

UNIT PEPERIKSAAN  
KOLEJ YAYASAN SAAD, MELAKA

SPM Trial Examinations 2012.

CHEMISTRY

Sept. 2012

1 ½ hours

4541 / 3

Name: .....

Form 5: .....

CHEMISTRY

Paper 3

One hours and thirty minutes

*DO NOT OPEN THIS QUESTION PAPER UNTIL YOU ARE TOLD TO DO SO*

**Information for Candidates**

1. This question paper consists of three questions.
2. Answer **ALL** questions.
3. Write your answers for questions 1 and 2 in the spaces provided in the question paper.
4. Write your answers for question 3 on lined papers.
5. Show your working, it may help you to get marks.
6. The diagrams in the questions are not drawn to scale unless stated.
7. Marks allocated for each question or part of a question are shown in brackets.
8. You may use a non-programmable calculator.
- 9.

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

Question	Full Marks	Marks obtained
1	18	
2	15	
3	17	
Total	50	

**This paper consists of 8 printed pages.**

Answer all questions.

1. A student carried out an experiment to investigate the effect of particle size on the rate of reaction.

Experiment I : 50.0 cm<sup>3</sup> hydrochloric acid 0.2 mol dm<sup>-3</sup> was added to 5.0 g marble **chips**.

Experiment II : 50.0 cm<sup>3</sup> hydrochloric acid 0.2 mol dm<sup>-3</sup> was added to 5.0 g marble **powder**.

The total volume of carbon dioxide gas released was collected in a burette and recorded at regular intervals. The table below shows the results obtained by the student.

Experiment I :

Time / min.	0	0.5	1.0	1.5	2.0	2.5	3.0	3.5
Burette reading / cm <sup>3</sup>	49.50	45.20	42.05	39.00	36.50	34.00	31.85	29.50
Total volume of CO <sub>2</sub> gas / cm <sup>3</sup>	0.00	4.30		10.50	13.00			20.00

Experiment II :

Time / min.	0	0.5	1.0	1.5	2.0	2.5	3.0	3.5
Burette reading / cm <sup>3</sup>	49.00	39.00	33.05	28.50	25.00	21.55	19.00	16.75
Total volume of CO <sub>2</sub> gas / cm <sup>3</sup>	0.00		15.95		24.00		30.00	32.25

- (a) Complete the table above by filling in the volumes of carbon dioxide.

[ 3 marks ]

	3
--	---

- (b) Using the same axes, draw a graph of volume of carbon dioxide gas against time for experiment I and experiment II on the graph paper provided below.

[ 3 marks ]

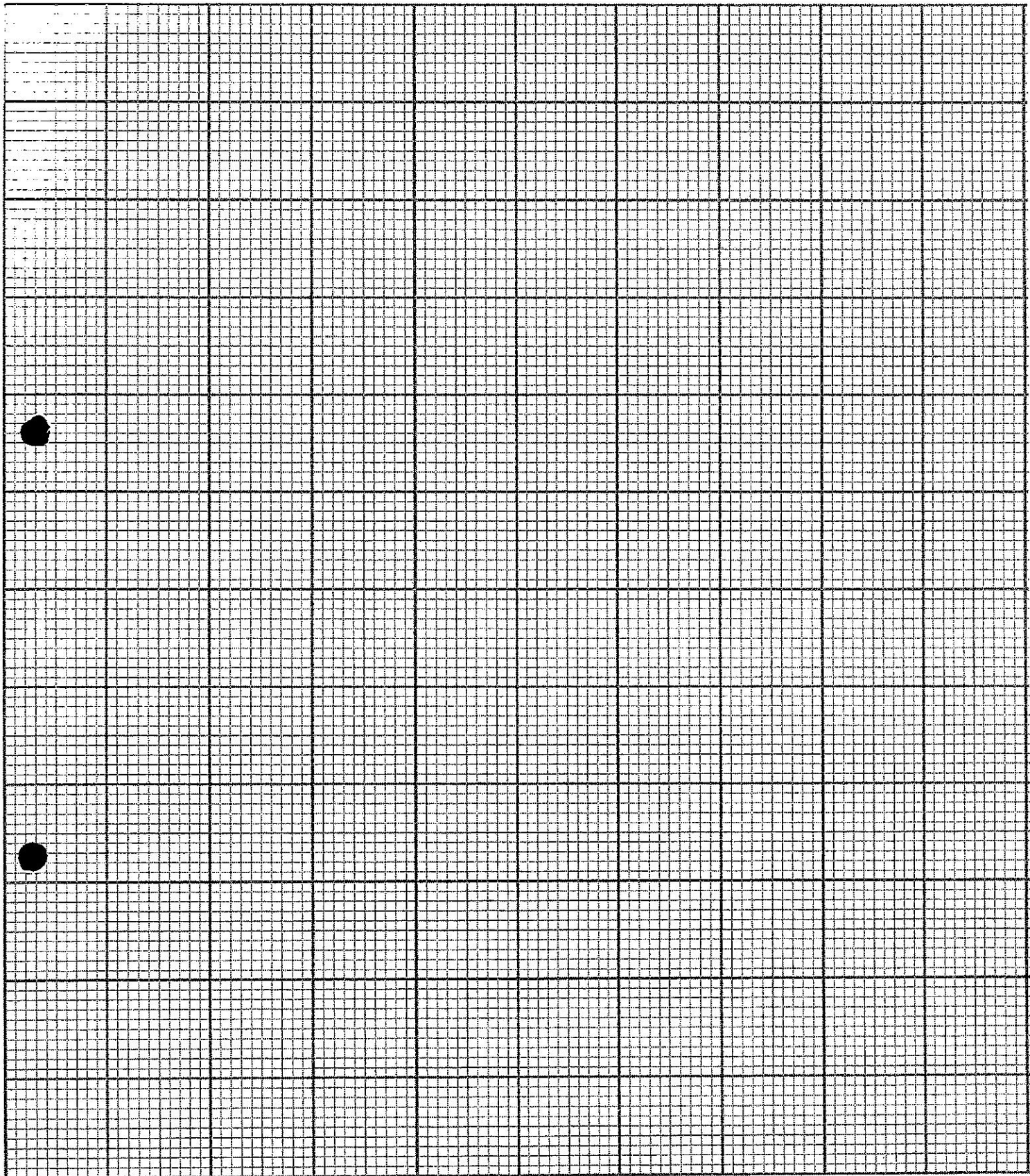
	3
--	---

- (c) State the hypothesis for this experiment.

.....  
 .....

[ 3 marks ]

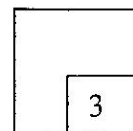
	3
--	---



(d) Based on the above experiment, complete the table below.

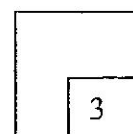
Manipulated variable : ..... .....	Method to manipulate the variable : ..... .....
Responding variable : ..... .....	How the variable is responding : ..... .....
Controlled variable : ..... .....	Method to maintain the controlled variable: ..... .....

[ 3 marks ]



(e) From the graphs, calculate **instantaneous rate** of reaction at 2 mins. for experiment I :

[ 3 marks ]



(f) Explain why potatoes when cut into smaller pieces cook faster than when cut into large pieces.

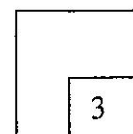
.....

.....

.....

.....

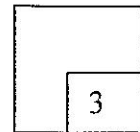
.....



(d) Based on the above experiment, complete the table below.

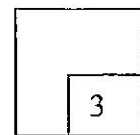
Manipulated variable : ..... .....	Method to manipulate the variable : ..... .....
Responding variable : ..... .....	How the variable is responding : ..... .....
Controlled variable : ..... .....	Method to maintain the controlled variable: ..... .....

[ 3 marks ]



(e) From the graphs, calculate **instantaneous rate** of reaction at 2 mins. for experiment I :

[ 3 marks ]



(f) Explain why potatoes when cut into smaller pieces cook faster than when cut into large pieces.

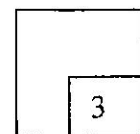
.....

.....

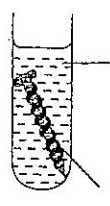

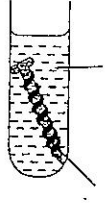

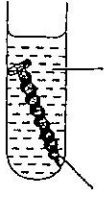

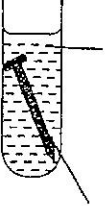

.....

.....

.....



The table below shows the set up of the apparatus for an experiment to study the effect of metals P, Q and R on the rusting of iron. The observations are recorded after two days.

Experiment	After two days	Observation <i>Pemerhatian</i>	
		Intensity of blue colour	Intensity of pink colour
<p>A</p>  <p>Jelly solution + Potassium hexacyanoferrate(III) + Phenolphthalein</p> <p>Iron nail + Metal P</p>		None	High
<p>B</p>  <p>Jelly solution + Potassium hexacyanoferrate(III) + Phenolphthalein</p> <p>Iron nail + Metal Q</p>		None	Low
<p>C</p>  <p>Jelly solution + Potassium hexacyanoferrate(III) + Phenolphthalein</p> <p>Iron nail + Metal R</p>		Very high	None
<p>D</p>  <p>Jelly solution + Potassium hexacyanoferrate(III) + Phenolphthalein</p> <p>Iron nail</p>		Low	None

Based on this experiment, state :

(i) the manipulated variable :

.....

(ii) the responding variable :

.....

(iii) the constant variable :

.....

[ 3 marks ]

3
---

(c) State the inference for the observation in test tube A, B, C and D.

Test tube	Inference
A	
B	
C	
D	

[ 3 marks ]

3
---

(d) State the operational definition for the rusting of iron.

.....

.....

[ 3 marks ]

3
---

(e) Based on the observations:

Arrange all the metals iron, P , Q and R in descending order of their electropositivity.

.....

[ 3 marks ]

3
---

2. By drawing a table, classify the following metals into **metals more electropositive than iron** and **metals less electropositive than iron**.

Lead, magnesium, tin, zinc, copper

[ 3 marks ]

3



3.

**Iron undergoes rusting when it is left unprotected.  
The rusting of iron is affected when it comes into contact  
with other metals.**

You are given some **iron nails**, magnesium ribbon and lead strip and all other necessary materials and apparatus.

With reference to the above statement, plan a laboratory experiment to investigate the effect of other metals on the rusting of iron.

Your planning should include the following aspects:

- (a) Statement of problem
- (b) All variables
- (c) Statement of hypothesis
- (d) List of materials and apparatus
- (e) Procedure of the experiment
- (f) Tabulation of data

[ 17 marks ]

- END OF QUESTION PAPER -

Prepared by :



.....  
( Mr. Tan Thwan Hoa )

Checked by :



.....  
( En. Shahrudin b Harun )