



# ZIMBABWE SCHOOL EXAMINATIONS COUNCIL

General Certificate of Education Ordinary Level

## CHEMISTRY

PAPER 1 Multiple Choice

4024/1

NOVEMBER 2018 SESSION

1 hour

**Additional materials:**

Electronic calculator

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 booklet until you are told to do so.**

Write your name, centre number and candidate number on the answer sheet in the spaces provided unless this has already been done for you.

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.

**Read very carefully the instructions on the answer sheet.**

### INFORMATION FOR CANDIDATES

Each correct answer will score one mark. A mark will not be deducted for a wrong answer. Any rough working should be done in this booklet. A copy of the Periodic Table is printed on page 12.

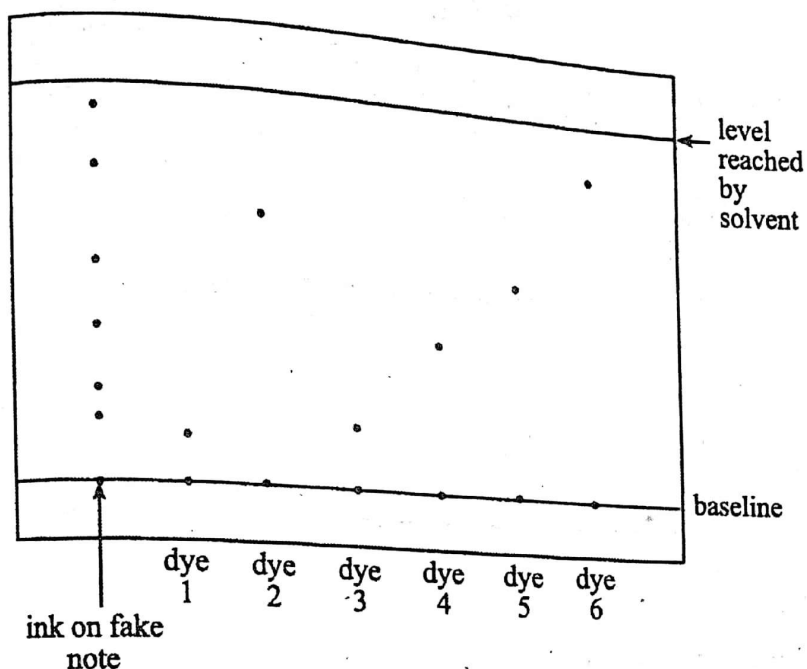
**This question paper consists of 12 printed pages.**

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**[Turn over]**

- 1 An investigation to identify the ink used to make a fake one hundred dollar note using paper chromatography was carried out. The chromatogram shown was obtained.



The dye(s) present in the fake note are/were

- A 3, 4 and 5
- B 2 and 3
- C 6 only
- D 3 and 4

- 2 Which pair correctly describes the structure of an atom?

	particles orbiting the nucleus	particles in the nucleus
A	protons	electrons and neutrons
B	electrons and neutrons	protons
C	electrons	protons and neutrons
D	protons and neutrons	electrons

- 3 What is the electronic configuration of the silicon isotope,  $^{30}_{14}\text{Si}$ ?

- A 2. 8. 4
- B 4. 8. 2
- C 2. 8. 8. 8. 4
- D 8. 4. 2

- 4 Which row correctly gives the physical properties of an ionic compound?

	melting point/ °C	electrical conductivity when solid	electrical conductivity when molten
A	high	none	none
B	low	conducts	conducts
C	high	none	conducts
D	low	none	none

- 5 The table shows the atomic numbers of two elements, P and Q.

element	atomic number
P	19
Q	17

Elements P and Q can combine to form

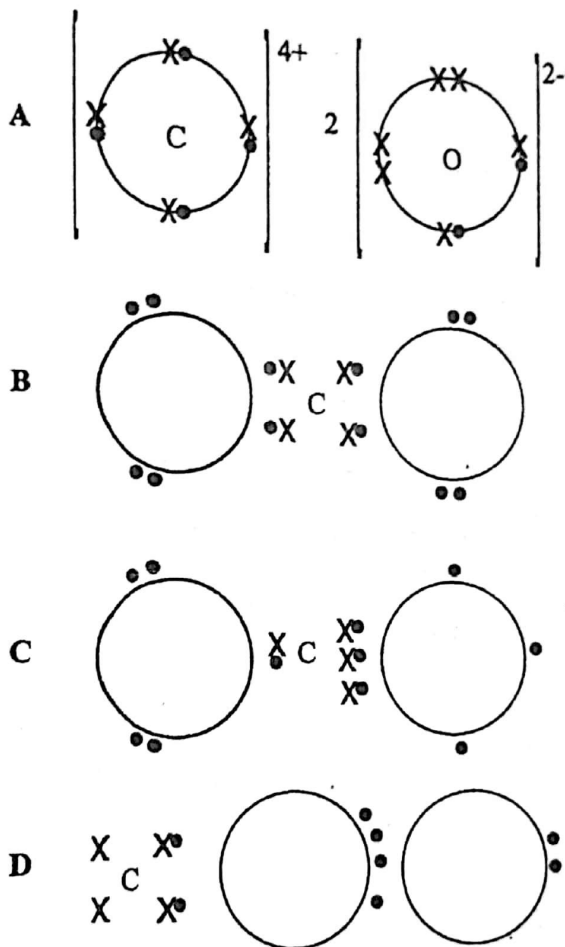
- A a covalent compound PQ.  
 B a covalent compound PQ<sub>2</sub>.  
 C an ionic compound PQ.  
 D an ionic compound PQ<sub>2</sub>.
- 6 What is the correct formula of the compound formed between M<sup>+</sup> and Z<sup>2-</sup>?
- A MZ  
 B MZ<sub>2</sub>  
 C M<sub>2</sub>Z  
 D M<sub>2</sub>Z<sub>2</sub>

Which structure correctly shows the bonding in carbon dioxide?

Key:

X carbon electrons

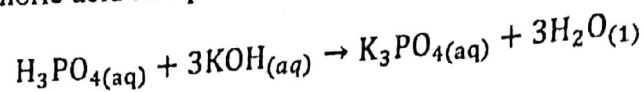
● Oxygen electrons



8 A  $0.1 \text{ mol dm}^{-3}$  solution of sodium carbonate can be prepared by dissolving

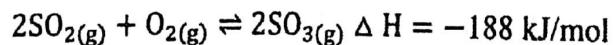
- A 106 g of  $\text{Na}_2\text{CO}_3(\text{s})$  in  $100 \text{ cm}^3$  of water
- B 10.6 g of  $\text{Na}_2\text{CO}_3(\text{s})$  in  $100 \text{ cm}^3$  of water
- C 10.6 g of  $\text{Na}_2\text{CO}_3(\text{s})$  in  $1000 \text{ cm}^3$  of water
- D 106 g of  $\text{Na}_2\text{CO}_3(\text{s})$  in  $1000 \text{ cm}^3$  of water

- 9 Phosphoric acid and potassium hydroxide react according to the equation:



Which ions will not appear in the ionic equation?

- A  $\text{H}_{(\text{aq})}^+$  and  $\text{OH}_{(\text{aq})}^-$
- B  $\text{K}_{(\text{aq})}^+$  and  $\text{PO}_{4(\text{aq})}^{3-}$
- C  $\text{H}_{(\text{aq})}^-$  and  $\text{PO}_{4(\text{aq})}^{3-}$
- D  $\text{K}_{(\text{aq})}^+$  and  $\text{OH}_{(\text{aq})}^-$
- 10 Which equation does not result in a change of oxidation state of the species involved?
- A  $\text{Fe}_{(\text{aq})}^{2+} \rightarrow \text{Fe}_{(\text{aq})}^{3+} + \text{e}^-$
- B  $\text{Cu}_{(\text{aq})}^{2+} + \text{CO}_{3(\text{aq})}^{2-} \rightarrow \text{CuCO}_{3(\text{s})}$
- C  $2\text{H}_{2(\text{g})} + \text{O}_{2(\text{g})} \rightarrow 2\text{H}_2\text{O}_{(1)}$
- D  $\text{Ag}_{(\text{aq})}^+ + \text{e}^- \rightarrow \text{Ag}_{(\text{s})}$
- 11 The production of carbohydrates during photosynthesis is an example
- A an endothermic reaction.
- B a combustion reaction.
- C an exothermic reaction.
- D a displacement reaction.
- 12 Sulphur dioxide reacts with oxygen according to the equation:



Which factor increases the amount of sulphur trioxide produced?

- A increase in temperature
- B decrease in temperature
- C increase in amount of catalyst
- D decrease in pressure

- 13 A new element has been discovered and is believed to be between zinc and lead in the electrochemical series.

How will the element react with solutions of zinc sulphate and lead nitrate.

	zinc sulphate	lead nitrate
A	zinc displaced	lead remains in solution
B	zinc remains in solution	lead displaced
C	zinc displaced	lead displaced
D	zinc remains in solution	lead remains in solution

- 14 When heated, a metal carbonate decomposes to form

- A metal oxide and carbon
- B carbon dioxide and metal
- C carbon monoxide and metal oxide
- D carbon dioxide and metal oxide

- 15 Nitrogen and oxygen are separated from liquid air by the process of

- A liquefaction
- B solidification
- C fractional distillation
- D condensation

- 16 Which reagent could be used to distinguish between aluminium nitrate and zinc nitrate?

- A sodium hydroxide solution
- B ammonia solution
- C barium chloride solution
- D silver nitrate solution

- 17 A compound of nitrogen and hydrogen contains 87.5 % nitrogen.

What is its empirical formula?

- A  $N_2$
- B  $NH_2$
- C  $N_2H_2$
- D  $N_2H_4$

- 18 Respiration, combustion and rusting are chemical processes which all use

- A water.
- B heat energy.
- C carbon dioxide.
- D oxygen.

19 Which one is not a property of transition metal ions?

- A They act as catalysts.
- B Their solutions are colourless.
- C Their solutions are coloured.
- D They have many oxidation states.

20 Which pair correctly matches a metal and its extraction method?

- |   | metal    | method       |
|---|----------|--------------|
| A | iron     | electrolysis |
| B | platinum | reduction    |
| C | gold     | electrolysis |
| D | nickel   | reduction    |

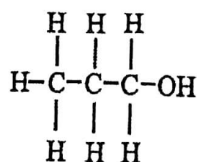
21 In the blast furnace, molten iron is tapped off at the bottom of the furnace while slag settles above the molten iron because

- A slag is more dense than molten iron.
- B slag is less dense than molten iron.
- C molten iron and slag have the same density.
- D molten iron occupies more space than slag.

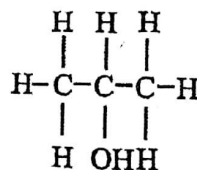
22 Copper metal is used in electrical wiring and manufacture of pots and pans because of its

- A high conductivity
- B high reactivity
- C cheap cost of production
- D abundance in nature

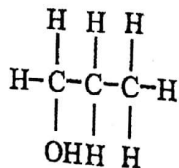
23 Which structures represents the same compound?



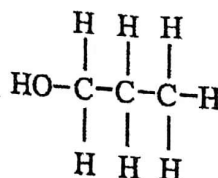
1



2



3



4

- A 2 and 4
- B 1 and 2
- C 1 and 3
- D 2 and 3

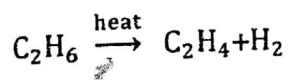
24 Which homologous series of organic compounds has the general formula  $C_nH_{2n}$ ?

- A alcohols
- B carboxylic acids
- C alkanes
- D alkenes

25 When two molecules react to form one molecule, this is

- A an addition reaction.
- B a substitution reaction.
- C a condensation reaction.
- D an esterification reaction.

26 Ethene may be manufactured according to the reaction:



What type of reaction is this?

- A polymerisation
- B cracking
- C addition
- D hydrogenation

27 Which one is an example of a saturated hydrocarbon?

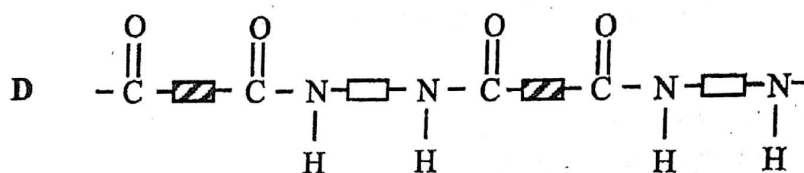
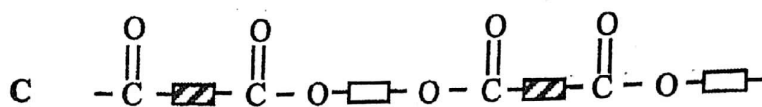
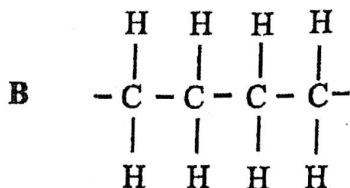
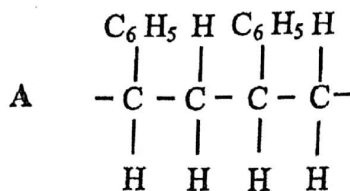
- A butane
- B ethanol
- C butene
- D butanol

28 Which compounds react to form ethylethanoate?

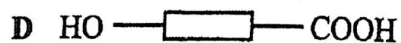
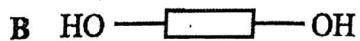
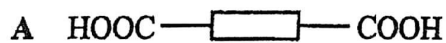
- A ethane and ethanol
- B ethanoic acid and ethanol
- C ethene and ethanoic acid
- D ethane and ethanoic acid



29 Which structural formula represents nylon?



30 Which monomer unit polymerises to form starch?

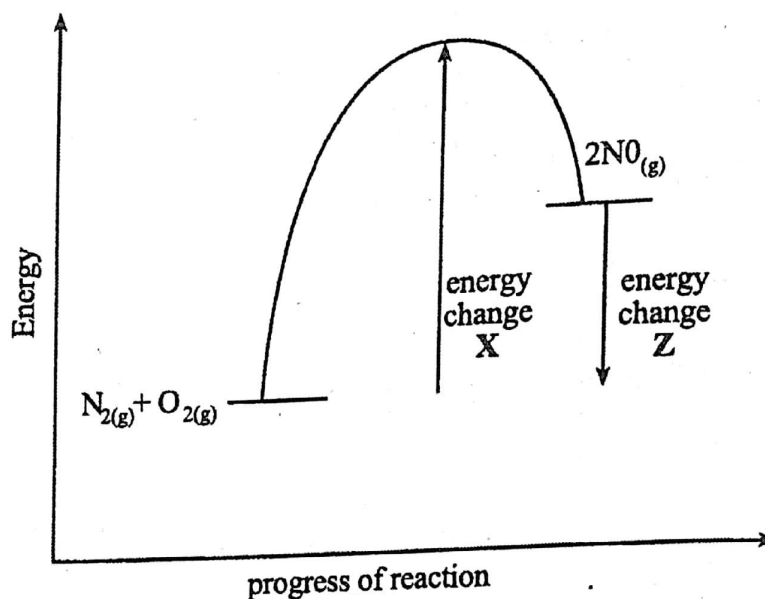
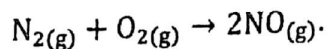


31 Which process describes the secondary stage of sewage treatment?

- A sedimentation
- B sludge activation
- C precipitation
- D discharge

- 32 Which ion is common to both sewage and fertilizers?
- A nitrate
  - B carbonate
  - C chloride
  - D sulphate
- 33 Which process increases the amount of sulphur dioxide in the air?
- A burning methane
  - B burning coal
  - C burning wood
  - D burning ethene
- 34 Which pair correctly matches a pollutant gas and its effect on the environment?
- |   | <b>pollutant</b> | <b>effect</b>            |
|---|------------------|--------------------------|
| A | SO <sub>2</sub>  | depletes the ozone layer |
| B | NO <sub>2</sub>  | global warming           |
| C | CFC              | form photochemical smog  |
| D | CO <sub>2</sub>  | global warming           |
- 35 Oxides of nitrogen are produced in car engines because the
- A bonds in nitrogen gas are easy to break.
  - B reactions can take place without interference.
  - C car engines have high temperatures for this reaction.
  - D reaction only need moderate warmth to proceed.
- 36 All of the following are used in waste management **except**
- A composting.
  - B source reduction.
  - C incineration.
  - D logging.
- 37 Charcoal is used in the purification of water because it
- A coagulates the water.
  - B removes inorganic ions.
  - C makes water colourless.
  - D disinfects the water.

- 38 The diagram shows the energy profile for the reaction



What is the energy change X?

- A enthalpy of combustion
  - B bond energy
  - C enthalpy of reaction
  - D activation energy
- 39 Which one is an advantage of using herbal medicines?
- A herbal medicines cure better than pharmaceutical medicines.
  - B herbal medicines are easily metabolized because they are organic.
  - C herbal medicines are cheaper than pharmaceutical medicines.
  - D herbal medicines have clear directions for use.
- 40 Which chemical process takes place during the production of biodiesel?
- A esterification
  - B addition
  - C hydrogenation
  - D combustion

# DATA SHEET

## The Periodic Table of the Elements

The Periodic Table of the Elements																											
Group																											
I		II														III		IV		V		VI		VII		O	
																1 Hydrogen										4 Helium	
																										2 Helium	
																										20 Neon	
																										40 Argon	
																										84 Krypton	
																										131 Xenon	
																										222 Radon	

Key

X

X = relative atomic mass  
X = atomic symbol

b = proton (atomic) Number

\*58-71 Lanthanoid series  
†90-103 Actinoid series

The volume of one mole of any gas is 28 dm<sup>3</sup> at room temperature and pressure (r.t.p.)