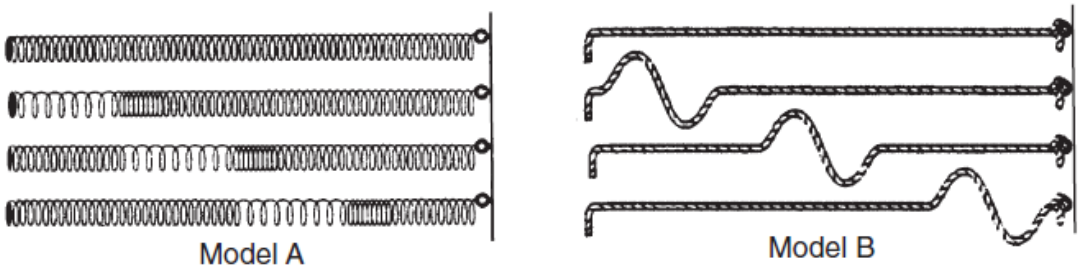
Earthquakes HW 1

Name

1. 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*

2. A seismic station recorded the *P*-waves, but no *S*-waves, from an earthquake because *S*-waves were

A) absorbed by Earth's outer core
B) transmitted only through liquids
C) weak and detected only at nearby locations
D) not produced by this earthquake

3. The first *P*-wave of an earthquake took 11 minutes to travel to a seismic station from the epicenter of the earthquake. What is the seismic station's distance to the epicenter of the earthquake and how long did it take for the first *S*-wave to travel that distance?

A) Distance to epicenter: 3350 km
S-wave travel time: 4 min 50 sec
B) Distance to epicenter: 3350 km
S-wave travel time: 6 min 10 sec
C) Distance to epicenter: 7600 km
S-wave travel time: 9 min
D) Distance to epicenter: 7600 km
S-wave travel time: 20 min

4. A *P*-wave takes 5 minutes to travel from the epicenter of an earthquake to a seismic station. Approximately how many minutes will it take an *S*-wave to travel that same distance?

A) 15 min B) 12 min C) 9 min D) 4 min

5. A seismic station is recording the seismic waves produced by an earthquake that occurred 4200 kilometers away. Approximately how long after the arrival of the first *P*-wave will the first *S*-wave arrive?

A) 1 min 05 sec B) 5 min 50 sec
C) 7 min 20 sec D) 13 min 10 sec

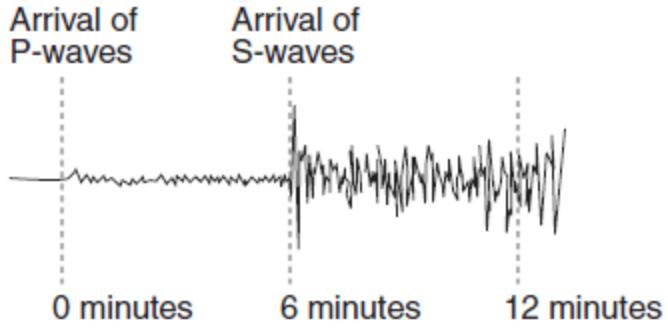
6. A seismic station 4000 kilometers from the epicenter of an earthquake records the arrival time of the first *P*-wave at 10:00:00. At what time did the first *S*-wave arrive at this station?

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

7. An earthquake occurs at 10:05 a.m. At 10:09 a.m., the first *P*-wave from this earthquake is detected at a seismic station. Approximately how many kilometers (km) from the epicenter is this seismic station located?

A) 1000 km B) 2000 km
C) 2600 km D) 5600 km

8. The seismogram below shows *P*-wave and *S*-wave arrival times at a seismic station following an earthquake.



The distance from this seismic station to the epicenter of the earthquake is approximately

A) 1,600 km B) 3,200 km
C) 4,400 km D) 5,600 km

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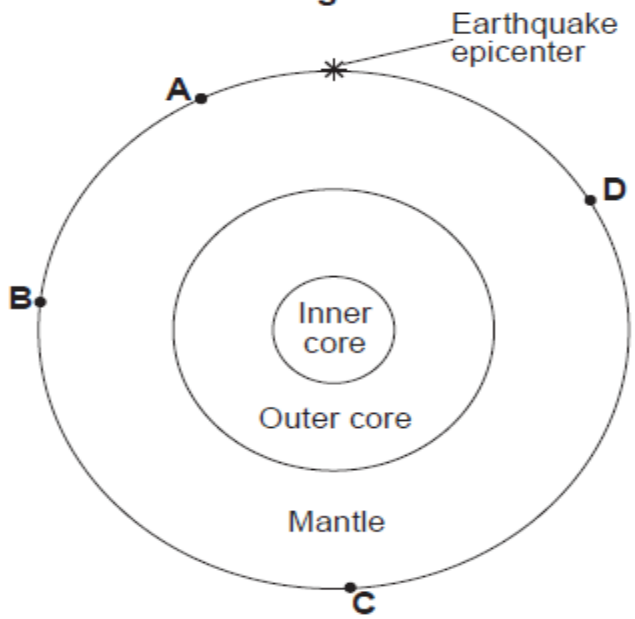
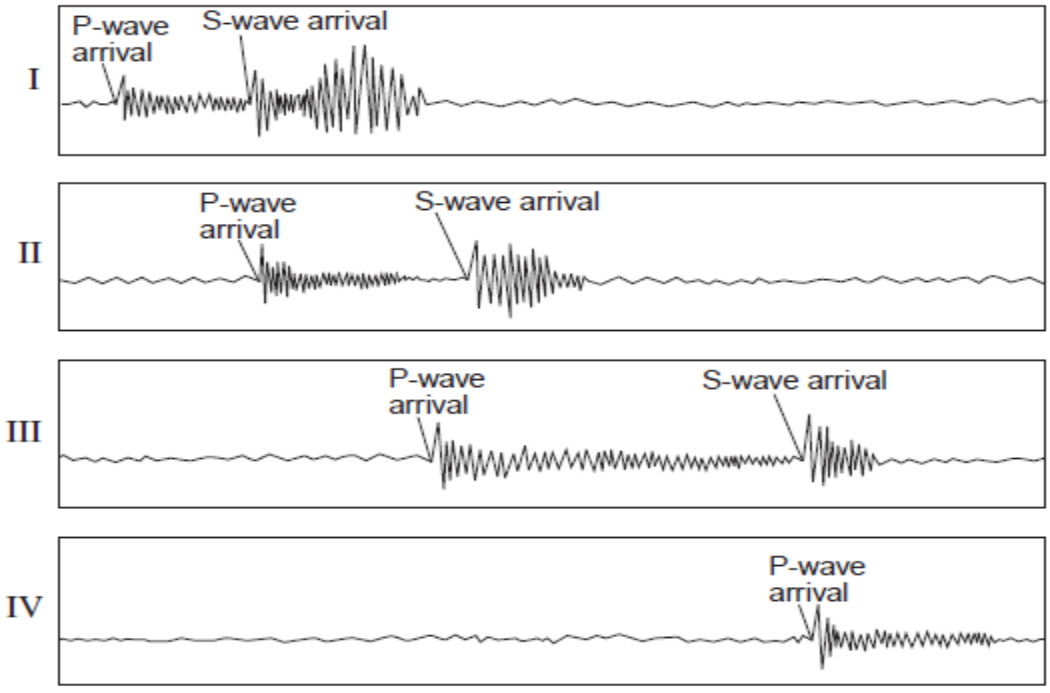
Base your answers to questions **9** and **10** on the diagrams below. Diagram 1 represents a cross section of Earth and its interior layers. The asterisk (*) shows the location of an earthquake epicenter. Letters *A* through *D* are seismic stations on Earth's surface. Diagram 2 shows four seismograms labeled I, II, III, and IV, which were recorded at seismic stations *A*, *B, C*, and *D* during the same time interval.

Diagram 1



(Not drawn to scale)

Diagram 2



5. 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

10. 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*

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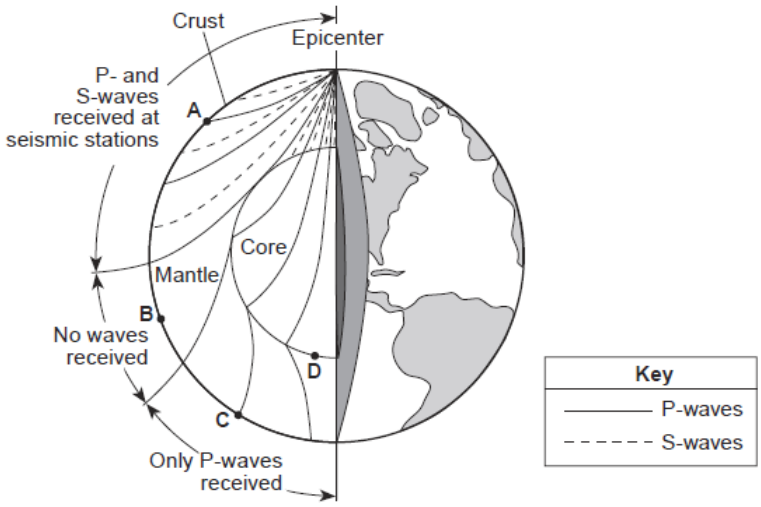
Base your answers to questions **11** and **12** on the diagram below and on your knowledge of Earth science. The diagram represents a cut-away view of Earth's interior and the paths of some of the seismic waves produced by an earthquake that originated below Earth's surface. Points *A, B,* and *C* represent seismic stations on Earth's surface. Point *D* represents a location at the boundary between the core and the mantle.



11. Which process prevented *P*-waves from arriving at seismic station *B*?

A) refraction B) reflection C) convection D) conduction

12. Only *P*-waves were recorded at seismic station *C* because *P*-waves travel

A) only through Earth's interior, and *S*-waves travel only on Earth's surface
B) fast enough to penetrate the core, and *S*-waves travel too slowly
C) through iron and nickel, while *S*-waves cannot
D) through liquids, while *S*-waves cannot

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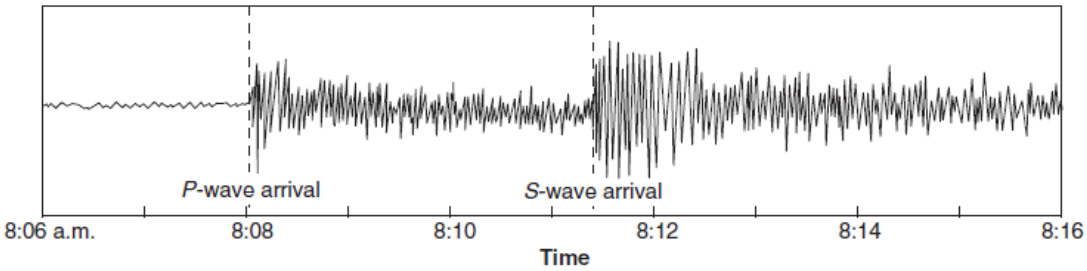
13. Base your answer to the next question on the seismogram below. The seismogram was recorded at a seismic station and shows the arrival times of the first *P*-wave and *S*-wave from an earthquake.



Which part of this seismogram is used to find the distance to the epicenter of the earthquake?

A) *P*-wave arrival time, only
B) *S*-wave arrival time, only
C) difference in the arrival time of the *P*-wave and *S*-wave
D) difference in the height of the *P*-wave and *S*-wave