ZIMBABWE SCHOOL EXAMINATIONS COUNCIL

General Certificate of Education Ordinary Level

CHEMISTRY

4024/1

PAPER 1 Multiple Choice

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.

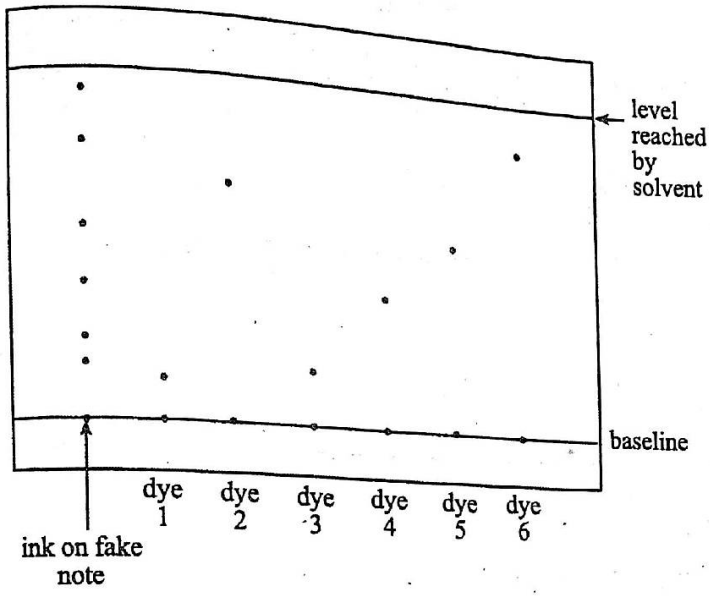
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[Turn over

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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, $^{30}_{14}Si$?

A 2.8.4
B 4.8.2
C 2.8.8.8.4
D 8.4.2

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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_2.
C an ionic compound PQ.
D an ionic compound PQ_2.

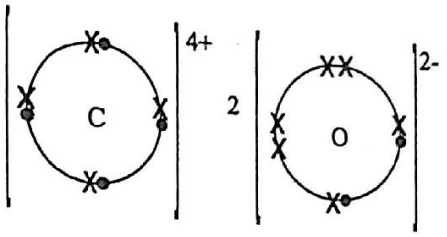
6 What is the correct formula of the compound formed between M^+ and Z^{2-}?

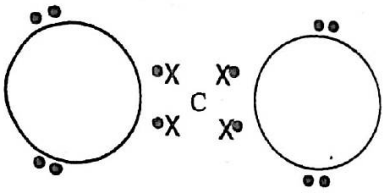
A MZ
B MZ_2
C M_2Z
D M_2Z_2

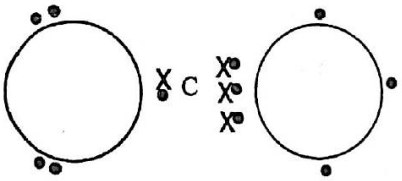
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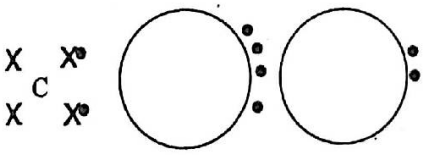
1 Which structure correctly shows the bonding in carbon dioxide?

Key:
X carbon electrons
● Oxygen electrons

A 

B 

C 

D 

8 A 0.1 moldm^{-3} solution of sodium carbonate can be prepared by dissolving

A 106 g of $Na_2CO_{3(s)}$ in 100 cm^3 of water
B 10.6 g of $Na_2CO_{3(s)}$ in 100 cm^3 of water
C 10.6 g of $Na_2CO_{3(s)}$ in 1000 cm^3 of water
D 106 g of $Na_2CO_{3(s)}$ in 1000 cm^3 of water

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

$$H_3PO_{4(aq)} + 3KOH_{(aq)} \rightarrow K_3PO_{4(aq)} + 3H_2O_{(1)}$$

Which ions will not appear in the ionic equation?

A $H^+_{(aq)}$ and $OH^-_{(aq)}$

B $K^+_{(aq)}$ and $PO^{3-}_{4(aq)}$

C $H^-_{(aq)}$ and $PO^{3-}_{4(aq)}$

D $K^+_{(aq)}$ and $OH^-_{(aq)}$

10 Which equation does **not** result in a change of oxidation state of the species involved?

A $Fe^{2+}_{(aq)} \rightarrow Fe^{3+}_{(aq)} + e^-$

B $Cu^{2+}_{(aq)} + CO^{2-}_{3(aq)} \rightarrow CuCO_{3(s)}$

C $2H_{2(g)} + O_{2(g)} \rightarrow 2H_2O_{(l)}$

D $Ag^+_{(aq)} + e^- \rightarrow Ag_{(s)}$

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:

$$2SO_{2(g)} + O_{2(g)} \rightleftharpoons 2SO_{3(g)} \; \Delta H = -188 \text{ kJ/mol}$$

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

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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.

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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

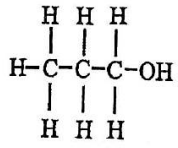
21 In the blast furnace, molten iron is tapped off at the bottom of the furnace while slag settles above the molten iron because

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.

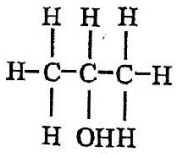
22 Copper metal is used in electrical wiring and manufacture of pots and pans because of its

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

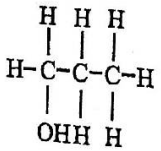
23 Which structures represents the same compound?



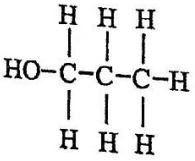
1



2



3



4

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

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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:

$$C_2H_6 \xrightarrow{\text{heat}} C_2H_4+H_2$$

What type of reaction is this?

A polymerisation
B cracking
C addition
D hydrogenation

27 Which one is an example of a saturated hydrocarbon?

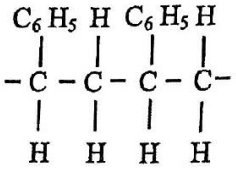
A butane
B ethanol
C butene
D butanol

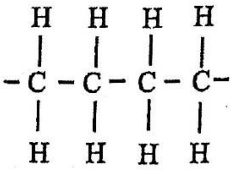
28 Which compounds react to form ethylethanoate?

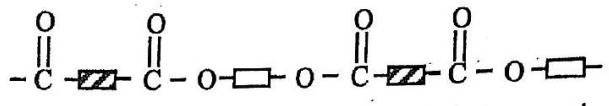
A ethane and ethanol
B ethanoic acid and ethanol
C ethene and ethanoic acid
D ethane and ethanoic acid

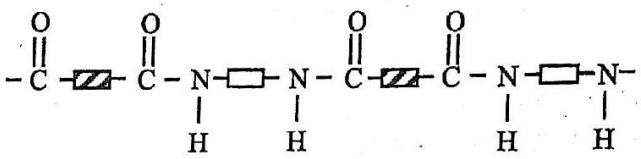
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29 Which structural formula represents nylon?

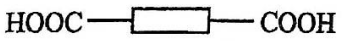
A 

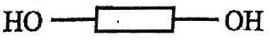
B 

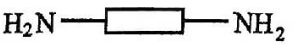
C 

D 

30 Which monomer unit polymerises to form starch?

A 

B 

C 

D 

31 Which process describes the secondary stage of sewage treatment?

A sedimentation
B sludge activation
C precipitation
D discharge

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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?

	pollutant	effect
A	SO_2	depletes the ozone layer
B	NO_2	global warming
C	CFC	form photochemical smog
D	CO_2	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.

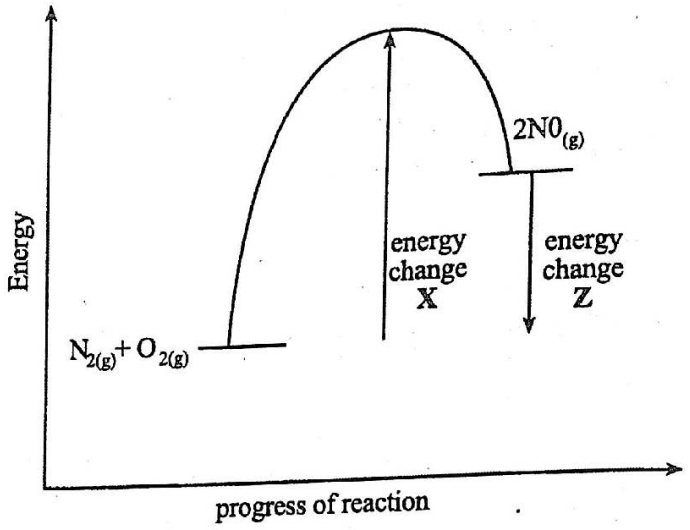
37 Charcoal is used in the purification of water because it

A coagulates the water.
B removes inorganic ions.
C makes water colourless.
D disinfects the water.

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38 The diagram shows the energy profile for the reaction

$$N_{2(g)} + O_{2(g)} \rightarrow 2NO_{(g)}.$$



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

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DATA SHEET
The Periodic Table of the Elements

Group I	Group II											Group III	Group IV	Group V	Group VI	Group VII	Group O
																	4 He Helium 2
						1 H Hydrogen 1						11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10
7 Li Lithium 3	9 Be Beryllium 4											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
23 Na Sodium 11	24 Mg Magnesium 12											70 Ga Gallium 31	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromide 35	84 Kr Krypton 36
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	115 In Indium 49	119 Sn Tin 50	122 Sb Antimony 51	128 Te Tellurium 52	127 I Iodine 53	131 Xe Xenon 54
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	101 Ru Ruthenium 44	103 Rh Rhodium 45	106 Pd Palladium 46	108 Ag Silver 47	112 Cd Cadmium 48	204 Tl Thallium 81	207 Pd Lead 82	209 Bi Bismuth 83	Po Polonium 84	At Astatine 85	Rn Radon 86
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						
Fr Francium 87	226 Ra Radium 88	227 Ac Actinium 89 †															

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

Key: a = relative atomic mass; X = atomic symbol; b = proton (atomic) Number

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

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