R3. EX 7. BÀI TẬP DẠNG THỨC VSTEP

Đọc bài đọc sau đây và trả lời câu hỏi.

The Periodic Table

Humans have always known about certain elemental substances, such as gold and silver, that **occur** in nature and cannot be broken down into other substances. Other chemical elements were discovered gradually beginning in 1669, when a German merchant, Hennig Brand, accidentally found phosphorus while attempting to find a way to create gold out of more common metals. By 1809, the number of known elements had increased to 47. Chemists studying the elements began to notice patterns in the way chemicals reacted.

The first modern chemistry textbook was written in 1789 by Antoine-Laurent de Lavoisier. He listed the known elements, which he classified into metals and nonmetals. But his listing omitted the gases and included some things that were not substances, such as light and calories. Thus, his list was not accepted as an accurate organizing system.

An important trait of elements is their periodicity: similarly acting elements tend to occur at regular intervals when arranged by their atomic weight (the number of protons plus neutrons in the nucleus). A French geologist, Alexandre-Emile Beguyer de Chancourtois, was the first to notice this periodicity. He designed a **precursor** to the periodic table, the telluric helix. That system arranged the elements on a spiral-shaped cylinder in order of their atomic weight. The elements with similar physical properties appeared vertically on the cylinder. But because Chancourtois's 1862 paper used geological terms and did not include drawings, his periodic system was not accepted by those in the field of chemistry.

As new elements were discovered through the first half of the 1800's, chemists confirmed the regular repetition of the physical properties of the elements. Chemists studied ways to classify the elements in order to reflect this periodicity. In 1863, an English chemist, John Newlands, divided the 56 known elements into groups, each sharing the same characteristics. As each group seemed to contain eight elements, he referred to his system as the Law of Octaves, after the eight keys in an octave on the piano. But Newlands's idea was ridiculed and his theory dismissed. Not until 1919 did it become accepted that the elements should be grouped by eights.

But the underlying concept of the periodicity of the elements was adapted to better effect in 1869 by the Russian chemist Dmitri Mendeleev. His great **breakthrough** was to see that the two key characteristics of an element – atomic weight and atomic number (the number of protons in the nucleus) – could be combined in a single table. His table came to be called the periodic table.

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Mendeleev's table was inspired by **the card game of solitaire**, in which cards are arranged horizontally by suit and vertically by number. Borrowing the same organizing patterns, Mendeleev arranged the elements in groups of seven. He grouped them horizontally by their atomic number in ascending order and vertically by their similar qualities in groups of seven. Thus similar metals such as gold, silver, and copper appear in the same vertical column. Similarly reacting gases such as helium, argon, and neon appear in another column. The most common elements (hydrogen, helium, lithium) have lower atomic numbers and thus appear near the beginning of the table in the first horizontal row. The rarest elements (uranium and plutonium) have the greatest number of protons in **their** nuclei. They are ordered near the end of the table.

In Mendeleev's time, only 63 elements had been discovered. The brilliance of his periodic table, however, was that it predicted that new elements would be found to fit into the missing slots in his original table. Today the table shows 120 elements, 92 naturally occurring and 28 created in the laboratory. Scientists believe that many more will be found. The periodic table has been called "the most elegant organizational chart ever devised."

Mendeleev's chart remains **valid** today. But it has been modified by the continual discovery and manufacture of new elements. And in 1914, Henry Mosely discovered a relationship between an element's X-ray wavelength and its atomic number. Thus, he rearranged the elements by electric charge. Another important improvement was suggested by Glenn T. Seaborg in 1945: the addition of a vertical group of certain heavy elements called the actinide series.

1. **The word "occur" in paragraph 1 is closest in meaning to _____.**

   A. happen B. exist C. appear D. remain

2. **Which of the following best paraphrases the highlighted sentence in paragraph 3?**

   A. Elements with the same number of protons do not react with each other.
   B. Periodicity refers to an element's tendency to periodically gain an extra proton.
   C. An element has protons and neutrons in the nucleus of its atom.
   D. The properties of elements tend to reoccur at fixed intervals of their atomic weights.

3. **According to the passage, the first chemist to notice periodicity was _____.**

   A. Mendeleev B. Chancourtois C. Lavoisier D. Newlands

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