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# CHEMISTRY

**0620 STYLE**

## Acids, Bases and Salts: Topic Practice Paper

Core and Extended **45 minutes**

You must answer on the question paper.
No additional materials are needed.

### INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, class and date in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- You may use a calculator.

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### INFORMATION

- The total mark for this paper is 42.
- The number of marks for each question or part question is shown in brackets [ ].
- Questions marked **(Extended)** are for Extended students. Core students may leave them out.

**For teacher's use**

| Question | 1 | 2 | 3 | 4 | Total |
|---|---|---|---|---|---|
| Marks | | | | | |
| Out of | 12 | 9 | 10 | 11 | 42 |

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**1** Table 1.1 shows the pH of four solutions, **A**, **B**, **C** and **D**.

**Table 1.1**

| **solution** | **A** | **B** | **C** | **D** |
|---|---|---|---|---|
| pH | 1 | 6 | 8 | 13 |

(a) Give the letter of the solution that is:

(i) a strong alkali

..... **[1]**

(ii) a weak acid.

..... **[1]**

(b) A few drops of methyl orange are added to solution **A** and to solution **D**.
State the colour of methyl orange in each solution.

solution **A** .....

solution **D** .....

**[2]**

(c) State the colour of thymolphthalein in solution **D**.

..... **[1]**

(d) **(Extended)** Acids and bases can be defined in terms of proton transfer.

(i) Define an acid.

..... **[1]**

(ii) Define a base.

..... **[1]**

(e) **(Extended)** Hydrochloric acid and ethanoic acid have the same concentration.
Hydrochloric acid has a lower pH than ethanoic acid.
Explain why, in terms of ions.

.....

.....

.....

..... **[3]**

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(f) **(Extended)** Write the ionic equation for neutralisation. Include state symbols.

..... **[2]**

**[Total: 12]**

**2** Dilute acids react with metals and with carbonates.

(a) Zinc reacts with dilute hydrochloric acid.

(i) Complete the word equation for the reaction.

zinc + hydrochloric acid → ..... + .....

**[2]**

(ii) Describe a test for the gas made. Give the result.

test .....

result .....

**[2]**

(b) Calcium carbonate is added to dilute nitric acid. Bubbles of gas are seen.

(i) Name the gas.

..... **[1]**

(ii) Describe a test for this gas. Give the result.

.....

..... **[2]**

(iii) **(Extended)** Complete the balanced symbol equation for the reaction.

$CaCO_3$ + ..... $HNO_3$ → ..... + $H_2O$ + $CO_2$

**[2]**

**[Total: 9]**

**3** A student makes crystals of hydrated copper(II) sulfate from copper(II) oxide and dilute sulfuric acid.

(a) Complete the word equation.

copper(II) oxide + sulfuric acid → ..... + .....

**[1]**

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(b) The student adds copper(II) oxide to the acid until it is in excess.
Explain why copper(II) oxide is added in excess.

.....

..... **[1]**

(c) The student filters the mixture. Fig. 3.1 shows the apparatus.

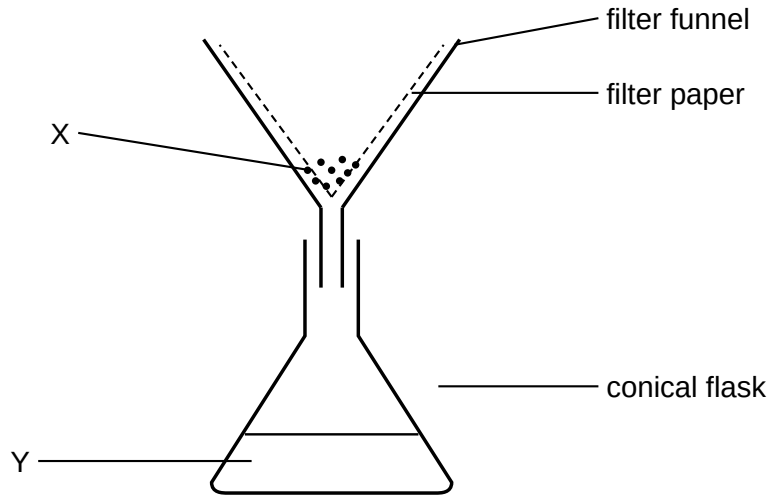



**Fig. 3.1**

(i) Name substance **X**.

..... **[1]**

(ii) Name solution **Y**.

..... **[1]**

(d) Describe how the student obtains pure, dry crystals of hydrated copper(II) sulfate from solution **Y**.

.....

.....

.....

..... **[3]**

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(e) Sodium chloride is made by titration. Fig. 3.2 shows the apparatus.

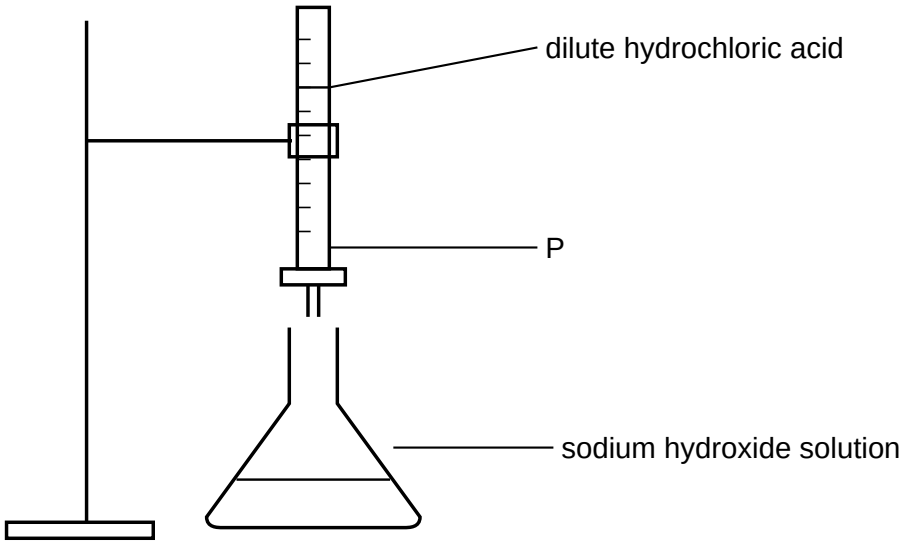



**Fig. 3.2**

(i) Name the piece of apparatus labelled **P**.

..... **[1]**

(ii) Explain why sodium chloride is made by titration and **not** by adding excess solid and filtering.

.....

.....

..... **[2]**

**[Total: 10]**

**4** Barium sulfate is an insoluble salt.

(a) Name the method used to make an insoluble salt.

..... **[1]**

(b) Name **two** aqueous solutions that can be mixed to make barium sulfate.

1 .....

2 .....

**[2]**

(c) **(Extended)** Write the ionic equation for the formation of barium sulfate. Include state symbols.

..... **[2]**

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(d) Describe how a pure, dry sample of barium sulfate is obtained from the mixture.

.....

.....

..... **[2]**

(e) **(Extended)** Complete Table 4.1 by putting **one** tick in each row to classify each oxide.

**Table 4.1**

| oxide | acidic | basic | amphoteric |
|---|---|---|---|
| sulfur dioxide, $SO_2$ | | | |
| calcium oxide, CaO | | | |
| aluminium oxide, $Al_2O_3$ | | | |

**[3]**

(f) **(Extended)** State what is meant by an *amphoteric* oxide.

.....

..... **[1]**

**[Total: 11]**

**END OF PAPER**

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