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GAN ENG SENG SCHOOL
Mid-Year Examination 2017

CANDIDATE NAME			
CLASS		**INDEX NUMBER**	

SCIENCE (PHYSICS, CHEMISTRY)

5076/01
12 May 2017
1 hour

Sec 3 Express
Paper 1 Multiple Choice

Additional Materials: OTAS

Calculators are allowed in the examination.

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.
Do not use staples, paper clips, highlighters, glue or correction fluid.
Write your name, class and index number on the cover page and shade in your index number on OTAS.

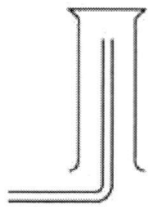
There are **forty** questions in this paper. Answer **all** questions. For each question there are four possible answers **A**, **B**, **C**, and **D**.
Choose the one you consider correct and record your choice in **soft pencil** on the separate OTAS.

Read the instructions on the OTAS very carefully.

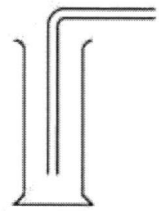
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
Any rough working should be done in this booklet.
A copy of periodic table is printed on page **10.**

Total Marks
40

21 Carbon dioxide is a gas that is soluble in water and denser than air.
Which of the following is most appropriate in collecting and measuring the volume of carbon dioxide produced in an experiment?



A



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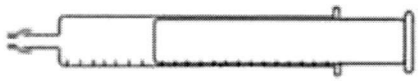

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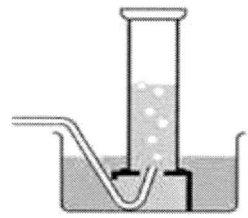


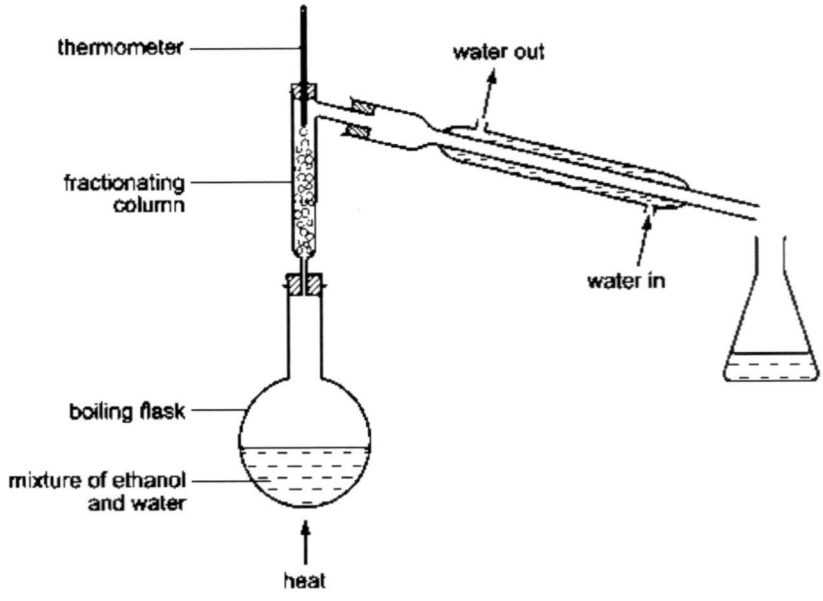
D

22 What is the correct sequence for obtaining pure salt from a mixture of sand and salt?

A Add water, evaporate
B Add water, filter
C Add water, filter, evaporate
D Filter, add water, evaporate

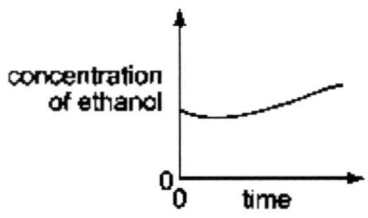
23 The apparatus shown is used to distil a dilute solution of ethanol in water.

[B.P.: ethanol, 78 °C; water 100°C]

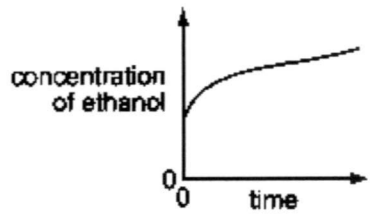


Which graph shows the change in concentration of the ethanol in the boiling flask as the distillation proceeds?

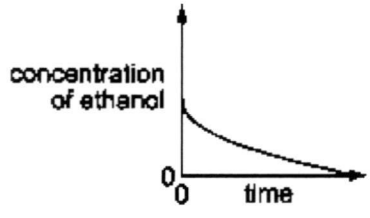
A



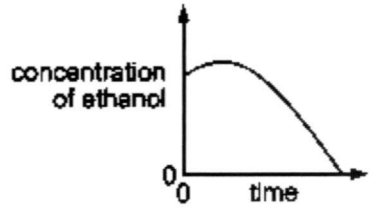
B



C



D



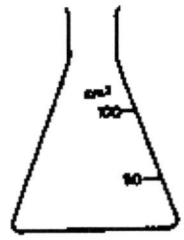
24 Which ions are present in an aqueous solution of Magnesium sulfate?

A Mg_2^+, SO^{4-}, H_2^+ and OH^-
B M_2^+, SO_4^{2-}, H^{2+} and OH^-
C Mg^{2+}, SO_3^{2-}, H^+ and OH^{2-}
D Mg^{2+}, SO_4^{2-}, H^+ and OH^-

25 Which of the following pieces of apparatus is most suitable for accurately measuring out 23.8 cm^3 of water?

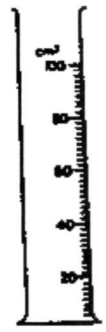
A

B



C

D



26 Sulfur and selenium, Se, are in the same group of the Periodic Table.

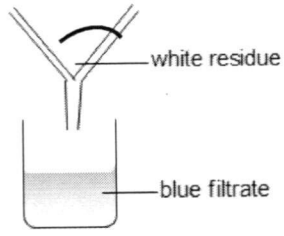
From this, we would expect selenium to form compounds having the formulae .....

A Se_2O, Na_2Se and $NaSeO_4$
B SeO_2, Na_2Se and $NaSeO_4$
C SeO_2, Na_2Se and Na_2SeO_4
D SeO_3, NaSe and $NaSeO_4$

27 Which statement describes ionic bonding?

A A lattice of ions in a sea of electrons.
B Electrostatic attraction between oppositely charged ions.
C Sharing of electrons between atoms to gain noble gas configuration.
D Transfer of electrons from atoms of a non-metal to the atoms of a metal.

28 A mixture containing two solids is added to excess water, stirred and filtered. A blue filtrate and a white residue are obtained after filtration.



Given that,

solid	colour	solubility in water
W	blue	insoluble
X	blue	soluble
Y	white	insoluble
Z	white	soluble

Determine which two solids were present in the mixture.

A **W** and **X**
B **W** and **Y**
C **X** and **Y**
D **X** and **Z**

29 The table shows the boiling points of some gases present in air.

gas	boiling point / °C
argon	-186
helium	-269
neon	-246
nitrogen	-196
oxygen	-183

When air is cooled to -250°C, some of these gases liquefy.

Which of the following gases will **not** liquefy?

A Argon
B Helium
C Neon
D Nitrogen

30 The table contains information on the structure of four particles.

particle	proton number	number of protons	number of neutrons	number of electrons
Mg	12	12	W	12
Mg^{2+}	12	12	12	X
F	Y	9	10	9
F^-	9	9	10	Z

What are the values of W, X, Y and Z in the table above?

	W	X	Y	Z
A	10	12	9	10
B	12	10	9	10
C	12	10	10	9
D	12	12	10	9

31 An atom of element Z has 14 neutrons and 13 protons.

It forms a positive ion.

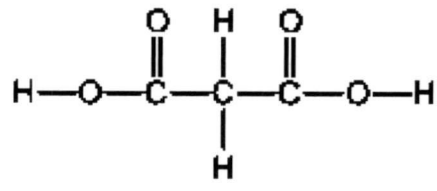
How many electrons does the ion of Z have?

A 10
B 13
C 14
D 27

32 Why does ammonia gas diffuse faster than hydrogen chloride gas?

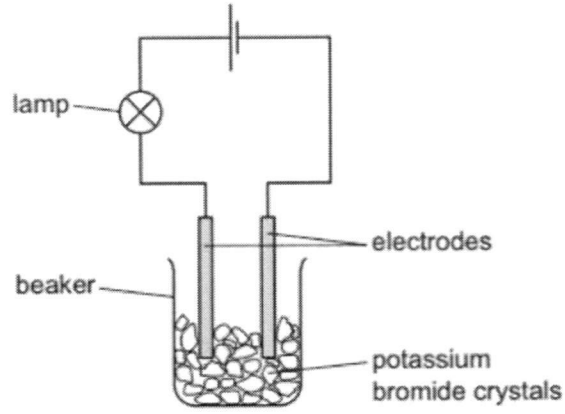
A Ammonia has a higher boiling point than hydrogen chloride.
B Ammonia is a base, hydrogen chloride is an acid.
C The ammonia molecule contains more atoms than a hydrogen chloride molecule.
D The relative molecular mass of ammonia is smaller than that of hydrogen chloride.

33 Which statements would be true of the compound which has the formula shown?



A It has 3 different elements with 14 paired of shared electrons.
B It has 8 paired of unshared electrons with 3 different elements.
C It has a total of 3 atoms.
D It is an ionic bonding.

34 The experiment shown is used to test potassium bromide crystals.

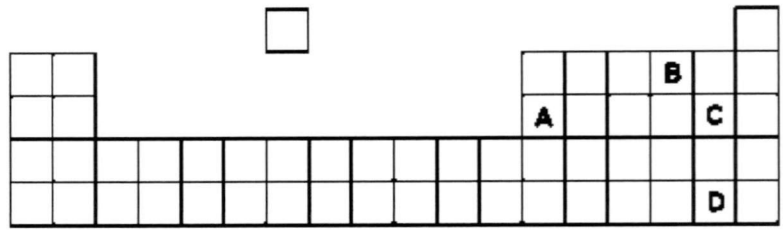


The lamp does not light.
Distilled water is then added to the beaker and the lamp lights.
Which statement explains these results?

A Electrons are free to move in the solution when potassium bromide dissolves.
B Metal ions are free to move when potassium bromide melts.
C Metal ions are free to move when potassium reacts with water.
D Oppositely charged ions are free to move in the solution when potassium bromide dissolves.

35 The positions of four elements are shown on the outline of part of the Periodic Table.

Which element is a solid non-metal at r.t.p.?



36 What will be observed if chlorine gas is added to the sodium fluoride solution instead of a bromine solution?

A A brown solution will be formed.
B A greenish yellow solution will be formed.
C A yellowish solution will be formed.
D No visible reaction.

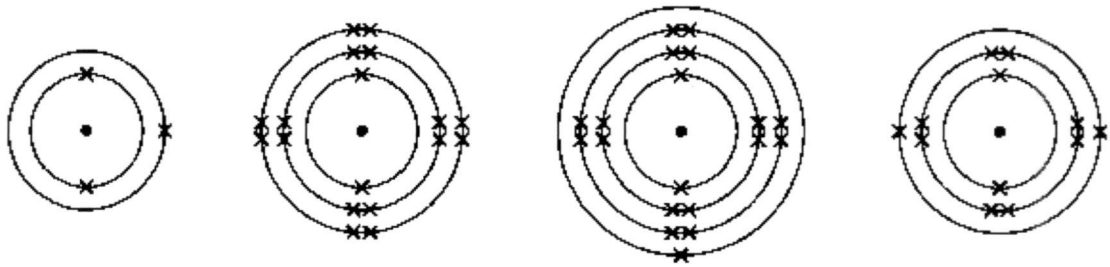
37 An element is in Period 3 and Group VII of the Periodic Table.

Which statement about this element is correct?

A The element will form 1+ ions.
B The element will have 3 electrons in its outer shell.
C The element will have 7 electrons in its outer shell.
D The element will have 7 shells of electrons in its atom.

38 The diagram shows the arrangement of electrons in the atoms of four different elements.

Which is the least reactive of the four elements?



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

39 Which molecule has only four electrons involved in covalent bonds?

A N_2
B H_2S
C CO_2
D Cl_2

40 Manganese(II) chloride has the formula $MnCl_2$ while copper(II) phosphate has the formula $Cu_3(PO_4)_2$. What is the formula of manganese(II) phosphate?

A $MnPO_4$
B Mn_2PO_4
C $Mn_2(PO_4)_3$
D $Mn_3(PO_4)_2$

END OF PAPER

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 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.).

GAN ENG SENG SCHOOL
Mid-Year Examination 2017

CANDIDATE NAME			
CLASS		**INDEX NUMBER**	

SCIENCE (PHYSICS, CHEMISTRY)
Sec 3 Express
Paper 3

5076/03
08 May 2017
1 hour 15 minutes

Candidates answer on the Question Paper.

Calculators are allowed in the examination.

READ THESE INSTRUCTIONS FIRST

Write your class, index number and name on all the work you hand in.
Write in dark blue or black pen on both sides of the paper.
You may use a soft pencil for any diagrams or graphs.
Do not use staples, paper clips, highlighters, glue or correction fluid/tape.

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

Section B
Answer **all three** questions, the last question is in the form **either/or**.
Write your answers **on the question paper itself**.
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.

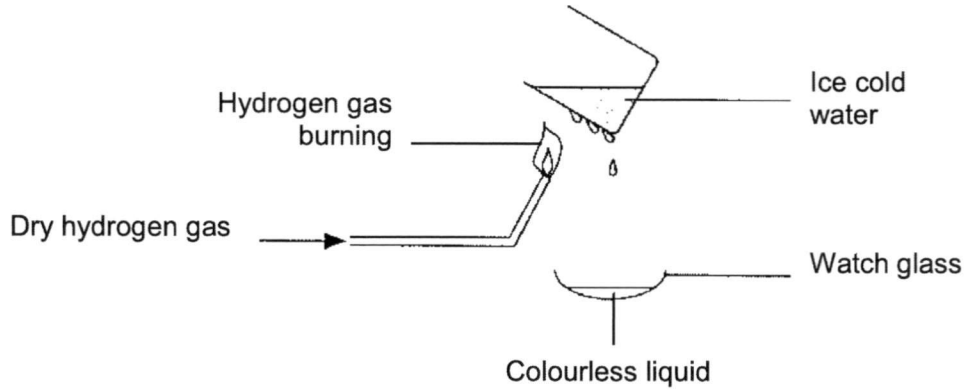
A copy of the Periodic Table is on page 12.

	For Examiner's Use
Section A	
Section B (answer 2 questions)	
B 1	
B 2	
B 3	
Total	**65**

Section A [45 marks]

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

A1 The diagram shows hydrogen gas being burnt.



(a) Name two elements that are involved in the reaction. [1]

.....

(b) **(i)** Name the colourless liquid. [1]

.....

(ii) How would you show that the colourless liquid is a pure substance? [1]

.....

A2 Magnesium oxide is made up of positive and negative ions arranged in an orderly manner to form a giant three-dimensional structure.

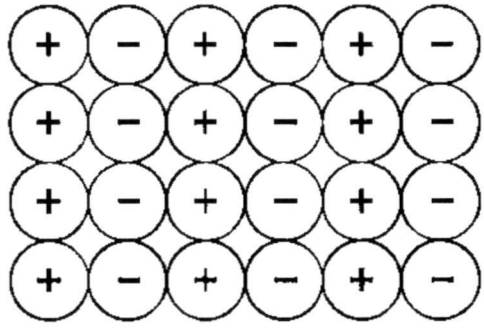
(a) Describe the structure and bonding present in magnesium oxide. [3]

.....

.....

.....

(b) The following diagram shows a possible arrangement of the ions in magnesium oxide.



(i) Why is this not a feasible arrangement of ions in magnesium oxide? [1]

.....

.....

(ii) Draw the correct arrangement of the ions in magnesium oxide. [1]

A3 Complete the table below. [3]

Name of compound	Formula
Lithium hydride	
Phosphoric acid	
	NH_4NO_3

A4 (a) Draw a 'dot and cross' diagram to show the arrangement of electrons in nitrogen dioxide. Show only the valence electrons. [2]

(b) The table shows the atomic number and mass number of element X and Y (which are not the actual chemical symbols of the elements).

Element	Atomic number	Mass number
X	19	39
Y	17	35

(i) Write the electronic structure of Y. [1]

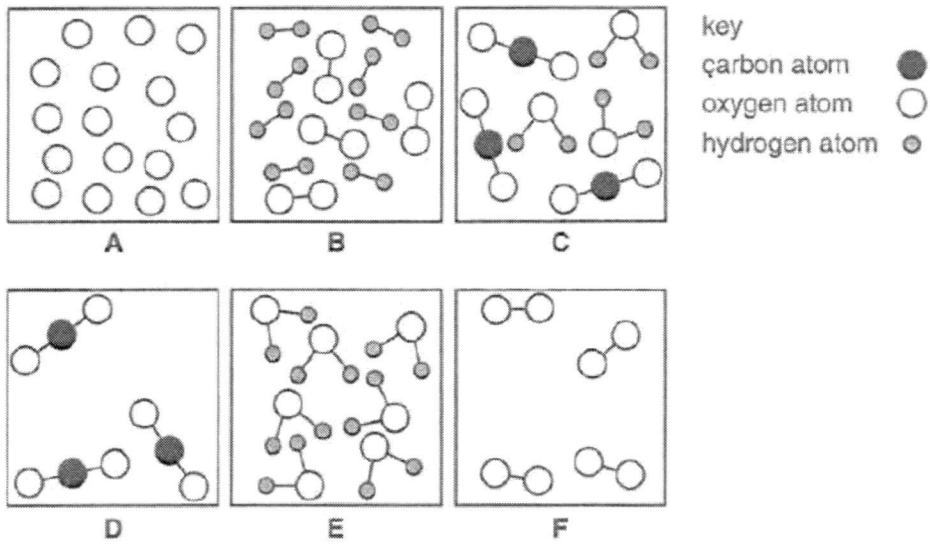
.....

(ii) Are the atoms of **X** likely to form positive or negative ions? Give a reason for your answer. [2]

.....

.....

A5 In the diagram, **A**, **B**, **C**, **D**, **E** and **F** represent the particles in different substances. [5]



Which one of **A**, **B**, **C**, **D**, **E** and **F** best represents the following?

(a) Pure oxygen: .....

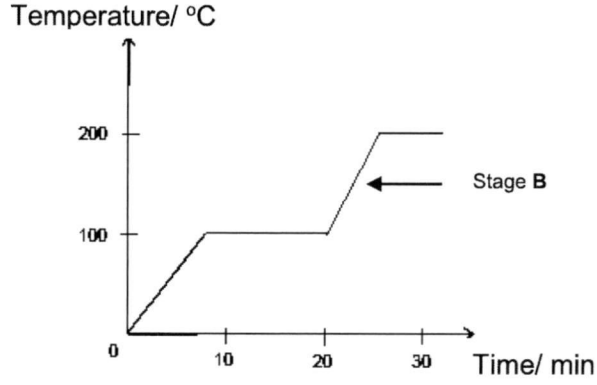
(b) Pure water: .....

(c) A mixture consisting of diatomic molecules: .....

(d) A mixture of compound: .....

(e) A gaseous compound present in air: .....

A6 The graph below shows the heating curve for a pure substance.



(a) What is the boiling point of the substance? [1]

.....

(b) Describe and explain the movements of the particles from the beginning to the end of stage **B.** [2]

.....

.....

.....

(c) Label **X** on the graph to show the substance existing as a mixture of liquid and gas. [1]

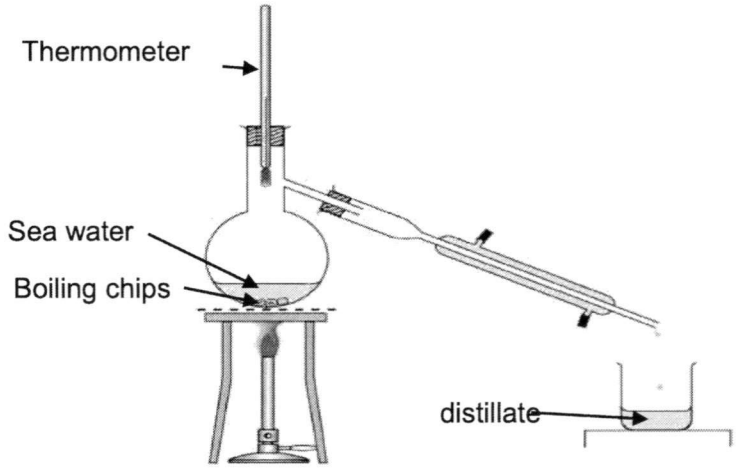
A7 Name a suitable piece of laboratory apparatus to measure each of the following: [3]

(a) Measuring exactly 20.6 cm^3 of hydrochloric acid. .....

(b) Collecting 15.0 cm^3 of oxygen gas from a chemical reaction. .....

(c) Holding dilute sodium chloride while it is being heated to obtain its crystals .....

A8 The experimental set up below shows a separation technique used to obtain different substances from seawater.



(a) What is the function of a condenser? [1]

.....

(b) What is the purpose of adding boiling chips in the round bottomed flask? [1]

.....

(c) Why is the bulb of the thermometer placed at the mouth of the condenser? [1]

.....

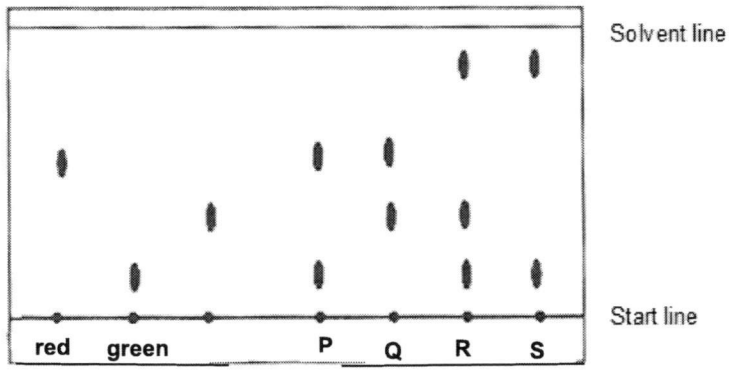
(d) Draw arrows on the diagram to show how the water enters and leaves the condenser. [1]

(e) Explain why a fractionating column is **not** needed in the above experimental set-up to separate the substances in seawater. [2]

.....

.....

A9 A student carried out paper chromatography on some ink dyes **P**, **Q**, **R** and **S** using ethanol as a solvent. The chromatogram is shown below as it is placed in the boiling tube. The results are compared with red, green and blue ink dyes.



(a) From the chromatogram, do ink dyes **P**, **Q**, **R** and **S** have fixed melting points? Explain your reason. [2]

.....

.....

.....

(b) Which ink dyes contain the most soluble dye? [1]

.....

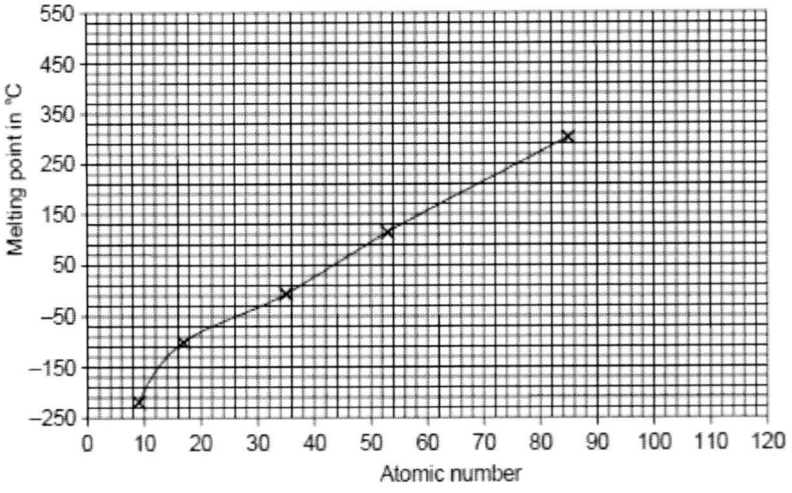
(c) Which ink could be purple in colour? [1]

.....

(d) Why is it necessary to cover the boiling tube? [1]

.....

A10 The graph below shows the melting points of the Group VII elements.



(a) Describe how the melting points change as the atomic number increases. [1]

.....

(b) Write an equation for the reaction when chlorine gas is bubbled into aqueous potassium iodide. [1]

.....

(c) Ununseptium, Uus, is a Group VII element with an atomic number of 117. It is a superheavy artificial chemical element.

(i) Use the graph above to predict its melting point. [1]

.....

(ii) Predict one other physical property of ununseptium. [1]

.....

(iii) Predict what will happen when ununseptium is added into a solution of potassium iodide. Give a reason for your answer. [2]

.....

.....

.....

SECTION B [20 marks]

Answer **two** questions from this section.

B1 The table below shows the formulae and melting points of oxides formed from the elements in Period 3 across Group I to Group VII.

Formula of oxide	Melting point/°C
Na_2O	1280
MgO	2900
Al_2O_3	2140
SiO_2	1610
P_4O_6	420
SO_2	39
Cl_2O_7	–69

(a) Describe how the melting point of the oxides changes across Period 3. [2]

.....

.....

(b) A student predicted that the melting point of aluminium oxide will be higher than that of sodium oxide. Suggest why the student predicted in this way. [2]

.....

.....

(c) Explain, in terms of structure and bonding, why the melting point of sulfur dioxide is much lower than that of magnesium oxide. [3]

.....

.....

.....

.....

.....

(d) Sodium oxide and phosphorus oxide exist as white solids at room temperature. A student was given two unlabelled white solids and was informed that one of them was sodium oxide and the other, phosphorus oxide. [3]

Describe a simple test, other than checking the melting point of the solids, which can be conducted to determine the identities of the two solids. Your answer must include the observations expected for each solid.

.....

.....

.....

.....

.....

.....

B2 When a solid is heated, it melts.

(a) **(i)** Use the ideas of the Kinetic Particle Theory to explain why a solid melts when it is heated. [2]

.....

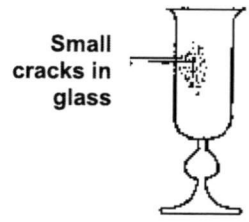
.....

(ii) The temperature remains constant during melting. [1]
Explain the above statement.

.....

.....

(b) Glass has the properties of a solid but the structure of a liquid.
In the Victoria and Albert museum in London, 17th century glasses are turning opaque because small cracks are forming on the surface of the glass.



Glass is composed of silicon dioxide and alkaline metal oxides, particularly sodium oxide.

(i) The cracks are caused by the *diffusion* of sodium ions to the surface and hydrogen ion away from the surface. [2]

Define diffusion.

.....

.....

(ii) Explain why sodium and hydrogen ions **do not** diffuse at the same rate. [2]

.....

.....

(c) Draw a dot and cross diagram for the compound, sodium oxide [3]

Chemical formula of sodium oxide: .....

B3 Lithium, sodium and potassium are elements in Group I of the Periodic Table.

The following table shows the reactions of these metals with oxygen.

Element	Reaction with oxygen
Lithium	Burns quickly with a red flame to give a white solid residue
Sodium	Burns very quickly with a bright yellow flame to give a white solid residue
Potassium	Burns violently with a lilac flame to give a white solid residue

(a) Using **M** as the symbol of an alkali metal, write a general equation for the reaction between an alkali metal and oxygen, with state symbols. [2]

.....

(b) **(i)** What is the white solid residue obtained in each reaction? [1]

.....

(ii) Predict the bonding in the white solids, explaining your answer. [2]

.....

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.....

(c) Using the information in the table shown above, describe the trend in the reactivity of the alkali metals towards oxygen. [2]

Provide reasons for your answers.

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.....

(d) Explain the order of reactivity of the three alkali metals with reference to their electronic structures. [3]

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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											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 -		

Key: proton (atomic) number; atomic symbol; name; relative atomic mass

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.).

E

GAN ENG SENG SCHOOL
Mid-Year Examination 2017

CANDIDATE NAME ANSWERS

CLASS | | | **INDEX NUMBER** | | |

SCIENCE (PHYSICS, CHEMISTRY)
Sec 3 Express
Paper 1 Multiple Choice

5076/01
12 May

Additional Materials: OTAS

Calculators are allowed in the examination.

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.
Do not use staples, paper clips, highlighters, glue or correction fluid.
Write your name, class and index number on the cover page and shade in your index number on OTAS.

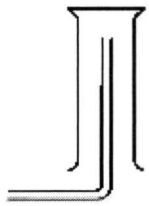
There are **forty** questions in this paper. Answer
four possible answers **A**, **B** **C**, and **D**.
Choose the one you consider correct and record your choice in **soft pencil** on the separate OTAS.

Read the instructions on the OTAS very carefully.

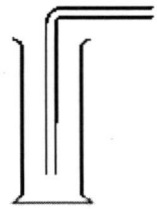
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
Any rough working should be done in this booklet.
A copy of periodic table is printed on page **10.**

Total Marks
40

21 Carbon dioxide is a gas that is soluble in water and denser than air.
Which of the following is most appropriate in collecting and measuring the volume of carbon dioxide produced in an experiment? [C]



A



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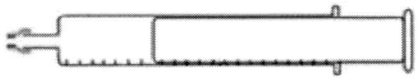

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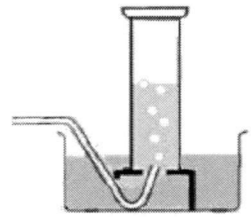


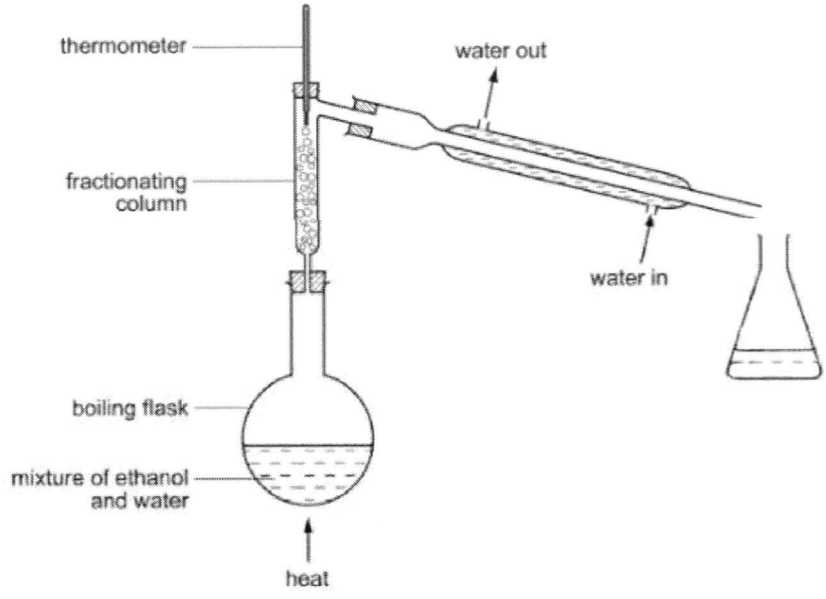
D

22 What is the correct sequence for obtaining pure salt from a mixture of sand and salt?

A Add water, evaporate
B Add water, filter
C Add water, filter, evaporate
D Filter, add water, evaporate

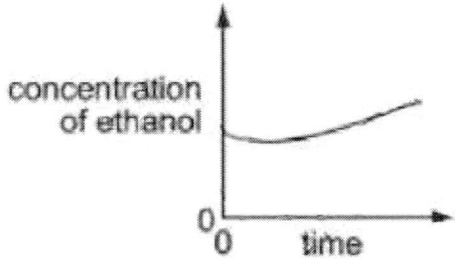
23 The apparatus shown is used to distil a dilute solution of ethanol in water.

[B.P.: ethanol, 78 °C; water 100°C]



Which graph shows the change in concentration of the ethanol in the boiling flask as the distillation proceeds?

A



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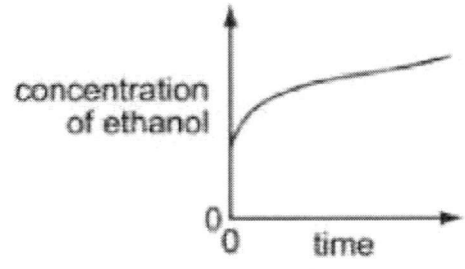

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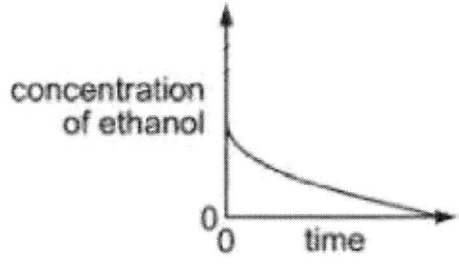

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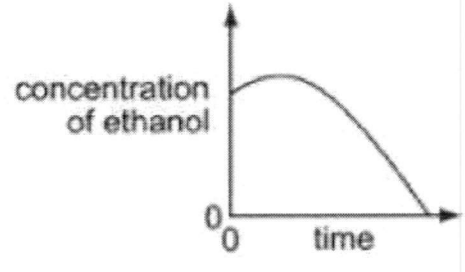


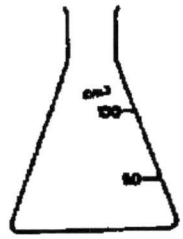
24 Which ions are present in an aqueous solution of Magnesium sulfate?

A Mg_2^+, SO^{4-}, H_2^+ and OH^-
B M_2^+, SO_4^{2-}, H^{2+} and OH^-
C Mg^{2+}, SO_3^{2-}, H^+ and OH^{2-}
D Mg^{2+}, SO_4^{2-}, H^+ and OH^-

25 Which of the following pieces of apparatus is most suitable for accurately measuring out 23.8 cm^3 of water? [A]

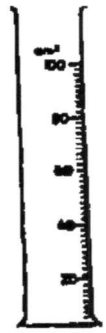
A

B



C

D



26 Sulfur and selenium, Se, are in the same group of the Periodic Table.

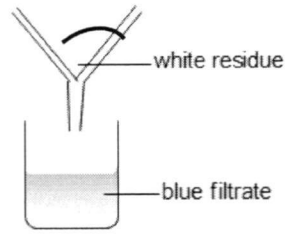
From this, we would expect selenium to form compounds having the formulae

A Se_2O, Na_2Se and $NaSeO_4$
B SeO_2, Na_2Se and $NaSeO_4$
C SeO , Na Se and Na SeO_4
D SeO_3, NaSe and $NaSeO_4$

27 Which statement describes ionic bonding?

A A lattice of ions in a sea of electrons.
B Electrostatic attraction between oppositely charged ions.
C Sharing of electrons between atoms to gain noble gas configuration.
D Transfer of electrons from atoms of a non-metal to the atoms of a metal.

28 A mixture containing two solids is added to excess water, stirred and filtered. A blue filtrate and a white residue are obtained after filtration.



Given that,

solid	colour	solubility in water
W	blue	insoluble
X	blue	soluble
Y	white	insoluble
Z	white	soluble

Determine which two solids were present in the mixture.

A **W** and **X**
B **W** and **Y**
C **X** and **Y**
D **X** and **Z**

29 The table shows the boiling points of some gases present in air.

gas	boiling point / °C
argon	-186
helium	-269
neon	-246
nitrogen	-196
oxygen	-183

When air is cooled to -250°C, some of these gases liquefy.

Which of the following gases will **not** liquefy?

A Argon
B Helium
C Neon
D Nitrogen

30 The table contains information on the structure of four particles.

particle	proton number	number of protons	number of neutrons	number of electrons
Mg	12	12	W	12
Mg^{2+}	12	12	12	X
F	Y	9	10	9
F^-	9	9	10	Z

What are the values of W, X, Y and Z in the table above?

	W	X	Y	Z
A	10	12	9	10
B	12	10	9	10
C	12	10	10	9
D	12	12	10	9

31 An atom of element Z has 14 neutrons and 13 protons.

It forms a positive ion.

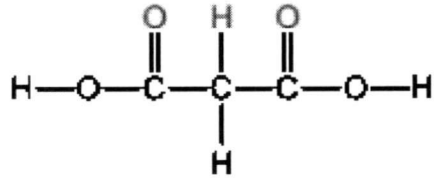
How many electrons does the ion of Z have?

A 10
B 13
C 14
D 27

32 Why does ammonia gas diffuse faster than hydrogen chloride gas?

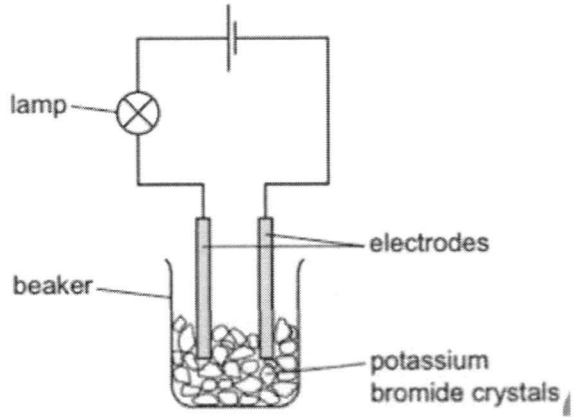
A Ammonia has a higher boiling point
B Ammonia is a base, hydrogen chloride is an acid.
C The ammonia molecule contains more atoms than a hydrogen chloride molecule.
D The relative molecular mass of ammonia is smaller than that of hydrogen chlride.

33 Which statements would be true of the compound which has the formula shown?



A It has 3 different elements with 14 paired of shared electrons.
B It has 8 paired of unshared electrons with 3 different elements.
C It has a total of 3 atoms.
D It is an ionic bonding.

34 The experiment shown is used to test potassium bromide crystals.

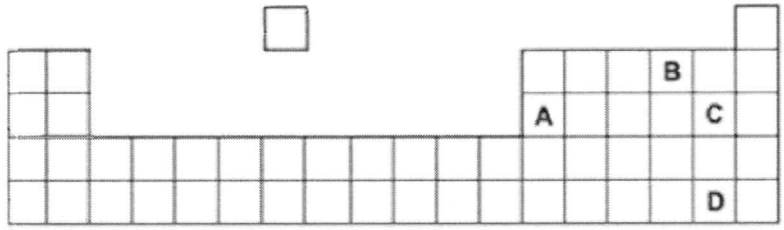


The lamp does not light.
Distilled water is then added to the beaker and the lamp lights.
Which statement explains these results?

A Electrons are free to move in the solution when potassium bromide dissolves.
Metal ions are free to move when potassium bromide melts.
C Metal ions are free to move when potassium reacts with water.
D Oppositely charged ions are free to move in the solution when potassium bromide dissolves.

35 The positions of four elements are shown on the outline of part of the Periodic Table.

Which element is a solid non-metal at r.t.p.? [D]



36 What will be observed if chlorine gas is added to the sodium fluoride solution instead of a bromine solution?

A A brown solution will be formed.
B A greenish yellow solution will be formed.
C A yellowish solution will be formed.
D No visible reaction.

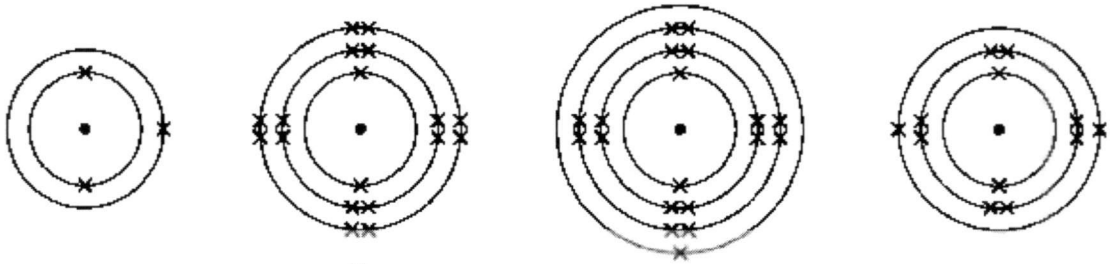
37 An element is in Period 3 and Group VII of the Periodic Table.

Which statement about this element is correct?

A The element will form 1+ ions.
B The element will have 3 electrons in its outer shell.
C The element will have 7 electrons in its outer shell.
D The element will have 7 shells of electrons in its atom.

38 The diagram shows the arrangement of electrons in the atoms of four different elements.

Which is the least reactive of the four elements?



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

39 Which molecule has only four electrons involved in covalent bonds?

A N_2
B H_2S
C CO_2
D Cl_2

40 Manganese(II) chloride has the formula $MnCl_2$ while copper(II) phosphate has the formula $Cu_3(PO_4)_2$. What is the formula of manganese(II) phosphate?

A $MnPO_4$
B Mn_2PO_4
C $Mn_2(PO_4)_3$
D $Mn_3(PO_4)_2$

END OF PAPER

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