

Essay {Paper03}

[MRSM05-03]

(a) Does reaction between strong acid with strong alkali will released difference heat of neutralisation between reaction of weak acid and strong alkali?

(b) The strong acid when react with strong alkali will released more heat of neutralisation than the reaction of weak acid with strong alkali

(c) substances : 0.1 mol dm⁻³ sodium hydroxide, 0.1 mol dm⁻³ hydrochloric acid, 0.1 mol dm⁻³ of ethanoic acid

Apparatus: Polystyrene cup, measuring cylinder, thermometer

(d) 1. 50 cm³ of 0.1 mol dm⁻³ of hydrochloric acid was measured and poured into polystyrene cup.

2. Measured and recorded the initial temperature of hydrochloric acid by using thermometer.

3. 50 cm³ of 0.1 mol dm⁻³ of sodium hydroxide was measured and poured into another polystyrene cup.

4. Measured and recorded the initial temperature of sodium hydroxide by using thermometer.

5. Then add hydrochloric into sodium hydroxide cup.

6. Stir and record the highest temperature of mixture.

7. Repeat step 1 to step 6 by replaced hydrochloric acid with ethanoic acid

(e)

Experiment	Initial Temperature/°C	Final temperature/°C	Change of temperature/ °C
HCl + NaOH			
CH ₃ COOH + NaOH			

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[SBPtrial11-03]

(a) To compare the heat of combustion of different alcohols/(methanol, ethanol, propan-1-ol)

(b) Manipulated variable : Different type of alcohols// type of alcohols//methanol, ethanol, propan-1-ol

Responding variable :Heat of combustion

Controlled variable :Volume of water// copper can// thermometer

(c) The higher the number of carbon atoms in the alcohol molecules, the higher the heat of combustion

(d) Material: methanol, ethanol, propan-1-ol, water
 Apparatus : Copper can, tripod stand, thermometer, measuring cylinder, spirit lamp, weighing balance, wooden block, wind shield.

- (e) 1. 250 cm³ of water is measured and pour into a copper can.
 2. The initial temperature of water is recorded.
 3. The copper can is placed on a tripod stand.
 4. A spirit lamp is filled with methanol and the initial mass is weighted and recorded.
 5. The spirit lamp is put under the copper can and the wick of the lamp is lighted immediately.
 6. The water is stirred with the thermometer until the temperature rises about 30 °C.
 7. The flame is put off and the highest temperature is recorded.
 8. The spirit lamp and its content is weighed immediately and the final mass is recorded
 9. Steps 1 to 8 are repeated using ethanol and propan-1-ol to replace methanol

(f)

Types of alcohol	Initial temperature/°C	Highest temperature/°C	Initial mass of spirit lamp/ g	Final mass of spirit lamp/ g
Methanol				
Ethanol				
Propan-1-ol				

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[SBPtrial04-03]

(a)

Rubric	Skor
<i>Dapat menyatakan pernyataan masalah yang munasabah</i> Cadangan jawapan <ul style="list-style-type: none"> • Membandingkan haba pembakaran beberapa jenis alkohol 	3
<i>Dapat menyatakan pernyataan masalah yang kurang tepat</i> Cadangan jawapan <ul style="list-style-type: none"> • Menentukan haba pembakaran alkohol • 	2
<i>Dapat menyatakan idea tentang pernyataan masalah</i> Cadangan jawapan <ul style="list-style-type: none"> • Haba pembakaran alkohol berbeza 	1
Tidak memberikan respons atau respons salah	0

(b)

Rubric	Skor
<i>Dapat membuat hubungan antara pemboleh ubah dimanipulasi dengan pemboleh ubah bergerak balas dengan betul.</i> Cadangan jawapan Semakin bertambah bilangan atom karbon per molekul alkohol, semakin besar nilai haba pembakaran	3
<i>Dapat membuat hubungan antara pemboleh ubah dimanipulasi dengan pemboleh ubah bergerak balas tetapi kurang tepat</i> Cadangan jawapan Jenis alkohol mempengaruhi nilai haba pembakaran	2
<i>Dapat memberi idea untuk menyatakan hipotesis atau tujuan eksperimen</i> Cadangan jawapan <ul style="list-style-type: none"> • Mengkaji haba pembakaran alkohol 	1
Tidak memberikan respons atau respons salah	0

(c)

Rubric	Skor
<i>Dapat menyatakan semua bahan dan alat radas dengan betul</i> Cadangan jawapan Bahan: Metanol, etanol, propanol, butanol, air, Radas: pelita, termometer, bekas/tin kuprum, silinder penyukat [50-100]cm ³ , neraca, pengadang angina	3
<i>Dapat menyatakan bahan dan alat radas minimum untuk menjalankan eksperimen</i> Cadangan jawapan Bahan: Metanol, etanol, propanol, butanol, air, Radas: pelita, termometer, bekas/tin kuprum, silinder penyukat, neraca,	2
<i>Dapat menyatakan sebarang bahan dan radas utama dalam eksperimen</i> Cadangan jawapan Metanol, etanol, propanol, butanol, pelita, termometer * kalau bahan lebih yang tiada kaitan, kalau dapat skor 3 jatuh 2/kalau dapat skor 2 jatuh 1/kalau 1 dapat 0	1
Tidak memberikan respons atau respons salah	0

(d)

Rubric	Skor
<i>Dapat menyatakan prosedur eksperimen yang lengkap</i> Cadangan jawapan <ol style="list-style-type: none"> 1. [100-200]cm³ air disukat ke dalam bekas kuprum dan suhu awal dicatatkan 2. Sebuah pelita diisi dengan metanol dan jisimnya dicatatkan. 3. Kedudukan pelita dilaraskan supaya nyala api sampai ke bekas kuprum. Pelita dinyalakan. 	3

4. Apabila suhu air meningkat [25 – 30]°C, nyalaan pelita dipadamkan. Suhu maksimum air dicatat. 5. Pelita berisi metanol ditimbang dan jisim dicatatkan. 6. Eksperimen diulang menggunakan etanol, propanol dan butanol	
<i>Dapat menyatakan prosedur minimum eksperimen berfungsi</i> Cadangan jawapan Langkah 1, 3, 4	2
<i>Dapat menunjukkan idea menyatakan prosedur eksperimen</i> Cadangan jawapan Langkah 1 dan 3	1
Tidak memberikan respons atau respons salah	0

(e)

Rubric	Skor																																			
<i>Dapat menunjukkan penjadualan data dengan tajuk yang sesuai untuk setiap lajur dan baris</i> Cadangan jawapan	3																																			
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Tidak memberikan respons atau respons salah	0																																			

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[SBPtrial08-03]

(a)

Rubric	Score
<p><i>[Able to make a statement of the problem accurately and must be in question form]</i></p> <p>Suggested answer: How does the number of carbon per molecule of alcohol affect/influence the heat of combustion? // Does the increase in the number of carbon per molecule of alcohol increases the heat of combustion?</p>	3
<p><i>[Able to make a statement of the problem but less accurate // Accurate statement of the problem but not in question form.]</i></p> <p>Suggested answer: Does different types of alcohols have different heat of combustions? // When the number of carbon per molecule of alcohol increases the heat of combustion increases.</p>	2
<p><i>[Able to state an idea of statement of the problem]</i></p> <p>Suggested answer: Alcohols have different heat of combustion.</p>	1

(b)

Rubric	Score
<p><i>[Able to state all the three variables correctly]</i></p> <p>Suggested answer: Manipulated variable: Different types of alcohols // Different alcohols such as ethanol, propanol and butanol. Responding variable: Heat of combustion // Increase in temperature Fixed variable: Volume of water, type of container / size of container</p>	3
<i>[Able to state any two of the variables correctly]</i>	2
<i>[Able to state any one of the variables correctly]</i>	1

(c)

Rubric	Score
<p><i>[Able to state the relationship between manipulated variable and responding variable correctly]</i></p> <p>Suggested answer: When the number of carbon per molecule of alcohol increases, the heat of combustion increases.</p>	3
<p><i>[Able to state the relationship between manipulated variable and responding variable but in reverse direction]</i></p> <p>Suggested answer: The heat of combustion increases when the number of carbon per molecule of alcohol increases. // Different types of alcohols have different heat of combustion.</p>	2
<p><i>[Able to state an idea of the hypothesis]</i></p> <p>Suggested answer: Alcohols have different heat of combustion.</p>	1

(d)

Rubric	Score
<p><i>[Able to state the list of substances and apparatus correctly and completely]</i></p> <p>Suggested answer: Ethanol, propanol, butanol, water, [metal] beaker, spirit lamp, thermometer, weighing balance, wooden block, tripod stand, wind shield, measuring cylinder.</p>	3
<p><i>[Able to state the list of substances and apparatus correctly but not complete]</i></p> <p>Suggested answer: Ethanol, propanol, butanol, water, [metal] beaker, spirit lamp, thermometer, weighing balance.</p>	2
<p><i>[Able to state an idea about the list of substances and apparatus]</i></p> <p>Suggested answer: Ethanol/propanol/butanol/water, beaker, thermometer.</p>	1

(e)

Rubric	Score
<p><i>[Able to state a complete experimental procedure]</i></p> <p>Suggested answer:</p> <ol style="list-style-type: none"> 1. [200 cm³] of water is poured into a [copper] beaker. 2. Initial temperature of the water is recorded. 3. A spirit lamp is half filled with ethanol. 4. Initial mass of the spirit lamp is recorded. 5. Put the spirit lamp under the copper beaker and ignite the wick immediately. 6. Stir the water and the flame is put off after the temperature has increased by 30°C. 7. The highest temperature of the water is recorded 8. Immediately the final mass of the spirit lamp is recorded. 9. Repeat the experiment by replacing ethanol with propanol and butanol. 	3
<p><i>[Able to state the following procedures]</i></p> <p>1, 2, 4, 5,7,8</p>	2
<p><i>[Able to state the following procedures]</i></p> <p>2, 4, 5, 7</p>	1

(f)

Rubric					Score
[Able to exhibit the tabulation of data correctly with suitable headings and units]					3
Types of alcohols	Initial temperature/°C	Highest temperature/°C	Initial mass of spirit lamp/g	Final mass of spirit lamp/g	
Ethanol					
Propanol					
Butanol					
[Able to exhibit the tabulation of data less accurately with suitable headings without units]					2
Types of alcohols	Initial temperature	Highest temperature	Initial mass of spirit lamp	Final mass of spirit lamp	
[Able state an idea about the tabulation of data]					1
Alcohol	Temperature	Mass			

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[MRSM07-02]

(a) Does the increase in the number of carbon per molecule of alcohol increases the heat of combustion?

(b) Manipulated variable: Different types of alcohols//Different alcohols such as ethanol, propanol and butanol.

Responding variable: Heat of combustion//Increase in temperature

Fixed variable: Volume of water, type of container/ size of container

(c) When the number of carbon per molecule of alcohol increases, the heat of combustion increases.

(d) substances : Ethanol, propanol, butanol, water,
Apparatus : [metal] beaker, spirit lamp, thermometer, weighing balance, wooden block, tripod stand, wind shield, measuring cylinder.

(e) [200 cm³] of water is poured into a [copper] beaker.

1. Initial temperature of the water is recorded.
2. A spirit lamp is half filled with ethanol.
3. Initial mass of the spirit lamp is recorded.
4. Put the spirit lamp under the copper beaker and ignite the wick immediately.
5. Stir the water and the flame is put off after the temperature has increased by 30°C.
6. The highest temperature of the water is recorded
7. Immediately the final mass of the spirit lamp is recorded.
8. Repeat the experiment by replacing ethanol with propanol and butanol.

(f)

Types of alcohols	Initial temperature/°C	Highest temperature/°C	Initial mass of spirit lamp/g	Final mass of spirit lamp/g
Ethanol				
Propanol				
Butanol				

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