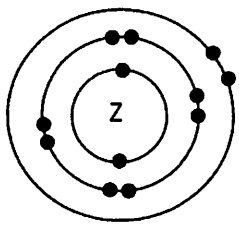
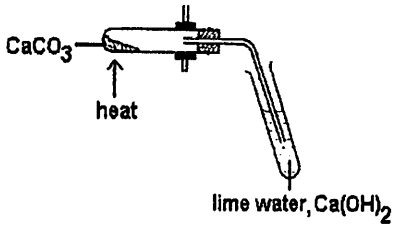
PEPERIKSAAN PERTENGAHAN TAHUN (OTI 1) TINGKATAN 4 2011
4541/2 CHEMISTRY *Paper* 2

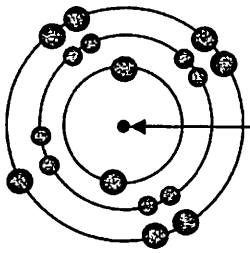
No	Rubric	Sub Marks	Marks
1(a) (i)	Melting		1
(ii)	By heating		1
(iii)	1.Kinetic energy state II higher than state I 2.Attraction force in state I stronger than state II	1 1	2
(iv)	Gas		1
(b) (i)	The movement of particles from high concentration region to low concentration region		1
(ii)	Molecules		1
(iii)	1 .Brown gas filled in the whole gas jar 2.The movement of nitrogen dioxide particles from high concentration region to low concentration region.	1 1	2
	TOTAL		**9**

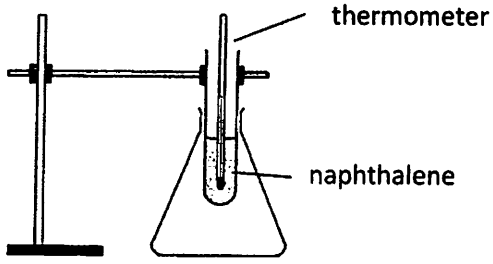
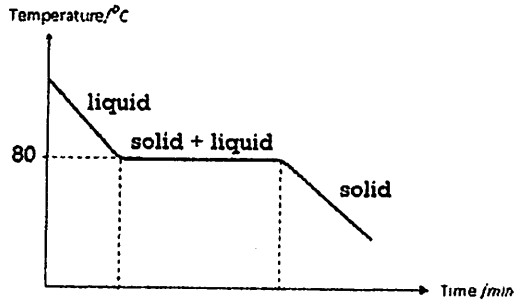
No	Rubric	Sub Marks	Marks
2(a)	proton , electron , neutron (*any two*)		1
(b)(i)	16		1
(ii)	6		1
(c)	17 Y 8		1
(d) (i)	2.8.2	1	
(ii)		1	2
(e) (i)	Isotopes are atoms of the same element with the same number of proton/proton number but different number of neutrons / nucleon number		1
(ii)	X and Y		1
(iii)	Iodine – 131.		1
	TOTAL		**9**

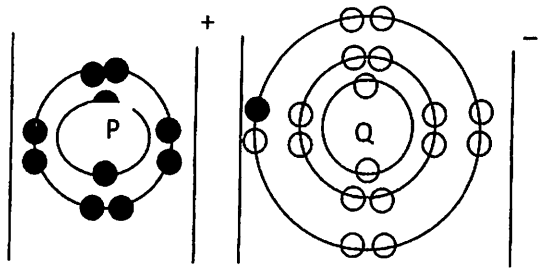
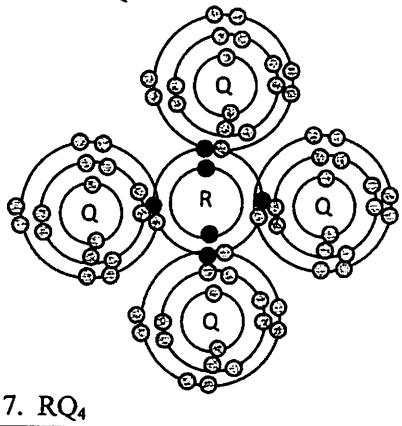
No	Rubric	Sub Marks	Marks
3 (a)	Formula that show the simplest ratio of atom of element in a compound		1
(b)	black		1
(c)	1 Flow the dry hydrogen gas into combustion tube before heating the copper(II) oxide. 2 Flow the dry hydrogen gas during cooling process of copper 3 Heating, cooling and weighing are repeated until the constant mass is obtain (*Any two*)	1 1	2
(d) (i)	mass of copper = 85.24 - 58.36 // 26.88 g the mass of oxygen = 91.96 - 85.24 // 6.72 g	1 1	2
(ii)	the number of mole of copper = 26.88 ÷ 64 // 0.42 the number of mole of oxygen = 6.72 ÷ 16 // 0.42	1 1	2
(iii)	CuO		1
(e)	Lead(II) oxide / Silver oxide		1
	TOTAL		**10**

No	Rubric	Sub Marks	Marks
4 (a)	D / E / H [*any one*]		1
(b)	E		1
(c)	I		1
(d)	They have the **same number of shells** occupied/filled with electrons.		1
(e)	G F E D H		1
(f) (i)	Use small piece // use forceps // use goggles // wear a safety glass // Conduct the experiment in fume chamber		1
(ii)	$4D + O_2 \rightarrow 2D_2OH$ *Correct formula of reactants and products* *Balanced equation*	1 1	2
(g)	Atomic size of D is smaller than H. Force of attraction between nucleus and valence electron of atom D is stronger. It is harder for D to donate electron.	1 1 1	3
	TOTAL		**10**

No	Rubric	Sub Marks	Marks
5 (a)	Black powder / lime water milky		1
(b)	Copper (II) oxide		1
(c)(i)	*Qualitative aspect* : 1.Reactant is copper (II) carbonate 2.product is copper (II)oxide and carbon dioxide *Quantitative aspect* 1 mol copper (II) carbonate produce 1 mol copper (II) oxide and 1 mol carbon dioxide	 1 1 1	3
(ii)	3.1 / 124 mol or 0.025 mol		1
(iii)	1 mol $CuCO_3$ produces 1 mol CuO 2.0.025 X 80 g // 2 g	1 1	2
(iv)	0.025 X 24 dm^3 // 0.6 dm^3 // 600 cm^3		1
(v)	1. *Functional diagram* 2.*Label* [copper (II) carbonate , lime water]  	1 1	2
	Total		**11**

No	Rubric	Sub Marks	Marks
6 (a)	Halogen		1
(b)	They have the same number of **valence electron**		1
(c)(i)	2.8.7		1
(ii)	 *Nucleus contains* : 17 proton 18 neutron *Number of shell and electron arrangement* *Number of proton and neutron in the nucleus*	1 1	2
d (i)	The solution is acidic	1	
(ii)	$Cl_2 + H_2O \rightarrow \underline{HCl} + HOCl$	1	2
e (i)	Reaction between **bromine with iron / Experiment II**		1
(ii)	Atomic size of bromine is smaller than iodine Force of attraction by the nucleus of bromine atom is stronger It is easier for bromine atom to receive electron	1 1 1	3
	Total		**11**

No	Rubric	Sub Marks	Marks
7 (a)	1. P : Water Q : Thermometer	1 1	2
(b)	Naphthalene easier to flammable	1	1
(c) (i)	80 ° C	1	1
(ii)	0 to t_1 : solid t_1 to t_2 : solid and liquid t_2 to t_3 : liquid	1 1 1	3
(iii)	Between to t_1 minutes 1. Particles only vibrate and rotate in fixed position 2. Lower kinetic energy Between t_2 to t_3 minutes 3. Particles move freely 4. High kinetic energy	 1 1 1 1	4
(iv)	1.Heat absorbed 2. Used t overcome attraction force between particles	1 1	2
(d) (i)	*1. Functional diagram* *2. Label*  	1 1	2
(ii)	1. Stir 2. To prevent super cooling	1 1	2
(iii)	*1. Right curve* *2. Label freezing point 80°C* *3. Label physical state*  	1 1 1	3
	TOTAL		**20**

No	Rubric	Sub Mark	Marks
8(a) (i)	2.4 / 2,4	1	1
(ii)	P Valence electron 1 / less than 3	1 1	2
(b) (i)	PQ  	1 2	3
(ii)	Solid state : ion cannot move Solution : ion can move freely	1 1	2
(iii)	1. **High melting & boiling point** 2. Need a lot heat energy 3. to overcome electrostatic forces between ion 4. **Dilute in water** 5. Ion are easily hydrated by water molecules to form hydrated ions.	1 1 1 1 1	5
(c)	1. R atom has four valence electron / 2.4 / proton no. = 6 2. Q atom has seven valence electron / 2.8.7 / proton no. = 17 3. Each R atom contributes four electron for sharing 4. Each Q atom contributes one electron for sharing 5. to achieve a stable octet 6. One R atom shares four pairs of electrons with four Q atoms /  7. RQ_4	1 1 1 1 1 1 1	7
	TOTAL		**20**

No	Rubric	Sub Mark	Marks
9 (a) (i)	$\underline{2}Al_{(s)} + \underline{3}ZnO_{(s)} \rightarrow \underline{3}Zn_{(s)} + Al_2O_{3\,(s)}$	1	1
(a)(ii)	1. reactant : aluminium, zinc oxide 2. product : zinc, aluminium oxide 3. aluminium oxide, zinc, zinc oxide and aluminium form as a solid	1 1 1	3
(a)(iii)	1. RFM ZnO = 65 + 16 = 81 2. Mole = mass (g) / RFM = 8.1 g / 81 = 0.1 3. from chemical equation, 3 mol ZnO → 3 mol Zn 0.1 mol Al → 3/3 x 0.1 = 0.1 mol Zn 4. mass of Al = mass (g) = mol x JFR Zn = 0.1 x 65 = 6.5 g	1 1 1 1	4
(b)	Chemical equation : $2X + O_2 \rightarrow 2XO$ *Formula of reactant and product* *balanced* Procedure : 1. A crucible and its lid is weighed and its weight is recorded. 2 A 10 cm length of X ribbon is coiled loosely and is placed in the crucible. 3. The crucible with its lid and content are weighed again and the weight is recorded 4. The crucible is heated strongly without its lid. 5. Using a pair of tongs, the lid is lifted at intervals. 6. When the burning is completed, the lid is removed and the crucible is heated strongly for 2 minutes. 7. The crucible is allowed to cool to room temperature. 8. The crucible and its lid and content are weighed again and its weight is recorded. [Precautions taken] 1. The magnesium ribbon is cleaned with sand paper to remove the layer of magnesium oxide on the surface. 2. The crucible must cover with its lid to prevent the white fumes of magnesium oxide of escaping. 3. The processes of heating, cooling and weighing are repeated untila constant mass is obtained. [*any two of the above*]	1 1 1 1 1 1 1 1 1 1 1 1 max: 5 1 1 Max : 2	

	[*Results*] Crucible + lid = **a** g Crucible + lid + magnesium = **b** g Crucible + lid + magnesium oxide = **c** g	1	
	[*Calculation*]		
	Element | X | Oxygen Mass(g) | b-a | c-b	1	
	Number of moles of atoms | b-a/24 | c-b/16	1	
	Simplest ratio of moles | m | n	1	
	Empirical formula = X_mO_n	1	12
	TOTAL		**20**

(c)	*Procedure* 1 Pour water into a beaker/basin 2 A small piece of V is cut using a knife 3 The oil on the surface of A is removed using filter paper 4 A is then placed slowly on the surface of water in the beaker/basin 5 The experiment is repeated using B *Observation* A moves slowly on the surface of water B moves rapidly on the surface of water **or** *Procedure* 1 A small piece of V is cut using a knife 2 The oil on the surface of A is removed using filter paper 3 A is heated in a gas jar spoon 4 A is then placed into gas jar filled with oxygen gas 5 The experiment is repeated using B *Observation* A burned slowly B burned rapidly	1 1 1 1 1 (max 4) 1	5
	TOTAL		**20**

END OF MARKING SCHEME