

4541/3  
Chemistry  
Paper 3  
Mei  
2007  
1 ½ jam

Nama: .....

Ting: .....



**BAHAGIAN SEKOLAH  
KEMENTERIAN PELAJARAN MALAYSIA  
PEPERIKSAAN PERTENGAHAN TAHUN 2007**

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**FORM 5 CHEMISTRY**

Paper 3

Satu jam tiga puluh minit

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**JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU**

1. *Tuliskan **nama dan tingkatan** anda pada ruangan yang disediakan.*
2. *Calon dikehendaki menjawab **semua** soalan.*
3. *Calon dikehendaki membaca maklumat yang terdapat di halaman 2.*

Untuk kegunaan pemeriksa		
Soalan	Markah Penuh	Markah Diperolehi
1	15	
2	18	
3	Respons 15	
	Laporan 2	
Jumlah	50	

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Kertas soalan ini mengandungi 8 halaman bercetak

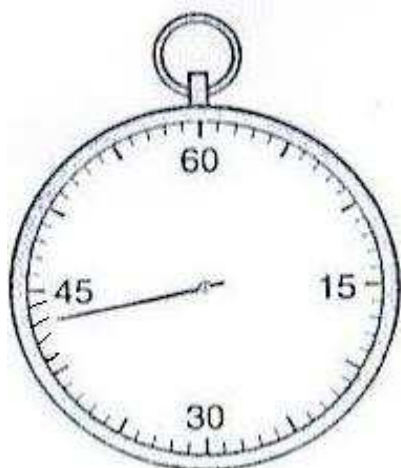
1. *Kertas soalan ini mengandungi tiga soalan. Jawab **semua** soalan*
2. *Tuliskan jawapan bagi **Soalan 1** dan **Soalan 2** dalam ruang yang disediakan dalam kertas soalan.*
3. *Tuliskan jawapan bagi **Soalan 3** pada halaman bergaris di bahagian akhir kertas soalan ini dengan terperinci. Anda boleh menggunakan persamaan, gambar rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda.*
4. *Tunjukkan kerja mengira, ini membantu anda mendapatkan markah.*
5. *Sekiranya anda hendak membatalkan sesuatu jawapan, buat garisan di atas jawapan itu.*
6. *Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan sebaliknya.*
7. *Markah yang diperuntukkan bagi setiap soalan atau ceraihan soalan ditunjukkan dalam kurungan.*
8. *Masa yang dicadangkan untuk menjawab **Soalan 1** dan **Soalan 2** ialah 45 minit dan **Soalan 3** ialah 45 minit.*
9. *Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogramkan.*
10. *Serahkan semua kertas jawapan anda di akhir peperiksaan.*

*Pemberian Markah:*

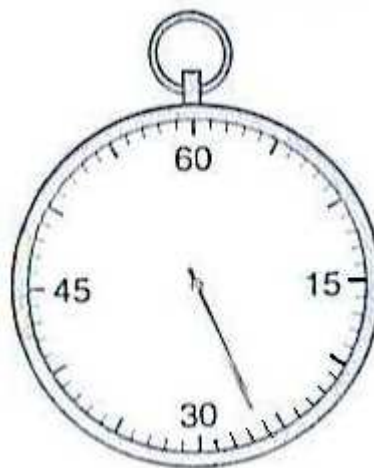
Skor	Penerangan
3	<b>Cemerlang:</b> Respons yang paling baik
2	<b>Memuaskan:</b> Respons yang sederhana
1	<b>Lemah:</b> Respons yang kurang tepat
0	Tiada respons <u>atau</u> respons salah

The time suggested to complete **Question 1** and **Question 2** is 45 minutes.

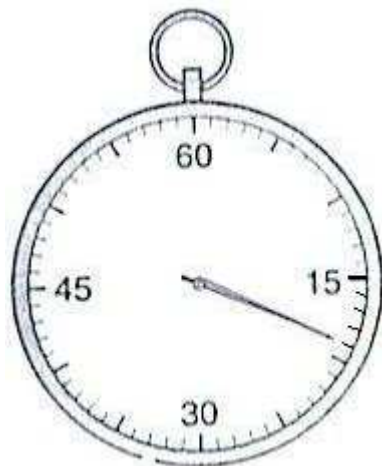
1. An experiment was conducted to study the effect of temperature on the rate of reaction.  $30 \text{ cm}^3$  of  $1.0 \text{ mol dm}^{-3}$  hydrochloric acid at  $30^\circ\text{C}$  was poured into a  $150 \text{ cm}^3$  conical flask. Magnesium strip of  $2 \text{ cm}$  long was added to the hydrochloric acid. The stopwatch was immediately started. The conical flask was shaken for a few seconds. As soon as the magnesium ribbon disappears, the stopwatch was stopped. The time taken was recorded. The steps were repeated for  $30 \text{ cm}^3$  of  $1.0 \text{ mol dm}^{-3}$  hydrochloric acid at  $35^\circ\text{C}$ ,  $40^\circ\text{C}$ ,  $45^\circ\text{C}$  and  $50^\circ\text{C}$  respectively. The figure below shows the readings of the stopwatch for each set of the experiment.



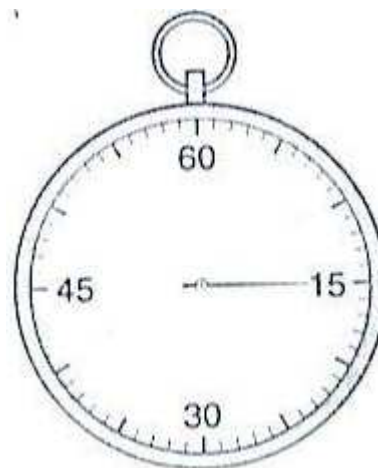
$t_1$  at  $30^\circ\text{C} = \underline{\hspace{2cm}} \text{ s}$



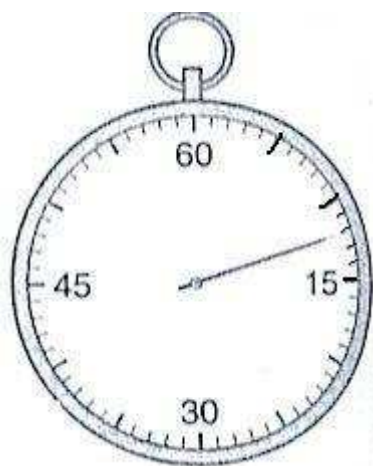
$t_2$  at  $35^\circ\text{C} = \underline{\hspace{2cm}} \text{ s}$



$t_3$  at  $40^\circ\text{C} = \underline{\hspace{2cm}} \text{ s}$



$t_4$  at  $45^\circ\text{C} = \underline{\hspace{2cm}} \text{ s}$



$t_5$  at  $50^\circ\text{C} = \underline{\hspace{2cm}} \text{ s}$

( a ) Record the time taken for each reaction in the spaces provided.

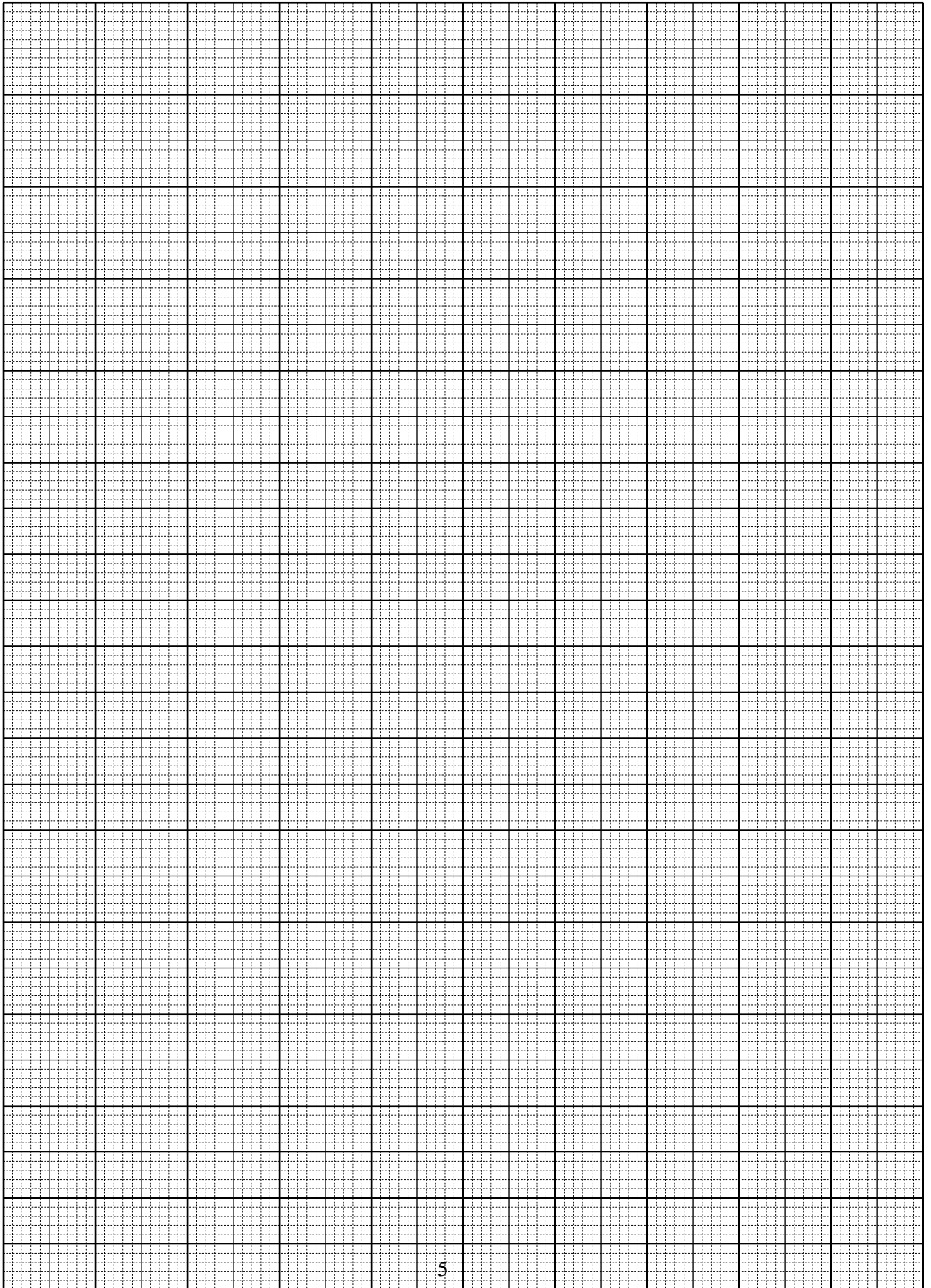
[3 marks]

( b ) Design a table and record the temperature, time and  $\frac{1}{\text{time}}$  for this experiment.

[3 marks]

( c ) Plot a graph of temperature against  $\frac{1}{\text{time}}$  on the graph paper provided.

[3 marks]



- ( d ) Based on the graph in ( c ), deduce the relationship between the rate of reaction and temperature.

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[3 marks]

- ( e ) Predict the time taken if the experiment is repeated at 44°C.

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[3 marks]

- 2 An experiment was carried out by a student to study the relationship between the concentration of hydroxide ions and the pH value of ammonia solution. The pH value of different concentration of ammonia solutions was measured using a pH meter. Table 2 shows the concentrations of ammonia solution and the respective pH values.

Beaker	Concentration of ammonia solution (mol dm <sup>-3</sup> )	pH value
1	0.100	9.0
2	0.060	8.8
3	0.040	8.6
4	0.025	8.4
5	0.015	8.2
6	0.010	8.0

Table 2

- (a) Based on table 2, state the variables involved in this experiment.

Manipulated variable

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Responding variable

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Fixed variable

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[ 3 marks ]

- (b) State the general relationship between concentration of hydroxide ions and the pH value of ammonia solution.

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[ 3 marks ]

- (c) 0.010 mol dm<sup>-3</sup> of ammonia solution has a pH value of 8.0 but sodium hydroxide solution of the same concentration has a pH value of 14.0. Explain

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[ 3 marks ]

- (d) Predict the pH value of ammonia solution with the concentration 0.005 mol dm<sup>-3</sup>.

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[ 3 marks ]

- (e) Write the chemical equation to show the ionization of ammonia in water.

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[ 3 marks ]

- (f) If the ammonia solution used in this experiment is replaced by hydrochloric acid, state the relationship between the concentration of acid and the pH value.

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[ 3 marks ]

3

The reactivity of the alkali metals increases as you go down the group

Referring to the statement above, plan an experiment to prove it true by using the reactions of lithium, sodium and potassium with water.

Your planning must include the following items:

- (a) Problem statement
- (b) All variables involved
- (c) List of materials and apparatus
- (d) Experimental procedure
- (e) Tabulation of data

[17 marks]

**END OF QUESTION PAPER**