TRIAL EXAMINATION

CHEMISTRY 2010

JOHOR STATE

PAPER 1 ANSWER SCHEME

Question No.	Answer	Question No.	Answer
1	D	26	B
2	C	27	C
3	A	28	D
4	B	29	C
5	A	30	B
6	B	31	B
7	A	32	C
8	D	33	B
9	B	34	C
10	B	35	A
11	D	36	C
12	A	37	A
13	D	38	B
14	C	39	D
15	B	40	C
16	B	41	D
17	D	42	B
18	B	43	C
19	C	44	A
20	D	45	B
21	D	46	C
22	A	47	A
23	A	48	D
24	C	49	A
25	C	50	A

MARKING SCHEME OF CHEMISTRY TRIAL EXAMINATION
PAPER 2, 2010

Question	Mark Scheme	Mark	
		Sub mark	Total Mark
1. (a) (i)	Contact	1	1
(ii)	Burn sulphur in air /oxygen Heating of zinc sulphide/ ZnS	1	1
(iii)	SO_3	1	1
(iv)	Concentrated sulphuric acid	1	1
(v)	Dissolve / Dilute in water	1	1
(vi)	Bubbles of gas are released // Beaker becomes warm// the mass of marble decreases	1	1
(b)	Ferum / Iron	1	1
(c) (i)	$2NH_3 + H_2SO_4 \rightarrow (NH_4)_2SO_4$ Correct formula of reactants and product Balance equation	1 1	2
(ii)	As fertilizers	1	1
	Total		10

Question	Mark Scheme	Mark	
		Sub mark	Total Mark
2. (a) (i)	Temperature at which a solid changes to liquid.	1	1
(ii)	83°C	1	1
(iii)	solid and liquid	1	1
(iv)	1. Heat energy absorbed	1	
	2. is used to overcome the forces of attraction between the molecules / particles P.	1	2

JABATAN PELAJARAN NEGERI JOHOR

PEPERIKSAAN PERCUBAAN SPM 2010
CHEMISTRY
Kertas 2
Ogos

4541/2

SKEMA PEMARKAHAN

UNTUK KEGUNAAN PEMERIKSA SAHAJA

Peraturan pemarkahan ini mengandungi 13 halaman bercetak

(v)	1. Water bath should be used and not ethanol bath.	1	
	2. Melting point of P is higher than boiling point of ethanol / 78°C // Ethanol is flammable.	1	2
(b) (i)	Sublimation	1	1
(ii)	1. Iodine-131	1	
	2. To treat thyroid patients // Diagnosis of thyroid Glands	1	2
	Total		10

Question	Mark Scheme	Mark	
		Sub mark	Total Mark
3. (a) (i)	The negatively charged ion/ particle	1	1
(ii)	OH^-, Cl^-	1	1
(iii)	Chlorine	1	1
(b) (i)	Carbon electrode Y	1	1
(ii)	$2H^+ + 2e \rightarrow H_2$	1	1
(iii)	1. Insert a lighted wooden splinter into the test tube,	1	
	2. A 'pop' sound is produce/ can be heard	1	2
(c)(i)	Hydroxide ion	1	1
(ii)	Because hydroxide ion is located lower than chloride ion in electrochemical series.	1	1
(iii)	Oxygen gas	1	1
	Total		10

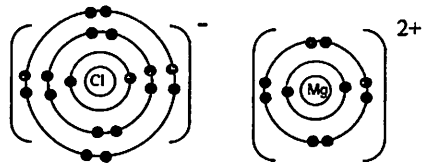
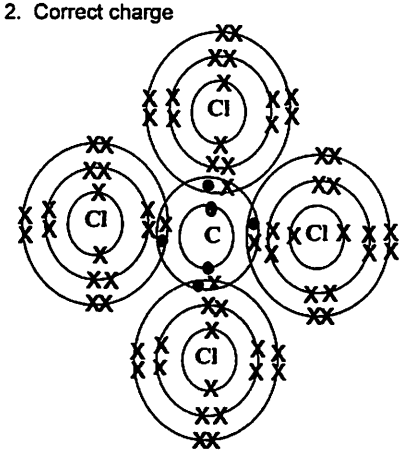
Question	Mark Scheme	Mark	
		Sub mark	Total Mark
4. (a) (i)	1. P : Alkene	1	
	2. Q : Alkane	1	2
(ii)	C_nH_{2n+2}	1	1
(iii)	Brown colour remains	1	1
(iv)	Acidified potassium manganate(VII) solution // Acidified potassium dichromate (VI) solution	1	1
(v)	In alkene carbon-carbon double bonds are more reactive than carbon-carbon single bonds.	1	1
(b) (i)	Carbon dioxide	1	1
(ii)	$C_2H_4 + 3O_2 \rightarrow 2CO_2 + 2H_2O$	1	1
	OR		
	$2C_2H_6 + 7O_2 \rightarrow 4CO_2 + 6H_2O$		
(iii)	1. Compound Q produced mere soot.	1	
	2. Compound Q has higher percentage of carbon mass than compound P.	1	2
	Total		10

Question	Mark Scheme	Mark	
		Sub mark	Total Mark
5. (a)	To allow movement of ions // To complete the electric circuit	1	1
(b) (i)	Green colour solution turn to brown / yellow	1	1
(ii)	$Fe^{2+} \rightarrow Fe^{3+} + e$	2	2

(iii)	1. A few drops of sodium hydroxide solution/ ammonium hydroxide solution is added into the product formed around carbon Y.	1	
	2. Brown precipitate is formed.	1	2
	[OR]		
	1. A few drops of potassium hexacyanoferrate (II) solution is added into the product formed around carbon Y.		
	2. Dark blue colour / precipitate produced.		
(c) (i)	Purple solution is decolourised / turn colourless	1	1
(ii)	Act as oxidizing agent	1	1
(iii)	Potassium manganate (VII) solution/ MnO_4^- ion is oxidized.	1	1
(d)	Bromine water/ chlorine water/ acidified potassium dichromate (VI) solution	1	1
	Total		10

Question	Mark Scheme	Mark	
		Sub mark	Total Mark
6. (a) (i)	Ethanoic acid/ formic acid / any suitable dilute acid.	1	1
(ii)	Because bacteria from air enter the latex and it produces lactic acid that causes the coagulation.	1	1
(iii)	Ammonia, NH_3 solution	1	1
(b) (i)	Saponification (Spelling must be correct)	1	1
(ii)	Concentrated potassium hydroxide, KOH// concentrated sodium hydroxide, NaOH.	1	1

(iii)	To precipitate the soaps / to reduce the solubility of soap	1	1
(iv)	1. When a cloth with grease is dipped into soap, soap reduces the surface tension of water.	1	
	2. The hydrophobic part dissolves in the grease	1	
	3. The hydrophilic part dissolve in water	1	Max 2
(c)	1. Agent Y s more effective	1	
	2. Detergent do not form scum// Detergent can still perform its cleaning action in hard water // Detergent can still clean well in hard water.	1	2
	Total		10

Question	Mark Scheme	Mark	
		Sub mark	Total Mark
7(a)	Aluminium ion : 2.8 Oxide ion : 2.8	1 1	2
(b)(i)	1. Magnesium atom donates / releases 2 electron to form magnesium ion / Mg^{2+} // $Mg \rightarrow Mg^{2+} + 2e$	1	
	2. Chlorine atom accepts / receives one electron to form chloride ion / Cl^- // $Cl + e \rightarrow Cl^-$	1	
	3. Magnesium ion and chloride ion are attracted to one another by electrostatic force.	1	
	 Chloride ion, Cl^- magnesium ion, Mg^{2+}		
(ii)	1. Correct number of shells and number of electron	1	
	2. Correct charge	1	5
			

	1. Correct number of shell and electron	1	
	2. Correct number of atoms of elements	1	
	3. Carbon atom contribute / needs / requires 4 electrons to share	1	
	4. Chlorine atom contribute / needs / requires 1 electron to share	1	
	5. One carbon atom share 4 valence electrons with 4 chlorine atoms.	1	5
(c)(i)	1. Compound (b)(i) / $MgCl_2$ is an ionic compound	1	
	2. In molten state, $MgCl_2$ has freely moving ions	1	
	3. Compound (b)(ii) / CCl_4 is a covalent compound.	1	
	4. CCl_4 has no freely moving ions// only consist of molecules.	1	4
(ii)	1. Ions in $MgCl_2$ are held together by strong electrostatic force	1	
	2. A lot of heat energy is needed to overcome the strong electrostatic force	1	
	3. Molecules in CCl_4 are held together by weak intermolecular forces / van der Waals	1	
	4. Less heat energy is needed to overcome the forces	1	4
	Total		20

Question	Mark Scheme	Mark	
		Sub mark	Total Mark
8. (a)	Heat of combustion of ethanol is the heat released when 1 mole of ethanol is burnt completely in air to produced 715 kJ.	2	2
(b) (i)	Graph		
	1. Correct axis and labels	1	
	2. Plot data	1	
	3. Straight line	1	3
(ii)	The higher the number of carbon atoms per molecule of alcohol, the higher the magnitude of the heat of combustion.	1	1
(iii)	1. [3200 – 3300] kJ mol $^{-1}$	1	
	2. Dotted line in graph.	1	2
(c)	1. The heat of combustion of butanol is higher than ethanol.	1	
	2. Butanol has higher number of carbon / hydrogen atoms per molecule// The relative mass of butanol is higher than ethanol	1	
	3. More carbon dioxide and water are formed.	1	
	4. The combustion of butanol produced more heat.	1	4
(d) (i)	1. The energy level diagram shows exothermic reaction / heat released to the surrounding.	1	
	2. The energy level of reactants is higher than the products	1	
	3. The heat of combustion released 715 kJ per 1 mole of ethanol	1	
	4. Ethanol burnt in oxygen to produced carbon dioxide and water.	1	4
(ii)	1. Number of mole of ethanol = $\frac{6.9}{46} = 0.15$	2	
	2. 0.15 mole will released 0.15 x 715 = 107.25 kJ of heat	2	4
	Total		20

Question	Mark Scheme	Mark	
		Sub mark	Total Mark
9. (a)	1. Empirical formula is the formula that shows the simplest ratio of atoms of each element in the compound.	1	
	2. Molecular formula is the formula that shows the actual number of atoms of each element in the compound.	1	
	3. Example : empirical formula of ethene is CH_2 and the molecular formula is C_2H_4	1	3
(b)(i)			

Element	Carbon	Hydrogen	Oxygen
Percentage	40.00	6.66	53.33
Number of moles	$\frac{40}{12}=3.33$	$\frac{6.66}{1}=6.66$	$\frac{53.33}{16}=3.33$
Ratio of moles	1	2	1

		1	
		1	
	Empirical formula is CH_2O	1	3
(ii)	$n(CH_2O) = 180$ $12n + 2n + 16n = 180$ $30n = 180$ $n=6$	1	
	molecular formula = $C_6H_{12}O_6$	1	2
(c)(i)	Because magnesium is more reactive than hydrogen// because magnesium oxide does not react with hydrogen gas.	1	1
(ii)	Lead oxide / Stanum oxide / iron oxide / copper oxide	1	1

Question	Mark Scheme	Mark	
		Sub mark	Total Mark
10. (a)(i)	The higher the concentration of hydrochloric acid, the lower the pH value / vice versa	1	
(ii)	1. The pH value is actually a measure of the concentration of H^+ ions [and OH^- ions]	1	
	2. The higher the number of H^+ ion per unit volume of solution, the lower the pH value.	1	
(iii)	Increasing acidity of hydrochloric acid is: A , B , C , D	1	4
(b)	1. Sodium hydroxide is a strong alkali.	1	
	2. Ammonia is a weak alkali	1	
	3. Sodium hydroxide ionises completely in water to produce higher concentration of hydroxide ions,	1	
	3. Whereas ammonia ionises partially in water to produce lower concentration of hydroxide ions.	1	
	4. The concentration of hydroxide ions in sodium hydroxide is higher than in ammonia solution.	1	
	5. When the concentration of hydroxide ion is higher, the pH value is higher // pH of NaOH = 13 / 14 and pH of NH_3 = 10 / 11	1	6
(c)(i)	Barium nitrate/ Barium chloride	1	
	Sodium sulphate/ Potassium sulphate/ Any suitable sulphate solution	1	
(ii)	1. Pour [20 – 100] cm^3 of [0.1 – 1.0] mol dm^{-3} barium nitrate solution into a beaker	1	
	2. Add slowly [20 – 100] cm^3 of [0.1 – 1.0] mol dm^{-3} sodium sulphate solution into the beaker.	1	

(iii)	1. Clean [5 – 15] cm magnesium ribbon with sandpaper and coil it.	1	
	2. Weigh an empty crucible with its lid.	1	
	3. Place the magnesium in the crucible and weigh again.	1	
	4. Record the reading.	1	
	5. Heat the crucible very strongly.	1	
	6. Open and close the lid very quickly.	1	
	7. When burning is complete stop the heating	1	
	8. Let the crucible cool and then weigh it again	1	
	9. The heating, cooling and weighing process is repeated until a constant mass is recorded.	1	Max 10
	Description / Mass(g): Crucible + lid; Crucible + lid + Mg / Zn / Al; Crucible + lid + MgO / ZnO / Al_2O_3	1 1	
	Total		20

	3. Stir the mixture. 4. Filter the mixture. 5. Rinse the residue with distilled water. 6. Dry the salt/ crystals by pressing between two pieces of filter papers, Chemical equation: $Na_2SO_4 + Ba(NO_3)_2 \rightarrow BaSO_4 + 2NaNO_3$ Note : If physical state is written, it must be correct. Ionic equation: $Ba^{2+} + SO_4^{2-} \rightarrow BaSO_4$	1 1 1 1 1 1	10
	Total		20

JABATAN PELAJARAN NEGERI JOHOR

PEPERIKSAAN PERCUBAAN SPM 2010
CHEMISTRY
Kertas 3
Ogos

4541/3

SKEMA PEMARKAHAN

UNTUK KEGUNAAN PEMERIKSA SAHAJA

Peraturan pemarkahan ini mengandungi 17 halaman bercetak

Marking Scheme Paper 3

Question	Mark Scheme	Marks
1(a)	**Able to state 5 correct observations.** **Able to state 3-4 correct observations.** **Able to state 1-2 correct observations.** Sample answer Test tube / Observation 1 / Low intensity of blue colour /solutions 2 / Low intensity of pink colour/ solutions 3 / Low intensity of blue colour /solutions 4 / High intensity of pink colour/ solutions 5 / High intensity of blue colour /solutions **Able to state 5 correct inferences.** **Able to state 3-4 correct inferences.** **Able to state 1-2 correct inferences.** Sample answer Test tube / Inference 1 / Iron(II) / Fe^{2+} ions formed / produced in the solutions // Iron / Fe rusted/corroded/oxidised 2 / Iron(II) / Fe^{2+} ions are not formed /produced in the solutions // Iron / Fe does not rust/ corrode/oxidised Magnesium/Mg rusted/corroded /oxidised 3 / Iron(II) / Fe^{2+} ions formed / produced in the solutions // Iron / Fe rusted/ corroded/ oxidised 4 / Iron(II) / Fe^{2+} ions are not formed /produced in the solutions // Iron / Fe does not rust/ corrode/oxidised // Zinc/Zn rusted/ corroded / oxidised 5 / Iron(II) / Fe^{2+} ions formed / produced in the solutions // Iron / Fe is rusted / corroded/ oxidised	3 2 1 3 2 1

Question	Mark Scheme	Marks
1(c)	**Able to state the hypothesis correctly.** Sample answer When a more/less electropositive metal is in contact with iron/ferum/Fe, the metal inhibits/(speeds up) rusting/corrosion of iron // When a more/less electropositive metal is in contact with iron/ferum/Fe, rusting of iron/ferum/Fe is faster/slower // If the metal in contact with iron is higher/lower than iron/ferum/Fe in electrochemical series, the rusting/corrosion of iron is slower/faster // The higher/lower the metal in contact with iron in electrochemical series/ than iron/ferum/Fe, the rusting/corrosion of iron/ferum/Fe is slower/faster	3
	Able to state the hypothesis less accurately. Sample answer When a more/less electropositive metal, the metal inhibits/(speeds up) rusting/corrosion of iron // If the metal in contact with iron is higher than iron/ferum/Fe in reactivity series, the rusting/corrosion of iron is slower/faster // The rusting of iron/ferum/Fe is faster/slower, if a more/less electropositive metal is in contact with iron/ferum/Fe	2
	Able to give an idea of hypothesis. Sample answer Different metal in contact with iron, will cause iron to rust // Metal can cause iron to rust.	1
	No response or wrong response	0

	Mark Scheme	Marks
1(b)	**Able to explain a difference in observation correctly between test tube 2 and 3** Sample answer Iron/Ferum/Fe in test tube 2 does not rust/ corrode/ oxidised because ferum is in contact with a more electropositive metal, but iron/Ferum/Fe in test tube 3 rusts/ corrodes/ is oxidised because ferum is in contact with a less electropositive metal.	3
	Able to explain a difference in observation between test tube 2 and test tube 3 incompletely. Sample answer Iron/Ferum/Fe in test tube 2 does not rust/ corrode/ oxidised, but iron/Ferum/Fe in test tube 3 rusts/ corrodes/ is oxidised.	2
	Able to state any idea of difference in observation. Sample answer Iron/Ferum/Fe/nail/metal does not rust / corrode/ oxidised // Iron/Ferum/Fe/nail/metal rusts / corrodes/ is oxidised	1
	No response or wrong response	0

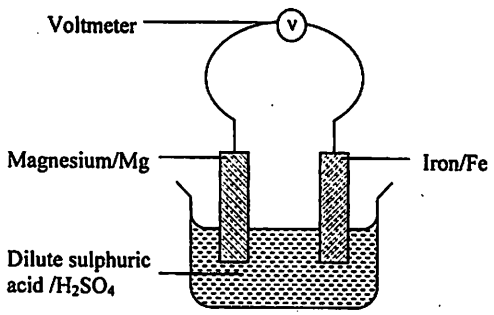
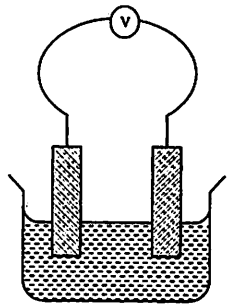
Question	Mark Scheme	Marks
1(d)	**Able to state all the variables in this experiment correctly.** Sample answer (i) Manipulated variables: Type/different metal // position of metal in electrochemical series (ii) Responding variable: Rusting / corrosion // presence of blue/pink colour (iii) Constant variable: Size/mass of iron nail // type of nail // clean iron nails // temperature // medium in which the iron nail 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 or wrong response	0

Question	Mark Scheme	Marks
1(e)	**Able to state the operational definition for the rusting of iron nail correctly.** Sample answer Rusting occurs when iron nail is in contact with copper/tin /less electropositive metal and form blue colouration in potassium hexacyanoferrate(III) solution	3
	Able to state the operational definition for the rusting of iron nail less accurately Sample answer: Rusting occurs when iron nail is in contact with copper/tin /less electropositive metal and form blue colouration	2
	Able to state any idea of operational definition. Sample answer: Rusting occurs when iron nail is in contact with cpoper/tin /less electropqsitive metal// Rusting occurs when blue colouration is formed // Rusting occurs when the colour of solution changes.	1
	No response or wrong response	0

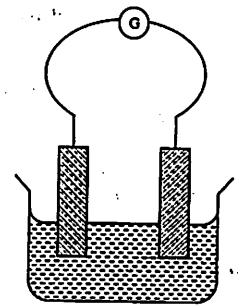
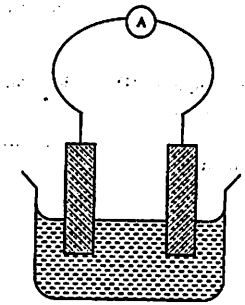
Question	Mark Scheme	Marks
1(f)	**Able to classify all the metals correctly.** Sample answer Metals that inhibit rusting: Magnesium/Mg, Zinc/Zn Metals that speed up rusting: Tin/Sn, Copper/Cu	3
	Able to classify at least three metals correctly.	2
	Able to classify any one of the metals correctly.	1
	No response or wrong response	0
1(g)(i)	**Able to state the relationship between the time taken and the amount of rust formed correctly.** Sample answer The longer the time taken, the greater/bigger/larger the rust formed // The longer the time taken, more rust is formed // The rust formed is greater/bigger/larger, when the time taken is longer.	3
	Able to state the relationship between the time taken and the amount of rust formed less accurately. Sample answer: The rust formation is directly proportional with time. // The rust formed is greater/bigger/larger after two days compared to one day. // The rust formed in two days is more than in one day [vice-versa]	2
	Able to state any idea of the relationship between the time taken and the amount of rust. Sample answer: The rust formed in two days is greater/bigger/larger. // The rust formed in one day is lesser/smaller	1
	No response or wrong response	0

Question	Mark Scheme	Marks
1(g)(ii)	**Able to predict the time taken for the iron nail to completely rust correctly.** Answer Less than 5 days	3
	Able to predict the time taken for the iron nail to completely rust less accurately Answer: 5 days	2
	Able to give an idea of the time taken. Sample answer: More than 5 days	1
	No response or wrong response	0

Question	Mark Scheme	Marks
1(h)(i)	**Able to record the voltmeter readings correctly in one decimal place.** Answer Pairs of metal / Positive terminal / Voltmeter reading (V) Magnesium and iron / Iron / 2.0 Iron and copper / Copper / 0.8 Iron and zinc / Iron / 0.4 Iron and tin / Tin / 0.2	3
	Able to record the voltmeter readings less accurately. Sample answer: Pairs of metal / Positive terminal / Voltmeter reading (V) Magnesium and iron / Iron / 2 Iron and copper / Copper / 0.8 Iron and zinc / Iron / 0.4 Iron and tin / Tin / 0.2 // Pairs of metal / Positive terminal / Voltmeter reading (V) Magnesium and iron / Iron / 2.00 Iron and copper / Copper / 0.80 Iron and zinc / Iron / 0.40 Iron and tin / Tin / 0.20	2
	Able to record at least one voltmeter reading less accurately. Sample answer: Pairs of metal / Positive terminal / Voltmeter reading (V) Magnesium and iron / Iron / 2 // 2.00 Iron and copper / Copper / Iron and zinc / Iron / Iron and tin / Tin /	1
	No response or wrong response	0

Question	Mark Scheme	Marks
1(h)(ii)	Able to draw a labelled diagram accurately. Sample Answer  	3
	Able to draw a diagram correctly without label. Sample Answer  	2

Question	Mark Scheme	Marks
2(a)	**Able to give the problem statement correctly** Sample Answer Does catalyst / (manganese(IV) oxide) affect the rate of reaction / (decomposition of hydrogen peroxide)? // How does a catalyst / (manganese(IV) oxide) affect the rate of reaction / (decomposition of hydrogen peroxide)? // What is the effect of catalyst / (manganese(IV) oxide) on the rate of reaction / (decomposition of hydrogen peroxide)? //	3
	Able to state the problem statement less accurate. Sample Answer Catalyst / (manganese(IV) oxide) affects the rate of reaction / (decomposition of hydrogen peroxide) // To investigate the effect of catalyst / (manganese(IV) oxide) on the rate of reaction / (decomposition of hydrogen peroxide).	2
	Able to give an idea of problem statement. Sample answer: Catalyst affects the decomposition.// Catalyst affects the reaction	1
	No response or wrong response	0

	Able to draw a diagram less accurately with galvanometer or ammeter. Sample answer:  //  	1
	No response or wrong response	0
	Total Mark	33

Question	Mark Scheme	Marks
2(b)	**Able to state the three variables correctly** Sample Answer Manipulated variable Catalyst Responding variable Rate of reaction / (decomposition of hydrogen peroxide) Contant variable Volume / concentration of hydrogen peroxide	3
	Able to state any two variables correctly.	2
	Able to state any one variable correctly.	1
	No response or wrong response	0

Question	Mark Scheme	Marks

2(c)	**Able to state the relationship between the manipulated variable and the responding variable correctly with direction.**
	
	Sample Answer
	
	Catalyst / (manganese(IV) oxide) increases / decreases the rate of reaction / (decomposition of hydrogen peroxide) //
	
	The presence of catalyst / (manganese(IV) oxide) increases / decreases the rate of reaction / (decomposition of hydrogen peroxide) //
	
	When catalyst / (manganese(IV) oxide) is present, the rate of reaction / (decomposition of hydrogen peroxide) increases/decreases
		3

	Able to state the relationship between the manipulated variable and the responding variable correctly without stating the direction.
	
	Sample answer
	
	Catalyst / (manganese(IV) oxide) affects / changes the rate of reaction / (decomposition of hydrogen peroxide) //
	
	The presence of catalyst / (manganese(IV) oxide) affects / changes the rate of reaction / (decomposition of hydrogen peroxide) //
	
	When catalyst / (manganese(IV) oxide) is present, the rate of reaction / (decomposition of hydrogen peroxide) changes / different
		2

	Able to state an idea of hypothesis. Sample answer Catalyst affects the decomposition.// Catalyst affects the reaction // Catalyst changes the reaction //	1
	No response or wrong response	0

Question	Mark Scheme	Marks
2(d)	**Able to list completely the materials and apparatus** Sample Answer Materials: 20-volume hydrogen peroxide, manganese(IV) oxide Apparatus: Test/boiling tube, spatula, wooden splinter	3
	Able to list incompletely materials and apparatus Sample answer Materials: Hydrogen peroxide, manganese(IV) oxide Apparatus: Test/boiling tube, wooden splinter	2
	Able to give an idea of materials and apparatus Sample answer Materials: Hydrogen peroxide Apparatus: Test / boiling tube / [any suitable container]	1
	No response or wrong response	0

Question	Mark Scheme	Marks
2(e)	**Able to state the steps correctly** Sample Answer 1. Pour [5-10 cm^3] hydrogen peroxide, H_2O_2 into a test tube / (test tube I) 2. Add [little/(0.-1.0) g] manganese(IV) oxide, MnO_2 into the test tube / (test tube I) 3. Bring/insert/place/put a glowing wooden splinter to the mouth of the test tube / (test tube I) 4. Record the observation. 5. Repeat (in test tube II) the experiment / (step 1, 3 and 4) without manganese(IV) oxide	3
	Able to state the steps partially correct Sample answer 1. Pour hydrogen peroxide, H_2O_2 into a test tube / (test tube I) 2. Add manganese(IV) oxide, MnO_2 into the test tube / (test tube I) 3. Bring/insert/place/put a glowing wooden splinter to the test tube / (test tube I) 4. Record the observation.	2
	Able to give an idea of the procedure Sample answer Add manganese(IV) oxide, MnO_2 into hydrogen peroxide, H_2O_2	1
	No response or wrong response	0

<table>
<tr><th>Question</th><th>Mark Scheme</th><th>Marks</th></tr>
<tr><td>2(f)</td><td>
Able to exhibit the tabulation of data that includes the following information:

1 Heading for the manipulated variable

2 Heading for the responding variable

<u>Sample Answer</u>
<table>
<tr><th>Experiment / test tube</th><th>Rate of reaction / observation</th></tr>
<tr><td>Catalyst presence / Manganese(IV) oxide/ MnO_2/ I</td><td></td></tr>
<tr><td>No catalyst / II</td><td></td></tr>
</table>
//
<table>
<tr><th></th><th>Rate of reaction / observation</th></tr>
<tr><td>Hydrogen peroxide/H_2O_2 and manganese(IV) oxide/ MnO_2/catalyst</td><td></td></tr>
<tr><td>Hydrogen peroxide/H_2O_2</td><td></td></tr>
</table>
</td><td>2</td></tr>
<tr><td></td><td>
Able to exhibit the incomplete tabulation of data that includes:

1 Heading for the manipulated variable

2 Heading for the responding variable

<u>Sample answer</u>
<table>
<tr><th>Experiment / test tube /catalyst</th><th>Rate of reaction / observation</th></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
</table>
</td><td>1</td></tr>
<tr><td></td><td>No response or wrong response</td><td>0</td></tr>
<tr><td></td><td>Total</td><td>17 marks</td></tr>
</table>

Notes : In question no. 2, accept alternate answers if student use other suitable reaction with correct reactants and catalyst.

END OF MARKING SCHEME