Ionic Bonding

Activity 1: Identify the Ionic Bond

Question Group 1

Question 1

Consider the four pairs of elements below. Which two pairs are most likely to form an ionic bond?

Na and Cl, Mg and O, Na and Al, C and O

Question 2

Consider the four pairs of elements below. Which two pairs are most likely to form an ionic bond?

Na and Br, Mg and S, Ca and Al, N and O

Question Group 2

Question 3

Consider the four pairs of elements below. Which two pairs are most likely to form an ionic bond?

Ca and Cl, Al and N, P and H, N and Cl

Question 4

Consider the four pairs of elements below. Which two pairs are most likely to form an ionic bond?

Ca and F, Al and P, C and H, P and Cl

Question Group 3

Question 5

Consider the four pairs of elements below. Which two pairs are most likely to form an ionic bond?

Mg and O, Na and F, O and F, Mg and Zn

Question 6
Consider the four pairs of elements below. Which two pairs are most likely to form an ionic bond?

Mg and S, Na and O, S and Cl, Ca and Zn

Question Group 4
Question 7
Consider the four pairs of elements below. Which two pairs are most likely to form an ionic bond?

Al and O, Ca and S, O and Cl, S and O

Question 8

Consider the four pairs of elements below. Which two pairs are most likely to form an ionic bond?

Al and S, Ba and O, S and Cl, N and Cl

Activity 2: Ion Formation
Question Group 5
Question 9
Construct the electron shell diagram for an atom of sodium ($_{11}$Na). Then identify the number of valence electrons in the sodium atom. Then complete the following sentence:

> For sodium to become an ion, it will _____ (gain or lose) _____ (a number) electrons and become a _____ (ion formula) ion.

Question 10
Construct the electron shell diagram for an atom of magnesium ($_{12}$Mg). Then identify the number of valence electrons in the magnesium atom. Then complete the following sentence:

For magnesium to become an ion, it will _____ (gain or lose) _____ (a number) electrons and become a _____ (ion formula) ion.

Question Group 6

Question 11

Construct the electron shell diagram for an atom of potassium ($_{19}$K). Then identify the number of valence electrons in the potassium atom. Then complete the following sentence:

For potassium to become an ion, it will _____ (gain or lose) _____ (a number) electrons and become a _____ (ion formula) ion.

Question 12

Construct the electron shell diagram for an atom of calcium ($_{20}$Ca). Then identify the number of valence electrons in the calcium atom. Then complete the following sentence:

For calcium to become an ion, it will _____ (gain or lose) _____ (a number) electrons and become a _____ (ion formula) ion.

Question Group 7

Question 13

Construct the electron shell diagram for an atom of oxygen ($_{8}$O). Then identify the number of valence electrons in the oxygen atom. Then complete the following sentence:

For oxygen to become an ion, it will _____ (gain or lose) _____ (a number) electrons and become a _____ (ion formula) ion.

Question 14

Construct the electron shell diagram for an atom of fluorine ($_{9}$F). Then identify the number of valence electrons in the fluorine atom. Then complete the following sentence:

For fluorine to become an ion, it will _____ (gain or lose) _____ (a number) electrons and become a _____ (ion formula) ion.

Question Group 8

Question 15

Construct the electron shell diagram for an atom of sulfur ($_{16}S$). Then identify the number of valence electrons in the sulfur atom. Then complete the following sentence:

> For sulfur to become an ion, it will _____ (gain or lose) _____ (a number) electrons and become a _____ (ion formula) ion.

Question 16

Construct the electron shell diagram for an atom of chlorine ($_{17}Cl$). Then identify the number of valence electrons in the chlorine atom. Then complete the following sentence:

> For chlorine to become an ion, it will _____ (gain or lose) _____ (a number) electrons and become a _____ (ion formula) ion.

Activity 3: Electron Transfer
Question Group 9
Question 17
Consider the ionic compound formed from sodium (Na) and oxygen (O). It's formed as a result of electron transfer. One element donates or gives away one or more electrons. The other element accepts or receives the electrons. Let's analyze this process.
To begin, identify the electron shell diagram for sodium and for oxygen:
Second, which element is the electron donor and which is the electron acceptor?
Third, how many electrons does each atom of _____ donate? And how many electrons does each atom of _____ accept?
Fourth, how many atoms of sodium and oxygen must be present in the compound's formula?
Finally, identify the formula for the ionic compound formed from sodium and oxygen.

Question 18
Consider the ionic compound formed from potassium (K) and oxygen (O). It's formed as a result of electron transfer. One element donates or gives away one or more electrons. The other element accepts or receives the electrons. Let's analyze this process.
To begin, identify the electron shell diagram for potassium and for oxygen:
Second, which element is the electron donor and which is the electron acceptor?
Third, how many electrons does each atom of _____ donate? And how many electrons does each atom of _____ accept?
Fourth, how many atoms of potassium and oxygen must be present in the compound's formula?
Finally, identify the formula for the ionic compound formed from potassium and oxygen.

Question 19
Consider the ionic compound formed from sodium (Na) and sulfur (S). It's formed as a result of electron transfer. One element donates or gives away one or more electrons. The other element accepts or receives the electrons. Let's analyze this process.
To begin, identify the electron shell diagram for sodium and for sulfur:
Second, which element is the electron donor and which is the electron acceptor?
Third, how many electrons does each atom of _____ donate? And how many electrons does each atom of _____ accept?
Fourth, how many atoms of sodium and sulfur must be present in the compound's formula?
Finally, identify the formula for the ionic compound formed from sodium and sulfur.

Question 20
Consider the ionic compound formed from potassium (K) and sulfur (S). It's formed as a result of electron transfer. One element donates or gives away one or more electrons. The other element accepts or receives the electrons. Let's analyze this process.
To begin, identify the electron shell diagram for potassium and for sulfur:

Second, which element is the electron donor and which is the electron acceptor?
Third, how many electrons does each atom of _____ donate? And how many electrons does each atom of _____ accept?
Fourth, how many atoms of potassium and sulfur must be present in the compound's formula?
Finally, identify the formula for the ionic compound formed from potassium and sulfur.

Question Group 10
Question 21
Consider the ionic compound formed from magnesium (Mg) and oxygen (O). It's formed as a result of electron transfer. One element donates or gives away one or more electrons. The other element accepts or receives the electrons. Let's analyze this process.
To begin, identify the electron shell diagram for magnesium and for oxygen:
Second, which element is the electron donor and which is the electron acceptor?
Third, how many electrons does each atom of _____ donate? And how many electrons does each atom of _____ accept?
Fourth, how many atoms of magnesium and oxygen must be present in the compound's formula?
Finally, identify the formula for the ionic compound formed from magnesium and oxygen.

Question 22
Consider the ionic compound formed from calcium (Ca) and oxygen (O). It's formed as a result of electron transfer. One element donates or gives away one or more electrons. The other element accepts or receives the electrons. Let's analyze this process.
To begin, identify the electron shell diagram for calcium and for oxygen.
Second, which element is the electron donor and which is the electron acceptor?
Third, how many electrons does each atom of _____ donate? And how many electrons does each atom of _____ accept?
Fourth, how many atoms of calcium and oxygen must be present in the compound's formula?
Finally, identify the formula for the ionic compound formed from calcium and oxygen.

Question 23
Consider the ionic compound formed from magnesium (Mg) and sulfur (S). It's formed as a result of electron transfer. One element donates or gives away one or more electrons. The other element accepts or receives the electrons. Let's analyze this process.
To begin, identify the electron shell diagram for magnesium and for sulfur.
Second, which element is the electron donor and which is the electron acceptor?
Third, how many electrons does each atom of _____ donate? And how many electrons does each atom of _____ accept?
Fourth, how many atoms of magnesium and sulfur must be present in the compound's formula?

Finally, identify the formula for the ionic compound formed from magnesium and sulfur.

Question 24

Consider the ionic compound formed from calcium (Ca) and sulfur (S). It's formed as a result of electron transfer. One element donates or gives away one or more electrons. The other element accepts or receives the electrons. Let's analyze this process.
To begin, identify the electron shell diagram for calcium and for sulfur.
Second, which element is the electron donor and which is the electron acceptor?
Third, how many electrons does each atom of _____ donate? And how many electrons does each atom of _____ accept?
Fourth, how many atoms of calcium and sulfur must be present in the compound's formula?
Finally, identify the formula for the ionic compound formed from calcium and sulfur.

Question Group 11

Question 25

Consider the ionic compound formed from aluminum (Al) and fluorine (F). It's formed as a result of electron transfer. One element donates or gives away one or more electrons. The other element accepts or receives the electrons. Let's analyze this process.
To begin, identify the electron shell diagram for aluminum and for fluorine:
Second, which element is the electron donor and which is the electron acceptor?
Third, how many electrons does each atom of _____ donate? And how many electrons does each atom of _____ accept?
Fourth, how many atoms of aluminum and fluorine must be present in the compound's formula?
Finally, identify the formula for the ionic compound formed from aluminum and fluorine.

Question 26

Consider the ionic compound formed from aluminum (Al) and chlorine (Cl). It's formed as a result of electron transfer. One element donates or gives away one or more electrons. The other element accepts or receives the electrons. Let's analyze this process.
To begin, identify the electron shell diagram for aluminum and for chlorine:
Second, which element is the electron donor and which is the electron acceptor?
Third, how many electrons does each atom of _____ donate? And how many electrons does each atom of _____ accept?
Fourth, how many atoms of aluminum and chlorine must be present in the compound's formula?
Finally, identify the formula for the ionic compound formed from aluminum and chlorine.

Question 27

Consider the ionic compound formed from aluminum (Al) and bromine (Br). It's formed as a result of electron transfer. One element donates or gives away one or more electrons. The other element accepts or receives the electrons. Let's analyze this process.

To begin, identify the electron shell diagram for aluminum and for bromine:

Second, which element is the electron donor and which is the electron acceptor?

Third, how many electrons does each atom of _____ donate? And how many electrons does each atom of _____ accept?

Fourth, how many atoms of aluminum and bromine must be present in the compound's formula?

Finally, identify the formula for the ionic compound formed from aluminum and bromine.

Question 28

Consider the ionic compound formed from aluminum (Al) and iodine (I). It's formed as a result of electron transfer. One element donates or gives away one or more electrons. The other element accepts or receives the electrons. Let's analyze this process.

To begin, identify the electron shell diagram for aluminum and for iodine:

Second, which element is the electron donor and which is the electron acceptor?

Third, how many electrons does each atom of _____ donate? And how many electrons does each atom of _____ accept?

Fourth, how many atoms of aluminum and iodine must be present in the compound's formula?

Finally, identify the formula for the ionic compound formed from aluminum and iodine.

Question Group 12

Question 29

Consider the ionic compound formed from magnesium (Mg) and fluorine (F). It's formed as a result of electron transfer. One element donates or gives away one or more electrons. The other element accepts or receives the electrons. Let's analyze this process.

To begin, identify the electron shell diagram for magnesium and for fluorine:

Second, which element is the electron donor and which is the electron acceptor?

Third, how many electrons does each atom of _____ donate? And how many electrons does each atom of _____ accept?

Fourth, how many atoms of magnesium and fluorine must be present in the compound's formula?

Finally, identify the formula for the ionic compound formed from magnesium and fluorine.

Question 30

Consider the ionic compound formed from calcium (Ca) and fluorine (F). It's formed as a result of electron transfer. One element donates or gives away one or more electrons. The other element accepts or receives the electrons. Let's analyze this process.
To begin, identify the electron shell diagram for calcium and for fluorine:
Second, which element is the electron donor and which is the electron acceptor?
Third, how many electrons does each atom of _____ donate? And how many electrons does each atom of _____ accept?
Fourth, how many atoms of calcium and fluorine must be present in the compound's formula?
Finally, identify the formula for the ionic compound formed from calcium and fluorine.

Question 31

Consider the ionic compound formed from magnesium (Mg) and chlorine (Cl). It's formed as a result of electron transfer. One element donates or gives away one or more electrons. The other element accepts or receives the electrons. Let's analyze this process.
To begin, identify the electron shell diagram for magnesium and for chlorine:
Second, which element is the electron donor and which is the electron acceptor?
Third, how many electrons does each atom of _____ donate? And how many electrons does each atom of _____ accept?
Fourth, how many atoms of magnesium and chlorine must be present in the compound's formula?
Finally, identify the formula for the ionic compound formed from magnesium and chlorine.

Question 32

Consider the ionic compound formed from calcium (Ca) and chlorine (Cl). It's formed as a result of electron transfer. One element donates or gives away one or more electrons. The other element accepts or receives the electrons. Let's analyze this process.
To begin, identify the electron shell diagram for calcium and for chlorine:
Second, which element is the electron donor and which is the electron acceptor?
Third, how many electrons does each atom of _____ donate? And how many electrons does each atom of _____ accept?
Fourth, how many atoms of calcium and chlorine must be present in the compound's formula?
Finally, identify the formula for the ionic compound formed from calcium and chlorine.

Question Group 13

Question 33

Consider the ionic compound formed from aluminum (Al) and oxygen (O). It's formed as a result of electron transfer. One element donates or gives away one or more electrons. The other element accepts or receives the electrons. Let's analyze this process.
To begin, identify the electron shell diagram for aluminum and for oxygen:

Second, which element is the electron donor and which is the electron acceptor?
Third, how many electrons does each atom of _____ donate? And how many electrons does each atom of _____ accept?
Fourth, how many atoms of aluminum and oxygen must be present in the compound's formula?
Finally, identify the formula for the ionic compound formed from aluminum and oxygen.

Question 34

Consider the ionic compound formed from aluminum (Al) and sulfur (S). It's formed as a result of electron transfer. One element donates or gives away one or more electrons. The other element accepts or receives the electrons. Let's analyze this process.
To begin, identify the electron shell diagram for aluminum and for sulfur:
Second, which element is the electron donor and which is the electron acceptor?
Third, how many electrons does each atom of _____ donate? And how many electrons does each atom of _____ accept?
Fourth, how many atoms of aluminum and sulfur must be present in the compound's formula?
Finally, identify the formula for the ionic compound formed from aluminum and sulfur.

Question Group 14

Question 35

Consider the ionic compound formed from sodium (Na) and nitrogen (N). It's formed as a result of electron transfer. One element donates or gives away one or more electrons. The other element accepts or receives the electrons. Let's analyze this process.
To begin, identify the electron shell diagram for sodium and for nitrogen:
Second, which element is the electron donor and which is the electron acceptor?
Third, how many electrons does each atom of _____ donate? And how many electrons does each atom of _____ accept?
Fourth, how many atoms of sodium and nitrogen must be present in the compound's formula?
Finally, identify the formula for the ionic compound formed from sodium and nitrogen.

Question 36

Consider the ionic compound formed from potassium (K) and nitrogen (N). It's formed as a result of electron transfer. One element donates or gives away one or more electrons. The other element accepts or receives the electrons. Let's analyze this process.
To begin, identify the electron shell diagram for potassium and for nitrogen:
Second, which element is the electron donor and which is the electron acceptor?
Third, how many electrons does each atom of _____ donate? And how many electrons does each atom of _____ accept?

Fourth, how many atoms of potassium and nitrogen must be present in the compound's formula?
Finally, identify the formula for the ionic compound formed from potassium and nitrogen.

Question 37
Consider the ionic compound formed from sodium (Na) and phosphorus (P). It's formed as a result of electron transfer. One element donates or gives away one or more electrons. The other element accepts or receives the electrons. Let's analyze this process.
To begin, identify the electron shell diagram for sodium and for phosphorus:
Second, which element is the electron donor and which is the electron acceptor?
Third, how many electrons does each atom of _____ donate? And how many electrons does each atom of _____ accept?
Fourth, how many atoms of sodium and phosphorus must be present in the compound's formula?
Finally, identify the formula for the ionic compound formed from sodium and phosphorus.

Question 38
Consider the ionic compound formed from potassium (K) and phosphorus (P). It's formed as a result of electron transfer. One element donates or gives away one or more electrons. The other element accepts or receives the electrons. Let's analyze this process.
To begin, identify the electron shell diagram for potassium and for phosphorus:
Second, which element is the electron donor and which is the electron acceptor?
Third, how many electrons does each atom of _____ donate? And how many electrons does each atom of _____ accept?
Fourth, how many atoms of potassium and phosphorus must be present in the compound's formula?
Finally, identify the formula for the ionic compound formed from potassium and phosphorus.