**3E Chapter 7 Mole Concept and Stoichiometry Worksheet One**

**1.** In an experiment, 4.0 g of sulfur was burnt in 48.0 $dm^3$ of oxygen measured at r.t.p to form sulfur dioxide.

**(a)** Write the equation for the reaction between sulfur and oxygen.

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**(b)** What was the limiting reactant in this reaction?

**(c)** Calculate the volume of sulfur dioxide formed at r.t.p.

Ans: (b) S (c) 3.00 $dm^3$

**2.** **(a)** A compound contains 40.0% carbon, 6.70% hydrogen and 53.3% oxygen. What is its empirical formula?

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**(b)** Given that the compound has an $M_r$ of 180, find its molecular formula.

Ans: (a) $CH_2O$ (b) $C_6H_{12}O_6$

**3.** In an experiment, 1.20 g of magnesium was reacted with excess hydrochloric acid. Magnesium chloride and hydrogen gas were produced.

**(a)** Write a balanced chemical equation for this reaction.

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**(b)** Calculate the mass of magnesium chloride produced in this reaction.

**(c)** Calculate the volume of hydrogen gas produced at room temperature and pressure.

Ans: (b) 4.75 g (c) 1.20 $dm^3$

**4.** **(a)** Define *relative atomic mass*.

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**(b)** Define *relative molecular mass.*

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**(c)** Calculate the relative molecular mass of the following substances.

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|---|---|
| $MgCl_2$ | NaOH |
| $H_2SO_4$ | Nitrogen Gas |

Ans: (Refer to solutions)

**5.** A magnesium ribbon was loosely coiled and placed in a weighed crucible. The crucible was heated to allow the magnesium to react with oxygen in the air to form magnesium oxide.

**Mass of Crucible / g :** 20.10

**Mass of Crucible With Magnesium / g :** 20.58

**Mass of Crucible With Magnesium Oxide / g :** 20.90

**(a)** Write a balanced chemical equation for this reaction.

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**(b)** Calculate the mass of magnesium ribbon used.

**(c)** Find the volume of oxygen that reacted.

Ans: (b) 0.48 g (c) 0.24 $dm^3$