KERTAS MODEL SPM

KIMIA

Dwibahasa

KERTAS MODEL SIJIL PELAJARAN MALAYSIA SET 1

Kertas 3 / *Paper* **3**

<table>
<tr><th colspan="3">Soalan
Questions</th><th>Cadangan Jawapan
Suggestion Answers</th><th>Markah
Marks</th><th>Jumlah markah
Total marks</th></tr>
<tr><td>1</td><td>(a)</td><td></td><td>
<table>
<tr><th rowspan="2">Larutan
Solution</th><th colspan="2">Pemerhatian
Observation</th></tr>
<tr><th>Aktiviti A
Activity A</th><th>Aktiviti B
Activity B</th></tr>
<tr><td>S1</td><td>Mendakan putih terbentuk. Mendakan putih larut dalam larutan ammonia berlebihan.
White precipitate is formed. White precipitate soluble in excess ammonia solution.</td><td>Tiada perubahan
No change</td></tr>
<tr><td>S2</td><td>Mendakan putih terbentuk. Mendakan putih tidak larut dalam larutan ammonia berlebihan.
White precipitate is formed. White precipitate is insoluble in excess ammonia solution.</td><td>Mendakan kuning terbentuk
Yellow precipitate is formed</td></tr>
</table>
</td><td>6</td><td rowspan="2"></td></tr>
<tr><td></td><td>(b)</td><td></td><td>
<table>
<tr><th>Larutan
Solution</th><th>Inferens
Inference</th></tr>
<tr><td>S1</td><td>Ion Zn^{2+} hadir
Zn^{2+} ion present</td></tr>
<tr><td>S2</td><td>Ion Mg^{2+}, Pb^{2+} atau Al^{3+} hadir
Mg^{2+}, Pb^{2+} or Al^{3+} ion present</td></tr>
</table>
</td><td>2</td></tr>
</table>

Soalan *Questions*			Cadangan Jawapan *Suggestion Answers*	Markah *Marks*	Jumlah markah *Total marks*
	(*c*)	(i)	Dimanipulasi: Larutan S1 dan S2 *Manipulated*: *Solution* S1 *and* S2	1	
		(ii)	Bergerak balas: Pembentukan mendakan *Responding*: *Formation of precipitate*	1	
	(*d*)	(i)	Larutan S1: Ion Zn^{2+} *Solution* S1: Zn^{2+} *ion*	1	
		(ii)	Larutan S2: Ion Pb^{2+} *Solution* S2: Pb^{2+} *ion*	1	
	(*e*)		**Ion klorida, Cl^-** *Chloride ion,* **Cl^-**: – Asid nitrik, HNO_3 *Nitric acid,* HNO_3 – Larutan aregentum nitrat, $AgNO_3$ *Silver nitrate solution,* $AgNO_3$ **Ion sulfat, SO_4^{2-}** *Sulphate ion,* **SO_4^{2-}**: – Asid hidroklorik, HCl *Hydrochloric acid,* HCl – Larutan barium klorida, $BaCl_2$ *Barium chloride solution,* $BaCl_2$ **Ion nitrat, NO_3^-** *Nitrate ion,* **NO_3^-**: – Asid sulfurik cair, H_2SO_4 *Dilute sulphuric acid,* H_2SO_4 – Larutan ferum(II) sulfat, $FeSO_4$ *Iron*(II) *sulphate solution,* $FeSO_4$ – Asid sulfurik pekat, H_2SO_4 *Concentrated sulphuric acid,* H_2SO_4	3	15

KERTAS MODEL SIJIL PELAJARAN MALAYSIA SET 2

Kertas 3 / *Paper* **3**

Soalan *Questions*			Cadangan Jawapan *Suggestion Answers*	Markah *Marks*	Jumlah markah *Total marks*
1	(*a*)		**Set** | **Masa yang digunakan untuk tanda '●' tidak kelihatan (saat)** *Time taken for '●' mark to disappear from sight* **(***second***)** **I** **II** **III** *Sampel jawapan murid / *Sample of student's answer*	3	

Soalan *Questions*			Cadangan Jawapan *Suggestion Answers*	Markah *Marks*	Jumlah markah *Total marks*
	(*b*)	(i)	Dimanipulasi: Kepekatan larutan natrium tiosulfat *Manipulated*: *Concentration of sodium thiosulphate solution*	1	
		(ii)	Bergerak balas: Masa yang digunakan untuk tanda '●' tidak kelihatan *Responding*: *Time taken for '●' mark to disappear from sight*	1	
		(iii)	Dimalarkan: Isi padu dan kepekatan asid hidroklorik *Constant*: *Volume and concentration of hydrochloric acid*	1	
	(*c*)	(i)	Set II $M_1V_1 = M_2V_2$ $(0.2)\ (40) = M_2\ (45)$ $M_2 = 0.18$ mol dm^{-3}	1	
		(ii)	Set III $M_1V_1 = M_2V_2$ $(0.2)\ (30) = M_2\ (45)$ $M_2 = 0.13$ mol dm^{-3}	1	
	(*d*)		Semakin tinggi kepekatan larutan natrium tiosulfat, semakin singkat masa yang digunakan untuk tanda '●' tidak kelihatan. *The higher the concentration of sodium thiosulphate solution, the shorter time taken for '●' mark to disappear from sight.*	1	
	(*e*)		Masa lebih pendek daripada pemerhatian set III *Shorter than the time recorded for set* III	1	
	(*f*)		Masa yang digunakan untuk tanda '●' tidak kelihatan *Time taken for '●' mark to disappear from sight*	1	
	(*g*)		Kadar tindak balas ialah masa yang digunakan untuk tanda '●' tidak kelihatan apabila asid hidroklorik ditambahkan ke dalam larutan natrium tiosulfat. *Rate of reaction is the time taken for '●' mark to disappear from sight when hydrochloric acid is added into sodium thiosulphate solution.*	1	
	(*h*)		**Tindak balas cepat** *Fast reaction*: • Pembakaran *Combustion* **Tindak balas perlahan** *Slow reaction*: • Pengaratan *Rusting* • Fotosintesis *Photosynthesis* • Penapaian *Fermentation*	3	15

Kertas 3 / *Paper* **3**

<table>
<tr><th colspan="3">Soalan
Questions</th><th>Cadangan Jawapan
Suggestion Answers</th><th>Markah
Marks</th><th>Jumlah markah
Total marks</th></tr>
<tr><td>1</td><td>(a)</td><td></td><td>1. Sukat dan tuangkan 5 cm^3 air suling dan aseton ke dalam dua tabung uji yang berbeza.
Measure and pour 5 cm^3 of distilled water and acetone into two different test tubes.

2. Masukkan separuh spatula serbuk X ke dalam setiap tabung uji.
Put half spatula of X powder into each test tube.

3. Tutup tabung uji dengan penyumbat tabung uji dan goncang perlahan-lahan.
Stopper the test tubes and shake gently.

4. Catatkan pemerhatian.
Record observation.

5. Ulangi langkah 1 hingga 4 dengan menggunakan bahan Y untuk menggantikan bahan X.
Repeat steps 1 to 4 using substance Y to replace substance X.</td><td>4</td><td rowspan="5"></td></tr>
<tr><td></td><td>(b)</td><td><table>
<tr><th rowspan="2">Bahan
Substance</th><th colspan="2">Keterlarutan
Solubility</th></tr>
<tr><th>Air suling
Distilled water</th><th>Aseton
Acetone</th></tr>
<tr><td>X</td><td>Larut
Soluble</td><td>Tidak larut
Insoluble</td></tr>
<tr><td>Y</td><td>Tidak larut
Insoluble</td><td>Larut
Soluble</td></tr>
</table></td><td>4</td></tr>
<tr><td></td><td>(c)</td><td></td><td>Bahan X adalah sebatian ion yang larut dalam air tetapi tidak larut dalam pelarut organik.
Substance X is an ionic compound that is soluble in water but insoluble in organic solvent.</td><td>1</td></tr>
<tr><td></td><td>(d)</td><td>(i)</td><td>Dimanipulasi: Jenis sebatian kimia
Manipulated: Type of chemical compound</td><td>1</td></tr>
<tr><td></td><td></td><td>(ii)</td><td>Bergerak balas: Keterlarutan dalam air dan pelarut organik
Responding: Solubility in water and organic solvent</td><td>1</td></tr>
</table>

Soalan *Questions*			Cadangan Jawapan *Suggestion Answers*	Markah *Marks*	Jumlah markah *Total marks*
	(*e*)		Sebatian ion ialah sebatian yang larut dalam air untuk membentuk larutan tidak berwarna apabila ditambah ke dalam air tetapi tidak larut dalam pelarut organik apabila ditambah ke dalam pelarut organik. *Ionic compound is the compound that is soluble in water to form a colourless solution when added into water but insoluble in organic solvent when added into organic solvent.*	2	
	(*f*)		<table><tr><th>Sebatian ion *Ionic compound*</th><th>Sebatian kovalen *Covalent compound*</th></tr><tr><td>• Natrium sulfat *Sodium sulphate* • Zink nitrat *Zinc nitrate*</td><td>• Butanol *Butanol* • Tetraklorometana *Tetrachloromethane*</td></tr></table>	2	15

KERTAS MODEL SIJIL PELAJARAN MALAYSIA SET 4

Kertas 3 / *Paper* **3**

Soalan *Questions*			Cadangan Jawapan *Suggestion Answers*	Markah *Marks*	Jumlah markah *Total marks*
1	(*a*)		1. Bersihkan jalur X dan jalur Y dengan kertas pasir. *Clear* X *strip and* Y *strip using sandpaper.* 2. Sukat dan tuangkan 5 cm^3 larutan ferum(III) nitrat 0.5 mol dm^{-3} ke dalam tabung uji yang berlabel A dan B. *Measure and pour* 5 cm^3 0.5 mol dm^{-3} *iron*(III) *nitrate solution into test tubes labelled* A *and* B. 3. Masukkan jalur X ke dalam larutan ferum(III) nitrat di tabung uji A dan jalur Y ke dalam larutan ferum(III) nitrat di tabung uji B. *Put strip* X *into iron*(III) *nitrate solution in test tube* A *and strip* Y *into iron*(III) *nitrate solution in test tube* B. 4. Catatkan pemerhatian. *Record observation.*	4	

Soalan *Questions*			Cadangan Jawapan *Suggestion Answers*	Markah *Marks*	Jumlah markah *Total marks*
	(*b*)		<table><tr><th>Set *Set*</th><th>Pemerhatian *Observation*</th></tr><tr><td>A</td><td>Larutan perang menjadi tidak berwarna *Brown solution turns colourless* Jalur X menjadi lebih nipis X *strip becomes thinner*</td></tr><tr><td>B</td><td>Tiada perubahan *No change*</td></tr></table>	3	
	(*c*)		Tindak balas dalam tabung uji A *Reaction in test tube* A	1	
	(*d*)	(i)	Dimanipulasi: Jalur X dan jalur Y *Manipulated*: X *strip and* Y *strip*	1	
		(ii)	Bergerak balas: Perubahan warna larutan *Responding*: *Colour change of solution*	1	
	(*e*)	(i)	Jalur X: Magnesium / Aluminium / Zink [mana-mana logam yang lebih elektropositif daripada Ferum] X *strip*: *Magnesium / Aluminium / Zink* [*any metal which is more electropositive than iron*]	1	
		(ii)	Jalur Y: Plumbum / Hidrogen / Kuprum [mana-mana logam yang kurang elektropositif daripada Ferum] Y *strip*: *Lead / Hydrogen / Copper* [*any metal which is less electropositive than iron*]	1	
	(*f*)		$Mg \rightarrow Mg^{2+} + 2e^-$ $Al \rightarrow Al^{3+} + 3e^-$ $Zn \rightarrow Zn^{2+} + 2e^-$	2	
	(*g*)		<table><tr><th>Persamaan ion yang menunjukkan pengoksidaan *Ionic equation showing oxidation*</th><th>Persamaan ion yang menunjukkan penurunan *Ionic equation showing reduction*</th></tr><tr><td>$SO_2 + 2H_2O \rightarrow SO_4^{2-} + 4H^+ + 2e^-$ $Zn \rightarrow Zn^{2+} + 2e^-$</td><td>$H_2O_2 + 2H^+ + 2e^- \rightarrow 2H_2O$ $Cr_2O_7^{2-} + 14H^+ + 6e^- \rightarrow 2Cr^{3+} + 7\ H_2O$</td></tr></table>	2	15

Kertas 3 / *Paper* **3**

<table>
<tr><th colspan="3">Soalan
Questions</th><th>Cadangan Jawapan
Suggestion Answers</th><th>Markah
Marks</th><th>Jumlah markah
Total marks</th></tr>
<tr><td>1</td><td>(a)</td><td></td><td>
<table>
<tr><th>Tabung uji
Test tube</th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th></tr>
<tr><td>Isi padu larutan plumbum(II) nitrat, $Pb(NO_3)_2$ (cm^3)
Volume of lead (II) nitrate solution, $Pb(NO_3)_2$ (cm^3)</td><td>2.5</td><td>2.5</td><td>2.5</td><td>2.5</td><td>2.5</td></tr>
<tr><td>Isi padu larutan kalium iodida, KI (cm^3)
Volume of potassium iodide solution, KI (cm^3)</td><td>1.0</td><td>2.0</td><td>3.0</td><td>5.0</td><td>8.0</td></tr>
<tr><td>Tinggi mendakan (cm)
Height of precipitate (cm)</td><td>1.0</td><td>2.0</td><td>3.0</td><td>5.0</td><td>5.0</td></tr>
</table>
*Contoh jawapan / Sample answer
</td><td>4</td><td rowspan="6">15</td></tr>
<tr><td></td><td>(b)</td><td>(i)</td><td>Dimanipulasi: Isi padu larutan kalium iodida
Manipulated: Volume of potassium iodide solution</td><td rowspan="3">3</td></tr>
<tr><td></td><td></td><td>(ii)</td><td>Bergerak balas: Tinggi mendakan
Responding: Height of precipitate</td></tr>
<tr><td></td><td></td><td>(iii)</td><td>Dimalarkan: Isi padu dan kepekatan larutan plumbum(II) nitrat
Constant: Volume and concentration of lead (II) nitrate solution</td></tr>
<tr><td></td><td>(c)</td><td></td><td>Semakin banyak isi padu larutan kalium iodida, KI ditambahkan kepada larutan plumbum(II) nitrat, $Pb(NO_3)_2$, ketinggian mendakan semakin bertambah dan kemudiannya menjadi malar.
As the higher the volume of potassium iodide solution, KI added to a solution of lead(II) nitrate, $Pb(NO_3)_2$, the height of the precipitate increases and then becomes constant.</td><td>2</td></tr>
<tr><td></td><td>(d)</td><td></td><td>Contoh jawapan / Example of answer:

Sila rujuk halaman terakhir J12
Please refer to the last page of J12</td><td>4</td></tr>
<tr><td></td><td>(e)</td><td></td><td>Ditunjuk melalui garis putus-putus:
Indicated by the dotted line:

Nilai yang diperoleh melalui ekstrapolasi graf = 1.5 cm^3
The value obtained through extrapolation of the graph = 1.5 cm^3</td><td>2</td></tr>
</table>

Kertas 3 / *Paper* **3**

<table>
<tr><th colspan="3">Soalan
Questions</th><th>Cadangan Jawapan
Suggestion Answers</th><th>Markah
Marks</th><th>Jumlah markah
Total marks</th></tr>
<tr><td rowspan="6">1</td><td>(a)</td><td></td><td>1. Tuangkan 1 g serbuk magnesium ke dalam bikar yang mempunyai Cecair A.
Put 1 g of magnesium powder into a beaker containing liquid A.

2. Kacaukan campuran dengan rod kaca.
Stir the mixture with glass rod.

3. Rekodkan pemerhatian.
Record the observation.

4. Ulang langkah 1 hingga 3 dengan menggunakan cecair B.
Repeat step 1 until 3 with liquid B.</td><td>3</td><td rowspan="6"></td></tr>
<tr><td>(b)</td><td></td><td><table><tr><th>Cecair
Liquid</th><th>Pemerhatian
Observations</th></tr><tr><td>A</td><td>Tiada perubahan
No change</td></tr><tr><td>B</td><td>Pembuakan gas berlaku
Effervescence occur</td></tr></table></td><td>3</td></tr>
<tr><td>(c)</td><td></td><td>Cecair A tidak bertindak balas dengan magnesium
Liquid A does not react with magnesium

Cecair B bertindak balas dengan magnesium
Liquid B reacts with magnesium</td><td>2</td></tr>
<tr><td rowspan="3">(d)</td><td>(i)</td><td>Dimanipulasi: Cecair A dan cecair B
Manipulated: Liquid A and liquid B</td><td rowspan="3">3</td></tr>
<tr><td>(ii)</td><td>Bergerak balas: Tindak balas dengan magnesium
Responding: Reaction with magnesium</td></tr>
<tr><td>(iii)</td><td>Dimalarkan: Jenis logam / Serbuk magnesium
Constant: Type of metal / Magnesium powder</td></tr>
<tr><td>(e)</td><td></td><td>1. Pembuakan gas berlaku / gas tidak berwarna terbebas
Effervescence occur / colourless gas is released

2. Kulit telur / $CaCO_3$ bertindak balas dengan cuka
Eggshell / $CaCO_3$ reacts with vinegar</td><td>2</td></tr>
</table>

Soalan *Questions*			Cadangan Jawapan *Suggestion Answers*	Markah *Marks*	Jumlah markah *Total marks*
	(*f*)		<table><tr><th>Bahan yang boleh bertindak balas dengan logam *Substances that can react with metals*</th><th>Bahan yang tidak boleh bertindak balas dengan logam *Substances that cannot react with metals*</th></tr><tr><td>• Asid hidroklorik *Hydrochloric acid* • Asid metanoik *Methanoic acid*</td><td>• Etena *Ethene* • Etil etanoat *Ethyl ethanoate*</td></tr></table>	2	15

KERTAS MODEL SIJIL PELAJARAN MALAYSIA SET 7

Kertas 3 / *Paper* **3**

Soalan *Questions*			Cadangan Jawapan *Suggestion Answers*	Markah *Marks*	Jumlah markah *Total marks*
1	(*a*)		<table><tr><th>Set</th><th>I</th><th>II</th></tr><tr><td>Suhu awal larutan A1 (ºC) *Initial temperature of solution* A1 (°C)</td><td></td><td></td></tr><tr><td>Suhu awal larutan A2 (ºC) *Initial temperature of solution* A2 (°C)</td><td></td><td></td></tr><tr><td>Suhu awal larutan B (ºC) *Initial temperature of solution* B (°C)</td><td></td><td></td></tr><tr><td>Purata suhu awal larutan (ºC) *Average temperature mixture* (ºC)</td><td></td><td></td></tr><tr><td>Suhu tertinggi atau terendah campuran (ºC) *Highest or lowest temperature mixture* (°C)</td><td></td><td></td></tr></table> *Sampel jawapan murid / *Sample of student's answer*	4	
	(*b*)	(i)	Set I: Bacaan suhu / termometer berkurang *Set* I: *Temperature / thermometer reading decreases* Set II: Bacaan suhu / termometer meningkat *Set* II: *Temperature / thermometer reading increases*	2	
		(ii)	Set I: Tindak balas adalah endotermik / Haba diserap dari persekitaran *Set* I: *Reaction is endothermic / Heat is absorbed from the surrounding* Set II: Tindak balas adalah eksotermik / Haba dibebaskan ke persekitaran *Set* II: *Reaction is exothermic / Heat is released to the surrounding*	2	

Soalan *Questions*			Cadangan Jawapan *Suggestion Answers*	Markah *Marks*	Jumlah markah *Total marks*
	(*c*)	(i)	Dimanipulasi: Larutan A1 dan larutan A2 *Manipulated*: *Solution* A1 *and solution* A2	1	
		(ii)	Bergerak balas: Suhu tertinggi atau terendah campuran / Haba pemendakan *Responding*: *Highest or lowest temperature mixture / Heat of precipitation*	1	
		(iii)	Dimalarkan: Kepekatan dan isi padu larutan B *Constant*: *Concentration and volume of solution* B	1	
	(*d*)		Tindak balas antara larutan A1 dan B dalam set I adalah endotermik dan tindak balas antara A2 dan B dalam set II adalah eksotermik. *The reaction between solutions* A1 *and* B *in set* I *is endothermic and the reaction between* A2 *and* B *in set* II *is exothermic.*	2	
	(*e*)		Haba pemendakan ialah apabila larutan A1 ditambah kepada larutan B untuk menghasilkan 1 mol mendakan, bacaan termometer berkurangan. *Heat of precipitation is when solution* A1 *is added to solution* B *to produce* 1 *mole of precipitate, the thermometer reading decreases.*	2	**15**

KERTAS MODEL SIJIL PELAJARAN MALAYSIA SET 8

Kertas 3 / *Paper* **3**

Soalan *Questions*			Cadangan Jawapan *Suggestion Answers*	Markah *Marks*	Jumlah markah *Total marks*
1	(*a*)		1. Tuangkan larutan kuprum(II) sulfat, $CuSO_4$ 1.0 mol dm^{-3} ke dalam bikar sehingga separuh penuh. *Pour a solution of copper*(II) *sulphate,* $CuSO_4$ 1.0 mol dm^{-3} *into the beaker until half full.* 2. Masukkan dua rod karbon ke dalam lubang pada kad. *Insert two carbon rods into the holes in the card.* 3. Sambungkan rod karbon kepada terminal negatif dan terminal positif bateri dengan menggunakan wayar penyambung. *Connect the carbon rods to the negative and positive terminals of the battery using connecting wires.* 4. Letakkan kad di atas bikar. *Place the card on top of the beaker.* 5. Rod karbon dicelup ke dalam larutan kuprum(II) sulfat. *The carbon rods are dipped into the copper*(II) *sulphate solution.* 6. Rekodkan pemerhatian selepas 5 minit. *Record the observations after* 5 *minutes.*	4	

Soalan *Questions*			Cadangan Jawapan *Suggestion Answers*	Markah *Marks*	Jumlah markah *Total marks*
	(*b*)		<table><tr><th>Elektrod *Electrode*</th><th>Pemerhatian *Observation*</th><th>Inferens *Inference*</th></tr><tr><td>**Anod** *Anode*</td><td>Gelembung gas tidak berwarna terbebas *Colourless gas bubbles is released*</td><td>Gas oksigen terbebas / terhasil *Oxygen gas is released / produced*</td></tr><tr><td>**Katod** *Cathode*</td><td>Pepejal perang terbentuk *Brown solid is deposited*</td><td>Kuprum terbentuk *Copper is formed*</td></tr></table>	5	
	(*c*)		Di anod, ion hidroksida dipilih untuk dinyahcas kerana nilai E^0 ion hidroksida kurang positif berbanding ion sulfat *At anode, hydroxide ion is selectively discharged because the* E^0 *value is less positive than sulphate ion* Di katod, ion kuprum(II) dipilih untuk dinyahcas kerana nilai E^0 ion kuprum lebih positif berbanding ion hidrogen *At cathode, copper*(II) *ion is selectively discharged because the* E^0 *value is more positive than hydrogen ion*	2	
	(*d*)		Kepingan kuprum menjadi lebih nipis *Copper plate becomes thinner* Kuprum mengalami pengoksidaan / teroksida / atom kuprum kehilangan elektron untuk membentuk ion kuprum(II) *Copper undergo oxidation / is oxidised / copper atom lose electron to form copper*(II) *ion*	2	
	(*e*)		<table><tr><th>Ion tertarik ke anod *Ion attracted to the anode*</th><th>Ion tertarik ke katod *Ion attracted to the cathode*</th></tr><tr><td>Cl^- OH^-</td><td>H^+</td></tr></table>	2	**15**

Graf untuk soalan 7(*d*)
Graph for Question 7(*d*)

Graf ketinggian mendakan melawan isi padu larutan kalium iodida
Graph height of precipitate against volume of potassium iodide solution