ANSWER KEY.

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Ions

Chemistry | ANSWER KEY

Use a periodic table. Show your work. Use the word bank and sentence frames where they are given.

1. What changes when a neutral atom becomes an ion? What stays the same?

Sentence frame: *When an atom becomes an ion, the number of _____ changes, but the number of _____ stays the same.*

When an atom becomes an ion, the number of electrons changes, but the number of protons stays the same. (The neutrons do not change either.)

2. A magnesium atom loses two electrons. Write the symbol for the ion. Is it a cation or an anion?

Word bank: cation, anion

Mg^{2+}, a cation. It lost negative electrons, so it has 2 more protons than electrons.

3. An ion has 17 protons and 18 electrons. Identify the element, find the charge, and write the symbol for the ion.

The first step is done for you: charge = protons − electrons = 17 − 18 = ____

Charge = 17 − 18 = −1, written 1−. Atomic number 17 is chlorine.

Cl^- (chloride ion)

4. How many protons and electrons are in Ca^{2+}? Explain why this ion is positive.

Calcium's atomic number is 20, so **20 protons**. Electrons = 20 − 2 = **18 electrons**.

It has 2 more protons than electrons, because the calcium atom lost 2 electrons.

5. A neutral sulfur atom gains two electrons. Name the ion and write its symbol.

Sulfide ion, S^{2-}. Gaining 2 negative electrons gives a 2− charge, and an anion's name ends in -ide.

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6. An aluminum ion has mass number 27 and a charge of 3+. Find its protons, neutrons, and electrons.

Protons = 13 (atomic number). Electrons = 13 − 3 = 10. Neutrons = 27 − 13 = 14.

13 protons, 14 neutrons, 10 electrons

7. An ion has 8 protons and 10 electrons. Find its charge, then write its symbol and name.

Charge = 8 − 10 = −2, written 2−. Atomic number 8 is oxygen.

O^{2-}, oxide ion

8. Compare how Na^{+} and Cl^{-} form. Use the words *gain* and *lose*.

A sodium atom loses 1 electron (11 protons, 10 electrons), so Na^{+} is positive. **A chlorine atom gains 1 electron** (17 protons, 18 electrons), so Cl^{-} is negative.

9. An ion has 15 protons, 16 neutrons, and 18 electrons. Write its symbol and find its mass number.

Atomic number 15 is phosphorus. Charge = 15 − 18 = 3−. Mass number = 15 + 16 = 31.

P^{3-} (phosphide ion), mass number 31

10. A student wrote Mg+2 for a magnesium ion. Write it correctly and explain where the charge goes.

Mg^{2+}. The charge goes at the top right of the symbol, with the number first and then the sign.

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