SMART EXAM RESOURCES
SUBJECT: CHEMISTRY
TOPIC:STOICHIOMETRY
SET-3-QP-MS

EQUATIONS

1 **(ii)** Complete the equation for the decomposition of hydrated zinc nitrate.

$$2Zn(NO_3)_2 \bullet 6H_2O \rightarrow .....ZnO + ...NO_2 + O_2 + ...H_2O$$ [2]

MARK SCHEME:

2ZnO(s) **and 4**NO2(g) (1) **12**H2O(g) (1)	**2**

2 In the second stage, nitrogen monoxide reacts with water and oxygen to produce nitric acid.

Balance the symbol equation for the reaction.

$$.....NO + ...O_2 + ...H_2O \rightarrow .....HNO_3$$ [1]

MARK SCHEME:

$4NO + 3O_2 + 2H_2O \rightarrow .4HNO_3$	1

3 Concentrated sulfuric acid is a dehydrating agent.

When glucose is dehydrated, carbon and one other product are formed.

Complete the equation to show the dehydration of glucose, $C_6H_{12}O_6$.

$$C_6H_{12}O_6 \rightarrow \text{.....}C + \text{.....} \quad [2]$$

MARK SCHEME:

	$C_6H_{12}O_6 \rightarrow 6C + 6H_2O$ H_2O (1) balance (1)	**2**

4 This question is about sulfur and compounds of sulfur.

Sulfur is converted into sulfuric acid, H_2SO_4, by the Contact process.

The process involves four stages.

stage 1 Molten sulfur is converted into sulfur dioxide.

stage 2 Sulfur dioxide reacts with oxygen to form sulfur trioxide.

stage 3 Sulfur trioxide combines with concentrated sulfuric acid to form oleum, $H_2S_2O_7$.

stage 4 Oleum reacts to form concentrated sulfuric acid.

(a) (i) In **stage 1**, iron pyrites, FeS_2, can be used instead of molten sulfur.
The iron pyrites is heated strongly in air.

Balance the equation for the reaction occurring when iron pyrites reacts with oxygen in the air.

$$.....FeS_2 + ...O_2 \rightarrow .....Fe_2O_3 + ...SO_2$$ [1]

MARK SCHEME:

$4FeS_2 + 11O_2 \rightarrow 2Fe_2O_3 + 8SO_2$	1

5 Iron is manufactured in a blast furnace.

The iron in Fe_2O_3 is reduced by reaction with carbon monoxide. The unbalanced symbol equation is shown.

Complete the equation.

$$Fe_2O_3 + ...CO \rightarrow .....CO_2 + ...Fe$$ [1]

MARK SCHEME

$Fe_2O_3 + 3CO \rightarrow 3CO_2 + 2Fe$	1

6 In the second stage, nitric acid is produced.

Balance the symbol equation for this reaction.

$$.....NO + ...O_2 + ...H_2O \rightarrow .....HNO_3$$ [1]

MARK SCHEME

	$4NO + 3O_2 + 2H_2O \rightarrow 4HNO_3$	1

7 Balance the chemical equation for the reaction of hydrogen sulfide with sulfur dioxide shown.

$$.....H_2S + SO_2 \rightarrow .....S + ...H_2O$$ [1]

MARK SCHEME:

)	**2**H_2S + SO_2 → **3**S + **2**H_2O	**1**