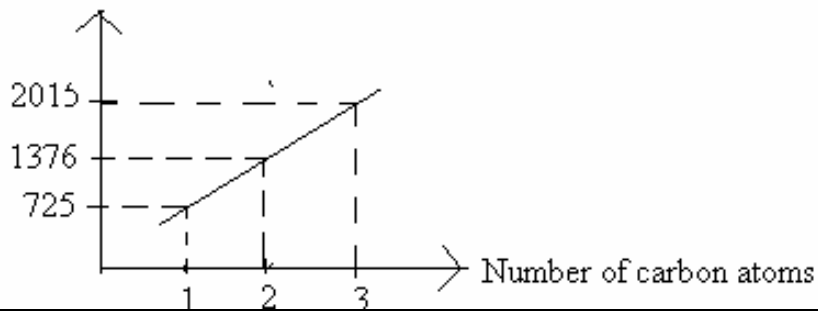


**MARKING SCHEME : PAPER 2**

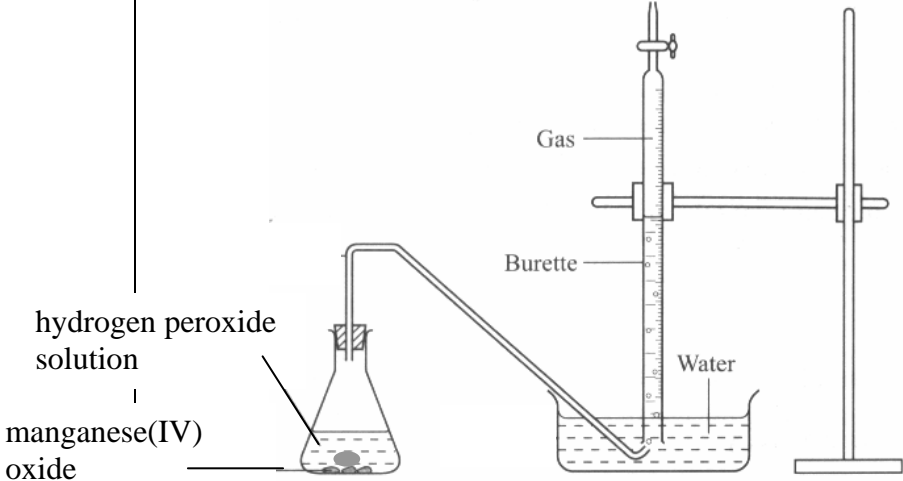
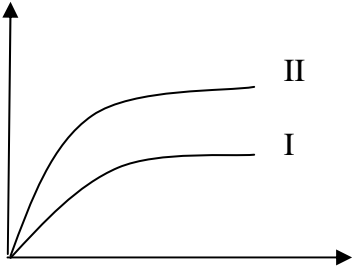
No		Answer	Mark
1	(a)	(i) Haber process	1
		(ii) Hydrogen ; nitrogen	1
		(iii) Iron / Ferum	1
		(iv) Pungent smell // dissolve in water // colourless gas // low melting point // low boiling point <i>Choose any 2</i>	2
	(b)	(i) Fused glass	1
		(ii) Highly heat resistant // great purity // resistance to chemical // resistance to thermal shock <i>Choose any 1</i>	1
		(iii) Withstand high temperature // chemically inert // hard // brittle // high melting point <i>Choose any 2</i>	2
<b>Total</b>			<b>9</b>

No		Answer	Mark
2	(a)	3	1
	(b)	Chlorine / Cl <sub>2</sub> // Argon / Ar	1
	(c)	Semiconductors/ to make diodes / transistors	1
	(d)	(i) 2. 8. 2 2. 8. 7	1 1
		(ii) Magnesium atom donates two electron, (Two) chlorine atom accept one electron	2
	(e)	The number of proton increase / The charge of the nucleus increase, The attraction force between nucleus and (valence ) electron increase	1 1
<b>Total</b>			<b>9</b>

Question number		Answer	Mark
3	(a)	1. Using beaker 2. Using wire gauze	1 1
	(b) (i)	point 1 : label and unit for axis point 2 : All three points plotted correctly point 3 : Draw a best straight line.  Heat of combustion / $\text{kJ mol}^{-1}$  Number of carbon atoms	1 1 1
	(ii)	1. More carbon dioxide molecules formed [or more water molecules formed] 2. Hence more bonds formed // more heat released due to formation of bonds	1 1
	(c) (i)	Number of mol of butanol = $\frac{3.7}{74} = 0.05$  Heat released = $\frac{3.7}{74} \times 2676$ // $0.05 \times 2676 = 133.8 \text{ kJ}$	1 1
	(ii)	point 1 : Vertical axis labelled with energy, energy levels correctly drawn point 2 : Correct writing of reactants, products and $\Delta H$ at appropriate energy levels	1 1

			Total	11

Question number		Answer	Mark
4	(a)	Zinc nitrate	1
	(b)	1 : Place a glowing splinter into the test tube. 2 : Glowing splinter is rekindled / relights.	1 1
	(c)	1: Brown fumes or brown gas 2: Residue (or solid) changes from yellow when hot to white when cold	1 1
	(d)	point 1: Correct reactants and products point 2: Equation is balanced $2\text{Zn}(\text{NO}_3)_2 \rightarrow 2\text{ZnO} + 4\text{NO}_2 + \text{O}_2$ / $2\text{J}(\text{NO}_3)_2 \rightarrow 2\text{JO} + 4\text{NO}_2 + \text{O}_2$	1 1
	(e)	(i)	1
		(ii)	1
	(f)	Brown ring	1
		Total	10

Question number	Answer	Mark
5 (a)	 <p>hydrogen peroxide solution</p> <p>manganese(IV) oxide</p> <p>Gas</p> <p>Burette</p> <p>Water</p>	
	functional diagram label	1 1
(b)	(i) Oxygen	1
	(ii) $2\text{H}_2\text{O}_2 \rightarrow 2\text{H}_2\text{O} + \text{O}_2$ [formula correct and balanced] [Formula correct but not balanced, 1 mark]	2
(c)	(i) Experiment II	1
	(ii) Concentration of hydrogen peroxide in Expt II is higher than in Expt I	1
	(iii) 	2
(d)	Lower the activation energy (1) Frequency of effective collision increases (1)	2
	Total	11

Question No	Answer	Mark
6 (a)	(i) Acidified Potassium manganate(VII) solution / manganate(VII) ion	1
	(ii) $\text{MnO}_4^- + \text{H}^+ + 5 e \rightarrow \text{Mn}^{2+} + \text{H}_2\text{O}$ - not balance $\text{MnO}_4^- + 8 \text{H}^+ + 5 e \rightarrow \text{Mn}^{2+} + 4 \text{H}_2\text{O}$ - balance	1 2 (max 2)
	(iii) green to yellow / brown	1
	(iv) +2 to +3	1
(b)	(i) chlorine is more electronegative than bromine	1
	(ii) Bromide ion	1
	(iii) brown	1
	(iv) purple Iodine cannot displace bromine from potassium bromide solution //. The purple colour is the colour of iodine in 1,1,1-trichloroethane.	1 1
Total		10

Question number	Answer	Mark														
7 (a)	(i) Psychotherapeutic medicines are the medicines that are used to alter abnormal thinking, feelings or behavior.	1														
	(ii) stimulant – to reduce fatigue Antidepressant – to reduce tension and anxiety Antipsychotic – to treat psychiatric illness	1 1 1 3														
(b)	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%; text-align: center;">X</th> <th style="width: 50%; text-align: center;">Y</th> </tr> </thead> <tbody> <tr> <td>(i) soap</td> <td>Detergent,</td> </tr> <tr> <td>(ii) effective only in soft water</td> <td>Effective in soft water and hard water,</td> </tr> <tr> <td>(iii) forms scum in hard water</td> <td>Does not form scum in hard water</td> </tr> <tr> <td>(iv) forms precipitate in acidic water</td> <td>Does not form precipitate in acidic water,</td> </tr> <tr> <td>(v) from natural sources</td> <td>From synthetic sources such as petroleum.</td> </tr> <tr> <td>(vi) biodegradable – cause no pollution</td> <td>Non-biodegradable – kill aquatic lives.</td> </tr> </tbody> </table> <p style="text-align: right;">[ Correct pairing ]</p>	X	Y	(i) soap	Detergent,	(ii) effective only in soft water	Effective in soft water and hard water,	(iii) forms scum in hard water	Does not form scum in hard water	(iv) forms precipitate in acidic water	Does not form precipitate in acidic water,	(v) from natural sources	From synthetic sources such as petroleum.	(vi) biodegradable – cause no pollution	Non-biodegradable – kill aquatic lives.	6
X	Y															
(i) soap	Detergent,															
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(c)	(i) Salt – preservative Ethyl butanoate – flavour Lecithin - stabilizer Vitamin C – antioxidant	1 1 1 1	4
	(ii) Salt : - Draws the water out of the cells of microorganism, - Retard / slow down the growth of microorganism - food can be kept for longer (period) of time	1 1 1	
	Monosodium glutamate: - Improve the taste of food, - Restore the taste loss because of processing, - Enhance the taste of food	1 1 1	6
		Total	20

Question number			Answer	Mark
8	(a)	(i)	Hydrocarbon is a (organic) compound/molecule containing carbon and hydrogen only.	1
		(ii)	point 1 : Saturated hydrocarbon contain only single covalent bond between carbon-carbon atom, point 2 : Unsaturated hydrocarbon contains at least one double covalent bond between carbon-carbon atom.	1 1
		(ii)	Name of reagent Procedure(s) with correct action verbs. Correct observation for octane Correct observation for octane  Sample answer: Chemical test 1 1. <u>Pour</u> octane and octane into two separate test tubes. 2. <u>Add</u> a few drops of <u>bromine water</u> <sup>1mark</sup> (or bromine in 1,1,1-trichloroethane) into each test tube and <u>shake</u> <sup>1mark</sup> the test tube. 3. Octene will <u>decolorize the brown bromine</u> <sup>1mark</sup> solution and Octane shows <u>no change</u> <sup>1mark</sup>  Sample answer: Chemical test 2 1. <u>Pour</u> octane into a test tube. 2. <u>Add</u> a few drops of <u>acidified potssium manganate(VII)</u> <sup>1 mark</sup> solution and <u>shake</u> <sup>1mark</sup> the test tube 3. Repeat steps 1 and two by replacing octane with octane. 4. Octene will <u>decolorize the purple potassiummanganate(VII) solution</u> <sup>1mark</sup> solution and	1 1 1 1

		<p>Octane shows <u>no change</u><sup>1mark</sup></p> <p><i>If candidate uses combustion of hydrocarbon as a chemical test, mark accordingly but no mark for 'name of reagent'. Maximum mark in this case will be 3 only.</i></p>	
(b)	(i)	<ul style="list-style-type: none"> <li>Ethene is a gas and ethanol is a liquid</li> <li>Ethene does dissolve in water and ethanol is soluble in water.</li> <li>Ethene has a lower boiling point (melting point) than ethanol</li> </ul> <p>[Any two correct]</p>	<p>1</p> <p>1</p> <p>2</p>
	(ii)	<p>Diagram</p> <p>Sample diagram</p> <p>Functional diagram label</p>	<p>1</p> <p>1</p> <p>2</p>
		<p>Procedure</p> <ol style="list-style-type: none"> <li>Placed glass wool soaked with ethanol into the boiling tube</li> <li>Place porcelain chips into the mid-section of the boiling tube</li> <li>Heat the porcelain strongly and then glass wool.</li> <li>Collect the gas over water.</li> </ol>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>4</p>
(c)	(i)	Orange to green	1
	(ii)	Ethyl ethanoate	1
	(iii)	<p>Ethanol</p> $  \begin{array}{c}  \text{H} \quad \text{H} \\    \quad   \\  \text{H} - \text{C} - \text{C} - \text{H} \\    \quad   \\  \text{H} \quad \text{OH}  \end{array}  \quad \text{or} \quad  \begin{array}{c}  \text{H} \quad \text{H} \\    \quad   \\  \text{H} - \text{C} - \text{C} - \text{O} - \text{H} \\    \quad   \\  \text{H} \quad \text{H}  \end{array}  $	1

		<p>Ethanoic acid</p> <p>or</p>	1
		<p>Ethyl ethanoate</p> <p>or</p>	1
		Total	20

Question number	Answer	Mark
9	(a)	<p>Hydrochloric acid // Nitric acid // Sulphuric acid, 1</p> <p>Acid reacts with a base / alkali to produce salt and water // 1</p> <p>Hydrochloric acid reacts with sodium hydroxide / ( any base/alkali ) to produce sodium chloride and water. 1</p> $\text{HCl} + \text{NaOH} \rightarrow \text{NaCl} + \text{H}_2\text{O}$ <p>1</p> <p>Acid reacts with a reactive metal to produce salt and hydrogen // 1</p> <p>Hydrochloric acid reacts with Magnesium / Zinc to produce Magnesium chloride/ zinc chloride and hydrogen. 1</p> $\text{Mg} + 2\text{HCl} \rightarrow \text{MgCl}_2 + \text{H}_2$ <p>1</p> <p>Acid reacts with a carbonate metal to produce salt, carbon dioxide and water // 1</p> <p>Hydrochloric acid reacts with calcium carbonate / ( any metal carbonate ) to produce calcium chloride , carbon dioxide and water. 1</p> $\text{CaCO}_3 + 2\text{HCl} \rightarrow \text{CaCl}_2 + \text{CO}_2 + \text{H}_2\text{O}$ <p>1</p> <p style="text-align: right;">max 6</p>
	(b)	<p>Solution A: 1</p> <p>Ethanoic acid ionizes in water to produce hydrogen ions, 1</p> <p>The presence of hydrogen ions causes solution A / ethanoic acid to show its acidic properties</p>



		<p><b>Solution B</b>  Without water / in propanone ethanoic acid still exists as molecules ,  No hydrogen ions present , does not shows acidic property.</p>	<p>1  1  4</p>
	(c)	<p>Materials : Solid sodium hydroxide and distilled water  Apparatus : 50cm<sup>3</sup> beaker, 250cm<sup>3</sup> volumetric flask, electronic balance, glass rod, filter funnel.  Calculation : Determine the mass of sodium hydroxide, NaOH:</p> $\text{No. of moles of NaOH} = \frac{MV}{1000} = \frac{1 \times 250}{1000} = 0.25 \text{ mol}$ $\text{Mass of NaOH needed} = \text{No. of moles} \times \text{Molar mass, of NaOH}$ $= 0.25 \times [23 + 16 + 1]$ $= 10 \text{ g}$ <p>Steps :</p> <ol style="list-style-type: none"> <li>Using an electronic balance, 10 g of sodium hydroxide is exactly weighed and placed into a beaker,</li> <li>Distilled water is added to the beaker to dissolve all the solid sodium hydroxide,</li> <li>Then the solution is poured into a 250cm<sup>3</sup> volumetric flask. The beaker is rinsed with distilled water and the solution is poured into the volumetric flask.</li> <li>The solution in the volumetric flask is topped up with distilled water until its calibration mark.</li> </ol>	<p>1  1  1  1  1  1  1  1  10  Total 20</p>

10	(a)	<ul style="list-style-type: none"> <li>Concentration of the solution effect the product of electrolysis process</li> <li>Ions presence in the solutions are Cu<sup>2+</sup>, Cl<sup>-</sup>, H<sup>+</sup> and OH<sup>-</sup></li> <li>In set I <ul style="list-style-type: none"> <li>ions move to anode are Cl<sup>-</sup> and OH<sup>-</sup></li> <li>Cl<sup>-</sup> ions is selectively discharged at anode due to the concentration of the solution</li> <li>2Cl<sup>-</sup> → Cl<sub>2</sub> + 2e</li> </ul> </li> </ul>	<p>1  1  1  1  1</p>
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	<ul style="list-style-type: none"> <li>• In set II               <ul style="list-style-type: none"> <li>- Ions move to anode are <math>\text{Cl}^-</math> and <math>\text{OH}^-</math></li> <li>- <math>\text{OH}^-</math> is selectively discharged due to the lower position in the ECS // it is easier to be discharged</li> <li>- <math>4\text{OH}^- \longrightarrow \text{O}_2 + \text{H}_2\text{O} + 4\text{e}</math></li> </ul> </li> </ul>	1 1 1
	max 6	
(b)	<ol style="list-style-type: none"> <li>1. Zinc is more electropositive // Negative terminal : <math>\text{Zn} \longrightarrow \text{Zn}^{2+} + 2\text{e}</math></li> <li>2. Copper is less electropositive // Positive terminal: <math>\text{Cu}^{2+} + 2\text{e} \longrightarrow \text{Cu}</math></li> <li>3. The electron move (from negative terminal to the positive terminal ) / (electrode zinc to electrode copper)</li> <li>4. The flow of electron, produce the electric current// The needle of the voltmeter deflected, shows the electric current is produced</li> </ol>	1 1 1 1
	4	
(c)		
	Functional diagram : [switch on, battery, shade of the solution]	1
	Label diagram : [iron spoon at cathode, copper rod at anode, copper(II) sulphate solution]	1
	<ol style="list-style-type: none"> <li>(i) <math>100 \text{ cm}^3</math> of <math>1.0 \text{ moldm}^{-3}</math> of copper(II) sulphate solution is poured into a beaker</li> <li>(ii) An iron spoon is connected to the negative terminal of the battery // is connected to the cathode</li> <li>(iii) Copper rod is connected to the positive terminal of the battery // is connected to the anode</li> <li>(iv) The switch is on // can infer from the diagram</li> </ol>	1 1 1 1

	(v) The observations is recorded in the table after 15 minutes.							
	(vi)							
	<table border="1"> <thead> <tr> <th>Electrodes</th> <th>Observation</th> </tr> </thead> <tbody> <tr> <td>Anode</td> <td>Copper electrode become thinner</td> </tr> <tr> <td>Cathode</td> <td>Iron spoon is coated with brown solid / metal</td> </tr> </tbody> </table>	Electrodes	Observation	Anode	Copper electrode become thinner	Cathode	Iron spoon is coated with brown solid / metal	1 1
Electrodes	Observation							
Anode	Copper electrode become thinner							
Cathode	Iron spoon is coated with brown solid / metal							
	(vi) Half equations :							
	Anode : $\text{Cu} \longrightarrow \text{Cu}^{2+} + 2\text{e}$	1						
	Cathode : $\text{Cu}^{2+} + 2\text{e} \longrightarrow \text{Cu}$	1						
		10						
	<b>JUMLAH</b>	<b>20</b>						

**END OF MARKING SCHEME**