species that once lived in shallow water  
 D) sections of the Earth's crust have changed their elevations relative to sea level

86. When the seafloor moves as a result of an underwater earthquake and a large tsunami develops, what will most likely occur?

- A) Deep-ocean sediments will be transported over great distances.  
 B) No destruction will occur near the origin of the earthquake.  
 C) The direction of the tsunami will be determined by the magnitude of the earthquake.  
 D) Severe destruction will occur in coastal areas.

87. The diagram below shows the interaction of two tectonic plates.



(Not drawn to scale)

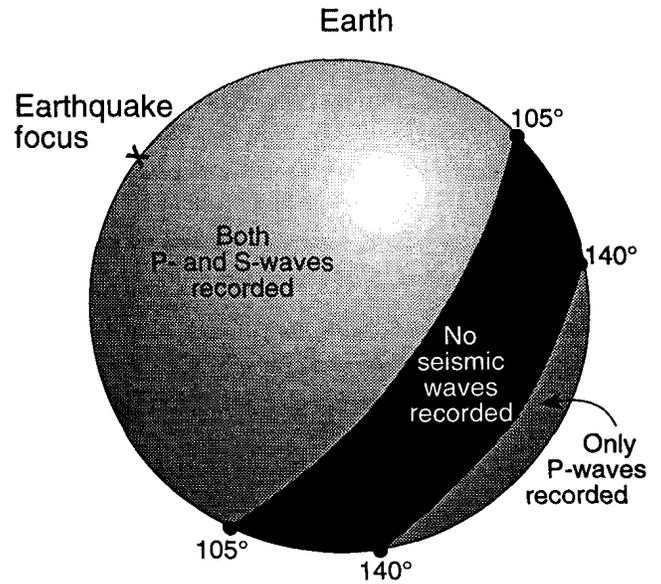
The type of plate boundary represented in the diagram most likely exists between the

- A) Antarctic Plate and the African Plate
- B) Antarctic Plate and the Indian-Australian Plate
- C) South American Plate and the Nazca Plate
- D) South American Plate and the African Plate

88. Which block diagram best represents the relative direction of plate motion at the San Andreas Fault?

- A)
- B)
- C)
- D)

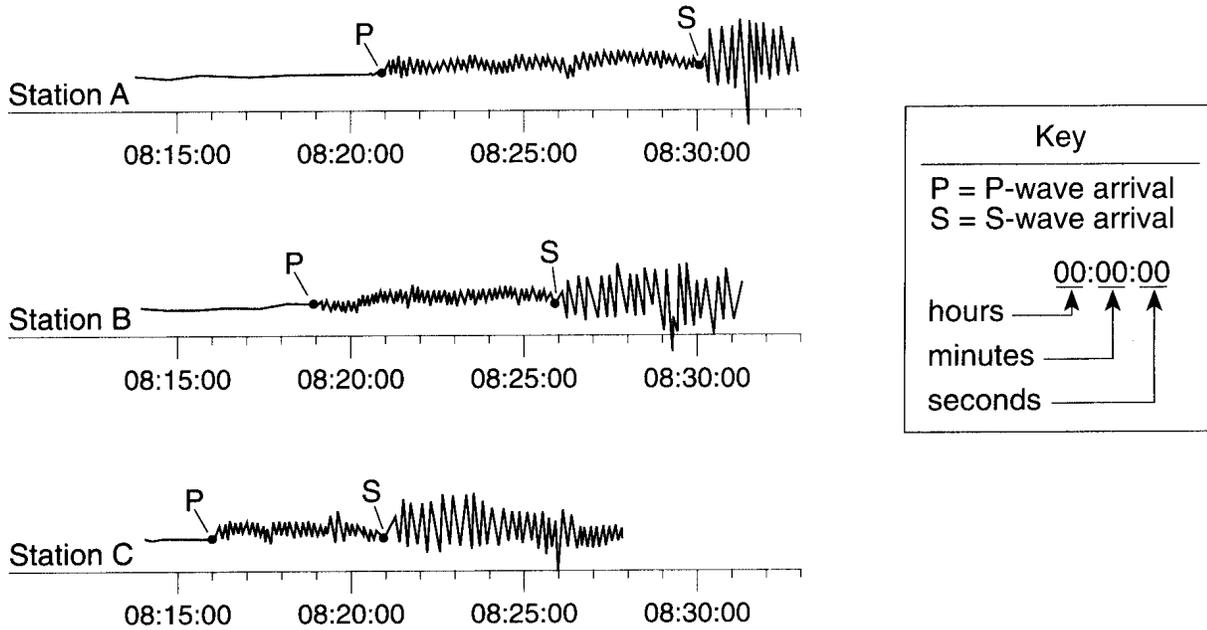
89. An earthquake recorded by seismic stations around the world created the pattern of seismic wave recordings shown in the diagram below



Which statement best explains this pattern of wave recordings?

- A) Some seismic waves cannot travel through oceans to reach every location on Earth.
- B) *S*-waves are too weak to travel very far from the earthquake focus.
- C) Mountain ranges and tectonic plate boundaries absorb or bend seismic waves.
- D) Layers with different properties inside Earth absorb or bend seismic waves.

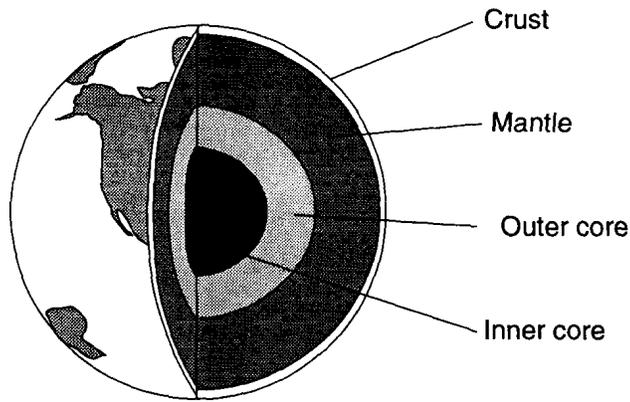
90. The diagram below represents three seismograms showing the same earthquake as it was recorded at three different seismic stations, *A*, *B*, and *C*.



Which statement correctly describes the distance between the earthquake epicenter and these seismic stations?

- A) *A* is closest to the epicenter, and *C* is farthest from the epicenter.
- B) *B* is closest to the epicenter, and *C* is farthest from the epicenter.
- C) *C* is closest to the epicenter, and *A* is farthest from the epicenter.
- D) *A* is the closest to the epicenter, and *B* is the farthest from the epicenter.

Base your answers to questions 91 and 92 on the diagram below which represents Earth's interior zones.



( Not drawn to scale )

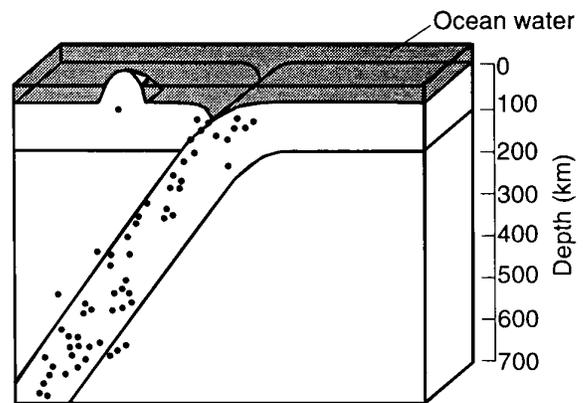
91. The thinnest section of Earth's crust is found beneath

- A) oceans
- B) desert regions
- C) coastal plains
- D) mountain regions

92. The composition of Earth's core is thought to be the same as the composition of many

- A) meteorites
- B) volcanic ashes
- C) granites
- D) basalts

93. The cross section below shows the location of earthquakes near a plate boundary.



Key

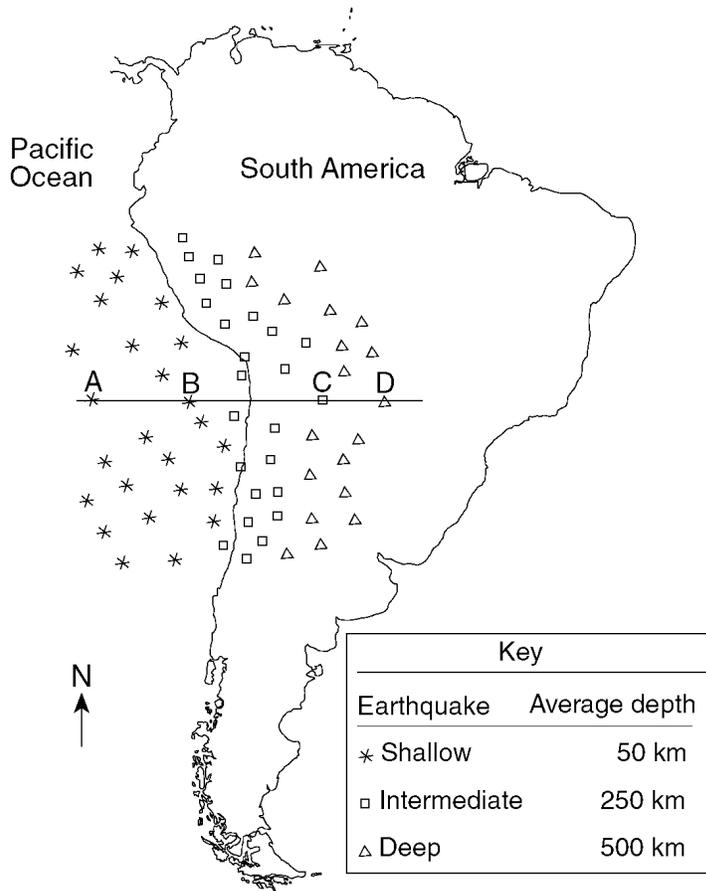
- Earthquake focus

This distribution of earthquakes near the plate boundary is most likely caused by

- A) a transform fault
- B) a mantle hot spot
- C) subduction of a crustal plate
- D) divergence of crustal plates

# Regents Review #8

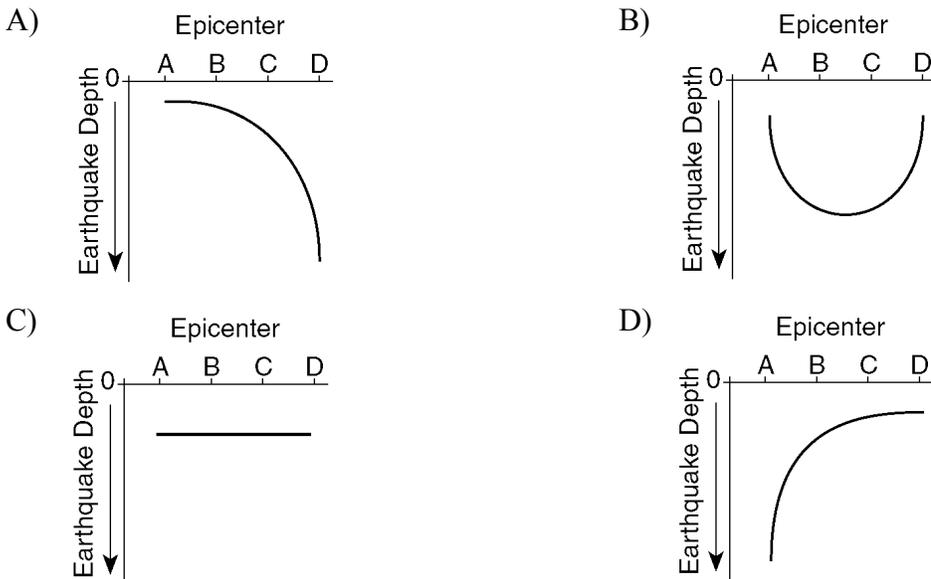
Base your answers to questions 94 and 95 on the map below, which shows the depths of selected earthquakes along the crustal plate boundary near the west coast of South America. Letters *A*, *B*, *C*, and *D* are epicenter locations along a west-to-east line at the surface. The relative depth of each earthquake is indicated.



94. The earthquake beneath epicenter *D* occurred in which part of Earth's interior?

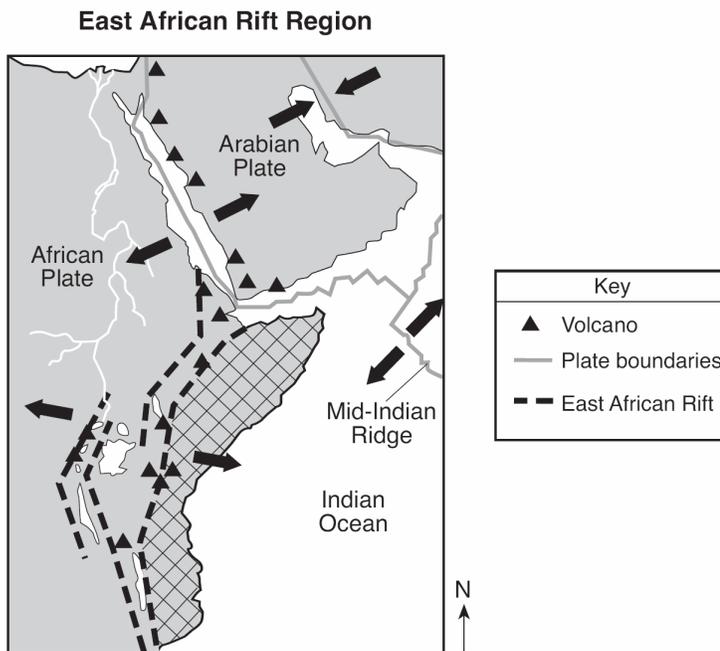
- A) crust                      B) rigid mantle              C) asthenosphere              D) stiffer mantle

95. Which graph best shows the depth of earthquakes beneath epicenters *A*, *B*, *C*, and *D*?

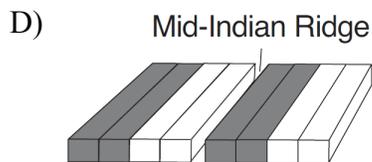
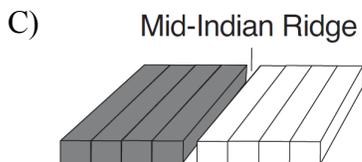
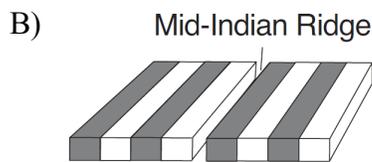
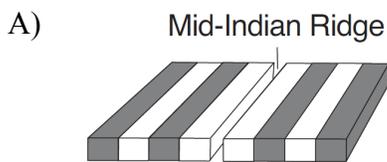
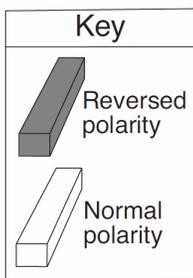


Base your answers to questions 96 and 97 on

the map below, which shows the tectonic plate boundaries near the East African Rift. Arrows show relative tectonic plate movement. A region of Africa is crosshatched.



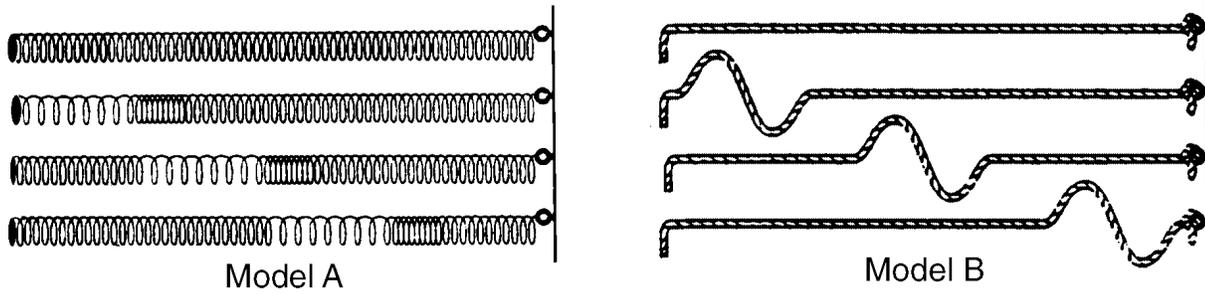
96. Which diagram best represents the polarity of the magnetic field preserved in the ocean-floor bedrock found on both sides of the Mid-Indian Ridge?



97. What appears to be happening to the crosshatched region of eastern Africa?

- A) A folded mountain range is forming as this region collides with the rest of Africa.
- B) Several volcanic mountains are forming as the rest of Africa subducts under this region.
- C) This region is moving eastward relative to the rest of Africa.
- D) This region is moving northward relative to the rest of Africa.

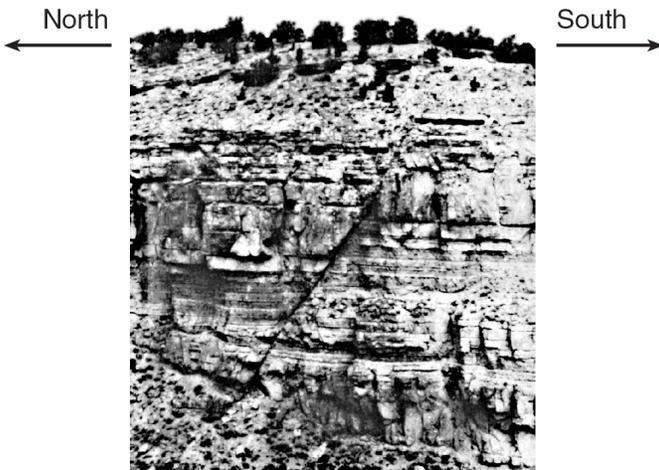
98. Base your answer to the following question on the diagram below, which shows models of two types of earthquake waves.



Model *A* best represents the motion of earthquake waves called

- A) *P*-waves (compressional waves) that travel faster than *S*-waves (shear waves) shown in model *B*
- B) *P*-waves (compressional waves) that travel slower than *S*-waves (shear waves) shown in model *B*
- C) *S*-waves (shear waves) that travel faster than *P*-waves (compressional waves) shown in model *B*
- D) *S*-waves (shear waves) that travel slower than *P*-waves (compressional waves) shown in model *B*

99. The photograph below shows an escarpment (cliff) located in the western United States. The directions for north and south are indicated by arrows. A fault in the sedimentary rocks is shown on the front of the escarpment.

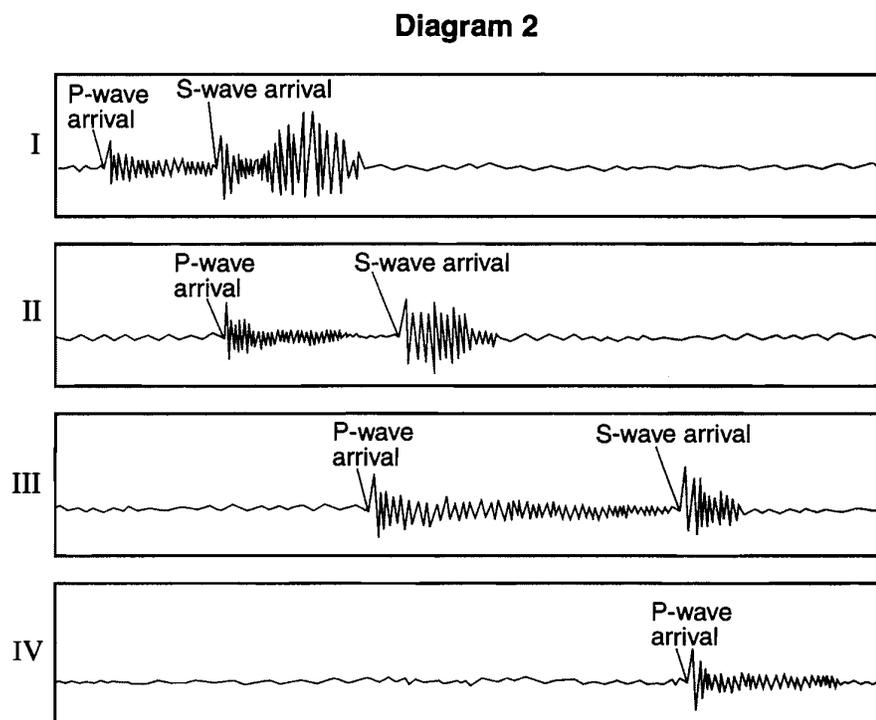
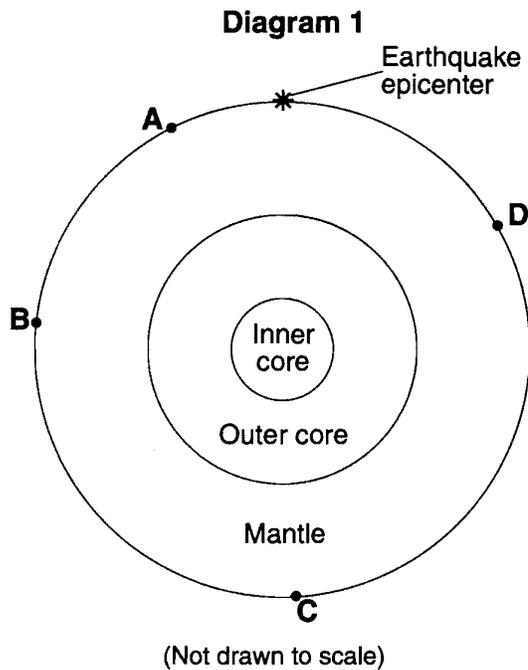


The photograph shows that the fault most likely formed

- A) after the rock layers were deposited, when the north side moved downward
- B) after the rock layers were deposited, when the north side moved upward
- C) before the rock layers were deposited, when the south side moved downward
- D) before the rock layers were deposited, when the south side moved upward

# Regents Review #8

Base your answers to questions **100** and **101** on the diagrams below. Diagram 1 represents a cross section of Earth and its interior layers. The asterisk (\*) shows the location of an earthquake epicenter. Letters *A* through *D* are seismic stations on Earth's surface. Diagram 2 shows four seismograms labeled I, II, III, and IV, which were recorded at seismic stations *A*, *B*, *C*, and *D* during the same time interval.



91. Which list correctly matches the seismograms with the seismic stations where they were recorded?

A) seismogram I - station *A*

seismogram II - station *B*

seismogram III - station *C*

seismogram IV - station *D*

B) seismogram I - station *B*

seismogram II - station *D*

seismogram III - station *A*

seismogram IV - station *C*

C) seismogram I - station *C*

seismogram II - station *B*

seismogram III - station *D*

seismogram IV - station *A*

D) seismogram I - station *A*

seismogram II - station *D*

seismogram III - station *B*

seismogram IV - station *C*

101 Station *D* is 8000 kilometers from the earthquake epicenter. How long did it take for the first *P*-wave to travel from the epicenter to station *D*?

A) 9 minutes 20 seconds

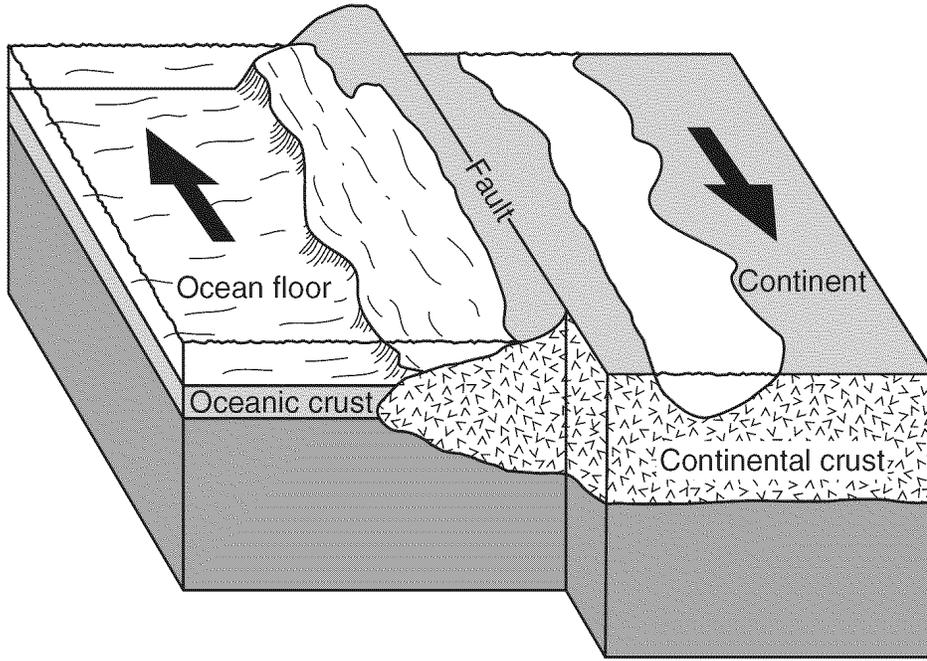
B) 11 minutes 20 seconds

C) 20 minutes 40 seconds

D) 4 minutes 20 seconds

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102. Arrows in the block diagram below show the relative movement along a tectonic plate boundary.

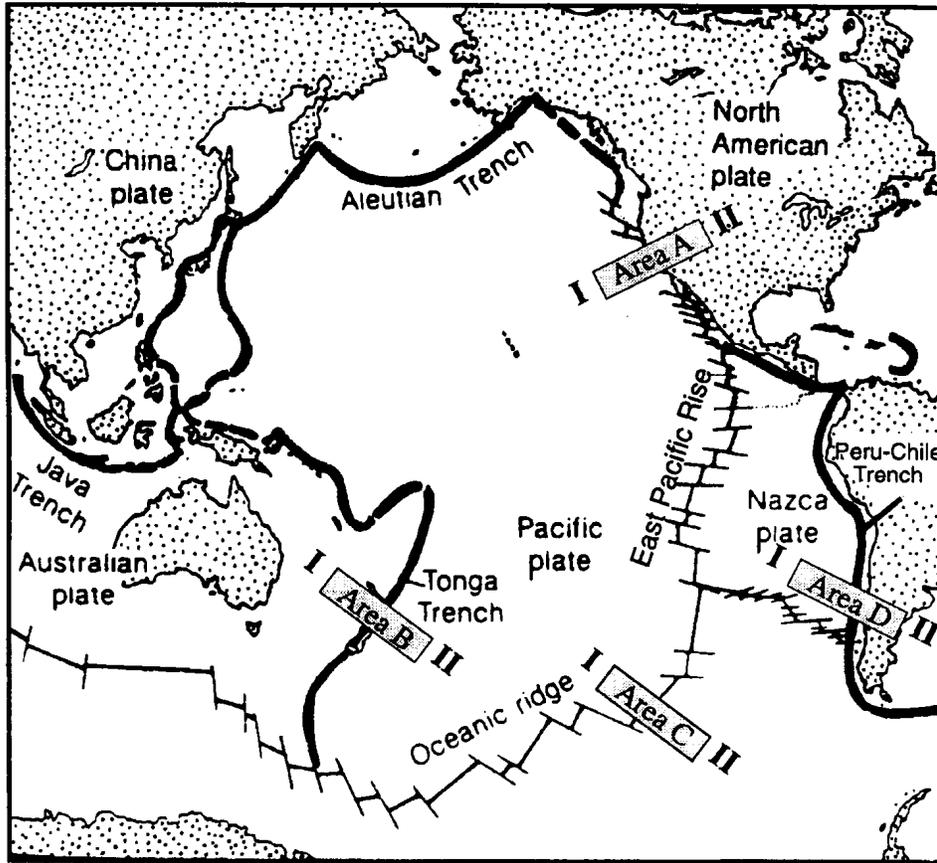


(Not drawn to scale)

Between which two tectonic plates does this type of plate boundary exist?

- A) Nazca Plate and South American Plate
- B) Eurasian Plate and Indian-Australian Plate
- C) North American Plate and Eurasian Plate
- D) Pacific Plate and North American Plate

Base your answers to questions 103 and 104 on the map below which shows mid-ocean ridges and trenches in the Pacific Ocean. Specific areas A, B, C, and D are indicated by shaded rectangles.



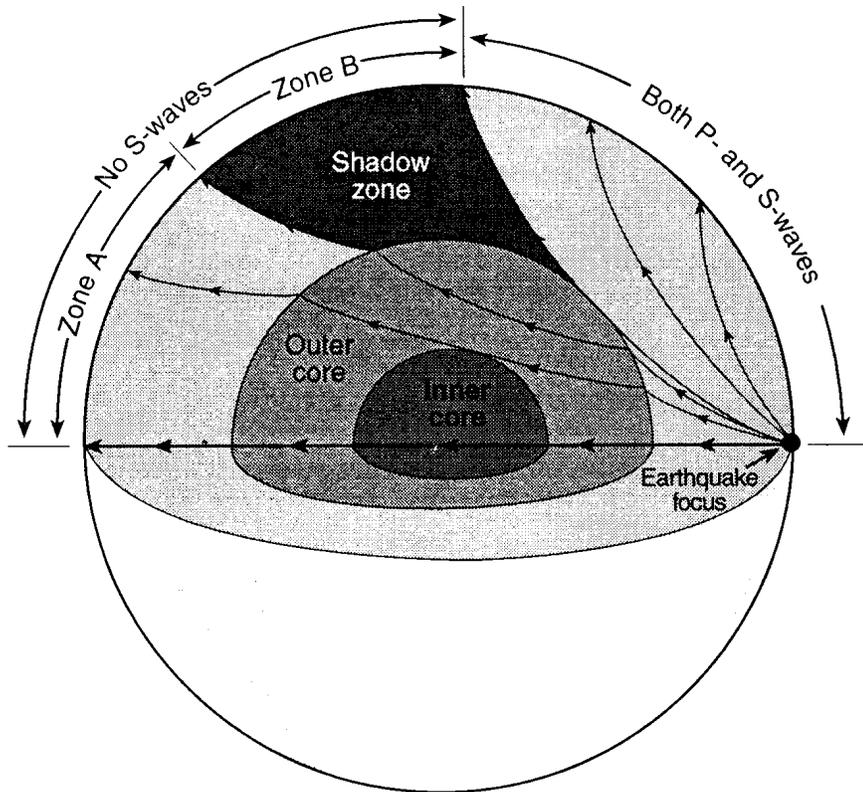
103 Movement of the crustal plates shown in the diagram is most likely caused by

- A) the revolution of the Earth
- B) the erosion of the Earth's crust
- C) shifting of the Earth's magnetic poles
- D) convection currents in the Earth's mantle

104 Mid-ocean ridges such as the East Pacific Rise and the Oceanic Ridge are best described as

- A) mountains containing folded sedimentary rocks
- B) mountains containing fossils of present-day marine life
- C) sections of the ocean floor that contain the youngest oceanic crust
- D) sections of the ocean floor that are the remains of a submerged continent

105. The cross section below shows the distribution of earthquake waves as they travel through Earth's interior. The arrows within Earth's interior represent the pathways followed by some earthquake waves.



Which types of earthquake waves will most probably be detected in zones *A* and *B*?

- A) zone *A*: *P*-waves, only; zone *B*: *S*-waves, only
- B) zone *A*: *P*-waves, only; zone *B*: no *P*- or *S*-waves
- C) zone *A*: *S*-waves, only; zone *B*: *P*-waves, only
- D) zone *A*: *S*-waves, only; zone *B*: no *P*- or *S*-waves