

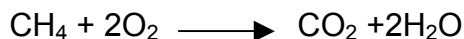
## SCIENCE (CHEMISTRY)

### CHEMICAL CALCULATION USING MOLE (VIII) - Calculating number of mole

Name: \_\_\_\_\_ ( ) Class: \_\_\_\_\_ Date: \_\_\_\_\_

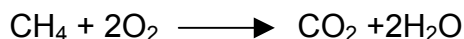
#### Notes

e.g. Calculate the mass of water produced when 4.0g of methane is completely burnt in oxygen.



Solution

**Step 1** Write the chemical equation.



**Step 2** Change the mass of methane into moles of methane.

$$\text{No. of moles} = \frac{\text{mass in grams}}{\text{M}_r \text{ of methane in grams}}$$

$$= 4/16$$

$$= 0.25 \text{ mol}$$

From the equation, find the ratio of the number of moles of H<sub>2</sub>O to the number of moles of CH<sub>4</sub>.

CH <sub>4</sub>	H <sub>2</sub> O
1 mol	2 mol

**Step 3** Use the ratio to find the number of moles of H<sub>2</sub>O produced when 0.25 mol of methane is burnt.

$$\text{No. of moles of H}_2\text{O} = 2 \times \text{no. of moles of CH}_4$$

$$= 2 \times 0.25$$

$$= 0.5 \text{ mol}$$

**Step 4** Multiply the number of moles by M<sub>r</sub> of H<sub>2</sub>O in grams to obtain the mass of H<sub>2</sub>O in grams

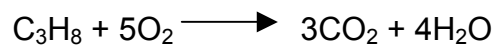
$$\text{Mass of H}_2\text{O in grams} = \text{no. of moles} \times \text{M}_r \text{ of H}_2\text{O in grams}$$

$$= 0.5 \times 18\text{g}$$

$$= 9\text{g}$$

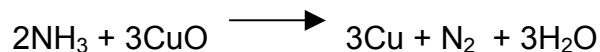
### Exercise

1. Propane,  $C_3H_8$ , burns in oxygen according to the equation



Calculate the mass of water produced when 0.2 mol of propane is burnt

2. Ammonia reacts with hot copper(II) oxide according to the equation



Calculate the mass of copper(II) oxide,  $CuO$ , that reacts with 3.4g of ammonia,  $NH_3$ .

3. The following equation represents the reaction between sodium carbonate and hydrochloric acid to give carbon dioxide.



Calculate the mass of sodium chloride that can be formed from 0.1 mol of sodium carbonate.

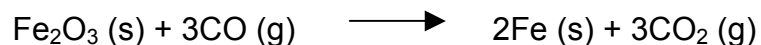
4. Sulphuric acid and sodium hydroxide can react as follows:



(a) How many moles of sodium sulphate can be formed from 2 mol of sodium hydroxide?

(b) How many grams of sodium sulphate can be formed from 40 grams of sodium hydroxide?

5. Iron (III) oxide reacts with carbon monoxide to give iron.



(a) How many moles of iron are formed when 2 moles of iron (III) oxide react with an excess of carbon monoxide?

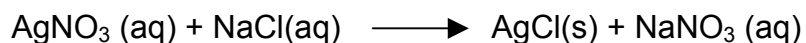
(b) How many moles of iron(III) oxide,  $\text{Fe}_2\text{O}_3$  will produce 40g of iron?

6. When aluminium is heated with iron (III) oxide, iron is formed according to the equation:



What mass of aluminium is needed to react completely with 8g of iron(III) oxide?

7. Aqueous silver nitrate reacts with aqueous sodium chloride producing insoluble silver chloride. The equation for the reaction is



What mass of silver chloride can be formed from 23g of sodium chloride?