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?

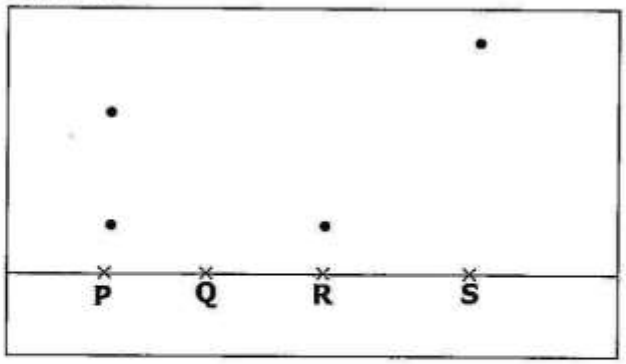
A Carbon dioxide and propane

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?

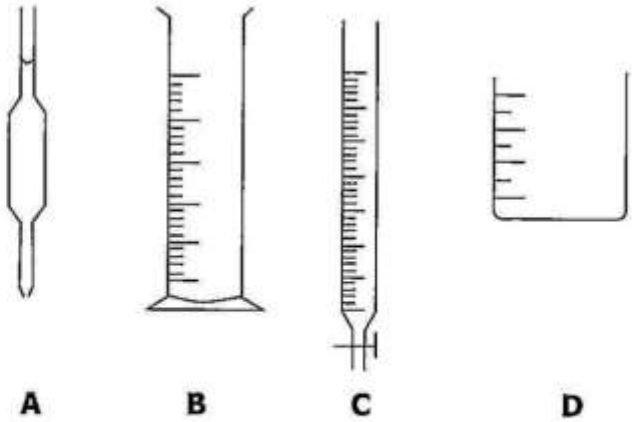
A **P** was a pure substance

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?



A **B** **C** **D**

5 The symbols of four elements are given as:

$^{12}_{6}\mathbf{W}$, $^{13}_{7}\mathbf{X}$, $^{13}_{6}\mathbf{Y}$, $^{14}_{7}\mathbf{Z}$

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?

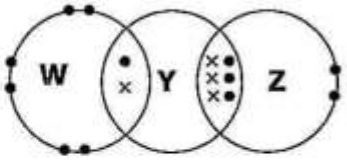
	Na^+	O^{2-}
A	✓	✓
B	x	✓
C	✓	x
D	x	x

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 $Zn(NO_3)_2$

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 $Ca(ClO_4)_2$. Which one of the following is a correct chemical formula for sodium perchlorate?

A $Na(ClO_4)_2$
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.

$N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$ $\Delta H = -92KJ/mol$

What is the effect of reducing the temperature to the equilibrium reaction above?

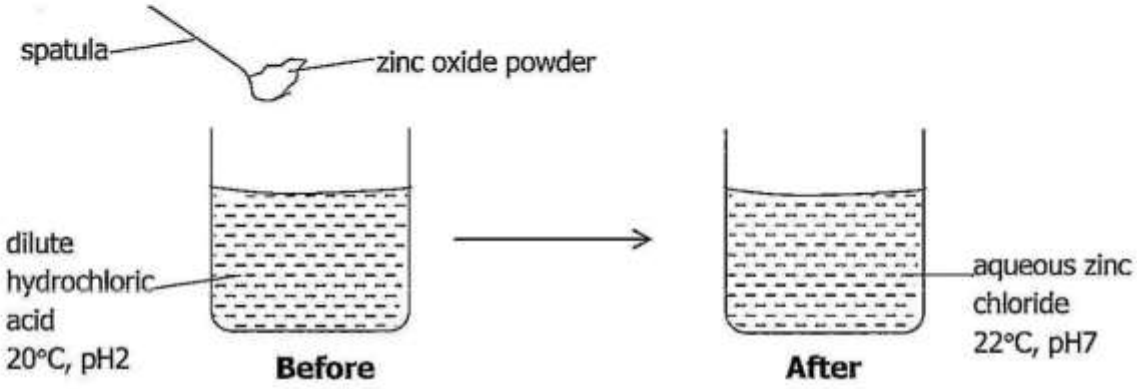
A Less ammonia is formed.

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 $1dm^3$

B 50g of HCℓ in $500dm^3$

C 20g of HCℓ in $50dm^3$

D 20g of HCℓ in $100dm^3$

21 Which one of the following is true about endothermic reactions?

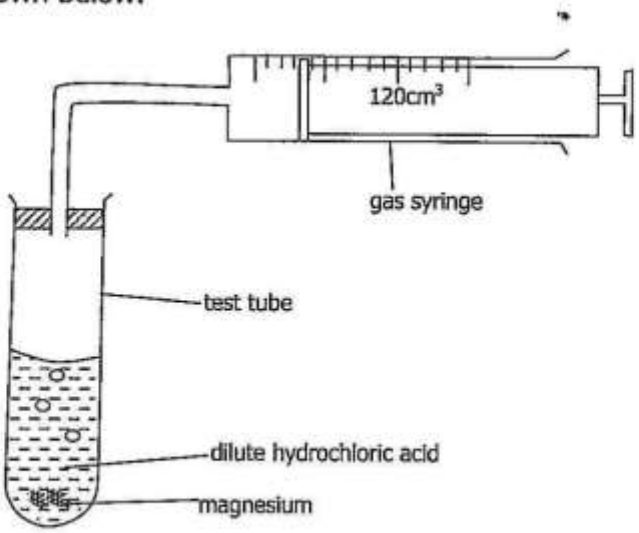
A Bonds in the products are stronger than those in the reactants.

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 $120cm^3$.

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.

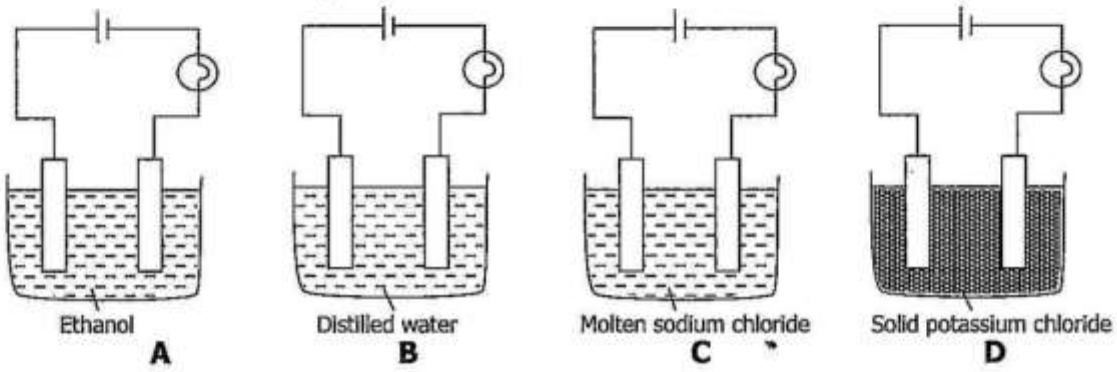
C potassium.

D Sulphur.

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

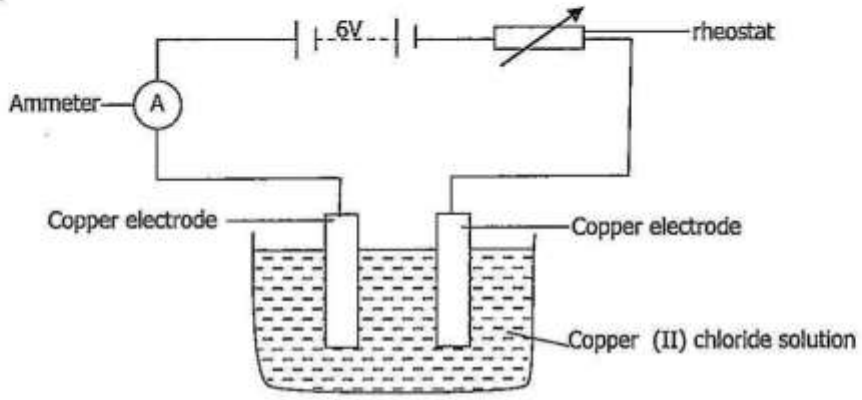
A Period 2
B Period 4
C Period 6
D Period 7

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.

$$H_2S \xrightarrow{\textbf{I}} S \xrightarrow{\textbf{II}} SO_2 \xrightarrow{\textbf{III}} SO_3 \xrightarrow{\textbf{IV}} H_2SO_4$$

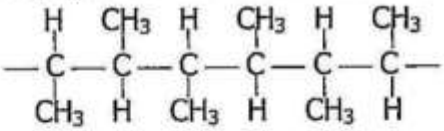
Identify the stage where the catalyst, vanadium (V) oxide is used.

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, $C_{15}H_{32}$, by the process of ...

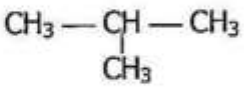
A cracking.
B dehydration.
C dehydrogenation.
D fermentation.

36 A polymer has the structure shown below



From which monomer is the above polymer made?

A $CH_3 - CH = CH - CH_3$

B 

C $CH_2 = CH - CH_3$

D $CH_3 - CH_2 - CH_3$

[Turn over

37 The alcohol C_3H_7OH on oxidation with acidified potassium dichromate (VI) will give a carboxylic acid **R**. What is **R**?

A C_3H_7COOH

B C_2H_5COOH

C CH_3COOH

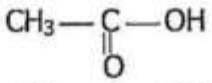
D C_4H_9COOH

38 From the substances given below, identify one which reacts with aqueous bromine.

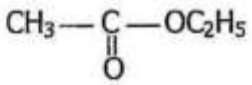
A CH_3CH_2OH

B $CH_2=CHCH_3$

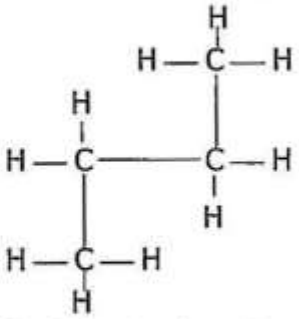
C



D

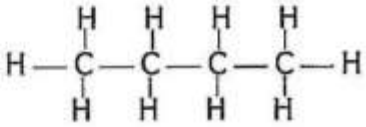


39 The structural formula of a hydrocarbon is given below.

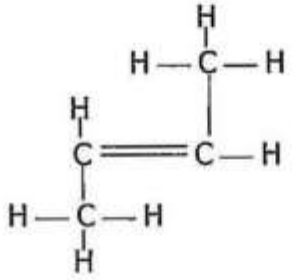


Which of the following is an isomer of the above hydrocarbon?

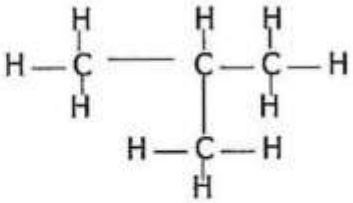
A



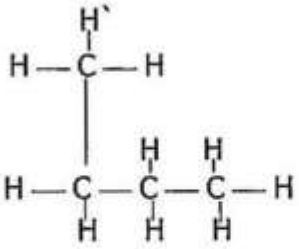
B



C



D



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	Group II											Group III	Group IV	Group V	Group VI	Group VII	Group 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 Technetium 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 Mercury 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 +															

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

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

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.).

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