Bohr Diagrams and Atomic Structure

Atomic Structure

Atoms are the building blocks of matter. They consist of three main subatomic particles:

1. Protons: Positively charged particles found in the nucleus.
2. Neutrons: Neutral particles found in the nucleus.
3. Electrons: Negatively charged particles that orbit the nucleus in energy levels.

The number of protons determines the element's identity, while the sum of protons and neutrons gives the atomic mass.

Bohr Diagrams

A Bohr diagram consists of a nucleus at the center, which contains protons and neutrons, and energy levels or shells surrounding the nucleus. Electrons occupy these energy levels and are represented by dots or circles.

To draw a Bohr diagram, follow these steps:

1. Determine the number of protons and neutrons in the nucleus.
2. Determine the number of electrons in the atom or ion.
3. Distribute the electrons in the energy levels, starting from the innermost level.

Practice Questions

1. Draw the Bohr diagram for a carbon atom.
2. How many protons, neutrons, and electrons does a carbon atom have?
3. Draw the Bohr diagram for a nitrogen ion with a charge of -3.
4. How many protons, neutrons, and electrons does a nitrogen ion with a charge of -3 have?
5. Draw the Bohr diagram for a sodium atom.
6. How many protons, neutrons, and electrons does a sodium atom have?
7. Draw the Bohr diagram for a chlorine ion with a charge of +1.

8. How many protons, neutrons, and electrons does a chlorine ion with a charge of +1 have?
9. Draw the Bohr diagram for a lithium atom.
10. How many protons, neutrons, and electrons does a lithium atom have?
11. Draw the Bohr diagram for a fluorine ion with a charge of -1.
12. How many protons, neutrons, and electrons does a fluorine ion with a charge of -1 have?
13. Draw the Bohr diagram for a helium atom.
14. How many protons, neutrons, and electrons does a helium atom have?

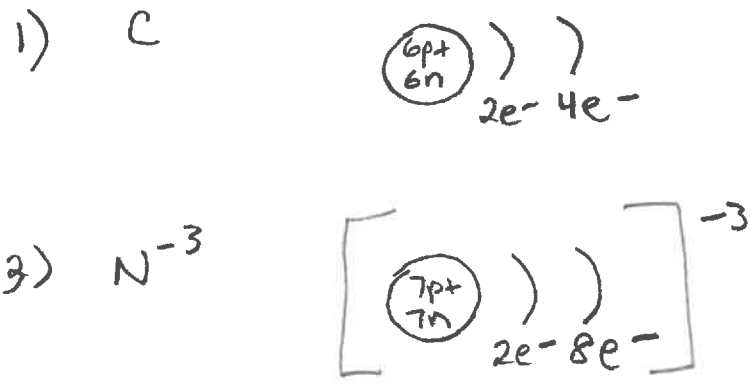
15. Draw Bohr diagrams of Lithium atom and Fluorine atoms to show how e-(s) transfer between the metal lithium and the nonmental fluorine. Now draw the resulting ions.

16. Draw Bohr diagrams of Lithium atom and Sulfur atoms to show how e-(s) transfer between the metal lithium and the nonmental Sulfur. Now draw the resulting ions.

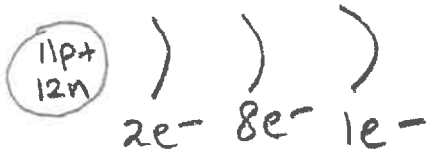
17. Draw Bohr diagrams of Magnesium atom and Fluorine atoms to show how e-(s) transfer between the metal Magnesium and the nonmental fluorine. Now draw the resulting ions.

Answers

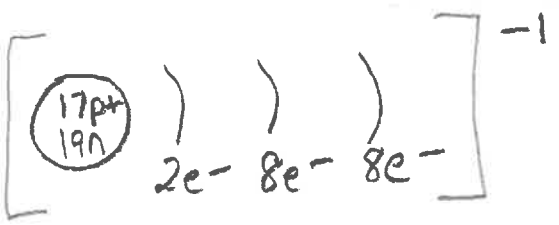
1. See diagram below.
2. Protons: 6, Neutrons: 6, Electrons: 6
3. See diagram below.
4. Protons: 7, Neutrons: 7, Electrons: 10
5. See diagram below.
6. Protons: 11, Neutrons: 12, Electrons: 11
7. See diagram below.
8. Protons: 17, Neutrons: 18, Electrons: 17
9. See diagram below.
10. Protons: 3, Neutrons: 4, Electrons: 3
11. See diagram below.
12. Protons: 9, Neutrons: 10, Electrons: 10
13. See diagram below.
14. Protons: 2, Neutrons: 2, Electrons: 2



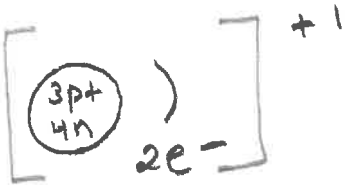
5) Na



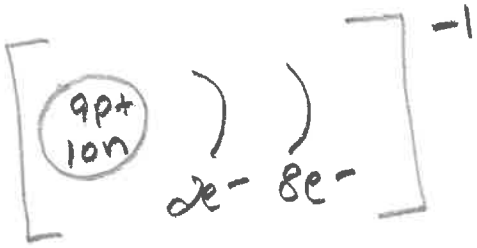
7) Cl^{-1}



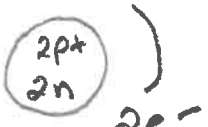
9) Li^{+1}



11) F^{-1}

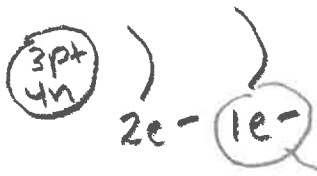


13) He

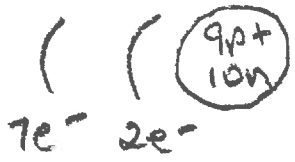


15)

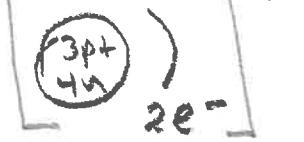
Lithium ATOM

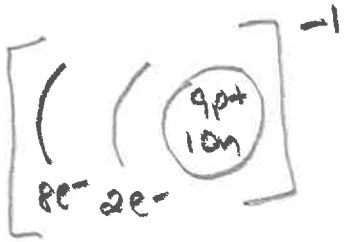


Fluorine ATOM



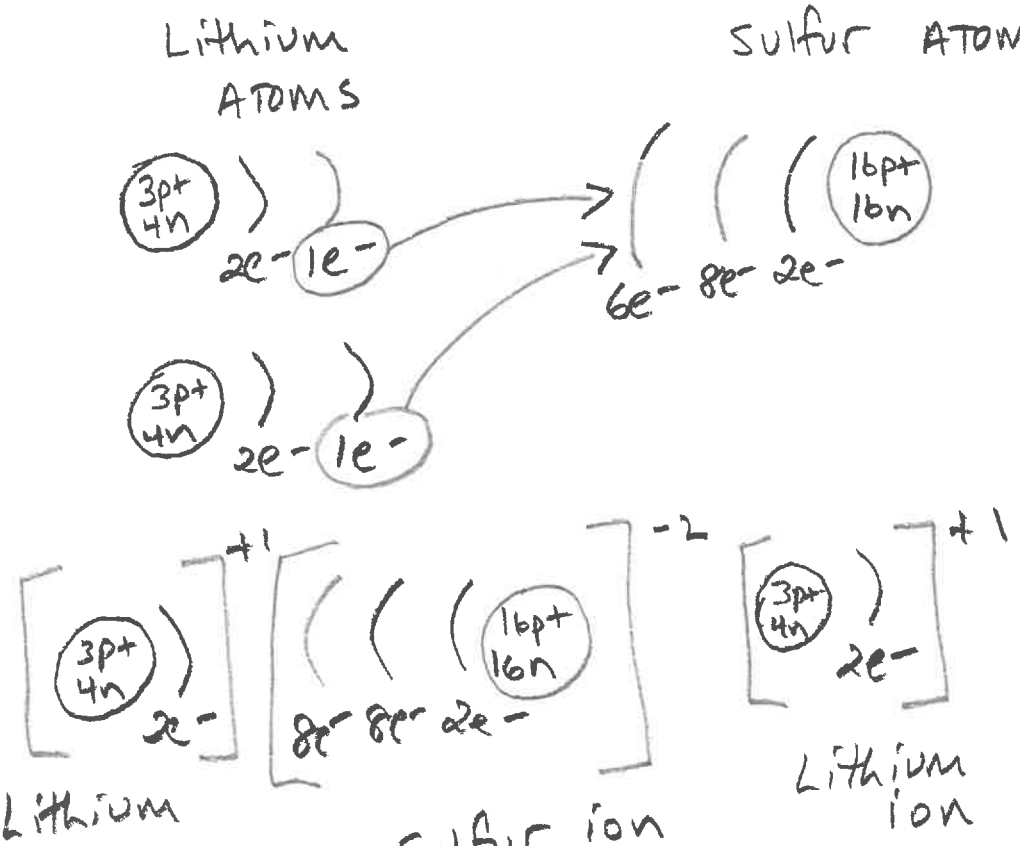
Lithium ion



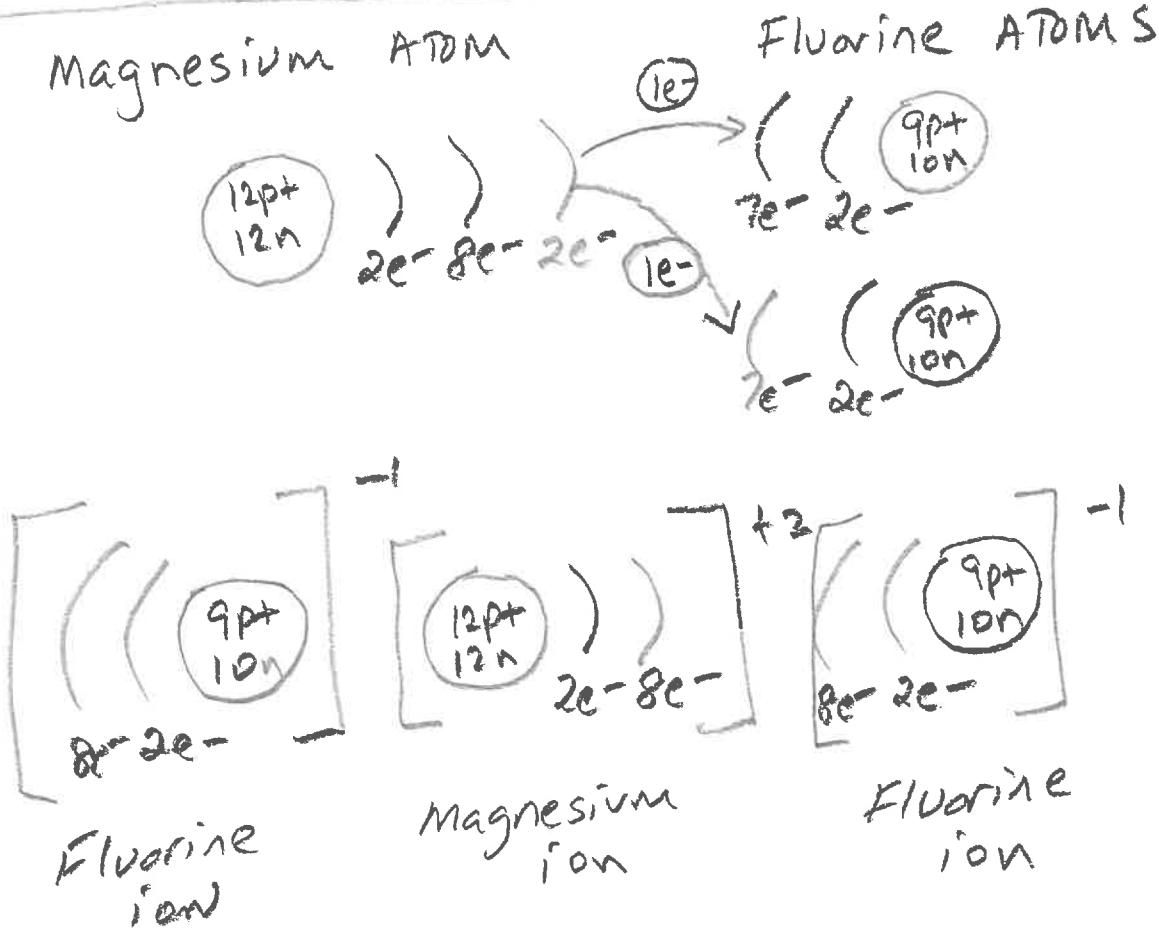


Fluoride or Fluorine ion.

16)


Lithium ATOMS
Sulfur ATOM
3p+ 4n
2e- 1e-
3p+ 4n
2e- 1e-
16p+ 16n
6e- 8e- 2e-
+1
3p+ 4n
2e-
-2
16p+ 16n
8e- 8e- 2e-
+1
3p+ 4n
2e-
Lithium Ion
Sulfur ion
Lithium ion

17)


Magnesium ATOM
Fluorine ATOMS
12p+ 12n
2e- 8e- 2e-
1e-
1e-
9p+ 10n
7e- 2e-
9p+ 10n
7e- 2e-
-1
9p+ 10n
8e- 2e-
+2
12p+ 12n
2e- 8e-
-1
9p+ 10n
8e- 2e-
Fluorine ion
Magnesium ion
Fluorine ion