PENANG SANGAM HIGH SCHOOL
YEAR 12 CHEMISTRY
SUPPLEMENTARY RESOURCES

Week 6 – Strand 3 Reactions

1. **Use stoichiometry in chemistry to answer this question**. The chemical equation for the burning of iron in air is given below:

   $4Fe + 3O_2 \longrightarrow 2Fe_2O_3$

   If 28g of iron was burnt in air, calculate the:

   (i) molar mass of iron oxide.

   _____

   _____

   _____

   (ii) amount (number of moles) of iron used.

   _____

   _____

   _____

   (iii) amount (number of moles) of iron oxide formed.

   _____

   _____

   _____

   (iv) mass of iron (II) oxide formed in this reaction.

   _____

   _____

   _____

2. To determine the percentage of water of water of crystallization in hydrated magnesium sulphate, $MgSO_4.7H_20$, a student followed the instructions given below and obtained the result shown. (**Refer to the lab on water of crystallisation, you can also read notes on water of crystallisation**)

Instructions	**Results**
1. Weigh a clean, dry crucible and lid. 2. Add about 1g of magnesium sulphate crystals and reweigh. 3. Heat the crucible, gently at first, then strongly for 10 minutes. Cool and reweigh. 4. Heat for a further 5 minutes and reweigh. 5. Repeat heating and reweighing until a constant mass ± 0.05g is achieved.	1. Mass of crucible and lid = 23.22g 2. Mass of crucible, lid and magnesium sulphate = 24.42g 3. Mass of crucible, lid and contents after heating = 23.84g

(a) Account for the purpose of the following:

(i) Weighing the crucible and its contents as soon as it is cool.

_____

_____

(ii) Repeating the heating and weighing process until constant mass is achieved.

_____

_____

(b) (i) Calculate the mass of hydrated salt used.

_____

_____

(ii) Calculate the mass of water present in the salt.

_____

_____

(iii) Determine the percentage of water in the hydrated magnesium sulphate.

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_____

_____

(iv) State the type of hydrates that would be unsuitable for this experiment.

_____

3. **Use your knowledge on titration (volumetric analysis) to answer this question.** The concentration of a sample of sulphuric acid was determined by titration with a standard solution of sodium carbonate solution. A 20ml sample of 0.20 mol/l sodium carbonate solution requires 25 ml of sulphuric acid.

i) What piece of apparatus was used to measure sulphuric acid?

_____

ii) What is meant by the term standard solution?

_____

_____

iii) If phenolphthalein was used as an indicator what colour change would you note at the end of the titration?

_____

iv) Calculate the concentration of sulphuric acid in moles per litre.