OCR
RECOGNISING ACHIEVEMENT

GCSE

CHEMISTRY B

F

B641/01

Chemistry B Unit 1: Modules C1, C2, C3

Specimen Paper

60 mins

Candidates answer on the question paper:

Additional materials: ruler (cm/mm), calculator

Candidate Name	

Centre Number						Candidate Number				

TIME 60 mins

INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above.
- Answer **all** the questions.
- Write your answers on the dotted lines unless the question says otherwise.
- Use blue or black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure you know what you have to do before starting your answer.
- There is a space after most questions. Use it to do your working. In many questions marks will be given for a correct method even if the answer is incorrect.
- Do not write in the bar code. Do not write in the grey area between the pages.
- DO NOT WRITE IN THE AREA OUTSIDE THE BOX BORDERING EACH PAGE. ANY WRITING IN THIS AREA WILL NOT BE MARKED.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [ ] at the end of each question or part question.
- The total number of marks for this paper is **60.**

This specimen paper consists of 32 printed pages.

Registered Charity Number: 1066969

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Answer all questions.

Section 1

1. Ali is concerned about his diet.

(a) He looks at packets of four different cereals.

The information tells him what is in 100 g of each cereal.

Squashy Flakes Content in 100 g	
Energy (kJ)	1450
Protein(g)	7.9
Fat(g)	5.0
Sugar(g)	6.5
Fibre(g)	3.5

Cornabix Content in 100 g	
Energy (kJ)	1400
Protein(g)	10.0
Fat(g)	4.1
Sugar(g)	1.0
Fibre(g)	12.9

Easy Go Content in 100 g	
Energy (kJ)	1055
Protein(g)	15.1
Fat(g)	0.1
Sugar(g)	44.9
Fibre(g)	28.6

Ready now Content in 100 g	
Energy (kJ)	1658
Protein(g)	12.0
Fat(g)	6.0
Sugar(g)	2.2
Fibre(g)	30.0

(i) Which cereal has the lowest fat content?

Choose from.

Squashy Flakes **Cornabix** **Easy Go** **Ready Now**

.....[1]

(ii) Ali knows that his daily average protein intake should be 60 g.

Look at the **Cornabix** cereal.

How may grams of **Cornabix** contain 60 g of protein?

You are advised to show how you work out your answer.

.....[2]

(b) Ali likes potatoes.

He knows that potatoes can be cooked by frying or boiling them.

(i) Write down **one** other way to cook potatoes.

.....[1]

(ii) Finish the sentence about cooking potatoes.

Choose the best word from this list.

chemical **natural** **reversible**

Cooking potatoes is an example of a.....change. [1]

(iii) We do not eat uncooked potatoes.

This is because cooking improves the texture, taste and flavour.

Write down **one** other reason.

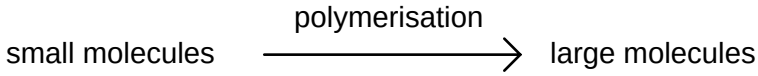
.....

.....[1]

[Total: 6]

2. This question is about polymerisation.

Polymerisation changes many small molecules into large molecules.



(a) Look at this list.

alkane

methane

monomer

polymer

Write down the name of the small molecules used in polymerisation.

Choose from the list.

.....[1]

(b) Polymerisation is used to make plastics.

Plastics are used to make many things.

Draw lines to link each plastic to its use.

plastic	use
poly(ethene)	**clothing**
nylon	**insulation**
poly(styrene)	**plastic bags**

[1]

(c) Poly(ethene) is made from a small molecule called ethene.

Write down the name of the small molecule used to make poly(tetrafluoroethene).

.....[1]

(d) There are more than 60 000 different plastics.

Plastics are made from polymer molecules.

This table shows some information about five polymers.

polymer	**density in kg/m^3**	**maximum usable temperature in ^{O}C**	**solubility in oil**
low density poly(ethene)	920	85	insoluble below 80 ^{O}C
high density poly(ethene)	960	120	insoluble below 80 ^{O}C
poly(styrene)	1050	65	soluble
poly(chloroethene)	1390	60	soluble
poly(propene)	900	150	insoluble

Look at the table.

(i) Which polymer has the **highest** density?

.....[1]

(ii) Which polymer would be best for making a pipe to carry oil at 100 ^{O}C?

Name of polymer.....

Write down **two** reasons for your answer.

1 .....

.....

2 .....

.....[3]

(e) Most polymers do not decay naturally. They are not biodegradable.

Chemists are trying to find polymers that are biodegradable.

Suggest **two** reasons why this research work is useful.

1 .....

.....

2 .....

.....[2]

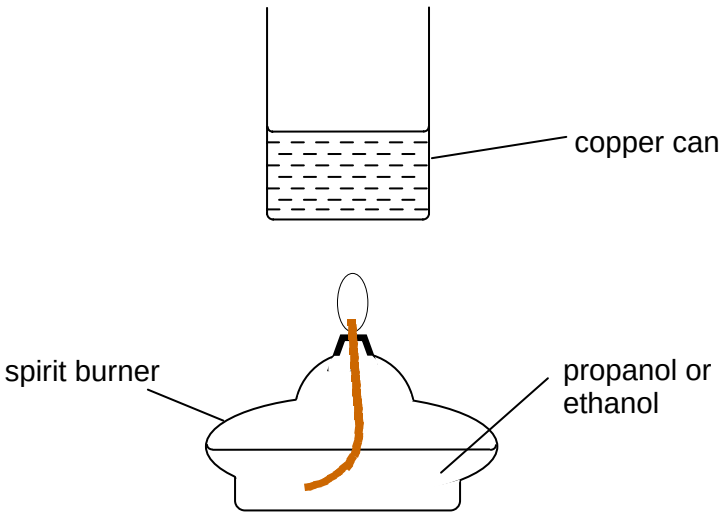
[Total: 9]

3. This question is about fuels.

Jodie and Natalie burn two fuels.

They compare the energy transferred.

Look at the diagram. It shows the apparatus they use.



(a) Explain how Jodie and Natalie can compare the energy transferred by the two fuels.

Your answer should include.

- the name of the liquid in the copper can
- how they can make it a fair test
- the measurements they would make.

.....

.....

.....

.....

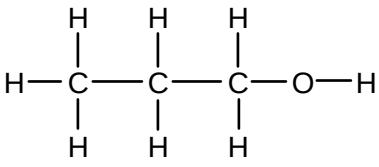
.....

.....

.....

.....[3]

(b) Look at the diagram. It shows the displayed formula of propanol.



(i) Write down the molecular formula for propanol.

.....[1]

(ii) Propanol is **not** a hydrocarbon.

Explain why.

.....[1]

[Total: 5]

Section 2

4. The air contains many pollutants.

(a) Draw lines to match each pollutant with the main problem it causes**.**

pollutant in the air	**main problem that the pollutant causes**
carbon dioxide	ozone depletion in the upper atmosphere
carbon monoxide	the greenhouse effect
chlorofluorocarbons	acid rain
sulphur dioxide	poisonous to humans

[3]

(b) A chlorofluorocarbon has the formula $C_2Cl_2F_4$.

(i) How many chlorine atoms are there in one molecule of $C_2Cl_2F_4$?

.....[1]

(i) How many different elements are combined in $C_2Cl_2F_4$?

.....[1]

[Total: 5]

5. Cars bodies made from iron and steel will rust.

(a) Two substances are needed for the iron parts in a car to rust.

One of these is oxygen.

What is the name of the other substance?

.....[1]

(b) Nowadays some car bodies are made from aluminium.

Write down **one** advantage of using aluminium instead of iron.

.....

.....[1]

(c) Sam is a research scientist.

He has just discovered a new alloy.

This alloy is suitable for making car bodies.

Sam decides to tell other scientists around the world about his discovery.

Describe how, **and** explain why Sam should tell other scientists.

.....

.....

.....

.....

.....[2]

[Total: 4]

6. Dilute hydrogen peroxide is used to make oxygen in a laboratory.

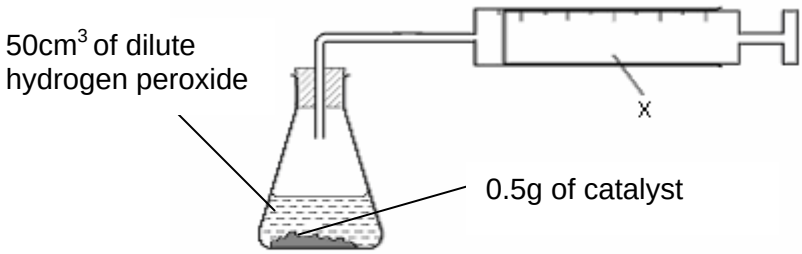
Hydrogen peroxide decomposes to make water and oxygen.

(a) Write the word equation for this decomposition reaction.

.....[1]

(b) Laura investigates the decomposition of dilute hydrogen peroxide at room temperature.

Look at the apparatus she uses.



What is the name of the piece of apparatus labelled **X**?

Choose from

gas syringe

measuring cylinder

metre rule

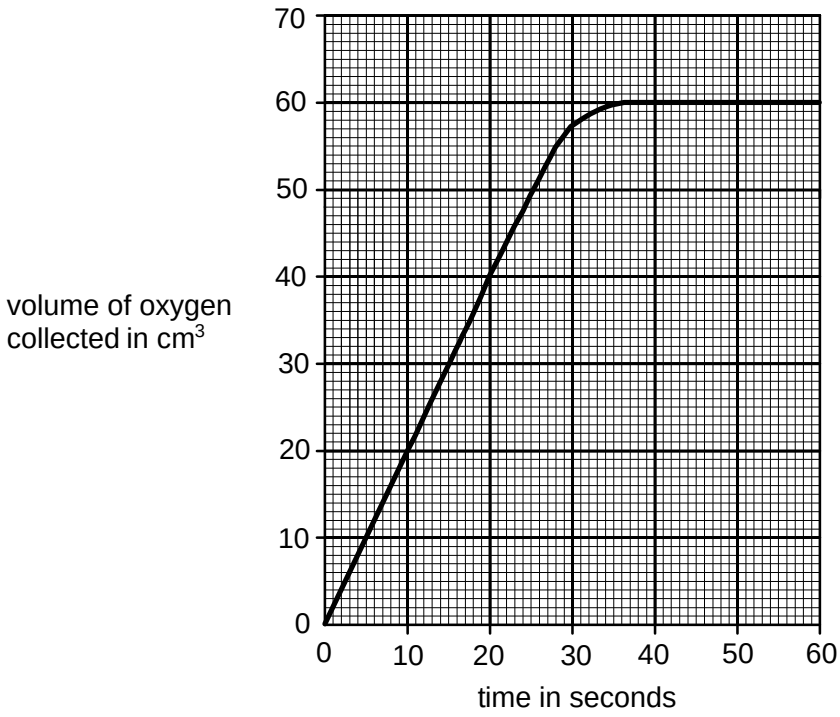
pipette

.....[1]

(c) Laura uses 50 cm^3 of dilute hydrogen peroxide and 0.5 g of a catalyst.

Laura records the volume of oxygen collected in the gas syringe every 10 seconds.

This is a graph of Laura's results.



Look at the graph.

(i) What is the volume of oxygen collected after 20 seconds?

..... cm^3 [1]

(ii) The reaction stops when all the hydrogen peroxide has been used up.

How long does it take for all the hydrogen peroxide to react?

..... seconds [1]

(iii) Laura uses 0.5 g of a catalyst.

How much of the catalyst remains at the end of the reaction?

Choose from

more than 0.5 g

0.5 g

less than 0.5 g

.....[1]

(d) Laura wants to make the decomposition reaction of hydrogen peroxide faster.

She still wants to use

- 0.5 g of the catalyst
- 50 cm^3 of hydrogen peroxide solution.

Write about some of the ways that she can make the reaction faster

.....

.....

.....

.....

.....

.....[3]

[Total: 8]

7. Cement is made from a rock called limestone.

(a) Limestone is removed from the ground in a quarry.

Limestone quarries cause some environmental problems.

One problem is that the quarry produces lots of dust.

Write about **two other** environmental problems.

1 .....

.....

2 .....

.....[2]

(b) Cement, sand and water are used to make concrete.

Describe how concrete is **reinforced**.

.....

.....[1]

[Total: 3]

Section 3

8. This question is about the Periodic Table.

Use the Periodic Table found on the back page to help you answer these questions.

(a) How many elements are there in the Periodic Table?

Tick your answer.

number of elements in the Periodic Table	tick one box only
less than 50	
about 50	
just over 100	
over 1000	

[1]

(b) Find calcium, Ca, on the Periodic Table.

What is the **atomic number** of calcium?

.....[1]

(c) Find oxygen, O, on the Periodic Table.

Write down the name of an element in the same **group** as oxygen.

.....[1]

(d) Find carbon, C, on the Periodic Table.

Write down the name of an element in the same **period** as carbon.

.....[1]

(e) Write down the name of a transition element.

.....[1]

(f) Calcium, Ca, reacts with oxygen, O_2, to make calcium oxide, CaO.

Write a **balanced symbol equation** for this reaction.

.....[2]

[Total: 7]

9. This question is about the Group 1 metals.

Sodium and potassium are Group 1 metals.

(a) Write down the name of one other Group 1 metal.

Use the Periodic Table to help you.

.....[1]

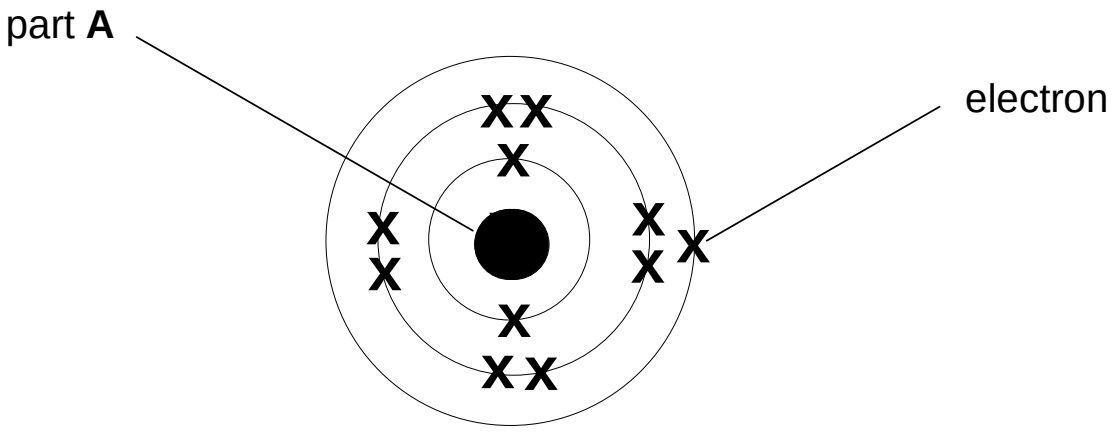
(b) Sodium and potassium are stored under oil.

Explain why.

.....

.....[2]

(c) Look at the diagram of a sodium atom.



(i) What is the name of part **A**?

.....[1]

(ii) What is the charge on an electron?

Choose from

negative

neutral

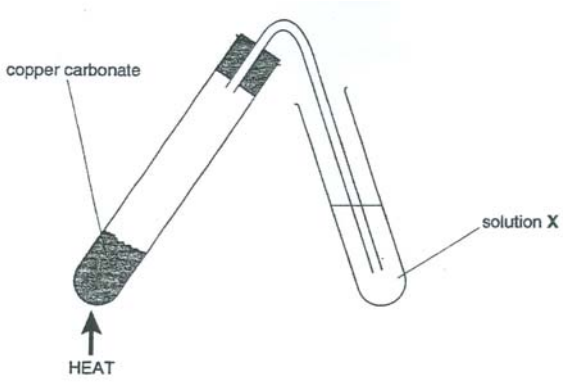
positive

.....[1]

[Total: 5]

10. Jamie and Gulam heat copper carbonate.

Look at the diagram. It shows the apparatus they use.



They use solution **X** to test for carbon dioxide.

(a) **(i)** Write down the name of solution **X.**

.....[1]

(ii) What happens to solution X as carbon dioxide is bubbled through it?

.....[1]

(b) The word equation for the action of heat on copper carbonate is

copper carbonate $\longrightarrow$ copper oxide + carbon dioxide.

This is an example of **thermal decomposition**.

What does thermal decomposition mean?

.....

.....[2]

[Total: 4]

11. Nikita and Matthew do some flame tests.

They test the chemicals in three bottles.

One bottle contains sodium chloride, another potassium chloride and a third lithium chloride.

The names are missing from the bottles.

Nikita and Matthew are asked to find out which chemical each bottle contains

Describe how they do a flame test.

You should include

- what they do
- the results they would get for each chemical.

You may wish to draw a diagram to help your answer.

.....

.....

.....

.....

.....[4]

[Total: 4]

The Periodic Table of the Elements

1	2											3	4	5	6	7	0
							1 **H** hydrogen 1										4 **He** helium 2
7 **Li** lithium 3	9 **Be** beryllium 4											11 **B** boron 5	12 **C** carbon 6	14 **N** nitrogen 7	16 **O** oxygen 8	19 **F** fluorine 9	20 **Ne** neon 10
23 **Na** sodium 11	24 **Mg** magnesium 12											27 **Al** aluminium 13	28 **Si** silicon 14	31 **P** phosphorus 15	32 **S** sulfur 16	35.5 **Cl** chlorine 17	40 **Ar** argon 18
39 **K** potassium 19	40 **Ca** calcium 20	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
85 **Rb** rubidium 37	88 **Sr** strontium 38	89 **Y** yttrium 39	91 **Zr** zirconium 40	93 **Nb** niobium 41	96 **Mo** molybdenum 42	[98] **Tc** technetium 43	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						

Key

relative atomic mass
atomic symbol
name
atomic (proton) number

**** The Lanthanides (atomic numbers 58-71) and the Actinides(atomic numbers 90-103) have been omitted.***

Cu and Cl have not been rounded to the nearest whole number.

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GCSE

CHEMISTRY B

F

B641/01

Chemistry B Unit 1: Modules C1, C2, C3

Specimen Mark Scheme

60 mins

Maximum mark for this paper is 60

This specimen mark scheme consists of 5 printed pages.

Registered Charity Number: 1066969

Question Number	Answer	Max Mark
Section 1		
1(a)i	Easy-Go;	**[1]**
1(a)ii	10x60 ; 600 ; **(allow two marks for correct answer with no working)**	**[2]**
1(b)i	Roast / microwave / barbecue/ bake / jacket potatoes / in a grill / in an oven/steam;	**[1]**
1(b)ii	Chemical;	**[1]**
1(b)iii	Make them easier to digest / high temperature kills microbes;	**[1]**
	Total marks	**[6]**
2(a)	Monomer;	**[1]**
2(b)	poly(ethene) = plastic bags nylon = clothing poly(styrene) = insulation **(All three correct 1, no half marks)**	**[1]**
2(c)	Tetrafluoroethene	**[1]**
2(d)i	poly(chloroethene)	**[1]**
2(d)ii	Poly(propene) Usable up to 150 ^{O}C / aw Insoluble in oil at 100 ^{O}C **allow high density poly(ethane) with correct reason relating to maximum useable temperature of 120 ^{O}C for one mark**	**[3]**
2(e)	**Any two from** They will decay naturally; No need for them to fill land-fill sites; No need to burn them/no toxic waste gases; Less litter problem;	**[2]**
	Total marks	**[9]**
3(a)	Water is in copper can; Same quantity of water in cans each time / same flame size each time / same gap between burner and can; Take readings of temperature before and after heating / measure temperature increase;	**[3]**
3(b)i	C_3H_80 Allow any order of symbols;	**[1]**
3(b)ii	Hydrocarbons <u>only</u> contain hydrogen and carbon atoms / propanol contains an oxygen atom;	**[1]**
	Total marks	**[5]**

Section 2		
4(a)	Carbon dioxide ----- Greenhouse effect Carbon monoxide -- Poisonous CFCs ---------- Ozone depletion Sulphur dioxide ----- Acid rain **All four correct - 3** **Two or three correct - 2** **One correct - 1**	**[3]**
4(b)i	2;	**[1]**
4(b)ii	3;	**[1]**
	Total marks	**[5]**
5(a)	Water **(allow moisture)**;	**[1]**
5(b)	Aluminium does not rust / aluminium has a lower density / same car body will weigh less;	**[1]**
5(c)	**Any two from** Means of communication e.g. phone, conference, internet, book, journal, meeting; To get work evaluated / aw; So no other scientist could take credit So other scientists could develop the work / aw;	**[2]**
	Total marks	**[4]**
6(a)	Hydrogen peroxide → oxygen + water **(any order for oxygen and water)**; (allow correct formulae instead of names) (allow = in equation)	**[1]**
6(b)	(Gas) Syringe;	**[1]**
6(c)i	40(cm^3) **(unit not needed);**	**[1]**
6(c)ii	34-38 **(seconds) (unit not needed);**	**[1]**
6(c)iii	0.5(g) **(unit not needed);**	**[1]**
6(d)	**Any three from** Increase concentration more crowded particles so more collisions; Use powdered catalyst more surface area so more collisions; Use a higher temperature / hotter / heat particles move faster / particles have more energy / more successful collisions / more energetic collisions; Stir or shake;	**[3]**
	Total marks	**[8]**

7(a)	**Any two from:** Lots of noise pollution / aw; Lots of lorries / aw; Damage to landscape / aw; When finished need to fill in the hole / aw;	**[2]**
7(b)	Add steel (rod) to mixture/aw;	**[1]**
	Total marks	**[3]**
Section 3		
8(a)	Just over 100;	**[1]**
8(b)	20;	**[1]**
8(c)	sulphur/ selenium/ tellurium/ polonium; **(accept correct symbols)**	**[1]**
8(d)	lithium/ beryllium/ boron/ nitrogen/oxygen/ fluorine/neon; **(accept correct symbols)**	
8(e)		**[1]**
8(f)	any correct transition element **(accept correct symbols)**; Any correct transition element **(accept correct symbols)**; $2Ca + O_2 \longrightarrow 2CaO$ **(accept multiples)**; **formulae (1), balancing (1)**	**[2]**
	Total marks	**[7]**
9(a)	Lithium/rubidium/caesium/francium **(accept correct formula)**;	**[1]**
9(b)	**Any two from** Very reactive; reacts with air/oxygen; reacts with water;	**[2]**
9(c)i	Nucleus **(NOT proton or neutron)**;	**[1]**
9(c)ii	Negative;	**[1]**
	Total marks	**[5]**
10(a)i	Limewater **(accept calcium hydroxide or bicarbonate indicator)**;	**[1]**
10(a)ii	Turns cloudy/milky/white/forms white solid/precipitate;	**[1]**
10(b)	Break down; By heating;	**[2]**
	Total marks	**[4]**

11	**At least one from:** (Flame) test wire / splint / rod / spatula moistened with HCl(aq) or water / AW; (Flame) test wire / splint / rod / spatula dipped in substance; Substance put into the Bunsen flame using an appropriate method; **At least one from:** Sodium (chloride) – orange / yellow flame; Lithium (chloride) – red / crimson flame; Potassium (chloride) - pink/ lilac/ mauve / purple / violet flame; **Total marks** **Overall marks**	 **[4]** **[60]**