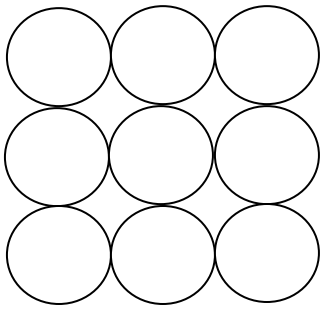
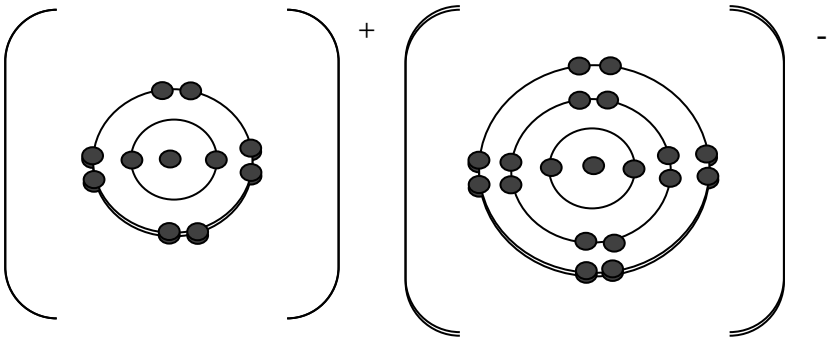
SULIT: Chemistry 2 **4541/2**

1		Mark Scheme	Marks
(a)	(i)	Diffusion	1
	(ii)	Ion	1
	(iii)	Less time // shorter // faster	1
	(iv)	 At least: 3 x 2	1
(b)	(i)	78 ^{o}C	1
	(ii)	Temperature when solid changes to liquid	1
	(iii)	Heat is absorbed / used to overcome the force between molecules	1+ 1
(c)	(i)	Boiling // Evaporation	1
	(ii)	Faster // more fast // random	1
		Total	**10**

2		Mark Scheme	Marks
(a)	(i)	Iron / Ferum	1
	(ii)	- Coloured solution / ion/ compounds - As catalyst - Has more than one oxidation number // has more than one charges - Can form complex ion [any correct answer]	1
(b)		Ar / Argon. Octet electron arrangement// 8 valences electrons // electron arrangement 2.8.8	1 1
(c)		Has high positive charges in the nucleus // Has high number of proton in the nucleus	1
(d)		Na / Sodium	1

(e)	(i)	ionic	1
	(ii)	- Diagram showing correct number of electrons between Na and Cl with label/nucleus - Correct number of charge in each atom  	1 1
	(iii)	It dissolves in water // can conduct electricity in molten / liquid or aqueous /solution// high melting and boiling point	1
		Total	**10**

3	Mark Scheme		Marks
(a)	The formula that gives the simplest ratio of atoms of each element in the compound.		1
(b)	(i)	Method II	1
	(ii)	copper is unreactive metal // does not react easily with oxygen // copper is below hydrogen in the reactivy series	1
(c)			

Element	Mg	O

		Unsur		
		Mass (g) *Jisim*	2.4	1.6
		Number of moles *Bilangan mol*	0.1	0.1
		Simplest ratio of moles *Nisbah ringkas bilangan mol*	1	1
		Empirical formula *Formula empirik*	MgO	

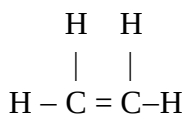
1+1

1

1

1

(d)	$2Mg + O_2 \longrightarrow 2MgO$ Correct Reactants and products ----------1mark Balanced equation ----------1mark	1 1
	Total	**10**

4		Mark Scheme	Marks
(a)	(i)	Ethene	1
	(ii)	Alkene	1
	(iii)		1
(b)	(i)	Hydration // Addition	1
	(ii)	Low boiling point // Dissolve in water // colourless liquid [any suitable answer]	1
(c)	(i)	Nickel // Platinum	1
	(ii)	$C_2H_4 + H_2 \longrightarrow C_2H_6$	1+ 1
(d)		P Percentage of carbon of P is higher. // P is an unsaturated hydrocarbon // P has double bond between carbon	1 1

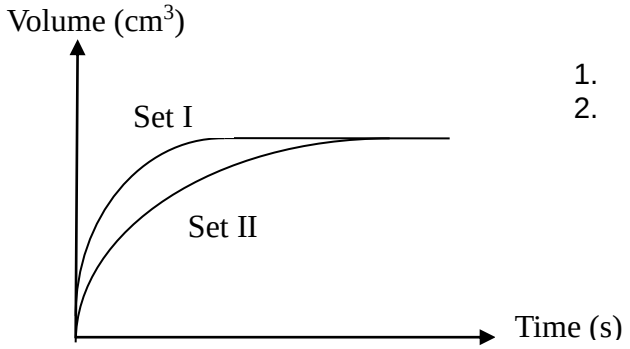
	Total	**10**

5		Mark Scheme	Marks
(a)		Monoprotic acid produce one hydrogen ion per molecule / 1 mol of hydrogen ion in water	1
(b)	(i)	Pink to colourless	1
	(ii)	Methyl orange	1
(c)	(i)	Mol of KOH / HNO_3 =20 X 0.5 /1000 // 0.01 1 mol of KOH/HNO_3 ⟶ 1 mol of KNO_3 0.01 mol of KOH/HNO_3 ⟶ 0.01 mol of KNO_3 Mass of KNO_3 = 0.01 X 101 // 1.01 g	1 1 1
	(ii)	10 cm^3	1
	(iii)	Sulphuric acid is a diprotic acid The number of hydrogen ions in sulphuric acid is double / two times	1 1
	(iv)	$H^+ + OH^- \longrightarrow H_2O$	1+ 1
			10

6		Mark Scheme	Marks
(a)	(i)	copper	1
	(ii)	Zinc dissolves // blue solution become less blue // container becomes hot // rise in thermometer reading	1
(b)		$Zn + Cu^{2+} \longrightarrow Zn^{2+} + Cu$	1 1
(c)	(i)	$5\ ^0C$	1

	(ii)	H = 50 X 4.2 X 5 // 1050 J // 1.05 kJ Mol $CuSO_4$ = $\frac{50 \times 0.1}{1000}$ // 0.005 Heat of displacement = -1.05 ÷ 0.005 = -210 000 J mol^{-1} // -210 kJ mol^{-1} Pt 4: negative sign and unit is compulsory	1 1 1 1
(d)	(ii)	insulator // reduce heat loss to surrounding	1
		Total	10

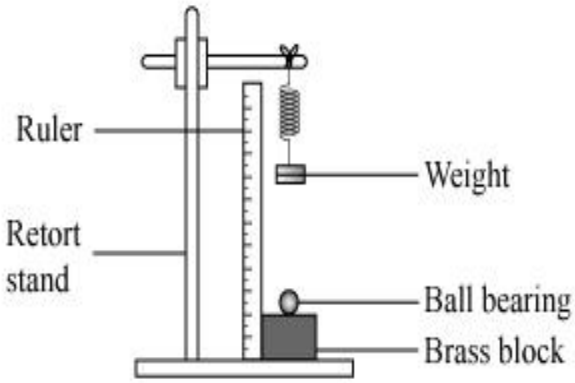
7 (a)	(i)	Copper(II) ions, Hydrogen ions Nitrate ions , Hydroxide ions [a: formulas]	1+1 1.....3
	(ii)	Positive terminal : Cu Negative terminal: Metal Q Metal Q : Mg / Al / Zn / Fe / Pb Solution R: Magnesium nitrate solution [suitable solution according to Q]	1 1 1 1**.....4**
(b)	(i)	Copper(II) ions // Cu^{2+} Cu^{2+} + 2e → Cu Copper	1 1 + 1 1**.....4**
	(ii)	Oxygen Put in a glowing splinter into test-tube Splinter will lights up / relights	1 1 1.....3
	(iii)	Copper(II) ion Factor is : type of electrode Copper electrode is active / electropositive Copper ionises to produce copper(II) ion	1 1 1 1 1 + 1

		$Cu \rightarrow Cu^{2+} + 2e$	6
		Total	**20**
8 (a)	(i)	Change in volume of gas per minutes // Change in volume of gas per unit time Factors are: temperature Total surface area / size of reactant Concentration catalyst	1 1 1 1**.....4**
	(ii)	$H_2SO_4 + CaCO_3 \rightarrow CaSO_4 + H_2O + CO_2$ Number of moles of acid = $\frac{25 \times 0.3}{1000}$ // 0.0075 mol 0.0075 mol acid : 0.0075 mol CO_2 Volume = 0.0075 X 24 // 0.18 dm^3 // 180 cm^3	1 + 1 .....**2** 1 1 1.....**3**
(b)	(i)	Set II = $\frac{45}{2}$ = 22.5 cm^3/min // $\frac{45}{120}$ = 0.375 cm^3/s Set III = $\frac{15}{2}$ = 7.5 cm^3/min // $\frac{15}{120}$ = 0.125 cm^3/s	1+ 1 1 + 1 .....**4**
(c)	(i)	 1. correct curve 2. correct label	1 1 .....**2**
	(ii)	• Rate of reaction in Experiment I is higher	1

		• The particles of hydrogen ions and carbonate ions gain more kinetic energy • Frequency of collision between hydrogen ions and carbonate ions / calcium carbonate increases / is higher • The effective frequency of collision between hydrogen ions and carbonate ions / calcium carbonate increases / is higher Note: name of reactants must mentioned at least once	1 1 1 **.....4**
(d)	Has large total surface area		1
		Total	**20**

9 (a)	(i)	Copper(II) oxide Carbon dioxide Copper(II)chloride	1 1 1**.....3**
	(ii)	Pass / Flow the gas into limewater Turns chalky / milky / cloudy	1 + 1 1**.....3**
	(iii)	$CuCO_3 \rightarrow CuO + CO_2$ $2HCl + CuO \rightarrow CaCl_2 + H_2O$	1+1 1 + 1 **.....4**
(b)		1. No. of mole = (0.5 x 250) / 1000 // 0.125 mol 2. Molar Mass of Na_2CO_3 = 46 +12 +48 // g mol^{-1} 3. Mass of NaOH = 0.125 x 106 g // 13.25 g 1. Weigh 13.25g of sodium carbonate in the weighing bottle using an electronic balance.. 2. Pour the sodium carbonate into a beaker. 3. Add a little bit of distilled water and stir until all the sodium carbonates dissolves. 4. Pour the solution through a filter funnel into the volumetric flask. Rinse the weighing bottle and beaker with distilled water. 5. Pour the contents into the volumetric flask. 6. Add distilled water slowly untik the water level reached the the	1 1 1 1 1 1 3 1 1 2 1 1 1 1 1

		calibration mark of the volumetric flask. 7. Close the flask with a stopper and inverted it several times.	1 1 **.....10**
		Total	**20**
10 (a)	(i)	X : Soap Y : Detergent	1 1**.....2**
	(ii)	1. Hard water contain Mg^{2+} and Ca^{2+} ion 2. Detergent does not form scum in hard water 3. Soap form scum in hard water // Mg^{2+} and Ca^{2+} in hard water react with soap 4. Soap molecule consist of hydrophobic and hydrophilic part 5. Hydrophobic part dissolve in oil 6. Hydrophilic part dissolve in water 7. During scrubbing / rinsing the oily stains/spots is washed away 8. Cloth in experiment II /detergent is cleaner than cloth in experiment I 9. Detergent in hard water is more effective than soap.	1 1 1 1 1 1 1 1 1 **Max..8**

1 *Functional diagram*	
2 *Label* [weight, steel ball, block, meter ruler]	1 1
	
3 *Name of metal* (*can refer to diagram*) <u>Sample answer</u>: copper	1
4 *Name the alloy(can refer to diagram)* <u>Sample answer</u>: brass	1
5 Tape a steel ball bearing to the brass [block]	1
6 Hang a weight of 1 kg above the ball bearing. (can refer to diagram)	1
7 Drop the weight and allow it to hit the steel bearing	1
8 Record the diameter of the dent	1
9 Repeat the experiment using copper block	1
Type of Block: Copper Diameter of dent (cm):	1+1
Type of Block: Brass Diameter of dent (cm):	
1 Presence of foreign atoms (in brass) disrupt the orderly arrangement of atoms	1
2 More difficult to slide.	1 **..max 10**
Total	**20**