00704243

Centre Number	Candidate Number

Candidate Name

EXAMINATIONS COUNCIL OF ZAMBIA

Examination for School Certificate Ordinary Level

Science 5124/3

Paper 3 Practical Test

Monday 21 NOVEMBER 2016

Additional Materials:
Electronic calculator (non-programmable) and Mathematical tables
Soft clean eraser
Soft pencil (type B or HB is recommended)

Time 1 hour 30 minutes

Instructions to Candidates

Write your **name**, **centre number** and **candidate number** at the top of this page and on all separate answer paper used.

There are **four questions** in this question paper divided into sections **A** and **B**.

Answer all questions by writing your answers in the spaces provided in this question paper.

Information for candidates

The number of marks is given in brackets [ ] at the end of each question or part question.

Qualitative analysis notes are on page 7.

The **Periodic Table** is on page 8.

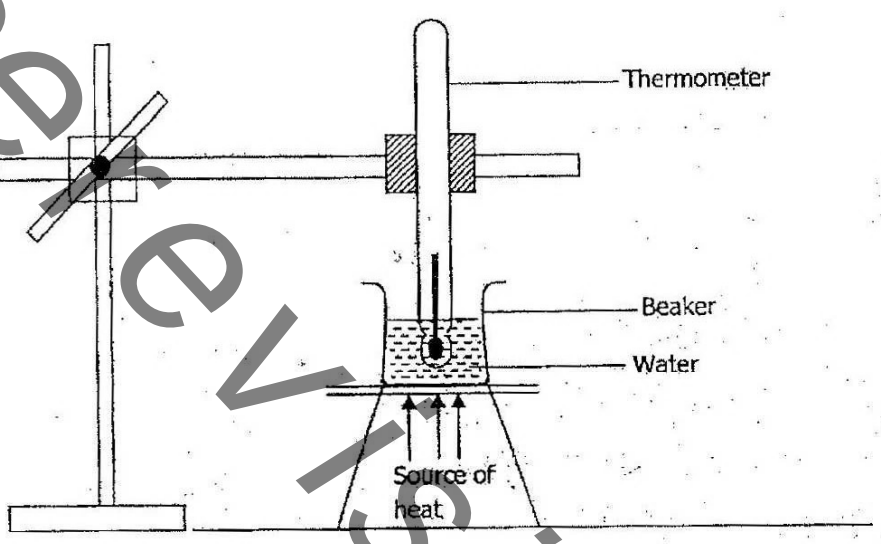
Cell phones are not allowed in the Examination room.

Question		Examiner's Use
Section A	1	
	2	
Section B	3	
	4	
Total		

This question paper consists of 8 printed pages

Answer all questions in this section

1 In this experiment you are required to determine the change in temperature of water during heating and cooling. The experiment has been set-up for you as shown below.



(a) Record the temperature of water before heating.

..... [1]

(b) Place the source of heat provided at the bottom of the beaker and record the temperature change every minute for at least five minutes.

Enter the results in the table below.

Time/minutes					
Temp/°C					

[3]

(c) Remove the source of heat from the beaker and record the temperature change every minute for at least five minutes. Construct a table and record the results obtained.

[4]

(d) State the method of heat transfer from water to the thermometer.

..... [1]

(e) State one precaution you took in this experiment.

.....

..... [1]

[Total: 10 marks]

2 In this experiment, you are required to determine the density of ball bearings. You are provided with six ball bearings and a measuring cylinder containing water and each ball bearing has a mass of 10.0g

(a) State the volume of the water provided in the measuring cylinder.

Volume $\mathbf{V_1}$ = ... [1]

(b) Place the six ball bearings completely in the volume of water provided. State the new volume of water

Volume $\mathbf{V_2}$ = ... [1]

(c) Work out the volume of the six ball bearings. Show your working.

Volume of six ball bearings = ... [2]

(d) Calculate the density of

(i) six ball bearings (show your working).

[2]

(ii) one ball bearing (show your working).

[2]

(e) Compare the densities of the six ball bearings and one ball bearing. Explain your observation.

.....

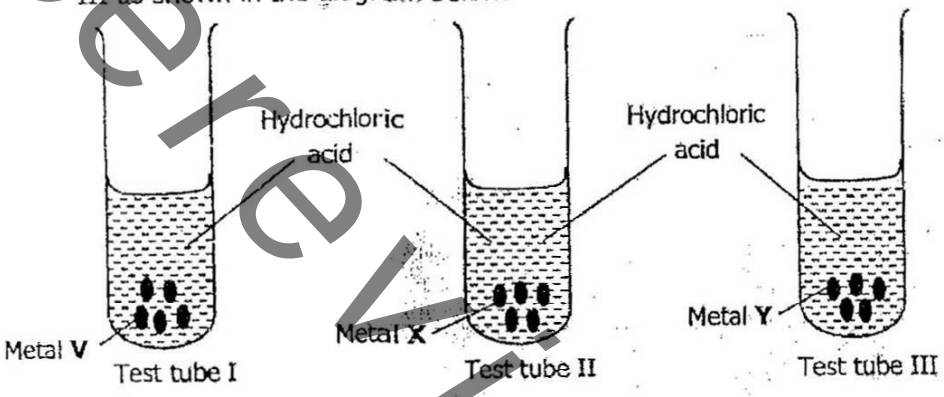
..... [2]

[Total: 10 marks]

Section B (CHEMISTRY) [20 marks]
Answer all questions in this section

3 In this experiment you will investigate the reactivity of metals with dilute hydrochloric acid.
Use about half a spatula-full of each of the metals **V**, **X** and **Y**.

(a) Place metal **V** in test tube I, metal **X** in test tube II and metal **Y** in test tube III as shown in the diagram below.



To each of the three test tubes containing the metals, add about $2cm^3$ of hydrochloric acid provided.
Record your observations in the space below:

Test tube I = ...

Test tube II = ...

Test tube III = ... [3]

(b) Arrange the metals **V**, **X** and **Y** in increasing order of their reactivity.

..... [2]

(c) Suggest the method of extraction of metal **X**.

..... [1]

(d) Assuming metal **V** has a valence of 2, write a balanced chemical equation for its reaction with dilute hydrochloric acid using symbol **V**.

..... [2]

(e) Describe the identity test for the gaseous product in this experiment.

..... [2]

[Total: 10 marks]

4 In this experiment, you will carry out tests on solution **Z** to identify the cations and anions present in this compound.

TEST NO.	TEST	OBSERVATIONS
(a) (i)	To about $2cm^3$ portion of solution **Z** in a test tube, add a few drops of aqueous sodium hydroxide.	
(ii)	Add excess aqueous sodium hydroxide to the test tube in **(a) (i)**	[2]
(b) (i)	To about $2cm^3$ fresh portion of solution **Z** in a test tube, add a few drops of aqueous ammonia.	
(ii)	Add excess aqueous ammonia to the test tube in **(b) (i)**	[2]
(c)	To about $2cm^3$ fresh portion of solution **Z**, add acidified silver nitrate.	[1]
(d)	To about $2cm^3$ fresh portion of solution **Z**, add acidified Barium nitrate.	[1]

(e) (i) Name the cation present in solution **Z** ..... [1]

(ii) Write the formula of the anion present in Solution **Z**.

..... [1]

(iii) Which test number was used to identify the anion in **Z**?

..... [1]

(iv) Write the chemical formula of compound Z.

..... [1]

[Total:10 marks]

DATA SHEET
The Periodic Table of the Elements

Group I	II											III	IV	V	VI	VII	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 Sulphur 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	Tc Tchnetium 43	104 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 Mecury 80	204 Tl Thallium 81	207 Pb lead 82	209 Bi Bismuth 83	Po Polonium 84	At Astatine 85	Rn Radon 86
Fr Francium 87	226 Ra Radium 88	227 Ac Actinium 89 +															

*58-71 Lanthanoid series
+90-103 Actinoid series

140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	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	Pa Protactinium 91	238 U Uranium 92	Np Neptunium 93	Pu Plutonium 94	Am Americium 95	Cm Curium 96	Bk Berkelium 97	Cf Californium 98	Es Einsteinium 99	Fm Fermium 100	Md Mendelevium 101	No Nobelium 102	Lr Lawrencium 103

Key: a X b

a = relative atomic mass
X = atomic symbol
b = proton (atomic) number

The volume of one mole of any gas is 24 dm^3 at room temperature and pressure (r.t.p.).

NA = 6.0×10^{23}/mol; 1F = 96500C.