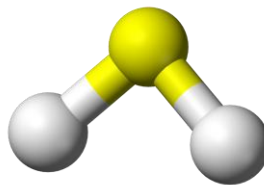


Chapter 6

End-of-Chapter Questions

1. A compound which, when dissolved in water, does not cause a current to flow, is called this.
2. Why is the simplest unit of an ionic compound called a formula unit and not a molecule?
3. When main-group metals lose all their outer-level electrons, what electron configuration do they obtain?
4. What holds the ions together in a crystal lattice?
5. When an atom of each of the following elements forms an ion, what will be its charge?
(a) potassium (b) sulfur (c) bromine
6. When an atom of each of the following elements forms an ion, what will be its charge?
(a) barium (b) phosphorus (c) aluminum
7. Identify the ion with the following combinations of protons (p) and electrons (e):
(a) 3 p, 2 e (b) 20 p, 18 e (c) 17 p, 18 e
8. Identify the ion with the following combinations of protons (p) and electrons (e):
(a) 26 p, 23 e (b) 14 p, 18 e (c) 30 p, 28 e
9. How many protons (p) and electrons (e) does each of the following species possess?
(a) Co^{2+} (b) Ag^+ (c) N^{3-}
10. How many protons (p) and electrons (e) does each of the following species possess?
(a) O^{2-} (b) Br^- (c) Ni^{2+}
11. Two species that have the same electronic structure are said to be isoelectronic. Identify the ion that is:
(a) isoelectronic with neon and has a charge of -4 ;
(b) isoelectronic with neon and a charge of $+3$.
12. Draw electron-dot symbols for the sodium ion and the iodide ion. Then deduce the ion-ratio of the ionic compound formed between the two ions and write its chemical formula.

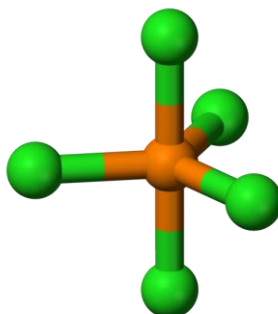
13. Draw electron-dot symbols for the potassium ion and the sulfide ion. Then deduce the ion-ratio of the ionic compound formed between the two ions and write its chemical formula.
14. Draw electron-dot symbols for the calcium ion and the nitride ion. Then deduce the ion-ratio of the ionic compound formed between the two ions and write its chemical formula.
15. There are five diatomic gaseous elements. Write the formula for each one.
16. Draw electron-dot symbols for the bromine atom and the chlorine atom. Then construct the electron-dot structure for the single-bonded molecule formed between these two elements. Then write the corresponding structural formula and the chemical formula.
17. Draw electron-dot symbols for the iodine atom and the sulfur atom. Then construct the electron-dot structure for the single-bonded molecule formed between these two elements. Then write the corresponding structural formula and the chemical formula.
18. Draw electron-dot symbols for the phosphorus atom and the chlorine atom. Then construct the electron-dot structure for the single-bonded molecule formed between these two elements. Then write the corresponding structural formula and the chemical formula.
19. Draw electron-dot symbols for the carbon atom and the sulfur atom. Then construct the electron-dot structure for the double-bonded molecule formed between these two elements (hint: the molecule contains two sulfur atoms). Then write the corresponding structural formula and the chemical formula.
20. Draw electron-dot symbols for the hydrogen atom, the carbon atom, and the nitrogen atom. Then construct the electron-dot structure for the molecule formed between these three elements (hints: the carbon atom is in the middle and there is a triple bond between the carbon and nitrogen atoms). Then write the corresponding structural formula and the chemical formula.
21. An unknown compound, X, is a solid at room temperature. It does not melt when heated in a flame. Compound X dissolves in water to form an electrically-conducting solution. Is the compound ionic or covalent? Why does the compound not conduct electricity in the solid phase?
22. From the standard colour code for molecular models:
 - (a) Write the formula for the following molecule



(b) Suggest why the molecule is vee-shaped and not linear.

23. From the standard colour code for molecular models:

(a) Write the formula for the following molecule



(b) Assuming there are no lone pairs on the central atom, how many bonding electron pairs must there be on the central atom?

24. Give one advantage and one disadvantage of using a space-filling model of a covalently-bonded compound.

25. Give one advantage and one disadvantage of using a ball-and-stick model of a covalently-bonded compound.