

PERCUBAAN SPM PERLIS

Telegram @soalanpercubaanspm

**ANSWER PAPER 1
TRIAL
SPM 2020**

1	A
2	C
3	C
4	D
5	D
6	A
7	A
8	A
9	C
10	A
11	B
12	C
13	D
14	D
15	B
16	A
17	D
18	B
19	B
20	C

21	D
22	B
23	D
24	B
25	C
26	B
27	B
28	C
29	A
30	B
31	B
32	D
33	B
34	B
35	C
36	C
37	D
38	D
39	A
40	A

41	A
42	B
43	D
44	A
45	C
46	C
47	A
48	C
49	D
50	C

ANALISIS

A : 11
B : 12
C : 14
D : 13

PEPERIKSAAN PERCUBAAN SPM PERLIS 2020

CHEMISTRY 4541/2

Paper 2

Question Number		Answer	Mark
1	(a)	(i) Water	1
		(ii) Sodium Chloride	1
	(b)	(i) Liquid	1
		(ii) To achieve duplet electrons arrangement	1
	(c)	(i) Ionic bond	1
		(ii) Ion	1
	(d)	(i) 2.8.7	1
		(ii) HCl	1
		(iii) Low melting point // exist as gas in room temperature // low boiling point // dissolve in water // dissolve in organic solvent	1
	TOTAL		

2.	(a)	Atoms of same element that have same number of protons but different number of neutrons	1									
	(b)	To detect the leakage of underground pipe// To detect the blood clot in blood capillary	1									
	(c)	<table border="1"> <thead> <tr> <th>Isotope <i>Isotop</i></th> <th>Number of elcctron <i>Bilangan elektron</i></th> <th>Number of neutron <i>Bilangan neutron</i></th> </tr> </thead> <tbody> <tr> <td>Sodium-23 <i>Natrium-23</i></td> <td>11</td> <td>12</td> </tr> <tr> <td>Sodium-24 <i>Natrium -24</i></td> <td>11</td> <td>13</td> </tr> </tbody> </table>	Isotope <i>Isotop</i>	Number of elcctron <i>Bilangan elektron</i>	Number of neutron <i>Bilangan neutron</i>	Sodium-23 <i>Natrium-23</i>	11	12	Sodium-24 <i>Natrium -24</i>	11	13	1 1
	Isotope <i>Isotop</i>	Number of elcctron <i>Bilangan elektron</i>	Number of neutron <i>Bilangan neutron</i>									
Sodium-23 <i>Natrium-23</i>	11	12										
Sodium-24 <i>Natrium -24</i>	11	13										
(d)	(i)	The heat energy absorbed by particles is use to overcome the forces attraction between particles	1 1									
	(ii)	<p>Temperature / °C <i>Suhu / °C</i></p> <p>Freezing point Takat beku</p> <p>80</p> <p>Telegram @soalanpercubaanspm</p> <p>Time/s <i>Masa/s</i></p> <p>Corect title and unit 1 Correct shape of curve 1 mark freezing ponit 1</p>										
TOTAL			9									

Question number	Answer		Mark	
3	(a)	(i)	Ester	1
		(ii)	Propyl butanoate	1
	(b)	(i)	Esterification	1
		(ii)	Butanoic acid	1
		(iii)	$C_3H_7OH + C_3H_7COOH \rightarrow C_3H_7COOC_3H_7 + H_2O$ correct chemical formulae for reactant and product [1m] balanced equation [1m]	2
	(c)	$C_3H_7OH + \frac{9}{2} O_2 \rightarrow 3CO_2 + 4H_2O //$ $2C_3H_7OH + 9O_2 \rightarrow 6CO_2 + 8H_2O$ correct chemical formulae for reactant and product [1m] balanced equation [1m]	2	
	(d)	$\begin{array}{c} \text{H} \quad \text{H} \quad \text{OH} \\ \quad \quad \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{H} \\ \quad \quad \\ \text{H} \quad \text{H} \quad \text{H} \end{array}$	1	
		$\begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \\ \quad \quad \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{H} \\ \quad \quad \\ \text{H} \quad \text{OH} \quad \text{H} \end{array}$	1	
	Total			10

Question Number	Answer		Mark	
4	(a)	(i)	period 2	1
		(ii)	alkali metal	1
		(iii)	T^+ Telegram @soalanpercubaanspm	1
	(b)	(i)	more reactive	1
		(ii)	atomic size for Q is bigger// force of attraction between nucleus and electron for atom Q is weaker	1
	(c)	(i)	$4Na + O_2 \rightarrow 2Na_2O$ correct chemical formulae for reactant and product [1m] balanced equation [1m]	2
		(ii)	mol Na $2.3/23 = 0.1$ [1 m] from the equation 4 mol Na : 1 mol O_2 if 0.1 mol Na : 0.025 mol O_2 [1 m] mass $O_2 = 0.025 \times 32 = 0.8$ g [1 m]	3
	TOTAL			10


Question Number	Answer	Mark
5 (a)	positively charged ion	1
(b) (i)	Lead (II) iodide / Plumbum (II) iodida	1
(ii)	yellow precipitate will dissolve when heated yellow precipitate will form again when it is cooled	1 1
(iii)	$\text{Pb}^{2+} + 2\text{I}^- \rightarrow \text{PbI}_2$ Telegram @soalanpercubaanspm correct chemical formulae for reactant and product [1m] balanced equation [1m]	2
(iv)	from the equation 2 mol I ⁻ : 1 mol PbI ₂ if 0.0002 mol I ⁻ : 0.0001 mol PbI ₂ [1 m] mass PbI ₂ = 0.0001 x 461 = 0.0461g [1 m]	2
(c)	zinc ion / Zn ²⁺	1
(d)	1. add excess sodium hydroxide solution into the industrial waste water 2. blue precipitate formed OR 1. add excess ammonia solution into the industrial waste water 2. dark blue solution formed	1 1
TOTAL		11

Question number	Answer	Mark
7	(a) Set I: In dry state, hydroxide ions in solid sodium hydroxide are arranged orderly at fixed position. Dry solid sodium hydroxide does not show alkaline properties. Set II: When moist red litmus paper is used/ water is present, sodium hydroxide ionises in water to produce free moving hydroxide ions. Sodium hydroxide shows alkaline properties.	1 1 1 1
	(b) Sodium hydroxide is strong alkali but ammonia is weak alkali. Sodium hydroxide ionises completely in water but ammonia ionises partially in water. Sodium hydroxide produces high concentration of hydroxide ions but ammonia produces low concentration of hydroxide ions. The higher the concentration of hydroxide ions, the higher the pH value.	1 1 1 1
(c)	(i) Dilution $0.1 \times V = 0.02 \times 250$ Volume = 50 cm^3	1 1 1
	(ii) pH value is lower than 13 Concentration of hydroxide ions decreases. The lower the concentration of hydroxide ions, the lower the pH value.	1 1 1
	(iii) Neutralisation $\text{H}_2\text{SO}_4 + 2\text{NaOH} \rightarrow \text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O}$ correct chemical formulae for reactant and product [1m] balanced equation [1m] Calculation: Number of mole of NaOH = $\frac{0.02 \times 25}{1000}$ // 0.0005 mol 2 mol of NaOH reacts with 1 mol of H_2SO_4 // 0.0005 mol of NaOH reacts with 0.00025 mol of H_2SO_4 Concentration of $\text{H}_2\text{SO}_4 = \frac{0.00025 \times 1000}{25} \text{ mol dm}^{-3}$ // 0.01 mol dm^{-3} OR Telegram @soalanpercubaanspm $\frac{M_a \times 25}{0.02 \times 25} = \frac{1}{2}$ $M_a = 0.01 \text{ mol dm}^{-3}$	1 1 1 1 1 1 1 1 1 1 OR 1+1 1
Total		20

Question number		Answer	Mark	
8	(a)	(i)	1. oxidation number for magnesium is +2 2. oxidation number for ferum is +3	1 1
		(ii)	1. MgCl ₂ is magnesium chloride / magnesium klorida 2. Fe ₂ O ₃ is iron(II) oxide / ferum (II) oksida	1 1
	(b)	(i)	redox//oxidation and reduction	1
		(ii)	1. metal Y is copper 2. metal Z is zinc 3. Mg, Z, Y 4. $2\text{Mg} + \text{O}_2 \rightarrow 2\text{MgO}$ correct chemical formulae reactant & product [1m] balanced equation[1m]	1 1 1 2
	(c)	(i)	1. metal R is Sn // Pb // Cu//Ag	1
			2. metal S is Mg//Al//Zn	1
			Set 1	
			3. Iron rusts/corrode	1
			4. Iron is more electropositive than R	1
			5. Fe ²⁺ is formed	1
6. $\text{Fe} \rightarrow \text{Fe}^{2+} + 2\text{e}$			1	
7. Iron is oxidized			1	
Set II				
8. Iron does not rust			1	
9. Iron is less electropositive than S	1			
10. Presence of OH ⁻	1			
11. $\text{O}_2 + \text{H}_2\text{O} + 4\text{e} \rightarrow 4\text{OH}^-$	1			
12. Metal S is oxidized	1			
			max 8	
TOTAL			20	

Question Number			Answer	Mark
9	(a)	(i)	<ul style="list-style-type: none"> ▪ Y: (Name of any metal situated above Cu in the electrochemical series) ▪ Z: (Name of any acid) <p>Sample answer: Y: Magnesium // Zinc // Aluminium [Reject: Sodium // Potassium]</p> <p>Z: Hydrochloric acid // Sulphuric acid // Nitric acid [Accept: weak acid]</p> <p>Telegram @soalanpercubaanspm</p> <ul style="list-style-type: none"> ▪ Chemical equation: Correct formula of reactants and products Balanced <p>Sample answer: $Mg + 2HCl \rightarrow MgCl_2 + H_2$</p>	1 1 1 1 4
		(ii)	<p>Experiment I Average Rate of Reaction = $30/10 = 3.0 \text{ cm}^3\text{s}^{-1}$</p> <p>Experiment II Average Rate of Reaction = $30/20 = 1.5 \text{ cm}^3\text{s}^{-1}$</p> <p>[With correct unit]</p>	1 1 ...2
		(iii)	<ul style="list-style-type: none"> ▪ Rate of reaction in Experiment I is higher than Experiment II ▪ The size of metal Y in Experiment I is smaller than Experiment II // The total surface area of metal Y in Experiment I larger than Experiment II ▪ Frequency of collision between hydrogen ions and atoms of Y in Experiment I is higher than in Experiment II ▪ Frequency of effective collision (between the particles) in Experiment I is higher than in Experiment II 	1 1 1 1 4

(b)	<p><u>Temperature:</u></p> <ol style="list-style-type: none"> 1. (20 – 100) cm³ of (0.1 – 1.0) mol dm⁻³ sodium thiosulphate solution is measured 2. Sodium thiosulphate solution is then poured into a conical flask 3. The initial temperature of sodium thiosulphate is recorded 4. The conical flask is placed on the top of a piece of white paper marked with “X” 5. 5.0 cm³ of (0.1 – 1.0) mol dm⁻³ hydrochloric acid is measured 6. The hydrochloric acid is poured quickly into the conical flask. 7. A stopwatch is started immediately 8. The conical flask is swirled throughout the experiment 9. The time taken for the mark “X” to disappear from sight is recorded 10. The experiment is repeated using sodium thiosulphate solution at 35°C, 40°C, 45°C and 50°C. 	1 1 1 1 1 1 1 1 1 1
	<p>OR</p> <p><u>Presence of catalyst:</u></p> <ol style="list-style-type: none"> 1. (25-50) cm³ of (0.1-1.0) mol dm⁻³ of hydrochloric acid is measured and poured into a conical flask. 2. About 5.0 g of zinc granules is weigh. 3. A burette is filled with water and inverted into a basin containing water 4. The water level in the burette is adjusted to 50 cm³ mark. 5. The granulated zinc is added into the conical flask. 6. Immediately the conical flask is closed and connect it using delivery tube to the burette 7. The stopwatch is started. 8. The conical flask is shaken steadily. 9. Record volume of hydrogen gas every 30 seconds interval. 10. The experiment is repeated by adding 5 cm³ of copper(II) sulphate solution into the reactants mixture. 	1 1 1 1 1 1 1 1 1 1
		...10
		OR
		...10
		TOTAL
		20

10.	(a)	-Cleaning agent Y is more effective than cleaning agent X -Cleaning agent Y do not form scum in hard water , so it can remove oily stain -Cleaning agent X form scum in hard water and cannot remove oily stain -Calcium ions and magnesium ions in hard water react with cleaning agent X to form scum/white precipitate	1 1 1 1
	(b)	(i) P=bronze Q= brass OR P=brass Q=bronze <ul style="list-style-type: none"> • [Bronze / alloy P] // [Brass / alloy Q /] is harder than it cooper / pure metal • The presence of different sizes of stanum/zinc atoms disrupts the ordely arrangement of atoms in cooper / pure metal • These make the atomic layers of atoms in alloys is harder to slide over one another • The layer of atoms in copper/ pure metal easily slide one another because it contain same size of atoms 	1 1 1 1 1 1
	(ii)	 <p>Functional diagram labelled diagram</p> <p>Procedure:</p> <ol style="list-style-type: none"> 1. A steel ball is attached to the surface of the copper block using cellophane tape. 2. A weight with a mass of 1 kg is hung at a height of 50 cm above the steel ball. 3. The weight is then dropped on the steel ball. 4. The diameter of the dent on the surface of the copper block is measured and recorded. 5. Steps 1 to 4 are repeated for two times at different places on the copper block 6. The experiment is repeated by using a [bronze/brass/P/Q] block to replace the copper block. 	1 1 1 1 1 1

Type of material <i>Jenis bahan</i>	Diameter of dent (cm)			Average diameter of dent (cm)	
	1	2	3		
Copper	a ₁	a ₂	a ₃	$\frac{a_1 + a_2 + a_3}{3}$ // a	1
Bronze/Brass	b ₁	b ₂	b ₃	$\frac{b_1 + b_2 + b_3}{3}$ // b	1
Conclusion [Bronze / alloy P] // [brass / alloy Q] is harder than coppery Telegram @soalanpercubaanspm					1 max=10
TOTAL					20

PEPERIKSAAN PERCUBAAN SPM PERLIS TAHUN 2020

SKEMA KIMIA KERTAS 3 (4541/3)

Question number	Rubric	Score
1 (a)	[Able to record all readings accurately with unit.] Sample answer : Set I : 0.7 V Set II : 1.6 V Set III : 2.4 V	3
	[Able to record all readings accurately without unit, or able to record any two readings correctly with unit, or able to record all readings accurately in two decimal places without unit.] Sample answer : Set I : 0.7 / 0.70 Set II : 1.6 / 1.60 Set III : 2.4 / 2.40	2
	[Able to record at least one reading correctly.]	1
	No response or wrong response	0

Question number	Rubric	Score
1 (b)	[Able to state the three variables correctly.] Sample answer : Manipulated variable : Pairs of metals//Tin, zinc, magnesium Responding variable : Potential difference//Voltmeter reading Fixed variable : Type of electrolyte//Metal X	3
	[Able to state any two variables correctly.]	2
	[Able to state any one variable correctly.]	1
	No response or wrong response	0

Question number	Rubric	Score
1 (c)	[Able to state the relationship between the manipulated variable and the responding variable and state the direction correctly.] Sample answer : The further the distance between two metals in electrochemical series, the voltmeter reading becomes higher.	3
	[Able to state the relationship between the manipulated variable and the responding variable without stating the direction.] Sample answer : The distance between two metals in electrochemical series influences changes the voltmeter reading.	2
	[Able to give an idea of hypothesis.] Sample answer : Different metal has a different voltage.	1
	No response or wrong response	0

Question number	Rubric	Score
1 (d)	[Able to give the operational definition for the construction of electrochemical series correctly with the following aspects : (I) What should be done (II) What should be observed Sample answer : Telegram @soalanpercubaanspm When two different metals are dipped into an electrolyte, the voltmeter gives a higher reading shows that the further the distance between two metals.	3
	[Able to give the operational definition for the construction of electrochemical series incompletely with any (one) aspects either (I) or (II)] Sample answer : Two different metals are dipped into an electrolyte// the voltmeter gives a higher reading shows that the further the distance between two metals.	2
	[Able to give an idea of operational definition for the construction of electrochemical series.] Sample answer : The voltmeter gives a reading.	1
	No response or wrong response	0

Question number	Rubric	Score
1 (e)	[Able to arrange the four metals correctly.] (accept symbol) Sample answer : X, tin, zinc, magnesium.	3
	[Able to arrange any three metals in sequence correctly.] (accept symbol) Sample answer : X, tin, zinc//Tin, zinc, magnesium	2
	[Able to arrange any two metals in sequence correctly.] (accept symbol) Sample answer : X, tin // tin, zinc // zinc, magnesium.	1
	No response or wrong response	0

Question number	Rubric	Score
1 (f)(i)	[Able to state the size change of metal X correctly.] Sample answer : The size of metal X increases//thicker.	3
	[Able to state the size change of metal X less correctly.] Sample answer : The size of metal X changes.	2
	[Able to give an idea of any observation.] Sample answer : Magnesium electrode become thinner.	1
	No response or wrong response	0

Question number	Rubric	Score
1 (f)(ii)	[Able to make inference correctly.] Sample answer : Copper(II) ion receive electron/discharge to form copper atom.	3
	[Able to make inference less correctly.] Sample answer : Copper(II) ion discharge//copper atom formed.	2
	[Able to give an idea of inference based on observation given in f(i).] Sample answer : Magnesium dissolved.	1
	No response or wrong response	0

Question number	Rubric	Score
1 (f)(iii)	[Able to state the relationship between the change in the size of X electrode with time correctly.] Telegram @soalanpercubaanspm Sample answer : The size of X electrode increases with time.	3
	[Able to state the relationship between the change in the size of X electrode with time less correctly.] Sample answer : Telegram @soalanpercubaanspm The size of X electrode directly proportional with time.	2
	[Able to give an idea of size of X electrode.] Sample answer : The size of X electrode changes.	1
	No response or wrong response	0

Question number	Rubric	Score
1 (g)	[Able to predict the voltage produced accurately.] Telegram @soalanpercubaanspm Answer : 2.0 V//2.0	3
	[Able to predict the voltage produced less accurately.] Sample answer : 1.8 [Any value between 1.6 and 2.4]	2
	[Able to give an idea of the voltmeter reading.] Answer : Less than 2.4	1
	No response or wrong response	0

Question number	Rubric	Score
1 (h)	[Able to achieve all the following aspects correctly : (i) Balance the half equation at zinc electrode. (ii) Balance the half equation at metal X electrode. (iii) Write the overall ionic equation.] Answer : At zinc electrode : $Zn \rightarrow Zn^{2+} + 2e$ At metal X electrode : $X^{2+} + 2e \rightarrow X$ Overall ionic equation : $Zn + X^{2+} \rightarrow Zn^{2+} + X$	3
	[Able to achieve any two aspects correctly.]	2
	[Able to achieve any one aspect correctly.]	1
	No response or wrong response	0

Question number	Rubric	Score				
1 (i)	[Able to classify all the four metals correctly.]	3				
	Answer : <table border="1" data-bbox="284 353 1157 488"> <tr> <td data-bbox="284 353 726 421">Metal which are more electropositive than copper</td> <td data-bbox="730 353 1157 421">Metal which are less electropositive than copper</td> </tr> <tr> <td data-bbox="284 421 726 488">Iron Tin</td> <td data-bbox="730 421 1157 488">Silver Gold</td> </tr> </table>	Metal which are more electropositive than copper	Metal which are less electropositive than copper	Iron Tin	Silver Gold	
	Metal which are more electropositive than copper	Metal which are less electropositive than copper				
	Iron Tin	Silver Gold				
	[Able to classify any three metals correctly.]	2				
[Able to classify any two metals correctly.]//Classify inversely	1					
No response or wrong response	0					

Question number	Rubric	Score
2 (a)	[Able to give the problem statement correctly.] Sample answer : Telegram @soalanpercubaanspm How does when iron in contact with magnesium, rusting of iron inhibit? // How does when iron in contact with copper, rusting of iron increase? // What is the effect of other metal on the rusting of iron?	3
	[Able to give the problem statement less correctly.] Sample answer : To investigate the effect of rusting of iron when in contact with more electropositive metal. // To investigate the effect of rusting of iron when in contact with less electropositive metal.	2
	[Able to give an idea of the problem statement.] Sample answer : Does rusting occurs when iron in contact with other metal?	1
	No response or wrong response	0

Question number	Rubric	Score
2 (b)	[Able to state all the variables correctly.] Sample answer : Manipulated variable : Magnesium and copper // Type of metals in contact with iron. Responding variable : Rusting of iron // formation of blue spot/colouration. Fixed variable : Iron nails // jelly/agar-agar solution // electrolyte // temperature // potassium hexacyanoferrate(III) solution.	3
	[Able to state any two variables correctly.]	2
	[Able to state any one variable correctly.]	1
	No response or wrong response	0

Question number	Rubric	Score
2 (c)	[Able to state the relationship between the manipulated variable and the responding variable correctly and with direction.] Sample answer : When iron in contact with magnesium, rusting of iron inhibit // When iron in contact with copper, rusting of iron increase	3
	[Able to state the relationship between the manipulated variable and the responding variable correctly and without direction.] Sample answer : When iron in contact with metal, iron does not rust. // When iron in contact with metal, rusting occurs.	2
	[Able to give an idea of the hypothesis.] Sample answer : The presence of metal effect rusting.	1
	No response or wrong response	0

Question number	Rubric	Score
2 (d)	[Able to list all the materials and apparatus correctly.] Sample answer : Materials : Iron nail, magnesium ribbon, copper strip, jelly//agar-agar solution, potassium hexacyanoferrate(III) and phenolphthalein indicator, sand paper. Apparatus : Test-tubes//boiling tubes, test tube rack.	3
	[Able to give a list the following materials and apparatus.] Sample answer : Materials : Iron nail, magnesium, copper, jelly solution, potassium hexacyanoferrate (III). Apparatus : Test-tubes//boiling tubes, test tube rack.	2
	[Able to give an idea of materials and apparatus.] Sample answer : Materials : Iron nail, magnesium/copper. Apparatus : Boiling tube / beaker / any suitable container.	1
	No response or wrong response	0

Question number	Rubric	Score
2 (e)	[Able to state all steps in the procedure correctly.] Sample answer : 1. Iron nails, magnesium ribbon and copper strip are cleaned with sand paper. 2. Both iron nails is coiled with different metal. 3. The iron nails are put into two different test tubes. 4. The mixture of jelly solutions, potassium hexacyanoferrate (III) and phenolphthalein indicator is poured into the test tubes. 5. The test tube left aside for one day. 6. Any observation are recorded.	3
	[Able to state the steps 2, 3, 4 and 6]	2
	[Able to state steps 2 and 4]	1
	No response or wrong response	0

Question number	Rubric	Score						
2 (f)	[Able to tabulate the data with the following aspects :] 1. Correct titles 2. Complete list of metals Sample answer : <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>Pairs of metal</th> <th>Observation</th> </tr> </thead> <tbody> <tr> <td>Iron + magnesium</td> <td></td> </tr> <tr> <td>Iron + copper</td> <td>Telegram @soalanpercubaanspm</td> </tr> </tbody> </table>	Pairs of metal	Observation	Iron + magnesium		Iron + copper	Telegram @soalanpercubaanspm	2
Pairs of metal	Observation							
Iron + magnesium								
Iron + copper	Telegram @soalanpercubaanspm							
	[Able to tabulate the data but incomplete.] Sample answer : <table border="1" style="margin-left: 40px;"> <tbody> <tr> <td></td> <td></td> </tr> <tr> <td>Iron + magnesium</td> <td></td> </tr> <tr> <td>Iron + copper</td> <td></td> </tr> </tbody> </table>			Iron + magnesium		Iron + copper		1
Iron + magnesium								
Iron + copper								
	No response or wrong response	0						