

To Know for SCH3U CH2 Test 2.1 - 2.4

- Be able to compare the properties of ionic and molecular compounds, and use these properties to classify compounds as either ionic or molecular.
- Be able to describe and explain the differences in bonds in ionic compounds and molecular compounds
- Be able to use electronegativity values to predict the nature of a bond. (polar, non-polar covalent, ionic)
- Be able to represent ionic and molecular compounds using Lewis structures and structural formulas
- Be able to write chemical formulas and IUPAC names for ionic and molecular compounds

Extra Practice

Any problems at the end of each section

Self Quiz pg 87 1-9

Ch 2 Review p 88 1-10, 22 a, b, c, 23, 24, 27, 33, 36,

40, 41, 42, 43, 44, 52

8. Which term refers to the smallest repeating unit in an ionic crystal?
- Lewis structure
 - formula unit
 - molecular compound
 - ionic compound
9. Which term refers to the number of covalent bonds that an atom can form?
- formula unit
 - electronegativity
 - electronegativity difference
 - bonding capacity
10. Which of the following representations shows the Lewis symbols for the formation of hydrogen sulfide?
- $\dot{\text{H}} + \cdot\ddot{\text{S}}: + \dot{\text{H}} \rightarrow [\text{H}]^+ [\ddot{\text{S}}:]^{2-} [\text{H}]^+$
 - $\dot{\text{H}} + \cdot\ddot{\text{S}}: \rightarrow [\text{H}]^+ [\ddot{\text{S}}:]^{2-}$
 - $\dot{\text{H}} + \cdot\ddot{\text{S}}: + \dot{\text{H}} \rightarrow [\text{H}]^- [\ddot{\text{S}}:]^{2+} [\text{H}]^-$
 - none of the above
11. Which of the following representations shows the Lewis symbols for the formation of potassium chloride?
- $\dot{\text{K}} + \cdot\ddot{\text{Cl}}: \rightarrow [\text{K}]^- [\ddot{\text{Cl}}:]^+$
 - $\dot{\text{K}} + \cdot\ddot{\text{Cl}}: \rightarrow [\text{K}] [\ddot{\text{Cl}}:]^-$
 - $\dot{\text{K}} + \cdot\ddot{\text{Cl}}: \rightarrow [\dot{\text{K}}] [\ddot{\text{Cl}}:]$
 - $\dot{\text{K}} + \cdot\ddot{\text{Cl}}: \rightarrow [\text{K}]^+ [\ddot{\text{Cl}}:]^-$
12. Which type of representation is shown here?
- $$\ddot{\text{O}}=\text{C}=\ddot{\text{O}}:$$
- structural formula for molecular compound
 - structural formula for molecular element
 - Lewis symbols for ionic compound
 - Lewis structure for molecular compound
13. Which type of representation is shown here?
- $$\begin{array}{c} \text{H} \quad \text{H} \\ | \quad | \\ \text{H}-\text{C}-\text{C}-\text{O} \\ | \quad | \quad | \\ \text{H} \quad \text{H} \quad \text{H} \end{array}$$
- structural formula for molecular element
 - Lewis symbols for ionic compound
 - structural formula for molecular compound
 - Lewis structure for molecular compound

SCH3U Ch2 Review Sheet

Answer Section

MULTIPLE CHOICE

1. ANS: B PTS: 1 REF: K/U
OBJ: 2.2 Molecular Elements and Compounds LOC: B3.5
MSC: Understanding
2. ANS: C PTS: 1 REF: K/U
OBJ: 2.2 Molecular Elements and Compounds LOC: B2.1
MSC: Knowledge
3. ANS: A PTS: 1 REF: K/U
OBJ: 2.2 Molecular Elements and Compounds LOC: B2.1
MSC: Knowledge
4. ANS: D PTS: 1 REF: K/U
OBJ: 2.3 Chemical Bonding and Electronegativity LOC: B2.5
MSC: Knowledge
5. ANS: A PTS: 1 REF: T/I
OBJ: 2.3 Chemical Bonding and Electronegativity LOC: B2.5
MSC: Evaluation
6. ANS: A PTS: 1 REF: K/U
OBJ: 2.3 Chemical Bonding and Electronegativity LOC: B2.5
MSC: Knowledge
7. ANS: C PTS: 1 REF: K/U
OBJ: 2.3 Chemical Bonding and Electronegativity LOC: B2.5
MSC: Knowledge
8. ANS: B PTS: 1 REF: K/U OBJ: 2.1 Ionic Compounds
LOC: B2.1 MSC: Knowledge
9. ANS: D PTS: 1 REF: K/U
OBJ: 2.2 Molecular Elements and Compounds LOC: B2.1
MSC: Knowledge
10. ANS: A PTS: 1 REF: C OBJ: 2.1 Ionic Compounds
LOC: B2.4 MSC: Analysis and Application
11. ANS: D PTS: 1 REF: C OBJ: 2.1 Ionic Compounds
LOC: B2.4 MSC: Analysis and Application
12. ANS: D PTS: 1 REF: C
OBJ: 2.2 Molecular Elements and Compounds LOC: B2.4
MSC: Understanding
13. ANS: C PTS: 1 REF: C
OBJ: 2.2 Molecular Elements and Compounds LOC: B2.4
MSC: Understanding
14. ANS: C PTS: 1 REF: T/I
OBJ: 2.3 Chemical Bonding and Electronegativity LOC: B2.5
MSC: Analysis and Application
15. ANS: A PTS: 1 REF: T/I
OBJ: 2.3 Chemical Bonding and Electronegativity LOC: B2.5
MSC: Analysis and Application

Chapter 2 Self-Quiz, page 87

1. (b)
2. (c)
3. (d)
4. (a)
5. (a)
6. (c)
7. (b)
8. (b)
9. (c)
10. False. The *formula unit* for the compound sodium chloride is NaCl(s) . Or The *chemical formula* for the compound sodium chloride is NaCl(s) .
11. False. The chemical bond that forms between a hydrogen atom and a chlorine atom will be *polar covalent*.
12. True
13. False. A molecule of carbon dioxide would have carbon–oxygen *double* bonds in its Lewis structure.
14. False. In the periodic table, electronegativity values increase from *bottom* to *top* and from left to right.
15. True
16. True
17. False. The chemical formula for the meat preservative sodium nitrite is NaNO_2 .
18. False. The chemical formula for the compound tin(IV) sulfide is SnS_2 .
19. False. The charge on the chromate ion in the compound potassium chromate, $\text{K}_2\text{CrO}_4(\text{s})$, is -2 .
20. True

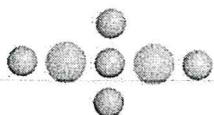
29. The zero-sum rule states that the total positive charge of the cations in a compound must equal the total negative charge of the anions.

30. Three adverse health consequences of consuming too much sugar are increased chances of developing type 2 diabetes, becoming obese, and developing tooth decay.

Understanding

31. When mixed with water, not all ionic compounds produce solutions that are good conductors of electricity. Some ionic compounds dissolve only slightly in water and thus do not introduce many ions into solution. It is also possible that only a tiny amount of a soluble ionic compound has been added to water, again resulting in very few ions in solution. In either case, these ionic-compound–water mixtures will not conduct electricity well.

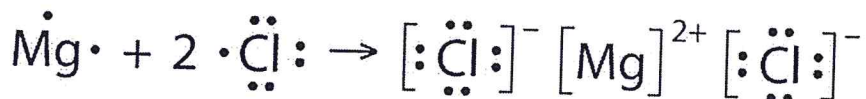
32. (a)



(b) X_2Y_5

33. Formation of ionic compound:

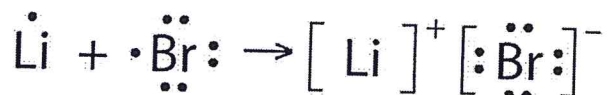
(a) Magnesium oxide:



(b) Aluminum sulfide:



(c) Lithium bromide:

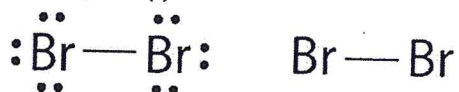


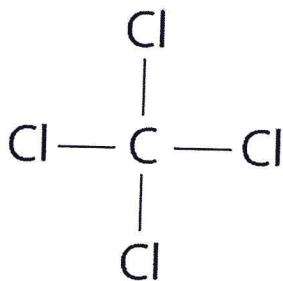
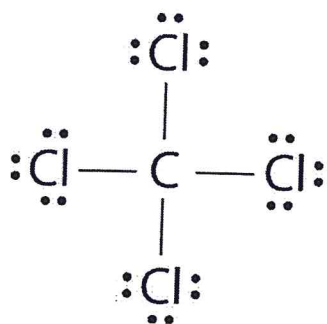
34. (a) The number of protons in the nucleus of the sulfur atom does not change when it gains electrons, so it remains a sulfur particle.

(b) When a sulfur atom gains 2 electrons it becomes a sulfur anion with a charge of -2 .

35. Glucose, $\text{C}_6\text{H}_{12}\text{O}_6$, cannot be represented with a formula unit of CH_2O because it is a molecular substance. Each molecule is composed of 6 carbon atoms, 12 hydrogen atoms, and 6 oxygen atoms bonded together. Formula units, which represent the simplest ratios of combination, are reserved for ionic compounds because ionic compounds do not have a molecular structure.

36. (a) $\text{Br}_2(\text{l})$:





37. The molecules in Question 36 that have double bonds are CS_2 and COCl_2 ; NO^+ contains a triple bond.
38. All of the entities in Question 36 contain polar covalent bonds except Br_2 (non-polar covalent) and NaF (ionic).
39. Electronegativity increases as atomic radius decreases because the positively charged nucleus of a small atom can get much closer to bonding electrons of another atom than the nucleus of a larger atom can. So, an atom with a small radius can exert a much stronger attractive force on those electrons. The increased electrostatic attraction causes the atom to draw the bonding electrons closer, thus giving the atom a higher electronegativity.
40. Type of bond between elements:
- (a) N and H: polar covalent (two non-metals, $\Delta EN = 0.8$)
 - (b) Al and F: ionic (a metal and a non-metal, $\Delta EN = 2.4$)
 - (c) N and O: polar covalent (two non-metals, $\Delta EN = 0.4$)
 - (d) F and F: non-polar covalent (identical atoms, $\Delta EN = 0$)
 - (e) Br and K: ionic (a metal and a non-metal, $\Delta EN = 2.2$)
41. Chemical formula for ionic compound:
- (a) Copper(II) oxide is CuO .
 - (b) Aluminum nitrate is $\text{Al}(\text{NO}_3)_3$.
 - (c) Manganese(II) chloride is MnCl_2 .
 - (d) Barium fluoride is BaF_2 .
 - (e) Lead(IV) oxide is PbO_2 .
 - (f) Iron(III) sulfate is $\text{Fe}_2(\text{SO}_4)_3$.
42. Chemical formula for molecular compound:
- (a) Carbon disulfide is CS_2 .
 - (b) Diarsenic trioxide is As_2O_3 .
 - (c) Dichlorine monoxide is Cl_2O .
 - (d) Diantimony pentoxide is Sb_2O_5 .
43. (a) The IUPAC name for $\text{SrS}(\text{s})$ is strontium sulfide.
- (b) The IUPAC name for $(\text{NH}_4)_2\text{SO}_4(\text{s})$ is ammonium sulfate.
- (c) The IUPAC name for $\text{SnF}_2(\text{s})$ is tin(II) fluoride.
- (d) The IUPAC name for $\text{FePO}_4(\text{s})$ is iron(III) phosphate.
- (e) The IUPAC name for $\text{Ca}(\text{OH})_2(\text{s})$ is calcium hydroxide.
- (f) The IUPAC name for $\text{MgCO}_3(\text{s})$ is magnesium carbonate.
44. (a) The IUPAC name for $\text{NF}_3(\text{g})$ is nitrogen trifluoride.
- (b) The IUPAC name for $\text{B}_2\text{O}_3(\text{s})$ is diboron trioxide.
- (c) The IUPAC name for $\text{I}_2\text{O}_5(\text{s})$ is diiodine pentoxide.