

EXAMINATIONS COUNCIL OF ZAMBIA

Examination for School Certificate Ordinary Level

Chemistry

5070/1

Paper 1 Multiple Choice

Tuesday

19 NOVEMBER 2019

Additional Materials:

Electronic calculator (non programmable) or Mathematical tables

Multiple Choice Answer Sheet

Soft clean eraser

Soft pencil (type B or HB is recommended)

Time 1 hour

Instructions to Candidates

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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.

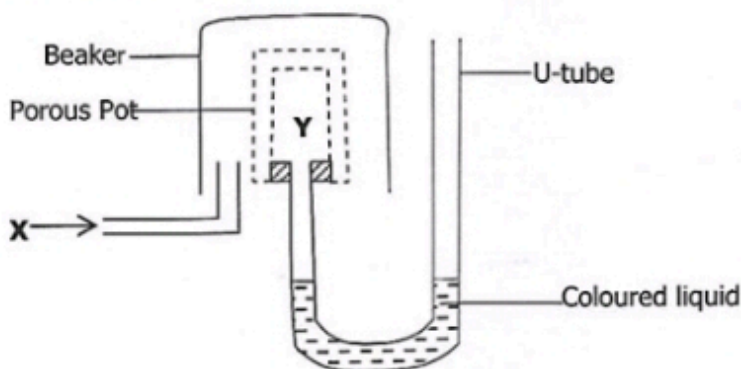
The **Periodic Table** is printed on page 12.

Cell phones are not allowed in the examination room.

- 1 Argon, salt and water are common chemical substances used in our day to day life. Which of the following is correct about the basic unit particles of matter each of them is made of?

	Argon	Salt	Water
A	Gas	Solid	Liquid
B	Atoms	Ions	Molecules
C	Molecules	Ions	Atoms
D	Molecules	Atoms	Ions

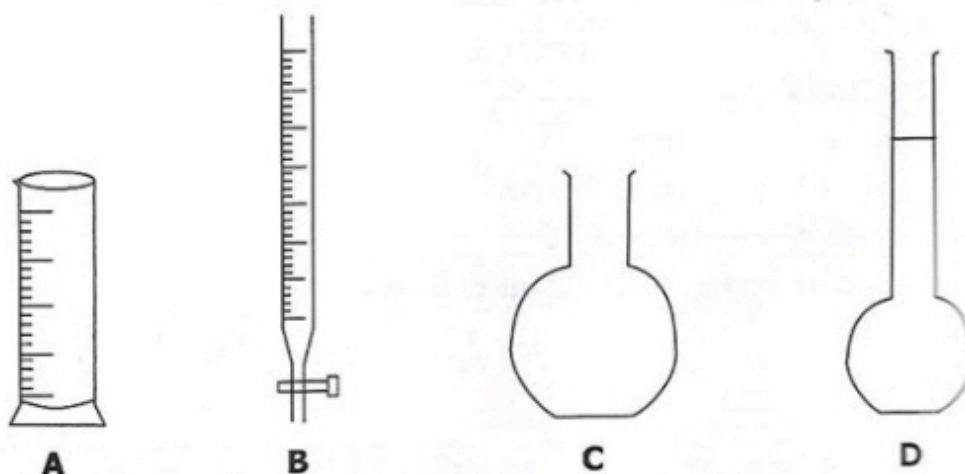
- 2 The rates of diffusion of two gases **X** and **Y** of equal volume are determined using the following apparatus.



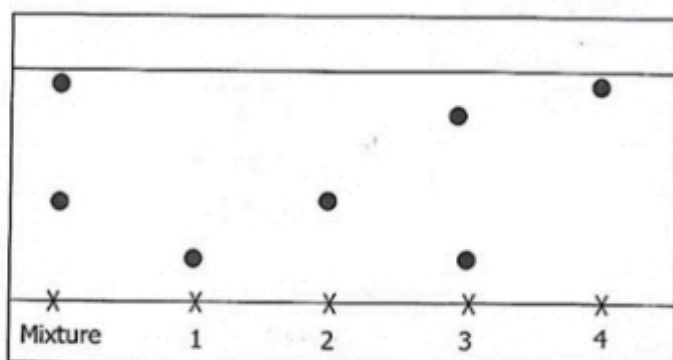
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After a long period, the levels of coloured liquid in both arms of the U-tube remain the same. Which pair of gases would be responsible for this observation?

- A Carbon dioxide and Propane
 B Carbon dioxide and Nitrogen *CO₂ + N₂*
 C Carbon and Sulphur dioxide
 D Propane and Propene
- 3 Which **one** of the following pieces of apparatus is **not** used to measure the volume of liquid?

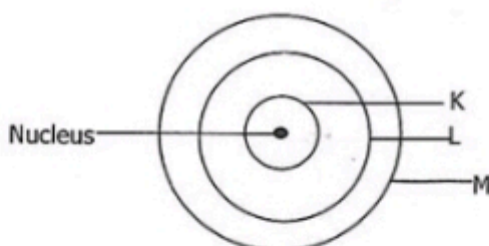


- 4 A mixture of two salts was compared with four different salts using chromatography. The results are shown on the chromatogram below.



Which **two** salts are **not** contained in the mixture?

- A 1 and 3
B 1 and 4
C 2 and 3
D 2 and 4
- 5 The diagram below shows different energy levels around the nucleus of an atom.



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What is the maximum number of electrons that can be accommodated in energy level **M**?

- A 2
B 8
C 18
D 32
- 6 The elements **P** and **R** form the compound **P₂R**. What is the correct electronic configuration of the atoms **P** and **R**?

	Atom P	Atom R
A	2, 1	2, 7
B	2, 2	2, 7
C	2, 1	2, 6
D	2, 2	2, 6

P: 2, 1
R: 2, 6
P₂R^{1 2}
2, 6

- 7 Which substance has metallic bonding?

	Conducts electricity		State of product formed on reaction with oxygen
	when solid	when liquid	
A	✓	✓	solid
B	✓	✓	gas
C	X	✓	no reaction
D	X	X	solid

- 8 Which of the following has the lowest mass?

- A 0.1 moles of iodine molecules, I_2 .
 B 0.5 moles of carbon dioxide, CO_2 .
 C 1.0 mole of beryllium oxide, BeO .
 D 1.0 mol of sodium atoms, Na .

- 9 A 0.1mol of the hydrate $X.nH_2O$ contains 9 grams of water. What is the value of n in $X.nH_2O$?

- A 4
 B 5
 C 7
 D 10

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- 10 In order to determine the actual formula of a compound from its empirical formula, which extra information is needed? Its ...

- A atomicity.
 B density.
 C melting point.
 D molar mass.

- 11 Nitrogen and hydrogen gases react according to the equation shown.



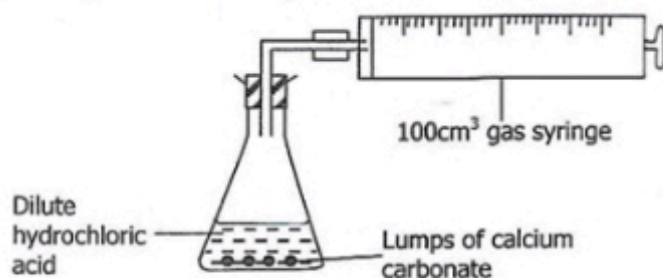
If $60dm^3$ of nitrogen and $60dm^3$ of hydrogen are made to react, what would be the volume compositions of the individual gases after the reaction?

	Volume of		
	Nitrogen/ dm^3	Hydrogen/ dm^3	Ammonia/ dm^3
A	0	0	120
B	40	0	40
C	0	40	40
D	40	40	40

- 12 1.0g calcium carbonate was reacted with excess dilute hydrochloric acid according to the equation:



The diagram below shows the set up for this reaction.



Why would the set up above be practically impossible to collect all the gas at r.t.p?

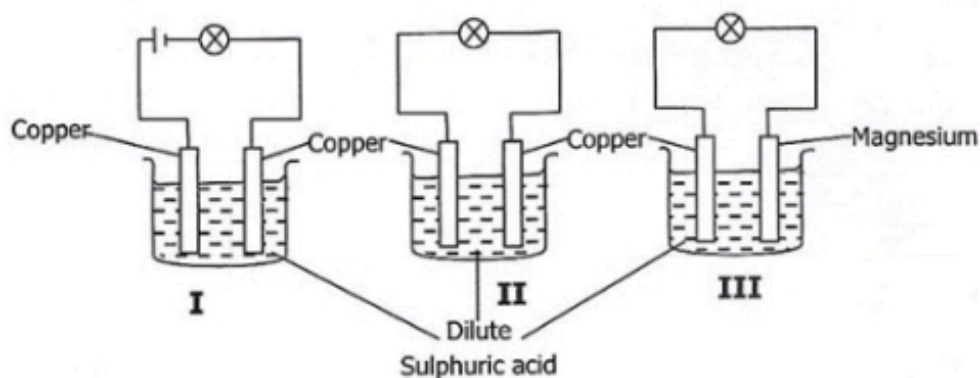
- A A catalyst must be added.
 B No gas is produced.
 C Powdered calcium carbonate must be used.
 D The gas syringe is small.
- 13 What mass of nickel is formed from a nickel salt solution, electrolysed by a current of 0.4A for 965 seconds? (1 mol of electrons = 96 500C)
- A 0.029 g
 B 0.059 g
 C 0.118 g
 D 0.236 g
- 14 Which substance will conduct electricity?
- A Aqueous sodium chloride
 B Liquid ammonia
 C Molten sugar
 D Solid sodium chloride
- 15 Which products are formed at the anode and cathode when an electric current is passed through molten lead (II) chloride?

	Anode (+)	Cathode (-)
A	Chloride ions	Lead ions
B	Chlorine molecules	Lead atoms
C	Lead atoms	Chlorine molecules
D	Lead ions	Chloride ions

- 16 An iron nail is to be electroplated with silver. Which entries in the table are correct?

	Anode	Cathode	Electrolyte
A	Silver metal	Iron nail	Dilute nitric acid
B	Iron nail	Silver metal	Aqueous silver nitrate
C	Iron nail	Silver metal	Dilute nitric acid
D	Silver metal	Iron nail	Aqueous silver nitrate

17 Study the diagrams below.



In which of the set ups will the bulb light?

- A I only
- B III only
- C I and II only
- D I and III only

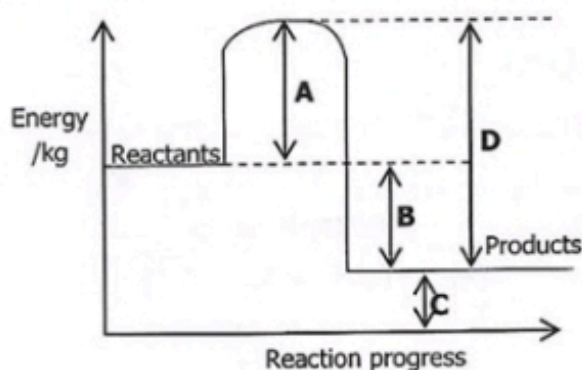
18 The table shows the energy released by the complete combustion of some compounds used as fuels.

Compound	Formula	Relative molecular mass	ΔH in KJ/mol
Benzene	C_6H_6	78	-3 270
Heptane	C_7H_{16}	100	-4 800
Octane	C_8H_{18}	114	-5 510
Propane	C_3H_8	44	-2 200

Which fuel releases the least energy when 1g of the compound is completely burned?

- A Benzene
- B Heptane
- C Octane
- D Propane

19 The diagram below shows an energy profile for a reaction.



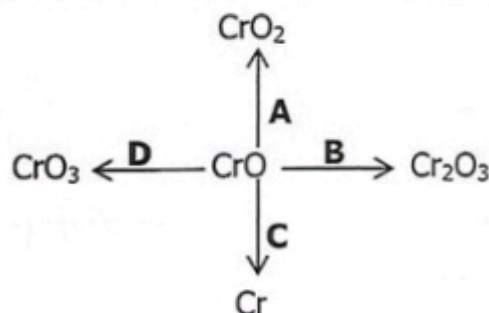
Which of the labelled parts **A**, **B**, **C** and **D** on the diagram above represents the enthalpy change for the reaction?

- 20 Below is a reaction at equilibrium.



Which of the following conditions should a manufacturer apply in order to increase the yield of hydrogen chloride gas?

- A Add a catalyst
 B Increase the temperature
 C Increase the pressure
 D Lower the temperature
- 21 In which change is chromium (II) oxide, CrO , reduced?



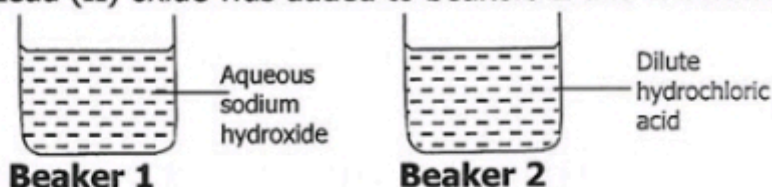
- 22 Which change will **not** increase the rate of a chemical reaction?

An increase in the ...

- A concentration of aqueous reactants.
 B pressure of gaseous reactants.
 C particle size of solid reactants.
 D temperature of the reaction system.

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- 23 Lead (II) oxide was added to beakers 1 and 2 below.



Which of the following entries is correct?

	Beaker 1	Beaker 2
A	No salt formed	Salt formed
B	No salt formed	No salt formed
C	Salt formed	No salt formed
D	Salt formed	Salt formed

- 24 A colourless solution **X** gives a white precipitate when added to separate solutions of dilute sulphuric acid and aqueous silver nitrate. What is solution **X**?

- A Silver nitrate
 B Magnesium chloride
 C Lead (II) nitrate
 D Barium chloride

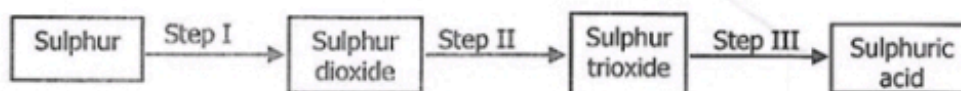
- 25 A learner, accidentally spilt nitric acid on the floor of a chemistry laboratory. Which of the following substances, when added in excess would neutralise the acid without leaving an alkaline solution?
- A Aqueous sodium hydroxide
 - B Ammonia solution
 - C Calcium carbonate
 - D Distilled water
- 26 ... is the common name for saturated calcium hydroxide solution.
- A Lime water
 - B Limestone
 - C Quick lime
 - D Slaked lime
- 27 Which one of the following is a use of a noble gas? A noble gas is used ...
- A as an antiseptic.
 - B for advertising.
 - C in photography.
 - D in toothpaste.
- 28 When copper (II) oxide is reacted with dilute sulphuric acid, a blue solution of copper (II) sulphate is formed. Which property of transition metals is shown in this reaction?
- A Formation of coloured compounds.
 - B Being used as a catalyst.
 - C High melting point.
 - D Variable valency.
- 29 Which one of the following is used in the sacrificial protection of underground steel oil pipe lines?
- A Iron
 - B Potassium
 - C Sodium
 - D Zinc
- 30 The table below shows some properties of metals. Which element could be sodium?

	Melting point (°C)	Density (g/cm ³)	Electrical conductivity
A	1 535	7.86	Good
B	1 083	8.92	Good
C	113	2.07	Poor
D	98	0.97	Good

- 31 The table below contains some alloys and their uses. Which use of the alloys is correct?

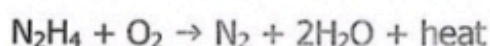
	Alloy	Use
A	Stainless steel	In cutlery
B	Mild steel	To make coins
C	Bronze	In food packaging
D	Brass	To make aircrafts

- 32 The diagram shows three steps in the manufacture of sulphuric acid.



In which step, is a catalyst used?

- A Step I only
 B Step II only
 C Step III only
 D Steps II and III
- 33 Hydrazine, N_2H_4 , burns completely in oxygen according to the equation below.



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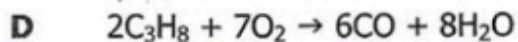
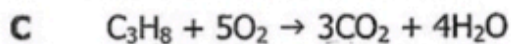
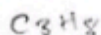
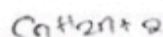
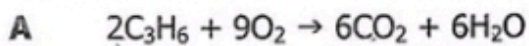
Which one of the following describes hydrazine?

- A Unclean fuel
 B Organic fuel
 C Fire resistant
 D Clean fuel
- 34 Gas P + vegetable oil $\xrightarrow[180^\circ\text{C}]{\text{Ni}}$ margarine

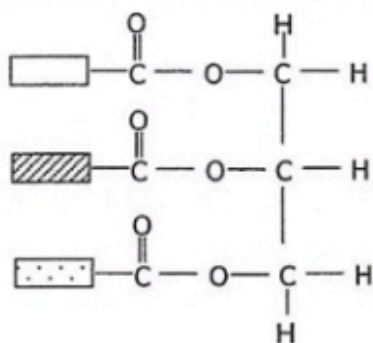
What is gas P?

- A Ethene
 B Hydrogen
 C Methane
 D Oxygen
- 35 Diesel, petrol, refinery gases and kerosene are fractions obtained from the distillation of crude oil. The order of volatility of these fractions, starting with the most volatile is refinery gas, ...
- A kerosene, petrol, diesel.
 B kerosene, diesel, petrol.
 C petrol, kerosene, diesel.
 D petrol, diesel, kerosene

36 Which of the equations below represents the complete combustion of propane?



37 Below is the structure of a fat.

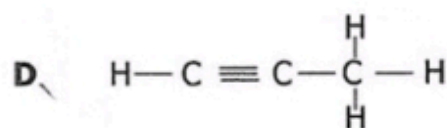
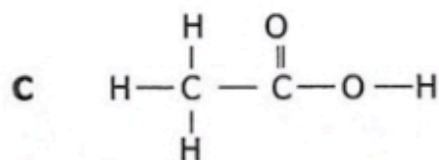
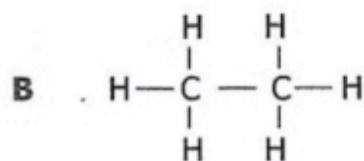
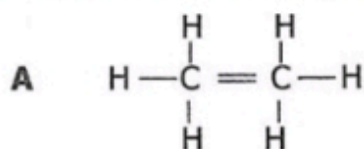


The fat was hydrolysed using sodium hydroxide solution. What are the products of this hydrolysis?

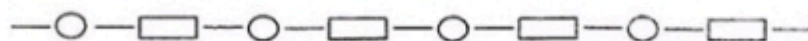
- A One alcohol and three soaps.
- B One alcohol and three fatty acids.
- C Three alcohols and one soap.
- D Three alcohols and one fatty acid.

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38 Which of the following structures is **not** a correct structural formula?



- 39 Below is the structure of a carbohydrate.



The monomer for this carbohydrate is ...

- A $\text{H}-\overset{\text{O}}{\parallel}{\text{C}}-\square-\overset{\text{O}}{\parallel}{\text{C}}-\text{H}.$
- B $\text{H}-\text{O}-\overset{\text{O}}{\parallel}{\text{C}}-\square-\overset{\text{O}}{\parallel}{\text{C}}-\text{O}-\text{H}.$
- C $\text{H}-\text{O}-\square-\text{O}-\text{H}.$
- D $\text{H}-\overset{\text{O}}{\parallel}{\text{C}}-\text{O}-\square-\text{O}-\overset{\text{O}}{\parallel}{\text{C}}-\text{H}.$

- 40 Which of the following compounds represents an ester?

- A $\begin{array}{ccccccc} & \text{H} & \text{H} & & \text{H} & \text{H} & \\ & | & | & & | & | & \\ \text{H} & -\text{C} & -\text{C} & -\text{O} & -\text{C} & -\text{C} & -\text{H} \\ & | & | & & | & | & \\ & \text{H} & \text{H} & & \text{H} & \text{H} & \end{array}$
- B $\begin{array}{ccccccc} & \text{H} & \text{H} & \text{H} & \text{O} & & \\ & | & | & | & || & & \\ \text{H} & -\text{C} & -\text{C} & -\text{C} & -\text{C} & -\text{O} & -\text{H} \\ & | & | & | & & & \\ & \text{H} & \text{H} & \text{H} & & & \end{array}$
- C $\begin{array}{ccccccc} & \text{H} & \text{O} & & \text{H} & \text{H} & \\ & | & || & & | & | & \\ \text{H} & -\text{C} & -\text{C} & -\text{O} & -\text{C} & -\text{C} & -\text{H} \\ & | & & & | & | & \\ & \text{H} & & & \text{H} & \text{H} & \end{array}$
- D $\begin{array}{ccccccc} & \text{H} & \text{H} & \text{H} & \text{H} & & \\ & | & | & | & | & & \\ \text{H} & -\text{C} & -\text{C} & -\text{C} & -\text{C} & -\text{O} & -\text{H} \\ & | & | & | & | & & \\ & \text{H} & \text{H} & \text{H} & \text{H} & & \end{array}$

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[illegible]

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

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

Chemistry/5570/1/2019