

新TOEFL 讀解問題演習

(模擬問題演習)

Earthquake Waves

①→ There are very few natural phenomena which can cause as much panic and damage as earthquakes. Throughout recorded history they have been responsible for **untold** millions of human casualties and property damage. Even though earthquakes have been feared since ancient times, very little was known about them until the emergence of modern seismology near the end of the 19th century. This academic discipline involves the scientific study of all aspects of earthquakes, including measuring their size, distribution, and effects.

②→ The first known instrument that could record the motion of an earthquake was invented by the Chinese scientist Chang Heng during the second century A.D. During the Middle Ages, Italian scientists created devices that used water, and later mercury, to detect and register earthquakes. But it was the work of several British scientists during the 1880's that is considered the start of modern seismology. Using Japan as their base owing to its frequent earthquakes, these three scientists founded the Seismological Society of Japan and developed the world's first sophisticated seismographs — devices that can record the intensity, direction, and **duration** of earthquakes.

③→ The shaking of the ground, which is responsible for the destructive nature of earthquakes, is caused when seismic energy is released suddenly in the form of seismic waves which pass through the Earth's rocks. Seismic waves are generally classified into three types. The first two types, P waves and S waves, are transmitted within the Earth itself, while the third type, called Love waves or Rayleigh waves, are carried along the surface. The existence of these waves was hypothesized during the late 19th century and modern researchers have discovered a remarkably close correspondence between the original theoretical calculations and their actual seismographic measure. P waves, or primary waves, travel longitudinally at extremely high speeds through both solid and liquid materials in the Earth's interior. On the other hand, S waves, or secondary waves, travel only through solid material inside the Earth. Because the particle motion caused by these latter waves is transverse to the direction of their travel, it often involves the shearing of the rock which transmits them.

④→ Because of their greater speed, P waves are the first to be detected by seismographs located at various points on the Earth's surface. The first P wave naturally emanates from the spot where the earthquake originates. This point, usually at some considerable depth within the Earth, is called the focus or hypocenter. The point immediately above the focus on the surface of the

Earth is known as the epicenter. The distinction between the focus and epicenter is of interest to scientists, of course, but is often confused by most people, newscasters among them. Love and Rayleigh waves follow the contours of the Earth's surface, passing through after the P and S waves have made their way through the body of the planet. As Love and Rayleigh waves travel, they disperse into long wave trains which can be felt at substantial distances from the source of the earthquake. Because of this dispersal, they cause much of the shaking felt during an earthquake incident.

⑤→ The surface of the Earth is like a jigsaw puzzle, with huge pieces called tectonic or crustal plates. These giant pieces move slowly over the partially melted rock known as the mantle. Within these plates there are many fractures, or faults — areas of weakness in the crust where two crustal blocks have slipped or moved against each other. One block may move up vertically while the other moves down, or one may move horizontally in one direction while the other moves in the opposite direction. When this happens, earthquakes occur. More than 95 percent of all of the world's earthquakes occur in the regions along these tectonic plate boundaries. The remaining 5 percent of earthquakes take place far away from the plate boundaries. These mid-plate or intra-plate earthquakes remain poorly understood even today, but they tend to be milder than their more common cousins.

⑥→ Because of its location squarely on a plate boundary, Alaska is the American state which has the largest number of earthquakes. With more than 4,000 recorded there every year, there are more earthquakes in Alaska than in all of the rest of the states combined. Predictably, the largest earthquake to ever occur in the United States was in Alaska in 1964. Ironically, though, the largest earthquake ever experienced in the continental United States, estimated at 7.5 on the Richter scale, occurred in Missouri in 1812, thousands of kilometers away from any plate boundary.

(Question 1)

The word **untold** is closest in meaning to

- (A) undisclosed
- (B) unrecognized
- (C) inconsequential
- (D) incalculable

(Question 2)

Seismology concerns itself with measuring all of the following aspects of earthquakes EXCEPT

- (A) amount of damage caused
- (B) actual magnitude
- (C) geographical distribution
- (D) fear among the populace

(Question 3)

The scientists credited with being the founders of modern seismology came from which country?

- (A) China
- (B) Britain
- (C) Japan
- (D) Italy

(Question 4)

The word **duration** is closest in meaning to

- (A) length
- (B) episode
- (C) strength
- (D) stage

(Question 5)

Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? ***Incorrect choices change the meaning in important ways or leave out essential information.***

The distinction between the focus and epicenter is of interest to scientists, of course, but is often confused by most people, newscasters among them.

- (A) Researchers pay particular attention to the exact spot where P waves originate.
- (B) Technically speaking, an earthquake's focus is essentially synonymous with its epicenter.
- (C) As opposed to researchers, many people fail to differentiate an earthquake's hypocenter from its epicenter.
- (D) Journalists often misunderstand the true amount of force necessary to generate an earthquake.

(Question 6)

The word **their** in paragraph 4 refers to

- (A) Love and Rayleigh waves
- (B) contours of the Earth's surface
- (C) long wave trains
- (D) P and S waves

(Question 7)

Which of the following does the author imply about Love and Rayleigh waves?

- (A) They have basically the same characteristics as other seismic waves.
- (B) They cause proportionately less damage than other seismic waves.

- (C) They scatter in a wider distribution than other seismic waves.
- (D) They travel in a transverse direction compared to other seismic waves.

(Question 8)

What does paragraph 5 mainly discuss?

- (A) The process that results in earthquakes
- (B) The fragmented nature of the Earth's mantle
- (C) The mechanics of intra-plate movement
- (D) The gradual melting of tectonic plates

(Question 9)

The word **squarely** is closest in meaning to

- (A) uniformly
- (B) directly
- (C) partially
- (D) hardly

(Question 10)

Why does the author consider the 1812 earthquake in Missouri noteworthy?

- (A) It occurred so far away from Alaska.
- (B) Such strong mid-plate earthquakes are exceedingly rare.
- (C) It was America's first scientifically recorded earthquake.
- (D) Missouri had never experienced earthquake damage before.

(Question 11)

Look at the four squares that indicate where the following sentence could be added to the passage.

Measuring 9.2 on the Richter scale, it lasted for a full seven minutes and the length of the ruptured fault was more than 500 kilometers.

Where would the sentence best fit?

Click on one of the four squares to add the sentence to the passage.

Because of its location squarely on a plate boundary, Alaska is the American state which has the largest number of earthquakes. A With more than 4,000 recorded there every year, there are more earthquakes in Alaska than in all of the rest of the states combined. B Predictably, the largest earthquake to ever occur in the United States was in Alaska in 1964. C Ironically, though, the largest earthquake ever experienced in the continental United States, estimated at 7.5 on the Richter scale, occurred in Missouri in 1812, thousands of kilometers away from any plate boundary. D

(Question 12)

Directions: Select the appropriate phrases from the answer choices and match them to the type of seismic wave to which they relate. TWO of the answer choices will NOT be used. **This question is worth 4 points.**

Drag your answer choices to the spaces where they belong. To remove an answer choice, click on it.

P waves

● _____
● _____
● _____
● _____

S waves

● _____
● _____

Answer Choices

- (A) Initially perceived by seismographs
- (B) Carried along the Earth's surface
- (C) Travel exclusively through solid material
- (D) Often shear off their transmitting medium
- (E) Essentially travel in a straight line
- (F) Move smoothly through liquid materials
- (G) Greatly affected by the Earth's topography
- (H) Used to pin down the focus of an earthquake

SAMPLE

