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FAJAR SECONDARY SCHOOL
2017 END-OF-YEAR EXAMINATIONS
SECONDARY 3 EXPRESS

CANDIDATE NAME

CLASS | INDEX NUMBER

SCIENCE (CHEMISTRY) 5076/01 and 5078/01
Paper 1

Setter: Yee NS
Additional Materials: OTAS

Date: 3 October 2017
Duration: 30 minutes

READ THESE INSTRUCTIONS FIRST

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

There are twenty questions on 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 OTAS Sheet.

A copy of the Periodic Table is printed on page 8 of this paper

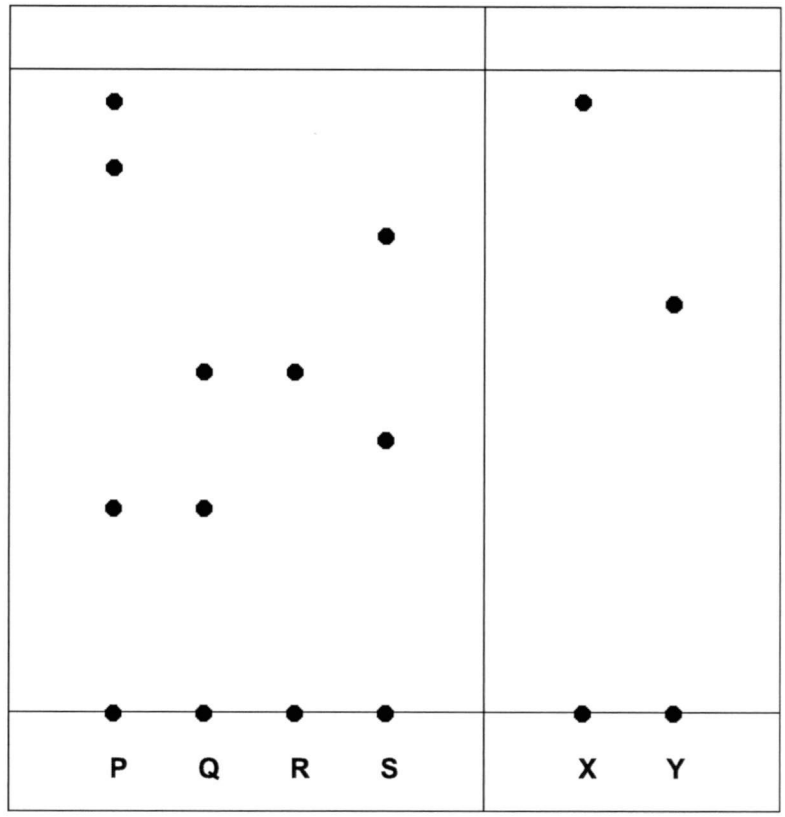
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

Any rough working should be done in this booklet.
The use of an approved scientific calculator is expected, where appropriate.

Do not open this document till permission is given.

This document consists of **8** printed pages and **0** blank pages.

1 The chromatogram below shows the dyes contained in four soft drinks, **P**, **Q**, **R** and **S**, compared with harmful dyes **X** and **Y**.



Which drink(s) has/have a dye that may be harmful?

A **P** only

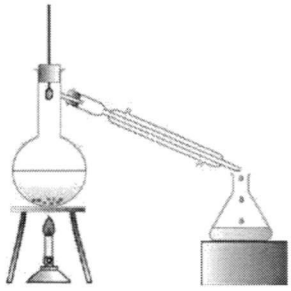
B **P** and **R**

C **P**, **R** and **S**

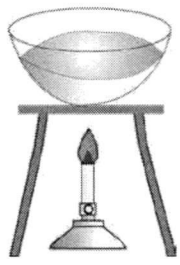
D **P**, **Q** and **R**

2 Compound **X** melts at 40 °C, boils at 120 °C, and is not soluble in water.

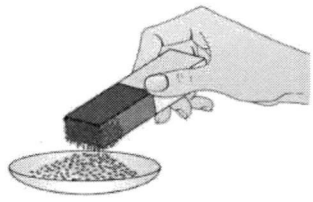
Which setup can be used to obtain pure **X** from a mixture of **X** with water?



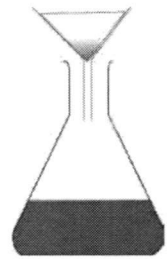
A



B



C



D

3 An aluminium ion is represented by the symbol, Al^{3+}.

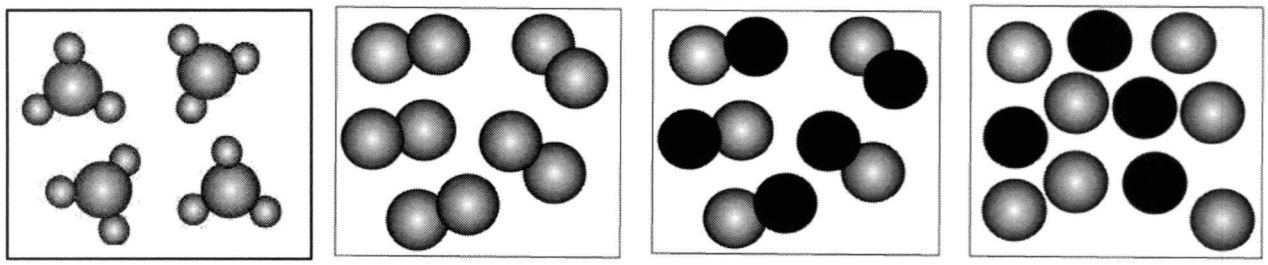
Which row correctly states the number of neutrons, protons and electrons the ion has?

	neutrons	protons	electrons
A	14	13	10
B	14	13	13
C	27	14	13
D	40	13	10

4 Which changes occur when a liquid at 50 °C becomes a gas at 120 °C?

	separation of particles	energy of particles	attractive force between particles
A	decrease	decrease	increase
B	decrease	increase	decrease
C	increase	decrease	increase
D	increase	increase	decrease

5 Which diagram represents the particles in a mixture?



A **B** **C** **D**

6 Which substance is a conductor of electricity when in solid state?

A nitrogen **B** sodium

C sodium chloride **D** sulfur

7 Which equation shows a neutralisation reaction?

A $CaCO_3 + H_2SO_4 \rightarrow CaSO_4 + H_2O + CO_2$

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

C $NaOH + HNO_3 \rightarrow NaNO_3 + H_2O$

D $NH_4Cl + KOH \rightarrow KCl + NH_3 + H_2O$

8 Ali dipped a piece of red litmus paper into an unknown solution and it remained red. He believed that the solution was acidic. John said that the test was incomplete.

What additional test should Ali conduct to confirm if the solution was acidic or not?

A check the solution to see whether it is clear or not

B taste the solution to see if it taste sour

C test the solution to see if it conducts electricity

D test the solution with a piece of blue litmus paper

9 Which of these Group I elements reacts most violently with water?

A caesium

B lithium

C potassium

D rubidium

10 The table shows information of five elements.

element	**P**	**Q**	**R**	**S**	**T**
atomic number	3	6	11	16	18

Which two elements belong to the same group of the Periodic Table?

A **P** and **R**

B **P** and **S**

C **Q** and **T**

D **R** and **S**

11 Metals **X**, **Y** and **Z** were each added to salt solutions of the other two metal ions as shown in the table below.

metal added	salt solutions of		
	X	**Y**	**Z**
X		**Y** displaced	**Z** displaced
Y	no reaction		no reaction
Z	no reaction	**Y** displaced	

Based on the results shown, what could be metals, **X**, **Y** and **Z**?

	X	**Y**	**Z**
A	copper	zinc	iron
B	iron	copper	zinc
C	zinc	copper	iron
D	zinc	iron	copper

12 The data on two indicators are given below:

indicator	pH which colour changes	colour change	
		acid	alkali
Bromocresol-green	5.5	yellow	blue
Phenol red	6.8	yellow	red

What would be the resultant colour if both indicators are added to a sample of pure water?

A blue **B** green

C purple **D** red

13 Which metal react slowly with dilute hydrochloric acid?

A copper **B** iron

C magnesium **D** zinc

14 **X**, **Y** and **Z** are elements from the same period of the Periodic Table. **X** forms an ion X^-, **Y** forms an ion Y^+ and **Z** forms an ion Z^{2+}.

If **X**, **Y** and **Z** are placed in order of increasing atomic number, which order is correct?

A **X**, **Y**, **Z**

B **X**, **Z**, **Y**

C **Y**, **X**, **Z**

D **Y**, **Z**, **X**

15 An element **Z** forms an oxide of formula Z_2O_3.

In which group of the Periodic Table is **Z** likely to be found?

A Group I

B Group II

C Group III

D Group IV

16 Which of these pairs of elements form a compound by sharing electrons?

A carbon and chlorine

B lithium and iodine

C neon and nitrogen

D sodium and fluorine

17 Sodium, aluminium and sulfur are in the same period of the Periodic Table.

Which trend in types of oxides occurs across this period?

	left → right		
A	acidic	amphoteric	basic
B	amphoteric	basic	acidic
C	basic	acidic	amphoteric
D	basic	amphoteric	acidic

18 When sulfuric acid dissolves in water,

A hydrogen ions and sulfate ions are produced.

B hydrogen ions and hydroxide ions are produced.

C only hydrogen ions are produced.

D only hydroxide ions are produced.

19 A liquid boils at a temperature of 100 °C.

Which other property of the liquid proves that it is pure water?

A It does not leave a residue when boiled.

B It freezes at 0 °C.

C It is neither acidic nor alkaline.

D It turns white anhydrous copper(II) sulfate blue.

20 The ease of obtaining metals from their ores are related to their position of elements in the reactivity series of metals.

Which metal is **incorrectly** matched to the metals extraction method?

	metals	extraction method
A	calcium	electrolysis
B	copper	electrolysis
C	silver	found uncombined in the ground
D	zinc	reduction with carbon

End of Paper

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.).

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FAJAR SECONDARY SCHOOL
2017 END-OF-YEAR EXAMINATIONS
SECONDARY 3 EXPRESS

CANDIDATE NAME

CLASS | INDEX NUMBER

SCIENCE (CHEMISTRY)
Paper 3

5076/03 and 5078/03

Setter: Yee NS
No Additional Materials are required.

Date: 5 October 2017
Duration: 1 hour 15 minutes

READ THESE INSTRUCTIONS FIRST

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

Section A
Answer **all** questions in the spaces provided

Section B
Answer any two questions.
Write your answers on the writing papers provided

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.
In calculations, you should show all steps in your working, giving you answer at each stage.
A copy of the Periodic Table is attached on page 14.
The use of an approved scientific calculator is expected, where appropriate.

For Examiner's Use	
Paper 1	/20
Paper 2 Section A	/45
Paper 2 Section B	/20
Total	/85

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This document consists of **13** printed pages and **1** blank page.

Section A [45 marks]

Answer **all** questions in the spaces provided.

For Examiner's Use

A1 Table 1.1 gives information about five substances, **P**, **Q**, **R**, **S** and **T**.

substances	melting point / °C	boiling point / °C
P	-214	-183
Q	-56	-79
R	17	118
S	87	167
T	809	1465

Table 1.1

(a) At 30 °C (room temperature), which of the substances, **P**, **Q**, **R**, **S** or **T**, is/are

(i) solid(s) ..... [1]

(ii) liquid(s)..... [1]

(iii) gas(es)..... [1]

(b) **(i)** Using only the information given in Table 1.1, name the most appropriate separation technique to separate a mixture of **P** and **Q?**

..... [1]

(ii) Which substance is likely an ionic salt?

..... [1]

[Total: 5]

For Examiner's Use

A2 **(a)** Table 2.1 shows the information of oxides, **A**, **B** and **C**.

oxide	appearance	solubility in		
		water	hydrochloric acid	sodium hydroxide
A	white solid	insoluble	dissolves to form colourless solution	dissolves to form colourless solution
B	white solid	soluble (turns blue litmus paper red)	insoluble	dissolves to form colourless solution
C	white solid	dissolve sparingly (turns red litmus paper blue)	dissolves to form colourless solution	insoluble

Table 2.1

Classify oxides, **A**, **B** and **C**, as acidic, basic or amphoteric oxide.

oxide **A** ..... [1]

oxide **B** ..... [1]

oxide **C** ..... [1]

(b) Write a balanced chemical equation for each of the following equations. State symbols are not required.

(i) zinc + hydrochloric acid → zinc chloride + hydrogen

..... [1]

(ii) magnesium oxide + sulfuric acid → magnesium sulfate + water

..... [1]

(c) Balance the following equation.

.....$CuO(s)$ + ...$HNO_3(aq)$ → .....$Cu(NO_3)_2(aq)$ + ...$H_2O(l)$ [1]

[Total: 6]

A3 Study Table 3.1 and use the information to answer the questions that follow.

For Examiner's Use

element	atomic number	mass number
chlorine	17	35.5
iron	26	56
carbon	6	12

Table 3.1

(a) Which element has the same number of protons and neutrons?

..... [1]

(b) How many neutrons are there in an atom of iron?

..... [1]

(c) How many electrons are there in a chloride ion?

..... [1]

(d) Draw a 'dot and cross' diagram of chlorine gas. Show only the electrons in the outermost shell.

[2]

[Total: 5]

A4 Complete Table 4.1 by filling in the missing information.

name of compound	formula of cation	formula of anion	chemical formula of compound
iron(III) hydroxide	Fe^{3+}		
ammonium sulfate		SO_4^{2-}	
sodium hydride			NaH
	Zn^{2+}	CO_3^{2-}	

Table 4.1

[4]

[Total: 4]

A5 Fig. 5.1 shows the arrangement of electrons in compound **Y.**

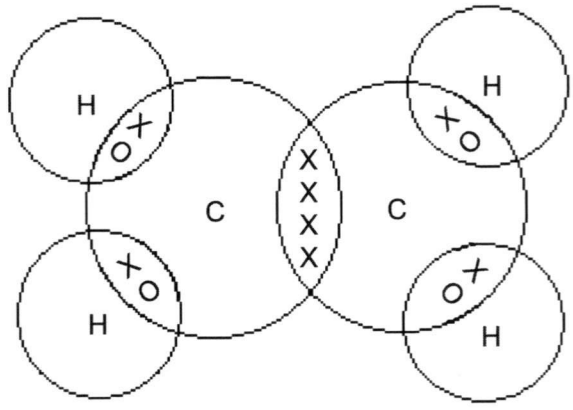


Fig. 5.1

(a) Name all elements present in compound **Y**.

.....

[1]

(b) Which two atoms in compound **Y** form a double bond?

.....

[1]

(c) How many single covalent bonds can each carbon atom form?

.....

[1]

(d) Use your knowledge of bonding, explain the low melting and boiling points of compound **Y.**

.....

.....

.....

[2]

[Total: 5]

A6 Fig. 6.1 shows the structure of an atom of an element **Z**.

For Examiner's Use

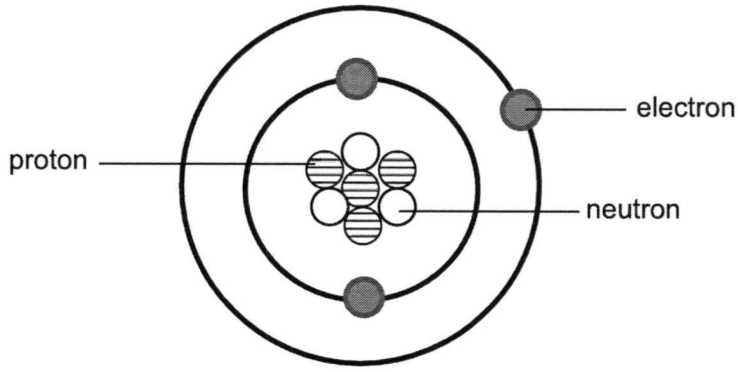


Fig. 6.1

(a) Using the Periodic Table, state the name and the atomic symbol of an element in the same group with element **Z**.

..... [1]

(b) Describe with a 'dot and cross' diagram to show the bonding between the element **Z** and fluorine. Show only the electrons in the outermost shell.

.....

.....

.....

.....

..... [4]

[Total: 5]

For Examiner's Use

A7 **(a)** In separate experiments, powdered samples of metal **X** and metal **Y** were reacted with solutions of nickel(II) sulfate and iron(II) sulfate.

Table 7.1 shows how the colours of the solutions changed.

	nickel(II) sulfate	iron(II) sulfate
metal **X**	solution goes from green to colourless	solution stays pale green
metal **Y**	solution goes from green to colourless	solution goes from pale green to colourless

Table 7.1

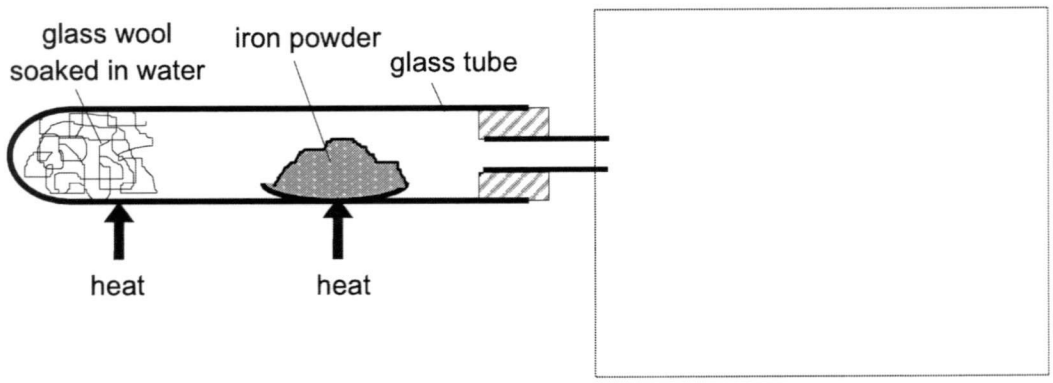
Among the four metals, **X, Y**, nickel and iron, which metal is the

(i) most reactive? ..... [1]

(ii) least reactive? ..... [1]

(b) The apparatus shown in the diagram was used to react steam with hot iron powder.

A colourless gas **Z** was produced in the reaction.



Complete the diagram to show how you would attempt to collect gas **Z**. [1]

(c) Iron can corrode and form rust under certain conditions.

(i) State the two conditions for rusting to occur.

..... [1]

(ii) Name a method of preventing rusting.

..... [1]

[Total: 5]

A8 Four unlabelled metals, **A, B, C** and **D,** are tested in a laboratory. The results are as follows:

For Examiner's Use

Metal **A** has to be hot before it will react with steam.

Metal **B** has to be very hot before it will react with steam. It reacts slowly with dilute hydrochloric acid.

Metal **C** is the only one to react with cold water. The reaction with water is steady but not violent.

Metal **D** does not react with dilute hydrochloric acid.

(a) Place the metals, **A, B, C** and **D** in order of decreasing reactivity.

..... [1]

(b) Suggest a possible name for **any two** of the metals, **A, B, C** and **D.**

letter of metal (**A, B, C** or **D**)	name of metal

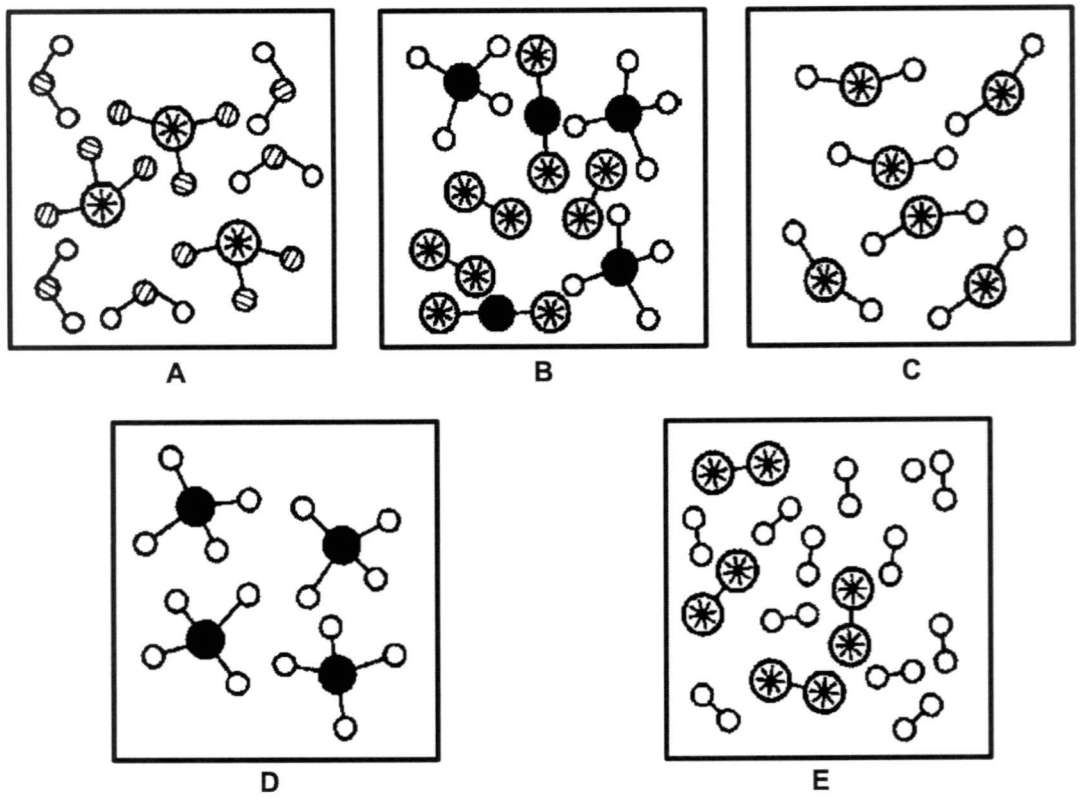
[2]

(c) Write a chemical equation for the reaction of any **one** of the metals with cold water. Include state symbols in your answers.

..... [2]

[Total: 5]

A9 The figure below contains students' drawings of particles in gases.



Which of the students' drawings, **A**, **B**, **C**, **D** or **E**, best represents

(a) a mixture of nitrogen and oxygen, ...

(b) molecules of methane, ...

(c) molecules of nitrogen dioxide, ...

(d) a mixture of compounds and an element, ...

(e) a mixture of ammonia and water? ..... [5]

[Total: 5]

Section B [20 marks]

Answer any **two** questions in this section

For Examiner's Use

B10 Chlorine and iodine are two important elements in Group VII of the Periodic Table.

(a) By what other name are the elements in Group VII known as?

..... [1]

(b) List out four physical properties of elements in Group VII of the Period Table.

.....

.....

.....

..... [4]

(c) **(i)** Describe what happens when chlorine is bubbled into a solution of potassium iodide. Explain your answer.

.....

.....

.....

.....

.....

..... [3]

(ii) Write a chemical equation for the reaction. Include state symbols in your answer.

..... [2]

[Total: 10]

B11 Fig. 10.1 shows a blast furnace used in industries to extract pure iron from its ores.

For Examiner's Use

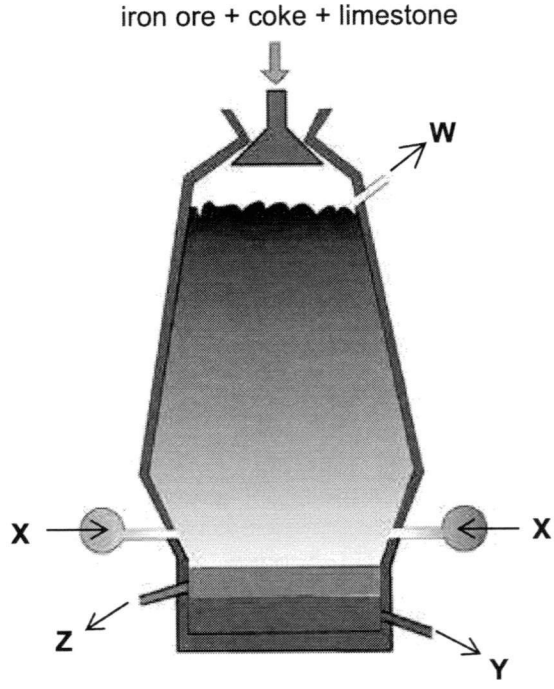


Fig. 10.1

(a) Label all the parts indicated by **W**, **X**, **Y** and **Z.**

W ..... **X** .....

Y ..... **Z** ..... [2]

(b) Describe the reactions taking place in the blast furnace that produce pure iron from the iron ore. Write balanced chemical equations where necessary.

.....

.....

.....

.....

..... [5]

(c) Describe with equations, the formation of the slag in the blast furnace.

.....

.....

.....

.....

..... [3]

[Total: 10]

For Examiner's Use

B12 A bottle of lemon juice can easily be purchased from any of our supermarkets.

(a) Suggest the pH of lemon juice.

..... [1]

(b) A student added some sugar syrup to the lemon juice to remove the sour taste and then tested the pH again. What would the pH now be? Explain your answer.

.....

.....

.....

..... [3]

(c) Some magnesium ribbons were added to the lemon juice and effervescence was observed.

(i) Name the gas produced.

..... [1]

(ii) Describe a chemical test to identify the gas produced in **(c)(i)**.

.....

..... [1]

(d) Drinking too much lemon juice can result in tooth decay if proper dental hygiene is not practised.

(i) Using the pH of toothpaste, explain how toothpaste can help protect us from tooth decay if we drink too much lemon juice.

.....

..... [2]

(ii) Some toothpaste contains calcium carbonate which can react with the lemon juice.

Describe one observation when some toothpaste containing calcium carbonate is added to lemon juice. State a confirmatory test for one of the products formed.

.....

.....

.....

..... [2]

[Total: 10]

End of Paper

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 –

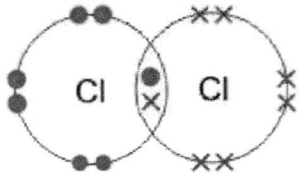
The volume of one mole of any gas is 24 dm^3 at room temperature and pressure (r.t.p.).

Fajar Secondary School
End-of-Year Examination 2017

3E Science (Chemistry) 5076/01 or 5078/01
(Paper 1)

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

3E Science (Chemistry) 5076/03 or 5078/03
(Paper 3)

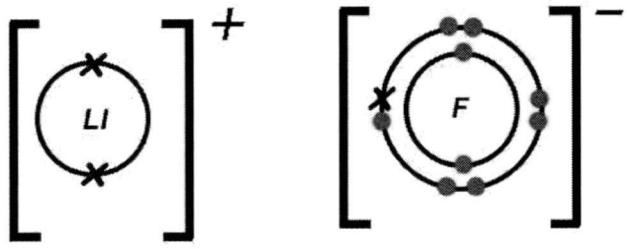
Section A (40 marks)		
1(a)	(i) S and T	[1]
	(ii) R	[1]
	(iii) P and Q	[1]
(b)	(i) fractional distillation	[1]
	(iii) T	[1]
2(a)	A: amphoteric oxide	[1]
	B: acidic oxide	[1]
	C: basic oxide	[1]
(b)	(i) $Zn + 2HCl \rightarrow ZnCl_2 + H_2$	[1]
	(ii) $MgO + H_2SO_4 \rightarrow MgSO_4 + H_2O$	[1]
(c)	$CuO(s) + \underline{2}HNO_3(aq) \rightarrow Cu(NO_3)_2(aq) + H_2O(l)$	[1]
3(a)	Carbon (reject "C", chemical symbol as answer)	[1]
(b)	30	[1]
(c)	18	[1]
(d)		[1] for correct number of electrons shared [1] for 7 valence electron drawn for each Cl atom

4		

Name of compound	Symbol of cation	Symbol of anion	Formula of compound
iron (III) hydroxide	Fe^{3+}	OH^-	$Fe(OH)_3$
ammonium sulfate	NH_4^+	SO_4^{2-}	$(NH_4)_2SO_4$
Sodium hydride	Na+	H-	NaH
zinc carbonate	Zn^{2+}	CO_3^{2-}	$ZnCO_3$

[1]
[1]
[1]
[1]

5(a)	carbon and hydrogen	[1]
(b)	carbon and carbon	[1
		[1]
(d)	covalent compound Y has weak intermolecular forces between its molecules, they need small amount of energy to overcome these attractive forces, hence compound Y has low melting and boiling.	[1] [1]

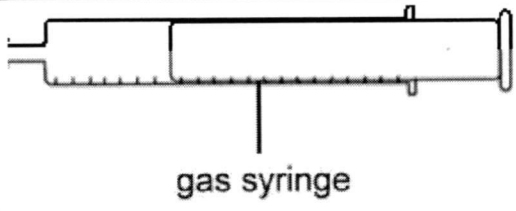
6(a)	Any other element in group one. Correct name and symbol must be given. Eg: Sodium, Na or Potassium, K etc (any one only) [1]
(b)	*After Bonding*  ***Lithium atom loses an electron to from lithium ion LI^+*** ***Fluorine atom gains an electron to from fluoride ion F^-*** Electrostatic forces of attraction between Li^+ and F^- to form LiF. *Candidates are allowed to use Z instead of Lithium in the drawing and in the description of bonding.*

[1] for Li^+

[1] for F^-

[1]

[1]

7(a)	(i) Y	[1]
	(ii) nickel	[1]
(b)		
(c)	(i) water and oxygen (or air)	Both conditions to score [1]
	(ii) any one of the following: • Greasing • Painting • Coating with plastics • electroplating	[1]
8(a)	**C A B D**	[1]
(b)	Any two of the answers below: **A:** magnesium **B** zinc **C:** calcium **D**: copper	[2]
(c)	Any of the following equations: (only calcium can react with water) $Ca + 2H_2O \rightarrow Ca(OH)_2 + H_2$	[1]
9	(a) E (b) D (c) C (d) B (e) A	Max [5]

Section B [20 marks] Answer any two questions		
10(a)	halogens	[1]
10(b)	Any of the four physical properties are: - non electrical conductors - low density - they have low melting and boiling points. - they are coloured. - they exist as gas, liquid and solid states at room temperature.	[4]
10(c)(i)	Colourless solution turns brown / yellow (with brown / black deposit) Chlorine being more reactive halogen, it displace iodine from an iodide solution giving a brown/yellow color solution.	[1] [1] [1]
10(c)(ii)	Cl_2 (g) + 2KI (aq) → 2KCl (aq) + I_2 (aq)	[2]

11(a)	**W**: waste gas **X**: hot air **Y**: molten slag or calcium silicate **Z**: molten iron	Every two correct – [1] Max [2]
11(b)	• oxygen in hot air reacts with coke form carbon dioxide • C(s) + O_2(g) → CO_2(g) • Carbon dioxide reacts with more coke to give carbon monoxide • C(s) + CO_2(g) → 2CO(g) • The Iron (III) oxide is then reduced by carbon monoxide to iron • Fe_2O_3(s) + 3CO(g) → 2Fe(*l*) + 3CO_2 (g) (state symbols in equations are not required)	6 points – [5] 5 points – [4] 4 points – [3] 3 points – [2] 2 points – [1] 1 point - 0
11(c)	• Limestone added in the blast furnace is decomposed by heat to produce carbon dioxide and calcium oxide. • $CaCO_3$(s) → CO_2(g) + CaO(s) • Calcium oxide reacts with acidic impurities sand to form slag, • CaO(s) + SiO_2(s) → $CaSiO_3$(*l*) (state symbols in equations are not required)	4 points – [3] 3 points – [2] 2 points – [1] 1 point - 0

12(a)	The pH range of lemon juice is 3 to 6	[1]
12(b)	The pH is properly to be the same as before, as there is <u>no</u> OH^- ions from neutral sugar syrup that can neutralize the H^+ in lemon juice, therefore the pH should be the same as its original pH.	[1] [1] [1]
12(c)(i)	Hydrogen gas	[1]
12(c)(ii)	Extinguish lighted splint with a pop sound	[1]
12(d)(i)	pH = 8 or 9, Tooth paste can neutralize the acids left in teeth.	[1] [1]
12(d)(ii)	Effervescence / fizzing White precipitate forms in limewater when carbon dioxide is formed	[1] [1]