Chemistry
Kertas 3
Ogos / Sept
2010
1 ½ jam

Nama Pelajar : .....

Tingkatan : .....

JABATAN PELAJARAN KELANTAN
DENGAN KERJASAMA
PERSIDANGAN KEBANGSAAN PENGETUA-PENGETUA
SEKOLAH MENENGAH MALAYSIA
CAWANGAN KELANTAN

PEPERIKSAAN PERCUBAAN SPM
TINGKATAN 5 (2010)

CHEMISTRY
KERTAS 3

Masa : Satu Jam Tiga Puluh Minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

Arahan:

1. *Kertas soalan ini adalah dalam dwibahasa.*
2. *Setiap soalan mengandungi kedua-dua bahasa Inggeris dan bahasa Melayu. Bahagian atas dalam bahasa Inggeris dan diikuti di bawahnya oleh bahasa Melayu.*
3. *Calon dibenarkan menjawab keseluruhan atau sebahagian soalan samada dalam bahasa Melayu atau bahasa Inggeris.*
4. *Calon dikehendaki membaca maklumat di halaman 2.*

Kod Pemeriksa		
Soalan	Markah Penuh	Markah Diperolehi
1	33	
2	17	
JUMLAH	50	

INFORMATION FOR CANDIDITES

1. This question paper consists of two questions. Answer all questions.
2. Write your answers for **Question 1** in the spaces provided in the question paper.
3. Write your answers for **Question 2** on the "helaian tambahan". You may use equation, diagrams, tables, graphs and other suitable methods to explain your answer.
4. Show your working, it may help you to get marks.
5. If you wish to change your answer, neatly cross out the answer that you have done. Then write down the new answer.
6. The diagrams in the questions are not drawn to scale unless stated.
7. Mark allocated for each question or part question are shown in brackets.
8. The time suggested to answers **Question 1** is 45 minutes and **Question 2** is 45 minutes.
9. You may use a non-programmable scientific calculator.
10. Hand your answer sheets at the end of the examination.

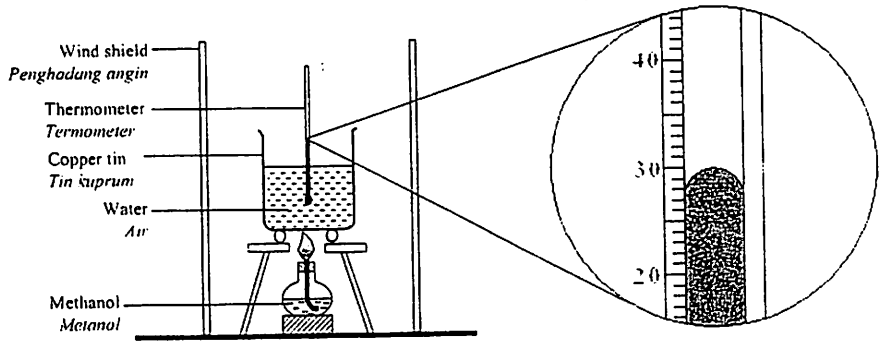
Marks awarded:

Mark	Description
3	Excellent : The best response
2	Satisfactory : An average response
1	Weak : An inaccurate response
0	No response or wrong response

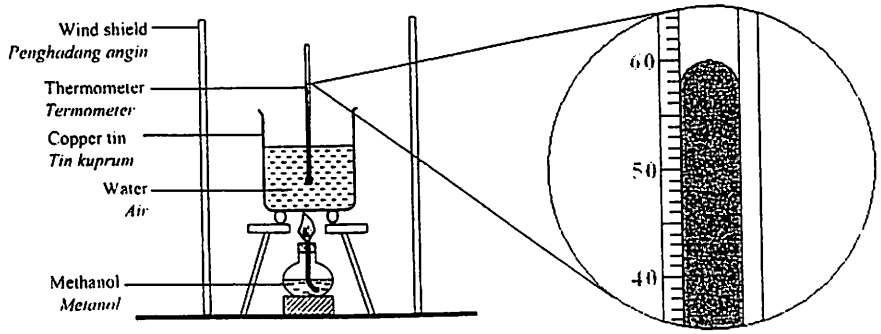
Answer all questions
Jawab semua soalan

1. An experiment is carried out to determine the heat of combustion of four alcohols, methanol (CH_3OH), ethanol (C_2H_5OH), propanol (C_3H_7OH) and butanol (C_4H_9OH). The initial mass of lamp containing alcohol is measured before burning the alcohol. 200 cm^3 of water is then heated with alcohol in the spirit lamp until the temperature of water rises by 30°C. The final mass of lamp containing alcohol is measured again after burning. Diagram 1.1 shows the set up of apparatus and thermometer reading of water for this experiment.

Satu eksperimen telah dijalankan untuk menentukan haba pembakaran empat jenis alkohol, metanol (CH_3OH), etanol (C_2H_5OH), propanol (C_3H_7OH) dan butanol (C_4H_9OH). *Jisim awal pelita yang mengandungi alkohol diukur sebelum pembakaran alkohol.* 200 cm^3 *air kemudian dipanaskan dengan alkohol dalam pelita sehingga suhu air meningkat sebanyak* 30°C. *Jisim akhir pelita yang mengandungi alkohol diukur sekali lagi selepas pembakaran. Rajah* 1.1 *menunjukkan susunan radas dan bacaan termometer suhu air bagi eksperimen ini.*



Initial temperature
Suhu awal



Final temperature
Suhu akhir

Diagram 1.1
Rajah 1.1

(a) (i) State **one** observation in Diagram 1.1.
Nyatakan satu pemerhatian dalam Rajah 1.1.

.....

[3 marks]
[3 *markah*]

(ii) Give **one** inference based on the observation in (a)(i).
Berikan satu inferens berdasarkan pemerhatian dalam (a)(i).

.....

[3 marks]
[3 *markah*]

(b) For this experiment, state:
Bagi eksperimen ini, nyatakan:

(i) The manipulated variable
Pembolehubah dimanipulasi

.....

(ii) The responding variable
Pembolehubah bergerak balas

.....

(iii) The fixed variable
Pembolehubah dimalarkan

.....

[3 marks]
[3 *markah*]

(c) State **one** hypothesis for this experiment.
Nyatakan satu hipotesis bagi eksperimen ini.

.....

.....

.....

[3 marks]
[3 *markah*]

(d) Diagram 1.2 shows the initial and final reading of the electronic balance for the mass of spirit lamp before burning and after burning of four alcohols.
Rajah 1.2 *menunjukkan bacaan awal dan akhir penimbang elektronik bagi jisim pelita sebelum pembakaran dan selepas pembakaran bagi empat alkohol.*

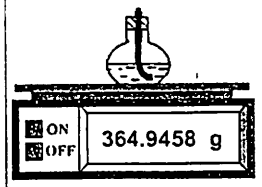
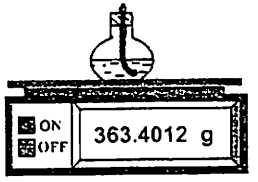
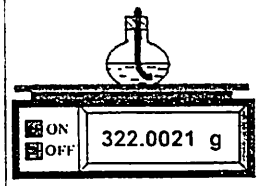
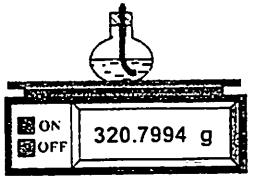
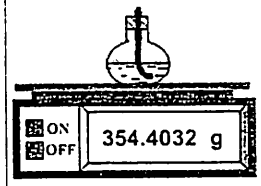
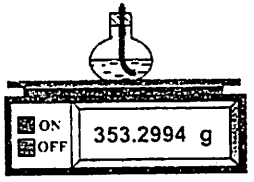
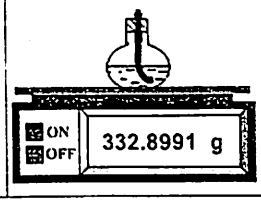
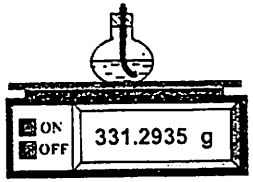
Alcohol *Alkohol*	Initial reading (g) *Bacaan awal*	Final reading (g) *Bacaan akhir*	Mass of alcohol used (g) *Jisim alkohol digunakan*
Methanol *Metanol*			
Ethanol *Etanol*			
Propanol *Propanol*			
Butanol *Butanol*			

Diagram 1.2
Rajah 1.2

Based on Diagram 1.2, state the mass of the alcohols used in space provided into two decimal places.
Berdasarkan Rajah 1.2, *nyatakan jisim alkohol yang digunakan dalam ruangan yang disediakan kepada dua tempat perpuluhan.*

[3 marks]
[3 *markah*]

(e) Calculate the heat of combustion of methanol.
[Heat capasity of water = 4.2 $Jg^{-1}{}^{o}C^{-1}$]
[Molar mass of methanol = 32gmol $^{-1}$]

Hitungkan haba pembakaran bagi metanol.
[*Muatan haba tentu air* = 4.2 $Jg^{-1}{}^{o}C^{-1}$]
[*Jisim molar metanol* = 32gmol $^{-1}$]

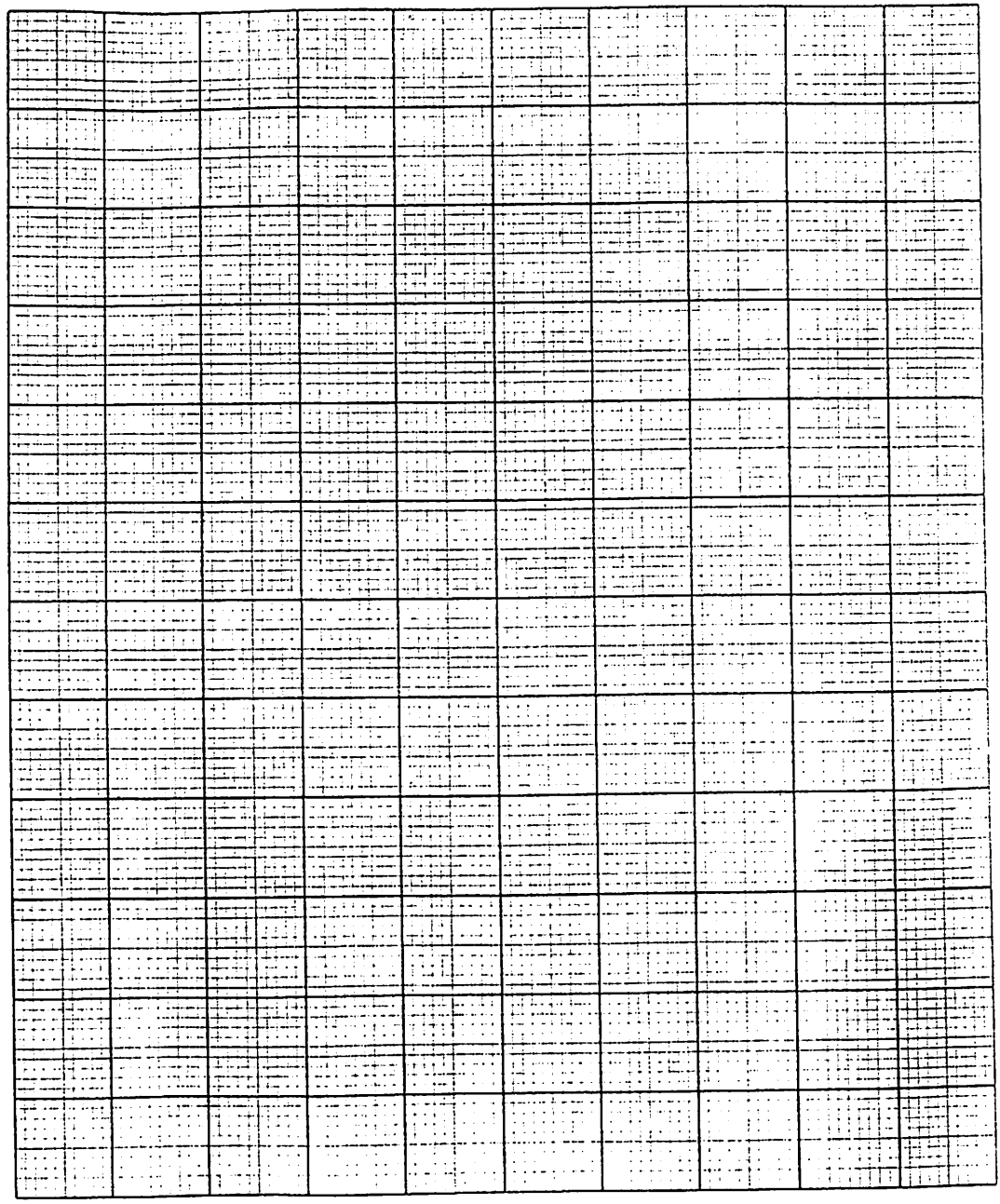
[3 marks]
[3 *markah*]

(f) Using the data in Table 1.1 and the heat of combustion of methanol calculated in (e), plot a graph of heat of combustion against number of carbon atoms per molecule of alcohol.
Dengan menggunakan data dalam Jadual 1.1 *dan haba pembakaran bagi metanol yang dihitung dalam (e), lukiskan graf haba pembakaran melawan bilangan atom karbon per molekul alkohol.*

Alcohol *Alkohol*	Number of carbon atoms per molecule *Bilangan atom karbon per molekul*	Heat of combustion *Haba pembakaran* (kJ mol^{-1})
Methanol *Metanol*	1	
Ethanol *Etanol*	2	970
Propanol *Propanol*	3	1400
Butanol *Butanol*	4	1860

Table 1.1
Jadual 1.1

[3 marks]
[3 *markah*]



(g) Based on the graph in (f), predict the heat of combustion for pentanol, $C_5H_{11}OH$.
Berdasarkan graf dalam (f), *ramalkan haba pembakaran bagi pentanol,* $C_5H_{11}OH$.

.....

[3 marks]
[3 *markah*]

(h) State the operational definition for heat of combustion of methanol.
Nyatakan definisi secara operasi bagi haba pembakaran metanol.

.....

.....

.....

[3 marks]
[3 *markah*]

(i) The actual heat of combustion for ethanol is 1376 kJ mol^{-1}.
State three reasons why the experimental value heat of combustion for ethanol less than the actual value.
Nilai sebenar haba pembakaran bagi etanol ialah 1376 kJ mol^{-1}.
Nyatakan tiga sebab mengapa nilai eksperimen haba pembakaran bagi etanol kurang daripada nilai sebenar.

1. .....

2. .....

3. .....

[3 marks]
[3 *markah*]

(j) Table 1.2 shows a list of carbon compounds and their molecular formula.
Jadual 1.2 *menunjukkan senarai sebatian karbon dan formula molekulnya.*

Carbon compound *Sebatian karbon*	Molecular formula *Formula molekul*
Propane *Propana*	C_3H_8
Methanoic acid *Asid metanoik*	HCOOH
Butene *Butena*	C_4H_8
Ethanol *Etanol*	C_2H_5OH

Table 1.2
Jadual 1.2

Classify the above carbon compounds into hydrocarbon and non hydrocarbon by completing Table 1.3.
Kelaskan sebatian karbon di atas kepada hidrokarbon dan bukan hidrokarbon dengan melengkapkan Jadual 1.3.

Hydrocarbon *Hidrokarbon*	Non hydrocarbon *Bukan hidrokarbon*

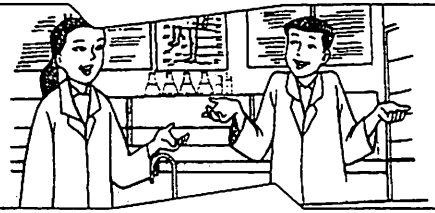
Table 1.3
Jadual 1.3

2. Diagram 2 shows the conversation between two students about the electrolysis experiment.

Rajah 2 menunjukkan perbualan antara dua orang pelajar tentang eksperimen elektrolisis.

I carried out an experiment of electrolysis process using carbon electrodes. I observed the gas bubbles are released at anode.

Saya menjalankan satu eksperimen tentang proses elektrolisis menggunakan elektrod karbon, saya dapati terdapat gelembung-gelembung gas dibebaskan di anod.



When I used copper as electrodes, I observed the anode become thinner
Bila saya gunakan kuprum sebagai elektrod , saya dapati anod menjadi nipis.

Diagram 2
Rajah 2

Referring to the conversation above, plan a laboratory experiment to investigate the effect of the type of electrode to the product at anode.
Your answer should consist of the following:

Merujuk kepada perbualan di atas, rancangkan satu eksperimen untuk menyiasat kesan jenis elektrod terhadap hasil di anod.
Jawapan anda hendaklah mengandungi perkara berikut :

(a) Problem statement
Penyataan masalah

(b) All the variables.
Semua p*emboleh ubah.*

(c) Hypothesis
Hipotesis

(d) Lists of materials and apparatus
Senarai bahan dan radas

(e) Procedure
Prosedur

(f) Tabulation of data
Penjadualan data

END OF QUESTION PAPER
KERTAS SOALAN TAMAT