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Surname					Other names									
Pearson					Centre Number					Candidate Number				
Edexcel GCSE					<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>					<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>				
Chemistry														
Unit C3: Chemistry in Action														
Foundation Tier														
Wednesday 17 June 2015 – Morning										Paper Reference				
Time: 1 hour										5CH3F/01				
You must have: Calculator, ruler										Total Marks				

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*

Information

- The total mark for this paper is 60.
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed
– *you should take particular care with your spelling, punctuation and grammar, as well as the clarity of expression, on these questions.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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The Periodic Table of the Elements

1	2	3	4	5	6	7	0																																																																																																																																																																																																																																																																																																																																																																																																																																																								
7 Li lithium 3	9 Be beryllium 4	23 Na sodium 11	24 Mg magnesium 12	39 K potassium 19	40 Ca calcium 20	85 Rb rubidium 37	88 Sr strontium 38	133 Cs caesium 55	137 Ba barium 56	[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	201 Hg mercury 80	197 Au gold 79	195 Pt platinum 78	192 Ir iridium 77	190 Os osmium 76	186 Re rhenium 75	184 W tungsten 74	181 Ta tantalum 73	178 Hf hafnium 72	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	113 In indium 49	114 Sn tin 50	115 Pb lead 82	116 Po polonium 84	117 Ts tennessine 117	118 Og oganesson 118	119 Su seaborgium 119	120 Uu ununium 120	121 Uub ununium 121	122 Uuq ununium 122	123 Uub ununium 123	124 Uuq ununium 124	125 Uub ununium 125	126 Uuq ununium 126	127 Uub ununium 127	128 Uuq ununium 128	129 Uub ununium 129	130 Uuq ununium 130	131 Uub ununium 131	132 Uuq ununium 132	133 Uub ununium 133	134 Uuq ununium 134	135 Uub ununium 135	136 Uuq ununium 136	137 Uub ununium 137	138 Uuq ununium 138	139 Uub ununium 139	140 Uuq ununium 140	141 Uub ununium 141	142 Uuq ununium 142	143 Uub ununium 143	144 Uuq ununium 144	145 Uub ununium 145	146 Uuq ununium 146	147 Uub ununium 147	148 Uuq ununium 148	149 Uub ununium 149	150 Uuq ununium 150	151 Uub ununium 151	152 Uuq ununium 152	153 Uub ununium 153	154 Uuq ununium 154	155 Uub ununium 155	156 Uuq ununium 156	157 Uub ununium 157	158 Uuq ununium 158	159 Uub ununium 159	160 Uuq ununium 160	161 Uub ununium 161	162 Uuq ununium 162	163 Uub ununium 163	164 Uuq ununium 164	165 Uub ununium 165	166 Uuq ununium 166	167 Uub ununium 167	168 Uuq ununium 168	169 Uub ununium 169	170 Uuq 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Questions begin on next page.



Answer ALL questions

Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Organic substances

1 Vinegar contains ethanoic acid.

(a) Which of these is a use of vinegar?

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

(1)

- A fuel
- B perfume
- C preservative
- D soap

(b) An indicator can be used to show that ethanoic acid is acidic.

Give the name of an indicator that can be used and state its colour in the acid.

(2)

indicator

colour in acid

(c) Use the gases from the box to complete the sentences.

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

carbon dioxide	hydrogen	nitrogen	oxygen
----------------	----------	----------	--------

(3)

(i) If a bottle of wine is left open, ethanoic acid is formed when

ethanol in the wine is oxidised by

(ii) Ethanoic acid reacts with magnesium to give a gas. When the gas is mixed

with air and ignited with a lighted splint, it gives a squeaky pop.

This gas is

(iii) When solid sodium carbonate is added to dilute ethanoic acid,

effervescence occurs. The effervescence is bubbles of



(d) Ethanoic acid is reacted with ethanol to produce an ester, ethyl ethanoate, and water.

Write the word equation for this reaction.

(2)

(Total for Question 1 = 8 marks)



P 4 4 6 8 5 A 0 5 2 0

Identifying ions

2 Tests are used to identify ions in three salts **X**, **Y** and **Z**.

(a) (i) In a flame test salt **X** gives a yellow flame.

What is the metal ion in salt **X**?

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

(1)

A calcium, Ca^{2+}

B lithium, Li^+

C potassium, K^+

D sodium, Na^+

(ii) Describe how a flame test is carried out on a solid.

(3)

.....

.....

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.....

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(b) Salt **Y** is a sulfate.

Salt **Y** is dissolved in water.

Dilute hydrochloric acid is added to the solution.

Barium chloride solution is then added to the mixture.

Describe what you would **see** when the barium chloride solution is added.

(2)

.....

(c) Salt **Z** contains iron(III) ions, Fe^{3+} .

Describe what is **seen** when sodium hydroxide solution is added to a solution of **Z**.

(2)

.....

(Total for Question 2 = 8 marks)



Water

3 (a) An acid can be reacted with a base in a titration experiment.

(i) State the name of the type of reaction when an acid reacts with a base.

(1)

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

The general equation for the reaction of an acid with a base is

(1)

- A** acid + base → alkali + water
- B** acid + base → salt + carbon dioxide
- C** acid + base → salt + water + hydrogen
- D** acid + base → salt + water

(b) A solution of sodium hydroxide is prepared.

The mass of a container with solid sodium hydroxide is determined.

The sodium hydroxide is transferred to a flask.

The mass of the empty container is determined.

The sodium hydroxide is dissolved in water and the volume made up to 2 dm³.

The results are

mass of container + solid sodium hydroxide = 17.12 g

mass of empty container = 7.02 g

The results are used to calculate the concentration of the sodium hydroxide solution.

(i) Calculate the mass of solid sodium hydroxide transferred to the flask.

(1)

mass of solid sodium hydroxide = g

(ii) Calculate the concentration of the sodium hydroxide solution in g dm⁻³.

(1)

concentration of sodium hydroxide solution = g dm⁻³



(c) Some tap water is hard.

The hardness is caused by metal ions dissolved in the water.

(i) Give the name of a metal ion that causes tap water to be hard.

(1)

(ii) Describe problems that can be caused by the use of hard water in the home.

(2)



Ethanol and homologous series

4 (a) Ethanol is produced by the fermentation of glucose solution.

- (i) Give the name of the substance added to the glucose solution to provide the enzymes needed for fermentation.

(1)

- (ii) Fermentation produces a dilute solution of ethanol.

Which process is used to obtain a concentrated solution of ethanol from this dilute solution?

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

(1)

- A** cracking
- B** crystallisation
- C** filtration
- D** fractional distillation

- (iii) Alcoholic drinks contain ethanol.

State the effect of drinking alcohol on a person's reaction times.

(1)



(b) Propane, C_3H_8 , and butane, C_4H_{10} , are members of the same homologous series, called the alkanes.

(i) Explain why both propane and butane are alkanes.

(2)

.....

.....

.....

(ii) Draw the structure of a molecule of butane, C_4H_{10} , showing all covalent bonds.

(2)

(c) Write the balanced equation for the combustion of methane, CH_4 , in oxygen to form carbon dioxide and water.

(3)

.....

(Total for Question 4 = 10 marks)



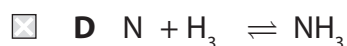
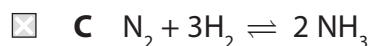
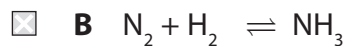
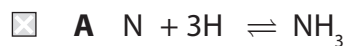
Fertilisers

5 (a) Nitrogen reacts with hydrogen to form ammonia.

(i) Which of these is the balanced equation for this reaction?

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

(1)



(ii) State the meaning of the symbol \rightleftharpoons in an equation.

(1)

(b) Ammonia is used in the manufacture of some fertilisers.

(i) The table shows information about three fertilisers manufactured from ammonia.

substance	% by mass of nitrogen	% by mass of oxygen
ammonium nitrate	35	60
ammonium sulfate	21	48
urea	47	27

Use the information in the table to explain why urea might be the best fertiliser.

(2)



(ii) When rivers flow through areas where fertilisers have been spread on the land, plants and animals that live in the rivers can be affected.

Explain how this happens.

(2)

.....

.....

.....

.....

.....



Electrolysis

6 A solution of sodium chloride contains the four ions shown in the box.



(a) The sodium chloride solution is electrolysed.

Give the formulae of the **two** ions that will be attracted to the positively charged electrode.

(1)

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

When molten lead bromide is electrolysed the products are

(1)

- A** lead and hydrogen
- B** hydrogen and bromine
- C** hydrogen and oxygen
- D** lead and bromine

(c) During electrolysis, oxidation takes place at the anode and reduction takes place at the cathode.

Explain, in terms of electrons, what is meant by **oxidation** and **reduction**.

(2)

(d) Explain why some metal objects are electroplated.

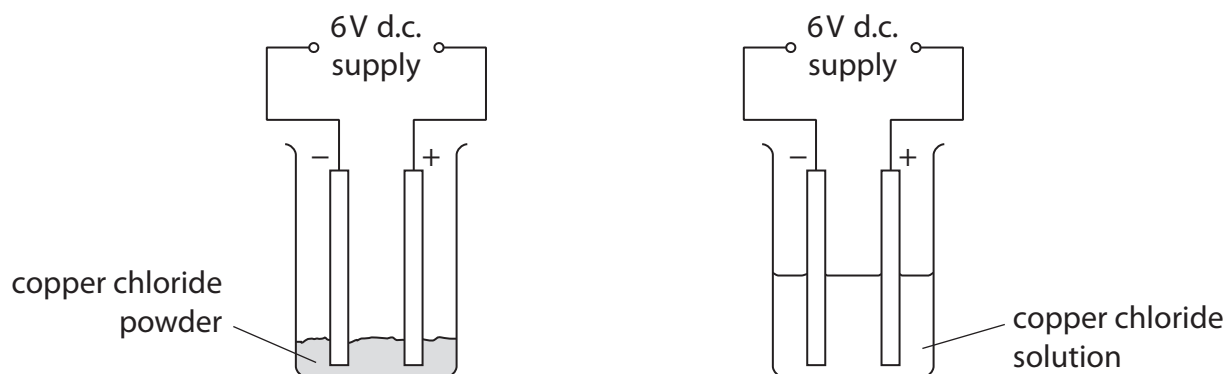
(2)



*(e) Carbon electrodes were placed in copper chloride powder.

Some more copper chloride was dissolved in water to make a solution and carbon electrodes were placed in this solution.

In both cases the electrodes were connected to a direct current supply.



The following results were obtained.

substance tested	observation at the cathode (-)	observation at the anode (+)
copper chloride powder	no change	no change
copper chloride solution	red-brown solid formed	bubbles of a yellow-green gas



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