



SCHOLARSHIP EXAMINATION

CHEMISTRY

2016

Time: 30 minutes

Total: 41 marks available

Name:

School:.....

Instructions to Candidates

Answer **All** of the questions in the spaces provided in this answer booklet.

Read the questions carefully.

Q1.

Many everyday items are made of metal.
The picture shows four objects made of metals or alloys.



electrical wire



aeroplane



jewellery



knife

Parts of aeroplanes are made of aluminium alloys instead of pure aluminium.

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

The aluminium alloys are used instead of pure aluminium because they

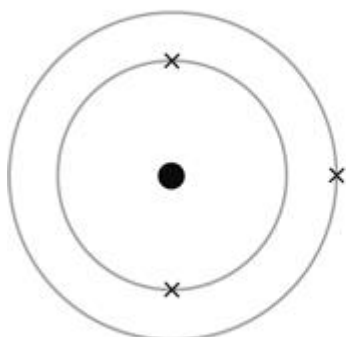
(1)

- A make the aeroplane heavier
- B corrode more easily
- C are more brittle
- D are stronger

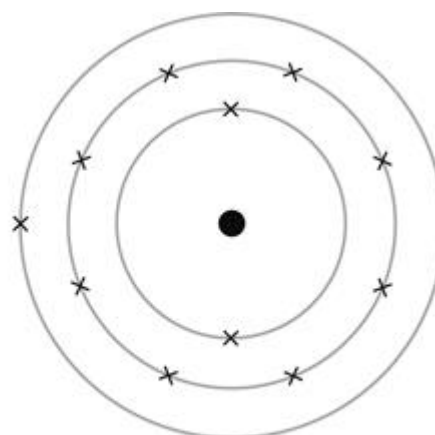
Q2.

Atoms of elements

The diagrams show the electronic configurations of lithium and sodium.



lithium



sodium

(a) (i) Use the information in the diagrams to explain why lithium and sodium have similar reactions.

(1)

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(ii) Use the information in the diagrams to explain in which group **and** period of the periodic table sodium is found.

(2)

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(iii) Use the information in the diagrams to explain why sodium is more reactive than lithium.

(2)

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(b) An atom of sodium contains 11 protons, 12 neutrons and 11 electrons. What is the mass number of this atom?

Put a cross (X) in the box next to your answer.

(1)

- A 11
- B 12
- C 23
- D 34

(c) The table gives information about the two stable isotopes of bromine.

Isotope	mass number
bromine-79	79
bromine-81	81

Explain why bromine-79 and bromine-81 have different mass numbers but the same chemical reactions.

(2)

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Q3.

Nitrogen and oxygen are present in the air.

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

Oxygen has a low boiling point because there are

(1)

- A** weak covalent bonds between the oxygen atoms
- B** weak covalent bonds between the oxygen molecules
- C** weak forces of attraction between the oxygen atoms
- D** weak forces of attraction between the oxygen molecules

Q4.

Burning fuels

The picture shows a gas water heater.

The fuel used in this heater is natural gas which is mainly methane.



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

Natural gas is a good fuel because

(1)

- A** supplies of it will never run out
- B** it always burns with a yellow flame that is easily seen
- C** it produces no waste gases on complete combustion
- D** it produces no solid waste on complete combustion

(b) The complete combustion of fossil fuels releases gases into the atmosphere.

Explain how these gases could cause an increase in the temperature of the Earth.

(2)

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(c) Biofuels, made from plants, can be used as alternatives to fossil fuels.

(i) State an advantage of replacing fossil fuels with biofuels made from plants.

(1)

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(ii) Explain a disadvantage of replacing fossil fuels with biofuels made from plants.

(2)

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(d) Incomplete combustion of methane can occur in gas heaters such as the one shown in the photograph.

Explain how incomplete combustion occurs and the problems it can cause.

(6)

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Q5.

A few drops of cold water are added to a lump of calcium oxide.
Which of the following is **not** a correct statement about this reaction?
Put a cross () in the box next to your answer.

(1)

- A** steam is formed
- B** a white powder is produced
- C** the lump of calcium oxide cools down
- D** calcium hydroxide is formed

Q6.
Changes in the atmosphere

(a) The Earth's earliest atmosphere was very different from the Earth's atmosphere today.

Complete the sentence by putting a cross () in the box next to your answer
The Earth's earliest atmosphere was formed by

(1)

- A** animals breathing
- B** global warming
- C** plants decaying
- D** volcanic activity

(b) Use words from the box to complete the sentences.

Each word may be used once, more than once, or not at all.

argon	carbon dioxide	carbonates	neon	nitrogen
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(3)

(i) The Earth's earliest atmosphere is thought to have contained mainly

(ii) Over the years, carbon dioxide dissolved in the oceans and was absorbed by marine organisms.
The marine organisms eventually formed rocks which are

(iii) The Earth's atmosphere today contains approximately 79% of

(c) There is much less water vapour in the Earth's atmosphere today than in the Earth's earliest atmosphere.

Explain how the amount of water vapour decreased.

(2)

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(d) When plants first started to grow on the Earth they caused the composition of the atmosphere to change.

Describe how the composition of the atmosphere changed as a result of plants growing.

(2)

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(Total for question = 8 marks)

Q7.

(a) The photograph shows bottles of some concentrated acids.



(i) There are hazard symbols on the bottles.
State why hazard symbols are used.

(1)

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(ii) This hazard symbol is on all the bottles of concentrated acid.



State the meaning of this symbol.

(1)

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(b) Which of these substances neutralises dilute hydrochloric acid?
Put a cross () in the box next to your answer.

(1)

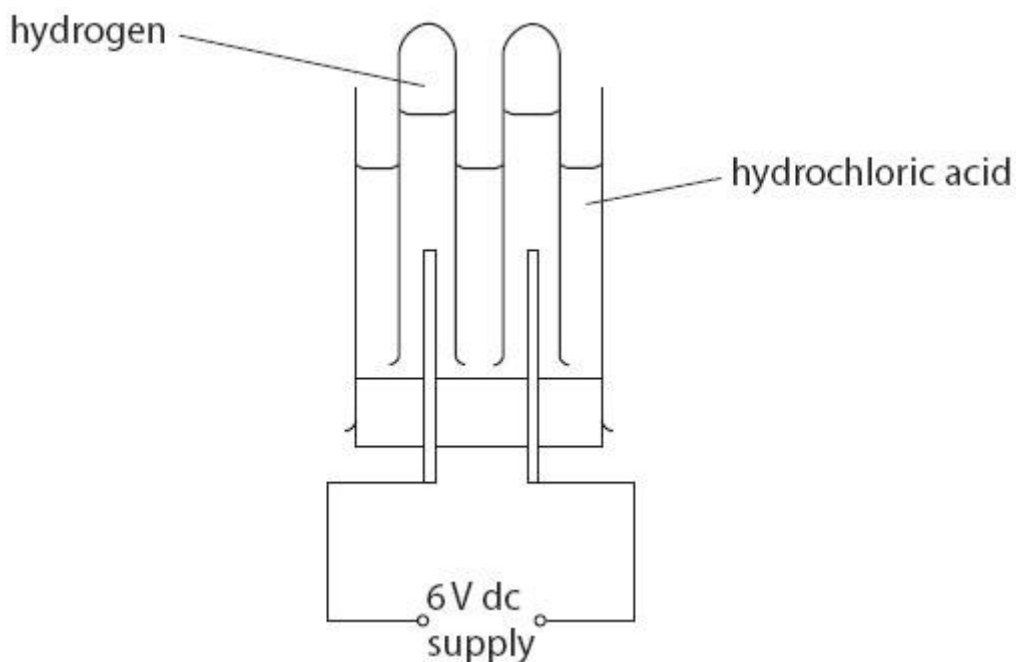
- A potassium chloride
- B potassium hydroxide
- C potassium nitrate
- D potassium sulfate

(c) Which of these substances is produced when sodium carbonate reacts with dilute sulfuric acid?
Put a cross () in the box next to your answer.

(1)

- A sodium chloride
- B sodium hydroxide
- C sodium nitrate
- D sodium sulfate

(d) The electrolysis of hydrochloric acid can be carried out using this apparatus.



(i) Explain what is meant by the term **electrolysis**.

(2)

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(ii) Hydrogen is formed at one electrode.
Name the gas formed at the other electrode.

(1)

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(iii) Describe the test to show a gas is hydrogen.

(2)

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(e) When water is electrolysed, hydrogen is also formed at one electrode.
Give the name of the gas formed at the other electrode.

(1)

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(Total for Question is 10 marks)