

EXAMINATIONS COUNCIL OF ZAMBIA

Examination for General Certificate of Education Ordinary Level

Chemistry

5070/1

Paper 1 Multiple Choice

Tuesday

1 AUGUST 2017

Additional Information:

Electronic calculator (non programmable) and / or Mathematical tables

Multiple Choice Answer Sheet

Soft clean eraser

Soft pencil (type B or HB is recommended)

Time 1 hour

Instructions to Candidates

Do not open this question paper until you are told to do so.

Look at the left hand side of your answer sheet. Ensure that your name, the school/centre name and subject paper are **printed**. Also ensure that the subject code, paper number, centre code, your examination number and the year are printed and shaded. Do not change the already printed information.

There are **forty** questions in this paper. Answer all questions. For each question there are four possible answers, **A, B, C** and **D**. Choose the one you consider correct and record your choice in **soft pencil** on the separate answer sheet provided.

Read very carefully the instructions on the Answer Sheet.

Information for Candidates

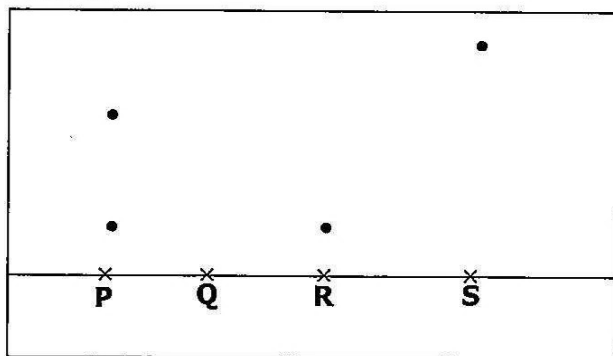
Each correct answer will score one mark.

Any rough working should be done in this question paper.

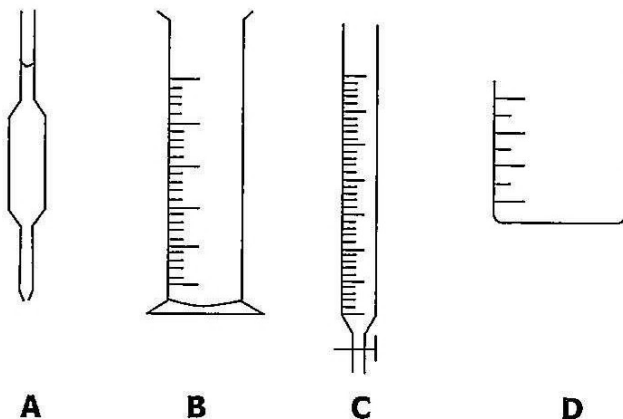
The **Periodic Table** is printed on page 12.

Cell phones are not allowed in the examination room.

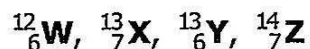
- 1 Which description shows the particles of copper at r.t.p?
A Stationary and close together
B Stationery and randomly arranged
C Vibrating and in a regular arrangement
D Vibrating and in a random arrangement
- 2 Which of the following pairs of gases would diffuse at the same rate under the same conditions of temperature and pressure?
A Carbon dioxide and propane
B Helium and argon
C Hydrogen and ammonia
D Nitrogen and oxygen
- 3 The diagram shows the results of the chromatography of the four substances **P**, **Q**, **R** and **S**.



- What conclusion can be made from the above result?
- A** **P** was a pure substance
B **Q** was insoluble in the solvent
C **R** was the most soluble in the solvent
D **S** was the least soluble in the solvent
- 4 Which of the following apparatus is used for measuring out an exact volume of a liquid?



- 5 The symbols of four elements are given as:



Which of the following terms best describes **X** and **Z**?

- A** Allotropes
B Alloys
C Isomers
D Isotopes
- 6 The electronic configuration of an ion is 2, 8. What could this ion be?

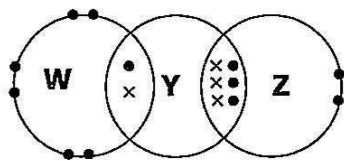
	Na^+	O^{2-}
A	✓	✓
B	x	✓
C	✓	x
D	x	x

KEY

✓ = Yes

x = No

- 7 The electronic structure of a compound is shown below.



In which Groups of the Periodic Table do the elements **W**, **Y** and **Z** belong?

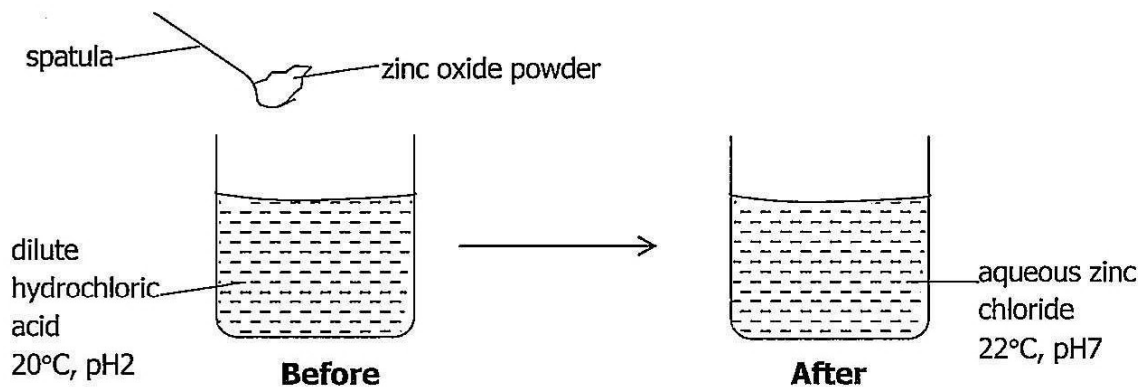
	W	Y	Z
A	1	3	5
B	1	4	3
C	7	4	3
D	7	4	5

- 8 The pH of an aqueous solution of ethanoic acid is found to be 4. The pH of this solution can be increased by adding ...
- A** aqueous sodium hydroxide.
B copper turnings.
C copper (II) chloride crystals.
D sodium chloride crystals.
- 9 The final reaction mixture in a beaker contains silver chloride and excess hydrochloric acid. A sample of pure silver chloride could best be obtained from this mixture by ...
- A** allowing the precipitate to settle, decanting the solution and drying the precipitate.
B evaporating the mixture to dryness.
C filtering, washing the precipitate with distilled water and drying it.
D filtering and evaporating the filtrate to dryness.

- 10** Aqueous barium chloride is added to a solution of zinc sulphate. Which reaction takes place?
- A** Neutralization
 - B** Oxidation
 - C** Precipitation
 - D** Reduction
- 11** Which of the salts below can be prepared by an acid-alkali titration method?
- A** CuSO_4
 - B** MgCl_2
 - C** NaNO_3
 - D** $\text{Zn(NO}_3)_2$
- 12** Deduce the empirical formula of a compound formed by reacting 1.15g of sodium with 0.8g of Sulphur.
- A** Na_4S_2
 - B** NaS
 - C** NaS_2
 - D** Na_2S
- 13** The relative atomic mass of chlorine is 35.5. What is the mass of 2 moles of chlorine atoms?
- A** 17.8g
 - B** 35.5g
 - C** 71.0g
 - D** 142g
- 14** 25.0cm^3 of 1.00mol/dm^3 potassium hydroxide just neutralizes 20.0cm^3 of solution of hydrochloric acid. What is the concentration of the acid?
- A** 1.25mol/dm^3
 - B** 1.00mol/dm^3
 - C** 0.800mol/dm^3
 - D** 0.0220mol/dm^3
- 15** The formula for calcium perchlorate is $\text{Ca(ClO}_4)_2$. Which one of the following is a correct chemical formula for sodium perchlorate?
- A** $\text{Na(ClO}_4)_2$
 - B** NaClO_4
 - C** Na_2ClO_4
 - D** Na_4ClO_2

- 16** Which one of the following is likely to be a binary compound?
A Calcium hydroxide
B Iron (II) sulphate
C Potassium sulphide
D Sodium carbonate
- 17** In which of the following changes is the nitrogen reduced?
A NH_3 to NO
B NH_3 to NO_3^-
C N^{3-} to N_2
D N_2 to NH_3
- 18** Ammonia is made by a reversible reaction between nitrogen and hydrogen.

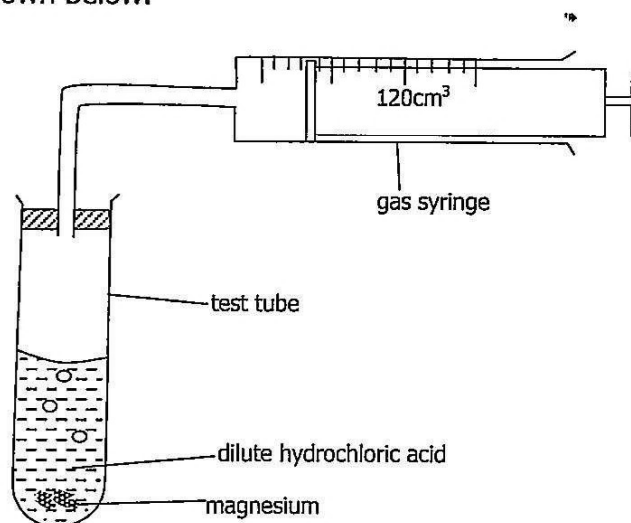
$$\text{N}_{2(\text{g})} + 3\text{H}_{2(\text{g})} \rightleftharpoons 2\text{NH}_{3(\text{g})} \quad \Delta H = -92\text{KJ/mol}$$
 What is the effect of reducing the temperature to the equilibrium reaction above?
A Less ammonia is formed.
B Less heat is produced.
C More ammonia is formed.
D More nitrogen is formed.
- 19** The diagram below shows an experiment.



Which terms describe the experiment?

	Exothermic	Neutralisation
A	✓	✓
B	✓	x
C	x	✓
D	x	x

- 20 With the other factors being constant, which of the following would give the fastest reaction when calcium carbonate reacts with dilute hydrochloric acid, HCl?
- A 100g of HCl in 1dm³
 - B 50g of HCl in 500dm³
 - C 20g of HCl in 50dm³
 - D 20g of HCl in 100dm³
- 21 Which one of the following is true about endothermic reactions?
- A Bonds in the products are stronger than those in the reactants.
 - B Bonds in the reactants are stronger than those in the products.
 - C Enthalpy change is negative.
 - D Reactants have higher enthalpy than products.
- 22 An excess of hydrochloric acid is added to 0.10 mol of magnesium in the apparatus shown below.

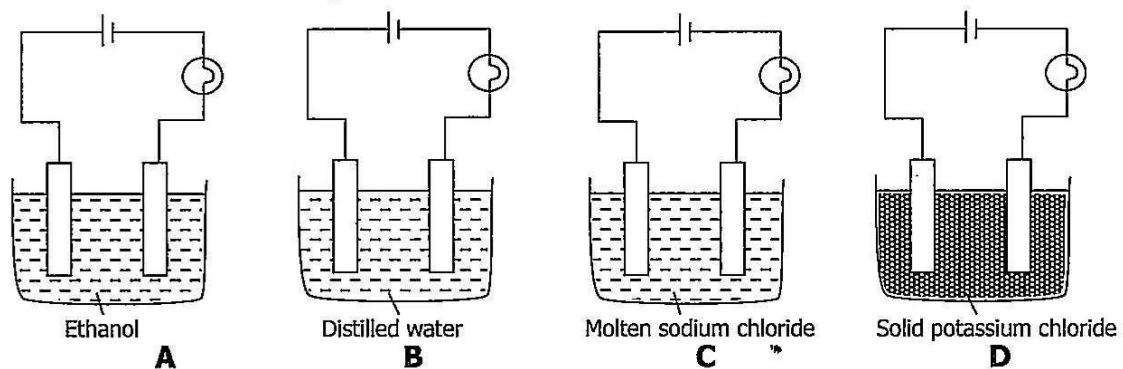


- Why is it impossible to measure the total volume of hydrogen gas produced at r.t.p using this apparatus?
- A Hydrogen is less dense than air.
 - B Some hydrogen reacts with the hydrochloric acid.
 - C There is air in the tube.
 - D The volume of hydrogen formed is greater than 120cm³.
- 23 An element **X** forms an ionic compound with lithium. **X** also forms a compound with hydrogen. Whose aqueous solution is strongly acidic. The element **X**, is most likely to be in the same Group of the Periodic Table as ...
- A aluminium.
 - B astatine.
 - C potassium.
 - D Sulphur.

24 Which period of the Periodic Table has the highest number of electrons?

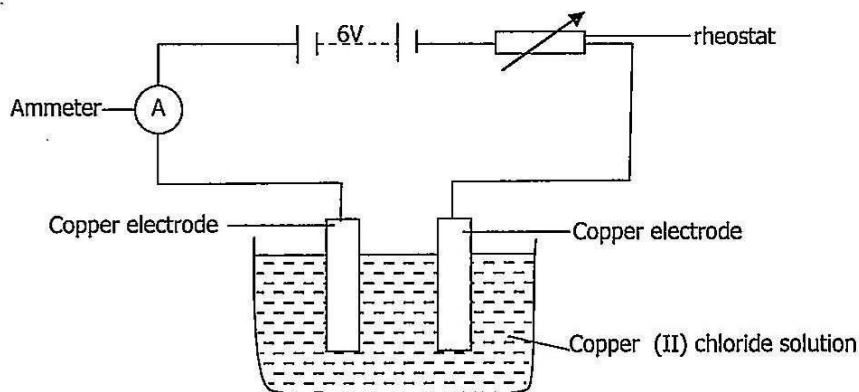
- A Period 2
- B Period 4
- C Period 6
- D Period 7

25 Four circuits were set up as shown below.



In which of these circuits will the bulb light?

26 The experimental set up below was used to measure the quantity of electricity required to deposit 1 mole of copper atoms.



Which of the following pieces of apparatus in addition to those shown in the diagram, is needed to successfully carry out the experiment?

- A Bulb
- B Clock
- C Thermometer
- D Voltmeter

- 27** An element **X** has an atomic mass of 88. When a current of 0.5A was passed through the fused chloride of **X** for 32 minutes and 10 seconds, 0.44g of **X** was deposited on the cathode. Find the number of Faradays needed to liberate one mole of **X**.

(1 Faraday = 96 500C)

- A** 0.2
B 0.4
C 2.0
D 4.0
- 28** In order to electroplate a metallic copper spoon with nickel, what must be the anode, cathode and electrolyte?

	Anode	Cathode	Electrolyte
A	Nickel	Spoon	Nickel(II)Sulphate
B	Spoon	Nickel	Nickel(II)Sulphate
C	Nickel	Spoon	Copper(II)Sulphate
D	Spoon	Nickel	Copper(II)Sulphate

- 29** Which two metals make up brass?
A Antimony and Lead
B Iron and Zinc
C Lead and Tin
D Zinc and Copper
- 30** The table below shows some metals and their uses. For which metal is the correct reason given for the stated use?

	Metal	Use	Reason
A	Zinc	Galvanising iron	Gets reduced easily
B	Iron	Manufacturing stainless steel	It easily rusts
C	Copper	Electrical wiring	Good conductor of heat
D	Aluminium	Kitchen utensils	Does not corrode easily

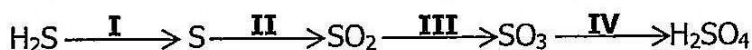
- 31** The metals iron, lead, magnesium and zinc were added to dilute sulphuric acid. Which metal would produce more bubbles of hydrogen gas?
A Iron
B Lead
C Magnesium
D Zinc

- 32 In which of the following mixtures would the metal oxide be reduced when the mixture is heated?
- A** Aluminium oxide and lead
B Iron (II) oxide and copper
C Magnesium oxide and zinc
D Zinc oxide and aluminium

- 33 Which list shows both the correct source and the correct effect of the named pollutant?

	Pollutant	Source	Effect
A	Carbon monoxide	Incomplete combustion of carbon-containing materials	Global warming
B	Oxides of nitrogen	Decaying vegetable matter	Global warming
C	Ozone	Photochemical reactions	Acid rain
D	Sulphur dioxide	Volcanoes	Acid rain

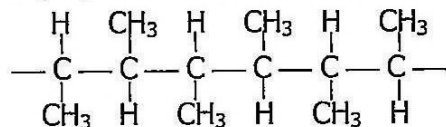
- 34 Sulphuric acid is manufactured by contact process through the following stages.



Identify the stage where the catalyst, vanadium (V) oxide is used.

- A** Stage **I**
B Stage **II**
C Stage **III**
D Stage **IV**
- 35 The alkane, C_8H_{18} , could be obtained from the higher member of the family, $\text{C}_{15}\text{H}_{32}$, by the process of ...
- A** cracking.
B dehydration.
C dehydrogenation.
D fermentation.

- 36 A polymer has the structure shown below



From which monomer is the above polymer made?

- A** $\text{CH}_3 - \text{CH} = \text{CH} - \text{CH}_3$
B $\begin{array}{c} \text{CH}_3 - \text{CH} - \text{CH}_3 \\ | \\ \text{CH}_3 \end{array}$
C $\text{CH}_2 = \text{CH} - \text{CH}_3$
D $\text{CH}_3 - \text{CH}_2 - \text{CH}_3$

40 Which of the following fibres occurs naturally?

- 1 Wool
 - 2 Terylene
 - 3 Nylon
 - 4 Cotton
- A** 1 and 2 only
- B** 1 and 3 only
- C** 2 and 3 only
- D** 2 and 4 only

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	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	65 Zn Zinc 30	
85 Rb Rubidium 37	88 Sr Strontium 38	89 Y Yttrium 39	91 Zr Zirconium 40	93 Nb Niobium 41	96 Mo Molybdenum 42	104 Ru Ruthenium 44	106 Pd Palladium 46	112 Cd Cadmium 48	115 In Indium 49	
133 Cs Caesium 55	137 Ba Barium 56	139 La Lanthanum 57	178 Hf Hafnium 72	181 Ta Tantalum 73	184 W Tungsten 74	190 Os Osmium 76	195 Pt Platinum 78	201 Hg Mercury 80	204 Tl Thallium 81	
226 Ra Radium 88	227 Ac Actinium 89	*58-71 Lanthanoid series +90-103 Actinoid series								209 Pb lead 82
87 Fr Francium		140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	150 Sm Samarium 62	152 Eu Europium 63	157 Gd Gadolinium 64	162 Dy Dysprosium 66	165 Ho Holmium 67	
		232 Th Thorium 90	141 Pa Protactinium 91	144 Nd Neodymium 60	150 Sm Samarium 62	152 Eu Europium 63	157 Gd Gadolinium 64	162 Dy Dysprosium 66	165 Ho Holmium 67	
		92 U Uranium 92	91 Pa Protactinium 91	93 Np Neptunium 93	94 Pu Plutonium 94	95 Am Americium 95	96 Cm Curium 96	98 Cf Californium 98	99 Es Einsteinium 99	
		101 Md Mendelevium 101	100 Fm Fermium 100	101 Md Mendelevium 101	102 No Nobelium 102	103 Lr Lawrencium 103	104 Rf Rutherfordium 104	106 Hs Hassium 106	108 Ds Darmstadtium 108	
		109 Uu Ununennium 109	108 Hs Hassium 108	109 Uu Ununennium 109	110 Uub Unbibium 110	112 Cn Copernicium 112	113 Nh Nihonium 113	116 Lv Livermorium 116	118 Og Oganesson 118	

The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.).

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

Key

^a X = relative atomic mass

_b X = atomic symbol

X = proton (atomic) number

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