2.3 Chemical Changes: 30-minute Pack

AQA 8462 · Calculator allowed · about 30 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Dilute sulfuric acid is corrosive.

(a) Give one piece of safety equipment that should be worn when handling dilute sulfuric acid. **(1)**

(b) State one hazard symbol that would appear on a bottle of concentrated sulfuric acid, and what it means. **(2)**

(Total for Question 1 is 3 marks)

---

2 Salt preparation by crystallisation is a method used to obtain solid salts from solution.

(a) State one step needed to obtain solid crystals from a salt solution after filtering to remove excess solid. **(1)**

(b) Give one safety precaution when heating a salt solution to evaporate water. **(1)**

(Total for Question 2 is 2 marks)

---

3 A metal oxide can behave as a base and react with acids to form a salt and water.

(a) Give the product(s) when magnesium oxide reacts with hydrochloric acid. **(2)**

(Total for Question 3 is 2 marks)

© Revision Library | revisionlibrary.co.uk

4 An experiment tests the reaction between dilute hydrochloric acid and magnesium ribbon. The word equation for the reaction is given.

(a) State one gas produced in this reaction and give one test you would use to show the gas is hydrogen. **(2)**

(b) State the type of reaction (acid with metal) shown by the word equation. **(1)**

(Total for Question 4 is 3 marks)

---

5 A student adds dilute hydrochloric acid to calcium carbonate chips in a flask, and bubbles of gas are produced.

(a) Write the word equation for this reaction. **(2)**

(b) Describe a test for the gas produced, including the positive result. **(2)**

(c) The student repeats the experiment using calcium carbonate powder instead of chips, with the same mass and same concentration of acid. Explain the effect this has on the rate of reaction. **(2)**

(Total for Question 5 is 6 marks)

---

6 Some reactions are reversible. A reversible reaction can reach a dynamic equilibrium.

(a) Explain what is meant by a dynamic equilibrium in a reversible reaction. **(3)**

(Total for Question 6 is 3 marks)

© Revision Library | revisionlibrary.co.uk

7 A student neutralises 25.0 cm^3 of 0.10 mol/dm3 hydrochloric acid with sodium hydroxide solution. The equation is HCl + NaOH -> NaCl + H_2O.

(a) Calculate the number of moles of HCl in 25.0 cm^3 of 0.10 mol/dm3 solution. Show your working and give the answer to 3 significant figures. **(2)**

.....

(b) Using the equation and the result from part (a), state the volume of 0.10 mol/dm3 NaOH needed to neutralise the acid. Show reasoning. **(1)**

.....

(Total for Question 7 is 3 marks)

---

8 A metal carbonate reacts with an acid producing a salt, water and carbon dioxide gas.

(a) Complete the word equation for the reaction between copper(II) carbonate and sulfuric acid. **(2)**

(b) State how you could test the gas produced to show it is carbon dioxide. **(1)**

(Total for Question 8 is 3 marks)

© Revision Library | revisionlibrary.co.uk

Mark scheme · 2.3 Chemical Changes: 30-minute Pack

Question 1

(a) safety goggles/eye protection **B1**

(a) Answer: Safety goggles

(b) corrosive symbol (liquid dripping onto a surface/hand) **B1**

(b) means the substance can destroy living tissue/materials on contact **B1**

(b) Answer: Corrosive symbol; means it destroys living tissue and materials on contact.

Question 2

(a) heat the solution to evaporate some water or allow to crystallise **B1**

(a) Answer: Warm or evaporate the solution to concentrate it, then allow to crystallise.

(b) use safety goggles, do not heat to dryness, use a heatproof mat, or similar safety point **B1**

(b) Answer: Use safety goggles and a heatproof mat; do not heat to complete dryness.

Question 3

(a) magnesium chloride **B1**

(a) water **B1**

(a) Answer: Magnesium chloride and water.

Question 4

(a) hydrogen **B1**

(a) test: lighted splint makes a squeaky pop (or 'pop' sound), oe **B1**

(a) Answer: Hydrogen; test with a lighted splint which makes a squeaky pop.

(b) metal + acid -> salt + hydrogen is an acid-metal reaction (or 'acid reacts with a metal') **B1**

(b) Answer: An acid reacting with a metal (acid-metal reaction).

Question 5

(a) calcium chloride and water named as products **B1**

(a) carbon dioxide also named as a product **B1**

(a) Answer: calcium carbonate + hydrochloric acid -> calcium chloride + water + carbon dioxide

(b) bubble the gas through limewater **B1**

(b) limewater turns cloudy/milky (white precipitate) **B1**

(b) Answer: Bubbling through limewater turns it cloudy, confirming carbon dioxide.

(c) powder has a larger surface area (to volume ratio) than chips for the same mass **M1**

(c) more frequent collisions between acid particles and calcium carbonate particles per unit time, so the rate increases (oe) **M1**

(c) Answer: Powder has a greater surface area, so collision frequency and rate of reaction increase.

Question 6

(a) a reversible reaction where the forward and reverse reactions occur **B1**

(a) rates of the forward and reverse reactions are equal at equilibrium **B1**

(a) concentrations of reactants and products remain constant (but not necessarily equal), oe **B1**

(a) Answer: In a dynamic equilibrium the forward and reverse reactions continue to occur but at equal rates, so the concentrations of reactants and products stay constant.

Question 7

(a) uses n = concentration x volume (in dm3) and substitutes: n = 0.10 x 0.025 **M1**

(a) 0.00250 mol cao **A1**

(a) Answer: 0.00250 mol

(b) same moles of NaOH needed, so volume = moles / concentration = 0.00250 / 0.10 = 0.0250 dm3 or 25.0 cm^3 **B1**

(b) Answer: 25.0 cm^3

Question 8

(a) copper(II) sulfate **B1**

(a) carbon dioxide (and water if split into two products) - both required for full 2 marks **B1**

(a) Answer: copper(II) sulfate + carbon dioxide + water

(b) bubble through limewater which turns cloudy (milky) **B1**

(b) Answer: Bubble it through limewater; the limewater turns cloudy.

© Revision Library | revisionlibrary.co.uk