

Quiz 5

Name: Key

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1. A 15.0 g sample of a compound contains 6.0 g of carbon. What is the percent composition of carbon in the compound?

$$\frac{6.0 \text{ g}}{15.0 \text{ g}} \times 100 = \boxed{40. \%}$$

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2. 3.43 % of the sample is composed of nitrogen. If the mass of the nitrogen is 15.6 g, what is the total mass of the sample?

$$\frac{15.6 \text{ g}}{x} \times 100 = 3.43 \% \quad \boxed{x = 454.8 \text{ g}}$$

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3. How many CO₂ molecules are in 0.000534 g of CO₂?

$$0.000534 \text{ g}_{\text{CO}_2} \times \frac{1 \text{ mol}}{44.01 \text{ g}} \times \frac{6.022 \times 10^{23} \text{ molecule}}{1 \text{ mol}} = \boxed{7.3 \times 10^{18} \text{ molecules}}$$

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4. How many grams are equivalent to 3.40×10^{36} atoms of iron (Fe)?

$$3.40 \times 10^{36} \text{ atoms} \times \frac{1 \text{ mol}}{6.022 \times 10^{23} \text{ atoms}} \times \frac{55.85 \text{ g}}{1 \text{ mol}} = \boxed{3.15 \times 10^{14} \text{ g}}$$

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5. A compound is found to be composed of 40.454% carbon, 5.658% hydrogen, and 53.888% oxygen by mass. The experimental molar mass of the compound is 267.21 g/mol. Determine the empirical and molecular formula of the compound.

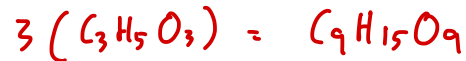
$$\text{C } 40.454 \text{ g} \times \frac{1 \text{ mol}}{12.01 \text{ g}} = 3.3683 \text{ mol} / 3.368 = 1 \times 3 = 3$$

$$\text{H } 5.658 \text{ g} \times \frac{1 \text{ mol}}{1.01 \text{ g}} = 5.60198 \text{ mol} / 3.368 = 1.66 \times 3 = 5$$

$$\text{O } 53.888 \text{ g} \times \frac{1 \text{ mol}}{16.00 \text{ g}} = 3.368 \text{ mol} / 3.368 = 1 \times 3 = 3$$

Empirical Formula: $\text{C}_3\text{H}_5\text{O}_3$

$$\frac{267.21}{89.07} = 3$$



Molecular Formula: $\text{C}_9\text{H}_{15}\text{O}_9$

1	1 H 1.008	IIA														2 He 4.003		
2	3 Li 6.941	4 Be 9.012															10 Ne 20.18	
3	11 Na 23.00	12 Mg 24.31															18 Ar 39.95	
4	19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.90	23 V 50.94	24 Cr 52.00	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.71	29 Cu 63.55	30 Zn 65.37	31 Ga 69.72	32 Ge 72.59	33 As 74.92	34 Se 78.96	35 Br 79.90	36 Kr 83.80
5	37 Rb 85.47	38 Sr 87.62	39 Y 88.91	40 Zr 91.22	41 Nb 92.91	42 Mo 95.94	43 Tc (99)	44 Ru 101.0	45 Rh 102.9	46 Pd 106.4	47 Ag 107.9	48 Cd 112.4	49 In 114.8	50 Sn 118.7	51 Sb 121.8	52 Te 127.6	53 I 126.9	54 Xe 131.3
6	55 Cs 132.9	56 Ba 137.3	57 La* 138.9	72 Hf 178.9	73 Ta 180.9	74 W 183.9	75 Re 186.2	76 Os 190.2	77 Ir 192.2	78 Pt 195.1	79 Au 197.0	80 Hg 200.6	81 Tl 204.4	82 Pb 207.2	83 Bi 209.0	84 Po (210)	85 At (210)	86 Rn (222)
7	87 Fr (223)	88 Ra (226)	89 Ac* (227)															