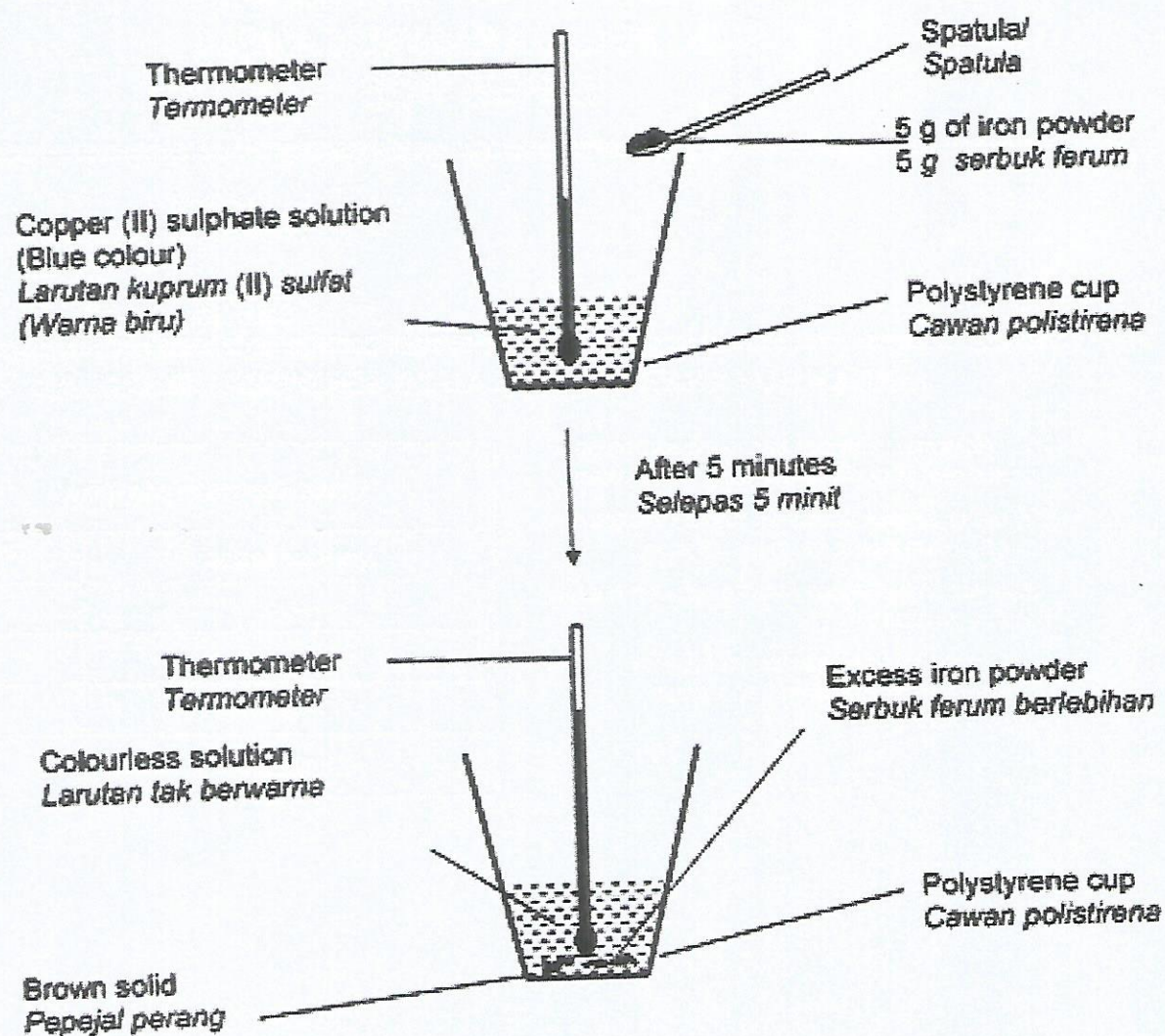


Answer all questions  
Jawab semua soalan

1. The experiments are conducted to determine the effect of position of metals in electrochemical series on the heat of displacement.  
Eksperimen dijalankan untuk menentukan kesan kedudukan logam dalam siri elektrokimia terhadap haba penyesaran.

Diagram 1.1 shows the apparatus for Experiment 1. 5 g of iron powder is added to 50 cm<sup>3</sup> of 0.5 mol dm<sup>-3</sup> of copper (II) sulphate solution and the thermometer is used to stir the mixture.

Rajah 1.1 menunjukkan susunan radas bagi Eksperimen 1. 5 g serbuk besi ditambahkan kepada 50 cm<sup>3</sup> larutan kuprum (II) sulfat 0.5 mol dm<sup>-3</sup> dan termometer digunakan untuk mengacau campuran.



The experiment is repeated by replacing iron powder with zinc powder and magnesium powder as shown in Table 1.1.

Eksperimen itu diulangi dengan menggantikan serbuk ferum dengan serbuk zink dan serbuk magnesium seperti yang ditunjukkan dalam Jadual 1.1.

Experiment/Eksperimen	Reaction/ Tindak balas
I	Iron powder with copper (II) sulphate solution <i>Serbuk ferum dengan larutan kuprum (II) sulfat</i>
II	Zinc powder with copper (II) sulphate solution <i>Serbuk zink dengan larutan kuprum (II) sulfat</i>
III	Magnesium powder with copper (II) sulphate solution <i>Serbuk magnesium dengan larutan kuprum (II) sulfat</i>

Table 1.1/ Jadual 1.1

**Experiment I : Iron with copper (II) sulphate solution**

**Eksperimen I : Ferum dengan larutan kuprum (II) sulfat**

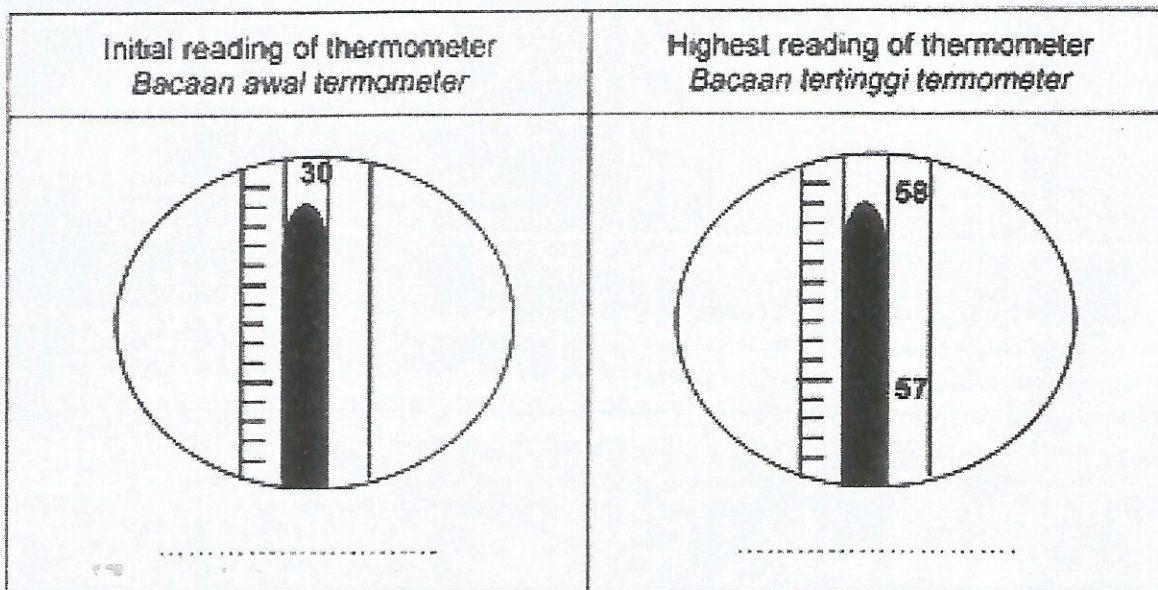


Diagram 1.2/ Rajah 1.2

**Experiment II : Zinc with copper (II) sulphate solution**

**Eksperimen II : Zink dengan larutan kuprum (II) sulfat**

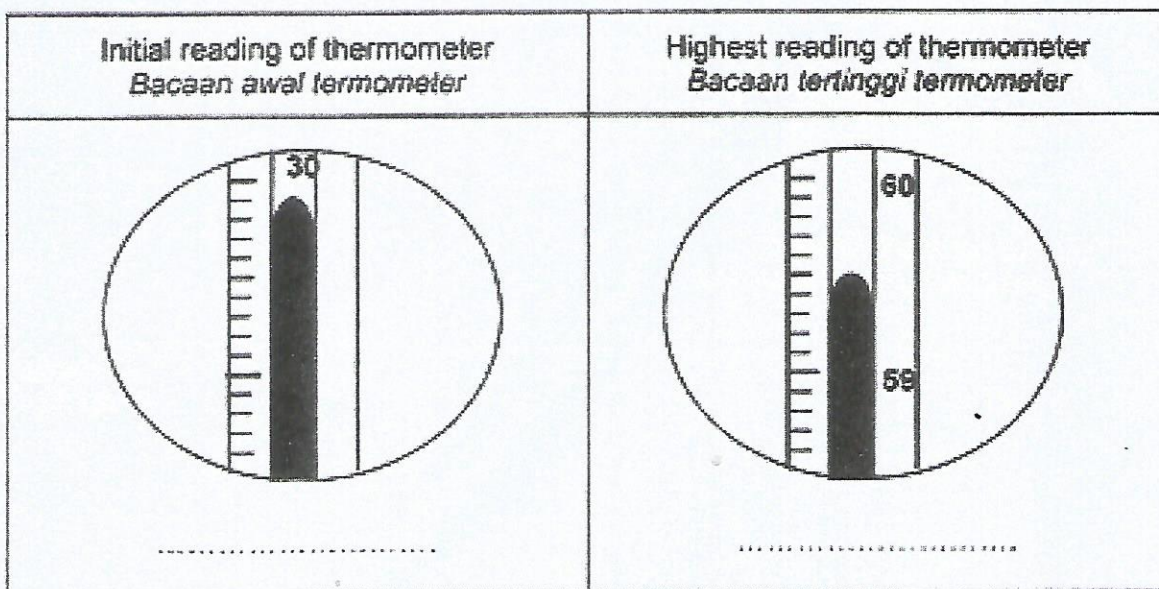


Diagram 1.3/ Rajah 1.3

For  
examiner's  
use

**Experiment III : Magnesium with copper (II) sulphate solution**  
**Eksperimen III : Magnesium dengan larutan kuprum (II) sulfat**

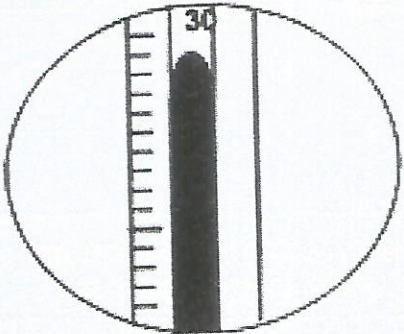
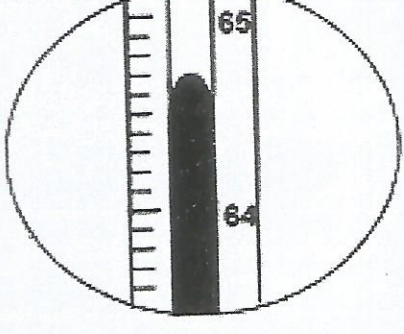
Initial reading of thermometer <i>Bacaan awal termometer</i>	Highest reading of thermometer <i>Bacaan tertinggi termometer</i>
 <p>.....</p>	 <p>.....</p>

Diagram 1.4/ Rajah 1.4

- (a) Record the thermometer readings in the spaces provided in Diagram 1.2, Diagram 1.3 and Diagram 1.4 to one decimal place.  
 Rekodkan bacaan termometer di dalam ruangan yang disediakan dalam Rajah 1.2, Rajah 1.3 dan Rajah 1.4 kepada satu tempat perpuluhan.

[3 marks]  
[3 markah]

1(a)

-
3

- (b) 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]  
[3 markah]

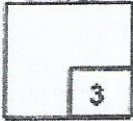
1(b)

3

For  
examiner's  
use

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

1(c)



.....

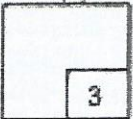
.....

.....

[3 marks]  
[3 markah]

(d) State one observation in this Experiment I as Diagram 1.1.  
*Nyatakan satu pemerhatian di dalam Eksperimen I ini seperti Rajah 1.1.*

1(d)



.....

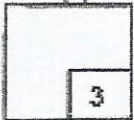
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[3 marks]  
[3 markah]

(e) State one inference for the observation in 1 (d).  
*Nyatakan satu inferens bagi pemerhatian di 1 (d).*

1(e)



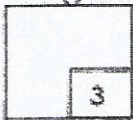
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[3 marks]  
[3 markah]

(f) State the relationship between the position of metals in electrochemical series with the temperature rise.  
*Nyatakan hubungan di antara kedudukan logam dalam siri elektrokimia dengan kenaikan suhu.*

1(f)



.....

.....

.....

[3 marks]  
[3 markah]

For  
examiner's  
use

- (g) Calculate the heat of displacement in Experiment I.  
*Kira haba penyesaran di dalam Eksperimen I*  
 [ Specific heat capacity / Muatan haba tentu =  $4.2 \text{ J g}^{-1} \text{ } ^\circ\text{C}^{-1}$  ; The mass of  $1 \text{ cm}^3$  of solution is  $1 \text{ g}$  ; *Jisim bagi  $1 \text{ cm}^3$  larutan ialah  $1 \text{ g}$* ]

[3 marks]  
[3 markah]

1(g)
3

- (h) Table 1.2 shows the heat of displacement.  
*Jadual 1.2 menunjukkan haba penyesaran.*

Metals Logam	Heat of Displacement / $\text{kJ mol}^{-1}$ <i>Haba Penyesaran / <math>\text{kJ mol}^{-1}</math></i>
Zinc <i>Zink</i>	210
Magnesium	336
Iron <i>Ferum</i>	121.8

Table/ Jadual 1.2

Predict the heat of displacement when aluminium reacts with copper (II) sulphate solution.  
*Ramalkan haba penyesaran apabila aluminium bertindak balas dengan larutan kuprum (II) sulfat.*

[3 marks]  
[3 markah]

1(h)
3

- (i) Write the ionic equation for reaction in Experiment III.  
*Tuliskan persamaan ion bagi tindakbalas di dalam Eksperimen III.*

[3 marks]  
[3 markah]

1(i)
3

For  
examiner's  
use

- (j) State the operational definition for the heat of displacement in this experiment.  
*Nyatakan definisi secara operasi untuk haba penyesaran di dalam eksperimen ini.*

.....

.....

.....

.....

[3 marks]  
[3 markah]

- (k) Classify the following metals into metal that can displace lead from lead (II) sulphate solution.

*Kelaskan logam-logam berikut kepada logam yang boleh menyesarkan plumbum daripada larutan plumbum (II) sulfat.*

Silver, Ag Argentum, Ag	Copper, Cu Kuprum, Cu
Zinc, Zn Zink, Zn	Aluminum, Al Aluminium, Al

<p><b>Metals that can displace lead from lead (II) sulphate solution.</b> <i>Logam yang dapat menyesarkan plumbum daripada larutan plumbum (II) sulfat</i></p>	<p><b>Metals that cannot displace lead from lead (II) sulphate solution.</b> <i>Logam yang tidak dapat menyesarkan plumbum daripada larutan plumbum (II) sulfat</i></p>

[3 marks]  
[3 markah]

1(j)

3
---

1(k)

3
---

Total 1

33
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2. Diagram 2.1 shows the conversation of a teacher and her students.  
 Rajah 2.1 menunjukkan perbualan antara seorang guru dengan muridnya.

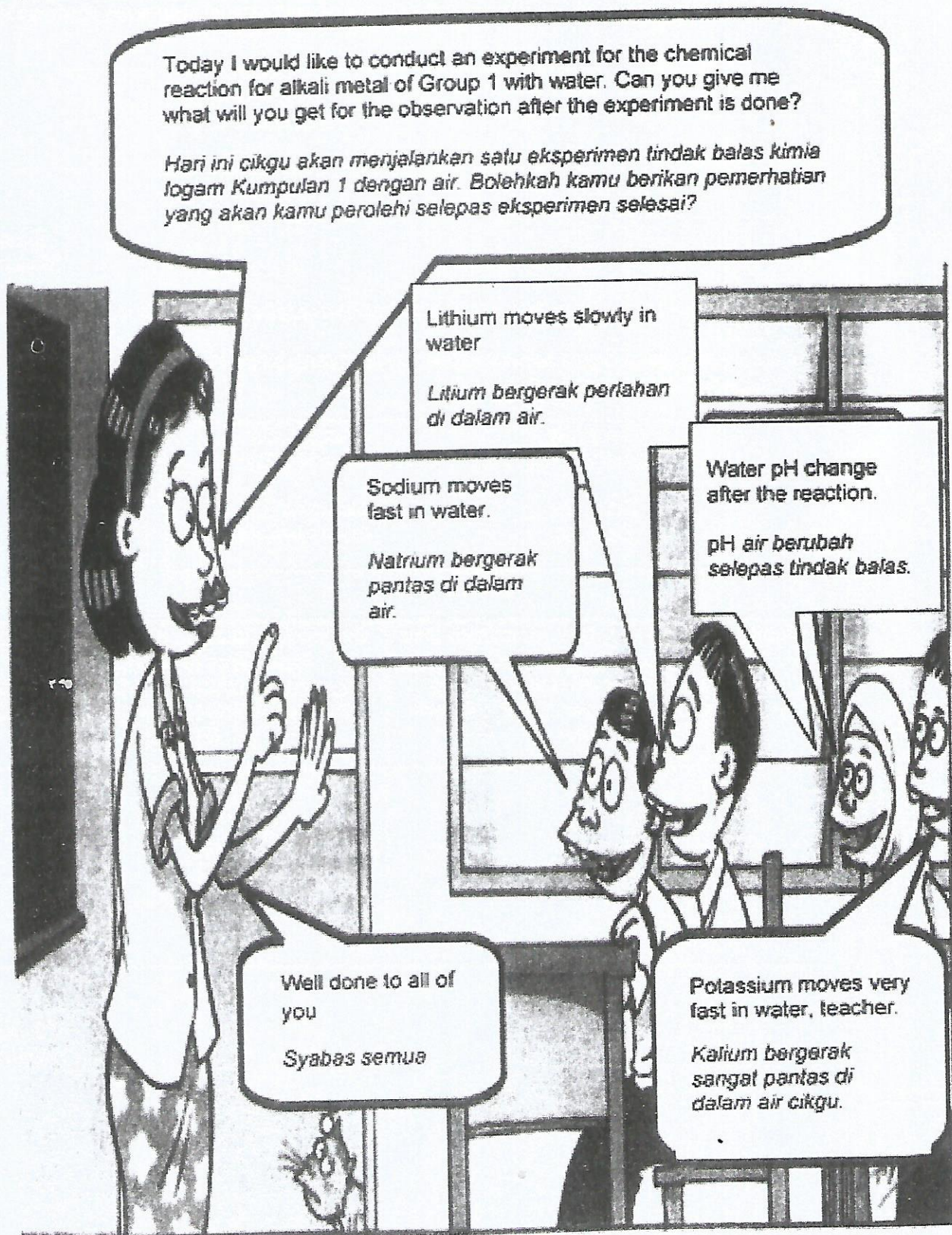


Diagram 1 Rajah 2

Based on Diagram 2, by naming the Group 1 metals, plan a laboratory experiment to study the reaction of Group 1 metal towards water. Your planning should include the following aspects :

*Berdasarkan Rajah 2, dengan menamakan logam-logam Kumpulan 1, rancang satu eksperimen makmal untuk mengkaji tindak balas logam kumpulan 1 dengan air. Perancangan anda hendaklah mengandungi aspek-aspek berikut :*

- (a) Problem statement  
*Penyataan masalah*
- (b) All the variables  
*Semua pemboleh ubah*
- (c) Statement of the hypothesis  
*Pernyataan hipotesis*
- (d) List of materials and apparatus  
*Senarai bahan dan radas*
- (e) Procedure for the experiment  
*Prosedur eksperimen*
- (f) Tabulation of data  
*Penjadualan data*

[17 marks]  
[17 markah]

**END OF QUESTIONS PAPER  
KERTAS SOALAN TAMAT**