

Class	Register Number	Name
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南洋女子中學校
NANYANG GIRLS' HIGH SCHOOL

BLOCK TEST 1
Secondary Three

CHEMISTRY

1 hour

Wednesday

6 April 2011

0745-0845 h

READ THESE INSTRUCTIONS FIRST

Do not open this booklet until you are told to do so.

Write your name, register number and class in the spaces at the top of this page.

Section A (15 MCQ)

This section consists of **15 multiple choice questions**. Choose the best answer and write its letter in the space provided on page 6 of the Question Paper.

Section B (Structured)

Answer **All** questions in the spaces provided on the Question Paper.

Section C (Free-Response)

Answer **All** questions in the spaces provided on the Question Paper.

Submit Sections A, B and C together.

The intended number of marks is given in the brackets [] at the end of each question or part question. A copy of the Periodic Table is printed on page 11.

Examiner's Use	
Section A (15 marks)	
Section B (20 marks)	
Section C (10 marks)	
Total (45 marks)	

Section A (15 Marks)

Answer the questions (1-15) by filling the answer in the table below.

1		6		11	
2		7		12	
3		8		13	
4		9		14	
5		10		15	

Section B (20 marks)

Answer all questions in this section in the spaces provided

- B1** The table shows the atomic structure of six particles, represented by the letters **L** to **Q**. The particles are either atoms or ions. The letters are not the symbols of the elements.

Particle	Electrons	Protons	Neutrons
L	6	6	6
M	2	2	2
N	12	12	12
O	10	12	12
P	6	6	8
Q	10	13	14

Using the letters **L** to **Q**, answer the following questions:

- (a) Which two particles are ions? _____ [2]
- (b) Which particle is an atom of a noble gas? _____ [1]
- (c) Which two particles are an atom and an ion of the same element? _____ [2]
- (d) Which two particles have the same electronic structure as neon (2.8)? _____ [2]
- (e) Which two particles are isotopes of the same element? _____ [2]
- (f) Write out the formula of the compound formed when an atom of particle **L** reacts with oxygen. _____ [1]

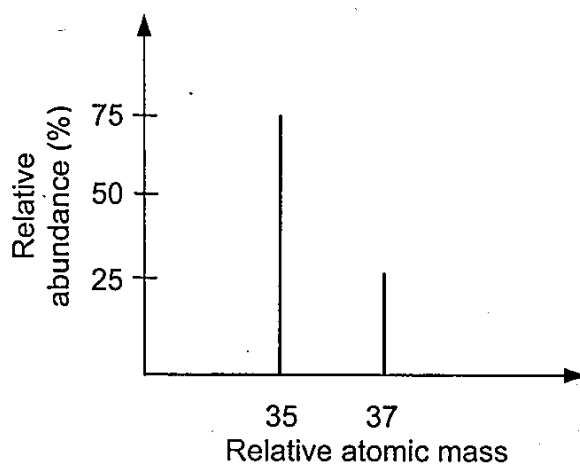
B2 (a) Draw a 'dot-and-cross' diagram (*showing only valence electrons*) to show the bonding in

(i) magnesium oxide [2]

(ii) oxygen gas [2]

(b) Explain why magnesium oxide has a higher melting point than oxygen gas? [2]

- B3** The following diagram was obtained from an analysis of naturally-occurring isotopes of chlorine.



- (a) Define the term 'isotopes'. [1]

- (b) Using the diagram, calculate the relative atomic mass of a sample of naturally occurring chlorine. [2]

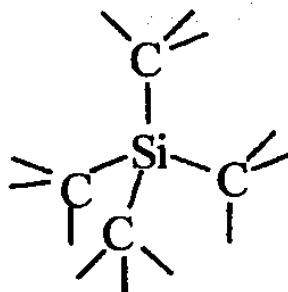
- (c) What is the difference between Chlorine-37 and Chlorine-35? [1]

☺ END OF SECTION B ☺

Section C (10 marks)

C1

- (a) Diamond and silicon carbide are both macromolecules. Part of the structure of silicon carbide is shown below.



- (i) State one difference between the structure of silicon carbide and diamond. [2]

- (ii) State one similarity between the structure of silicon carbide and diamond. [1]

- (iii) Suggest two physical properties of silicon carbide. [2]

(b) Another compound of silicon, silicon(IV) oxide, SiO_2 , has a giant structure of atoms. Sodium chloride, NaCl , on the other hand has a giant structure of ions. The element, iodine, I_2 , has a simple molecular structure.

(i) Draw a dot and cross diagram (showing only the valence electrons) of the element, iodine, I_2 . [1]

(ii) Describe a test which you could use to decide whether a substance has a giant structure or a molecular structure. [2]

(iii) Describe a test which you could use to decide whether a substance with a giant structure is made up of atoms or ions. [2]

☺END OF TEST☺

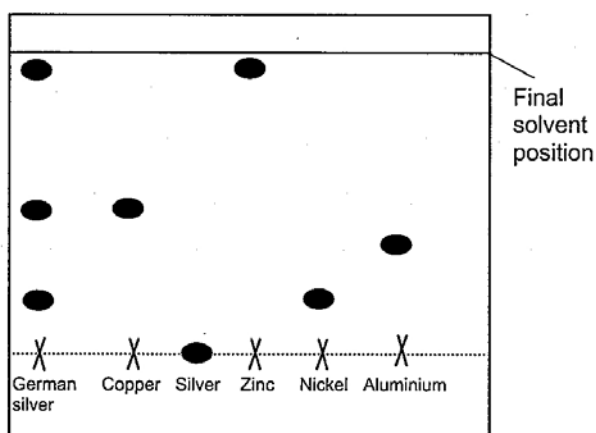
Section A (15 marks)

Choose the most suitable answer and write its letter in the answer table provided on Page 2.

- 1 A pure and dry sample of copper(II) sulfate can be obtained from a mixture of copper(II) sulfate and chalk by using the four processes listed below. The order in which these processes should be used is

A	filtration	crystallization	evaporation	dissolving
B	dissolving	evaporation	crystallization	filtration
C	dissolving	filtration	evaporation	crystallization
D	filtration	evaporation	crystallization	dissolving

- 2 A chromatography experiment was carried out using a drop of a solution of an alloy, German silver. The results is shown below:



We can conclude that the metals present in German silver are

- A** aluminium, copper and nickel.
B aluminum, nickel and silver.
C copper, nickel and zinc.
D copper, silver and zinc.
- 3 A sample of solid **X** melts gradually over a large range of temperatures. However, the liquid that is formed on heating solid **X** solidifies at one temperature. This sample most likely contains
- A** a pure compound.
B a mixture of compounds miscible in the liquid state.
C a mixture of two or more compounds that combine to form a new compound when solid X was melted.
D a mixture of compounds immiscible in the liquid state.

- $$\begin{array}{c} \text{H} \quad \text{H} \\ | \quad | \\ \text{H}-\text{C}-\text{C}-\text{H} \\ | \quad | \\ \text{H} \quad \text{H} \end{array}$$

A	0	C	4
B	2	D	8

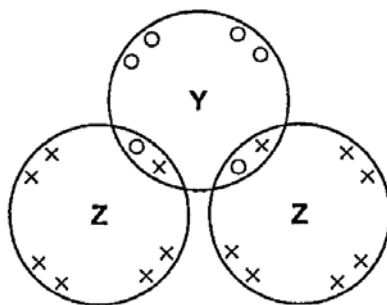
- $$\text{X (s)} + 2\text{HCl (aq)} \longrightarrow \text{XCl}_2(\text{aq}) + \text{H}_2(\text{g})$$

	element X	Type of bonding compound XC_2
A	covalent	covalent
B	covalent	ionic
C	metallic	covalent
D	metallic	ionic

13 Which property allows graphite to act as a lubricant? It

- A** contains mobile electrons.
- B** has a low melting point.
- C** contains layers of carbon atoms which can slide over one another easily.
- D** forces binding all the carbon atoms are weak Van der Waal's forces.

14 The diagram shows the arrangement of electrons in a molecule of compound **YZ₂**.



What are the elements **Y** and **Z**?

- | | Y | Z |
|----------|----------|----------|
| A | calcium | chlorine |
| B | carbon | oxygen |
| C | oxygen | hydrogen |
| D | sulfur | chlorine |

15 Element **X** has n protons and forms ions with charge of -2. Element **Y** has $(n+1)$ protons. **X** reacts with **Y** to form

- A** an ionic compound, X_2Y .
- B** a covalent compound, X_2Y .
- C** an ionic compound, XY_2 .
- D** a covalent compound XY_2 .

☺ **END OF SECTION A** ☺

DATA SHEET

The Periodic Table of the Elements

Group																	
I	II											III	IV	V	VI	VII	0
1 H Hydrogen																	
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 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	101 Ru Ruthenium 44	101 Rh Rhodium 45	103 Pd Palladium 46	106 Ag Silver 47	108 Cd Cadmium 48	112 In Indium 49	115 Sn Tin 50	119 Sb Antimony 51	122 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		At Astatine 85	Rn Radon 86
Fr Francium 87	226 Ra Radium 88	227 Ac Actinium 89															
58-71 Lanthanoid series																	
90-103 Actinoid series																	

a

X

b

a = relative atomic mass
X = atomic symbol
b = proton (atomic) number

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

Key

a	X
b	

a = relative atomic mass
X = atomic symbol
b = proton (atomic) number

The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.).