

Base your answers to questions 12 on the information below and on your knowledge of chemistry.

Rubidium and iodine have different chemical and physical properties. Some of these properties are shown in the table below.

Some Physical and Chemical Properties of Rubidium and Iodine

Rubidium	Iodine
silvery-white solid	bluish-black lustrous solid
forms ionic compounds with nonmetals	forms ionic bonds with active metals
reacts with oxygen in the air	sublimes at room temperature
specific heat = 0.363 J/g(tid:129)	specific heat = 0.214 J/g(tid:129)

- 12 Compare the atomic radius of an atom of iodine to the atomic radius of an atom of rubidium when both atoms are in the ground state.

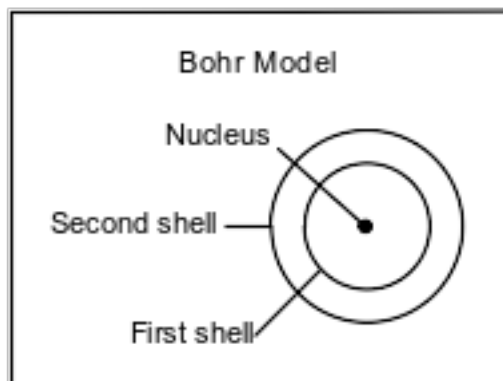
Base your answers to questions 13 on the information below and on your knowledge of chemistry.

Periodic trends are observed in the properties of the elements in Period 3 on the Periodic Table. These elements vary in physical properties, such as phase, and in chemical properties, such as their ability to lose or gain electrons during a chemical reaction.

- 13 Identify the element in Period 3 that requires the least amount of energy to remove the most loosely held electrons from a mole of gaseous atoms of the element in the ground state.

Base your answers to questions 14 on the information below and on your knowledge of chemistry.

The Bohr model of the atom was developed in the early part of the twentieth century. A diagram of the Bohr model for one atom, in the ground state, of a specific element is shown below. The nucleus of this atom contains 4 protons and 5 neutrons.



14 State the number of electrons in each shell in this atom in the ground state.

Base your answers to questions 15 on the information below and on your knowledge of chemistry.

The table below shows data for three isotopes of the same element.

Data for Three Isotopes of an Element

Isotopes	Number of Protons	Number of Neutrons	Atomic Mass (u)	Natural Abundance (%)
Atom D	12	12	23.99	78.99
Atom E	12	13	24.99	10.00
Atom G	12	14	25.98	11.01

15 State the number of valence electrons in an atom of isotope D in the ground state.

Answer Keys

1 1

2 4

3 4

4 1

5 3

6 2

7 2

8 4

9 1

10 2

11 Allow 1 credit. Acceptable responses include, but are not limited to:

- 4
- four
- $4e^-$
- four valence electrons

12 Allow 1 credit. Acceptable responses include, but are not limited to:

- In the ground state, the atomic radius of an iodine atom is smaller than the atomic radius of a rubidium atom.
- The Rb atom is larger than the I atom.
- The Rb atomic radius is 215 pm, but the I atomic radius is only 136 pm.

13 Allow 1 credit for Na or sodium.

14 Allow 1 credit. Acceptable responses include, but are not limited to:

- Number of electrons in first shell: 2 or $2e^-$
- Number of electrons in second shell: 2 or $2e^-$

15 Allow 1 credit for 2 or two.