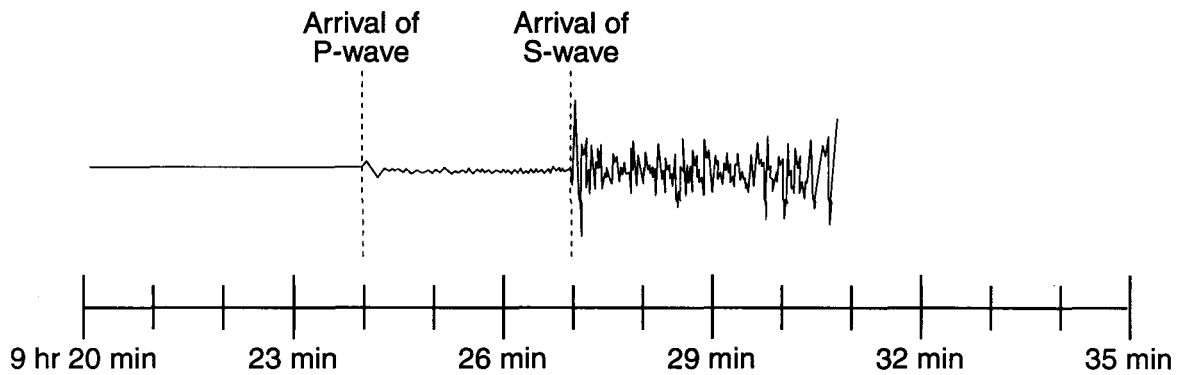


Earthquake Review

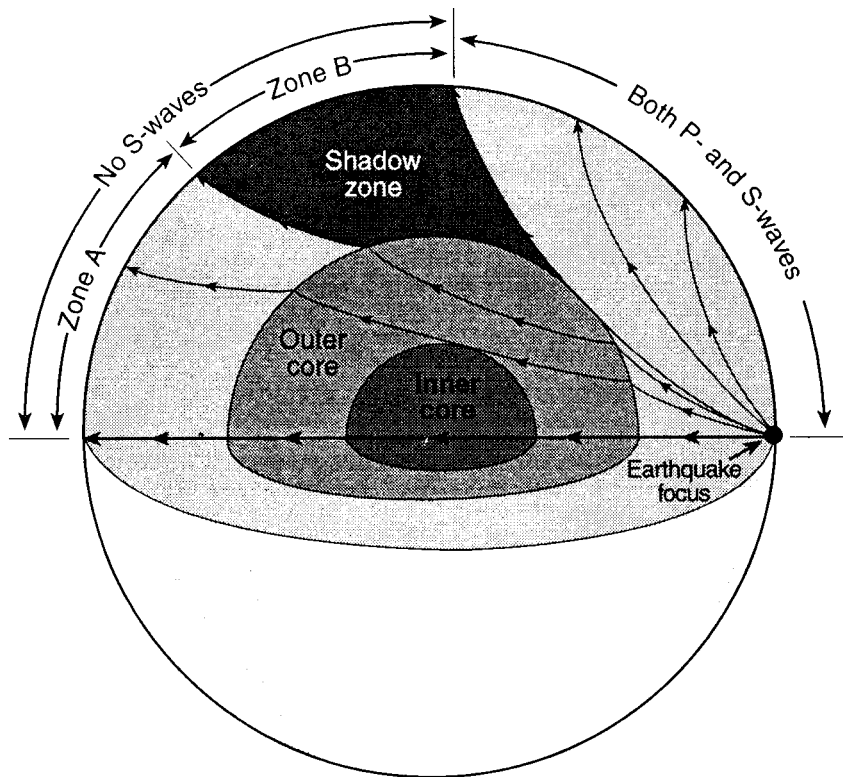
1. The seismogram below shows the arrival times of an earthquake's *P*-wave and *S*-wave recorded at a seismic station in Portland, Oregon.



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

- (1) 1800 km (2) 2500 km (3) 3200 km (4) 4100 km
-
2. Which of the following earthquake waves can travel through both solids and fluids?
- (1) *S*-waves, only
(2) *P*-waves, only
(3) *S*-waves and *P*-waves
3. Which statement best describes the materials through which earthquake waves are transmitted?
- (1) *P*-waves are transmitted through solids, only.
(2) *P*-waves are transmitted through liquids, only.
(3) *S*-waves are transmitted through solids, only.
(4) *S*-waves are transmitted through solids and liquids.
-

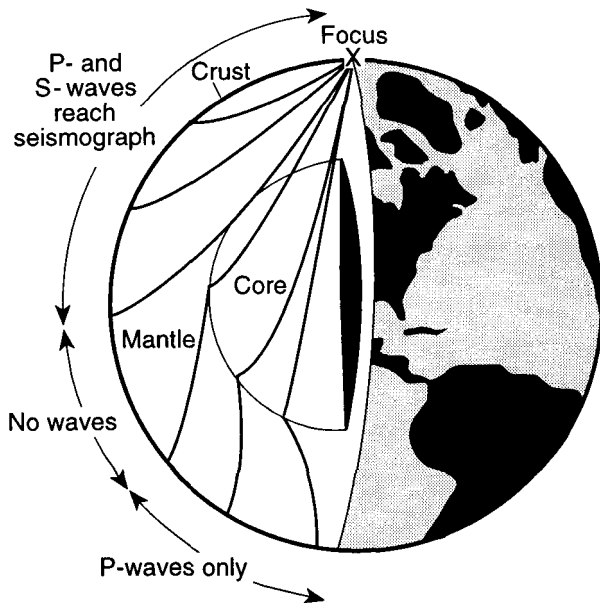
4. The cross section below shows the distribution of earthquake waves as they travel through Earth's interior. The arrows within Earth's interior represent the pathways followed by some earthquake waves.



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

- (1) zone A: *P*-waves, only; zone B: *S*-waves, only (3) zone A: *S*-waves, only; zone B: *P*-waves, only
(2) zone A: *P*-waves, only; zone B: no *P*- or *S*-waves (4) zone A: *S*-waves, only; zone B: no *P*- or *S*-waves

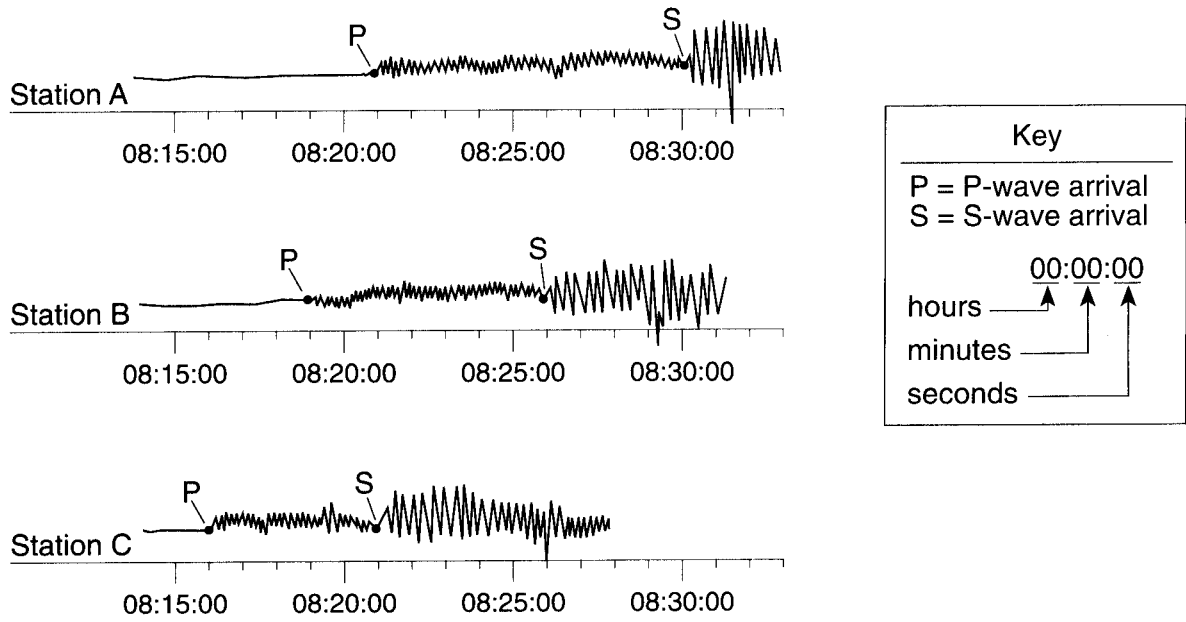
5. The cutaway diagram below shows the paths of earthquake waves generated at point X.



Only *P*-waves reach the side of Earth that is opposite the focus because *P*-waves

- (1) are stronger than *S*-waves
 - (2) travel faster than *S*-waves
 - (3) travel faster than *S*-waves
 - (4) can travel through liquids and *S*-waves cannot
6. A huge undersea earthquake off the Alaskan coastline could produce a
- (1) tsunami
 - (2) cyclone
 - (3) hurricane
 - (4) thunderstorm
7. The study of how seismic waves change as they travel through Earth has revealed that
- (1) *P*-waves travel more slowly than *S*-waves through Earth's crust
 - (2) seismic waves travel more slowly through the mantle because it is very dense
 - (3) Earth's outer core is solid because *P*-waves are not transmitted through this layer
 - (4) Earth's outer core is liquid because *S*-waves are not transmitted through this layer

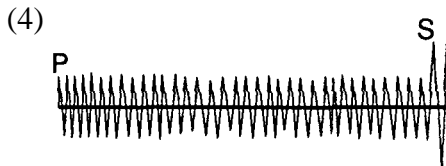
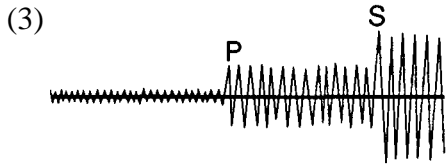
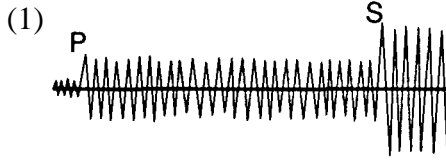
8. The diagram below represents three seismograms showing the same earthquake as it was recorded at three different seismic stations, *A*, *B*, and *C*.



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

- (1) *A* is closest to the epicenter, and *C* is farthest from the epicenter.
 - (2) *B* is closest to the epicenter, and *C* is farthest from the epicenter.
 - (3) *C* is closest to the epicenter, and *A* is farthest from the epicenter.
 - (4) *A* is the closest to the epicenter, and *B* is the farthest from the epicenter.
-
9. At which epicenter distance is the difference in arrival times between *P*-waves and *S*-waves greatest?
- (1) 1,000 km
 - (2) 3,000 km
 - (3) 5,000 km
 - (4) 7,000 km
10. 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
- (1) 2,600 km
 - (2) 3,400 km
 - (3) 4,000 km
 - (4) 8,800 km
11. The difference in arrival times for *P*- and *S*-waves from an earthquake is 5.0 minutes. How far away is the epicenter of the earthquake?
- (1) 1.3×10^3 km
 - (2) 2.6×10^3 km
 - (3) 3.5×10^3 km
 - (4) 8.1×10^3 km

12. The diagrams below represent seismograms of the same earthquake recorded in four different locations. Which seismogram was recorded closest to the epicenter of the earthquake?



13. What is the approximate total distance traveled by an earthquake's *P*-wave in its first 9 minutes?

- (1) 2,600 km (3) 7,600 km
 (2) 5,600 km (4) 12,100 km

14. What is the total distance that a *P*-wave will travel in 7 minutes and 20 seconds?

- (1) 2,000 kilometers (3) 5,800 kilometers
 (2) 4,200 kilometers (4) 7,200 kilometers

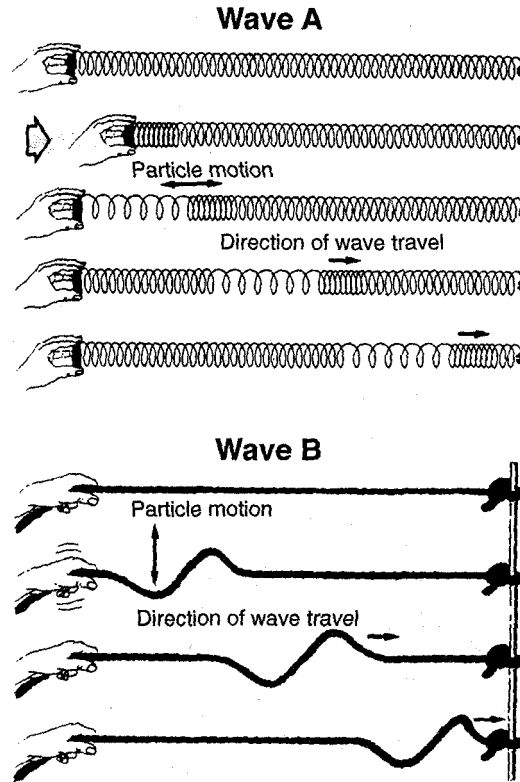
15. Approximately how long does an earthquake *P*-wave take to travel the first 6500 kilometers after the earthquake occurs?

- (1) 6.5 min (3) 10.0 min
 (2) 8.0 min (4) 18.5 min

16. 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?

- (1) 6 mm 40 sec (3) 15 mm 00 sec
 (2) 9 mm 40 sec (4) 19 mm 00 sec

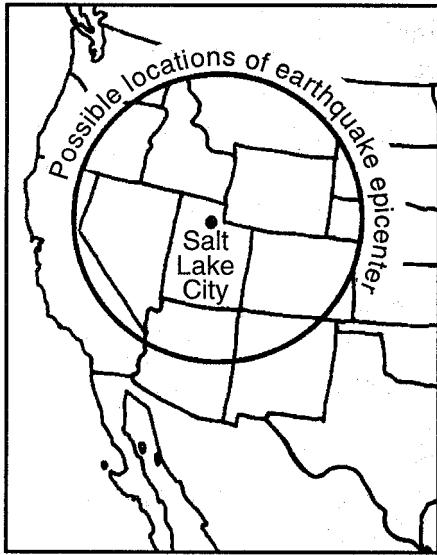
17. The diagrams below show demonstrations that represent the behavior of two seismic waves, *A* and *B*.



Which statement concerning the demonstrated waves is correct?

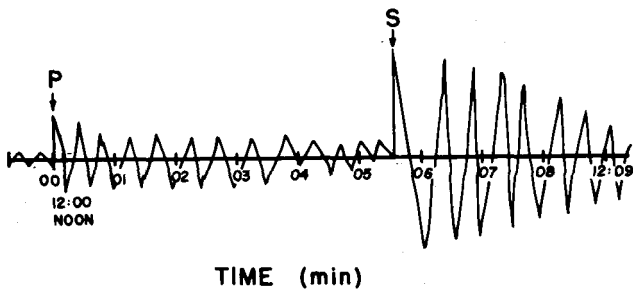
- (1) Wave *A* represents a compressional wave, and wave *B* represents a shear wave.
 (2) Wave *A* represents a shear wave, and wave *B* represents a compressional wave.
 (3) Wave *A* represents compressional waves in the crust, and wave *B* represents compressional waves in the mantle.
 (4) Wave *A* represents shear waves in the crust, and wave *B* represents shear waves in the mantle.

18. The map below shows the western part of the United States.



Which observation made at Salt Lake City would allow seismologists to determine that an earthquake had occurred somewhere along the circle shown on the map?

- (1) the relative strength of the *P*-waves and *S*-waves
 - (2) the time interval between the arrival of the *P*-waves and *S*-waves
 - (3) the difference in the direction of vibration of the *P*-waves and *S*-waves
 - (4) the density of the subsurface bedrock through which the *P*-waves and *S*-waves travel
19. The seismogram below shows the arrival times of *P*- and *S*-waves from a single earthquake. How far from the earthquake epicenter was the station that recorded this seismogram?

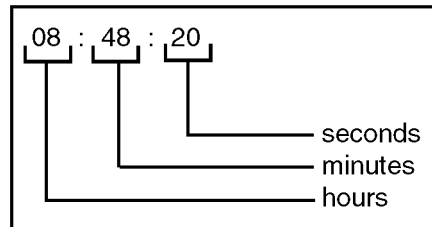


- (1) 1.5×10^3 km
- (2) 2.5×10^3 km
- (3) 3.0×10^3 km
- (4) 4.0×10^3 km

Base your answers to questions 20 through 22 on the data table below, which gives information collected at seismic stations *A*, *B*, *C*, and *D* for the same earthquake. Some of the data has been deliberately omitted.

Seismic Station	<i>P</i> -Wave Arrival Time	<i>S</i> -Wave Arrival Time	Difference in Arrival Times	Distance to Epicenter
<i>A</i>	08:48:20	No <i>S</i> -waves arrived		
<i>B</i>	08:42:00		00:04:40	
<i>C</i>	08:39:20		00:02:40	
<i>D</i>	08:45:40			6,200 km

Key for Reading Time on the Table



20. What is the most probable reason for the absence of *S*-waves at station *A*?
- (1) *S*-waves cannot travel through liquids. (3) Station *A* was located on solid bedrock.
 (2) *S*-waves were not generated at the epicenter. (4) Station *A* was located too close to the epicenter.
21. What is the approximate distance from station *C* to the earthquake epicenter?
- (1) 3,200 km (2) 2,400 km (3) 1,600 km (4) 1,000 km
22. How long did it take the *P*-wave to travel from the epicenter of the earthquake to seismic station *D*?
- (1) 00:46:20 (2) 00:39:20 (3) 00:17:20 (4) 00:09:40

Answer Key
[New Exam]

1. 1

2. 2

3. 3

4. 2

5. 4

6. 1

7. 4

8. 3

9. 4

10. 2

11. 3

12. 2

13. 1

14. 3

15. 3

16. 3

17. 1

18. 2

19. 4

20. 1

21. 3

22. 4
