

4541/2
Kimia
Kertas 2
Peraturan
Pemarkahan
2007

**LOGO DAN
NAMA SEKOLAH**

**PEPERIKSAAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA 2007**

KIMIA

KERTAS 2

PERATURAN PEMARKAHAN

UNTUK KEGUNAAN PEMERIKSA SAHAJA

AMARAN

Peraturan pemarkahan ini **SULIT** dan **Hak Cipta Jabatan Pelajaran Pahang**. Kegunaannya khusus untuk pemeriksa berkenaan sahaja

Peraturan Pemarkahan ini mengandungi 8 halaman bercetak

PAPER 2
MARKING SCHEME
SPM TRIAL EXAMINATION YEAR 2007

No	Sub	Answer	Mark																
1	(a)(i)	- the number of proton in a nucleus - the total number of proton and neutron in a nucleus	1 1																
	(ii)	${}_{16}^{33}\text{S}$	1																
	(iii)	S and T	1																
	(iv)	S and T have same number of protons but different number of neutron.	1																
	(b)(i)	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Element</th> <th>C</th> <th>H</th> <th>O</th> </tr> </thead> <tbody> <tr> <td>% mass</td> <td>64.87</td> <td>13.51</td> <td>21.62</td> </tr> <tr> <td>No. of mole</td> <td>64.87/12 = 5.41</td> <td>13.51/1 = 13.51</td> <td>21.62/16 = 1.35</td> </tr> <tr> <td>Smallest ratio</td> <td>5.41/1.35 = 4</td> <td>13.51/1.35 = 10</td> <td>1.35/1.35 = 1</td> </tr> </tbody> </table>	Element	C	H	O	% mass	64.87	13.51	21.62	No. of mole	64.87/12 = 5.41	13.51/1 = 13.51	21.62/16 = 1.35	Smallest ratio	5.41/1.35 = 4	13.51/1.35 = 10	1.35/1.35 = 1	1
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Empirical formula is $\text{C}_4\text{H}_{10}\text{O}$	1																		
(ii)	$(74)n = 74 / n = 1$ -molecular formula is $\text{C}_4\text{H}_{10}\text{O}$	1 1																	
TOTAL			10																
2	(a)	2.8.2	1																
	(b)(i)	Ionic bond	1																
	(ii)	-Atom A releases 2 electrons to atom B - to achieve octet electron arrangement / to form ion A^{2+} .	1 1																
	(iii)	Each ion drawn correctly	1+1																
	(iv)	Has high melting and boiling point	1																
	(c)(i)	CB2	1																
	(ii)	$12 + 2(32) / 12 + 64$ 76 a.d.p	1 1																
TOTAL			10																
3	(a)(i)	Sodium hydroxide/ potassium hydroxide r: formula	1																
	(ii)	$2\text{NaOH} + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O}$ $/ 2\text{KOH} + \text{H}_2\text{SO}_4 \rightarrow \text{K}_2\text{SO}_4 + 2\text{H}_2\text{O}$ - Chemical formulae of reactants and products correct	1																

		- Equation is balanced	1
	(iii)	soap	1
	(iv)	Y	1
	(b)(i)	W / X	1
	(ii)	<ul style="list-style-type: none"> - W is added into sodium carbonate/any metal carbonate stated in a test tube, - Gas released turns lime water cloudy / - magnesium/zinc is added into W in a test tube, - gas released gives a 'POP' sound with a lighted splinter	1 1
	(iii)	<ul style="list-style-type: none"> - W is a strong acid and X is a weak - W completely dissociates in aqueous solution to produce high concentration of hydrogen ions. / X dissociates partially in aqueous solution to produce low concentration of hydrogen ions.	1 1
		TOTAL	10
4	(a)(i)	$\text{Mg} + 2\text{HCl} \rightarrow \text{MgCl}_2 + \text{H}_2$ <ul style="list-style-type: none"> 1. correct formula for the reactants – 1m 2. correct formula for the products – 1m 3. balance chemical equation – 1m 	3
	(b)(i)	Hydrogen gas	1
	(b)(ii)	<ul style="list-style-type: none"> 1. Ratio of mol, Mg:H₂ is 1:1 – 1m 2. mol for Mg = $\frac{1.2}{24}$ / 0.05 - 1m 3. volume of H₂ produce = $0.05 \times 24 / 1.2 \text{ dm}^3 / 1200 \text{ cm}^3$. – 1m 	3
	4(c)(i)	$\frac{1200}{50} / 24 \text{ cm}^3 / \text{s}$	1
		$\frac{1200}{20} / 60 \text{ cm}^3 / \text{s}$	1
		$\frac{1200}{15} / 80 \text{ cm}^3 / \text{s}$	1
		TOTAL	10
5	(a)	(-) Magnesium and (+) silver	1
	(b)	- allows movement of ions	1
	(c)	- magnesium	1
	(d)	$\text{Ag}^+ + \text{e} \rightarrow \text{Ag}$	1
	(e)	- magnesium electrode corroded	1

		- mass of silver electrode increases/ shiny solid deposited	1
	(f)	0 to +2	1
	(g)(i)	- pointer of galvanometer not deflected/ galvanometer shows no deflection	1
	(ii)	-glacial ethanoic acid contains molecules only - does not contain free moving ions/ free ions.	1
			1
		TOTAL	10
6	(a)(i)	Copper and tin	1
	(ii)	Bronze / alloy	1
	(iii)	The presence of foreign atoms hinder the sliding of atoms on top of each other.	1
	(iv)	Medals / statues / monuments	1
	(b)(i)	$2\text{SO}_2 + \text{O}_2 \rightarrow 2\text{SO}_3$ -formulae of reactants and products correct - balanced equation	1 1
	(ii)	Vanadium(V) oxide/ vanadium pentoxide	1
	(iii)	-Detergent -electrolyte for accumulator	1 1
		TOTAL	10
		SECTION B	
7	(a)	- labelled diagram for heating of substance Q - labelled diagram for testing of gas R - limewater is labelled	2 1 1 4
	(b)(i)	Copper(II) ion	1
	(ii)	-add ammonia solution and then in excess -blue precipitate soluble in excess ammonia solution produces a dark blue solution.	1 1 1 3
	(c)	-heat the solution V until a saturated solution is produced. - cool to room temperature -filter the crystal formed -dry the crystal with filter paper.	1 1 1 4
	(d)	Magnesium/aluminium/zinc - blue solution turns pale / colourless	1 1

		/ brown solid deposited	2
	(e)	-Excess zinc oxide is added into dilute sulphuric acid - filter the mixture/filter - add sodium carbonate solution into the filtrate/add sodium carbonate. - while precipitate produced -filter dan dry the zinc carbonate with filter paper/ filter and dry. -Equation: $\text{ZnO} + 2\text{HNO}_3 \longrightarrow \text{Zn}(\text{NO}_3)_2 + \text{H}_2\text{O}$ $\text{Zn}(\text{NO}_3)_2 + \text{Na}_2\text{CO}_3 \longrightarrow \text{ZnCO}_3 + 2\text{NaNO}_3$	1 1 1 1 1 1 1 1 7
		TOTAL	20
8	(a)	Part X – hydrophobic/hydrocarbon – 1m Part Y – hydrophilic/ionic – 1m Part X – dissolves in grease – 1m Part Y – dissolves in water – 1m	4
	(b)	1.The cloth in experiment II is clean whereas the cloth in Experiment I is still dirty. 2.In hard water,soap react with magnesium ion 3.to form scum 4.Detergent are more effective in hard water 5.Detergent does not form scum 6.Detergent are better cleansing agen then soap to remove oily stain. [each points – 1m]	6
	(c)	Patient X : Analgeis/anpirin - 1m Patient Y: Antibiotic/penicillin/streptomycin – 1m Patient Z ; Psychotherapeutic / antidepressant – 1m	3
	(d)(i)	Precaution: 1.Take after food. 2. Swallowed with plenty of water Explain: 1. Acidic and can cause irritation of the stomach. 2. To avoid internal bleeding/ulceration [precaution – 1m] [explain – 1m]	2
	(d)(ii)	1.To make sure all the bacteria are killed / becomes ill again – 1m 2. bacteria become more resistant. – 1m 3.Need stronger antibiotic to fight the same infection – 1m	3
	(d)(iii)	1.Drowsiness – 1m	

		2. poor coordination/light-headedness – 1m	2
		TOTAL	20
		SECTION C	
9	(a)(i)	-heat of combustion is the heat released when 1 mole of ethanol burnt completely in oxygen.	1
	(ii)	$\text{C}_2\text{H}_5\text{OH} + 3\text{O}_2 \longrightarrow 2\text{CO}_2 + 3\text{H}_2\text{O}$ <ul style="list-style-type: none"> - chemical formulae of reactants and products correct - equation is balanced 	1 1
	(iii)	<p>Energy</p> <ul style="list-style-type: none"> - energy is labeled for the y- axis and energy level correctly drawn - reactants and product at the correct energy level 	1 1
	(iv)	<p>Relative molecular mass of ethanol = $2(12) + 6 + 16 / 46$</p> <p>Number of mole of ethanol = $\frac{2.3}{46}$ = 0.05</p> <p>Heat change = $0.05 \times 1376 \text{ kJ}$ = 68.8 kJ / = 68800 J</p> <p>Temperature increased = $\frac{68800}{4.2 \times 500}$ = 32.8°C</p> <p>Final temperature of water = $28.0 + 33.8$ = 60.8 °C</p>	1 1 1 1
	(b)	-labelled diagram -arrangement of apparatus is functional Procedure:	1 1

		<ul style="list-style-type: none"> - 200cm³ of water is measured using a measuring cylinder - and poured into a copper tin. - The initial temperature of water is measured and recorded - A spirit lamp is filled with butanol and weighed - The spirit lamp is light and put under the copper can. - The water is stirred continuously with a thermometer. - When the temperature of water increased by 30°C, the flame is put off. - The spirit lamp is weighed again - The highest temperature is recorded. 	1 1 1 1 1 1												
		<p>Results:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td style="width: 80%;">Mass of weight of spirit lamp + butanol /g</td> <td style="width: 20%;"></td> </tr> <tr> <td>Final mass of spirit lamp + butanol /g</td> <td></td> </tr> <tr> <td>Mass of butanol used/g</td> <td></td> </tr> <tr> <td>Highest temperature of water /°C</td> <td></td> </tr> <tr> <td>Initial temperature of water /°C</td> <td></td> </tr> <tr> <td>Increased in temperature /°C</td> <td></td> </tr> </tbody> </table> <p>-results tabulated in table form -unit stated</p>	Mass of weight of spirit lamp + butanol /g		Final mass of spirit lamp + butanol /g		Mass of butanol used/g		Highest temperature of water /°C		Initial temperature of water /°C		Increased in temperature /°C		1 1
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			20												
10	a i)	<p>A:Propanoic acid and its structure</p> <p>B:Propene and its structure</p> <p>C:Propane and its structure</p>	2 2 2												
	ii)	<p>B will decolourise the acidified potassium manganate(VII) while there is no change for the reaction of C.</p> <p>B is able to undergo addition reaction due to the presence of the double bond.// unsaturated state</p> <p>C is a saturated compound with no double bonds so no</p>	2 2												

		addition reaction can take place.	
	iii)	2 cm ³ of Propan-1-ol is added to 2 cm ³ of A in a boiling tube. The mixture is shaken and about 1 cm ³ of concentrated sulphuric acid is added to it. The mixture is carefully heated over a low flame for about 2- 3 minutes.	3
	b i)	Alkene C _n H _{2n} (n= 2,3,4....)	1 1
	ii)	Rajah: Polythene Manufacture of plastic bags Making toys.....	1 2
	iii)	Recycle Reuse	2
			20