Quiz: Earthquakes

1.

When a fault ruptures DEEP in the lithosphere, the energy is released mainly by _____.

	Student Response	Value	Correct Answer
A.	P-waves that dissipate perpendicularly (at a 90° angle) from the fault plane		
B.	S-waves that dissipate perpendicularly (at a 90° angle) from the fault plane		
C.	Raleigh waves that dissipate away from the fault plane	0%	
D.	both P-waves and S-waves that dissipate in all directions away from the fault plane		✓
E.	P-waves, S-waves and Raleigh waves that dissipate in all directions away from the fault plane		

Score: 0/1

2.

Of the four types of seismic waves, which will propagate only along a surface?

	Student Response	Value	Correct Answer

A. only P and S waves
B. only Rayleigh and S waves
C. only Rayleigh and Love waves 100% ✓
D. only P, S, and Rayleigh waves
E. All four wave types.

Score: 1/1

3.

What does the Mercalli scale measure?

Student Response	Value	Correct Answer
A. seismic energy release per square meter		
B. moment magnitude		
C. maximum ground acceleration		
D. felt intensity of shaking, and damage	100%	✓
E. seismic moment rate		

Score: 1/1

4.

Based on the map of SW British Columbia below, we can conclude that earthquake intensity in Richmond is likely higher than that in Vancouver because_____.

Student Response	Value	Correct Answer
A. the majority of buildings in		

Vancouver are concrete

B. the majority of buildings in Richmond have not been retrofitted to withstand earthquakes

C. Richmond is underlain by less consolidated rock 100% ✓

D. Richmond is closer to the main subduction thrust

E. the majority of buildings in Richmond are wood frame

Score: 1/1

5.

Which form of earthquake magnitude is based upon the actual energy released at the hypocentre?

Student Response	Value	Correct Answer
A. Richter magnitude		
B. Surface-wave magnitude		
C. P-wave magnitude		
D. S-wave magnitude		
E. Moment magnitude	100%	✓

Score: 1/1

6.

The process of establishing a model of the Earth by "inverting" seismic data involves _____.

Student Response	Value	Correct Answer
A. calculating the seismic signals by knowing what's inside the Earth		
B. finding out where the earthquake occurred using several seismic signals		
C. determining how rapidly seismic wave energy is dissipated within the Earth		
D. using large quantities of seismic data to figure out details about Earth's structure	100%	✓
E. using Earth's known structure to build a graph showing the travel times of a large number of seismograms		

Score: 1/1

7.

Which of the following wave types travels slowest through the interior rocks?

Student Response	Value	Correct Answer
A. P-waves		
B. S-waves		✓
C. Rayleigh waves	0%	
D. Love waves		
E. They all travel with the same velocity		

Score: 0/1

8.

Based on observations of earthquake intervals, when will the next Cascadia mega-earthquake most likely occur?

Student Response	Value	Correct Answer
A. sometime in the next 100-300 years		☑
B. 500 to 600 years from now		
C. 600 to 800 years from now		
D. never - the subduction interface is aseismic		
E. we have no idea - earthquakes are completely random	0%	

Score: 0/1

9.

Which wave is the second to arrive from a distant earthquake?

Student Response	Value	Correct Answer
A. P wave		
B. S wave	100%	☑
C. Ritcher wave		
D. Rayleigh wave		
E. Love wave		

Score: 1/1

10.

Which seismic waves travel the fastest?

Student Response	Value	Correct Answer
A. P waves	100%	☑
B. S waves		
C. Surface waves		
D. Rayleigh waves		
E. Love waves		

Score: 1/1

11.

Which recent earthquake is MOST similar to the mega-earthquake that is predicted to occur along the Cascadia subduction zone?

Student Response	Value	Correct Answer
A. 2003 Bam, Iran		
B. 2004 Parkfield, California		
C. 2004 Sumatra, Indonesia		☑
D. 1999 Izmit, Turkey	0%	
E. 2001 Pacific Northwest		

Score: 0/1

12.

Why is soil liquefaction dangerous to buildings?

Student Response	Value	Correct Answer
A. It causes floods.		
B. Liquefied soil gets into building foundations, weakening them.	0%	
C. It enhances side-to-side ground motion.		
D. It always causes landslides.		
E. It causes soil to lose its strength.		✓

Score: 0/1

13.

Two earthquakes occur in the same area but at separate times. Earthquake A has a magnitude 5.5 and earthquake B has a magnitude 7.5. Which statement is TRUE?

Student Response	Value	Correct Answer
A. The ground moved thirteen (7.5 + 5.5) times as much in event B.		
B. Nothing can be determined due to insufficient information.	0%	
C. The ground moved 100 times less in event A as it did in event B.		✓
D. The ground moved 1600 times as much in event B as in event A.		
E. The ground moved twice as much in		

event B as it did in event A.

Score: 0/1

14.

Which of the following statements about the S-wave shadow zone is FALSE?

Student Response	Value	Correct Answer
A. It is the region of the Earth's surface where direct S waves are not received.		
B. Part of it is also the P-wave shadow zone.		
C. It is always the southern hemisphere of the Earth.	100%	☑
D. It exists because S waves cannot travel through the Earth's outer core.		
E. It is evidence that the outer core is liquid.		

Score: 1/1

15.

What inexpensive revision to a building can prevent "soft story" collapse?

Student Response	Value	Correct Answer
A. firmly fix the building's base to the		

ground

B. add shear walls 100%

C. increase the depth of the building's foundation

D. convert the first floor into a parking garage

E. remove all installed dampers

Score: 1/1

16.

Although recent earthquakes that occurred south of Seattle, Washington (Feb 2001), in Kobe, Japan (1995) and at Bam, Iran (2003) were of similar magnitude, the Seattle earthquake did NOT cause as much devastation because _____.

Student Response	Value	Correct Answer
A. fewer people lived in the region		
B. its hypocentre was much deeper than the other earthquakes	100%	
C. the ground around Seattle was not so dangerously soft		
D. there were more warnings issued, allowing people to prepare themselves		
E. of the time of day when it occurred		

Score: 1/1

17.

Careful observations of ground motion all along a fault show that _____.

Student Response	Value	Correct Answer
A. distance of motion at the surface is always more than at depth		
B. most motion occurs too slowly to observe even with modern instruments		
C. faults move with one uniform shift in position		
D. distance of motion at depth is always more than at the surface		
E. portions of the fault may move much more than other portions	100%	☑

Score: 1/1

18.

What information do you need to calculate Richter magnitude?

Student Response	Value	Correct Answer
A. Time between P and S wave arrival at three or more seismographs.	0%	
B. Time between maximum horizontal displacement and maximum vertical displacement.		
C. Maximum acceleration and time		

between S wave and Rayleigh wave arrivals.

D. Time between P and S wave arrivals and maximum amplitude of shaking. ☑

E. Distance to the earthquake and maximum amplitude of shaking at 100 Hz.

Score: 0/1

19.

The movement of the Pacific Plate past the North American Plate along the Queen Charlotte fault is an example of what type of plate boundary?

Student Response	Value	Correct Answer
A. transform	100%	☑
B. divergent		
C. convergent (continent/continent collision)		
D. convergent (ocean/continent collision)		
E. convergent (ocean/ocean collision)		

Score: 1/1

20.

Which statement about the February 28, 2001 Nisqually earthquake is TRUE?

Student Response	Value	Correct Answer
A. It occurred in the subduction zone where the Juan de Fuca plate is diving under the North America plate.		☑
B. It was the second largest earthquake ever recorded.		
C. It caused severe damage in Mexico City, which is over 200 miles away.		
D. It was one of many earthquakes that occurred over a period of 3 days along a strike-slip fault.		
E. Many people did not feel it because it was 40km deep and 150km off the west coast of Washington State.	0%	

Score: 0/1