

From textbook: (1, 11, 35, 37, 39, 41, 43, 45, 45, 47, 67, 69, 75, 77, 79, 83, 85, 87, 89, 91, 97, 103, 107, 109, 115, 119, 121, 127, 129 and 131)

- Which one of the following is most likely to be an ionic compound?  
A. KF      B. CCl<sub>4</sub>      C. CS<sub>2</sub>      D. CO<sub>2</sub>      E. ICl
- Which one of the following is most likely to be an ionic compound?  
A. GaAs      B. SrBr<sub>2</sub>      C. NO<sub>2</sub>      D. CBr<sub>4</sub>      E. H<sub>2</sub>O
- Which one of the following is most likely to be an ionic compound?  
A. NCl<sub>3</sub>      B. BaCl<sub>2</sub>      C. CO      D. SO<sub>2</sub>      E. SF<sub>4</sub>
- Which one of the following is most likely to be a covalent compound?  
A. Rb<sub>2</sub>S      B. SrCl<sub>2</sub>      C. CS<sub>2</sub>      D. CaO      E. MgI<sub>2</sub>
- Which one of the following is most likely to be a covalent compound?  
A. KF      B. CaCl<sub>2</sub>      C. SF<sub>4</sub>      D. Al<sub>2</sub>O<sub>3</sub>      E. CaSO<sub>4</sub>
- A polar covalent bond would form in which one of the following pairs of atoms?  
A. Cl — Cl      B. Si — Si      C. Ca — Cl      D. Cr — Br      E. P — Cl
- What type of chemical bond holds the atoms together within a water molecule?  
A. Ionic bond      B. Nonpolar covalent bond      C. Polar covalent bond
- A *nonpolar* covalent bond (i.e., pure covalent) would form in which one of the following pairs of atoms?  
A. Na — Cl      B. H — Cl      C. Li — Br      D. Se — Br      E. Br — Br
- Which of the bonds below would have the *greatest* polarity (i.e., highest percent ionic character)?  
A. Si — P      B. Si — S      C. Si — Se      D. Si — Cl      E. Si — I
- Classify the O — H bond in CH<sub>3</sub>OH as ionic, polar covalent, or nonpolar covalent.  
A. ionic      B. polar covalent      C. nonpolar covalent
- Classify the C — Cl bond in CCl<sub>4</sub> as ionic, polar covalent, or nonpolar covalent.  
A. ionic      B. polar covalent      C. nonpolar covalent
- Classify the Ca — Cl bond in CaCl<sub>2</sub> as ionic, polar covalent, or nonpolar covalent.  
A. ionic      B. polar covalent      C. nonpolar covalent
- What is the molar mass of ammonium nitrate?
- How many oxygen atoms are present in  $1.00 \times 10^{-3}$  mole of ozone, O<sub>3</sub>?

15. How many oxygen atoms are in 1.00 mol SO<sub>3</sub>?
16. What is the mass percent oxygen in copper(II) sulfate pentahydrate?
17. Calculate the percent composition by mass of all the elements in Na<sub>2</sub>CO<sub>3</sub>.
18. The molar mass of hydrazine is 32 g/mol and its empirical formula is NH<sub>2</sub>. What is its molecular formula?
19. Ketoprofen is an anti-inflammatory drug which is 75.59% C, 5.51% H, and 18.90% O. If the molecular mass of ketoprofen is 254 g/mol, what is its molecular formula?
20. What is the empirical formula of a compound of uranium and fluorine that is composed of 67.6% uranium and 32.4% fluorine?
21. The percent composition by mass of a compound is 76.0% C, 12.8% H, and 11.2% O. The molar mass of this compound is 284.5 g/mol. What is the molecular formula of the compound?
22. A 0.600 g sample of a compound of arsenic and oxygen was found to contain 0.454 g of arsenic. What is the empirical formula of the compound?
23. 2.386 g of a compound containing only Carbon, Hydrogen and Oxygen undergoes combustion analysis to produce 5.77 g CO<sub>2</sub> and 2.14 g H<sub>2</sub>O. What is the empirical formula of this compound?
24. Vitamin C is essential for the prevention of scurvy. Combustion of a 2.00 gram sample of this Carbon, Hydrogen and Oxygen containing compound yields 2.998 g CO<sub>2</sub> and 0.819 g H<sub>2</sub>O. What is the empirical formula and percent composition of Vitamin C?
25. An 0.1888-g sample of a hydrocarbon produces 0.6270 g of CO<sub>2</sub> and 0.1602 g H<sub>2</sub>O in combustion analysis. Its molar mass is found to be 106 g/mol. For this hydrocarbon, determine A) Its percent composition; B) Its empirical formula and C) its molecular formula
26. Para-cresol is used as a disinfectant and in the manufacture of herbicides and artificial food flavors. A 0.4039-g sample of this carbon-hydrogen-oxygen containing compound yields 1.1518 g CO<sub>2</sub> and 0.2694 g H<sub>2</sub>O. What is the empirical formula of para-cresol?

### Answers

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|--|------------------------------------|--|--|-------------------------------------|-----------------|----------|
| 1. A   | 2. B                               | 3. B   | 4. C   | 5. C                                | 6. E            | 7. C     |
| 8. E   | 9. D                               | 10. B  | 11. B  | 12. A                               | 13. 80.05 g/mol |          |
| 14. $1.81 \times 10^{21}$ O atoms                  | 15. $1.81 \times 10^{24}$ O atoms  | 16. 57.7% Oxygen                                   |  |                                     |                 |          |
| 17. 43.4% Na, 11.3% C, 45.3% O                     | 18. N <sub>2</sub> H <sub>4</sub>  | 19. C <sub>16</sub> H <sub>14</sub> O <sub>3</sub> | 20. UF <sub>6</sub>                                |                                     |                 |          |
| 21. C <sub>18</sub> H <sub>36</sub> O <sub>2</sub> | 22. As <sub>2</sub> O <sub>3</sub> | 23. C <sub>11</sub> H <sub>20</sub> O <sub>3</sub> | 24. C <sub>3</sub> H <sub>4</sub> O <sub>3</sub> / | 40.91% C                            | 4.58% H and     | 54.51% O |
| 25. A) 90.56% C                                    | 9.44% H                            | b) C <sub>4</sub> H <sub>5</sub>                   | C) C <sub>8</sub> H <sub>10</sub>                  | 26. C <sub>7</sub> H <sub>8</sub> O |                 |          |