

# EQUATIONS

**1** Potassium reacts with bromine at room temperature to form potassium bromide.

(a) Write a chemical equation for this reaction. Include state symbols.

..... [3]

**MARKING SCHEME:**

|     |                                                                                                                                                          |          |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| (a) | $2\text{K(s)} + \text{Br}_2(\text{l}) \rightarrow 2\text{KBr(s)}$<br>1 mark for formulae all correct<br>1 mark for balancing<br>1 mark for state symbols | <b>3</b> |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------|----------|

**2** Iodine reacts with chlorine to form iodine monochloride,  $\text{ICl}$ , as the only product.

(i) Write a chemical equation for this reaction.

..... [2]

**MARKING SCHEME:**

|     |                                                                                                  |          |
|-----|--------------------------------------------------------------------------------------------------|----------|
| (i) | $I_2 + Cl_2 \rightarrow 2ICl$<br>1 mark for formulae all correct<br>1 mark for correct balancing | <b>2</b> |
|-----|--------------------------------------------------------------------------------------------------|----------|

3

Write the word equation for the reaction between ethanoic acid and copper(II) carbonate.

..... [1]

**MARKING SCHEME:**

|                                                                              |   |
|------------------------------------------------------------------------------|---|
| ethanoic acid + copper carbonate → copper ethanoate + carbon dioxide + water | 1 |
|------------------------------------------------------------------------------|---|

**4**

- (i) When iron is added to dilute sulfuric acid, an aqueous solution of iron(II) sulfate is formed as one of the products.

Write a chemical equation for the reaction.

..... [1]

- (ii) When iron(III) oxide is added to dilute sulfuric acid, an aqueous solution of iron(III) sulfate is formed as one of the products.

Write a chemical equation for the reaction.

..... [3]

**MARKING SCHEME:**

|      |                                                                                                                                                                                                                               |   |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| (i)  | $\text{Fe} + \text{H}_2\text{SO}_4 \rightarrow \text{FeSO}_4 + \text{H}_2$                                                                                                                                                    | 1 |
| (ii) | $\text{Fe}_2\text{O}_3 + 3\text{H}_2\text{SO}_4 \rightarrow \text{Fe}_2(\text{SO}_4)_3 + 3\text{H}_2\text{O}$<br>M1 formula of $\text{Fe}_2(\text{SO}_4)_3$<br>M2 all formulae correct (no additional species)<br>M3 balanced | 3 |



**5** This question is about phosphorus and compounds of phosphorus.

**(a)** A phosphorus molecule contains four phosphorus atoms **only**.

What is the formula of a phosphorus molecule?

..... [1]

**(b)** Phosphorus reacts with chlorine gas to produce phosphorus(III) chloride,  $\text{PCl}_3$ .

**(i)** Write a chemical equation for the reaction between phosphorus and chlorine to produce phosphorus(III) chloride,  $\text{PCl}_3$ .

..... [2]

**MARKING SCHEME:**

|       |                                                                                |   |
|-------|--------------------------------------------------------------------------------|---|
| (a)   | P <sub>4</sub>                                                                 | 1 |
| b)(i) | $P_4 + 6Cl_2 \rightarrow 4PCl_3$<br>formulae correct (1) equation balanced (1) | 2 |