

**DIRECTIONS:** Each of the following groups of questions consists of five lettered terms followed by a list of numbered phrases or sentences. For each numbered phrase or sentence, select the choice that is most clearly related to it. Each choice may be used once, more than once, or not at all.

**Questions 1 - 4**

- (A) He
- (B) Li
- (C) Br
- (D) Ca
- (E) Au

- \_\_\_ 1. The element with the largest ionization energy
- \_\_\_ 2. The element that exists in all three basic states of matter at standard temperature and pressure
- \_\_\_ 3. This element is the most malleable and ductile of the known pure metals
- \_\_\_ 4. The most stable element

**Questions 5 - 8**

- (A) Star
- (B) Planet
- (C) Dwarf planet
- (D) Plutoid
- (E) Asteroid

- \_\_\_ 5. Orbits the Sun at a greater axis than Neptune
- \_\_\_ 6. Largest body to revolve around a star
- \_\_\_ 7. Undergoes nuclear fusion in its core
- \_\_\_ 8. Also known as planetoids; most are located between Jupiter and Mars

**DIRECTIONS:** Each of the questions or incomplete statements below is followed by five possible answers or completions. Select the one that is best for each question.

- 9. Which of the following is a carbohydrate found in a plant's primary cell wall?

- (A) Lignin
- (B) Chitin
- (C) Cellulose
- (D) Plastid
- (E) Peptidoglycan

10. Sea turtles are large organisms with long life spans if they reach adulthood. They produce large numbers of offspring at once, but do not tend to their offspring. These characteristics of sea turtles are best described as:

- (A) Altruistic
- (B) R-selected
- (C) K-selected
- (D) Neither r-selected nor k-selected
- (E) Both r-selected and k-selected

## Answers

(A) Ionization energy increases from left to right across the periodic table, and decreases from top to bottom. Helium's position on the periodic table makes it the element with the highest ionization energy. As ionization energy increases, more energy is needed to break a full shell of electrons.

(C) Only elements in the halogen group exist in all three states of matter at standard temperature and pressure. Bromine is the only element listed that is a halogen.

(E) Gold (Au), a transitional metal, is the most malleable and ductile of the known pure metals. This means it can be deformed and its shape can be changed without fracturing.

(A) An element that has a full valence shell is said to be stable. The only element listed that has a full valence shell is helium (He), with two electrons in its outer shell.

(D) Plutoid is a newer classification of celestial bodies used to describe trans-neptunian dwarf planets that are similar to Pluto.

(B) Planets are the largest bodies that revolve around stars. In our solar system, the eight planets are the largest celestial bodies, with the exception of the Sun.

(A) Stars are gaseous bodies that produce their own energy through nuclear fusion in their core. Nuclear fusion produces a large amount of energy that is emitted as light and heat. Although the outer planets are known as gas giants and look similar to stars, they do not undergo nuclear fusion in their cores.

(E) Asteroids are also known as planetoids, and are smaller than planets. Their origins are unknown, but they are thought to be left over from the creation of the solar system. The asteroid belt is a region between Jupiter and Mars where the majority of asteroids are located. These asteroids are caught in Jupiter's large gravitational pull.

(C) Cellulose is a polysaccharide. It is the most common chemical and the strongest substance present in a plant's primary cell wall.

(E) High reproductive rates and adults not caring for their young are both characteristics that are r-selected. These are also known as opportunistic life strategies. However, the size and longevity of sea turtles (assuming they do reach adulthood) are characteristics that are k-selected. These are also known as equilibreal life strategies. Thus, sea turtles possess both r- and k-selected traits.