

Name: \_\_\_\_\_

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# Earthquakes

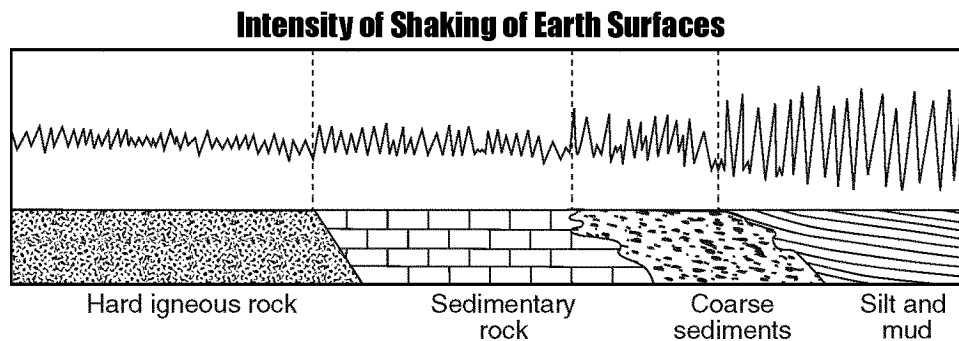
Earth Science

# Earthquakes Practice Exam

**Directions:** For questions 1-25 record your answers on the scantron provided. Some questions may require the use of the 2011 Edition Reference Tables for Physical Setting/Earth Science.



- 1) A strong earthquake that occurs on the ocean floor could result in the formation of
- 1) an ocean current      2) an El Niño event      3) a delta      4) a tsunami
- 2) Scientists have inferred the structure of Earth's interior mainly by analyzing
- 1) the Moon's composition    2) the Moon's interior      3) Earth's surface features    4) Earth's seismic data
- 3) The magnitude of an earthquake is a number that represents the
- 1) arrival time of the first P-wave      2) distance to the epicenter  
3) energy released by an earthquake      4) difference in arrival times between P- and S-waves
- 4) Compared to the velocity of an earthquake's P-waves, the velocity of the S-waves in the same material is
- 1) less      2) greater      3) the same
- 5) The diagram below represents the intensity of the shaking that occurs on different Earth surfaces during the same earthquake.



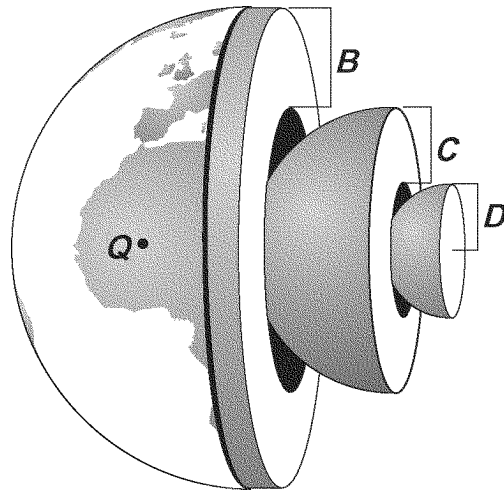
- The greatest earthquake hazard to homes exists when they are built on
- 1) sedimentary rock      2) silt and mud      3) coarse sediments      4) hard igneous rock
- 6) Beneath which surface location is Earth's crust the thinnest?
- 1) San Andreas Fault      2) East Pacific Ridge      3) Old Forge, New York      4) the center of South America
- 7) A seismic station recorded the P-waves, but no S-waves, from an earthquake because S-waves were
- 1) absorbed by Earth's outer core      2) transmitted only through liquids  
3) not produced by this earthquake      4) weak and detected only at nearby locations

- 8) Which statement correctly describes the density of Earth's mantle compared to the density of Earth's core and crust?
- 1) The mantle is less dense than both the core and the crust.
  - 2) The mantle is more dense than both the core and the crust.
  - 3) The mantle is less dense than the core, but more dense than the crust.
  - 4) The mantle is more dense than the core, but less dense than the crust.
- 9) Which temperature is inferred to exist in Earth's plastic mantle?
- 1) 5,000°C
  - 2) 6,000°C
  - 3) 3,000°C
  - 4) 2,000°C
- 10) Which evidence recorded at seismic stations following an earthquake supports the inference that Earth's interior changes from solid rock to molten iron and nickel at the mantle-core boundary?
- 1) P-waves and S-waves are both recorded at all stations.
  - 2) Only P-waves are recorded on the opposite side of Earth.
  - 3) P-waves arrive earlier than S-waves.
  - 4) Only S-waves are recorded at all stations.
- 11) How long after receiving the first P-wave from an earthquake centered 4,000 kilometers away does a seismic station receive its first S-wave from the same earthquake?
- 1) 1 minute
  - 2) 7 minutes
  - 3) 5 minutes 35 seconds
  - 4) 12 minutes 40 seconds
- 12) According to the Earth Science Reference Tables, as depth within the Earth's interior increases, the
- 1) density decreases, but temperature and pressure increase
  - 2) density and temperature decrease, but pressure increases
  - 3) density, temperature, and pressure decrease
  - 4) density, temperature, and pressure increase
- 13) What is the approximate time difference between the first P-wave and the first S-wave recorded at a seismic station located 8,000 kilometers from an earthquake's epicenter?
- 1) 8 minutes 40 seconds
  - 2) 20 minutes 40 seconds
  - 3) 9 minutes 20 seconds
  - 4) 11 minutes 20 seconds
- 14) If a seismic station is 3,200 km from an earthquake epicenter, what is the time needed for an S-wave to travel from the epicenter to the seismic station?
- 1) 10 min 40 sec
  - 2) 4 min 40 sec
  - 3) 6 min 0 sec
  - 4) 11 min 10 sec



Questions 19 and 20 refer to the following:

In the diagram of Earth shown below, letters B, C, and D represent layers of Earth. Letter Q represents a location on Earth's surface.



19) Which letter in the given diagram best represents Earth's mantle?

- 1) Q                                      2) B                                      3) C                                      4) D

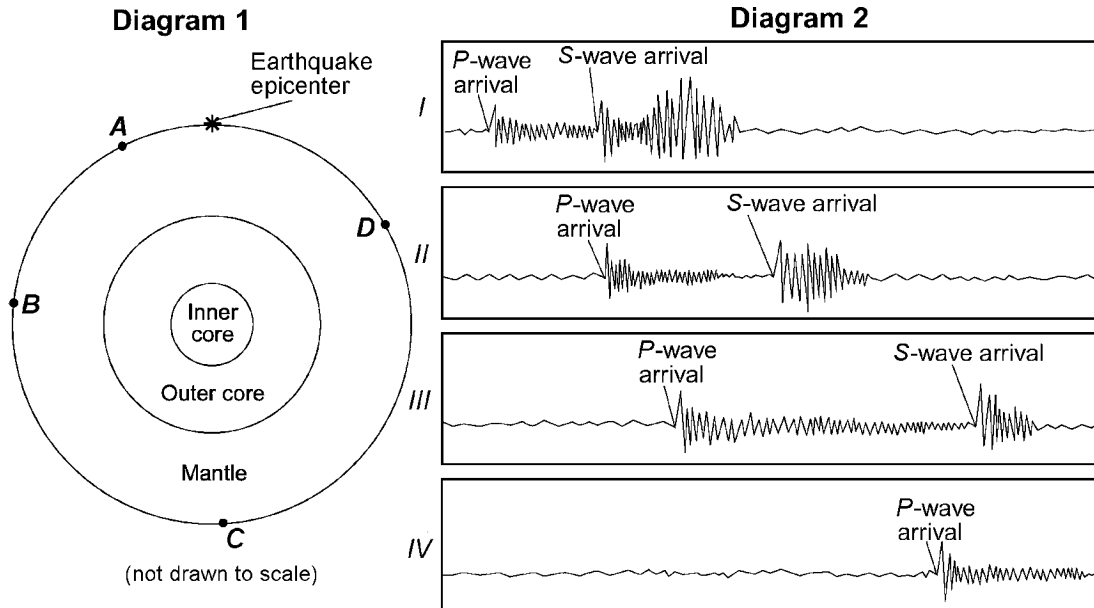
20) What is the probable density of the granitic bedrock at Q in the given diagram?

- 1)  $5.5 \text{ g/cm}^3$                                       2)  $3.0 \text{ g/cm}^3$                                       3)  $1.0 \text{ g/cm}^3$                                       4)  $2.7 \text{ g/cm}^3$

Questions 21 and 22 refer to the following:

Diagram 1 below 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.



21) Which list correctly matches the given seismograms with the seismic stations where they were recorded?

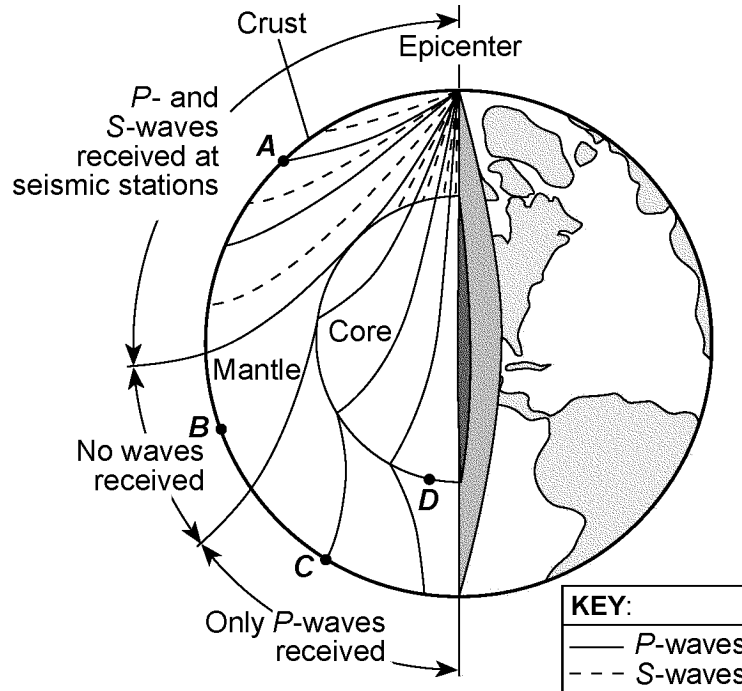
- |   |   |
|---|---|
| 1) seismogram I — station C<br>seismogram II — station B<br>seismogram III — station D<br>seismogram IV — station A | 2) seismogram I — station B<br>seismogram II — station D<br>seismogram III — station A<br>seismogram IV — station C |
| 3) seismogram I — station A<br>seismogram II — station B<br>seismogram III — station C<br>seismogram IV — station D | 4) seismogram I — station A<br>seismogram II — station D<br>seismogram III — station B<br>seismogram IV — station C |

22) Station D in the given diagram is 8,000 kilometers from the earthquake epicenter. How long did it take for the first P-wave to travel from the epicenter to station D?

- 1) 11 minutes 20 seconds    2) 20 minutes 40 seconds    3) 4 minutes 20 seconds    4) 9 minutes 20 seconds

**Questions 23 through 25 refer to the following:**

The diagram below 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.



- 23) Seismic station A in the given diagram is 5,000 kilometers from the epicenter. What is the difference between the arrival time of the first P-wave and the arrival time of the first S-wave recorded at this station?
- 1) 2 minutes 20 seconds      2) 8 minutes 20 seconds      3) 6 minutes 40 seconds      4) 15 minutes 00 second
- 24) Which process prevented P-waves from arriving at seismic station B in the given diagram?
- 1) reflection                      2) refraction                      3) conduction                      4) convection
- 25) Only P-waves were recorded at seismic station C in the given diagram because P-waves travel
- 1) through liquids, while S-waves cannot  
 2) only through Earth's interior, and S-waves travel only on Earth's surface  
 3) fast enough to penetrate the core, and S-waves travel too slowly  
 4) through iron and nickel, while S-waves cannot