# End of topic quiz

# Topic C3: Chemical Reactions

## Learner Activity

### Topic: C3 of J250

**Total marks: 43**

1. Calcium forms Ca2+ ions. What is the formula of calcium chloride? **[1 mark]**

|  |  |  |
| --- | --- | --- |
| **A** | CaC*l* |  |
| **B** | CaC*l*2 |  |
| **C** | Ca2C*l* |  |
| **D** | Ca2C*l2* |  |

Your answer

1. Which statement best describes neutralisation? **[1 mark]**

|  |  |  |
| --- | --- | --- |
| **A** | An acid reacting with an alkali and a salt to form water. |  |
| **B** | An acid reacting with water and a salt to form an alkali or base. |  |
| **C** | An acid reacting with an alkali or base to form a salt plus water. |  |
| **D** | An acid reacting with a salt to form an alkali or base. |  |

Your answer

1. What is the correct formula for sodium chloride? **[1 mark]**

|  |  |  |
| --- | --- | --- |
| **A** | Na2C*l*2 |  |
| **B** | NaC*l*2 |  |
| **C** | Na2C*l* |  |
| **D** | *NaCl* |  |

Your answer

1. Which of the following is an ionic compound? **[1 mark]**

|  |  |  |
| --- | --- | --- |
| **A** | Ammonia |  |
| **B** | Carbon dioxide |  |
| **C** | Magnesium Oxide |  |
| **D** | Methane |  |

Your answer

1. What are the symbols s, l, g and aq used to describe? **[1 mark]**

|  |  |  |
| --- | --- | --- |
| **A** | Chemical properties |  |
| **B** | Elements |  |
| **C** | Physical states |  |
| **D** | Molecules |  |

Your answer

1. Bill weighs a piece of magnesium. He then heats it in air, where it reacts with oxygen. Bill weighs the product of the reaction.

|  |  |  |  |
| --- | --- | --- | --- |
| **(a)** | **(i)** | What are the chemical symbols for magnesium and oxygen? **[1 mark]** | |
|  |  | **Magnesium** |  |
|  |  |  | |
|  |  | **Oxygen** |  |
|  |  |  | |
|  | **(ii)** | Write a balanced symbol equation for the reaction of magnesium with oxygen.  **[1 mark]** | |
|  |  |  | |
|  |  |  | |
| **(b)** | **(i)** | How much product is made if 5.0g of magnesium reacts with 5.0 g of oxygen?  **[4 marks]**  Give your answer to 2 significant figures. | |
|  |  |  | |

1. Jill mixes ethanoic acid and sodium carbonate together. She measures the temperature of the reaction and draws a graph of the energy against progress of reaction.

|  |  |  |
| --- | --- | --- |
| Graph showing the energy against progress of reaction when mixing ethanoic acid and sodium carbonate | | |
| **(a)** | **(i)** | What is the type of reaction in Jill’s experiment? **[1 mark]** |
|  |  |  |
|  |  |  |
|  | **(ii)** | Why does the graph peak at **A**? **[2 marks]** |
|  |  |  |
|  |  |  |
| **(b)** | **(i)** | Jill does another experiment. She notices the reaction mixture gets warm. Sketch the reaction profile below for this experiment. **[2 marks]** |
|  |  |  |
|  |  |  |
|  | **(ii)** | How and why are endothermic and exothermic reactions different? **[4 marks]** |
|  |  |  |

1. Manraj studies how iron is extracted from iron ore in his science lesson. His teacher writes this equation on the board.

|  |  |  |
| --- | --- | --- |
| Fe2O3 + 3CO 🡪 2Fe + 3CO2 | | |
| **(a)** | **(i)** | Define the term ‘oxidation’. **[1 mark]** |
|  |  |  |
|  |  |  |
|  | **(ii)** | Manraj’s teacher says there is a reducing agent in this reaction.  Which substance is the reducing agent in this reaction? What does it do? **[2 marks]** |
|  |  |  |
|  |  |  |
| **(b)** | **(i)** | Which reactant is reduced? **[1 mark]** |
|  |  |  |
|  |  |  |
|  | **(ii)** | Complete the half equation for this reaction. **[1 mark]** |
|  |  | 2Fe3++………. e-🡪………. Fe |

1. pH scales are often used in laboratories.

|  |  |  |
| --- | --- | --- |
| **(a)** |  | Complete the sentences. Use the words from the list below. **[2 marks]**  **hydrogen acidity hydroxide alkalinity alkali corrosive** |
|  |  | The pH scale is used to measure the relative …………….….or.........................  of a substance.  Acids form ....................... ions when they dissolve in water, and solutions of  alkalis contain ......................... ions. |
|  |  |  |
| **(b)** |  | Why is water formed in neutralisation reactions? **[1 mark]** |
|  |  |  |
|  |  |  |
| **(c)** |  | A bottle is labelled as concentrated acid and has a hazard symbol on it.  What does the term ‘concentrated’ mean? **[1 mark]** |
|  |  |  |
|  |  |  |

1. The picture shows electrolysis of sodium chloride solution.

|  |  |  |
| --- | --- | --- |
| Diagram showing electrolysis of sodium chloride solution | | |
| **(a)** | **(i)** | The electrolysis reaction above uses inert electrodes. What does ‘inert’ mean?  **[1 mark]** |
|  |  |  |
|  |  |  |
|  | **(ii)** | At which electrode do the cations form? **[1 mark]** |
|  |  |  |
|  |  |  |
| **(b)** | **(i)** | What are the products of electrolysis of sodium chloride solution? **[3 marks]** |
|  |  |  |
|  |  |  |
|  | **(ii)** | In electrolysis, what happens at each electrode? **[2 marks]** |
|  |  |  |
|  |  |  |

1. Neutralisation can be used to produce salts.

Sodium hydroxide and sulfuric acid react together to produce sodium sulfate.

|  |  |  |
| --- | --- | --- |
| **(a)** |  | Complete the balanced symbol equation. **[1 mark]** |
|  |  | ..........NaOH + H2SO4 🡪……………... + 2H2O |
|  |  |  |
| **(b)** |  | What is mass sodium hydroxide needed to make 25.0g of sodium sulfate?  **[3 marks]**  Use the periodic table to help you. |
|  |  |  |
|  |  |  |

1. Combustion is another type of chemical reaction. Hydrogen can be oxidised by combustion.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | **Bond** | **Bond Energy (kJ/mol)** | | --- | --- | | H-H | 426 | | O=O | 495 | | H-O-H | 920 | | | |
| **(a)** |  | Using the bond energies in the table above, show that the oxidation of hydrogen is exothermic. **[3 marks]** |
|  |  |  |