Key Concepts for A Level Chemistry

Checkup Quiz...Moles Part 6

1) Balance the following equations.

a) $Mg + HNO_3 \rightarrow Mg(NO_3)_2 + H_2$

b) $CuCl_2 + NaOH \rightarrow Cu(OH)_2 + NaCl$

c) $SO_2 + O_2 \rightarrow SO_3$

d) $C_3H_8 + O_2 \rightarrow CO_2 + H_2O$

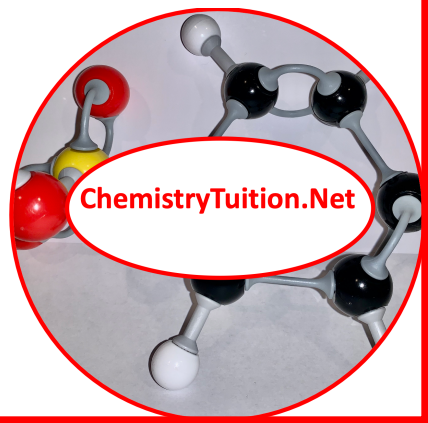
2) Give balanced equations for the following reactions. Remember to work out the formulae first!

a) sodium + oxygen → sodium oxide

b) aluminium + chlorine → aluminium chloride

c) calcium + hydrochloric acid → calcium chloride + hydrogen

d) ammonia + sulphuric acid → ammonium sulphate



3) Calculate the mass of each of the following:

i) 0.100 moles of hydrogen gas

ii) 0.200 moles of sodium bromide

b) Calculate the amount of moles in each of the following:

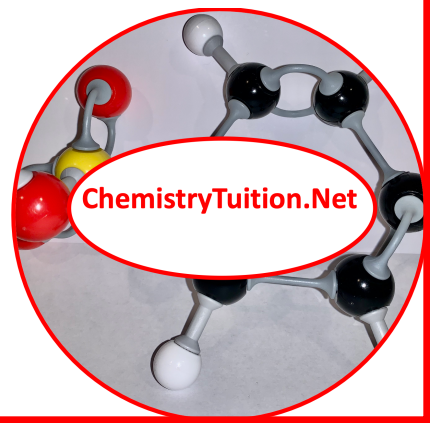
i) 0.150 g of iron

ii) 1.23 g of Na_2SO_4

4) a) How many moles of H_2SO_4 are there in 98.1 g of H_2SO_4?

b) How many moles of H^+ ions does this contain?

c) How many moles of SO_4^{2-} ions does this contain?



5) What volume of O_2 is required to ignite 20.0 g of hydrogen in oxygen at RTP?

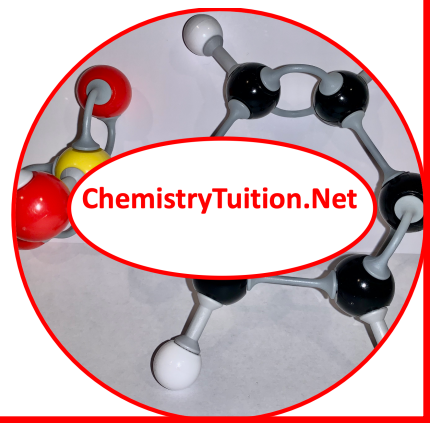
$$2\ H_2 + O_2 \rightarrow 2\ H_2O$$

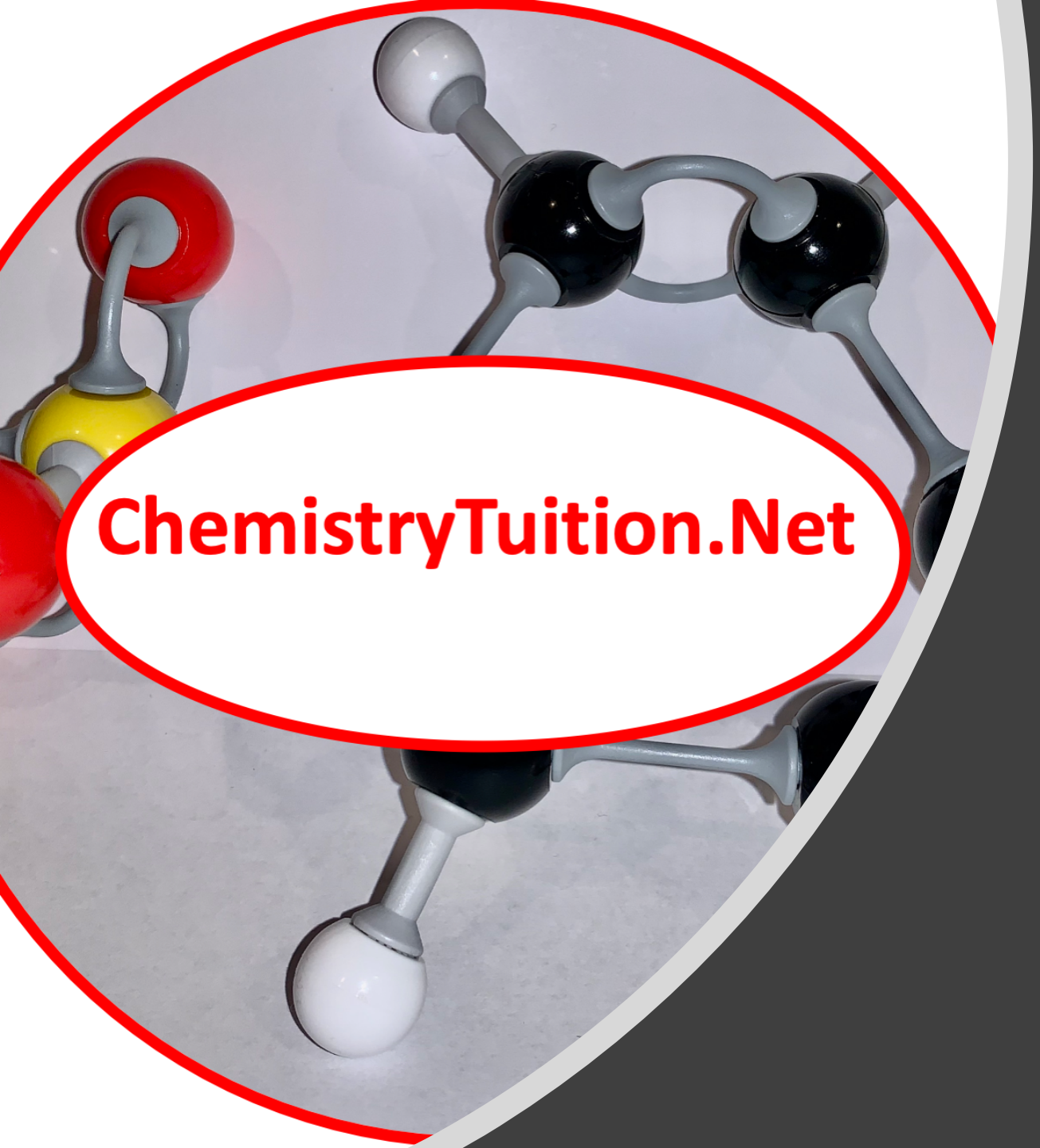
6) What mass of Na_2O is produced when 2.50 g of sodium is burned in oxygen?

$$4\ Na + O_2 \rightarrow 2\ Na_2O$$

7) If 4 dm^3 of hydrogen sulphide is burned in 10 dm^3 of oxygen, what is the final volume of the mixture at RTP (give the volume of each gas at the end)?

$$2\ H_2S(g) + 3\ O_2(g) \rightarrow 2\ H_2O(g) + 2\ SO_2(g)$$





Answers are coming up…

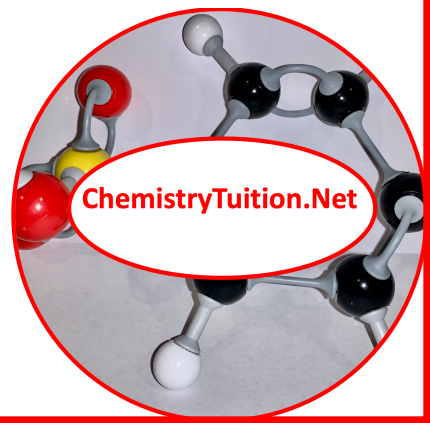
1) Balance the following equations.

a) $Mg + 2HNO_3 \rightarrow Mg(NO_3)_2 + H_2$

b) $CuCl_2 + 2NaOH \rightarrow Cu(OH)_2 + 2NaCl$

c) $2SO_2 + O_2 \rightarrow 2SO_3$

d) $C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$



2) Give balanced equations for the following reactions. Remember to work out the formulae first!

a) sodium + oxygen → sodium oxide

$4Na + O_2 \rightarrow 2Na_2O$

b) aluminium + chlorine → aluminium chloride

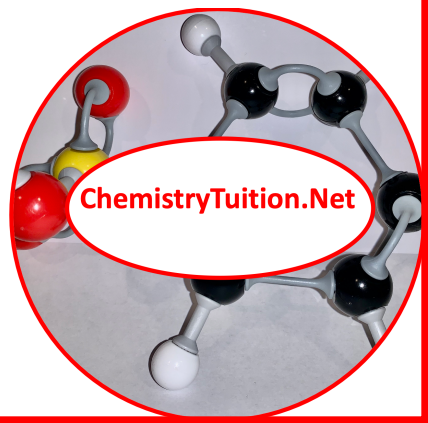
$2Al + 3Cl_2 \rightarrow 2AlCl_3$

c) calcium + hydrochloric acid → calcium chloride + hydrogen

$Ca + 2HCl \rightarrow CaCl_2 + H_2$

d) ammonia + sulphuric acid → ammonium sulphate

$2NH_3 + H_2SO_4 \rightarrow (NH_4)_2SO_4$



3) Calculate the mass of each of the following:

i) 0.100 moles of hydrogen gas

Mass = Moles x Molar Mass = 0.100 x 2 = 0.200 grams

ii) 0.200 moles of sodium bromide

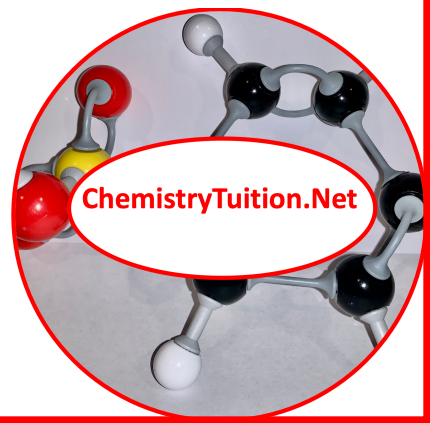
Mass = Moles x Molar Mass = 0.200 x 103 = 20.6 grams

b) Calculate the amount of moles in each of the following:

i) 0.150 g of iron

Moles= Mass/Molar Mass = 0.150/55.84 = 2.67 moles

ii) 1.23 g of Na_2SO_4 = 1.23/142 = 0.00880 moles



4)

a) How many moles of H_2SO_4 are there in 98.1 g of H_2SO_4?

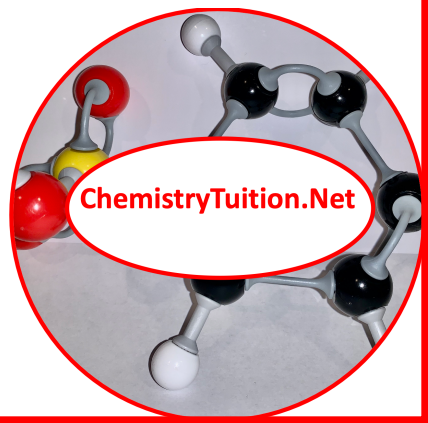
Moles = Mass/Molar Mass = 98.1/98.1 = 1 mole

b) How many moles of H^+ ions does this contain?

2 moles

c) How many moles of SO_4^{2-} ions does this contain?

1 mole



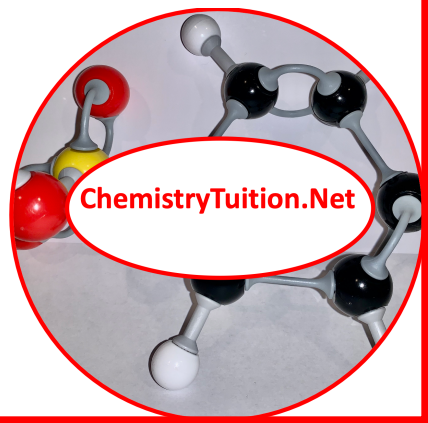
5) What volume of O_2 is required to ignite 20.0 g of hydrogen in oxygen at RTP?

$$2\ H_2 + O_2 \rightarrow 2\ H_2O$$

Moles of H_2 = 20.0/2 = 10 moles

Moles of O_2 = 5 moles

Volume of O_2 = 5 x 24000 = 120,000 cm^3



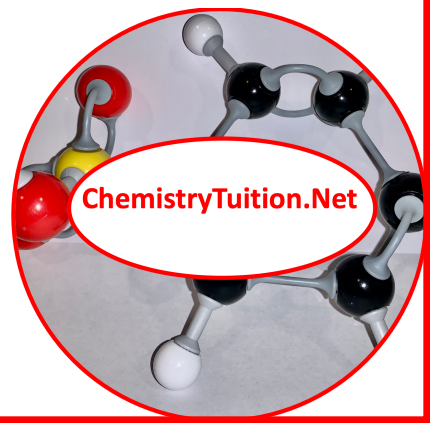
6) What mass of Na_2O is produced when 2.50 g of sodium is burned in oxygen?

$$4\ Na + O_2 \rightarrow 2\ Na_2O$$

Moles of Na = 2.5/23 = 0.109 moles

Moles of Na_2O = 2.5/23 = 0.109/2 = 0.0543 moles

Mass of Na_2O = 0.0543 x 62 = 3.37 grams



7) If 4 dm^3 of hydrogen sulphide is burned in 10 dm^3 of oxygen, what is the final volume of the mixture at RTP (give the volume of each gas at the end)?

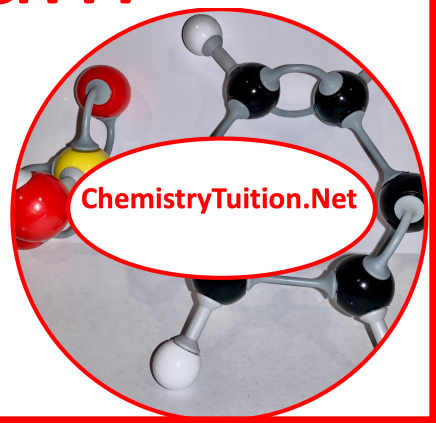
$$2\ H_2S(g) + 3\ O_2(g) \rightarrow 2\ H_2O(g) + 2\ SO_2(g)$$

4 dm^3 of H_2S requires $\frac{4}{2}$ x 3 = 6 dm^3 of O_2

$$2\ H_2S(g) + 3\ O_2(g) \rightarrow 2\ H_2O(g) + 2\ SO_2(g)$$

0 dm^3 4 dm^3 4 dm^3 4 dm^3

Total volume = 12 dm^3



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