Quiz 5A

1. Answer the following questions about benzene, C6H6 (7 points).
	1. How many molecules of benzene are in 12.7 moles of benzene?

$12.7 mol C\_{6}H\_{6}×\frac{6.022×10^{23} molecules C\_{6}H\_{6} }{1 mol C\_{6}H\_{6}}=7.65×10^{24} molecules C\_{6}H\_{6}$

* 1. How many moles of hydrogen are in 0.6430 moles of benzene?

$$0.6430 mol C\_{6}H\_{6}×\frac{6 mol H}{1 mol C\_{6}H\_{6}}=3.858 mol H$$

* 1. What is the empirical formula? \_\_\_\_\_\_\_\_\_CH\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. If the molar mass of benzene is 78.11 g/mol, how many moles of benzene are in 24.3 grams of benzene?

$$24.3 g C\_{6}H\_{6}×\frac{1 mol C\_{6}H\_{6}}{78.11 g C\_{6}H\_{6}}=0.311 mol C\_{6}H\_{6}$$

1. In an experiment, 1.26 g of iron combines with oxygen to give a compound that has a mass of 1.80 g (8 points).
	1. What is the empirical formula of the compound?

$$1.26 g Fe×\frac{1 mol Fe}{55.85 g Fe}=\frac{0.02256043 mol Fe}{0.02256043 mol Fe}=1×2=2$$

$$g O=1.80 g-1.26 g=0.56 g O$$

$0.56 g O×\frac{1 mol O}{16.00 g O}=\frac{0.03375 mol O}{0.02256043 mol Fe}=1.495982143×2=2.991964286≈3$

Therefore the empirical formula is Fe2O3

* 1. What is the name of the compound? iron(III) oxide or ferric oxide
1. Match the compound formula with the correct molar mass (5 points).

a. 84.01 g/mol

b. 72.00 g/mol

c. 87.92 g/mol

d. 32.04 g/mol

e. 39.95 g/mol

f. 153.8 g/mol

g. 28.01 g/mol

\_d\_\_ methanol, CH3OH

\_a\_\_\_ NaHCO3

\_e\_\_ argon gas

\_c\_\_ iron(II) sulfide

\_f\_\_ carbon tetrachloride

Quiz 5B

1. Match the compound formula with the correct molar mass (5 points).

a. 135.5 g/mol

b. 28.01 g/mol

c. 66.01 g/mol

d. 41.99 g/mol

e. 44.01 g/mol

f. 22.99 g/mol

g. 83.00 g/mol

\_a\_\_\_ CuCl2

\_d\_\_ sodium fluoride

\_f\_\_ sodium metal

\_e\_\_ carbon dioxide

\_c\_\_ chromium(III) nitride

1. Answer the following questions about hydrazine, N2H4 (7 points).
	1. What is the empirical formula? \_\_\_\_\_\_\_\_\_NH2 \_\_\_\_\_\_\_\_\_\_\_\_\_
	2. If the molar mass of hydrazine is 32.05 g/mol, how many moles of hydrazine are in 15.8 grams of hydrazine?

$$15.8 g N\_{2}H\_{4}×\frac{1 mol N\_{2}H\_{4}}{32.05 g N\_{2}H\_{4}}=0.493 mol N\_{2}H\_{4}$$

* 1. How many molecules of hydrazine are in 2.544 moles of hydrazine?

$2.544 mol N\_{2}H\_{4}×\frac{6.022×10^{23} molecules N\_{2}H\_{4} }{1 mol N\_{2}H\_{4}}=1.532×10^{24} molecules N\_{2}H\_{4}$

* 1. How many moles of hydrogen are in 1.22 moles of hydrazine?

$$1.22 mol N\_{2}H\_{4}×\frac{4 mol H}{1 mol N\_{2}H\_{4}}=4.88 mol H$$

1. In an experiment, 2.52 g of iron combines with oxygen to give a compound that has a mass of 3.60 g (8 points).
	1. What is the empirical formula of the compound?

$$2.52 g Fe×\frac{1 mol Fe}{55.85 g Fe}=\frac{0.045120859 mol Fe}{0.045120859 mol Fe}=1×2=2$$

$$g O=1.80 g-1.26 g=0.56 g O$$

$0.56 g O×\frac{1 mol O}{16.00 g O}=\frac{0.0675 mol O}{0.045120859 mol Fe}=1.495982143×2=2.991964286≈3$

Therefore the empirical formula is Fe2O3

* 1. What is the name of the compound? iron(III) oxide or ferric oxide