

# EXAMINATIONS COUNCIL OF ZAMBIA

Examination for School Certificate Ordinary Level

## Chemistry

5070/1

### Paper 1 Multiple Choice

Friday

4 NOVEMBER 2016

#### Additional Materials:

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.

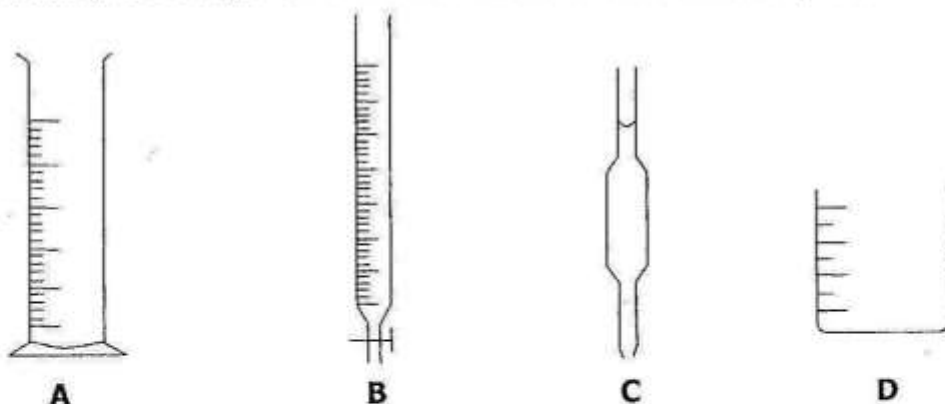
Any rough working should be done in this question paper.

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

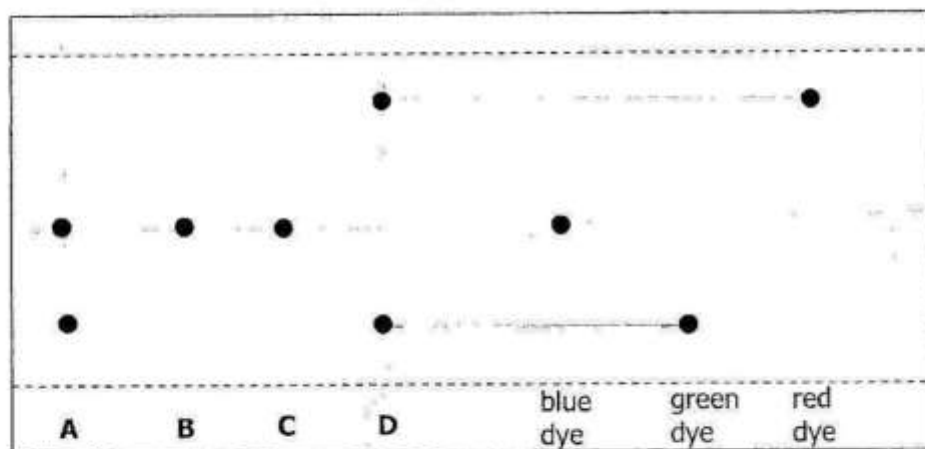
**Cell phones are not allowed in the examination room.**



- 1 What are the basic units of matter in water?  
**A** Atoms  
**B** Electrons  
**C** Ions  
**D** Molecules
- 2 Which of the following is **not** a change of state?  
**A** Condensation  
**B** Filtration  
**C** Sublimation  
**D** Vaporization
- 3 Which piece of apparatus can be used to measure accurately 15.6cm<sup>3</sup> of solution?

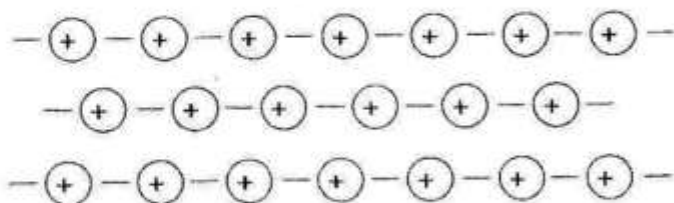


- 4 The diagram below shows a chromatogram obtained using solutions **A**, **B**, **C** and **D** on one side and the dyes blue, green and red on the other side.



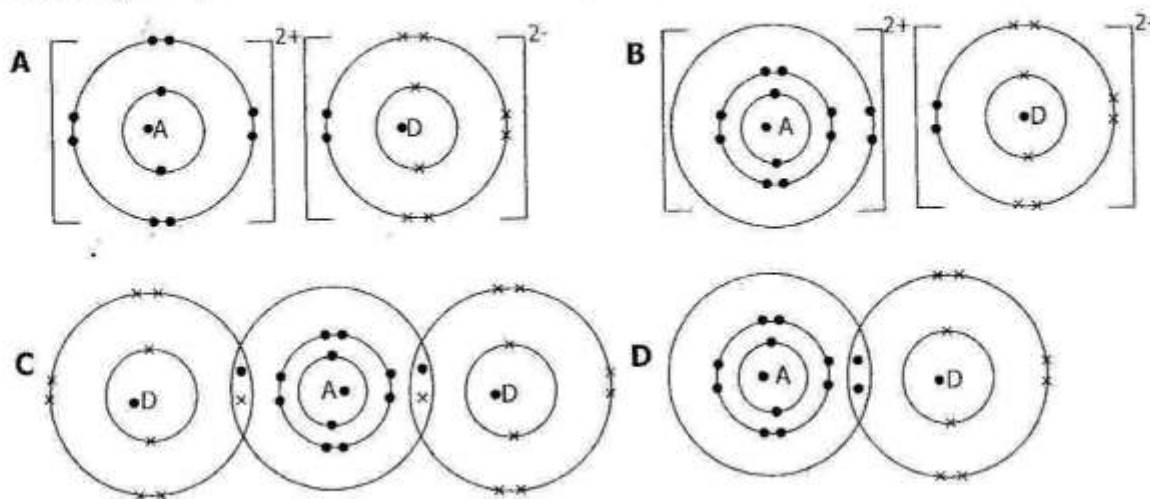
- Which of the solutions **A**, **B**, **C** and **D** contains green and red dyes only?
- 5 The mixture which contains elements only is ...  
**A** air.  
**B** brass.  
**C** mineral water.  
**D** seawater.

- 6 The structure below represents a solid substance at r.t.p.



Which of the following substances is likely to have the structure above?

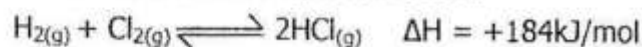
- A Aluminium  
 B Calcium  
 C Lithium  
 D Magnesium
- 7 Elements **A** and **D** have atomic numbers 12 and 8 respectively. When **A** and **D** react together, the structure of the resulting compound is ...



- 8 Which of the following common substances contains ethanoic acid?
- A Cooking oil  
 B Dish washing liquid  
 C Jik  
 D Vinegar
- 9 Which one of the following substances will neutralize both dilute hydrochloric acid and aqueous ammonia solutions?
- A Aluminium hydroxide  
 B Copper (II) hydroxide  
 C Iron (II) hydroxide  
 D Magnesium hydroxide

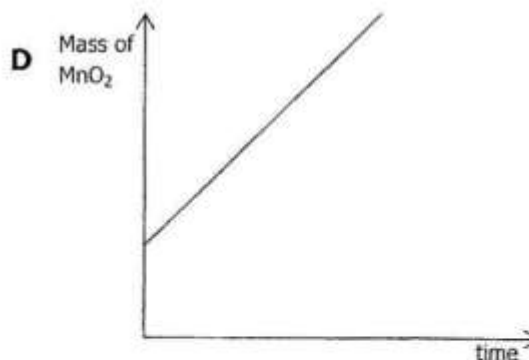
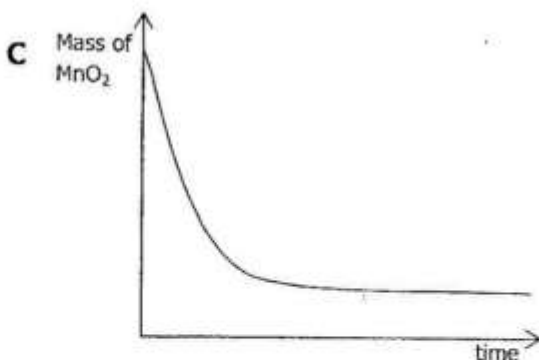
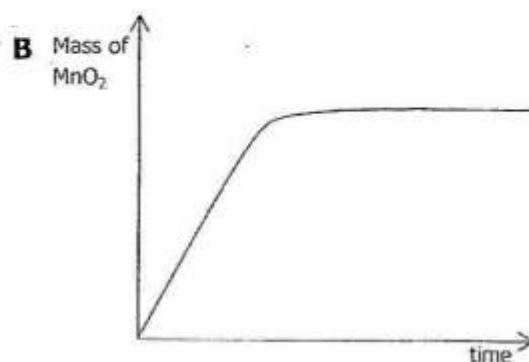
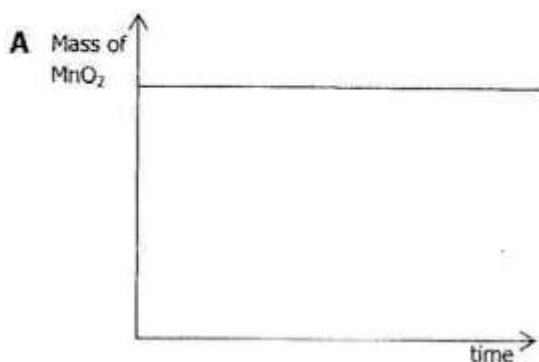
- 10** Which of the following salts cannot be crystallized from an aqueous solution?
- A** Barium Chloride
  - B** Magnesium Sulphate
  - C** Silver Chloride
  - D** Sodium Ethanoate
- 11** Which one of the following oxides has a pH of 7?
- A** Calcium oxide
  - B** Hydrogen oxide
  - C** Sodium oxide
  - D** Magnesium oxide
- 12** A compound has the empirical formula of  $\text{CH}_2\text{O}$  and a relative molecular mass of 60. What is the molecular formula of this compound?
- A**  $\text{C}_2\text{H}_4\text{O}$
  - B**  $\text{C}_3\text{H}_4\text{O}_2$
  - C**  $\text{C}_3\text{H}_4\text{O}_3$
  - D**  $\text{C}_2\text{H}_4\text{O}_2$
- 13** What mass of methane,  $\text{CH}_4$ , occupies the same volume, measured at r.t.p as 11g of carbon dioxide?
- A** 4g
  - B** 16g
  - C** 176g
  - D** 264g
- 14** A solution was made by dissolving 14.0g of potassium hydroxide, KOH, to make  $50\text{cm}^3$  of solution. What is the concentration of the solution in  $\text{mol/dm}^3$ ?
- A** 0.25
  - B** 0.28
  - C** 2.5
  - D** 5.0
- 15** The equation of a chemical reaction is given below.
- $$\underline{a} \text{P}_{4(\text{s})} + \underline{b} \text{KClO}_{3(\text{s})} \rightarrow \underline{c} \text{P}_2\text{O}_{5(\text{s})} + \underline{d} \text{KCl}_{(\text{s})}$$
- The underlined letters **a**, **b**, **c** and **d** represent numbers used to balance the equation. Which of the following is correct?
- |          | <b>a</b> | <b>b</b> | <b>c</b> | <b>d</b> |
|----------|----------|----------|----------|----------|
| <b>A</b> | 3        | 10       | 6        | 10       |
| <b>B</b> | 3        | 5        | 3        | 5        |
| <b>C</b> | 2        | 3        | 4        | 3        |
| <b>D</b> | 1        | 2        | 2        | 2        |

- 16 One mole of hydrogen gas and one mole of water have an equal number of ...
- A atoms.
  - B electrons.
  - C ions.
  - D molecules.
- 17 Hydrogen and chlorine gases react under suitable conditions as shown in the reversible chemical equation below.

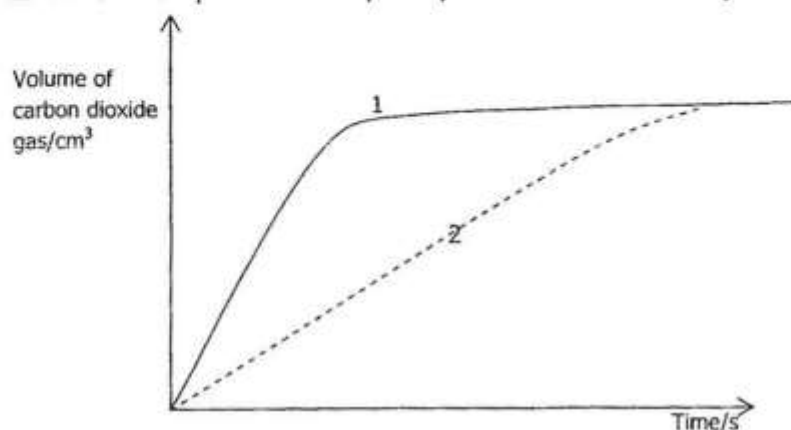


Which one of the following changes will affect the position of the equilibrium?

- A Addition of a catalyst
  - B Change of volume ✓
  - C Increase in temperature
  - D Increase in pressure
- 18 A pupil prepared oxygen gas from potassium chlorate by using manganese (IV) oxide,  $\text{MnO}_2$ , as a catalyst. Which of the following graphs shows how the mass of manganese (IV) oxide changed with time during the reaction?



- 19 Curve 1 shows the volume of carbon dioxide gas given off when 8g of calcium carbonate lumps react completely with excess dilute hydrochloric acid at 20°C.

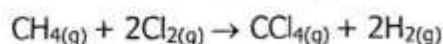


Curve 2 could be produced by using ...

- A 2g of powdered calcium carbonate.
  - B 3g of calcium carbonate lumps.
  - C a lower temperature.
  - D a more concentrated solution of the acid.
- 20 Some bond enthalpy in kJ/mol are shown in the table below.

Bond	C – H	Cl – Cl	C – Cl	H – H
Bond enthalpy in kJ/mol	413	242	346	436

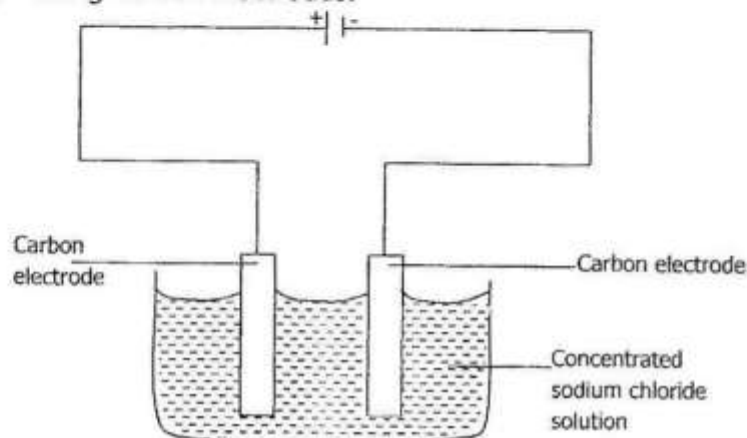
Find the enthalpy change for the reaction below



- A +53.8kJ/mol
  - B –53.8kJ/mol
  - C –120kJ/mol
  - D +120kJ/mol
- 21 Which statement about a catalyst is correct? It ...
- A increases the energy barrier of the reaction.
  - B lowers the energy barrier of the reaction.
  - C increases the bond energy of the reaction.
  - D lowers the bond energy of the reaction.
- 22 An element E, forms coloured compounds which are commonly used as catalysts. In which section of the Periodic Table is element E found?
- A Alkali metals
  - B Halogens
  - C Noble gases
  - D Transition metals

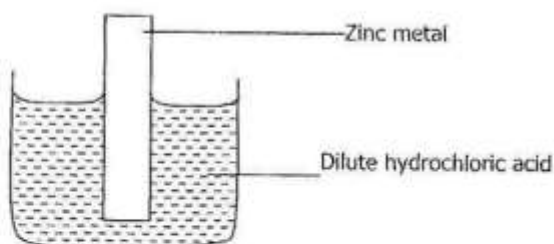


- 26 The apparatus below shows the electrolysis of concentrated sodium chloride solution using carbon electrodes.



What took place at the cathode?

- A Sodium ions were oxidized.
  - B Sodium ions were reduced.
  - C Hydrogen ions were reduced.
  - D Hydrogen ions were oxidized.
- 27 Which of the following is true about mercury? It ...
- A is an insulator.
  - B is an electrolyte.
  - C conducts electricity by the movement of ions.
  - D conducts electricity by movement of electrons.
- 28 Mild steel is an alloy of two elements. What are these elements?
- A Copper and Tin
  - B Copper and Zinc
  - C Iron and Tin
  - D Iron and Carbon
- 29 In the laboratory, an experiment was set up as shown in the diagram below.

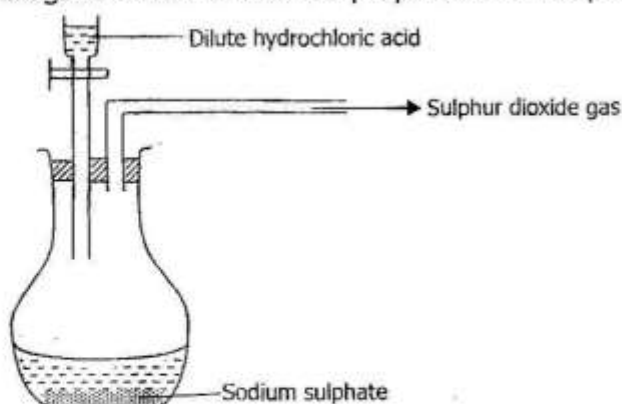


Which of the following is the correct equation for the reaction in the above experiment?

- A  $\text{Zn} + \text{HCl} \rightarrow \text{ZnCl} + \text{H}$
- B  $2\text{Zn} + \text{HCl} \rightarrow 2\text{ZnCl} + \text{H}_2$
- C  $\text{Zn} + 2\text{HCl} \rightarrow \text{ZnCl}_2 + \text{H}_2$
- D  $\text{Zn} + \text{HCl} \rightarrow \text{ZnCl}_2 + \text{H}_2$



- 30 Which of the following metals forms the least stable nitrate?
- A Aluminium
  - B Copper
  - C Silver
  - D Sodium
- 31 A powdered mixture of metals contains magnesium, copper, iron and zinc. Excess dilute sulphuric acid is added until no more reaction occurs. What is the residue left in the reaction vessel?
- A Copper
  - B Iron
  - C Magnesium
  - D Zinc
- 32 The diagram below shows the preparation of Sulphur dioxide gas.



- Which of the following methods can be used to collect Sulphur dioxide gas?
- A Downward displacement of water.
  - B Downward displacement of air.
  - C Upward displacement of air.
  - D Upward delivery of the gas.
- 33 The source of nitrogen used in the manufacture of ammonia using the Haber process is ...
- A fractional distillation of liquid air.
  - B the decomposition of organic matter.
  - C the decomposition of ammonium nitrate.
  - D the electrolysis of water.
- 34 Which of the following fuels is environmental friendly?
- A Coal
  - B Ethanol
  - C Hydrogen
  - D Petrol

35 Which method of rust prevention does **not** involve coating the iron or steel object?

- A Alloying
- B Electroplating
- C Galvanising
- D Painting

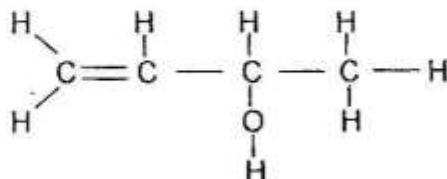
36 Which set of polymers comprises natural polymers?

- A Protein, fats and nylon.
- B Protein, fats and cellulose.
- C Protein, cellulose and nylon.
- D Nylon, cellulose and fats.

37 Which type of reaction occurs when glucose is formed from starch?

- A Polymerization
- B Hydrolysis
- C Fermentation
- D Cracking

38 A compound has the following structure.



Which of the reactions below will this compound undergo?

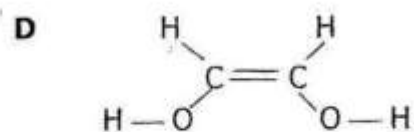
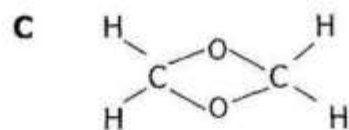
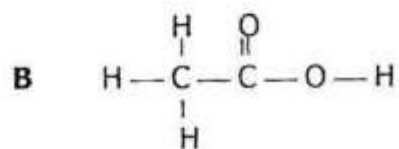
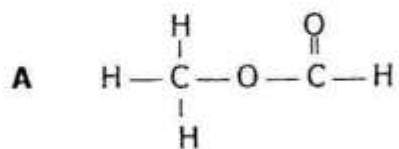
- 1. It will react with methanoic acid to form an ester
- 2. It will decolourise bromine water rapidly
- 3. It will react with an alkali to form a salt

- A 1, 2 and 3
- B 2 and 3 only
- C 1 and 2 only
- D 1 only

39 Which of the following plastics is thermally stable?

- A Poly(ethene)
- B Poly(propene)
- C Poly(vinylchloride)
- D Poly(tetrafluoroethene)

- 40 An organic compound, **R**, has an empirical formula,  $\text{CH}_2\text{O}$ . **R** gives out carbon dioxide from marble chips. Which of the following is the structure of compound **R**?



# DATA SHEET

## The Periodic Table of the Elements

Group		I	II											III	IV	V	VI	VII	0																
		<div>1 H Hydrogen</div>																		<div>2 He Helium</div>															
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 Aluminum 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	58	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	86	Sr Strontium 38	88	Y Yttrium 39	91	Zr Zirconium 40	93	Nb Niobium 41	96	Mo Molybdenum 42	104	Ru Ruthenium 44	106	Pd Palladium 46	108	Ag Silver 47	112	Cd Cadmium 48	115	In Indium 49	119	Sn Tin 50	122	Sb Antimony 51	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	190	Os Osmium 76	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	222	Rn Radon 86						
Fr Francium 87	223	Ra Radium 88	226	Ac Actinium 89															At Astatine 85																
																				*58-71 Lanthanoid series															
																				+90-103 Actinoid series															

Key

a

X

b

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

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  $24 \text{ dm}^3$  at room temperature and pressure (r.t.p.).

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

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