ZIMBABWE SCHOOL EXAMINATIONS COUNCIL

General Certificate of Education Ordinary Level

CHEMISTRY 4024/1

PAPER 1 Multiple Choice

SPECIMEN PAPER 1 hour

Additional materials:
- Mathematical tables and/or 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** youconsider 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 donein 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 Which process involves a change of state?

A filtration
B chromatography
C sublimation
D diffusion

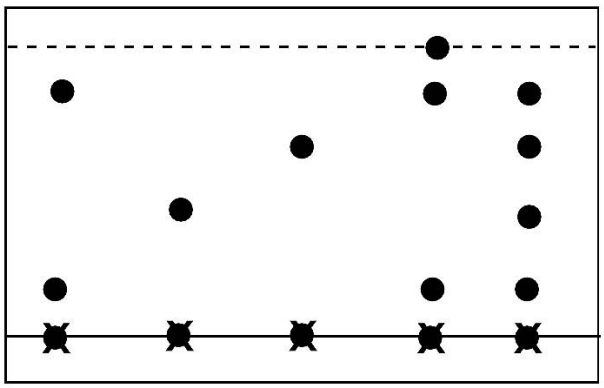
2 When liquid water changes into steam, the molecules

A break up into small particles.
B become very large.
C move further apart.
D give out heat energy.

3 Which apparatus would be most suitable for measuring 16.75 cm^3 of a liquid?

A a bulb pipette
B a burette
C a measuring cylinder
D a volumetric flask

4 The diagram shows a chromatogram of the dyes present in five different inks.



What is the total number of different dyes inall the five inks?

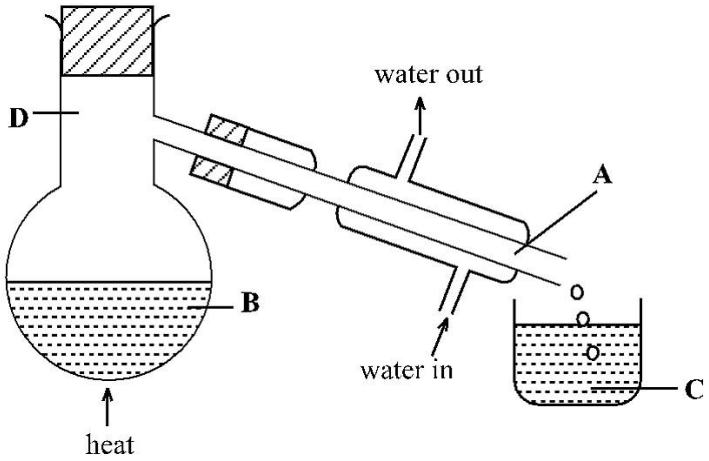
A 3
B 4
C 5
D 11

5 Which property allows substances to be separated by paper chromatography?

A different solubilities
B different colours
C equalsolubilities
D different boiling points

6 The diagram shows the distillation of a salt solution.

At which point would the temperature be equal to the boiling point of water?



7 Graphite conducts electricity because

A it contains electrons that are free to move.
B it contains protons that are free to move.
C the layers of atoms can slide over each other.
D it contains impurities.

8 Elements are systematically arranged in the Periodic Table in the order of increasing

A nucleon number.
B proton number.
C valency number.
D number of neutrons.

9 Which pair of atoms has the same number of neutrons?

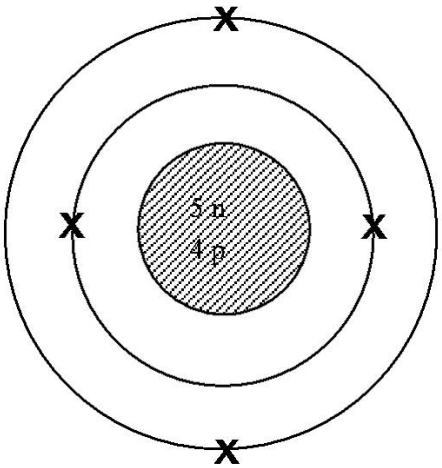
A $^{15}_{7}N$ and $^{14}_{7}N$

B $^{23}_{11}Na$ and $^{23}_{12}Mg$

C $^{14}_{6}C$ and $^{16}_{8}O$

D $^{235}_{92}U$ and $^{238}_{92}U$

10 The structure of an atom is shown.



Which statement about this atom is correct?

A It is not a neutral atom.
B Its nucleon number is 13.
C It has 4 valency electrons.
D It forms ions of a charge of +2.

11 Theelement francium, Fr, is in the same group of the Periodic table as potassium. The formula of francium chloride is likely to be

A Fr_2Cl
B $FrCl$
C $FrCl_2$
D $FrCl_3$

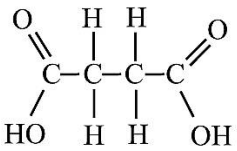
12 The proton number of element X is 19. When X forms an ionic compound, the electronic structure of the ion formed by X is

A 2, 8, 8.
B 2, 8, 8, 1.
C 2, 8, 8, 2.
D 2, 8, 8, 3.

13 Which equation is balanced?

A $CO + O_2 \rightarrow CO_2$
B $2CO + 2O_2 \rightarrow 2CO_2$
C $CO + O_2 \rightarrow 2CO_2$
D $2CO + O_2 \rightarrow 2CO_2$

14 The structural formula of butanedioic acid is shown.



Which statement about butanedioic acid is **not** true?

A Its molecular formula is $C_4H_6O_4$.
B It contains 3 types of elements.
C Its molecular and empirical formulae are the same.
D One molecule contains 14 atoms.

15 What is the ionic equation for the reaction between sodium hydroxide and hydrochloric acid?

A $2H^+_{(aq)} + OH^-_{(aq)} \rightarrow H_2O_{(l)}$

B $H^+_{(aq)} + OH^-_{(aq)} \rightarrow H_2O_{(l)}$

C $Na^+_{(aq)} + Cl^-_{(aq)} \rightarrow NaCl_{2(aq)}$

D $H^+_{(aq)} + Cl^-_{(aq)} \rightarrow HCl_{2(aq)}$

16 A compound contains 33.3% carbon and 66.7% oxygen.

The empirical formula of the compound is

A CO_2.

B C_2O_3.

C C_3O_2.

D CO_3.

17 Sodium hydrogen carbonate decomposes on heating as shown

$$2NaHCO_3 \rightarrow Na_2CO_{3(s)} + H_2O_{(l)} + CO_{2(g)}$$

What is the volume of gas produced at r.t.p, from the decomposition of 4 moles of sodium hydrogen carbonate?

A $22.40\,dm^3$

B $28.00\,dm^3$

C $44.80\,dm^3$

D $56.00\,dm^3$

18 What is the number of chlorine molecules in 35.5 g of chlorine gasif the number of molecules in one mole of a gas is x. ?

A 0.5 x

B x

C 2x

D 35.5x

19 A chloride ion, Cl^-, has the same number of electrons as

A Br^-.
B F.
C Ar.
D O^{2-}.

20 During electrolysis, cations move towards the

A cathode.
B anode.
C electrolyte.
D battery.

21 An object is electroplated with copper.

Which statement about the process is correct?

A The concentration of copper ions in the electrolyte increases.
B Copper is used as the cathode.
C Copper ions gain electrons from the object being electroplated.
D Oxygen is evolved at the anode.

22 Which reaction takes place when a photographic film is exposed to light?

A $2Ag + Br_2 \rightarrow 2AgBr$
B $Ag^+ + e^- \rightarrow Ag$
C $Br_2 + 2e^- \rightarrow 2Br^-$
D $Ag^+ + Br^- \rightarrow AgBr$

23 In the equilibrium reaction $N_2 + 3H_2 \rightleftharpoons 2NH_3$, which substance(s) will be present in the equilibrium mixture?

A NH_3 only
B N_2, H_2 and NH_3
C N_2 and H_2 only
D H_2 only

24 Which row correctly gives the correct number of protons, neutrons and electrons of the ion.

	ion	protons	neutrons	electrons
A	$^{9}_{4}Be^{2+}$	4	5	4
B	$^{19}_{9}F^{-}$	9	10	10
C	$^{27}_{13}Al^{3+}$	13	14	13
D	$^{35}_{17}Cl^{-}$	17	18	16

25 A solution of an alkali in water

A has a pH less than 7.
B turns blue litmus paper red.
C contains hydroxide ions.
D neutralises a salt to produce an acid.

26 What is the oxidation state of nitrogen in N_2O_3?

A +6
B +3
C - 3
D - 2

27 Which element is always found in steel?

A carbon
B chromium
C nickel
D silicon

28 Brass is an alloy of

A lead and tin.
B zinc and copper.
C iron and carbon.
D iron and aluminium.

29 Molten cryolite, Na_3AlF_6, is used in the extraction of aluminium because

A it lowers the melting point of aluminium oxide.
B it dissolves the aluminium oxide.
C it increases the melting point of aluminium oxide.
D it increases the purity of aluminium.

30 Which **one** is **not** an air pollutant?

A nitrogen
B carbon monoxide
C nitrogen oxide
D vaporised lead compounds

31 Which element is used to purify water for domestic purposes?

A iodine
B chlorine
C fluorine
D bromine

32 In the manufacture of sulphuric acid by the contact process, the sulphur trioxide is dissolved in

A water.
B dilute sulphuric acid.
C concentrated sulphuric acid.
D oleum.

33 Which catalyst is used in the manufacture of nitric acid?

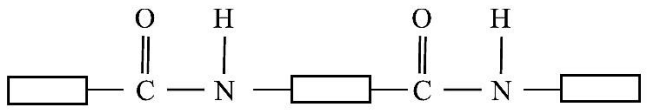
A vanadium pentoxide
B platinum
C iron
D nickel

34 What type of a compound is formed when an element P(proton number 12) reacts with an element Q(proton number 17)

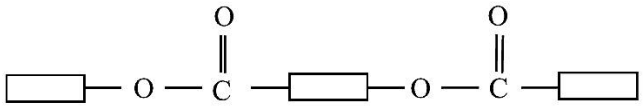
A a covalent compound of formula PQ
B a covalent compound of formula PQ_2
C an ionic compound of formula PQ_2
D anionic compound of formula P_2Q

35 Which structure has an ester bond?

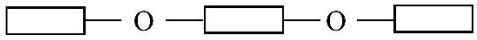
A



B



C



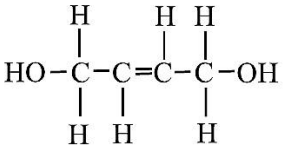
D



36 Polyethene and ethane have the same

A empirical formula.
B relative molecular mass.
C molecular formula.
D reaction towards aqueous bromine.

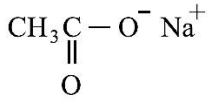
37 The structure of a compound is shown.

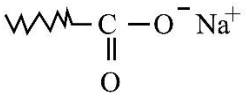


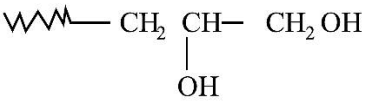
The compound can be classified asan

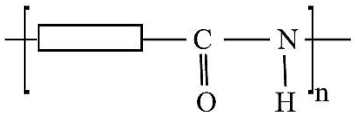
A acid and an alkene.
B alcohol and an alkene.
C acid and an alcohol.
D ester and an alkene.

38 Which structure represents a soap molecule resulting from the hydrolysis of fat with aqueous sodium hydroxide?

A 

B 

C 

D 

39 Which one is an advantage of using herbs over conventional medicines?

A herbs are readily available and cheaper
B herbs are more effective
C herbs are not toxic
D herbs are obtained in a natural form

40 Which method is not recommended for the disposal of non-biodegrable waste ?

A reusing
B bioremediation
C burning
D an esterification

DATA SHEET
The Periodic Table of the Elements

Group																
I	II										III	IV	V	VI	VII	O
							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 Bromide 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	98 Tc Technetium 43	101 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 Pd 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 = 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.)