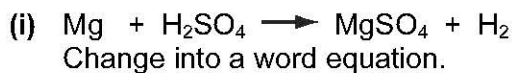


WRITING EQUATIONS IN DIFFERENT WAYS

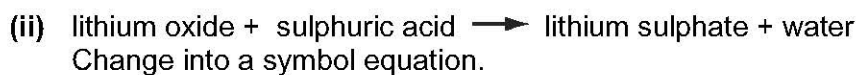
4.17.1

Sulphuric acid is a typical strong acid.

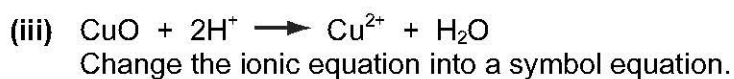
(a) Change the equations given into a different format.



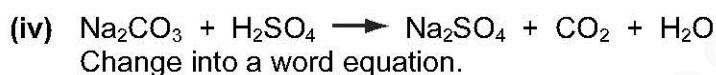
..... [1]



..... [2]



..... [2]



..... [1]

-----Marking Scheme-----

- (a) (i) magnesium + sulphuric acid = magnesium sulphate + hydrogen [1]
ACCEPT hydrogen sulphate
- (ii) $\text{Li}_2\text{O} + \text{H}_2\text{SO}_4 \rightarrow \text{Li}_2\text{SO}_4 + \text{H}_2\text{O}$ [2]
formulae correct but not balanced [1]
- (iii) $\text{CuO} + \text{H}_2\text{SO}_4 \rightarrow \text{CuSO}_4 + \text{H}_2\text{O}$ [2]
OR $\text{CuO} + 2\text{HCl} \rightarrow \text{CuCl}_2 + \text{H}_2\text{O}$
OR $\text{CuO} + 2\text{HNO}_3 \rightarrow \text{Cu}(\text{NO}_3)_2 + \text{H}_2\text{O}$
formulae correct but not balanced [1]
- (iv) sodium carbonate + sulphuric acid $\rightarrow$ sodium sulphate + carbon dioxide + water [1]

4.17.2

Complete the word equations for the reactions of ethanoic acid.



Write the symbol equation for the reaction between ethanoic acid and sodium hydroxide.



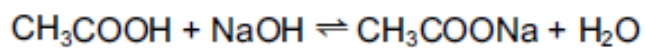
-----Marking Scheme-----

calcium ethanoate + hydrogen

[1]

zinc oxide **or** hydroxide

[1]



[2]

reactants [1]

products [1]

4.17.3

(a) Complete the following word equations.

(i) magnesium hydroxide + dilute sulfuric acid

..... [1]

(ii) zinc + dilute sulfuric acid

..... [1]

(iii) copper carbonate + dilute sulfuric acid

..... [1]

(b) Write equations for the reaction of dilute sulfuric acid with each of the following.

(i) ammonia

..... [2]

(ii) sodium hydroxide

..... [2]

(iii) iron

..... [2]

-----Marking Scheme-----

(a) (i)	(→) magnesium sulfate + water;
(ii)	(→) zinc sulfate + hydrogen;
(iii)	(→) copper(II) sulfate / copper sulfate + carbon dioxide + water;
(b) (i)	$2\text{NH}_3 + \text{H}_2\text{SO}_4 \rightarrow (\text{NH}_4)_2\text{SO}_4 / \text{NH}_3 + \text{H}_2\text{SO}_4 \rightarrow (\text{NH}_4)\text{HSO}_4;$
(ii)	$2\text{NaOH} + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O}$ $\text{Na}_2\text{SO}_4;$ rest of equation correct; or $\text{H}^+ + \text{OH}^- \rightarrow \text{H}_2\text{O}$ H_2O as the only product on the right hand side; rest of equation correct; or $\text{NaOH} + \text{H}_2\text{SO}_4 \rightarrow \text{NaHSO}_4 + \text{H}_2\text{O}$ $\text{NaHSO}_4;$ rest of equation correct; or $\text{OH}^- + \text{H}_2\text{SO}_4 \rightarrow \text{HSO}_4^- + \text{H}_2\text{O}$ $\text{HSO}_4^-;$ rest of equation correct;
(iii)	$\text{Fe} + \text{H}_2\text{SO}_4 \rightarrow \text{FeSO}_4 + \text{H}_2;$ $\text{FeSO}_4;$ rest of equation correct; or $\text{Fe} + 2\text{H}^+ \rightarrow \text{Fe}^{2+} + \text{H}_2;$ $\text{Fe}^{2+};$ rest of equation correct; or $2\text{Fe} + 3\text{H}_2\text{SO}_4 \rightarrow \text{Fe}_2(\text{SO}_4)_3 + 3\text{H}_2;$ $\text{Fe}_2(\text{SO}_4)_3;$ rest of equation correct; or $2\text{Fe} + 6\text{H}^+ \rightarrow 2\text{Fe}^{3+} + 3\text{H}_2;$ $\text{Fe}^{3+};$ rest of equation correct;

4.17.4

(ii) Write a symbol equation for the reduction of iron(III) oxide, Fe_2O_3 , to iron.

..... [2]

-----**Marking Scheme**-----

any correct equation

[2]

only error not balanced [1]