

# Preparation of Salts

## Question Paper

Level	O Level
Subject	Chemistry
Exam Board	Cambridge International Examinations
Topic	The Chemistry and Uses of Acids, Bases And Salts
Sub-Topic	Preparation of Salts
Booklet	Question Paper

**Time Allowed:** 42 minutes

**Score:** /35

**Percentage:** /100

- 1 Group I metals form compounds with Group VII halogens. The compounds formed are .....1..... in water and contain .....2..... bonds.

Which words correctly complete gaps 1 and 2?

	1	2
<b>A</b>	insoluble	covalent
<b>B</b>	insoluble	ionic
<b>C</b>	soluble	covalent
<b>D</b>	soluble	ionic

- 2 Which pair of substances can be used to prepare a sample of lead(II) chloride when added to water and mixed?

- A** lead and sodium chloride
- B** lead(II) nitrate and sodium chloride
- C** lead(II) carbonate and sodium chloride
- D** lead and hydrochloric acid

- 3 The table shows the results of two reactions of an aqueous solution of a salt.

reagents	observation
excess aqueous sodium hydroxide	white precipitate
dilute nitric acid and aqueous silver nitrate	yellow precipitate

What is the name of the salt?

- A** calcium chloride
- B** calcium iodide
- C** zinc nitrate
- D** zinc sulfate

4 Which substance is insoluble in water?

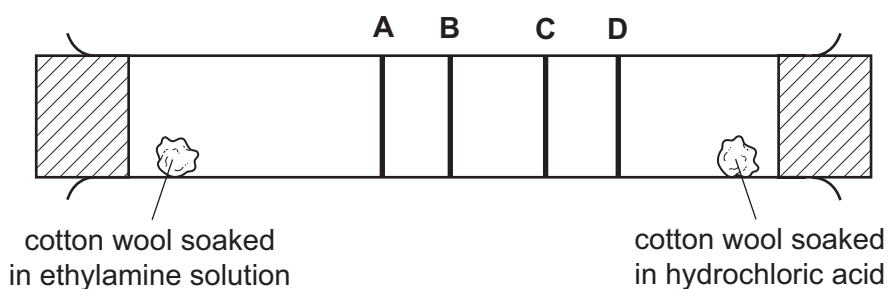
- A ammonium carbonate
- B ammonium nitrate
- C calcium carbonate
- D calcium nitrate

5 Which process is used in the preparation of soluble salts?

- A electrolysis
- B evaporation
- C melting
- D precipitation

6 Ethylamine gas,  $C_2H_5NH_2$ , and hydrogen chloride gas,  $HCl$ , react together to form a white solid, ethylamine hydrochloride.

At which position in the tube would a ring of solid white ethylamine hydrochloride form?



7 What is the correct sequence for obtaining pure salt from a mixture of sand and salt?

- A add water, evaporate
- B add water, filter
- C add water, filter, evaporate
- D filter, add water, evaporate

8 To which substance is dilute sulfuric acid added to prepare lead(II) sulfate?

- A aqueous lead(II) nitrate
- B lead foil
- C powdered lead(II) carbonate
- D powdered lead(II) oxide

9 The table shows the solubility of some compounds of metal Q in cold water.

salt	solubility in cold water
carbonate	insoluble
chloride	soluble
sulfate	insoluble

What is metal Q?

- A barium
- B lead
- C magnesium
- D sodium

10 An aqueous solution of a compound **X** reacts with

- aqueous zinc chloride to form a white precipitate which dissolves when **X** is in excess,
- aluminium sulfate solution to form a white precipitate which is insoluble when **X** is in excess.

What is the identity of **X**?

- A ammonia
- B barium chloride
- C silver nitrate
- D sodium hydroxide

- 11 Which reagent is added to aqueous potassium chloride to prepare lead chloride?
- A aqueous lead nitrate
  - B lead
  - C lead carbonate
  - D lead sulfate
- 12 Which compound is insoluble in water?
- A lead sulfate
  - B silver nitrate
  - C sodium carbonate
  - D zinc chloride
- 13 Salts containing which of the following anions are always soluble in water?
- A carbonates
  - B chlorides
  - C nitrates
  - D sulfates
- 14 Which acid and base react together to produce an **insoluble** salt?
- A hydrochloric acid and sodium hydroxide
  - B nitric acid and calcium oxide
  - C sulfuric acid and barium hydroxide
  - D sulfuric acid and zinc oxide

- 15 Which substance would **not** be used for preparing a pure sample of crystalline magnesium sulfate by reaction with dilute sulfuric acid?
- A magnesium carbonate
  - B magnesium hydroxide
  - C magnesium nitrate
  - D magnesium oxide
- 16 Which pair of compounds could be used in the preparation of calcium sulfate?
- A calcium carbonate and sodium sulfate
  - B calcium chloride and ammonium sulfate
  - C calcium hydroxide and barium sulfate
  - D calcium nitrate and lead(II) sulfate
- 17 A student mixed together aqueous solutions of Y and Z. A white precipitate formed.

Which could **not** be solutions Y and Z?

	solution Y	solution Z
<b>A</b>	hydrochloric acid	silver nitrate
<b>B</b>	hydrochloric acid	sodium nitrate
<b>C</b>	sodium chloride	lead(II) nitrate
<b>D</b>	sodium chloride	silver nitrate

- 18 Which metal has a soluble carbonate, chloride and sulfate?
- A barium
  - B calcium
  - C copper
  - D potassium

19 Solid Y is insoluble in water. It gives off a gas when heated and also when reacted with dilute sulfuric acid.

What is Y?

- A copper(II) carbonate
- B sodium carbonate
- C sodium nitrate
- D zinc oxide

20 Which salts are soluble in water?

- 1 ammonium carbonate,  $(\text{NH}_4)_2\text{CO}_3$
- 2 calcium carbonate,  $\text{CaCO}_3$
- 3 lead(II) carbonate,  $\text{PbCO}_3$
- 4 sodium carbonate,  $\text{Na}_2\text{CO}_3$

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

21 In which reaction do the products formed **not** include a salt?

- A calcium(II) carbonate with hydrochloric acid
- B copper(II) oxide with hydrogen
- C copper(II) oxide with sulfuric acid
- D copper(II) sulfate with sodium hydroxide

22 Which salt can be prepared by an acid-alkali titration method?

- A ammonium sulphate
- B copper(II) sulphate
- C iron(II) sulphate
- D zinc sulphate

23 The table shows properties of four chlorides.

Which is magnesium chloride?

	colour	solubility in water	method of preparation
<b>A</b>	green	soluble	metal and acid
<b>B</b>	white	insoluble	precipitation
<b>C</b>	white	soluble	metal and acid
<b>D</b>	green	insoluble	precipitation

24 Which pair of substances reacts to form a salt and water only?

- A** sodium chloride solution and silver nitrate solution
- B** sodium hydroxide solution and dilute ethanoic acid
- C** sodium carbonate solution and dilute sulphuric acid
- D** zinc and dilute hydrochloric acid

25 The table gives information about the solubilities of the hydroxides, carbonates and sulphates of calcium, sodium and zinc.

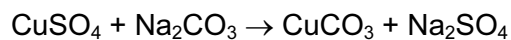
	hydroxide	carbonate	sulphate
calcium	slightly soluble	insoluble	slightly soluble
sodium	soluble	soluble	soluble
zinc	insoluble	insoluble	soluble

What is the best way of making zinc carbonate?

- A** Shake aqueous zinc sulphate with aqueous sodium carbonate.
- B** Shake aqueous zinc sulphate with solid calcium hydroxide and bubble in carbon dioxide.
- C** Shake solid zinc hydroxide with aqueous sodium hydroxide and bubble in carbon dioxide.
- D** Shake solid zinc sulphate and solid calcium carbonate with water.



26 The equation for one method of making copper carbonate is shown below.



The reaction is an example of

- A neutralisation.
- B oxidation and reduction.
- C precipitation.
- D synthesis.

27 Rubidium is in Group I of the Periodic Table.

What are properties of rubidium chloride?

	formula	approximate melting point/°C	solubility in water
A	RbCl	70	insoluble
B	RbCl	700	soluble
C	RbCl <sub>2</sub>	70	soluble
D	RbCl <sub>2</sub>	700	insoluble

28 Which substance reacts with water to form a soluble compound and an insoluble gas?

- A ammonium sulphate
- B caesium
- C calcium carbonate
- D copper

29 Which pair of substances produce a precipitate when their aqueous solutions are mixed?

- A sodium chloride and barium nitrate
- B sodium nitrate and barium chloride
- C sodium nitrate and silver nitrate
- D sodium sulphate and barium chloride

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30 Which two reagents could be used to prepare the insoluble salt copper(II) carbonate?

- A  $\text{CuO(s)} + \text{Na}_2\text{CO}_3\text{(aq)}$
- B  $\text{CuO(s)} + \text{MgCO}_3\text{(s)}$
- C  $\text{CuSO}_4\text{(aq)} + \text{Na}_2\text{CO}_3\text{(aq)}$
- D  $\text{CuSO}_4\text{(aq)} + \text{MgCO}_3\text{(s)}$

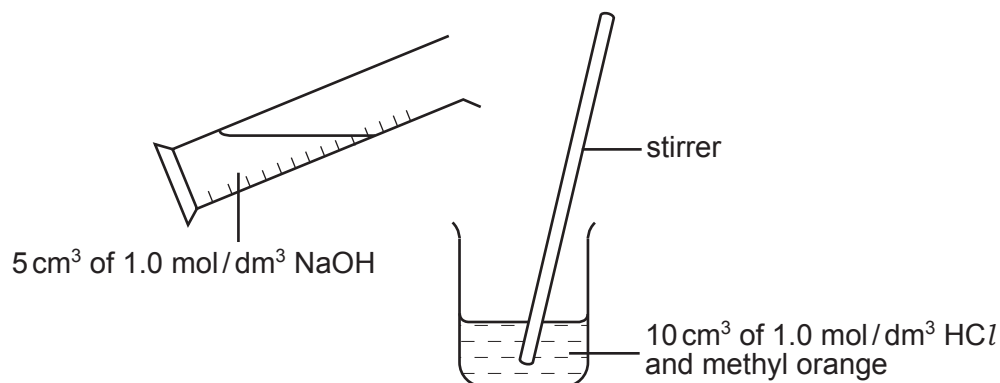
31 Which method of preparation of a pure salt solution requires the use of a pipette and burette?

- A  $\text{BaCl}_2\text{(aq)} + \text{H}_2\text{SO}_4\text{(aq)} \rightarrow \text{BaSO}_4\text{(s)} + 2\text{HCl(aq)}$
- B  $\text{CuO(s)} + 2\text{HCl(aq)} \rightarrow \text{CuCl}_2\text{(aq)} + \text{H}_2\text{O(l)}$
- C  $\text{KOH(aq)} + \text{HCl(aq)} \rightarrow \text{KCl(aq)} + \text{H}_2\text{O(l)}$
- D  $\text{MgCO}_3\text{(s)} + \text{H}_2\text{SO}_4\text{(aq)} \rightarrow \text{MgSO}_4\text{(aq)} + \text{H}_2\text{O(l)} + \text{CO}_2\text{(g)}$

32 Which reactants could be used safely to prepare potassium chloride?

- A aqueous potassium hydroxide and dilute hydrochloric acid
- B aqueous potassium sulphate and aqueous sodium chloride
- C potassium and aqueous sodium chloride
- D potassium and dilute hydrochloric acid

- 33 In an experiment  $5\text{ cm}^3$  of  $1.0\text{ mol/dm}^3$  sodium hydroxide are gradually added to  $10\text{ cm}^3$  of  $1.0\text{ mol/dm}^3$  hydrochloric acid containing methyl orange.



Which change occurs in the mixture?

- A The concentration of the  $\text{H}^+$  ions increases.
  - B The methyl orange changes colour.
  - C More water molecules are formed.
  - D A precipitate is formed.
- 34 Salts are made by reacting acids with bases.
- For which combination of acids and bases is the titration method of preparation suitable?
- A an insoluble acid with an insoluble base
  - B an insoluble acid with a soluble base
  - C a soluble acid with an insoluble base
  - D a soluble acid with a soluble base
- 35 An acid, **X**, was added to a solution of the nitrate of metal **Y**. A dense white precipitate was formed.

What are **X** and **Y**?

	acid <b>X</b>	metal <b>Y</b>
<b>A</b>	hydrochloric	calcium
<b>B</b>	nitric	zinc
<b>C</b>	sulphuric	aluminium
<b>D</b>	sulphuric	barium