30. Look at the four squares [ ] that indicate where the following sentence can be added to the passage.

They are completely safe and may possibly help us, hence a commensalism relationship.

Where would the sentence best fit?

A. [**A**] B. [**B**]

C. [**C**] D. [**D**]

PASSAGE 4 – Questions 31-40

Earth has several distinct layers; the outermost of these is the crust, which has an inconsistent thickness of 35-70 km in the continents and 5-10 km in the ocean basins. The second layer is known as the mantle, which is about 2900 km thick, and divided into an upper and lower mantle. Most of Earth's internal heat is situated here. The upper mantle has an area known as the low-velocity zone, where secondary waves decrease rapidly and then gradually increase. The last layer is the core. This is a thick ball of iron and nickel divided into two layers, the inner core and the outer core.

The inner core is solid, whereas the outer core is so hot that the metal is always molten. However, because the force at the inner core is so **immense**, it cannot melt. Due to Earth's rotation, the outer core spins around the inner core, which causes the Earth's magnetism. The inner core consists of iron, nickel and other elements, probably a mix of carbon, oxygen, sulphur, silicon, and potassium. The temperature is extremely high, and due to pressure, the core is solid. Because the outer core is liquid, mainly consisting of iron, nickel and about 10% oxygen and sulphur, here the temperature is not as high.

Both the outer and inner cores together create the Earth's magnetism. The core has a huge influence on Earth. Because it is so hot, it radiates a natural heat to the upper layers, setting off a current of heat, which in turn causes the movement of the tectonic plates. Because of Earth's rotation, the outer core spins, but the inner core does not because it is solid. This provides a sort of dynamo effect and causes the Earth's magnetic force.

A seismic wave is a wave that travels through Earth; it is often the result of **a tectonic earthquake**. There are two kinds of seismic waves, "body waves" and "surface waves." Other waves do exist, but

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are of little importance. Body waves travel through the center of Earth, following ray paths which are bent by the unstable density and stiffness of Earth's interior. These differ according to temperature, **phase**, and structure. Body waves send out the first tremors of an earthquake as well as any later ones.

There are two kinds of body waves, "primary" and "secondary" waves. Primary waves are compression waves, meaning the ground is alternately compressed and expanded in the direction of propagation. These waves can travel slightly faster through solids than secondary waves can, and are also able to travel through any type of material. Through air, they take the form of sound waves and so travel at the speed of sound.

Primary waves, when created by an earthquake, are less destructive than sound waves due to their minor amplitudes. Secondary waves are tilted waves; in other words, the ground is shifted vertically in the direction of transmission. Here, the ground moves from one side to the other. Secondary waves are only able to travel through solids, not liquids or gases, and thus are unable to travel through Earth's core. Primary waves are faster than secondary waves. Primary and secondary waves are usually produced by earthquakes and volcanoes. However, they can also be produced by people using explosives or large machinery.

Surface waves are comparable to water waves traveling just under Earth's surface. They travel at slower speeds than body waves. Surface waves can be the most **devastating** type of seismic wave due to their low frequency, long duration, and large amplitude. In theory, they are understood as a system which relates to primary and secondary waves.

[A] The moment an earthquake occurs, seismographs try to record its primary and secondary waves, but often they cannot detect the secondary waves of a distant earthquake. **[B]** This may be due to the fact that secondary waves are unable to pass through liquids. **[C]** This information about wave travel helps scientists determine the internal structure of the planet. **[D]**

31. In paragraph 1, what does the author say about the presence of the low-velocity zone in the Earth's interior?

A. It causes the high-frequency stimulation.

B. Its width is consistent with the fault zone.

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C. It induces regionally extensive oscillations.

D. It is located just above the lower crustal boundary.

32. The word "immense" in the passage is closest in meaning to_____.

A. compressed B. dilated

C. immeasurable D. varied

33. According to paragraph 2, which of the following is NOT true about the inner core?

A. It contributes to the Earth's magnetic field.

B. It is always molten and liquid.

C. It is under a lot of pressure.

D. It mainly consists of iron, nickel and some lighter elements.

34. According to paragraph 3, which of the following is the reason for tectonic plate movement?

A. The convection of heat from the core

B. The gravitational effect of the core

C. The powerful magnetic forces of the core

D. The spinning of the inner and outer core together

35. Why does the author mention "a tectonic earthquake" in the passage?

A. To show that primary waves are far more powerful than secondary waves

B. To demonstrate the effect of seismic waves on the Earth

C. To develop understanding of the structure of the Earth's interior

D. To explain that scientific detection methods are very efficient

36. The word "phase" in the passage is closest in meaning to_____.

A. change B. period

C. heat D. construction

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37. The word "<u>devastating</u>" in the passage is closest in meaning to_____.

A. faint B. destructive

C. productive D. quiet

38. Which of the following best expresses the essential information in the highlighted sentence? Incorrect answer choices change the meaning in important ways or leave out essential information.

A. Although primary and secondary waves would be recorded, the secondary waves are not strong enough to be detected at a distance.

B. Seismic waves are too small to be felt as a noticeable earthquake, but detectable by seismographs.

C. Secondary waves can be generated as a result of nonlinear interaction, so seismographs cannot detect them.

D. Because of extensive fault repetition, the primary wave is the most powerful force in an earthquake.

39. It can be inferred from the passage that the author most likely believes which of the following about earthquakes in the world?

A. Volcanoes would not exist if earthquakes never happened.

B. They are caused by the force of primary waves hitting the crust.

C. They are primarily caused by the heat from the Earth's core.

D. There is no more destructive thing in the world.

40. Look at the four squares [_] that indicate where the following sentence can be added to the passage.

For example, with the use of secondary waves, scientists were able to suggest that Earth has a liquid outer core.

Where would the sentence best fit?

A. [**A**] B. [**B**]

C. [**C**] D. [**D**]

THIS IS THE END OF THE READING PAPER.
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