Answer all questions.
Jawab semua soalan.

1. Diagram 1.1 and Diagram 1.2 shows the apparatus set up used in two experiment to determine heat of displacement.
Rajah 1.1 *dan Rajah* 1.2 *menunjukkan susunan radas yang digunakan dalam dua eksperimen untuk menentukan haba penyesaran.*

Experiment I
***Eksperimen* I**

Excess magnesium powder is added into 50 cm^3 of copper (II) nitrate 1.0 mol dm^{-3}. The mixture is stirred and the change of temperature is recorded.
Serbuk magnesium berlebihan ditambahkan kepada 50 cm^3 *larutan kuprum* (II) *nitrat* 1.0 mol dm^{-3}. *Campuran dikacau dan perubahan suhu dicatatkan.*

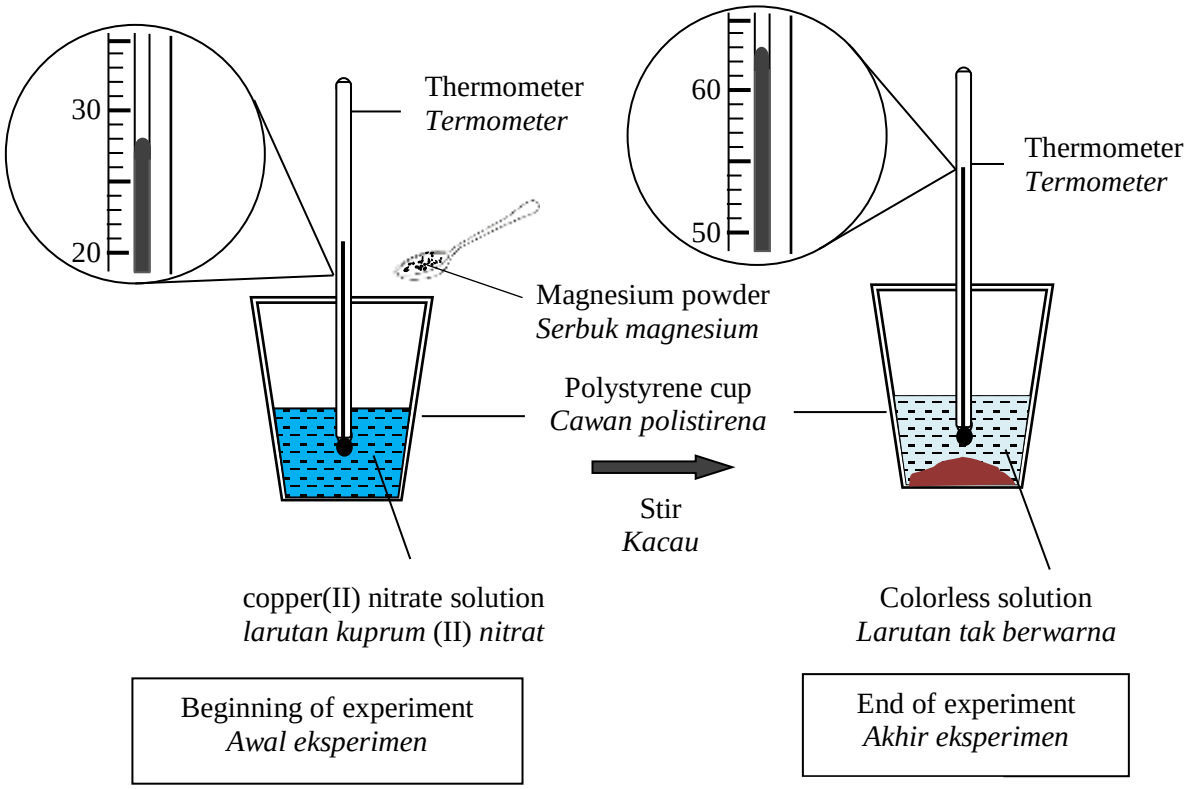


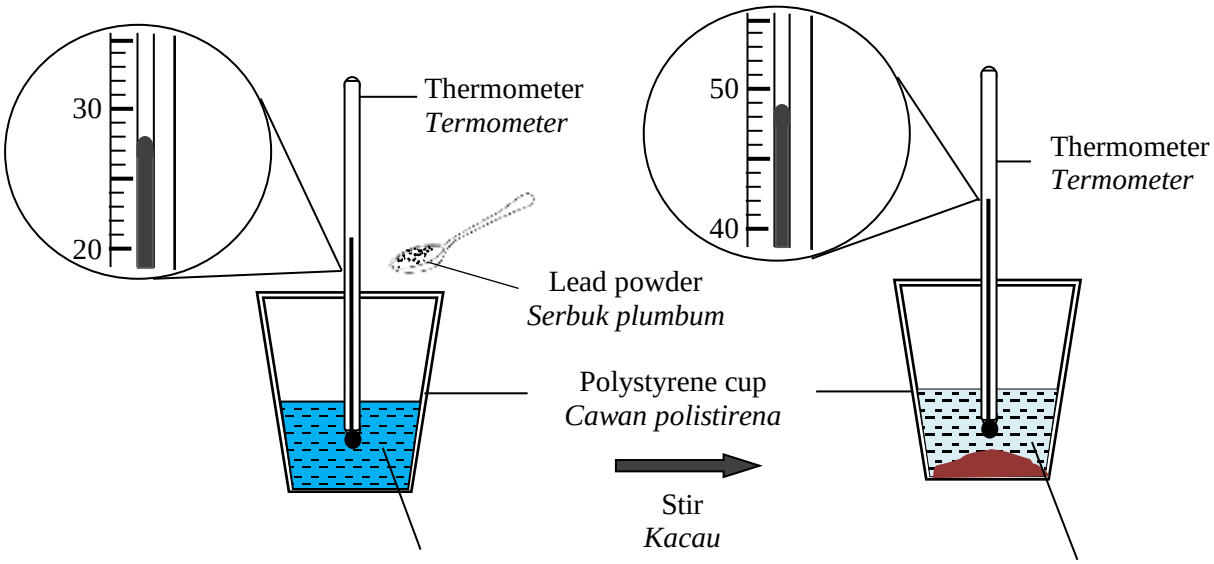
Diagram 1.1
Diagram 1.1

Initial temperature of the solution : ……..
Suhu awal larutan

Highest temperature of the mixture : ……..
Suhu tertinggi campuran

Experiment II
***Eksperimen* II**

Excess lead powder is added into 50 cm^3 of copper(II) nitrate 1.0 $moldm^{-3}$. The mixture is stirred and the change of temperature is recorded.
Serbuk plumbum berlebihan ditambahkan kepada 50 cm^3 *larutan kuprum*(II) *nitrat* 1.0 $moldm^{-3}$. *Campuran dikacau dan perubahan suhu dicatatkan.*



50 cm^3 of 1.0 mol dm^{-3} copper(II) nitrate solution
50 cm^3 *larutan kuprum* (II) *nitrat* 1.0 $moldm^{-3}$

Beginning of experiment
Awal eksperimen

Colourless solution
Larutan tak berwarna

End of experiment
Akhir eksperimen

Diagram 1.2
Diagram 1.2

Initial temperature of the solution : ……..
Suhu awal larutan

Highest temperature of the mixture : ……..
Suhu tertinggi campuran

(a) Record the initial and the highest temperature of the mixture and change in temperature for Experiment I and II in the space provided.
Rekodkan suhu awal dan suhu tertinggi campuran serta perubahan suhu untuk Eksperimen I dan II dalam ruangan yang disediakan.

[3 *marks*]

(b) Construct a table to record the initial thermometer reading, highest thermometer reading and the temperature change.
Binakan satu jadual untuk merekod bacaan awal termometer, bacaan tertinggi termometer dan perubahan suhu.

[3 *marks*]

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

(i) the manipulated variable.
pemboleh ubah dimanipulasikan.

.....

(ii) the responding variable.
pemboleh ubah bergerak balas.

.....

(iii) the constant variable.
pemboleh ubah dimalarkan.

.....

[3 *marks*]

(d) State the hypothesis for the experiment.
Nyatakan hipotesis bagi eksperimen tersebut.

.....

.....

[3 *marks*]

(e) (i) Based on the Experiment I, state two observation for this experiment other than temperature changes.
Berdasarkan Eksperimen 1, *nyatakan dua pemerhatian bagi eksperimen ini selain daripada perubahan suhu.*

.....

.....

.....

[3 *marks*]

(ii) Give the corresponding inference base on your answer in 1(e)(i)
Beri inferens yang sepadan, berdasarkan kepada jawapan anda di 1(e)(i)

.....

.....

[3 *marks*]

(f) State the operational definition of heat of displacement for the experiment.
Nyatakan definisi secara operasi bagi haba penyesaran dalam eksperimen ini.

.....

.....

[3 *marks*]

(g) Based on Experiment I, calculate
Berdasarkan kepada Eksperimen I, *hitung*

(i) the heat release when copper displaced by magnesium.
(Heat capacity of the solution is 4.2 J g^{-1} $^oC^{-1}$, density of solution is 1.0 g cm^{-3}.)
haba yang terbebas apabila kuprum disesarkan oleh magnesium.
(Muatan haba tentu larutan ialah 4.2 J g^{-1o} C^{-1}, *ketumpatan larutan ialah* 1.0 g cm^{-3}.)

Heat energy release *Tenaga haba yang terbebas*	=	Mass of solution *Jisim larutan*	X	Heat capacity of solution *Muatan haba tentu larutan*	X	Temperature change *Perubahan suhu*
	=	……	X	……..	X	……
	=	…… J				

(ii) The number of mole of copper ion displaced.
Bilangan mol ion kuprum yang disesarkan.

$$\text{Number of mole of copper ion} = \frac{\text{Molarity X } \frac{\text{volume}}{1000}}{\text{Molariti X } \frac{\text{isipadu}}{1000}}$$

= ….…….. mol

(iii) The heat of displacement
Haba penyesaran

$$= \frac{\text{Heat energy release}\ /\ \textit{Tenaga haba yang terbebas}}{\text{Number of mol of copper ion}\ /\ \textit{Bilangan mol ion kuprum}}$$

= ….…….. kJ mol^{-1}

[3 *marks*]

(h) By calculate the heat of displacement, draw energy level diagram for Experiment II.
Dengan menghitung haba penyesaran, lukiskan gambar rajah aras tenaga untuk Eksperimen II

[3 *marks*]

(i) Based on this experiment, predict the heat of displacement for copper by zinc.
Berdasarkan eksperimen ini, ramal haba penyesaran kuprum oleh zink.

.....

[3 *marks*]

(j) A list of chemicals is dissolved in distilled water as follows:
Satu senarai bahan kimia dilarutkan di dalam air suling seperti berikut:

Sodium hydroxide *Natrium hidroksida*	Anhydrous copper(II) sulphate *Kuprum*(II) *sulfat kontang*
Ammonium nitrate *Ammonium nitrat*	Ammonium chloride *Ammonium klorida*

Classify these substances that produce exothermic reactions and endothermic reactions when dissolved in water.
Kelaskan bahan-bahan ini kepada bahan yang menghasilkan tindak balas eksotermik dan tindak balas endotermik apabila dilarutkan di dalam air.

[3 *marks*]

2 Diagram 2 show the products that can be made from rubber. Tyre and rubber band are widely used in our life. However tyre is more elastic than rubber band.
Rajah 2 menunjukkan produk yang dapat dihasilkan dari getah. Tayar dan gelang getah digunakan dengan meluas dalam kehidupan kita. Walaubagaimanapun tayar adalah lebih elastic daripada gelang getah.

Diagram 2
Rajah 2

Referring to the diagram, plan a laboratory experiment to investigate the elasticity of vulcanise and unvulcanised rubber.
Merujuk kepada rajah di atas, rancang satu eksperimen makmal untuk mengkaji kekenyalan bagi getah tervulkan dan getah tidak tervulkan.

Your planning should include the following aspects:
Perancangan anda hendaklah mengandungi aspek-aspek berikut:

(a) Statement of problem
Pernyataan masalah

(b) All the variables
Semua pembolehubah

(c) Statement of the hypothesis
Pernyataan hipotesis

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

(e) Procedure of the experiment
Prosedur eksperimen

(f) Tabulation of data
Penjadualan data

[17 marks]
[*17 markah*]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT