08 Acids and Bases

Set A Foundations

Name	Time 45 minutes	Total 23 marks	Score ____ / 23

Use a copy of the Periodic Table where you need one.

A From the lesson

9 MARKS

1 A green powder is added to dilute hydrochloric acid. It fizzes and the gas turns limewater milky. What type of substance is the powder?

A a metal **B** a metal oxide **C** a carbonate **D** an alkali

/1 Answer ☐ [1]

Source: Learners' Alley, Acids and Bases slides

2 Which pair of substances gives off ammonia when heated together?

A ammonium chloride and hydrochloric acid
B ammonium sulfate and sodium hydroxide
C sodium chloride and sodium hydroxide
D ammonium nitrate and water

/1 Answer ☐ [1]

Source: Learners' Alley, Acids and Bases slides

3 Solution P has pH 2 and solution Q has pH 5. Which statement is correct?

A Q is more acidic than P.
B P has a higher concentration of H^+ ions than Q.
C Both turn Universal Indicator green.
D Q is alkaline.

/1 Answer ☐ [1]

Source: Learners' Alley, Acids and Bases slides

4 Which element forms an oxide that dissolves in water to give a solution with a pH below 7?

A copper **B** magnesium **C** sulfur **D** sodium

/1 Answer ☐ [1]

Source: Learners' Alley, Acids and Bases slides

5 Answer these questions about acids, alkalis and oxides.

(a) Define an acid.

.....

[1]

(b) Write the ionic equation, with state symbols, for neutralisation.

.....

[1]

(c) State the difference between a strong acid and a weak acid.

.....

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

(d) Classify aluminium oxide and give a reason.

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

/5

Source: Learners' Alley, Acids and Bases slides

B Practice

14 MARKS

6 An aqueous solution has a pH value of 1. What information does this fact imply about the ions present in the solution?

	concentration of H^+ ions	concentration of OH^- ions
A	high	low
B	high	none
C	low	high
D	low	none

/1

Answer ☐ **[1]**

Source: 2023 HYSS Sec 3 End-of-Year P1 Q12

7 Which statement about an alkali is **incorrect**?

A It reacts with a carbonate to form carbon dioxide.

B It reacts with an acid to form a salt.

C It reacts with an ammonium salt to form ammonia.

D It turns Universal Indicator blue.

/1

Answer ☐ **[1]**

Source: 2023 HYSS Sec 3 End-of-Year P1 Q14

8 Which row correctly classifies the nature of these oxides?

	aluminium oxide	nitrogen dioxide	sodium oxide
A	amphoteric	basic	acidic
B	basic	acidic	amphoteric
C	amphoteric	acidic	basic
D	acidic	amphoteric	basic

/1

Answer ☐ **[1]**

Source: 2023 GESS Sec 3 End-of-Year P1 Q29

9 A farmer wishes to grow some ceanothus flowers. The pH of his soil is 5.1. Ceanothus flowers are known to grow best at around pH 7.2. Which substance should he add to his soil for the ceanothus to

grow well?

A calcium hydroxide **B** citric acid **C** sodium hydroxide **D** water

/1

Answer [1]

Source: 2023 GESS Sec 3 End-of-Year P1 Q30

10 Both magnesium carbonate and magnesium oxide react with dilute sulfuric acid. In what way are both reactions the same?

A A gas is produced.

B An acid is neutralised by a soluble base.

C Sulfuric acid is acting as an oxidising agent.

D Water is a product.

/1

Answer [1]

Source: 2024 CHS Sec 3 End-of-Year Section A Q23

11 The table shows information about three indicators. Which colour would each indicator show if it were added separately to pure water?

indicator	colour change	pH at which colour changes
methyl yellow	red to yellow	3
bromocresol green	yellow to blue	5
thymolphthalein	colourless to blue	9

	methyl yellow	bromocresol green	thymolphthalein
A	red	blue	blue
B	red	yellow	blue
C	yellow	blue	colourless
D	yellow	yellow	colourless

/1

Answer [1]

Source: 2023 XMS Sec 3 WA3 Q5

12 Which equation suggests that a metal oxide, RO, behaves as an amphoteric oxide?

A $RO(s) + 2H^+(aq) \rightarrow R^{2+}(aq) + H_2O(l)$

B $RO(s) + 2OH^-(aq) \rightarrow RO_2{}^{2-}(aq) + H_2O(l)$

C $RO(s) + H_2O(l) \rightarrow R^{2+}(aq) + 2OH^-(aq)$

D $RO(s) + 2NH_4{}^+(aq) \rightarrow R^{2+}(aq) + H_2O(l) + 2NH_3(g)$

/1

Answer [1]

Source: 2024 SMSS Sec 3 End-of-Year P1 Q12

13 In an accident at a factory, some dilute acid was spilt. Which substance, when added in excess, removes the acid without leaving an alkaline solution?

A aqueous ammonia

B aqueous sodium hydroxide

C solid ammonium nitrate

D solid calcium carbonate

/1

Answer [1]

Source: 2024 CHS Sec 3 End-of-Year Section A Q24

14 Choose from the following substances to answer the questions: Al_2O_3, NaCl, N_2, $Pb(NO_3)_2$, SO_2. Each substance may be used once, more than once or not at all.

(a) Select the amphoteric oxide.

.....

[1]

(b) Select the acidic oxide.

.....

[1]

/2

Source: 2023 XMS Sec 3 WA3 Q6, adapted

15 Hydrochloric acid is a strong acid with pH 1 while ethanoic acid is a weak acid with pH 5.

(a) What is meant by the term *weak acid*?

.....

.....

[1]

(b) Starting with acids of the same concentration, describe a chemical test that you can conduct to show that sulfuric acid is a strong acid but ethanoic acid is a weak acid. Include in your answer the chemicals you use, the expected observations and the conclusion.

.....

.....

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.....

.....

[3]

/4

Source: SJI 2020 Year 3 End-of-Year P2 B8(a)