

Name: _____

Date: _____

1. In which area of Earth's interior is the pressure most likely to be 2.5 million atmospheres?

A. asthenosphere B. stiffer mantle
C. inner core D. outer core

2. The actual temperature at the boundary between the stiffer mantle and the outer core is estimated to be approximately

A. 1.5°C B. 250°C
C. 3000°C D. 5000°C

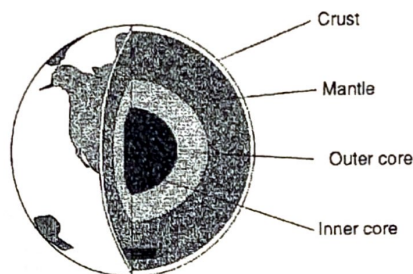
3. Compared to oceanic crust, continental crust is generally

A. older and thinner
B. older and thicker
C. younger and thinner
D. younger and thicker

4. Which observed feature would provide the best evidence of crustal stability?

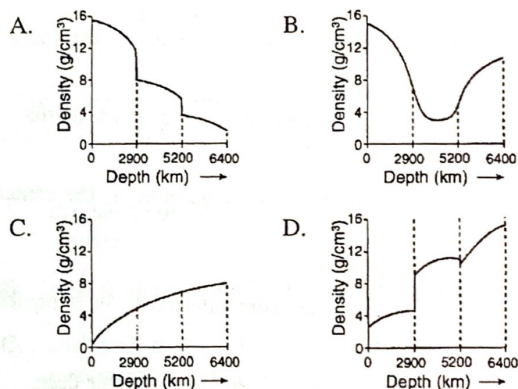
A. horizontal sedimentary layers
B. changed benchmark elevations
C. folded, faulted, and tilted rock strata
D. marine fossils at elevations high above sea level

5. Base your answer(s) to the following question(s) on the *Earth Science Reference Tables*, the diagram below, and your knowledge of Earth science. The diagram represents Earth's interior zones.



(Not drawn to scale)

Which graph best represents the relationship between depth below Earth's surface and density?



6. At which depth below Earth's surface is the density most likely 9.5 grams per cubic centimeter?

A. 1,500 km B. 2,000 km
C. 3,500 km D. 6,000 km

7. Base your answer(s) to the following question(s) on the *Earth Science Reference Tables* and on your knowledge of Earth science.

The pressure at the interface between the mantle and the outer core of Earth is inferred to be approximately

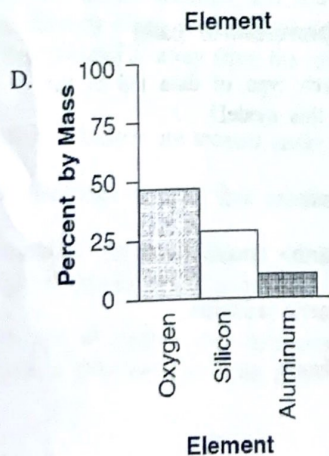
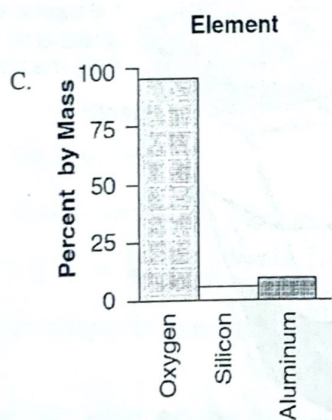
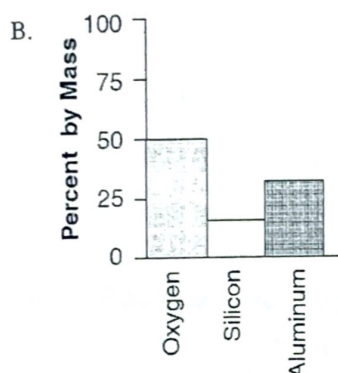
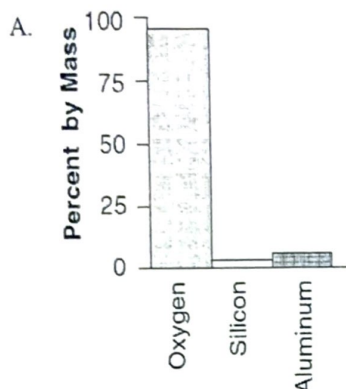
- A. 1.0 million atmospheres
 - B. 1.4 million atmospheres
 - C. 3.0 million atmospheres
 - D. 3.4 million atmospheres
8. From the top of the stiffer mantle to the center of Earth, the rock material is inferred to be
- A. solid all the way to the center of the inner core
 - B. solid, then liquid to the center of the inner core
 - C. solid, then liquid, then solid again to the center of the inner core
 - D. solid, then liquid, then gaseous to the center of the inner core
9. Why is Earth's outer core inferred to be a liquid?
- A. P-waves can pass through the outer core.
 - B. P-waves cannot pass through the outer core.
 - C. S-waves can pass through the outer core.
 - D. S-waves cannot pass through the outer core.

10. Base your answer(s) to the following question(s) on the 2001 edition of the *Earth Science Reference Tables* and on your knowledge of Earth science.

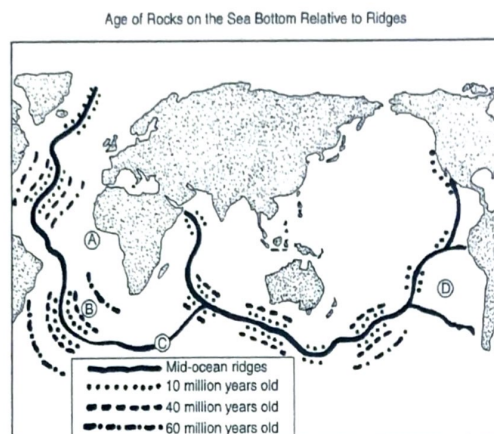
Which statement most accurately compares Earth's crust and Earth's mantle?

- A. The crust is thinner and less dense than the mantle.
 - B. The crust is thinner and more dense than the mantle.
 - C. The crust is thicker and less dense than the mantle.
 - D. The crust is thicker and more dense than the mantle.
11. Earth's outer core is best inferred to be
- A. liquid, with an average density of approximately 4 g/cm^3
 - B. liquid, with an average density of approximately 11 g/cm^3
 - C. solid, with an average density of approximately 4 g/cm^3
 - D. solid, with an average density of approximately 11 g/cm^3

12. Which graph correctly represents the three most abundant elements, by mass, in Earth's crust?



13. Base your answer(s) to the following question(s) on the map, which 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.



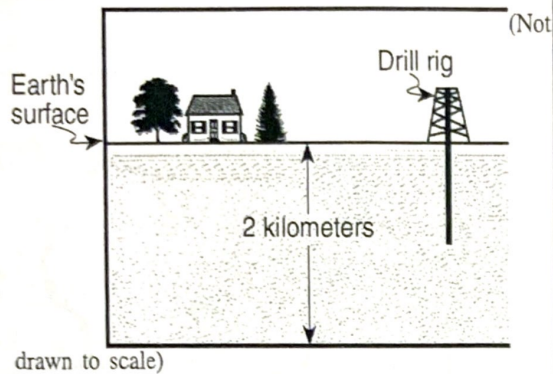
Rising convection currents in the asthenosphere would most likely be under location

- A. A B. B C. C D. D

14. Most inferences about the characteristics of Earth's mantle and core are based on

- A. the behavior of seismic waves in Earth's interior
- B. well drillings from Earth's mantle and core
- C. chemical changes in exposed and weathered metamorphic rocks
- D. comparisons between Moon rocks and Earth rocks

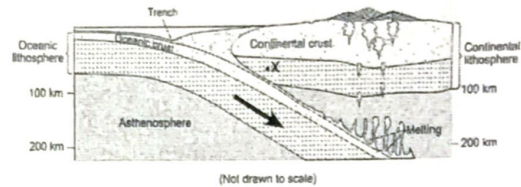
15. The cross section below shows a drill rig used to collect rock samples from below Earth's surface.



The rock samples collected from the bottom of the drill hole came from which Earth layer?

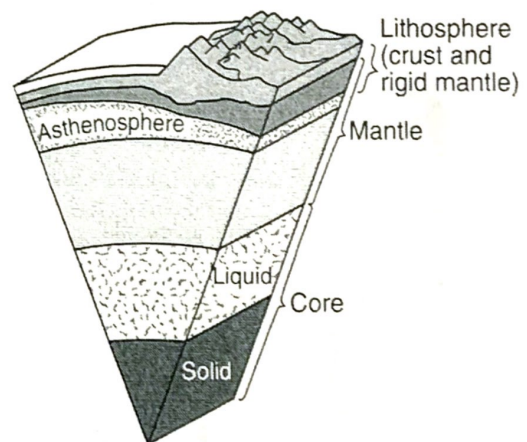
- A. lithosphere B. hydrosphere
C. asthenosphere D. stiffer mantle
16. Scientists have inferred the structure of Earth's interior mainly by analyzing
- A. the Moon's interior
B. the Moon's composition
C. Earth's surface features
D. Earth's seismic data
17. In which Earth layer are most convection currents that cause seafloor spreading thought to be located?
- A. crust B. asthenosphere
C. outer core D. inner core
18. What happens to the density and temperature of rock within Earth's interior as depth increases?
- A. density decreases and temperature decreases
B. density decreases and temperature increases
C. density increases and temperature increases
D. density increases and temperature decreases

19. Base your answer(s) to the following question(s) 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.



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 pl
D. African Plate and Arabian Plate
20. A model of Earth's internal structure is shown below.

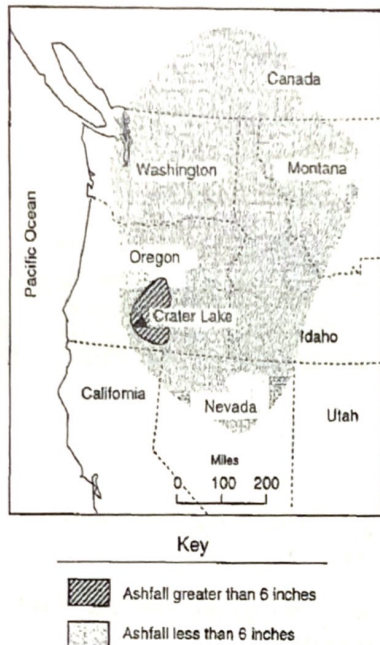


(Not drawn to scale)

Analysis of which type of data led to the development of this model?

- A. seismic waves
B. depth of Earth's oceans
C. electromagnetic radiation
D. isobar gradients

21. Base your answer(s) to the following question(s) on the map below, which shows the area of the northwestern United States affected by a major volcanic eruption at Crater Lake during the Holocene Epoch.



The pattern of distribution of the ash from the volcano was almost likely caused by the direction of the

- A. magnetic field
 - B. force of the volcanic eruption
 - C. flow of surface water
 - D. atmospheric air movements
22. Which information indicates that new seafloor rock is forming along a mid-ocean ridge and then moving horizontally away from the ridge?
- A. Most volcanoes are located under ocean water
 - B. Seafloor rock is older than continental rock
 - C. Fossils of marine organisms can be found at high elevations on continents
 - D. The age of seafloor rock increases as the distance from the mid-ocean ridge increases

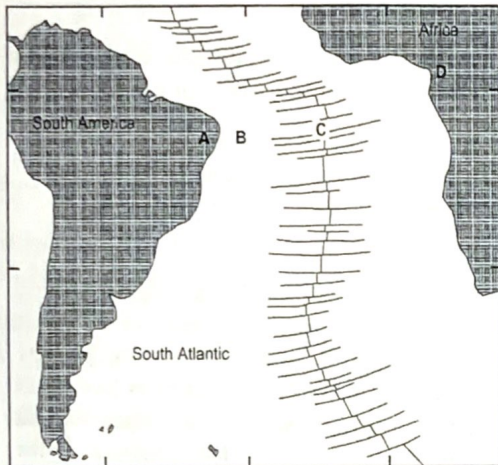
23. Which evidence causes most scientists to believe that seafloor spreading occurs at the mid-Atlantic Ridge?

- A. Oceanic crust is oldest at the ridge.
- B. Large sedimentary folds exist in the mantle near the ridge.
- C. Oceanic crust on both sides of the ridge is less dense than continental crust.
- D. Oceanic crust on both sides of the ridge shows matching patterns of reversed and normal magnetic polarity.

24. The Himalayan Mountains are located along a portion of the southern boundary of the Eurasian Plate. At the top of Mt. Everest (29,028 feet) in the Himalayan Mountains, climbers have found fossilized marine shells in the surface bedrock. From this observation, which statement is the best inference about the origin of the Himalayan Mountains?

- A. The Himalayan Mountains were formed by volcanic activity.
- B. Sea level has been lowered more than 29,000 feet since the shells were fossilized.
- C. The bedrock containing the fossil shells is part of an uplifted seafloor.
- D. The Himalayan Mountains formed at a divergent plate boundary.

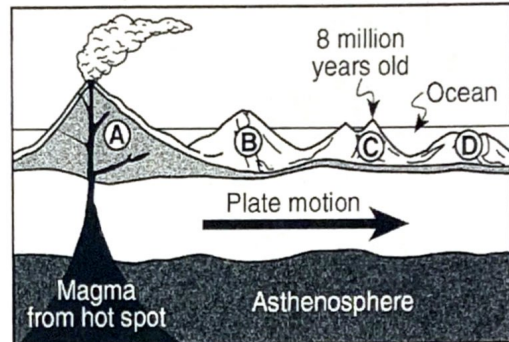
25. Base your answer(s) to the following question(s) on the map below. The map shows the continents of Africa and South America, the ocean between them, and the ocean ridge and transform faults. Locations A and D are on the continents. Locations B and C are on the ocean floor.



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

- A. A B. B C. C D. D
26. Great volcanic eruptions send dust and ash into the stratosphere. Weeks after such great eruptions, air temperatures are often
- A. cooler than normal because the atmosphere is less transparent
- B. cooler than normal because the atmosphere is more transparent
- C. warmer than normal because the atmosphere is less transparent
- D. warmer than normal because the atmosphere is more transparent

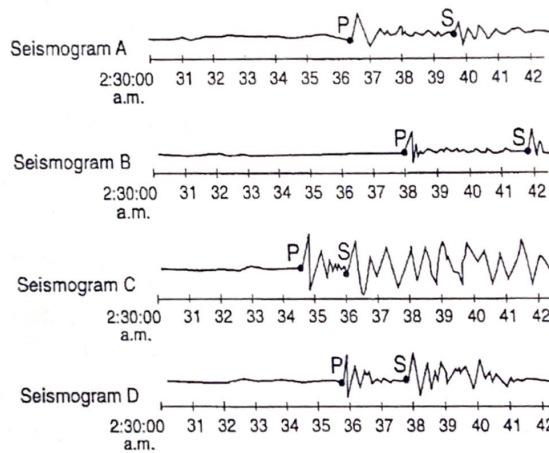
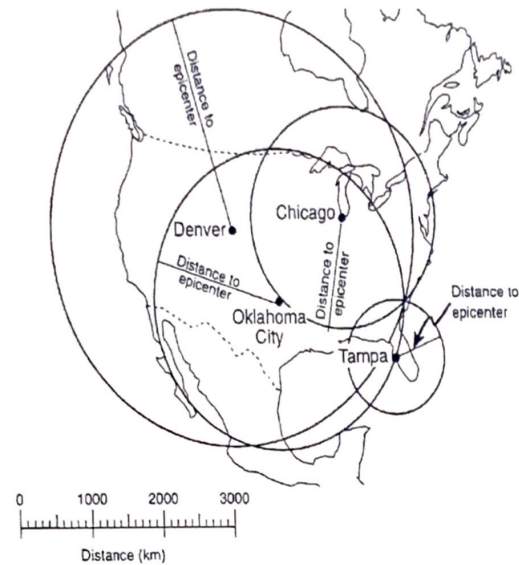
27. The cross section below shows the direction of movement of an oceanic plate over a mantle hot spot, resulting in the formation of a chain of volcanoes labeled A, B, C, and D. The geologic age of volcano C is shown.



What are the most likely geologic ages of volcanoes B and D?

- A. B is 5 million years old and D is 12 million years old.
- B. B is 2 million years old and D is 6 million years old.
- C. B is 9 million years old and D is 9 million years old.
- D. B is 10 million years old and D is 4 million years old.
28. The formation of the Canary Islands was primarily caused by their location near a
- A. subduction zone B. mantle hot spot
- C. divergent boundary D. transform fault

29. Base your answer(s) to the following question(s) on the *Earth Science Reference Tables*, the map and seismograms below, and your knowledge of Earth science. 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.



Which location on the map below is closest to the epicenter of this earthquake?



A. W

B. X

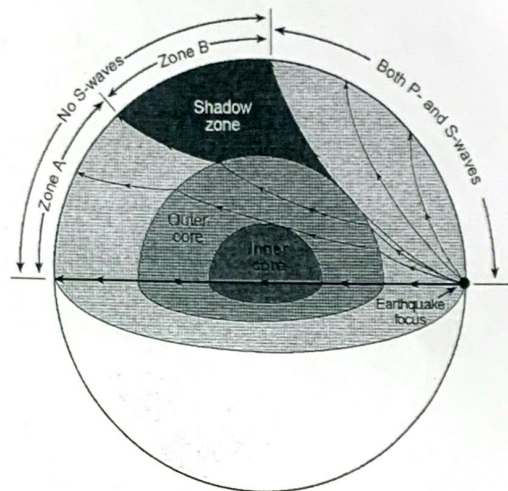
page 7 C. Y

D. Z

PTT#6

30. What is the direct cause of most earthquakes?
- movement of bedrock along a fault line
 - gravitational pull on bedrock by the Moon
 - deposition of sediment in lakes and oceans
 - heat exchange between the crust and the atmosphere
31. How far from an earthquake epicenter is a city where the difference between the *P*-wave and *S*-wave arrival times is 6 minutes and 20 seconds?
- 1.7×10^3 km
 - 9.9×10^3 km
 - 3.5×10^3 km
 - 4.7×10^3 km
32. A seismograph records the arrival of a *P*-wave at 11:13 am. If the earthquake occurred 4,000 kilometers from the recording station, when did the earthquake occur?
- 11:06 am
 - 11:11 am
 - 11:13 am
 - 11:20 am

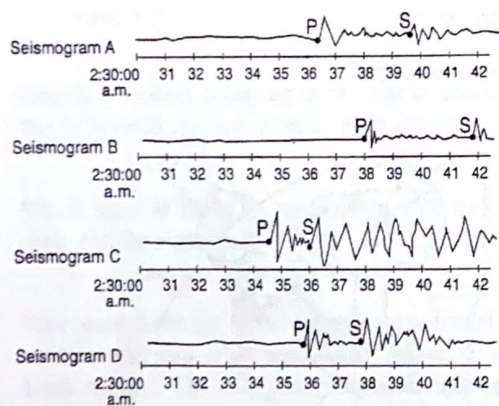
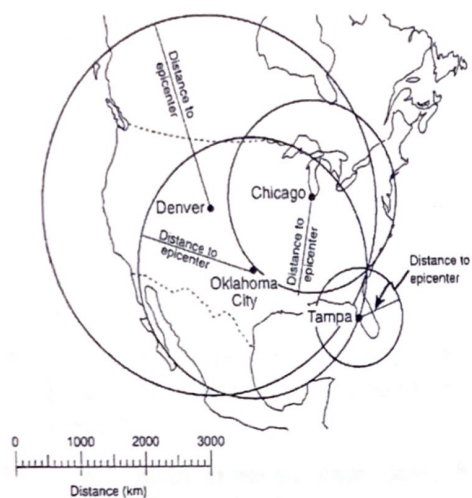
33. The accompanying cross section shows the distribution of earthquake waves as they travel through Earth's interior. The arrows within Earth's interior represent the pathways followed by some earthquake waves.



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

- zone A *P*-waves, only; zone B *S*-waves, only
- zone A *P*-waves, only; zone B no *P*- or *S*-waves
- zone A *S*-waves, only; zone B *P*-waves, only
- zone A *S*-waves, only; zone B no *P*- or *S*-waves

34. Base your answer(s) to the following question(s) on the *Earth Science Reference Tables*, the map and seismograms below, and your knowledge of Earth science. 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.



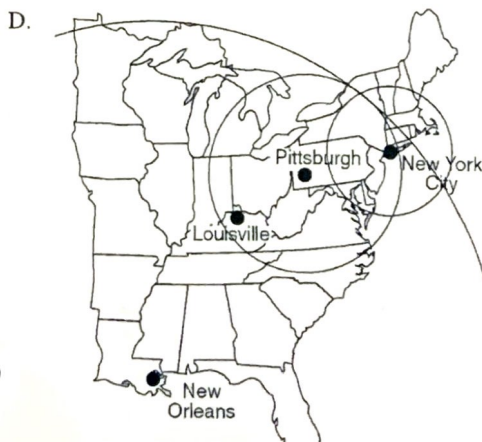
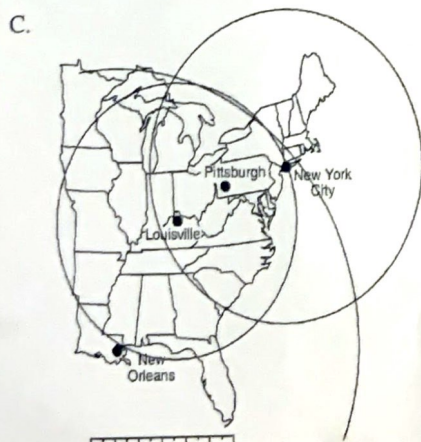
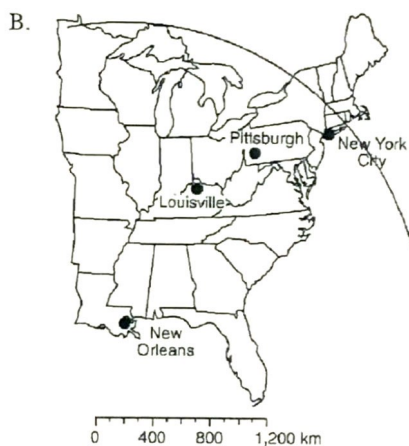
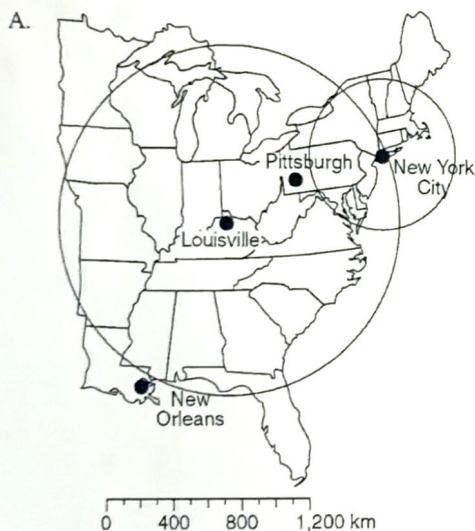
What is the *minimum* number of seismic stations needed to locate most earthquake epicenters?

- A. 1 B. 2 C. 3 D. 4

35. Base your answer(s) to the following question(s) on the map below. Seismic stations are located at the four cities shown on the map. Letter X represents the epicenter of an earthquake determined from seismic waves recorded at all four cities.



Which map correctly shows how the location of the epicenter was determined?



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



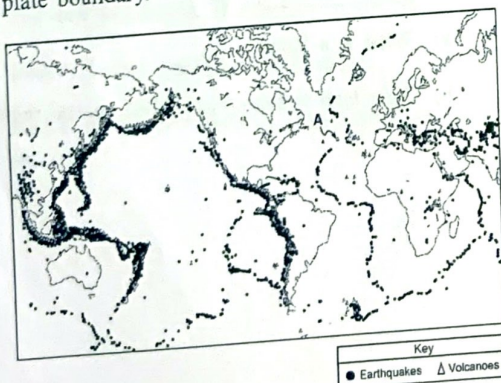
Model A best represents the motion of earthquake waves called

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

37. Identify a process occurring in the plastic mantle that is inferred to cause tectonic plate motion.

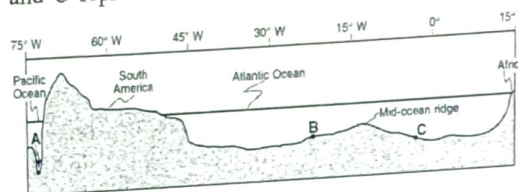
38. Which layer of Earth is composed of both the crust and the rigid mantle?

39. Base your answer(s) to the following question(s) on the world map below and on your knowledge of Earth science. The map shows major earthquakes and volcanic activity occurring from 1996 through 2000. Letter A represents a volcano on a crustal plate boundary.



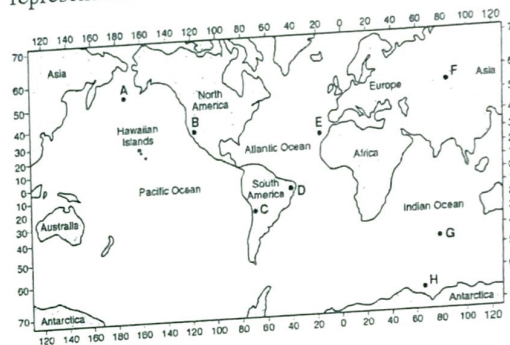
Explain why most major earthquakes are found in specific zones instead of being randomly scattered across Earth's surface.

40. Base your answer(s) to the following question(s) on the cross section below, which shows the major surface features of Earth along 25°S latitude between 75°W and 15°E longitude. Points A, B, and C represent locations on Earth's crust.



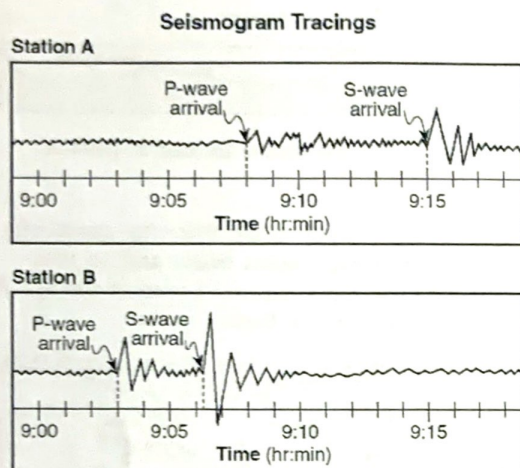
Identify the crustal feature located at point A.

41. Base your answer(s) to the following question(s) on the world map shown below and on your knowledge of Earth science. Letters A through H represent locations on Earth's surface.



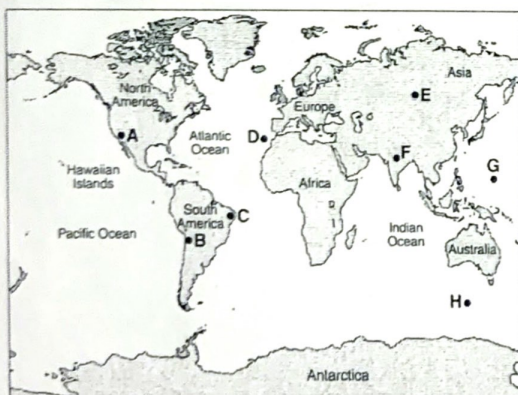
Explain why a volcanic eruption is more likely to occur at location E than at location F.

42. Base your answer(s) to the following question(s) on the diagram below, which shows two seismogram tracings, at stations A and B, for the same earthquake. The arrival times of the P-waves and S-waves are indicated on each tracing.



Explain how the seismic tracings recorded at station A and station B indicate that station A is farther from the earthquake epicenter than station B.

43. Base your answer(s) to the following question(s) on the world map below. Points A through H represent locations on Earth's surface.



Identify the tectonic feature responsible for the formation of the Hawaiian Islands.

44. Base your answer(s) to the following question(s) on the reading passage and map of the western United States below and on your knowledge of Earth science. The states of Washington and Oregon have been labeled on the map. The plate boundary shown on the map is the source area for high-magnitude earthquakes in Washington and Oregon. Two hazardous zones associated with these earthquakes are also shown.

Washington and Oregon Earthquakes

Large-magnitude earthquakes have occurred in Washington and Oregon as a result of crustal movement along thrust faults bordering the coasts of these states. Thrust faults occur when one section of Earth's crust slides over another section. Associated with the sudden movement of these thrust faults, coastlines can drop several feet, flooding forests with saltwater. Geologists have discovered evidence from various geologic ages of flooded coastal forests in the bedrock layers of Washington and Oregon. They have also found layers of sandstone thought to have been derived from sand deposits left by tsunamis. Using the rock record, scientists conclude that very large magnitude earthquakes occur every 300 to 500 years with the most recent large quake occurring about 200 years ago.



- What is a tsunami?
- State how tsunamis can affect coastal regions.