MODUL PERKEMBANGAN PEMBELAJARAN (MPP3) - TRIAL SPM 2019 4541/3 KIMIA KERTAS 3

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| Question | Mark Scheme | Score |
| 1 (a) | Able to record all readings accurately to one decimal point with correct unit  Answer:  Experiment I : 29.0 °C 25.0 °C Eksperimen I  Experiment II : 28.5 °C 36.0 °C  Eksperimen II  Experiment 111: 30.0 °C 23.5 °C  Eksperimen III  Experiment IV : 28.0 °C 41.0 °C  Eksperimen IV | 3  ( |
| Able to record all readings correctly without decimal point with correct unit or Able to record all readings accurately to decimal point without unit  Sample answer:  Experiment I : 29 °C / 29.0 25 °C / 25.0  Eksperimen I  Experiment II : 28.5 °C / 28.5 36 °C / 36.0  Eksperimen II  Experiment 111: 30 °C / 30.0 23.5 °C 123.5  Eksperimen 111  Experiment IV : 28°C / 28.0 41 °C / 41.0  Eksperimen IV | 2 |
| Able to record at least four readings correctly without decimal point and without unit  Samole answer:  Experiment I : 29 25 Eksperimen I  Experiment II : 28.5 36 Eksperimen II  Experiment III: 30 23.5  Eksperimen 111  Experiment IV: 28 41 Eksperimen IV | i.  1 |
| No response given / wrong response | 0 |

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| Question | v Mark Scheme | | | | Score |
| 1 (b) | Able to construct a table that contains the following information:   1. Heading in the table : Experiment, Initial temperature, Lowest or Highest temperature 2. Transfer all the temperature readings from (a)(i) correctly 3. With unit   Sample answer: | | | | 3 |
| Experiment  Eksperimen | initial temperature i °C Suhu awal | Lowest or highest temperature/ °C Suhu terendah atau tertinggi |  |
| I | 29.0 | 25.0 |
| II | 28.5 | 36.0 |
| III | 30.0 | 23.5 |
| IV | 28.0 | 41.0 |
|  | | |  |
| Able to construct a table that contains the following information:   1. Heading in the table : Experiment. Initial temperature, Lowest or Highest temperature 2. Transfer all the temperature readings from (a)(i) correctly 3. Without unit   Sample answer: | | | | 2 |
| Experiment  Eksperimen | Initial temperature Suhu awal | Lowest or highest temperature Suhu terendah atau tertinqqi |  |
| I | 29 | 25 |
| II | 28.5 | 36 |
| III | 30 | 23.5 |
| IV | 28 | 41 |
| Able to give an idea to construct a table | | | | 1 |
| No response given / wrong response | | | | 0 |

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| Question | Mark Scheme | | | | Score |
|  | Able to classify four experiments correctly | | |  |  |
|  | Sample answer: | |  |  |  |
|  |  | Endothermic reaction Tlndak balas endotermik | Exothermic reaction Tlndak balas eksotermik |  | 3 |
| 1 (c) |  | Experiment I Eksperimen i  Experiment III Eksperimen III | Experiment I! Eksperimen II  Experiment IV Eksperimen IV |  |
|  | Able to classify any three experiments correctly | | | | 2 |
|  | Able to classify any two experiments correctly | | | | 1 |
|  | No response given / wrong response | | | | 0 |

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| Question | Mark Scheme | Score |
| 1 m) | Able to state three observations correctly Sample answer:   1. Thermometer reading decreases it Level of mercury decreases Bacaan termometer menurun //Aras merkuri menurun 2. Bubbles of gas released ii Effervescence Gelembung-gelembung gas terbebas//Pembuakan 3. The volume of solution increases Isipadu larutan bertambah | 3 |
| Able to state any two observations correctly | 2 |
| Able to state any one observation correctly | 1 |
| No response qiven / wrong response | 0 |

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| Question | Mark Scheme | Score |
| 1 (d)(ii) | Able to state any one inference based on observation correctly Sample answer:  Endothermic reaction tt Heat is absorbed from surrounding //  Carbon dioxide gas is released tt Sodium hydrogen carbonate solution reacts with hydrochloric acid  Ttndak balas endotermik // Haba diserap dart persekitaran//  Gas karbon dioksida dibebaskan // Larutan natrium hidrogen karbonat bertindak balas denqan asid hidroklorik | 3 |
| Able to state an inference less correctly  Sample answer:  Heat transfer ft Gas released Haba dipindahkan ft Gas terbebas | 2 |
| Able to give an idea of inference Sample answer:  Heat/energy change tt Air bubbles // Exothermic reaction  Haba f Tenaqa berubah // Gelembung udara ft Tindak balas eksotermik | 1 |
| No response given / wrong response | 0 I |

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| Question | Mark Scheme | Score' |
| 1 (e) | Able to calculate the Hfeat of neutralisation for Experiment IV correctly with unit  Sample answer:  Step 1 : Heat released = met)  = 100x4.2x13//5460 J  Step 2 : Number of mole of NaOH//HCI = (2.0)(50)/1000 // 0.1 mol  Step 3:0.1 mol of water formed releases 5460 J heat energy Step 4:1.0 mol of water formed releases = 5460 / 0.11154600 J  Step 5 : Heat of neutralisation = - 54.6 kJ mol'1 {score 2 if without unit)  Langkah 1 : Haba yang dibebaskan = mcG  = 100 x 4.2 x 13//5460 J  Langkah 2 : Biiangan mol NaOH//HCI = {2.0)(50)/10001! 0.1 mol  Langkah 3 .0.1 mo/ air membebaskan haba 5460 J  Langkah 4: 1.0 mol air membebaskan haba = 5460 / 0.1 // 54600 J  Langkah 5 : Haba peneutralan = - 54.6 kJ mol'1 (skor 2 jika tiada unit) | 3 |
| Able to calculate the heat of neutralisation for Experiment IV correctly with the following steps : Step 1, 2 and 5 | 2 |
| Able to state the idea of calculation of heat of neutralisation ( any 1 step) | 1 |
| No response given / wrong response | 0 |

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| Question | Mark Scheme | Score |
| 1(f) | Able to predict the temperature change accurately with correct unit  Sample answer:  26 °C / 26.0 °C | 3 |
| Able to predict the temperature change correctly  Sample answer 26/26.0 // Twice // Double 26/26.0// 2 kali // Berqanda | 2 |
| Able to state the idea of the temperature change Sample answer:  Increases // Higher than 13 °C // (Any value less than 26.0 °C 1 Bertambah li Lebih tinggi dari 13 °C //  [Mana-mana niiai kurang dari 26.0°C ] | 1 |
| No response given / wrong response | 0 |

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| Question | Mark Scheme | Score |
| 1(9)0) | Able to state the three variables correctly.  Sample answer  Manipulated variable : Hydrochloric acid and ethanoic acid // Type of acid  Responding variable : Heat of neutralisation//Temperature change Constant variable : Sodium hydroxide solution II Type of alkali  Pemboleh ubah dimanipulasi : Asid hidroklorik dan asid etanoik//  Jenis asid  Pemboleh ubah bergerak balas: Haba peneutralan // Pe rub ah an suhu Pemboleh ubah dimalarkan : Larutan natrium hidroksida //Jenis alkali | 3 |
|  | Able to state any two variables correctly. | 2 |
|  | Able to state any one variable correctly. | 1 |
|  | No response given / wrong response | 0 |

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| Question | Mark Scheme | Score |
| 1 (9)(ii) | Able to state the relationship between the manipulated variable and responding variable with direction correctly  Sample answer:  The reaction between (hydrochloric acid)/(strong acid) and (sodium hydroxide solution)/ (strong alkali) produce a higher heat of neutralisation than reaction between (ethanoic acid)/(weak acid) and (sodium hydroxide solution)/ (strong alkali)  Tindak balas antara (asid hidroklorik)/(asid kuat) dan (larutan natrium hidroksida)/(alkati kuat) menghasitkan haba peneutralan yang lebih tinggi daripada tindak balas antara (asid etanoik)/(asid iemah) dan (larutan natrium hidroksida)/(aikali kuat) | 3 |
| Able to state the relationship between the manipulated variable and responding variable with direction less correctly  Sample answer:  Heat of neutralisation between a strong acid and a strong alkali is higher than a weak acid and a strong alkali II A strong add produces a higher heat of neutralisation Haba peneutralan antara asid kuat dan alkali kuat lebih tinggi daripada asid Iemah dan alkali kuat//  Asid kuat menqhasiikan haba peneutralan yang lebih tinggi | 2  V |
| Able to state an idea of hypothesis Sample answer:  Type of acid affects heat of neutralisation U  Different type of acid produces different heat of neutralization  Jenis asid mempengaruhi haba peneutralan//  Jenis asid yanq berbeza menqhasiikan haba peneutralan yang berbeza | 1 |
| No response given / wrong response | 0 |

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| Question | Mark Scheme | Score |
| 1 <g)(iii) | Able to state the relationship correctly SamDle answer  A strong acid produces a higher temperature change than a weak acid when reacts with sodium hydroxide solution  Asid kuat menghasilkan perubahan suhu yang lebih tinggi daripada asid letvah apabila bertindak balas denqan larutan natrium hidroksida | 3 |
| Able to state the relationship less correctly Sample answer  A strong acid produces a higher temperature change // A weak acid produces a lower temperature change  Asid kuat menghasilkan perubahan suhu yang lebih tinggi //Asid lemah menghasilkan perubahan suhu yang lebih rendah | 2 |
| Able to give an idea of relationship Sample answer  Type of acid affects the temperature change II  Different type of acid produces different the temperature change  Jenis asid mempengaruhi perubahan suhu //  Jenis asid berbeza menghasilkan perubahan suhu yang berbeza | 1 |
| No response given / wrong response | 0 |

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| Question | Mark Scheme | Score |
| 1 (g)(iv) | Able to state the operational definition for the heat of neutralisation accurately with the following criteria;   1. What should be done 2. What should be observed   Sample answer  {Thermometer reading rises)/ (Temperature increases) when alkali / (sodium hydroxide solution) is added into acid/ (hydrochloric acid)/ (ethanoic acid) to produce 1 mol of water (Bacaan termometer meningkat) / (Suhu meningkat) apabila alkali/  (larutan natrium hidroksida) ditambah kepada asid /(asid hidroklorik)/ (asid etanoik) untuk menghasilkan 1 mol air | 3 |
| Able to state the operational definition for the heat of neutralisation less correctly  Sample answer  (Thermometer reading rises)/ (Temperature increases) when alkali is added into acid H Thermometer reading rises // Temperature increases ii Acid is added into alkali  (Bacaan termometer meningkat) / (Suhu meningkat) apabila alkali ditambah kepada asid//Bacaan termometer meningkat // Suhu meningkat //Asid ditambahkan ke daiam alkali | 2 |
| Able to give an idea of operational definition for the heat of neutralisation Sample answer  Heat is released // Alkali neutralises / (reacts with) acid  Haba dibebaskan // Alkali meneutralkan / (bertindak balas dengan) asid | 1 |
| No response given / wrong response | 0 |

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| Question | Mark Scheme | Score |
| 2(a) | Able to give the statement of the problem correctly Sample answer:  Is the concentration of electrolyte affect the product of electrolysis at the anode? // How does the concentration of electrolyte affect the product formed at anode?  Adakah kepekatan elektrolit mempengaruhi hasii elektrollsis di anod?//Bagaimanakah kepekatan elektrolit mempengaruhi hasil terbentuk di anod? | 3 |
| Able to give the statement of the problem less correctly Sample answer:  Is the concentration of electrolyte affect the product of electrolysis? II How does the concentration of electrolyte affect the product of electrolysis?  Adakah kepekatan elektrolit mempengaruhi hasil elektrolisis? // Bagaimanakah kepekatan elektrolit mempengaruhi hasil elektrolisis? | 2 |
| Able to state an idea the statement of problem SamDle answer:  The concentration of electrolyte affects the product of electrolysis. Kepekatan elektrolit mempengaruhi hasil elektrolisis | 1 |
| No response given / wrong response | 0 |

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| Question | Mark Scheme | Score |
| 2(b) | Able to state All variables correctly SamDle answer:  Manipulated variable : Concentration of electrolyte It Concentration of iodide ion Responding variable : Product formed at anode Constant variable : Carbon electrode 11 Type of electrode II  Potasium iodide solution it Type of electrolyte  Pemboleh ubah dimanipulasi: Kepekatan elektrolit //  Kepekatan ion iodida Pemboleh ubah bergerak balas: Hasil di anod Pemboleh ubah dimalarkan: ElektrodkarJbon //Jenis efektrodff  Larutan kalium iodide // Jenis elektrolit | 3 |
| Able to state any two variables correctly | 2 |
| Able to state any one variables correctly | 1 |
| No response given / wrong response | 0 |

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| Question | Mark Scheme | Score |
| 2(c) | Able to state the relationship between manipulated variable and responding variable correctly  Samole answer.  If the concentrated potassium iodide solution is electrolysed /used, product at the anode is iodine solution, if the dilute potassium iodide solution is electrolysed/ used, the product at the anode is oxygen gas.  Jika larutan kalium iodida p&kat dielektrolisiskan / digunakan hasil di anod iatah larutan iodin.  Jika larutan kalium iodida cair dielektrolisiskan / digunakan hasil di anod ialah gas oksigen. | 3 |
| Able to state the relationship between manipulated variable and responding variable less correctly  Samole answer;  If the concentrated potassium iodide solution used, product at the anode is iodine solution //  If the dilute potassium iodide solution used, the product at the anode is oxygen gas.  Jika larutan kalium iodida pekat digunakan hasil di anod ialah larutan iodin J/  Jika larutan kalium iodida cair digunakan hast! di anod ialah gas oksigen. | 2 |
| Able to state an idea of the hypothesis Samole answer:  The concentration of electrolyte affects the product at the anode II Different concentration of electrolyte produces different product at the anode  Kepekatan etektrolit mempengaruhi hasil di anod //  Kepekatan elektrolit yang berheza menghasilkan hasil yang berbeza di anod. | 1 |
| No response given / wrong response | 0 |

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| Question | Rubric | Score |
| 2(d) | Able to give the list of the apparatus and materials correctly and completely  Sample answer:  Material  [ 0.0001 -0.001 ] mol dm'3 potassium iodide solution,  [ 0.1 - 2.0 ] mol dm'3 potassium iodide solution Bahan  Larutan kalium iodida [ 0.0001 - 0.001 ] mol dm 3,  Larutan kalium iodida {0.1 - 2.0 1 mol dm-3  Apparatus  Carbon electrode, electrolytic cell, wire, battery, test tube. Radas  Elektrod karbon, sel elektroiisis, wayar, bated, tabung uji | 3 |
| Able to give the list of the apparatus and materials less correctly Material  [ 0.0001 - 0.001 ] mol dm-3 potassium iodide solution 11 [ 0.1 - 2,0 ] mol dm'3potassium iodide solution Bahan  Larutan kalium iodida [ 0.0001 - 0.001 ] mol dm-3 ii Larutan kalium iodida [ 0.1 - 2.0 ] mol dnrr3  Apparatus  Electrolytic cell, wire, battery Radas  Set elektroiisis, wayar, bateri | 2 |
| Able to give at least one substance and one apparatus  Material  [Any electrolyte]  Bahan  [ Mana-mana elektrofit]  Apparatus  Battery  Radas  Bateri | 1 |
| No response given / wrong response | 0 |

Score

Question

Mark Scheme

Abie to state ail procedures correctly Sample answer:

1. Pour half full of {0.0001 - 0.001 ] mol dm 3 potassium iodide solution into an electrolytic cell.
2. Pour the solution into 2 small test tubes until full.
3. Turn the test tube upside down to both electrodes.
4. Connect both electrodes to the battery with connecting wires // Complete the circuit.
5. Record observation.
6. Repeat step 1 to 5 by replacing [ 0.0001 - 0.001 ] mol dm3 potassium iodide solution with (0.1 - 2.0 ] mol dm 3 potassium iodide solution.

2(e)

1. Masukkan larutan kalium iodida [ 0.0001 - 0,001 ] mol drrr3 ke dalam sel elektrolisis sehingga separuh penuh.
2. Masukkan larutan tersebut ke dalam 2 tabung uji kecit sehingga penuh.
3. Telangkupkan tabung uji yang berisi larutan kepada kedua-dua elektrod.
4. Sambungkan kedua-dua elektrod kepada bateri dengan wayar penyambung//Lengkapkan litar.
5. Rekod pemerhatian.
6. Ulang langkah 1 hingga 5 dengan menggantikan larutan kalium iodida 10.0001 - 0.001 ] mol dnr3 dengan iarutan kafium iodida [ 0.1 - 2.0 1 mol dm 3.

Able to list steps 1,4,5 and 6 correctly

Able to list steps 1 and 4 only

No response given / wrong response

Score

Question

Mark Scheme

Able to exhibit the tabulation of data correctly Tabulation of data has the following elements: 1. 2 columns and 3 rows

2(f)

Sample answer:

|  |  |
| --- | --- |
| Concentration of electrolyte (mol dm3) Kepekatan elektrolit (mol dm-3) | Observation  Pemerhatian |
| (0.0001 -0.001 ] |  |
| [0.1 -2.0] |  |

Able to give an idea of tabulation of data Sample answer:

Observation

*Pemerhatian*

Electrolyte

*Elektrolit*

No response given / wrong response

END OF MARKING SCHEME SKEMA PEMARKAHAN TAMAT