

Name _____

Earth Science

Worksheet: Topic 5 – Earthquakes

Directions: Use your knowledge of Earth Science and the E.S. Reference Tables to answer these questions. Specifically, the charts on page 10 & 11 should be most useful.

- 1) P-waves are _____ (faster or slower) than S-waves.
- 2) P-waves can travel through both _____ and _____ layers of the Earth, but S-waves can only travel through _____ layers.

3) What are the distances to the epicenters if the following arrival times of seismic waves are accurate?

- a) P-wave arrival time = 1:00.00 PM
S-wave arrival time = 1:06.00 PM
Difference in time = _____
Distance to epicenter = _____ km

- b) P-wave arrival time = 5:02.00 AM
S-wave arrival time = 5:09.20 AM
Difference in time = _____
Distance to epicenter = _____ km

- c) P-wave arrival time = 6:05.00 PM
S-wave arrival time = 6:08.40 PM
Difference in time = _____
Distance to epicenter = _____ km

4) How far will a P-wave travel in 6 minutes? _____ km

5) How long would it take for P-waves to travel an epicenter distance of 4,000 km?

What was the origin time (time the Earthquake started), if the P-waves arrived the seismograph station at 11:07 AM?

6) How long did it take the P-waves to arrive at the seismic station? Use a scale of 1 cm = 1,000 km.

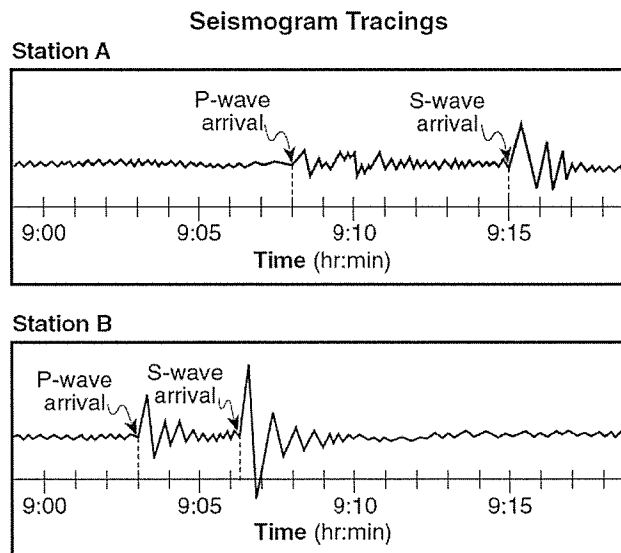
Epicenter ●

● Seismic station

7) The seismograph station is 3,000 km away from the epicenter of the Earthquake. How long does it take for the S-waves to travel from the epicenter to the station?

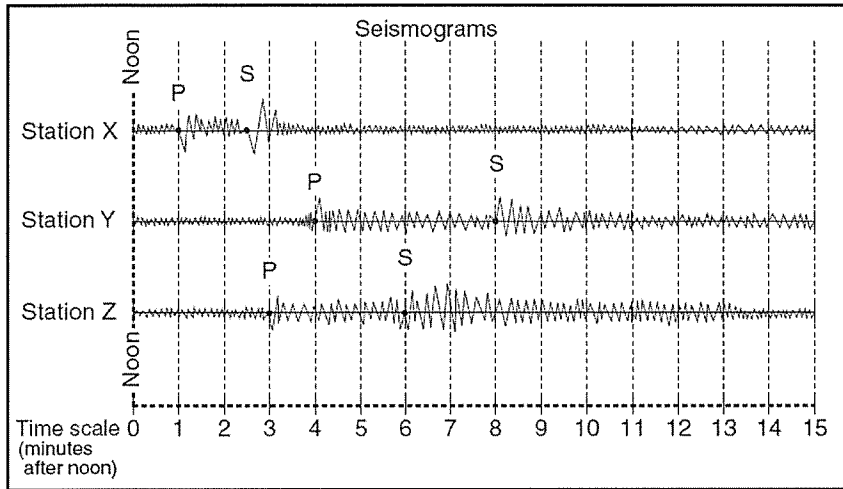
8) Where do most volcanoes and earthquakes occur? _____

- 9) What are the densities (range) of the following layers of the Earth:
- Oceanic crust = _____
 - Continental crust = _____
 - Mantle = _____
 - Outer core = _____
 - Inner core = _____
- 11) The crust is made mostly of igneous rock. Of which igneous rock is the oceanic crust composed? _____ The Continental crust? _____
- 12) At what depths are the following boundaries:
- bottom of Asthenosphere and the top of the stiffer Mantle - _____
 - bottom of the stiffer Mantle and the top of the Outer Core - _____
 - bottom of Outer Core and top of Inner Core - _____
- 13) How much pressure exists at the following depths within the Earth:
- 4,000 km = _____
 - 6,000 km = _____
- 14) What type of relationship exists between depth within the Earth and pressure?
- 15) What type of relationship exists between depth within the Earth and temperature?
- 16) How do we “know” anything about the interior of the Earth if we have only drilled about 10 km deep? (*Please explain fully in complete sentences all the possible answers.*)



- 63 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. [1]
- 64 Seismic station A is located 5,400 kilometers from the epicenter of the earthquake. How much time would it take for the first S-wave produced by this earthquake to reach seismic station A? [1]

Base your answers to questions 43 through 46 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.



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| <p>43 Approximately how far away from station Y is the epicenter?</p> <p>(1) 1,300 km (3) 3,900 km
 (2) 2,600 km (4) 5,200 km</p> <p>44 The S-waves from this earthquake that travel toward Earth's center will</p> <p>(1) be deflected by Earth's magnetic field
 (2) be totally reflected off the crust-mantle interface
 (3) be absorbed by the liquid outer core
 (4) reach the other side of Earth faster than those that travel around Earth in the crust</p> | <p>45 Seismic station Z is 1,700 kilometers from the epicenter. Approximately how long did it take the P-wave to travel to station Z?</p> <p>(1) 1 min 50 sec (3) 3 min 30 sec
 (2) 2 min 50 sec (4) 6 min 30 sec</p> <p>46 On the map, which location is closest to the epicenter of the earthquake?</p> <p>(1) E-5 (3) H-3
 (2) G-1 (4) H-8</p> |
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