PEARSON EDEXCEL GCSE CHEMISTRY · 1CH0

CHEMISTRY



EXAM QUESTION PACK

TOPIC 3: CHEMICAL CHANGES (PACK 3)

SCORE	PERCENTAGE
/29	%

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Q1.

The word equation for the reaction between copper carbonate and dilute sulfuric acid is

$$\text{copper carbonate} + \text{sulfuric acid} \rightarrow \text{copper sulfate} + \text{carbon dioxide} + \text{water}$$

Figure 4 shows a conical flask containing dilute sulfuric acid.
Copper carbonate is added to the acid in the flask.
The copper carbonate is added one spatula measure at a time until the reaction has finished.

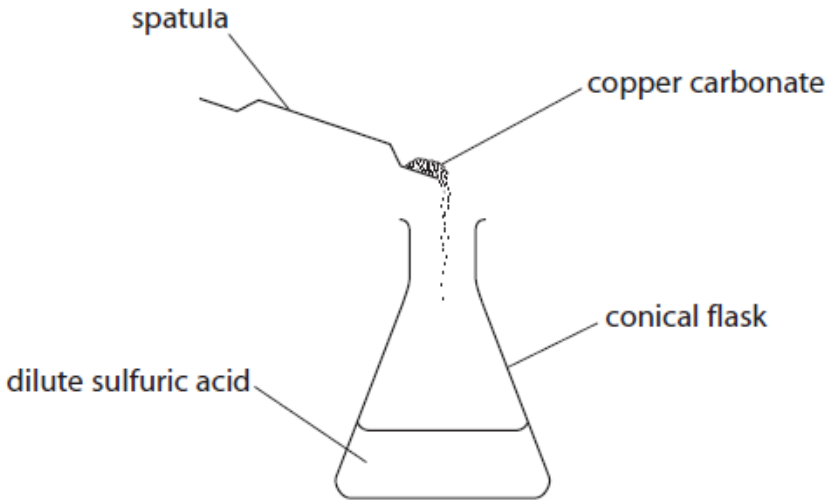


Figure 4

State **two** observations that would show the reaction has finished.

(2)

1 .....

.....

2 .....

.....

(Total for question = 2 marks)

Q2.

Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Copper carbonate reacts with dilute nitric acid.

(i) During the reaction the copper carbonate powder completely disappears.

State what can be deduced about the amount of acid used.

(1)

.....

.....

(ii) During the reaction, the pH of the mixture changed from 2 to 6.

By what factor has the concentration of the hydrogen ions in the mixture changed?

(1)

- ☒ **A** $\times 10\,000$
- ☒ **B** $\times 4$
- ☒ **C** $\times \frac{1}{4}$
- ☒ **D** $\times \frac{1}{10\,000}$

(Total for question = 2 marks)

Q3.

The pH of a sodium chloride solution was measured.

(i) State what could be used to measure the pH of a solution.

(1)

.....

(ii) Sodium chloride solution is neutral.

Give the pH of this solution.

(1)

.....

(Total for question = 2 marks)

Q4.

Water, acidified with sulfuric acid, is decomposed by electrolysis. The water is decomposed to produce hydrogen and oxygen.

(i) A sample of hydrogen is mixed with air and ignited.

State what would happen.

(1)

.....

.....

.....

(ii) Throughout the experiment the volume of hydrogen and the volume of oxygen are measured at two-minute intervals.

The results are shown in Figure 2.

time in minutes	volume of hydrogen in cm^3	volume of oxygen in cm^3
0	0	0
2	4	2
4	8	4
6	12	6
8	16	8

Figure 2

Describe, using the data in Figure 2, what the results show about the volumes of hydrogen and of oxygen produced in this experiment.

(2)

.....

.....

.....

.....

(Total for question = 3 marks)

Q5.

Water, acidified with sulfuric acid, is decomposed by electrolysis.
The water is decomposed to produce hydrogen and oxygen.

(i) A sample of hydrogen is mixed with air and ignited.

State what would happen.

(1)

.....

.....

.....

(ii) Throughout the experiment the volume of hydrogen and the volume of oxygen are measured at two-minute intervals.

The results are shown in Figure 9.

time in minutes	volume of hydrogen in cm^3	volume of oxygen in cm^3
0	0	0
2	4	2
4	8	4
6	12	6
8	16	8

Figure 9

Describe, using the data in Figure 9, what the results show about the volumes of hydrogen and of oxygen produced in this experiment.

(2)

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.....

(Total for question = 3 marks)

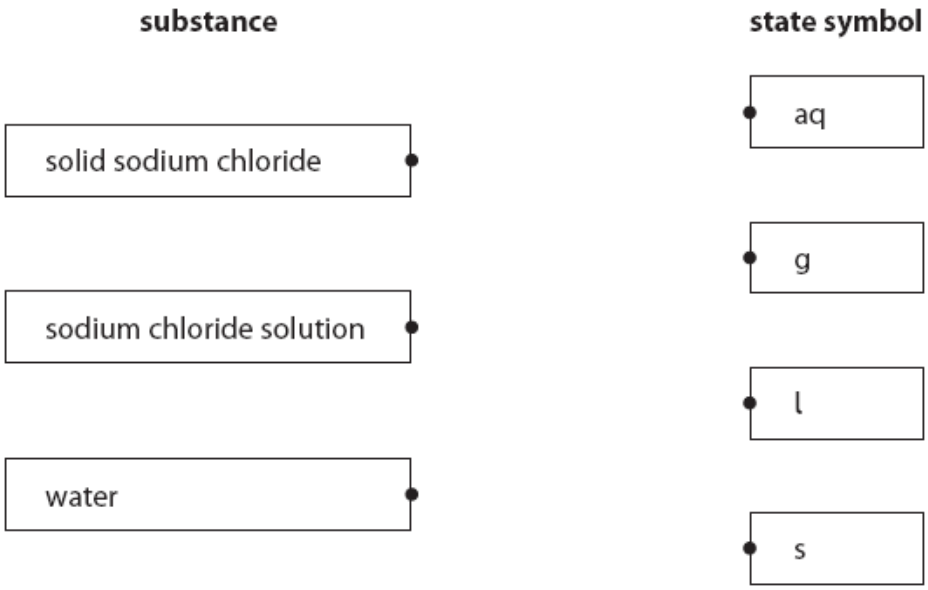
Q6.

A student is investigating the maximum mass of sodium chloride that can be dissolved in 100 cm^3 water at room temperature.

The student has been given 1.0 g samples of solid sodium chloride to dissolve in the water.

Draw **one** straight line from each substance to its state symbol.

(2)



(Total for question = 2 marks)

Q7.

Figure 11 shows the apparatus that can be used to electrolyse sodium sulfate solution using inert electrodes.

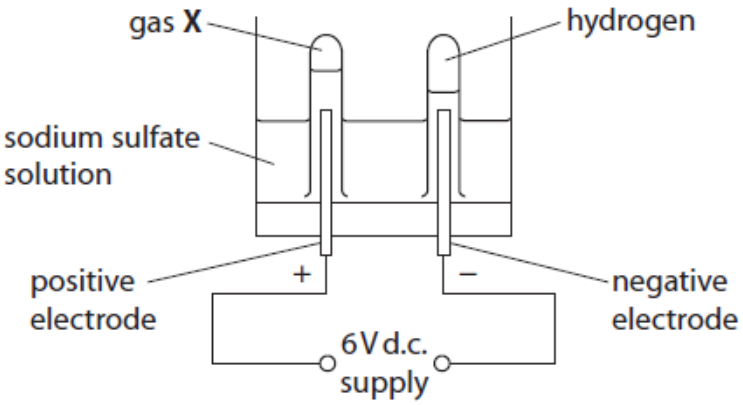


Figure 11

(i) In Figure 11, the gases given off at the electrodes are collected in test-tubes.

However, the actual volume of gases cannot be measured using these test-tubes.

Suggest what apparatus could be used in place of the test-tubes in Figure 11 to measure the volume of gases
given off.

(1)

.....

(ii) State what could be added into the circuit to show a current is flowing during electrolysis.

(1)

.....

(Total for question = 2 marks)

Q8.

Salts of metals can be prepared by reacting the metal with an acid to produce the salt and hydrogen.

(i) Describe the test to show that the gas is hydrogen.

(2)

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.....

.....

.....

(ii) Nickel is a metal.

Explain how the structure of a nickel atom, Ni, changes when it forms a nickel ion, Ni^{2+}.

(2)

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.....

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.....

(Total for question = 4 marks)

Q9.

Salts of metals can be prepared by reacting the metal with an acid to produce the salt and hydrogen.

(i) Describe the test to show the gas is hydrogen.

(2)

.....

.....

.....

.....

(ii) Nickel is a metal.

Explain how the structure of a nickel atom, Ni, changes when it forms a nickel ion, Ni^{2+}.

(2)

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(Total for question = 4 marks)

Q10.

When dilute hydrochloric acid is added to copper carbonate, a gas is produced.

Describe a test to show that this gas is carbon dioxide.

(2)

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.....

Q11.

(a) A technician had two bottles, each containing a solid.
The labels had fallen off the bottles.
The two labels were:



The technician carried out the following tests.

(i) A flame test was carried out on each solid.
One solid produced a yellow colour in the Bunsen flame.
Give the name of the ion that produces this yellow colour.

(1)

.....

(ii) Dilute hydrochloric acid was added to a solution of each solid.
Then barium chloride solution was added.
A white precipitate was seen in one of the mixtures.
Give the name of the ion that produces this white precipitate.

(1)

.....

(b) Describe how the technician should carry out a flame test on a solid.

(2)

.....

.....

.....

.....

(c) Describe what you would see when sodium hydroxide solution is added to a solution containing iron(III) ions, Fe^{3+}.

(2)

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.....

.....

(d) When dilute hydrochloric acid is added to copper carbonate, a gas is produced.

Describe a test to show that this gas is carbon dioxide.

(2)

.....

.....

.....

.....

(Total for Question = 8 marks)

Q12.

Acids are used to make salts.

Give the name of the acid used to make chlorides.

(1)

.....

(Total for question = 1 mark)

Q13.

Figure 11 shows the apparatus that can be used to electrolyse sodium chloride solution in the laboratory.

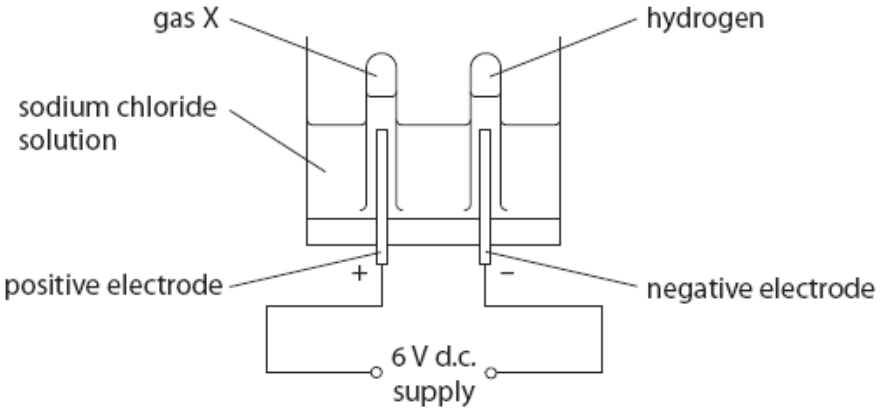


Figure 11

What is the name of the electrode where hydrogen is formed?

(1)

☒ **A** anion

☒ **B** anode

☒ **C** cation

☒ **D** cathode

(Total for question = 1 mark)

Q14.

A solution of hydrochloric acid has a pH of 1.

Explain the pH change when 10 cm^3 of this acid is diluted with water to make 100 cm^3 of solution.

(2)

.....

.....

.....

.....

(Total for question = 2 marks)

Q15.

Titration can be used to determine the exact amount of hydrochloric acid that reacts with a given amount of sodium hydroxide solution.

$$HCl + NaOH \rightarrow NaCl + H_2O$$



Suggest why universal indicator must not be used in titration experiments.

(1)

.....

Q16.

The concentration of a solution of an alkali can be determined by titration with an acid.

25.0 cm^3 portions of the solution of the alkali are transferred into a conical flask and titrated with the acid solution, using a suitable indicator.

(i) Describe how you would measure out and transfer 25.0 cm^3 of the solution of the alkali.

(2)

.....

.....

.....

.....

.....

(ii) Complete the sentence by putting a cross (☒) in the box next to your answer.

The burette readings of acid added were

	titration 1	titration 2	titration 3
final volume / cm^3	27.20	30.10	25.35
initial volume / cm^3	2.05	5.20	0.10
volume of acid added / cm^3	25.15	24.90	25.25

The volume of acid added that should be used in the calculation is

(1)

☒ **A** 24.90 cm^3

☒ **B** 25.00 cm^3

☒ **C** 25.10 cm^3

☒ **D** 25.20 cm^3

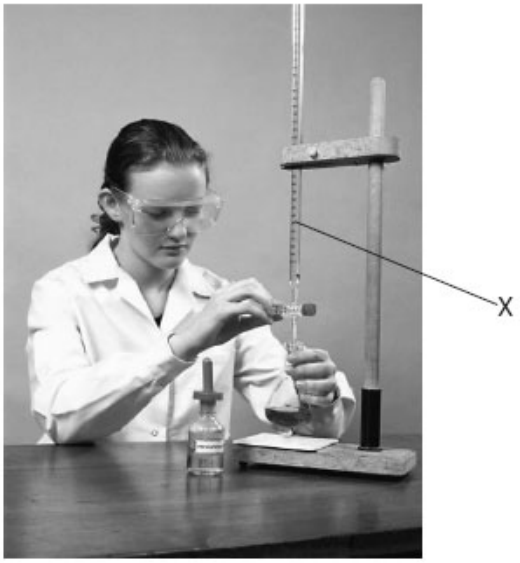
Q17.

In the Haber process nitrogen and hydrogen are reacted together to form ammonia.

Titration can be used to determine the exact volume of ammonia solution that reacts with 25.0 cm^3 of sulfuric acid.

The photograph shows a student carrying out a titration.

(1)



(i) Give the name of the piece of apparatus labelled X.

.....

(ii) State what is added to the sulfuric acid to show when it has been neutralised by the ammonia solution.

(1)

.....

Q18.

Ammonia solution is alkaline.

Which of the following could be used to show that ammonia solution is alkaline?

(1)

☒ **A** conical flask

☒ **B** pH meter

☒ **C** pipette

☒ **D** thermometer

(Total for question = 1 mark)