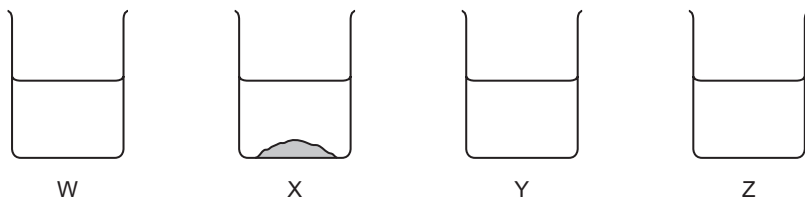


20 Which statement describes a property of ethanoic acid?

- A** It does **not** produce carbon dioxide when added to sodium carbonate.  
**B** It does **not** produce hydrogen when added to magnesium.  
**C** It only donates some of its protons when added to excess aqueous sodium hydroxide.  
**D** It only partially dissociates when added to water.

21 A student adds different solid salts to an excess of water. The student stirs the mixtures to determine the solubilities of the salts.

The results are shown.



What could the four different salts be?

|          | W                 | X                 | Y                 | Z                 |
|----------|-------------------|-------------------|-------------------|-------------------|
| <b>A</b> | calcium sulfate   | lead(II) chloride | ammonium nitrate  | potassium sulfate |
| <b>B</b> | ammonium nitrate  | sodium carbonate  | calcium sulfate   | lead(II) chloride |
| <b>C</b> | sodium carbonate  | calcium sulfate   | potassium sulfate | ammonium nitrate  |
| <b>D</b> | lead(II) chloride | ammonium nitrate  | sodium carbonate  | calcium sulfate   |

22 Four metal oxides are listed.

- 1  $Al_2O_3$   
 2  $CaO$   
 3  $CuO$   
 4  $ZnO$

Which metal oxides are amphoteric?

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

20 Which method is used to prepare a pure, dry sample of lead(II) chloride?

- A** mix aqueous lead(II) nitrate and dilute hydrochloric acid → filter → crystallise and dry the filtrate  
**B** mix aqueous lead(II) nitrate and dilute hydrochloric acid → filter → wash and dry the residue  
**C** mix solid lead(II) hydroxide and aqueous sodium chloride → filter → crystallise and dry the filtrate  
**D** mix solid lead(II) hydroxide and aqueous sodium chloride → filter → wash and dry the residue

21 Phosphorus is an element in Group V of the Periodic Table.

It burns in air to form an oxide that dissolves in water to form a solution with a pH of 1.

Which row describes this oxide of phosphorus?

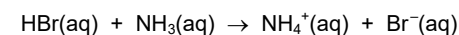
|          | metal oxide | non-metal oxide | acidic oxide | basic oxide |
|----------|-------------|-----------------|--------------|-------------|
| <b>A</b> | ✓           | x               | ✓            | x           |
| <b>B</b> | ✓           | x               | x            | ✓           |
| <b>C</b> | x           | ✓               | ✓            | x           |
| <b>D</b> | x           | ✓               | x            | ✓           |

key

✓ = yes

x = no

22 The equation shows the reaction between aqueous hydrogen bromide and aqueous ammonia.



Which statement describes the role of aqueous hydrogen bromide?

- A** It is a catalyst.  
**B** It is a reducing agent.  
**C** It is a proton acceptor.  
**D** It is a proton donor.

21 Which statement describes a base?

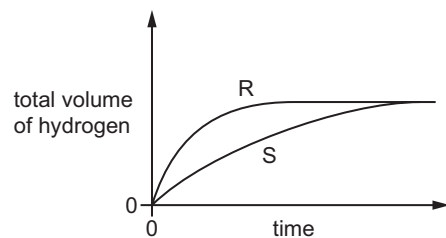
- A** It reacts with ammonium chloride to produce ammonia gas.  
**B** It reacts with calcium carbonate to produce carbon dioxide gas.  
**C** It reacts with copper to produce hydrogen gas.  
**D** It turns blue litmus red.

**24** Dilute acid R and dilute acid S have the same concentration.

The same volume of each dilute acid is reacted separately with the same mass of magnesium ribbon. Both reactions are carried out at room temperature and pressure.

The volume of hydrogen produced is measured.

A graph of the results is shown.



Which statement about the reactions is correct?

- A** Acid S reacts faster than acid R.
- B** The final volume of hydrogen produced in each reaction is different.
- C** Acid R is a stronger acid than acid S.
- D** Acid S is a stronger acid than acid R.

**25** Which metal oxide reacts with aqueous sodium hydroxide to form a salt and water?

- A** calcium oxide
- B** copper(II) oxide
- C** sodium oxide
- D** aluminium oxide

**34** Which statement about aqueous ethanoic acid is correct?

- A** It reacts with magnesium to form oxygen gas.
- B** It reacts with sodium carbonate to form carbon dioxide gas.
- C** It turns red litmus paper blue.
- D** It turns methyl orange yellow.