



SCHOLARSHIP EXAMINATION

CHEMISTRY

2015

Time: 30 minutes

Total: 35 marks available

Name:

School:.....

Instructions to Candidates

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

Read the questions carefully.

1		2		3		4		5		6		7		0				
Key																		
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 5px; text-align: center;"> 1 H hydrogen 1 </div> <div style="border: 1px solid black; padding: 5px; text-align: center;"> 4 He helium 2 </div> </div>																		
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 5px; text-align: center;"> relative atomic mass atomic symbol name atomic (proton) number </div> </div>																		
7 Li lithium 3	9 Be beryllium 4	45 Sc scandium 21	48 Ti titanium 22	51 V vanadium 23	52 Cr chromium 24	55 Mn manganese 25	56 Fe iron 26	59 Co cobalt 27	59 Ni nickel 28	63.5 Cu copper 29	65 Zn zinc 30	70 Ga gallium 31	73 Ge germanium 32	75 As arsenic 33	79 Se selenium 34	80 Br bromine 35	84 Kr krypton 36	
23 Na sodium 11	24 Mg magnesium 12	40 Ca calcium 20	45 Sc scandium 21	51 V vanadium 23	52 Cr chromium 24	55 Mn manganese 25	56 Fe iron 26	59 Co cobalt 27	59 Ni nickel 28	63.5 Cu copper 29	65 Zn zinc 30	70 Ga gallium 31	73 Ge germanium 32	75 As arsenic 33	79 Se selenium 34	80 Br bromine 35	84 Kr krypton 36	
39 K potassium 19	40 Ca calcium 20	85 Rb rubidium 37	88 Sr strontium 38	89 Y yttrium 39	91 Zr zirconium 40	93 Nb niobium 41	96 Mo molybdenum 42	101 Ru ruthenium 44	103 Rh rhodium 45	106 Pd palladium 46	108 Ag silver 47	112 Cd cadmium 48	115 In indium 49	119 Sn tin 50	122 Sb antimony 51	128 Te tellurium 52	127 I iodine 53	131 Xe xenon 54
133 Cs caesium 55	137 Ba barium 56	139 La* lanthanum 57	178 Hf hafnium 72	181 Ta tantalum 73	184 W tungsten 74	186 Re rhenium 75	190 Os osmium 76	192 Ir iridium 77	195 Pt platinum 78	197 Au gold 79	201 Hg mercury 80	204 Tl thallium 81	207 Pb lead 82	209 Bi bismuth 83	[209] Po polonium 84	[210] At astatine 85	[222] Rn radon 86	
[223] Fr francium 87	[226] Ra radium 88	[227] Ac* actinium 89	[261] Rf rutherfordium 104	[262] Db dubnium 105	[266] Sg seaborgium 106	[264] Bh bohrium 107	[277] Hs hassium 108	[268] Mt meitnerium 109	[271] Ds darmstadtium 110	[272] Rg roentgenium 111	Elements with atomic numbers 112 – 116 have been reported but not fully authenticated							

* The Lanthanides (atomic numbers 58 – 71) and the Actinides (atomic numbers 90 – 103) have been omitted.
Relative atomic masses for **Cu** and **Cl** have not been rounded to the nearest whole number.

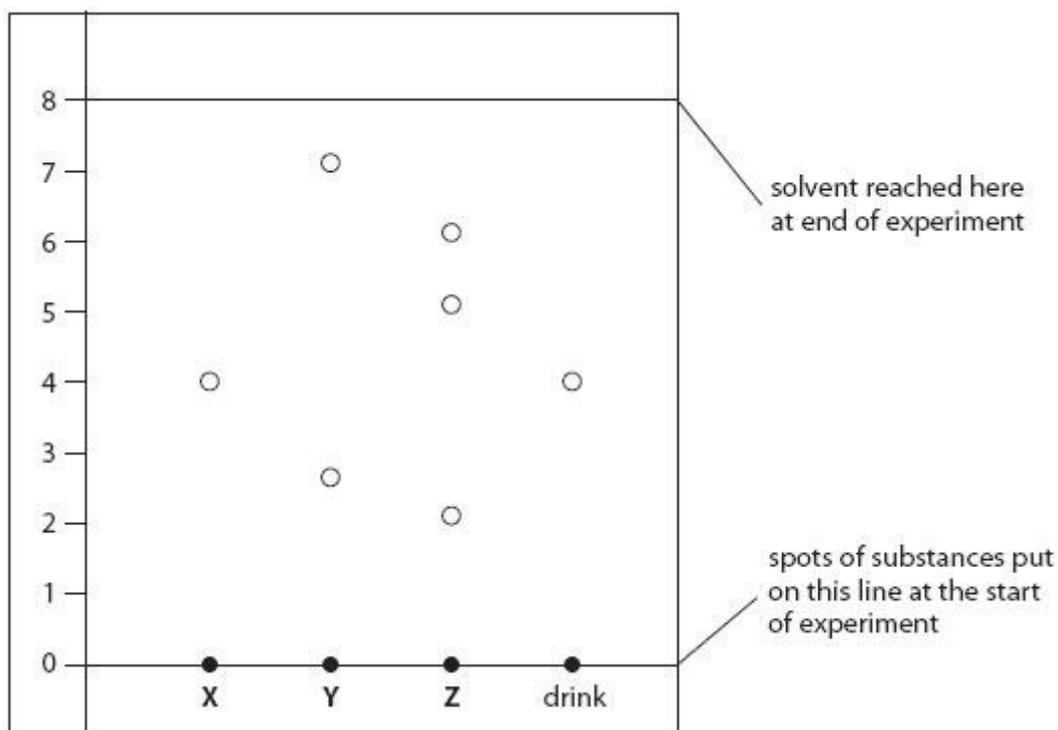
Q1.

Some food colourings are a mixture of coloured substances. Paper chromatography can be used to separate the coloured substances in food colourings. Charles carried out a chromatography experiment to test which food colouring was present in a coloured drink.

He used samples of three food colourings, **X**, **Y** and **Z**.

He also tested a sample of the colouring in the drink.

Charles obtained this chromatogram.



(i) Charles looked at the chromatogram to find out which food colourings contained more than one coloured substance.

State all the food colourings that contain more than one coloured substance.

(1)

.....

(ii) Food colouring **Y** is banned.

Explain how Charles can tell that the drink that he tested did **not** contain the banned food colouring.

(2)

.....
.....
.....
.....

Q2.

Some processes add carbon dioxide to the atmosphere, some remove it. Three processes are shown in the table. Complete the table to show the effect of each process on the amount of carbon dioxide in the atmosphere. Put **one** tick (✓) in each row. The first one has been done for you.

(2)

process	adds carbon dioxide	does not affect amount of carbon dioxide	removes carbon dioxide
burning fossil fuels	✓		
volcanic activity			
dissolving in the oceans			

Q3.

Elements in the periodic table

(a) Copper is a metal.

(i) Complete the sentence by putting a cross (☒) in the box next to your answer. In the periodic table copper is in

(1)

- A group 0
- B group 1
- C group 7
- D the transition metals

(ii) Which of these is a property of copper metal? Put a cross (☒) in the box next to your answer.

(1)

- A does not conduct an electric current
- B forms colourless compounds
- C has a low melting point
- D is malleable

(b) Helium and argon are noble gases.

(i) Choose the correct word from this box to complete the sentence below.

non- flammable	odourless	reactive
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(1)

Argon can be used to put out fires because it is

(ii) Choose the correct phrase from this box to complete the sentence below.

has a high density has a low density is colourless



Helium is used in airships because it

(1)

(c) Chlorine, bromine and iodine are halogens.

(i) The table shows the appearance of bromine and iodine at room temperature. Complete the table to show the appearance of chlorine at room temperature.

(2)

halogen	appearance at room temperature
chlorine	
bromine	dark red liquid
iodine	grey solid

(ii) Chlorine reacts with hydrogen to form hydrogen chloride. Write a chemical equation for this reaction.

(2)

..... + →

Q4.

Most metals occur as compounds found in rocks.

Metals can be extracted from some of these rocks.

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

Rocks from which metals can be extracted are called

(1)

- A sand
- B limestone
- C ores
- D elements

Q5.

The photograph shows bottles of some concentrated acids.



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

(1)

.....

.....

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



State the meaning of this symbol.

(1)

.....

.....

Q6.

Some fuels contain sulfur impurities.
Burning fuels such as coal produce a gas which can cause damage to limestone statues.
Explain how the burning of some fuels can cause this damage.

(2)

.....
.....
.....
.....

Q7.

The table shows tests for gases **A**, **B** and **C**.
Use the evidence from these tests to identify the gases.

(3)

gas	test	result
A	put a flame to the gas mixed with air	a squeaky pop is heard
B	put a glowing splint into the gas	the splint relights
C	put some damp litmus paper into the gas	the litmus paper is bleached

Gas **A** is.....

Gas **B** is.....

Gas **C** is.....

Q8.

Indigestion can cause pain in the chest.

Indigestion tablets can be taken to relieve this pain.



(i) Explain how indigestion tablets relieve this pain.

(2)

.....

.....

.....

.....

(ii) Complete the sentence by putting a cross (☒) in the box next to your answer.
Some indigestion tablets contain magnesium carbonate.
When magnesium carbonate is added to dilute hydrochloric acid, a salt is formed.
The name of the salt formed is

(1)

- A magnesium oxide
- B magnesium nitrate
- C magnesium chloride
- D magnesium sulphate

Q9.

(a) Unreactive metals are found as uncombined metals in the Earth's crust.
Which of the following metals is found uncombined in the Earth's crust?

(1)

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

- A** gold
- B** sodium
- C** tin
- D** zinc

(b) When iron oxide is heated with carbon, the iron oxide is reduced.

(i) Complete the word equation for the reaction.

(2)

iron oxide + carbon → +

(ii) Part of the reactivity series is shown.

- sodium
- aluminium
- carbon (non metal)
- zinc
- iron
- copper

Aluminium is found in the ore bauxite.
Aluminium is obtained from bauxite by electrolysis (using electricity)
Explain why electrolysis has to be used to obtain aluminium from bauxite.

(2)

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.....

.....

.....

(c) A large amount of copper in use today has come from recycling copper.
Explain the advantages of recycling metals, such as copper, rather than obtaining them from their ores.

(2)

.....

.....

.....

.....

(d) Write a word equation for zinc reacting with iron sulfate

.....

(1)

Q10.

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

Q11.

The table shows some solids and some properties of solids.

Draw **one** straight line from each solid to properties of that solid.

(1)

solid	properties of solid
iodine	<input type="checkbox"/> a soft metal that reacts vigorously with water
potassium	<input type="checkbox"/> a grey solid that forms a purple vapour when heated
copper	<input type="checkbox"/> a yellow solid that does not conduct electricity
	<input type="checkbox"/> a red-brown solid that reacts to form blue compounds

Q12.

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