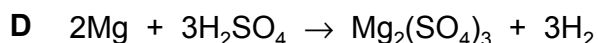
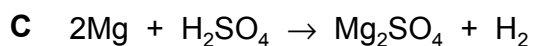
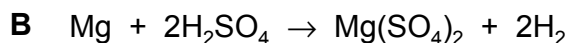
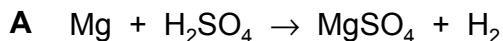


Paper 1

Questions are applicable for both core and extended candidates

1 What is the balanced equation for the reaction between magnesium and dilute sulfuric acid?



2 Compound X dissolves in water to form an aqueous solution.

Methyl orange is added to aqueous compound X.

The methyl orange turns red.

What is compound X?

A sodium carbonate

B copper(II) oxide

C potassium oxide

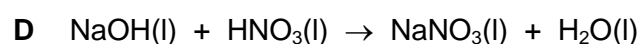
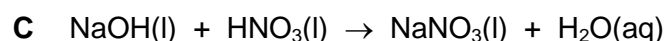
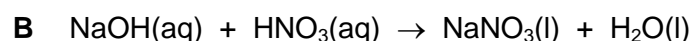
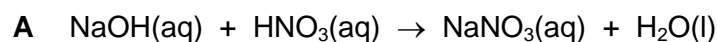
D sulfur dioxide

3 Dilute hydrochloric acid reacts with aqueous sodium hydroxide in a neutralisation reaction.

Which two ions are involved in this neutralisation reaction?

A Na^+ and H^+ B H^+ and OH^- C Na^+ and Cl^- D OH^- and Cl^-

4 Which equation represents the neutralisation of nitric acid using sodium hydroxide?



5 Sodium hydroxide forms an alkaline solution with a pH of 14.

Which indicator turns yellow when added to this solution?

- A litmus
- B methyl orange
- C thymolphthalein
- D universal indicator

6 Which solids react with dilute sulfuric acid to form aqueous magnesium sulfate?

- 1 magnesium
- 2 magnesium hydroxide
- 3 magnesium nitrate
- 4 magnesium oxide

- A 1, 2 and 4 B 1 and 3 C 2, 3 and 4 D 2 and 4 only

7 Which statements about an aqueous acid are correct?

- 1 Ammonia is formed when solid ammonium nitrate is added to an aqueous acid.
- 2 Effervescence is seen when sodium carbonate is added to an aqueous acid.
- 3 Methyl orange becomes yellow when added to an aqueous acid.
- 4 Red litmus remains red when added to an aqueous acid.

- A 1 and 3 B 1 and 4 C 2 and 3 D 2 and 4

8 Farmers spread calcium hydroxide on their fields to neutralise soils that are too acidic for crops to grow well.

Which ion neutralises the acid in the soil?

- A Ca^{2+} B H^+ C O^{2-} D OH^-

9 Four different solutions, J, K, L and M, are tested with universal indicator.

solution	J	K	L	M
colour with universal indicator	green	red	purple	orange

Which solutions are acidic?

- A J and M B K and M C K only D L only

10 Methyl orange is added to dilute hydrochloric acid and to aqueous sodium hydroxide.

What is the colour of the methyl orange in each solution?

	colour in dilute hydrochloric acid	colour in aqueous sodium hydroxide
A	orange	red
B	red	yellow
C	red	orange
D	yellow	red

11 Which products are formed when magnesium hydroxide reacts with hydrochloric acid?

- A** magnesium chloride, carbon dioxide and water
- B** magnesium chloride, hydrogen and water
- C** magnesium chloride and hydrogen only
- D** magnesium chloride and water only

12 Which row about aqueous ethanoic acid and dilute hydrochloric acid is correct?

	both contain carbon	both contain hydrogen	both react with carbonates
A	✓	✗	✓
B	✓	✓	✗
C	✗	✓	✓
D	✗	✗	✗

key

✓ = yes

✗ = no

13 When an acid is added to an alkali, the temperature of the reaction mixture rises.

Which words describe this reaction?

- A** decomposition and endothermic
- B** decomposition and exothermic
- C** neutralisation and endothermic
- D** neutralisation and exothermic

14 Which reaction produces ammonia gas?

- A** warming ammonium chloride with dilute sodium hydroxide
- B** warming ammonium nitrate with dilute sulfuric acid
- C** warming ammonium phosphate with dilute sodium chloride
- D** warming ammonium sulfate with dilute nitric acid

15 Which reactions produce carbon dioxide?

- 1 addition of dilute nitric acid to copper(II) carbonate
 - 2 heating zinc carbonate
 - 3 combustion of methane
- A** 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 3 only

Paper 2

**Questions are applicable for both core and extended candidates
unless indicated in the question**

- 16** Hydrogen iodide is dissolved in water.



Which row describes the final colours seen when the solution is tested with damp red litmus paper and with acidified aqueous potassium manganate(VII)? **(extended only)**

	damp red litmus paper	acidified aqueous potassium manganate(VII)
A	blue	brown
B	blue	colourless
C	red	brown
D	red	colourless

- 17** Which statement describes the properties of hydrochloric acid?

- A** Carbon dioxide is produced when limestone reacts with hydrochloric acid.
- B** Hydrogen is produced when sodium hydroxide reacts with hydrochloric acid.
- C** Methyl orange turns yellow in strong hydrochloric acid.
- D** Red litmus paper turns blue when dipped into hydrochloric acid.

- 18** Butanoic acid partially dissociates in aqueous solution.

Which row about butanoic acid is correct?

	pH	effect on thymolphthalein
A	3	turns blue
B	5	turns colourless
C	8	turns blue
D	10	turns colourless

- 19 The concentration of hydrogen ions in 100 cm^3 of 0.1 mol/dm^3 hydrochloric acid is higher than the concentration of hydrogen ions in 100 cm^3 of 0.1 mol/dm^3 ethanoic acid.

Which statement explains the difference in hydrogen ion concentration? **(extended only)**

- A Ethanoic acid is an organic acid.
B Ethanoic acid has a lower pH than hydrochloric acid.
C Ethanoic acid is partially dissociated.
D Ethanoic acid is a strong acid.
- 20 Which gas is made when powdered zinc is added to dilute hydrochloric acid?
- A carbon dioxide
B chlorine
C hydrogen
D oxygen
- 21 Which statement about acids is correct? **(extended only)**
- A A weak acid partially dissociates in aqueous solution.
B An acid accepts protons when added to water.
C Ethanoic acid acts as a strong acid when added to water.
D Hydrochloric acid is a strong acid that ionises in water to form H^+ ions.

- 22 Four different solutions, J, K, L and M, are tested with universal indicator.

solution	J	K	L	M
colour with universal indicator	green	red	purple	orange

Which solutions are acidic?

- A J and M B K and M C K only D L only
- 23 Which solution has the lowest pH?
- A 0.1 mol/dm^3 ammonia solution
B 0.1 mol/dm^3 ethanoic acid
C 0.1 mol/dm^3 hydrochloric acid
D 0.1 mol/dm^3 lithium hydroxide

24 Methyl orange is added to dilute hydrochloric acid and to aqueous sodium hydroxide.

What is the colour of the methyl orange in each solution?

	colour in dilute hydrochloric acid	colour in aqueous sodium hydroxide
A	orange	red
B	red	yellow
C	red	orange
D	yellow	red

25 Which statement about acids is correct? **(extended only)**

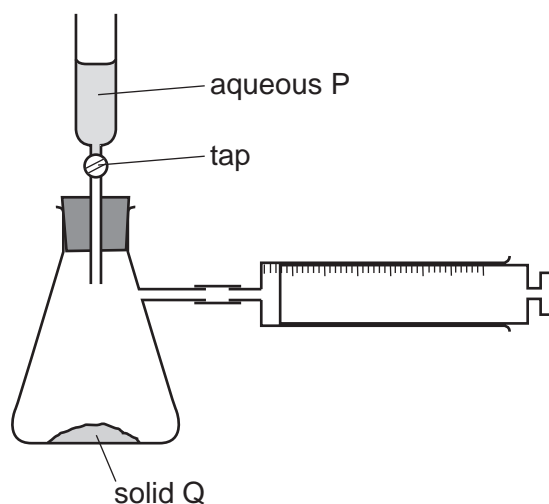
- A** A strong acid has a higher pH than a weak acid of the same concentration.
- B** A strong acid is a proton acceptor.
- C** A weak acid is a proton donor.
- D** A weak acid is fully ionised in aqueous solution.

26 When an acid is added to an alkali, the temperature of the reaction mixture rises.

Which words describe this reaction?

- A** decomposition and endothermic
- B** decomposition and exothermic
- C** neutralisation and endothermic
- D** neutralisation and exothermic

27 The diagram shows an experiment.



A small volume of aqueous P is poured on to solid Q and the tap of the funnel closed.

Which pairs of substances cause the syringe to fill with gas?

	HNO ₃ and Mg	HCl and Cu	H ₂ SO ₄ and Na ₂ CO ₃
A	✓	✓	✓
B	✓	✓	x
C	✓	x	✓
D	x	✓	✓

28 Ethanoic acid reacts with water to produce an acidic solution.

Which row describes the roles of ethanoic acid and water in this reaction? **(extended only)**

	ethanoic acid	water
A	accepts a proton	donates a proton
B	accepts an electron	donates an electron
C	donates a proton	accepts a proton
D	donates an electron	accepts an electron