PENTAKSIRAN DIAGNOSTIK AKADEMIK SBP 2013

CHEMISTRY

http://cikguadura.wordpress.com/

SKEMA JAWAPAN KERTAS 1

1	A	11	A	21	D	31	B	41	D
2	D	12	A	22	B	32	D	42	B
3	A	13	C	23	A	33	B	43	D
4	C	14	D	24	C	34	D	44	A
5	D	15	B	25	C	35	D	45	B
6	C	16	B	26	C	36	C	46	C
7	C	17	A	27	A	37	D	47	D
8	A	18	A	28	B	38	B	48	B
9	C	19	C	29	A	39	D	49	B
10	D	20	C	30	B	40	A	50	C

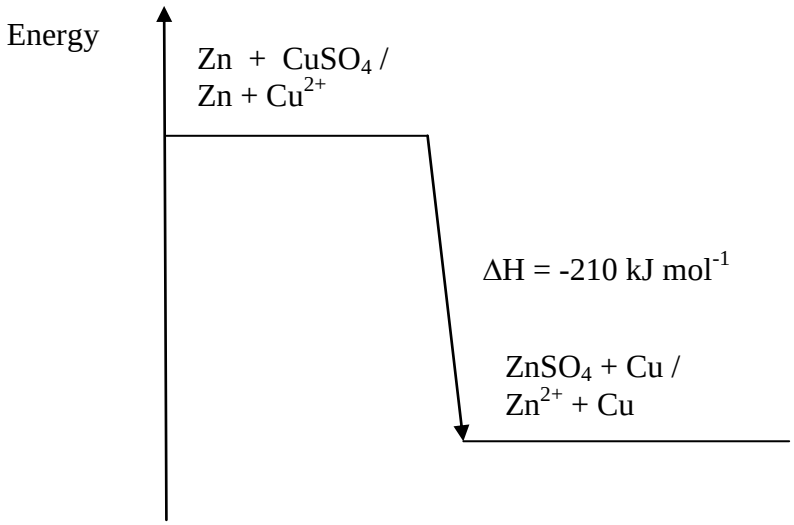
KERTAS 2

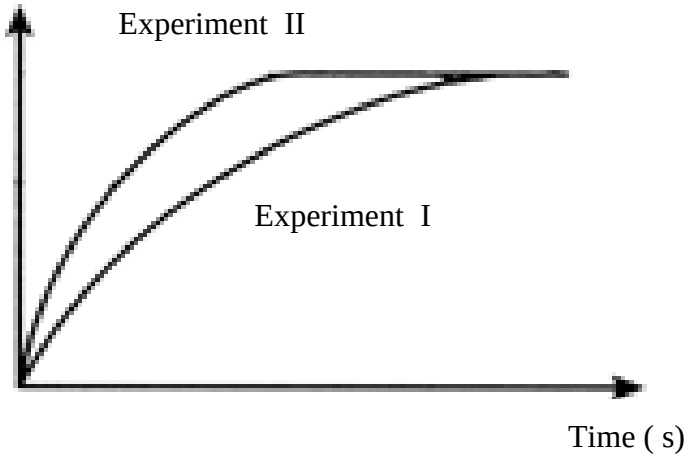
SECTION A

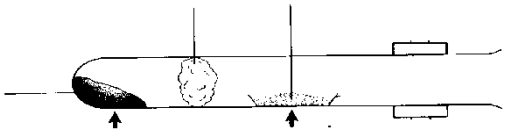
No		Rubric	Mark
1(a)	(i)	Diffusion r. diffuse	1
	(ii)	Ion	1
	(iii)	1. Potassium manganate(VII) is made of tiny and discrete particles/ions 2. The particles are constantly moving/vibrate and rotate 3. The particles move into spaces between agar particles// there are spaces between agar particles// the particles move from high concentration area to low concentration region	1 1 1
(b)	(i)	Proton // neutron r. p/n	1
	(ii)	Atoms that have the same proton number but difference nucleon number.	1
	(iii)	8	1
	(v)	To estimate the age of fossil	1
		TOTAL http://cikguadura.wordpress.com/	**9**

No	Rubric	Mark
2 (a)(i)	2.8.2	1
(ii)	Group 2, Period 3	1
(b)	Gas	1
(c)	Chlorine/ Cl	1
(d) (i) (ii)	Al_2O_3 Ionic r: ionic compound	1 1
(e)	Mass Mg Cl 2.4 g 7.1 g Mol 0.1 0.2 Ratio 1 2 Formula : $MgCl_2$	 1 1 1
TOTAL		**9**

No	Rubric	Mark
3 (a)	(i) ionic compound formed when the hydrogen ion from an acid is replaced by a metal ion or ammonium ion	1
	(ii) Blue	1
(b)	(i) Oxygen	1
	(ii) NO_2	1
	(iii) CuO	1
(c)	(i) Copper(II) ion	1
	(ii) Copper(II) carbonate / $CuCO_3$	1
(d)	1. Mol of HCl = 0.5 x 20 /1000// 0.01 mol	1
	2. Mol of H_2O= 0.005	1
	3. No. of H_2O molecules = 0.005 x 6.02 x 10^{23} // 3.01 x 10^{21}	1
TOTAL		**10**

No	Rubric	Mark
4 (a)	Heat change / released when one mole of copper is displaced from/ copper(II) sulphate solution by zinc	1
(b)	Polystyrene is a heat insulator / / to reduce heat loss to surroundings r: to prevent	1
(c) (i)	No of moles of Copper(II) ion = $\frac{0.2 \times 50}{1000}$ // 0.01 mol	1
(ii)	1. 1 mol of Cu is displaced produce 210 kJ heat	1
	2. 0.01 mol of Cu = 0.01 x 210 kJ // 2.1 kJ / 2100 J	1
(iii)	2100 J = 50 x 4.2 x θ // θ = 10^{o}C	1
(d) (i)	More than -210 kJ mol^{-1} / Higher / Increases	1
(ii)	Magnesium is more electropositive than zinc // magnesium is higher than zinc in electrochemical series // distance between Mg – Cu is further than Zn-Cu in electrochemical series	1
(e)	1. Label energy and diagram has 2 different energy levels for exothermic reaction 2. Balanced chemical / ionic equation, ΔH is written 	1 1
TOTAL		**10**

No	Rubric	Mark
5(a) (i)	Hydrogen	1
(ii)	Place/ insert a lighted splinter into a test tube Produce "pop" sound	1 1
(b)(i)	Experiment 1: Average rate of reaction: = 35/ 140 cm^3s^{-1} or 0.25 cm^3s^{-1} Experiment II: Average rate of reaction: = 35/120 cm^3s^{-1} or 0.29 cm^3s^{-1}	 1 1
(ii)	Rate of reaction in Experiment II is higher	1
b(iii)	In Experiment II , 1. Size of zinc in is smaller// Total surface area of zinc in Experiment II is bigger 2. Frequency of collision between zinc atom and hydrogen ion is higher 3. Frequency of effective collisions between zinc atom and hydrogen ion is higher	1 1 1
(c)	Volume of gas Y (cm^3)  1. Correct shape of graf and smooth 2. Label the curve correctly	 1 1
	Total	**11**

No.	Rubric	Marks
6(a)(i)	oxidizing agent / to oxidize iodide ion	1
(ii)	Purple layer formed	1
(iii)	$Br_2 + 2I^- \rightarrow 2Br^- + I_2$ 1. First mark for correct formulae of reactants and products 2. Balanced the equation	 1 1
(iii)	$-1 \rightarrow 0$	1
(iv)	Chlorine r: Fluorine	1
(b)(i)	Glass wool *Wul kaca* Metal powder *Serbuk logam* Potassium manganate(VII) *Kalium manganat*(VII)  Heat *Panaskan* Heat *Panaskan* 1. Functional diagram 2. Label; Potassium manganate(VII), glass wool, metal	 1 1
(ii)	Zinc / Zn	1
(iii)	$2Zn + O_2 \rightarrow 2ZnO$	1
(iv)	Y, W , X	1
	Total	**11**

SECTION B

http://cikguadura.wordpress.com/

No	Mark scheme	Mark	Σ Mark
7(a)	P1: Borosilicate glass P2: It has a lower thermal expansion coefficient // high resistant to heat// more resistant to chemical attack. P3: Polyvinyl chloride P4: It does not rust a: Light	1 1 1 1	4
7(b)(i)	Number of moles of sulphur = 8÷32 // 0.25 mol Volume of sulphur dioxide = $0.25 \times 24 = 6\ dm^3$ // $6000\ cm^3$ [unit 'mol' and 'dm^3' / 'cm^3' must be stated]	1 1	2
7(b)(ii)	P1: Sulphur dioxide dissolves in water/ rain water to produce **acid solution**/**acid rain**. <u>Any two correct answers:</u> P2: Acid rain can corrode buildings /metal structures P3: Lake and river become acidic P4: pH of soil decreases P5: Destroys trees/forest	1 1 1	3
7(b)(iii)	$SO_3 + H_2SO_4 \rightarrow H_2S_2O_7$	1	1
7(c)(i)	P1: Y is more effective than X in hard water. P2: Hard water contains magnesium **or** calcium ions. P3: X form scum/insoluble salt with magnesium /calcium ion P4: Y does not form scum/insoluble salt. P5: Amount of agent X is reduced// amount of agent Y is remains	1 1 1 1 1	5
7(c)(ii)	P1: Part P = Hydrophobic P2: Part Q = Hydrophilic P3: Hydrophobic part <u>dissolves</u> in the grease/ oil P4: Hydrophilic part <u>dissolves</u> in the water P5: This reduces the surface tension// Increase the wetting ability of water r: Like / dislike	1 1 1 1 1	5
	Total		**20**

No		Answer	Mark	Total Mark
8	(a)			

	Voltaic cell	Electrolytic cell
Negative terminal	Zinc	P
The flow of electron	Zinc to P through external circuit	Magnesium to P through external circuit

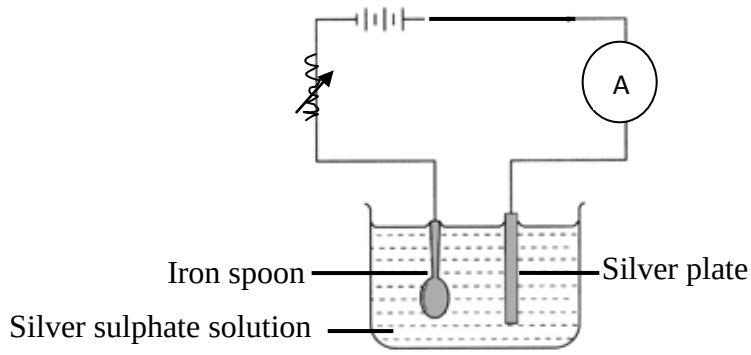
1 + 1

1 + 1

4

r: showing the answer in the diagram

(b)



- Functional diagram (not include rheostat) — 1
- Silver plate is connect to positive terminal and iron spoon connect to negative terminal. — 1

Procedure:

1. Iron spoon is cleaned with sand paper — 1
2. a beaker is half fulled with silver sulphate solution — 1
3. iron spoon and silver plate are dipped into the silver sulphate solution — 1
4. iron spoon is connected to the negative terminal and silver plate is connected to the positive terminal. — 1
5. half equation: — 1

   Anode/ Silver plate : $Ag \rightarrow Ag^{+} + e$ //

   Cathode/ Iron spoon : $Ag^{+} + e \rightarrow Ag$

Max 6

[Anode/silver plate or cathode/Iron spoon must be stated]

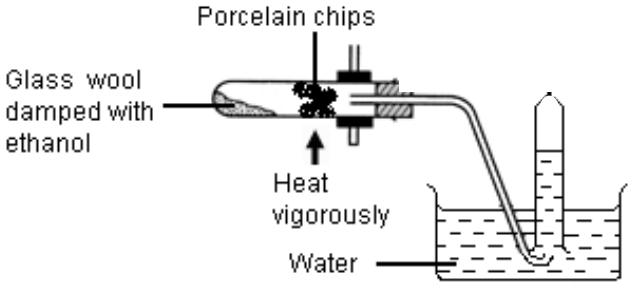
	(c)	1. metal Q : eg: Zinc [Zn/Fe/Sn/Pb] 2. Q solution: eg: zinc nitrate 3. Flow of electron : Aluminium plate to zinc plate through connecting wire/ external circuit 4. Negative terminal : $Al \rightarrow Al^{3+} + 3e$ 5. Positive terminal : $2H^+ + 2e \rightarrow H_2$ 6. Ionic equation: $2Al + 6H^+ \rightarrow 2Al^{3+} \; 3H_2$ 7. Function of porous pot : to allow the movement of ions // to balance the total charges between solution 8. Observations: • Aluminium plate become thinner// Mass decreases// size become smaller • Colourless bubble gas produce	1 1 1 1 1 1 + 1 1 1 1	10
TOTAL			**20**	

SECTION C

NO	RUBRIC	MARK	∑MARK
9 (a)	Daily application of neutralisation 1. Ammonia : neutralize organic acid produced by bacteria// to prevent latex from coagulate/remain as liquid 2. Antacid/ health salt/ sodium hydrogen carbonate : neutralised acid in stomach of gastric patients 3. Lime /quick lime (calcium oxide)/ slaked lime (calcium hydroxide), chalk (calcium carbonate) : neutralised acidic soil 4. Magnesium hydroxide / toothpaste: neutralised acid produced by bacteria in our mouth [Accept other suitable examples and usage] **Any 2**	 1+1 1+1	 4
(b)	1. Example of R ; sodium hydroxide solution/ litium hydroxide solution/ potassium hydroxide solution 2. R ionised completely in water and produced high concentration of OH^- ions 3. Exampleof Q : ammonia aqueous / solution 4. Q ionised partially in water and produce low concentration of OH^- ions 5. the concentartion of OH^- ions in R is higher than Q	1 1+1 1 1+1 1	 Max 6

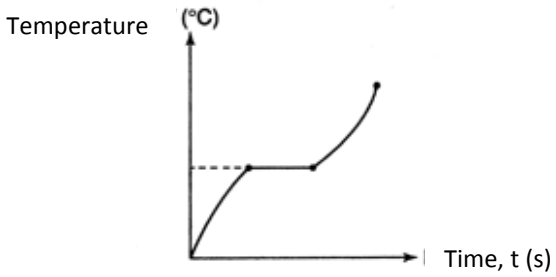
(c)	1. Solution 1 : barium nitrate /barium chloride solution 2. Solution 2 : sodium carbonate/ potassium carbonate/lithium carbonate solution/ H_2CO_3 [Any pair of solution above] 3. Procedure : 1. Pour solution 1 into a beaker 2. Add solution 2 into the beaker/solution 1 3. Stir the mixture using glass rod 4. Filter the mixture 5. Rinse the residue with distilled water 6. Dry the precipitate/solid/salt/residue in between sheet of filter papers to dry 4. Equation Sample answer: $Ba(NO_3)_2 + Na_2CO_3 \rightarrow BaCO_3 + 2NaNO_3$ // $BaCl_2 + Na_2CO_3 \rightarrow BaCO_3 + 2NaCl$ • Correct reactant & product • Balanced	1 1 1 1 1 1 1 1 1 1	10
	Total	**20**	

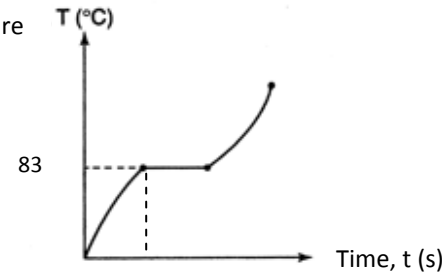
No	Explanation	Mark	∑ mark
10 (a)(i)	Hex-1-ene r: hexene	1	**1**
(ii)	1. Percentage of carbon in compound B is higher 2. Percentage carbon in compound A = 72/86 x 100 % / 83.72% Percentage carbon in compound B = 72/84 x 100 % /85.71%	1 1 1	**3**

(b)	• Soluble in water/ miscible in water • Low melting point/ volatile • Colourless liquid • Cannot conduct electricity *Any 1* 1. Pour compound J and K into two different test tubes 2.Put magnesium ribbon / calcium carbonate / any suitable metal/carbonate metal into both test tubes 3. Place a lighted wooden splinter into the test tube// gas release is pass through the lime water 4. If 'pop' sound produced// lime water turns cloudy shows the compound is J 5. If no change the compound is K	1 1 1 1 1 1	**6**
(d)	*Sample answer:* 1. Name of alcohol 2. Place glass wool in a boiling tube 3. Add a few drops of alcohol to the glass wool 4. Clamp the boiling tube horizontally 5. Place a porcelain chips in the middle of the boiling tube 6. Heat the porcelain chips strongly 7. Heat the alcohol/glass wool 8. Collect the gas produced in a test tube 9. Functional diagram 10. Label : Glass wool damped with alcohol, porcelain chips, water, heat 11. Equation: $C_2H_5OH \rightarrow C_2H_4 + H_2O$  	 1 1 1 1 1 1 1 1 1 1 1	**10**
		Total	**20**

KERTAS 3

No.	Mark scheme http://cikguadura.wordpress.com/	Score
1(a)	*Able to record all readings accurately to one decimal point with correct unit.* Answer : 70.0 ^{o}C, 77.0 ^{o}C, 83.0 ^{o}C, 83.0 ^{o}C, 83.0 ^{o}C, 84.0 ^{o}C, 89.0 ^{o}C, 95.0 ^{o}C	3
	Able to record all readings without unit and no decimal point	2
	Able to record at least 6 readings.	1
	No response / wrong response	0

No.	Mark scheme	Score
1(b)	*Able to plot a graph correctly which fulfills the following criteria.* Answer :  1. both axes are labeled and with correct units Y axis : temperature, (^{o}C) X axis : time, min 2. uniform scale 3. all points are transferred correctly 4. smooth and correct curve 5. the size of the graph must ≥ 50% of the graph paper.	3
	Able to plot a graph at least fulfill three of the criteria.	2
	Able to have an idea to plot a graph Example answer: 1. graph axis 2. a curve	1
	No response / wrong response	0

No.	Mark scheme	Score
1(c)(i)	*Able to state all 3 criteria correctly* *1. mark on the graph to show melting point* *2. label the melting point on the graph and* *3. state the melting point, 83.0 ^{o} C* Answer: 1. Temperature  2. show 83.0 ^{o} C / write the melting point on the graph 3. 83.0 ^{o} C	3
	Able to state at least two criteria correctly	2
	Able to state at least one criteria correctly	1
	No response / wrong response	0

No.	Mark scheme	Score
(c)(ii)	*Able to state the meaning of melting point based on the heating graph correctly.* *1. The temperature is constant in* 2nd minute to 4th minute *2. at* 83.0 ^{o} C *3. Where solid becomes liquid.* Sample answer: 1. The temperature which doesn't change / constant within a certain period of time / 2nd to 4th minute 2. at 83.0 ^{o} C 3. Where solid becomes liquid.	3
	Able to state any two criteria correctly.	2
	Able to state any one criteria correctly or an idea of melting point.	1
	No response / wrong response	0

No.	Mark scheme	Score
(d)	*Able to explain why the temperature of naphthalene from 2nd minute to 4th minute did not change during the heating process correctly.* Answer : 1.Heat <u>energy</u> absorbed by the particles /molecules, is 2. Used to overcome the forces between particles / molecules.	3
	Able to explain why the temperature of naphthalene did not change from 2nd minute to 4th minute during the heating process. Sample answer: 1. Heat absorbed. 2. Used to overcome the forces between particles / molecules.	2
	Able to an idea of why the temperature does not change during the heating process. Example : Heat is absorbed// Solid become liquid//	1
	No response / wrong response	0

Q	Mark scheme	Score
2(a)	*Able to state all inferences correctly* Test tube / Inference: A — Iron nail does not rust // Fe^{2+} does not present; B — Iron nail rust // Fe^{2+} present / formed; C — Iron nail does not rust // Fe^{2+} does not present; D — Iron nail rust // Fe^{2+} present / formed	3
	Able to state 3 inferences correctly	2
	Able to state any one inference correctly	1
	No response / wrong response	0

Q	Mark scheme	Score
2(b)	*Able to state the hypothesis correctly* Sample answer: When a more electropositive metal / higher than iron in Electrochemical series is in contact with iron, iron (nail) does not rust. When a less electropositive metal / lower than iron in Electrochemical series is in contact with iron, iron (nail) rust.	3
	Able to state the hypothesis less correctly Sample answer: When a more electropositive metal / higher than iron in Electrochemical series is in contact with iron, iron (nail) does not rust. **or** When a less electropositive metal / lower than iron in Electrochemical series is in contact with iron, iron rust. **or** The rusting of iron is faster/slower, if a less /more electropositive metal is in contact with iron/Fe.	2
	Able to give an idea of hypothesis Sample answer: Iron rust when in contact with other metal // other metal affect the rusting of iron.	1
	No response / wrong response	0

Q	Answer	Score
2(c)	*Able to state all the variables in this experiment correctly* Sample answer: Manipulated variable: Type / different metal Responding variable: Rusting // presence of blue spot Constant variable: Type of nail iron // iron// medium in which the iron are kept	3
	Able to state any two of the variables in this experiment correctly	2
	Able to state any one of the variables in this experiment correctly	1
	No response / wrong response	0

Q	Answer	Score
2(d)	*Able to state all 3 criteria correctly* Sample answer: 1. Rusting of iron is the formation of blue spot / colouration 2. When iron nail is coiled / in contact with a less electropositive metal (copper) / metal located below iron in Electrochemical series. 3. Immersed / dipped / placed / put in a mixture of jelly solution, potassium hexacyanoferrate(III) and phenolphthalein.	3
	Able to state at least two criteria correctly Sample answer: 1. Rusting of iron is the formation of blue spot / colouration 2. When iron nail is coiled / in contact with a less electropositive metal	2
	Able to state any one criteria correctly Sample answer: 1. Rusting of iron is the formation of blue spot / colouration **or** 2. When iron nail is coiled / in contact with a less electropositive metal	1
	No response / wrong response	0

Q	Answer	Score
2(e)	*Able to classify the metals into metal that can provide sacrificial protection and metal that cannot provide sacrificial protection correctly.* Answer: Metal that can provide sacrificial protection: magnesium /Mg and zinc /Zn Metal that cannot provide sacrificial protection : copper/Cu	3
	Able to classify any two metals correctly	2
	Able to classify one metals correctly	1
	No response / wrong response	0

Q	Answer	Score
2(f)	*Able to predict the observation correctly.* Answer : The intensity of blue spot/colouration is very high // higher than test tube B.	3
	Able to predict the observation Answer: Blue spot/ colouration formed	2
	Able to state idea of observation Answer:	1

	Blue	
	No response / wrong response	0

Q	Answer	Score
3(a)	*Able to state the problem statement of the experiment correctly.* How does the presence of <u>catalyst</u> / <u>manganese (IV) oxide</u> affect on the rate of decomposition of hydrogen peroxide? How does the presence of catalyst affect the rate of reaction? To investigate the effect/ presence of catalyst. *Students give a wrong response.*	 3 2 1 0
3(b)	*Sample answer:* Manipulated variable: The presence of catalyst/ manganese (IV) oxide Responding variable: rate of reaction// rate of decomposition of hydrogen peroxide Constant variable: Concentration and temperature of hydrogen peroxide. *Students able to write all **3** variables correctly* *Students able to write **2** variables correctly* *Students able to write **1** variable correctly* *Students give a wrong response.*	 3 2 1 0
3(c)	*Able to state the relationship between the manipulated variable and the responding variable and state the direction.* Sample answer: When catalyst/ manganese (IV) oxide presents, the rate of decomposition of hydrogen peroxide increases When catalyst presents, the rate of reaction increases. Catalyst affects the rate of reaction. *Students give a wrong response.*	 3 2 1 0

Q	Answer	Score
3(d)	*Able to give complete list of substances and apparatus* Method 1: Substances: Hydrogen peroxide, manganese (IV) oxide powder Apparatus: Test tube, measuring cylinder, spatula, wooden splinter. *Students able to list down substances and improperly apparatus* Substances: Hydrogen peroxide, manganese (IV) oxide powder Apparatus: Test tube, spatula *Students able to list one of the substance and suitable container* Substances: Hydrogen peroxide and manganese (IV) oxide powder Apparatus: Beaker *Students give a wrong response.*	3 2 1 0
3(d)	Method 2: *Able to give complete list of substances and apparatus* Substances: Hydrogen peroxide, manganese (IV) oxide powder Apparatus: Conical flask, delivery tube and stopper, burette, basin/ water trough, retort stand with clamp, stopwatch, measuring cylinder, spatula. *Students able to list down substances and improperly apparatus* Substances: Hydrogen peroxide, manganese (IV) oxide powder Apparatus: Conical flask, delivery tube and stopper, burette, basin/ water trough, retort stand with clamp, stopwatch. *Students able to list one of the substance and suitable container* Substances: Hydrogen peroxide, manganese(IV) oxide powder Apparatus: Conical flask, delivery tube and stopper, burette, basin/ water trough *Students give a wrong response.*	3 2 1

Q	Answer	Score
3(e)	*Method 1:* *Able to list all the steps correctly* *Procedure:* 1. Measure and pour (2 - 5) cm^3 of hydrogen peroxide in a test tube. 2. Add 1 spatula of manganese (IV) powder into the test tube 3. Put a glowing splinter into the test tube. 4. Observe and record the changes on the glowing splinter. 5. Repeat steps 1 to 4 without adding manganese (IV) oxide/ catalyst. *Able to write steps 1, 2, 4, 5 improperly.* *Able to write steps 1&2 less correctly.* *No response / wrong response.*	3 2 1 0
3(e)	Method 2: *Able to list all the steps correctly* Procedure: **1.** Fill a basin/ water trough with water. **2.** Fulfill a burette with water and invert it in onto water in a basin/ water trough. **3.** Clamp the burette by using a retort stand. Record the initial burette reading. **4.** Measure and pour (20 - 100) cm^3 of hydrogen peroxide in a conical flask. **5.** Add 1 spatula of manganese (IV) powder into the conical flask. **6.** Close the conical with a stopper which attached to a delivery tube. Immediately start the stopwatch. **7.** Observe and record the burette reading at every 30 seconds interval time. **8.** Repeat steps 1 to 7 without adding manganese(IV) oxide/ catalyst. *Able to write 7 steps improperly.* **1.** Fill a basin/ water trough with water. **2.** Fulfill a burette with water and invert it in onto water in a basin/ water trough. **3.** Clamp the burette by using a retort stand. Record the initial burette reading. **4.** Measure and pour of hydrogen peroxide in a conical flask. **5.** Add 1 spatula of manganese(IV) powder into the conical flask. **6.** Close the conical with a stopper which attached to a delivery tube. Start the stopwatch. **7.** Observe and record the burette reading	3 2

<table>
<tr>
<td></td>
<td>
Able to write at least 6 steps improperly.
1. Fill a basin/ water trough with water.
2. Fulfill a burette with water and invert it in onto water in a basin/ water trough.
3. Measure and pour of hydrogen peroxide in a conical flask.
4. Add 1 spatula of manganese (IV) powder into the conical flask.
5. Close the conical with a stopper which attached to a delivery tube.
6. Observe and record the burette reading

No response / wrong response.
</td>
<td>1

0</td>
</tr>
<tr>
<td>3(f)</td>
<td>
Method 1:
Able to tabulate the data with the following aspects
Sample answer:

<table>
<tr><td>Set</td><td>Observation</td></tr>
<tr><td>Hydrogen peroxide + manganese(IV) oxide</td><td></td></tr>
<tr><td>Hydrogen peroxide only</td><td></td></tr>
</table>

Able to tabulate the data with the following aspects
Sample answer:
<table>
<tr><td>Set</td><td></td></tr>
<tr><td>With catalyst</td><td></td></tr>
<tr><td>Without catalyst</td><td></td></tr>
</table>

Students give a wrong response.
</td>
<td>2

1

0</td>
</tr>
<tr>
<td>3(f)</td>
<td>
Method 2:
Able to tabulate the data with the following aspects

Set 1: With catalyst/ manganese(IV) oxide

<table>
<tr><td>Time (s)</td><td>0</td><td>30</td><td>60</td><td>90</td><td>120</td></tr>
<tr><td>Volume of gas (cm^3)</td><td></td><td></td><td></td><td></td><td></td></tr>
</table>

Set 2: Without catalyst/ manganese(IV) oxide

<table>
<tr><td>Time (s)</td><td>0</td><td>30</td><td>60</td><td>90</td><td>120</td></tr>
<tr><td>Volume of gas (cm^3)</td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
</td>
<td>2

1</td>
</tr>
</table>

	Able to tabulate the data with the following aspects **Set** | **Volume** With catalyst/ manganese(IV) oxide | Without catalyst | *Students give a wrong response.*	0

END OF MARKING SCHEME