

18.0.0 ACIDS, BASES AND SALTS Q

For Examiners use only.

Question	Maximum Score	Candidates Score
1 - 14	46	

*This paper consists of [Please insert number of pages] Printed pages.
Candidates should check the question paper to ensure that all the
Papers are printed as indicated and no questions are missing*

1.

- (i) Aluminium oxide is an amphoteric oxide. State the meaning of the term **amphoteric**.

.....

(1)

- (ii) Write two ionic equations which illustrate the amphoteric behaviour of aluminium oxide.

.....

.....

(2)

2.

The table below shows pH values of some acids.

Acid	A	B	C	D
pH Value	6.5	6.0	5.0	4.0

- a) Identify the acid with highest concentration of hydrogen ions.

(1 mk)

- b) Distinguish between a strong acid and concentrated acid.

(2 mks)

3.

Explain why the PH of 1.0M Hydrochloric acid is 1.0 while that of 1.0 M ethanoic acid is 5.0.

(2marks)

[2m]

4.

(a) Sodium hydroxide solution gives a pale blue precipitate with copper (II) nitrate usually described as copper (II) hydroxide. Write an ionic equation for this reaction.

[1m]

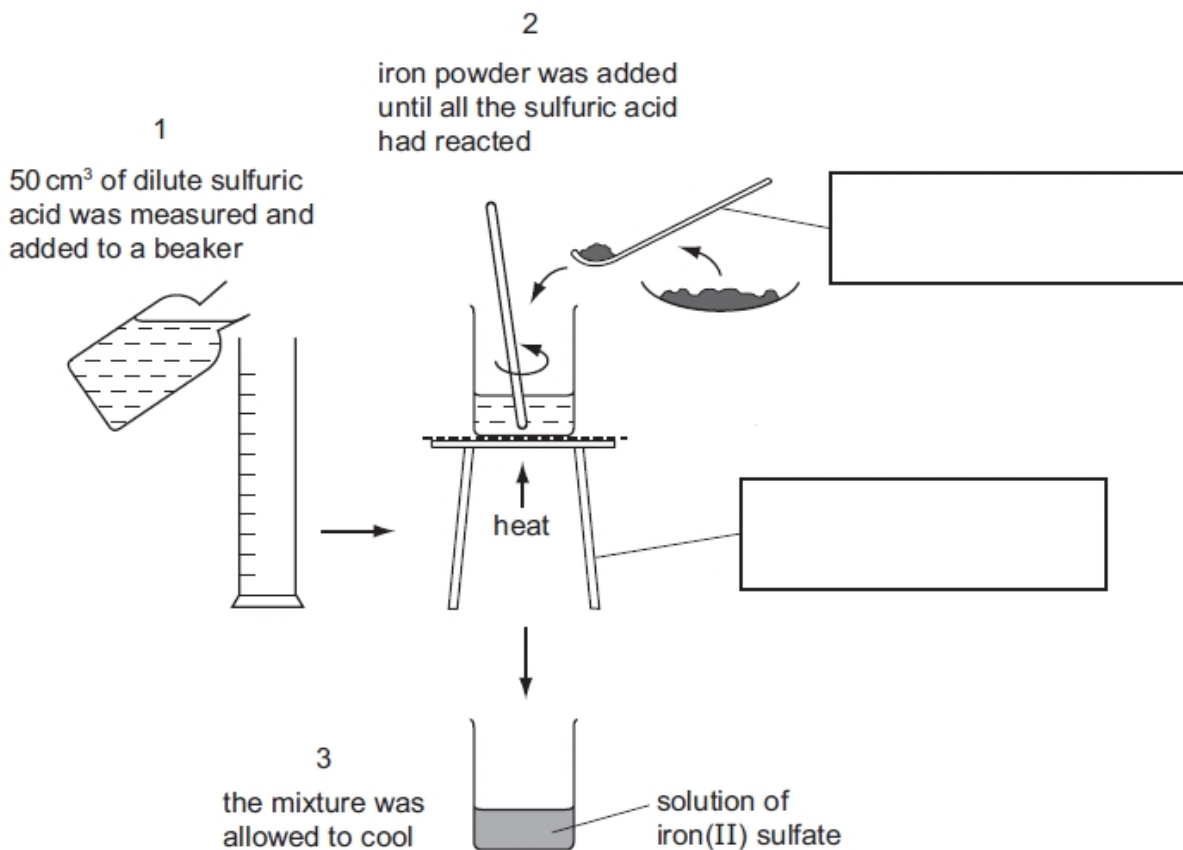
(b) Ammonia solution initially gives a blue precipitate as for sodium hydroxide. Further addition of ammonia gives deep blue soluble cuprammine complexes. Write an ionic equation for this reaction.

[1m]

[Total 2m]

5.

A student reacted excess iron powder with sulfuric acid to prepare a solution of iron (II) sulphate. The diagram shows the procedure followed in three stages.



Complete the boxes to identify the pieces of apparatus labelled. [2]

(b) How would the student know when all of the sulfuric acid had reacted? Give **two** reasons.

(c) Describe the effect of boiling the solution of iron (II) sulfate for several minutes.

[2]

[3]
[Total: 7]

6.

Iron(III) oxide is a basic oxide. What type of oxide is:

(i) aluminium oxide;

.....

(1)

(ii) silicon dioxide.

.....

(1)

(Total 2 marks)

7.

Name the process which takes place when

a) Iodine changes directly from solid to gas [1m]

b) $\text{Fe}^{2+}_{(\text{aq})}$ changes to $\text{Fe}^{3+}_{(\text{aq})}$ [1m]

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c) White sugar changes to black solid when mixed with excess conc. sulphuric acid. [1m]

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[3m]

8.

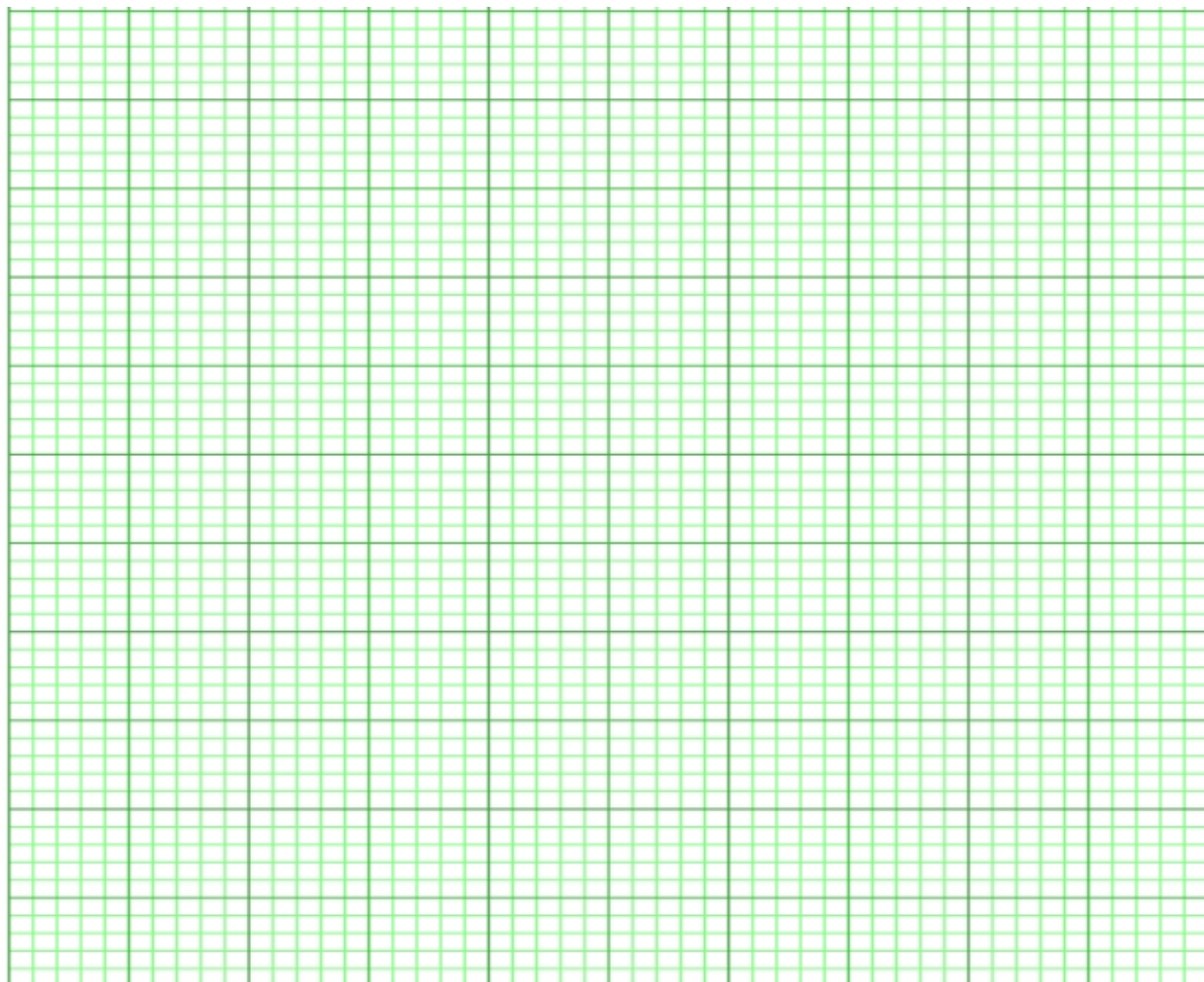
When hydrogen chloride gas is dissolved in water, the solution formed turns blue litmus paper red but there is no effect on blue litmus paper, when the gas is dissolved in carbon tetra chloride (CCl₄)(2mks)

[Total 2m]

9.

An experiment was carried out to determine the solubility of potassium chlorate at different temperatures. The solubility is the mass of potassium chlorate that dissolves in 100 g of water. The results obtained are shown in the table below.

temperature / °C	0	10	20	30	40	50	60
solubility in g / 100 g water	14	17	20	24	29	34	40



(b) Use your graph to determine the solubility of potassium chlorate at 70 °C. Show clearly on the graph how you obtained your answer.

(c) What would be the effect of cooling a saturated solution of potassium chlorate from 60 °C to 20 °C? [2]

[2]
[Total: 8]

10.

Name the species acting as the base in the equation below and explain your answer.



(1mk)

11.

Zinc oxide is an **amphoteric** oxide

(a) Explain what you understand by the term **amphoteric**.

[2m]

(b) Write an equation for the reaction between:

(i) Zinc oxide and dilute hydrochloric acid

[1m]

(ii) Zinc oxide and dilute sodium hydroxide

[1m]

(iii) Give an example of a neutral oxide

[1m]

[Total 5m]

12.

a) Write an ionic equation to show how washing removes permanent hardness in water. (1mk)

.....
.....

b) Give one advantage of drinking hard water by humans (1mk)

.....
.....

13.

a) Write an ionic equation to show how washing removes permanent hardness in water. (1mk)

b) Give one advantage of drinking hard water by humans (1mk)

[2m]

14.

(a) What is hard water?(1mk)

.....
.....

(b) Write the formulae of the two cations responsible for water hardness.(1mk)

.....
.....

(c) Given that the formula of an ion exchange resin which softens water is Na_2X . Write any one ionic equation to show how the

cations in (b) above are removed during water softening. (1mk)

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