FUCHUN SECONDARY SCHOOL
PRELIMINARY EXAMINATION 2019
SECONDARY FOUR EXPRESS AND FIVE NORMAL (ACADEMIC)

SCIENCE (CHEMISTRY/PHYSICS)

Paper 1 Multiple Choice

5076/01
5078/01
19 September 2019
Paper 1 : 1 hour

Additional materials: Multiple Choice Answer Sheet

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.
Do not use staples, paper clips, glue or correction fluid.
Write your name, index number and class on the Answer Sheet in the spaces provided.

There are **forty** questions on this paper. Answer **all** questions. For each question, there are four possible answers **A**, **B**, **C** or **D**.
Choose the **one** you consider correct and record your choice in **soft pencil** on the separate answer sheet.

Read the instructions on the answer sheet very carefully.

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 **10**.
The use of an approved scientific calculator is expected, where appropriate.

Setter: Mdm Yogeswari

This document consists of 10 printed pages.

21 Bromine is a liquid at 20 °C.

What is the melting point and boiling point for bromine?

	melting point/ °C	boiling point/°C
A	-22	-3
B	-8	-33
C	-7	59
D	25	103

22 A label is missing from a bottle of colourless solution **Q**.

In order to identify the solution two chemical tests are carried out.

test 1: When magnesium is added to solution **Q**, bubbles of colourless gas is given off which extinguishes a lighted splint with a pop sound.

test 2: 1 cm^3 of nitric acid is added to another sample of **Q**. The a few drops of silver nitrate solution is added. A white precipitate is formed.

What is **Q**?

A calcium hydroxide

B hydrochloric acid

C iron(II) carbonate

D zinc(II) hydroxide

23 An element Y has two isotopes, ^{238}Y and ^{235}Y.

How does ^{238}Y differ from ^{235}Y?

A It has 3 more neutrons and 3 more electrons.

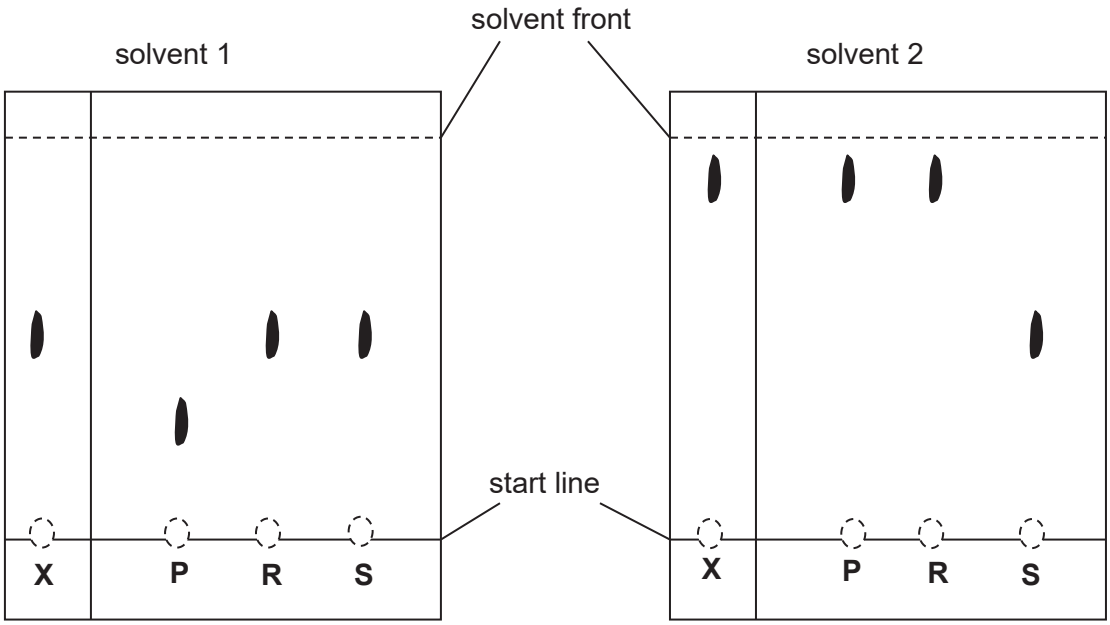
B It has 3 more neutrons.

C It has 3 more protons and 3 more electrons.

D It has 3 more protons.

24 Substance **X** contains one of the three substances **P**, **R** or **S**.

Two chromatograms of the four substances were obtained using different solvents.
The diagram below shows the results obtained.



What does **X** contain?

A **P** only

B **R** only

C either **P** or **R**

D either **R** or **S**

25 Which of the following changes will result in the particles moving at a higher speed?

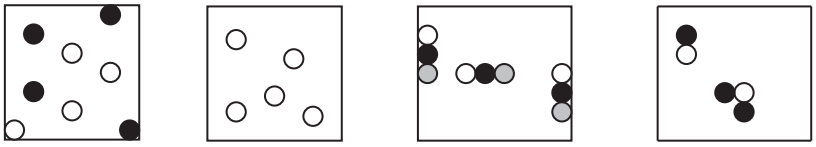
A Br_2 (g) → Br_2 (*l*)

B I_2 (g) → I_2 (s)

C H_2O (*l*) → H_2O (s)

D CO_2 (s) → CO_2 (g)

26 The diagrams below show atoms of different elements represented by ○, ◍ and ● .



I II III IV

Which diagram shows a pure compound and a mixture of elements respectively?

	pure compound	mixture of elements
A	III	I
B	III	II
C	IV	I
D	IV	II

27 A newly discovered element, Xylonium (Xy), is placed in Group II of the Periodic Table. Which is the correct chemical formula for its sulfate?

A Xy_2SO_4

B $Xy(SO_4)_2$

C $Xy_2(SO_4)_2$

D $XySO_4$

28 The table below shows the melting point and the electrical conductivity when in molten state and in solid state of substances **A**, **B**, **C** and **D**.

Which substance best represents a compound formed between a metal and non-metal?

	melting point	conducts electricity	
		when in solid state	when in molten state
A	Low	Good	Good
B	High	Poor	Good
C	Low	Poor	Poor
D	High	Poor	Poor

29 Ethane burns completely in oxygen as shown in the equation.

$$2C_2H_6\ (g) + 7O_2\ (g) \rightarrow 4CO_2\ (g) + 6H_2O\ (l)$$

If 15 cm^3 of ethane is burnt in excess oxygen, calculate the volume of the carbon dioxide obtained at the end of the reaction, measured at room temperature and pressure.

A 20.0 cm^3

B 30.0 cm^3

C 40.0 cm^3

D 50.0 cm^3

30 The reaction between hydrochloric acid and magnesium is shown.

$$2HCl + Mg \rightarrow MgCl_2 + H_2$$

Which volume of 1.0 mol/dm^3 hydrochloric acid is needed to react completely with 2.4 g of magnesium?

A 10 cm^3

B 20 cm^3

C 100 cm^3

D 200 cm^3

31 The following equation shows the reaction of zinc sulfide forming zinc and sulfur in the extraction of zinc from its ore.

$$ZnS \rightarrow Zn + S$$

Which statement about this reaction is correct?

A Zinc gains electrons to form zinc ions.

B Zinc loses electrons to form zinc ions.

C Zinc ions gain electrons to form zinc atoms.

D Zinc ions lose electrons to form zinc atoms.

32 Which oxide reacts with both acids and alkalis?

A carbon monoxide

B sulfur dioxide

C lead(II) oxide

D calcium oxide

33 Which element can only be extracted by electrolysis?

A lead

B silver

C sodium

D zinc

34 Which process is exothermic?

A burning petrol in a car engine

B cracking of petroleum fractions

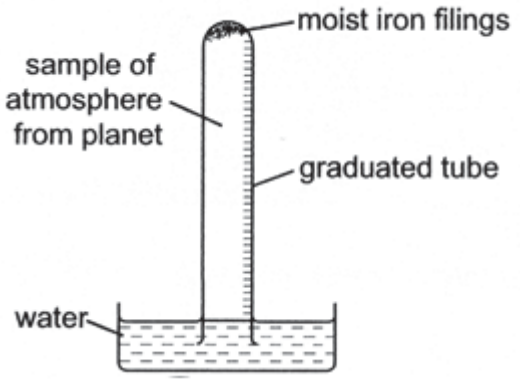
C fractional distillation of petroleum

D melting bitumen for roads

35 The air taken from a newly discovered planet contains the following gases.

gas	concentration (%)
carbon dioxide	20
hydrogen	40
ammonia	10
oxygen	30

The apparatus below was set up with a 100 cm^3 sample of the air taken from the planet in the graduated tube. The volume of the sample was measured at regular time intervals until no further change in volume took place.



What is the volume of gas left in the tube?

A 20 cm^3

B 30 cm^3

C 70 cm^3

D 80 cm^3

36 Substance **Y** turns a solution of acidified potassium manganate (VII) from purple to colourless.

What must solution **Y** contain?

A an alkali

B an ammonium salt

C a reducing agent

D an oxidising agent

37 Some metals will react with the solutions of the salts of another metal. The following ionic equations illustrate the reactions of metals copper, iron, zinc and Y.

$$Cu + Y^{2+} \rightarrow \text{no reaction}$$

$$Fe + Cu^{2+} \rightarrow Fe^{2+} + Cu$$

$$Y + Zn^{2+} \rightarrow Y^{2+} + Zn$$

$$Zn + Cu^{2+} \rightarrow Zn^{2+} + Cu$$

$$Zn + Fe^{2+} \rightarrow Zn^{2+} + Fe$$

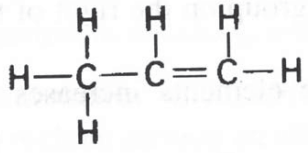
$$Zn + Y^{2+} \rightarrow \text{no reaction}$$

From the ionic equations, deduce the correct order of reactivity of the metals.

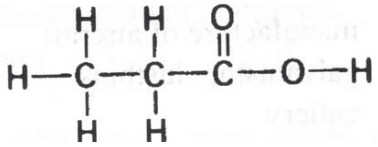
	most reactive	⟶		least reactive
A	Cu	Fe	Zn	Y
B	Y	Fe	Zn	Cu
C	Y	Zn	Fe	Cu
D	Zn	Y	Cu	Fe

38 Which compound is unsaturated and reacts with sodium carbonate?

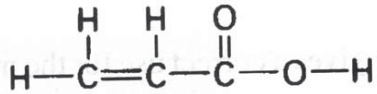
A



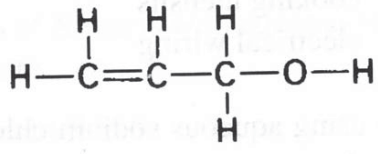
B



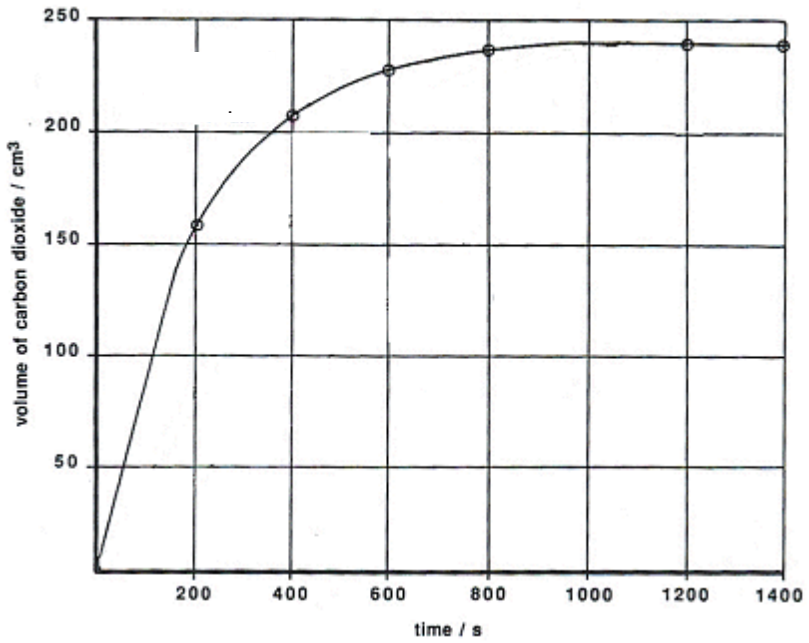
C



D



39 Calcium carbonate is placed in a flask on weighing balance and dilute hydrochloric acid is added. The total mass of the flask and its content is recorded every 200 seconds.



At which time is the reaction the fastest?

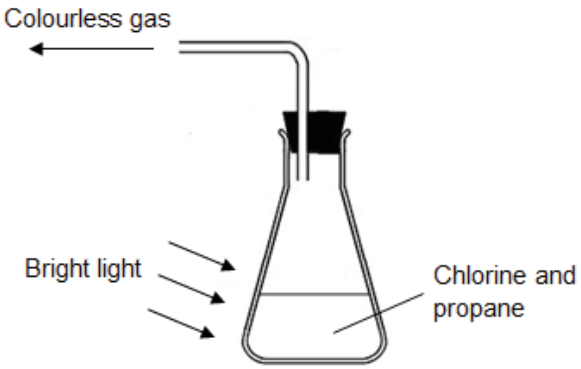
A 100 s

B 200 s

C 400 s

D 800 s

40 A mixture of chlorine and excess propane was exposed to bright light. When the light was switched on, the mixture in the flask began to bubble, giving off a colourless gas.



What is the colourless gas?

A chlorine **B** hydrogen

C hydrogen chloride **D** propane

The Periodic Table of Elements

Group																	
I	II											III	IV	V	VI	VII	0
							1 H hydrogen 1										2 He helium 4
3 Li lithium 7	4 Be beryllium 9		**Key** proton (atomic) number atomic symbol name relative atomic mass									5 B boron 11	6 C carbon 12	7 N nitrogen 14	8 O oxygen 16	9 F fluorine 19	10 Ne neon 20
11 Na sodium 23	12 Mg magnesium 24											13 Al aluminium 27	14 Si silicon 28	15 P phosphorus 31	16 S sulfur 32	17 Cl chlorine 35.5	18 Ar argon 40
19 K potassium 39	20 Ca calcium 40	21 Sc scandium 45	22 Ti titanium 48	23 V vanadium 51	24 Cr chromium 52	25 Mn manganese 55	26 Fe iron 56	27 Co cobalt 59	28 Ni nickel 59	29 Cu copper 64	30 Zn zinc 65	31 Ga gallium 70	32 Ge germanium 73	33 As arsenic 75	34 Se selenium 79	35 Br bromine 80	36 Kr krypton 84
37 Rb rubidium 85	38 Sr strontium 88	39 Y yttrium 89	40 Zr zirconium 91	41 Nb niobium 93	42 Mo molybdenum 96	43 Tc technetium –	44 Ru ruthenium 101	45 Rh rhodium 103	46 Pd palladium 106	47 Ag silver 108	48 Cd cadmium 112	49 In indium 115	50 Sn tin 119	51 Sb antimony 122	52 Te tellurium 128	53 I iodine 127	54 Xe xenon 131
55 Cs caesium 133	56 Ba barium 137	57 – 71 lanthanoids	72 Hf hafnium 178	73 Ta tantalum 181	74 W tungsten 184	75 Re rhenium 186	76 Os osmium 190	77 Ir iridium 192	78 Pt platinum 195	79 Au gold 197	80 Hg mercury 201	81 Tl thallium 204	82 Pb lead 207	83 Bi bismuth 209	84 Po polonium –	85 At astatine –	86 Rn radon –
87 Fr francium –	88 Ra radium –	89 – 103 actinoids	104 Rf rutherfordium –	105 Db dubnium –	106 Sg seaborgium –	107 Bh bohrium –	108 Hs hassium –	109 Mt meitnerium –	110 Ds darmstadtium –	111 Rg roentgenium –	112 Cn copernicium –		114 Fl flerovium –		116 Lv livermorium –		

lanthanoids	57 La lanthanum 139	58 Ce cerium 140	59 Pr praseodymium 141	60 Nd neodymium 144	61 Pm promethium –	62 Sm samarium 150	63 Eu europium 152	64 Gd gadolinium 157	65 Tb terbium 159	66 Dy dysprosium 163	67 Ho holmium 165	68 Er erbium 167	69 Tm thulium 169	70 Yb ytterbium 173	71 Lu lutetium 175
actinoids	89 Ac actinium –	90 Th thorium 232	91 Pa protactinium 231	92 U uranium 238	93 Np neptunium –	94 Pu plutonium –	95 Am americium –	96 Cm curium –	97 Bk berkelium –	98 Cf californium –	99 Es einsteinium –	100 Fm fermium –	101 Md mendelevium –	102 No nobelium –	103 Lr lawrencium –

The volume of one mole of any gas is 24 dm^3 at room temperature and pressure (r.t.p.)

FUCHUN SECONDARY SCHOOL
PRELIMINARY EXAMINATION 2019
SECONDARY 4 EXPRESS/ 5 NORMAL ACADEMIC

NAME:

CENTER NO: | | | | | | INDEX NO: | | | | |

CLASS:

SCIENCE (CHEMISTRY)
Paper 3

5076/03 and 5078/03
17 September 2019
1 hr 15 min
Max mark: 65

READ THESE INSTRUCTIONS FIRST

Write your name, class and index number on all the work you hand in.
You may use an HB pencil for any diagrams, graphs, tables or rough working.
Write in dark blue or black pencil.
Do not use staples, paper clips, highlighters, glue or correction fluid.

The use of an approved scientific calculator is expected, where appropriate.
You may lose marks if you do not show your working or if you do not use appropriate units.

Section A
Answer **all** the questions in the spaces provided.
Write your answers in the spaces provided on the question paper.

Section B
Answer any **two** questions.
Write your answers in the spaces provided on the question paper.

The number of marks is given in brackets [ ] at the end of each question or part question.

A copy of the Data Sheet is printed on page **15**.
A copy of the Periodic Table is printed on page **16**.

Marks Obtained	
Paper 3 Sect A	
Paper 3 Sect B ___	
B ___	
Total	

Name of Setter: Mdm Yogeswari

Section A (45 marks)

Answer **ALL** the questions in the spaces provided in this section.

1 Table 1.1 lists the number of protons, neutrons and electrons in several different particles.

Table 1.1

particle (not chemical symbols)	number of protons	number of neutrons	number of electrons
C	1	0	1
D	3	3	2
E	7	7	7
F	8	9	8
G	8	10	8
H	9	10	10

Which of the particles, **C**, **D**, **E**, **F**, **G** and **H** in Table 1.1, fit into each of the following descriptions

(a) an atoms with mass number of 18 …… [1]

(b) an atom with 5 electrons in its outer shell …… [1]

(c) an ion of a metal …… [1]

(d) atoms of isotopes of the same element …….. and …… [1]

(e) a negatively charged ion …….. [1]

[Total: 5]

2 Table 2.1 gives the melting points and boiling points of Group I and Group VII elements.

Table 2.1

	element	melting point/ °C	boiling point/ °C
Group I	lithium	180	1330
	sodium	97.8	890
	potassium	64	774
Group VII	chlorine	-101	-35
	bromine	-7	59
	iodine	114	184

(a) (i) The trends in melting points and boiling points for elements in Group I differ from those in Group VII.
Describe the trend down each group.

……

……

……[2]

(ii) Describe two other trends down Group VII.

……

…..……[2]

(b) (i) All of the elements in Group VII are diatomic.

Explain the meaning of *diatomic*.

……

……[1]

(ii) Draw a “dot and cross” diagram to show the bonding in a chlorine molecule.

Show the outer electrons only.

[2]

(c) **(i)** Sodium and chlorine react together to form sodium chloride.

Draw the “dot and cross” diagram to show the bonding in sodium chloride.

[2]

(ii) Explain why sodium chloride can conduct electricity in molten and aqueous state but not in solid state.

……

……

……[2]

[Total: 11]

3 The boxes in Fig 3.1 contain descriptions of five different substances **K**, **L**, **M**, **N** and **O**.

Fig 3.1

A solid, **K**, which melts on heating to a yellow liquid that cannot be made into a simpler substance.		A chemical reaction takes places and heat is liberated when this white solid, **L**, is formed.
	When this blue liquid, **M**, is distilled, a colourless liquid is collected.	
A white solid, **N**, that can be separated into two different substances by adding water and filtering.		A colourless substance, **O**, with a fixed melting point and a fixed boiling point.

Decide whether each substance should be classified as an element, compound, mixture or either an element or compound. Show your decision by putting a tick (√) in one box correct box for each substance in Table 3.1.

Table 3.1

substance	element	compound	mixture	either an element or a compound
K				
L				
M				
N				
O				

[5]

[Total: 5]

4 Salts can be prepared by using reactions of acids.

(a) The table shows some names and formulae of salts.

Complete the Table 4.1 by filling in the missing information.

Table 4.1

name of salt	formula of salt	name of acid used to make the salt	name of the other compound used to make the salt
potassium sulfate	K_2SO_4		
sodium chloride	NaC*l*	hydrochloric acid	
magnesium nitrate	$Mg(NO_3)_2$	nitric acid	
copper(II) sulfate		sulfuric acid	copper(II) oxide

[5]

(b) Write a balanced chemical equation for the reaction between copper(II) oxide and sulfuric acid.

……[2]

(c) Describe how to obtain pure, dry crystals of copper(II) sulfate from the resulting solution in the reaction in (b).

……

……

……

……[2]

(d) Name two salts that are prepared by precipitation.

…….

……. [2]

[Total:11]

5 Poisonous oxides of nitrogen and carbon monoxide are released from car exhausts and cause major pollution issues.

(a) State one harmful effect of each pollutant on human health.

(i) oxides of nitrogen

……

……[1]

(ii) carbon monoxide

……

……[1]

(b) The harmful gases are converted to less harmful ones before they are released from car exhausts as shown in the chemical equation below.

……CO + …….. NO $\rightarrow$ ……..CO_2 + …….. N_2

(i) Balance the chemical equation above. [1]

(ii) State which substance is reduced and give the reason for your answer.

substance reduced ……

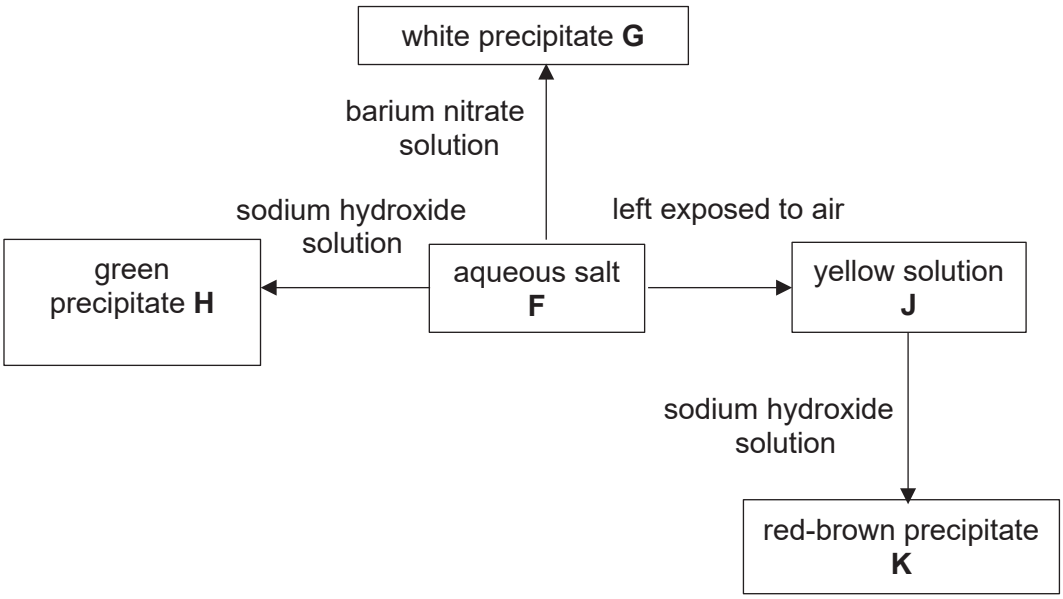
reason……..

……...[2]

[Total: 5]

6 Fig 6.1 below shows some reactions of an aqueous salt, **F**.

Fig 6.1



Name the substances **F**, **G**, **H, J** and **K**.

F: ……

G: ……

H: ……

J: ……..

K: ……..

[5]

[Total: 5]

7 The properties of a substance make it suitable for particular tasks.
Complete Table 7.1 by naming a suitable substance for each task.

Table 7.1

task	substance needed.
repairing road surfaces	
lowering the acidity of the soil	
making margarine from vegetable oils	

[3]

[Total: 3]

Section B (20 marks)

Answer any **two** questions in this section.

8 **(a)** Explain, including relevant chemical equations, how iron is extracted from its ore in a blast furnace.

……..

……..

……..

……..

……..

……..[4]

(b) Iron from blast furnaces is usually mixed with other element to form alloys.

Name one of these alloys and give a reason why this alloy is preferred to iron from blast furnaces.

……..……

……..…[2]

(c) Calculate the mass in grams, and the volume in dm^3, measured in room temperature and pressure, of carbon dioxide formed in producing 10 000 g of iron.

[4]

[Total: 10]

9 **(a)** Crude oil is separated into several useful substances in a fractionating tower. Describe the separation process.

……

……

……

……

……

……

……[3]

(b) Organic compounds are placed in an homologous series.

(i) Give two characteristics of an homologous series.

……

……[2]

(ii) Write the general formula for the homologous series of alkanes.

……[1]

(iii) Name and write the chemical formula of the first member of the homologous series of alkanes.

……[2]

(c) The alkenes include ethene, C_2H_4. This compound undergoes addition polymerization to form addition polymers.

(i) Draw the structural formula of ethene.

[1]

(ii) Draw two repeating units of the addition polymer formed by ethene.

[1]

[Total: 10]

10 **(a)** **(i)** Explain how coating iron with paint prevents iron from rusting.

……

……

……

……

……[2]

(ii) A student wants to investigate if salt water speeds up the rusting process. Describe a laboratory investigation that can be used to decide if salt water speeds up rusting.

You are provided with the two iron nails.

……

……

……

……

……

……

……

……

……

……

……

……

……[4]

(b) Iron reacts with steam to form the dark brown solid Fe_3O_4 and a colourless gas.

(i) Write a balanced chemical equation for this reaction

……...……[2]

(ii) Describe a positive test to identify the colourless gas.

……

……...……[2]

[Total: 10]

END OF PAPER 3

DATA SHEET

Colours of Some Common Metal Hydroxides

calcium hydroxide	white
copper(II) hydroxide	light blue
iron(II) hydroxide	green
iron(III) hydroxide	red-brown
lead(II) hydroxide	white
zinc hydroxide	white

The Periodic Table of the Elements

Group																	
I	II										III	IV	V	VI	VII	0
							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 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	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 bromine 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	– 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 Pb lead 82	209 Bi bismuth 83	– Po polonium 84	– At astatine 85	– Rn radon 86
– Fr francium 87	– Ra radium 88	– Ac actinium 89 †															

*58-71 Lanthanoid series

†90-103 Actinoid 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
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 mendeleviu m 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 24 dm^3 at room temperature and pressure.

Fuchun Secondary School

Secondary 4 Express

Science Chemistry (5076)

Prelim Examination 2019

Marking Scheme

Question	Answer	Question	Answer
1	C	11	C
2	B	12	C
3	B	13	C
4	B	14	A
5	D	15	C
6	A	16	C
7	D	17	C
8	B	18	C
9	B	19	A
10	D	20	C

Section A	Answer	marks	Markers report
A1a	G	1	
A1b	E	1	
A1c	D	1	
A1d	F,G	1	
A1e	H	1	
A2ai	Down group I, melting point and boiling point decreases. Down group VII, melting point and boiling point increases.	1 1	
A2aii	Down the group, The density increases, The color darkens The reactivity decreases	Any Two 2m	
A2bi	Two atoms chemically bonded together	1	Badly done
A2bii	Covalent bond sharing of two electrons Correct number of unshared electrons for chlorine atoms Outer shells only –penalise 1m	1 1	
A2bii	Correct charge and electrons for Na ion Correct charge and electrons for Cl ion All shells must be drawn –penalise 1m	1 1	

A2bii	In solid state, the ions are **held together by strong electrostatic forces of attraction** in a giant lattice structure. They cannot conduct electricity In aqueous and molten state, the **ions are mobile** and can conduct electricity	1 1	Wrong keywords such as electrons and atoms were used instead of ions
A3	K: element L: compound M: mixture N: Mixture O: Either an element or compound	1 x 5	
A4a	Potassium sulfate: sulfuric acid, potassium hydroxide, (do not accept potassium) Sodium chloride: Sodium hydroxide/sodium carbonate Magnesium nitrate: magnesium Copper(II) sulfate: $CuSO_4$	1 x 5	Many students gave " potassium" and "sodium" as answers. They also gave examples of other salts instead of reagents
A4b	$CuO + H_2SO_4 \rightarrow CuSO_4 + H_2O$	2	
A4c	Evaporate/heat the solution till saturation Leave it to cool and crystallise. Collect the crystals by filtration, rinse with little deionised water. Press dry between sheets of filter paper.	1 1	Badly done. Students need to know the steps of salt prep.
A4d	Any 2 insoluble salt, Lead chloride, silver chloride, Barium sulfate, lead sulfate, calcium sulfate Or any carbonate other than SPA carbonates. Must be name and not chemical formula	1 x 2	Badly done Many students forgot their insoluble salts and gave even hydroxides observed in QA as answers.
A5ai **A5aii**	Respiratory probelms /breathing difficulties Combines with haemoglobin in blood and prevent oxygen from being transported around the body, leading to brain damage or death	1 1	 For CO, improper answers such as "fuse with blood cells" or " reduce amount of haemoglobin" were unacceptable.

A5b	**2**CO + **2**NO → **2**CO_2 + N_2	1	
A5bii	Substance reduced: NO Reason: NO is reduced as it loses oxygen to form N_2. Starting and ending species with reason must be given	1 1	They could recognise what species is reduced but cannot explain. Quoted wrong oxidation state for nitrogen in NO.
A6	F: Iron (II) sulfate G:Barium sulfate H:Iron(II) hydroxide J: Iron(III) sulfate K: Iron (III) hydroxide Must be names and not chemical formula	1 x 5	
A7	Bitumen Calcium oxide/ calcium hydroxide Hydrogen	1 x 3	Could not identify hydrogen.
	Section B		
B8a	C + O_2 → CO_2 In the blast furnace, Carbon in coke burns in air to form carbon dixoide. CO_2 + C → 2CO Carbon dioxide further reacts with coke to form carbon monoxide. Fe_2O_3 + 3CO → 2Fe + 3CO_2 Carbon monoxide then **reduces iron(III) oxide,** haematite, to form molten iron and carbon dioxide.	1eqn 1eqn 1eqn 1m for all the three proper descriptions	Those who attempted managed to at least get the equations right.
B8b	Steel is an alloy of iron. It is stronger and harder than iron.	1 1	
B8c	No of moles of 10000g of iron = 10000/56 mol No of moles of carbon dioxide = (10000/56) x 3/2 mol Volume of CO_2 = (10000/56) x 3/2 x 24 = 6428.57 dm^3	1 1 1	

	Mass of CO_2= (10000/56) x 3/2 x 44 = 11 785.71g All units not correct/ or not given- penalise 1m Allow ecf accordifng to eqn given by student in 8bi	1	
B9a	Crude oil is heated until it becomes vapor. The vapor cools and condenses in the fractionating tower and is collected into different fractions according to their different boiling points. The fraction with the lowest boiling point will condense and be collected at the top of the fractionating tower. The fraction with highest boiling point will condense and be collected at the bottom of the fractionating tower.	1 1 1	Many inappropriate keywords. Students ans were highlighted for teachers to refer to.
B9bi	They have the same functional group; They have the same general formula; They differ by one $-CH_2$ group; They have the similar chemical properties	Any two (2m)	Same vs Similar Example similar functional group or similar general formula is different from same functional group and same general formula.
B9bii	C_nH_{2n+2}	1	
B9biii	Methane, CH_4	1 1	Students did not recall formula for methane
B9ci	Draw C_2H_4	1	
B9cii		1	Badly done. Either drew three units or ended the

			chain by adding hydrogen atoms
B10ai	Paint acts as an **protective layer,** Prevents contact with **oxygen and water**	1 1	Many did not mention protective layer
B10aii	Measure the mass of each nail and record it as No and Mo. Place nail in a test tube labelled N filled with distilled water. Place the second nail in a test tube M filled with saltwater. Leave the test tubes in the lab for a week. Measure the dry mass of each nail and label it as N1 and M1. Calculate the mass gain as N1-N0 and M1-Mo. The one with the higher mass gain has rusted more.	1 1 1 1 1	Badly done. Students want to time the rusting process. Students were highlighted for teachers to take note of
B10bi	$3Fe + 4H_20 \rightarrow Fe_3O_4 + 4H_2$	2	
B10bii	Insert a lighted splint. If the gas extinguishes the flame with a pop sound, it is hydrogen.	1 1	