

Problem Set - Molecular Weights #1 - Answers

Determine the Molecular Weights of the following molecules:¹

1. C₂H₅F

$$C \Rightarrow 12.01 \text{ g/mole}$$

$$H \Rightarrow 1.008 \text{ g/mole}$$

$$F \Rightarrow 19.00\text{g/mole}$$

$$MW = (2 \times C) + (5 \times H) + (1 \times F)$$

$$MW = (2 \times 12.01 \text{ g/mole}) + (5 \times 1.008 \text{ g/mole}) + (1 \times 19.00 \text{ g/mole})$$

$$MW = 48.06 \text{ g/mole} \Rightarrow 4.806 \times 10^1 \text{ g/mole}$$

2. C₃H₅O

$$C \Rightarrow 12.01 \text{ g/mole}$$

$$H \Rightarrow 1.008 \text{ g/mole}$$

$$O \Rightarrow 16.00\text{g/mole}$$

$$MW = (3 \times C) + (5 \times H) + (1 \times O)$$

$$MW = (3 \times 12.01 \text{ g/mole}) + (5 \times 1.008 \text{ g/mole}) + (1 \times 16.00 \text{ g/mole})$$

$$MW = 57.07 \text{ g/mole} \Rightarrow 5.707 \times 10^1 \text{ g/mole}$$

3. C₅H₅N

$$C \Rightarrow 12.01 \text{ g/mole}$$

$$H \Rightarrow 1.008 \text{ g/mole}$$

$$N \Rightarrow 14.01\text{g/mole}$$

$$MW = (5 \times C) + (5 \times H) + (1 \times N)$$

$$MW = (5 \times 12.01 \text{ g/mole}) + (5 \times 1.008 \text{ g/mole}) + (1 \times 14.01 \text{ g/mole})$$

$$MW = 79.10 \text{ g/mole} \Rightarrow 7.910 \times 10^1 \text{ g/mole}$$

4. C₆H₁₂O₆

¹ Note: Use the Atomic Masses from the table on the inside front cover of the text book.

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$$\text{C} \Rightarrow 12.01 \text{ g/mole}$$

$$\text{H} \Rightarrow 1.008 \text{ g/mole}$$

$$\text{O} \Rightarrow 16.00 \text{ g/mole}$$

$$\text{MW} = (6 \times \text{C}) + (12 \times \text{H}) + (1 \times \text{O})$$

$$\text{MW} = (6 \times 12.01 \text{ g/mole}) + (12 \times 1.008 \text{ g/mole}) + (6 \times 16.00 \text{ g/mole})$$

$$\text{MW} = ~~180.156~~ \text{ g/mole} = 180.2 \text{ g/mole} \Rightarrow 1.802 \times 10^2 \text{ g/mole}$$

5. NaCl

$$\text{Na} \Rightarrow 22.99 \text{ g/mole}$$

$$\text{Cl} \Rightarrow 35.45 \text{ g/mole}$$

$$\text{MW} = (1 \times \text{Na}) + (1 \times \text{Cl})$$

$$\text{MW} = (1 \times 22.99 \text{ g/mole}) + (1 \times 35.45 \text{ g/mole})$$

$$\text{MW} = 58.44 \text{ g/mole} \Rightarrow 5.844 \times 10^1 \text{ g/mole}$$

6. C₆CrO₆

$$\text{C} \Rightarrow 12.01 \text{ g/mole}$$

$$\text{Cr} \Rightarrow 52.00 \text{ g/mole}$$

$$\text{O} \Rightarrow 16.00 \text{ g/mole}$$

$$\text{MW} = (6 \times \text{C}) + (1 \times \text{Cr}) + (6 \times \text{O})$$

$$\text{MW} = (6 \times 12.01 \text{ g/mole}) + (1 \times 52.00 \text{ g/mole}) + (6 \times 16.00 \text{ g/mole})$$

$$\text{MW} = ~~220.06~~ \text{ g/mole} = 220.1 \text{ g/mole} \Rightarrow 2.201 \times 10^2 \text{ g/mole}$$

7. C₁₀H₁₀Fe

$$\text{C} \Rightarrow 12.01 \text{ g/mole}$$

$$\text{H} \Rightarrow 1.008 \text{ g/mole}$$

$$\text{Fe} \Rightarrow 55.85 \text{ g/mole}$$

$$\text{MW} = (10 \times \text{C}) + (10 \times \text{H}) + (1 \times \text{Fe})$$

$$\text{MW} = (10 \times 12.01 \text{ g/mole}) + (10 \times 1.008 \text{ g/mole}) + (1 \times 55.85 \text{ g/mole})$$

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$$MW = \cancel{186.03} \text{ g/mole} = 186.0 \text{ g/mole} \Rightarrow 1.860 \times 10^2 \text{ g/mole}$$

8. MgO

$$\text{Mg} \Rightarrow 24.31 \text{ g/mole}$$

$$\text{O} \Rightarrow 16.00 \text{ g/mole}$$

$$MW = (1 \times \text{Mg}) + (1 \times \text{O})$$

$$MW = (1 \times 24.31 \text{ g/mole}) + (1 \times 16.00 \text{ g/mole})$$

$$MW = 40.31 \text{ g/mole} \Rightarrow 4.031 \times 10^1 \text{ g/mole}$$

9. Na₂SiO₃

$$\text{Na} \Rightarrow 22.99 \text{ g/mole}$$

$$\text{Si} \Rightarrow 28.09 \text{ g/mole}$$

$$\text{O} \Rightarrow 16.00 \text{ g/mole}$$

$$MW = (2 \times \text{Na}) + (1 \times \text{Si}) + (3 \times \text{O})$$

$$MW = (2 \times 22.99 \text{ g/mole}) + (1 \times 28.09 \text{ g/mole}) + (3 \times 16.00 \text{ g/mole})$$

$$MW = \cancel{122.07} \text{ g/mole} = 122.1 \text{ g/mole} \Rightarrow 1.221 \times 10^2 \text{ g/mole}$$