

Nama: .....

Kelas: .....

**SULIT**  
**4541/3**  
**Kimia**  
**Kertas 3**  
**September**  
**2005**

4541/3



1½ jam

**MAKTAB RENDAH SAINS MARA**

**PEPERIKSAAN PERCUBAAN  
SIJIL PELAJARAN MALAYSIA 2005**

**KIMIA**

Kertas 3

Satu jam tiga puluh minit

4  
5  
4  
1  
3

**JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU**

1. *Tuliskan nama dan kelas anda pada ruang yang disediakan.*
2. *Kertas soalan ini adalah dalam dwibahasa.*
3. *Soalan di halaman kiri adalah dalam bahasa Melayu. Soalan di halaman kanan adalah yang sepadan dalam bahasa Inggeris.*
4. *Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam bahasa Melayu atau bahasa Inggeris.*
5. *Calon dikehendaki membaca maklumat di halaman 2 atau halaman 3.*

<i>Untuk Kegunaan Pemeriksa</i>		
Soalan	Markah Penuh	Markah Diperoleh
1	9	
2	24	
3	Respons 15	
	Laporan 2	
Jumlah	50	

Kertas soalan ini mengandungi 24 halaman bercetak

**INFORMATION FOR CANDIDATES**

1. *This question paper consists of three questions. Answer **all** questions.*
2. *Write your answers for **Question 1** and **Question 2** in the spaces provided in the question paper.*
3. *Write your answers for **Question 3** on the lined pages at the end of the question paper in detail. You may use equations, diagrams, tables, graphs and other suitable methods to explain your answers.*
4. *Show your working, it may help you to get marks.*
5. *If you wish to cancel any answer, neatly cross out the answer.*
6. *The diagrams in the questions are not drawn to scale unless stated.*
7. *Marks allocated for each question or part question are shown in brackets.*
8. *The time suggested to complete **Question 1** and **Question 2** is 45 minutes and **Question 3** is 45 minutes.*
9. *You may use a non-programmable scientific calculator.*
10. *Hand in all your answer sheets at the end of the examination.*

Marks awarded:

<b>Score</b>	<b>Description</b>
<b>3</b>	<b>Excellent:</b> The best response
<b>2</b>	<b>Satisfactory:</b> An average response
<b>1</b>	<b>Weak:</b> An inaccurate response
<b>0</b>	No response <i>or</i> wrong response

Answer all questions.

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

- 1 A student carried out an experiment to estimate the size of an oil particle,  $t$  cm. The steps and set - up of apparatus of the experiment are shown in Figure 1.

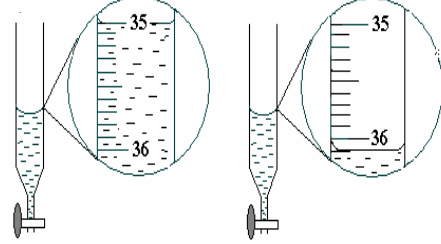
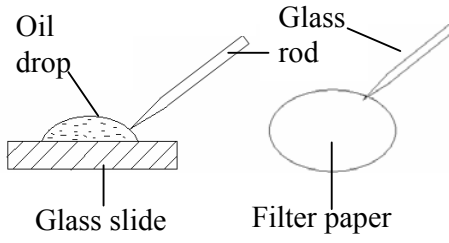
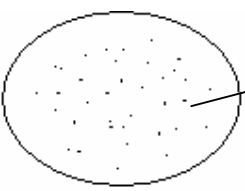
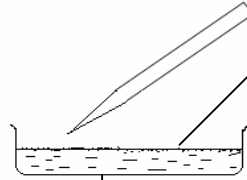
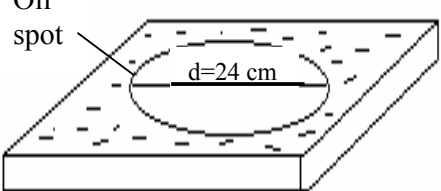
Step of experiment	Set – up of apparatus
1. The volume of 50 oil drops is determined.	 <p>Initial reading      Final reading</p>
2. An oil drop from the burette is placed on a glass slide. A glass rod with a fine end is dipped into the oil drop and transferred to a piece of filter paper.	 <p>Oil drop      Glass rod</p> <p>Glass slide      Filter paper</p>
3. The step is repeated until all the oil drop is transferred. The number of small oil drops is recorded ( $n$ ).	 <p>Number of small oil drops, <math>n = 100</math></p>
4. The glass rod with a fine end is dipped into the oil drop and is touched on to the water surface covered with lycopodium powder.	 <p>Lycopodium powder</p> <p>Basin</p>
5. The diameter of the oil spot is measured immediately ( $d$ ).	 <p>Oil spot</p> <p><math>d = 24</math> cm</p>

FIGURE 1

[Lihat sebelah

(a) Record the following readings :

Initial reading of burette: \_\_\_\_\_ cm<sup>3</sup>

Final reading of burette: \_\_\_\_\_ cm<sup>3</sup>

[3 marks]

For  
Examiner's  
Use

1(a)

(b) Complete the following table:

(i) Determine the volume of one drop of oil.	
(ii) Determine the volume of a tiny drop of oil.	
(iii) Determine the size of an oil particle ( $t$ ). ( $\pi = 3.142$ )	

[3 marks]

1(b)

(c) Another student excessively sprinkle the lycopodium powder on the water surface. What is the effect on the estimated size of the oil molecule obtained, and state your reason.

1(c)

**Total**

[3 marks]

[Lihat sebelah

- 2 Figure 2 shows the set – up of apparatus of two experiments to investigate the effect of electrolyte concentration on the products of electrolysis. In Experiment I,  $0.1 \text{ mole dm}^{-3}$  of hydrochloric acid is used while in Experiment II,  $0.001 \text{ mole dm}^{-3}$  of hydrochloric acid is used.

*For  
Examiner's  
Use*

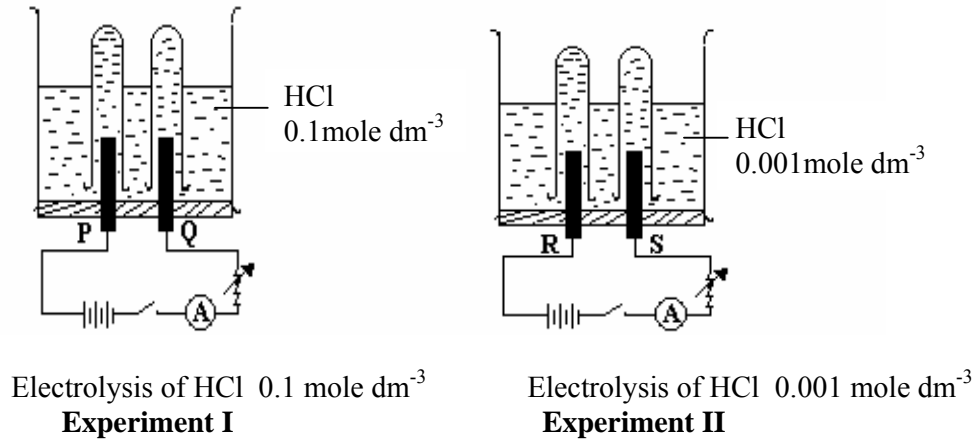


FIGURE 2

- (a) State the variables involved in this experiment.

Manipulated variable

\_\_\_\_\_

Responding variable

\_\_\_\_\_

Controlled variable

\_\_\_\_\_

[3 marks]

2(a)

- (b) State the hypothesis for the experiment.

\_\_\_\_\_

\_\_\_\_\_

[3 marks]

2(b)

⌈Lihat sebelah

- (c) Construct a table and categorise the ions that are attracted to the anode and the cathode for both experiments.

*For  
Examiner's  
Use*

2(c)

[3 marks]

- (d) **Complete** and **label** the diagram in Figure 3 to show the volume of the gases evolved at electrodes R and S, 5 minutes after the experiments took place .

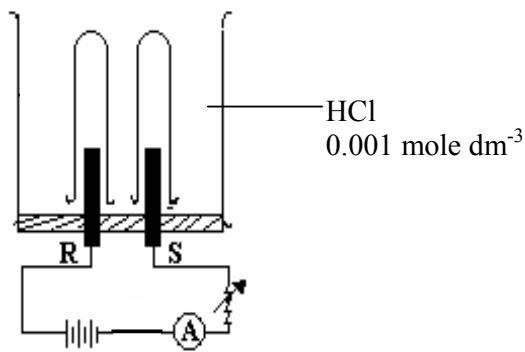


FIGURE 3

2(d)

[3 marks]

[Lihat sebelah

- (e) Write the half ionic equations for the reactions that occurred at the electrodes P, Q and R in Experiments I and II.

Experiment I:

Electrode	Half ionic equation
P	
Q	

Experiment II

Electrode	Half ionic equation
R	
S	$2H^+ + 2e \rightarrow H_2$

[3 marks]

- (f) What is the inference that can be deduced based on the answers in (e)?

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[3 marks]

- (g)

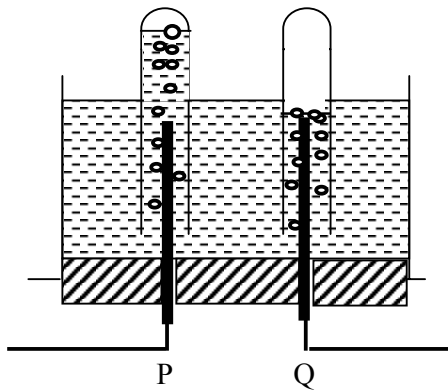


Diagram shows part of the apparatus set up for Experiment 1, two minutes after the circuit was connected. State your observation.

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[3 marks]

[Lihat sebelah

For  
Examiner's  
Use

2(e)

2(f)

2(g)

- (h)  $2 \text{ cm}^3$  of potassium iodide solution  $1.0 \text{ mole dm}^{-3}$  is added to the gas that was collected at electrode P and then the mixture is shaken. The observation obtained is shown in Figure 4.

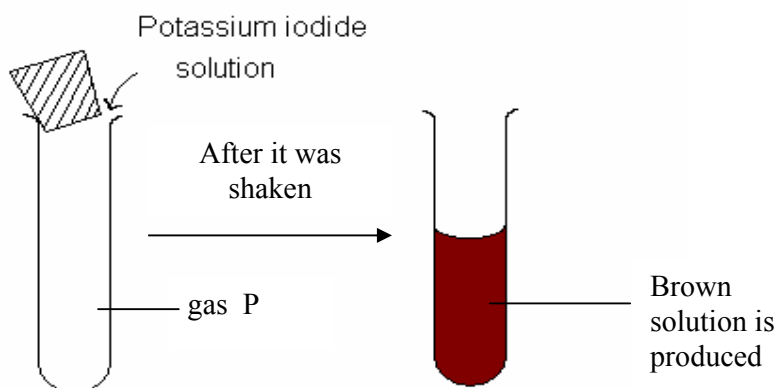


FIGURE 4

Based on the changes that has occurred, explain the chemical property of the gas that was evolved at electrode P.

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[3 marks]

*For  
Examiner's  
Use*

2(h)

Total

[Lihat sebelah]



3

The neutralization reaction between sodium hydroxide and hydrochloric acid releases  $57 \text{ kJ mole}^{-1}$  of heat

while

the neutralization reaction between sodium hydroxide and ethanoic acid releases  $55 \text{ kJ mole}^{-1}$  of heat.

Based on the above statement, you are required to design an experiment to determine and compare the heat of neutralization between sodium hydroxide and a named strong acid and a weak acid.

In designing your experiment it must include the following items:

- (a) Problem statement
- (b) Statement of hypothesis
- (c) Lists of substances and apparatus
- (d) Procedure of the experiment
- (e) Tabulation of data

[17 marks]

**END OF QUESTION PAPER**













