Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2024

Double Award Science: Chemistry

Unit 7 Practical Skills
Booklet B
Foundation Tier

GDW73

[GDW73]
FRIDAY 14 JUNE, MORNING

TIME

30 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
You must answer the questions in the spaces provided.
Do not write outside the boxed area on each page or on blank pages.
Complete in black ink only. **Do not write with a gel pen.**
Answer **all four** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 35.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
A Data Leaflet, which includes a Periodic Table of the Elements, is included in this question paper.
You may use a scientific calculator.
Quality of written communication will be assessed in Question **3(a)**.

1 **(a)** When potassium reacts with water, a lilac flame is observed.

(i) State three **other** observations which would be made during this reaction.

1. _____

2. _____

3. _____ [3]

(ii) Complete the word equation for the reaction between **potassium** and **water**.

potassium + water → _____ + _____ [2]

(iii) Calcium also reacts with water but the reaction is less vigorous than when potassium reacts with water.

Put a tick (✓) beside the correct statement below to explain why potassium is more reactive than calcium when reacting with water.

	Tick (✓)
Potassium loses an electron more easily than calcium	
Potassium gains an electron more easily than calcium	

[1]

(b) Some metals, when heated, react with steam to produce a metal oxide and hydrogen.

$$\text{metal} + \text{steam} \rightarrow \text{metal oxide} + \text{hydrogen}$$

For each metal below draw a line from the metal to the correct observations when it reacts with steam.

Metal	Observations
Magnesium	Glows red A black solid is formed
Iron	Orange solid formed
Zinc	Bright white light given off White solid formed Heat given out
	Yellow solid forms and changes to white on cooling

[3]

(c) Describe what is observed when a piece of sodium is freshly cut and exposed to the air.

_____ [1]

[Turn over

2 Mixtures can be separated in the laboratory using a variety of techniques.

(a) A student was given a mixture of sand and water and asked to remove the sand.

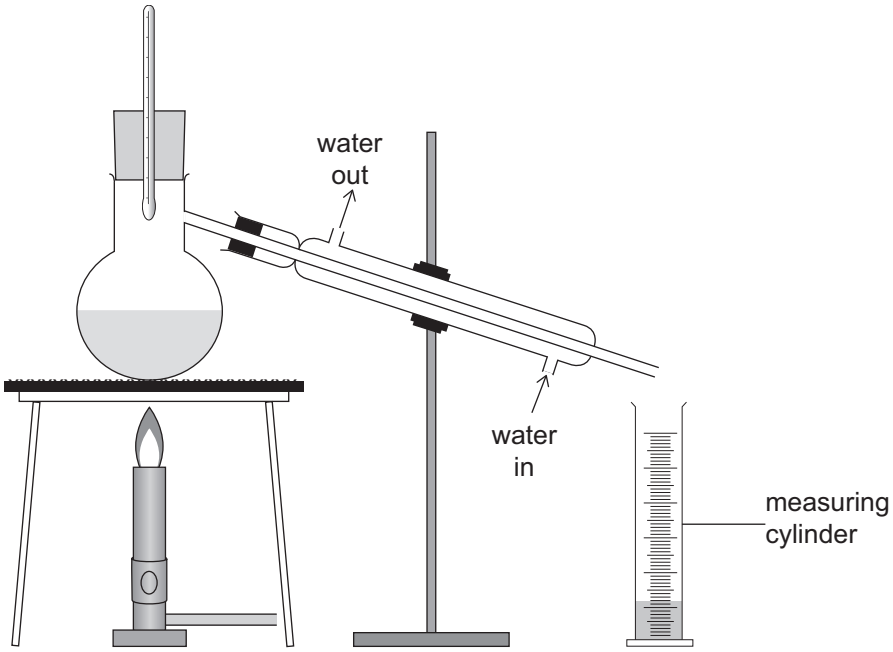
Draw a **diagram** of the assembled apparatus that could be used to separate the sand from the water.

Label your diagram using the following words:

filter funnel **filter paper** **conical flask** **sand** **water**

[5]

(b) Distillation can be carried out in the laboratory. The apparatus used is shown below.



(i) Label the **thermometer**, **condenser** and the **round bottom flask** on the diagram above. [3]

(ii) Explain the purpose of the thermometer.

_____ [1]

[Turn over

3 **(a)** Ethanol can be made by fermentation. Carbon dioxide gas is also produced.

State the reactants and conditions needed for fermentation to occur.
Describe the test used to confirm the identity of carbon dioxide gas and give the observations for a positive result.

In this question you will be assessed on your written communication skills including the use of specialist scientific terms.

State the reactants and conditions needed for fermentation to occur.

Describe the test used to confirm the identity of carbon dioxide gas and give the observations for a positive result.

[6]

(b) When ethane is reacted with a plentiful supply of oxygen, **complete combustion** occurs producing water and carbon dioxide.

ethane + oxygen → water + carbon dioxide

(i) To prove that water is produced, anhydrous copper(II) sulfate can be used.

Describe the colour change you would observe when water is added to anhydrous copper(II) sulfate:

from _____ to _____ [2]

(ii) When ethane reacts with a limited supply of oxygen, **incomplete combustion** occurs producing carbon monoxide and water. A black solid may also form.

Suggest the name of the black solid.

_____ [1]

[Turn over

4 **(a)** A solution of magnesium chloride can be prepared by reacting magnesium, magnesium oxide, magnesium hydroxide or magnesium carbonate with hydrochloric acid.

(i) Give **three** observations which occur when magnesium reacts with hydrochloric acid.

1. _____

2. _____

3. _____ [3]

(ii) Complete the word equation below for the reaction between magnesium hydroxide and hydrochloric acid.

magnesium hydroxide + hydrochloric acid → magnesium chloride + _____

[1]

(iii) What is the colour of solid magnesium chloride?

_____ [1]

(b) **(i)** The hydrochloric acid had a pH value of 2. Circle the answer below which correctly describes hydrochloric acid.

weak acid **neutral** **strong acid**

[1]

(ii) What piece of equipment could be used to **accurately** measure the pH of the hydrochloric acid, to one decimal place?

_____ [1]

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Question Number	**Marks**
1	
2	
3	
4	
Total Marks	

Examiner Number

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SYMBOLS OF SELECTED IONS

Positive ions

Name	Symbol
Ammonium	NH_4^+
Chromium(III)	Cr^{3+}
Copper(II)	Cu^{2+}
Iron(II)	Fe^{2+}
Iron(III)	Fe^{3+}
Lead(II)	Pb^{2+}
Silver	Ag^+
Zinc	Zn^{2+}

Negative ions

Name	Symbol
Butanoate	$C_3H_7COO^-$
Carbonate	CO_3^{2-}
Dichromate	$Cr_2O_7^{2-}$
Ethanoate	CH_3COO^-
Hydrogencarbonate	HCO_3^-
Hydroxide	OH^-
Methanoate	$HCOO^-$
Nitrate	NO_3^-
Propanoate	$C_2H_5COO^-$
Sulfate	SO_4^{2-}
Sulfite	SO_3^{2-}

SOLUBILITY IN COLD WATER OF COMMON SALTS, HYDROXIDES AND OXIDES

Soluble
All sodium, potassium and ammonium salts
All nitrates
Most chlorides, bromides and iodides EXCEPT silver and lead chlorides, bromides and iodides
Most sulfates EXCEPT lead and barium sulfates Calcium sulfate is slightly soluble

Insoluble
Most carbonates EXCEPT sodium, potassium and ammonium carbonates
Most hydroxides EXCEPT sodium, potassium and ammonium hydroxides
Most oxides EXCEPT sodium, potassium and calcium oxides which react with water

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Data Leaflet

Including the Periodic Table of the Elements

For the use of candidates taking
Science: Chemistry,
Science: Double Award
or Science: Single Award

Copies must be free from notes or additions of any kind. No other type of data booklet or information sheet is authorised for use in the examinations

gcse examinations

chemistry

11984.02

THE PERIODIC TABLE OF ELEMENTS

Group

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	64 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	210 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	285 Cn Copernicium 112						

140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	145 Pm Promethium 61	150 Sm Samarium 62	152 Eu Europium 63	157 Gd Gadolinium 64	159 Tb Terbium 65	162 Dy Dysprosium 66	165 Ho Holmium 67	167 Er Erbium 68	169 Tm Thulium 69	173 Yb Ytterbium 70	175 Lu Lutetium 71
232 Th Thorium 90	231 Pa Protactinium 91	238 U Uranium 92	237 Np Neptunium 93	242 Pu Plutonium 94	243 Am Americium 95	247 Cm Curium 96	245 Bk Berkelium 97	251 Cf Californium 98	254 Es Einsteinium 99	253 Fm Fermium 100	256 Md Mendelevium 101	254 No Nobelium 102	257 Lr Lawrencium 103

* 58 – 71 Lanthanum series
† 90 – 103 Actinium series

a
X
b

a = relative atomic mass (approx)
x = atomic symbol
b = atomic number

11984.02