

007044253

Centre Number	Candidate Number
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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 Zec 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

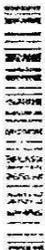
The number of marks is given in brackets [] at the end of each question or part question.

Qualitative analysis notes are on page 7.

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

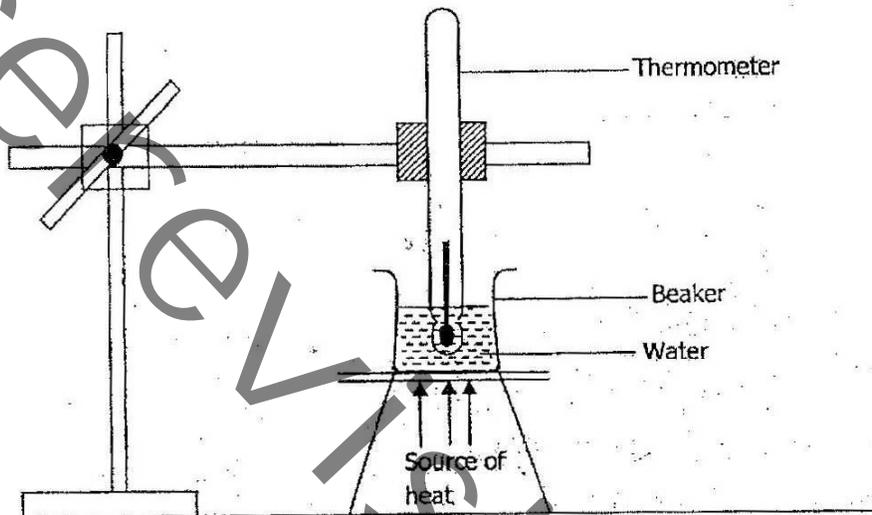
Cell phones are not allowed in the Examination room.

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



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 V_1 = [1]

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

Volume 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]

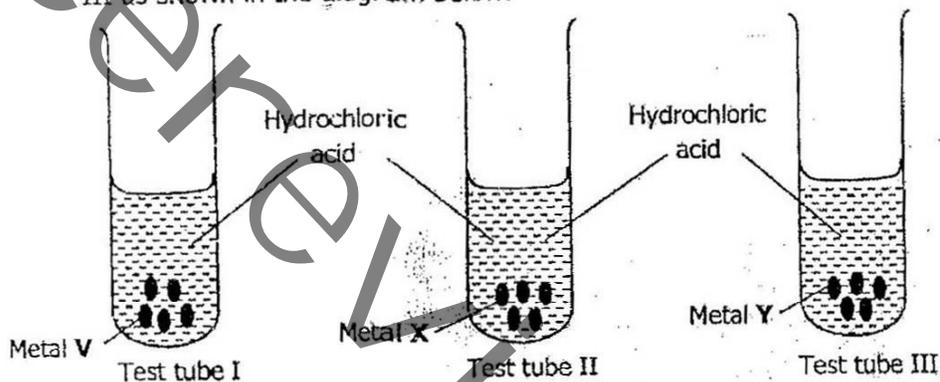
Section B (CHEMISTRY) [20 marks]

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 2cm³ 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) (ii)	To about 2cm ³ portion of solution Z in a test tube, add a few drops of aqueous sodium hydroxide. Add excess aqueous sodium hydroxide to the test tube in (a) (i)	[2]
(b) (i) (ii)	To about 2cm ³ fresh portion of solution Z in a test tube, add a few drops of aqueous ammonia. 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
7	Li Lithium 3	1	H Hydrogen 1	11	12	14	16	19	2
9	Be Beryllium 4	2	He Helium 2	10	18	36	54	86	
11	Na Sodium 11	13	B Boron 5	14	15	16	17	18	
12	Mg Magnesium 12	15	C Carbon 6	16	17	18	19	20	
13	Al Aluminium 13	17	N Nitrogen 7	18	19	20	21	22	
14	Si Silicon 14	19	O Oxygen 8	20	21	22	23	24	
15	P Phosphorus 15	21	F Fluorine 9	22	23	24	25	26	
16	S Sulphur 16	23	Ne Neon 10	24	25	26	27	28	
17	Cl Chlorine 17	25	Ar Argon 18	26	27	28	29	30	
18	K Potassium 19	27	Kr Krypton 36	28	29	30	31	32	
19	Ca Calcium 20	29	Xe Xenon 54	30	31	32	33	34	
20	Sc Scandium 21	31	Rn Radon 86	32	33	34	35	36	
21	Ti Titanium 22	33		34	35	36	37	38	
22	V Vanadium 23	35		36	37	38	39	40	
23	Cr Chromium 24	37		38	39	40	41	42	
24	Mn Manganese 25	39		40	41	42	43	44	
25	Fe Iron 26	41		42	43	44	45	46	
26	Co Cobalt 27	43		44	45	46	47	48	
27	Ni Nickel 28	45		46	47	48	49	50	
28	Cu Copper 29	47		48	49	50	51	52	
29	Zn Zinc 30	49		50	51	52	53	54	
30	Ga Gallium 31	51		52	53	54	55	56	
31	Ge Germanium 32	53		54	55	56	57	58	
32	As Arsenic 33	55		56	57	58	59	60	
33	Se Selenium 34	57		58	59	60	61	62	
34	Br Bromine 35	59		60	61	62	63	64	
35	Kr Krypton 36	61		62	63	64	65	66	
36	Rb Rubidium 37	63		64	65	66	67	68	
37	Sr Strontium 38	65		66	67	68	69	70	
38	Y Yttrium 39	67		68	69	70	71	72	
39	Zr Zirconium 40	69		70	71	72	73	74	
40	Nb Niobium 41	71		72	73	74	75	76	
41	Mo Molybdenum 42	73		74	75	76	77	78	
42	Tc Technetium 43	75		76	77	78	79	80	
43	Ru Ruthenium 44	77		78	79	80	81	82	
44	Rh Rhodium 45	79		80	81	82	83	84	
45	Pd Palladium 46	81		82	83	84	85	86	
46	Ag Silver 47	83		84	85	86	87	88	
47	Cd Cadmium 48	85		86	87	88	89	90	
48	Hg Mercury 80	87		88	89	90	91	92	
49	Tl Thallium 81	89		90	91	92	93	94	
50	Pb Lead 82	91		92	93	94	95	96	
51	Bi Bismuth 83	93		94	95	96	97	98	
52	Po Polonium 84	95		96	97	98	99	100	
53	At Astatine 85	97		98	99	100	101	102	
54	Rn Radon 86	99		100	101	102	103	104	
55	Fr Francium 87	101		102	103	104	105	106	
56	Ba Barium 56	103		104	105	106	107	108	
57	La Lanthanum 57	105		106	107	108	109	110	
58	Ce Caesium 58	107		108	109	110	111	112	
59	Pr Praseodymium 59	109		110	111	112	113	114	
60	Nd Neodymium 60	111		112	113	114	115	116	
61	Pm Promethium 61	113		114	115	116	117	118	
62	Sm Samarium 62	115		116	117	118	119	120	
63	Eu Europium 63	117		118	119	120	121	122	
64	Gd Gadolinium 64	119		120	121	122	123	124	
65	Tb Terbium 65	121		122	123	124	125	126	
66	Dy Dysprosium 66	123		124	125	126	127	128	
67	Ho Holmium 67	125		126	127	128	129	130	
68	Er Erbium 68	127		128	129	130	131	132	
69	Tm Thulium 69	129		130	131	132	133	134	
70	Yb Ytterbium 70	131		132	133	134	135	136	
71	Lu Lutetium 71	133		134	135	136	137	138	
72	Hf Hafnium 72	135		136	137	138	139	140	
73	Ta Tantalum 73	137		138	139	140	141	142	
74	W Tungsten 74	139		140	141	142	143	144	
75	Re Rhenium 75	141		142	143	144	145	146	
76	Os Osmium 76	143		144	145	146	147	148	
77	Ir Iridium 77	145		146	147	148	149	150	
78	Pt Platinum 78	147		148	149	150	151	152	
79	Au Gold 79	149		150	151	152	153	154	
80	Hg Mercury 80	151		152	153	154	155	156	
81	Tl Thallium 81	153		154	155	156	157	158	
82	Pb Lead 82	155		156	157	158	159	160	
83	Bi Bismuth 83	157		158	159	160	161	162	
84	Po Polonium 84	159		160	161	162	163	164	
85	At Astatine 85	161		162	163	164	165	166	
86	Rn Radon 86	163		164	165	166	167	168	
87	Fr Francium 87	165		166	167	168	169	170	
88	Ra Radium 88	167		168	169	170	171	172	
89	Ac Actinium 89	169		170	171	172	173	174	
90	Th Thorium 90	171		172	173	174	175	176	
91	Pa Protactinium 91	173		174	175	176	177	178	
92	U Uranium 92	175		176	177	178	179	180	
93	Np Neptunium 93	177		178	179	180	181	182	
94	Pu Plutonium 94	179		180	181	182	183	184	
95	Am Americium 95	181		182	183	184	185	186	
96	Cm Curium 96	183		184	185	186	187	188	
97	Bk Berkelium 97	185		186	187	188	189	190	
98	Cf Californium 98	187		188	189	190	191	192	
99	Es Einsteinium 99	189		190	191	192	193	194	
100	Fm Fermium 100	191		192	193	194	195	196	
101	Md Mendelevium 101	193		194	195	196	197	198	
102	No Nobelium 102	195		196	197	198	199	200	
103	Lr Lawrencium 103	197		198	199	200	201	202	

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

Key
 $\begin{matrix} a \\ X \\ b \end{matrix}$
 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.).

$NA = 6.0 \times 10^{23} / \text{mol}$; $1F = 96500C$.

Chemistry/5070/1/2016 a