UNIT PEPERIKSAAN
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MELAKA

SPM TRIAL EXAMINATION 2012 **4531 / 3**

PHYSICS

Paper 3

1 hour 30 minutes

Name: ..... **Class:** .....

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

INFORMATION FOR CANDIDATES

Information for candidates:

1 This question paper consists of 2 sections: Section A and section B.
2 Answer all the questions in Section A and one question from section B.
3 Write your answers to section A in the spaces provided in the question paper.
4 Write your answers to section B on writing papers.
5 You are advised to spend 60 minutes on section A and 30 minutes on section B.
6 You may use a non programmable scientific calculator.

For marker's use		
Section	Question	Marks obtained
A	1	
	2	
B	3	
	4	
Total		

This paper consists of 9 printed pages

SECTION A

Answer all the questions

1 A student carries out an experiment to investigate the relationship between the volume and the pressure of a gas. The set-up of the apparatus is shown in diagram 1.1. The volume of the air, V is recorded when a load of mass m is placed on top of the piston.

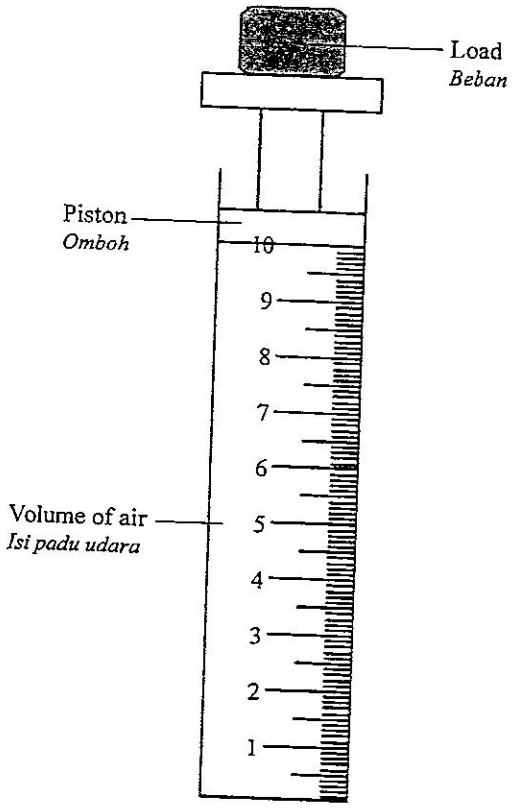

Diagram 1.1

When a mass of 0.5 kg is placed on the piston, the volume of air is shown in diagram 1.2. The experiment is repeated by using m = 1.0kg, 1.5 kg, 2.0 kg and 3.0 kg. The corresponding volumes of air are as shown in diagrams 1.3, 1.4, 1.5 and 1.6 respectively.

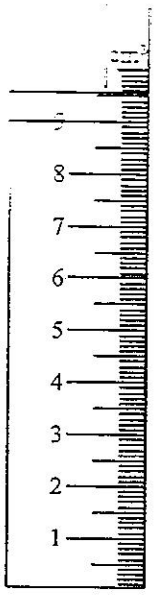

Diagram 1.2
Rajah 1.2

$m = 0.5$ kg

$V =$ _____ cm³

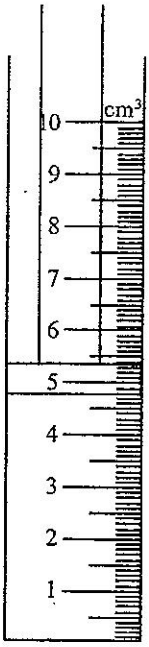

Diagram 1.3
Rajah 1.3

$m = 1.0$ kg

$V =$ _____ cm³

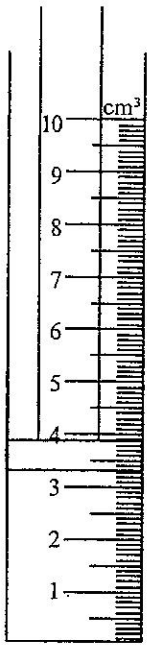

Diagram 1.4
Rajah 1.4

$m = 1.5$ kg

$V =$ _____ cm³

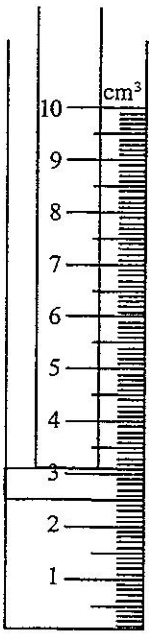

Diagram 1.5
Rajah 1.5

$m = 2.0$ kg

$V =$ _____ cm³

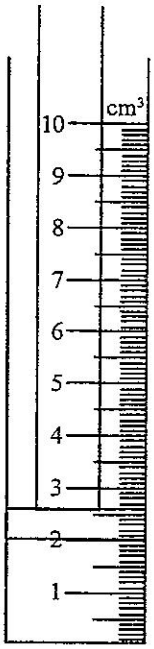

Diagram 1.6
Rajah 1.6

$m = 2.5$ kg

$V =$ _____ cm³

(a) For the experiment described above, identify:

(i) the manipulated variable: .....

(ii) the responding variable : .....

(iii) the constant variable : ..... [3 marks]

(b) Base on diagrams 1.2, 1.3, 1.4, 1.5 and 1.6, measure the volume, V, of the air for each value of m. Calculate the values of $\frac{1}{V}$.

Tabulate all the values of m, V and $\frac{1}{V}$ in the space below. [7 marks]

(c) Plot the graph of $\frac{1}{V}$ against m on page 5. [5 marks]

(d) Base on your graph, state the relationship between $\frac{1}{V}$ and m. [1 mark]

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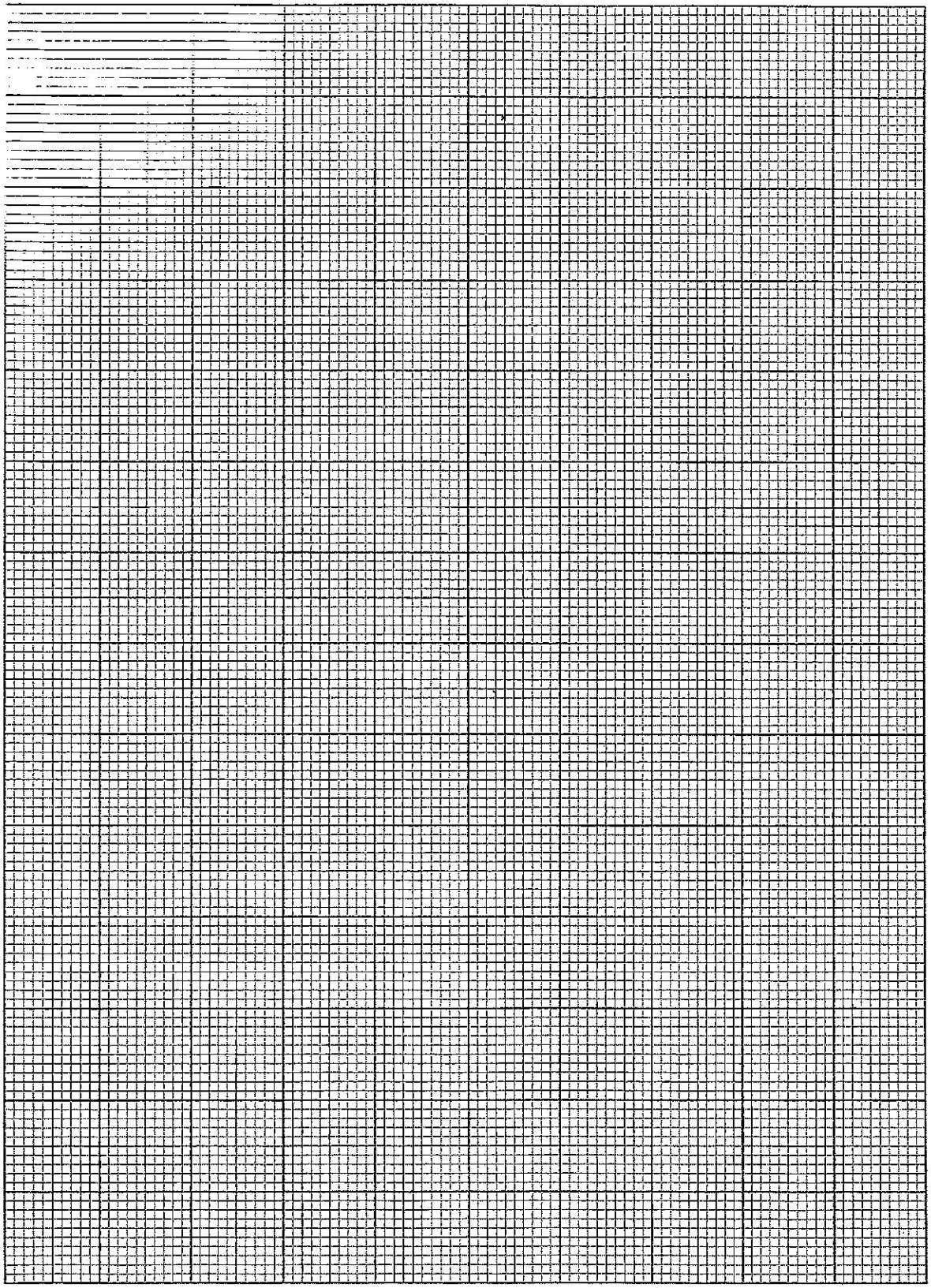
Graph of $\frac{1}{V}$ against m

Graf $\frac{1}{V}$ *melawan* m



2 The results of an experiment carried out to determine the current amplification factor of a transistor are shown in the graph of I_B against I_C in Diagram 2.

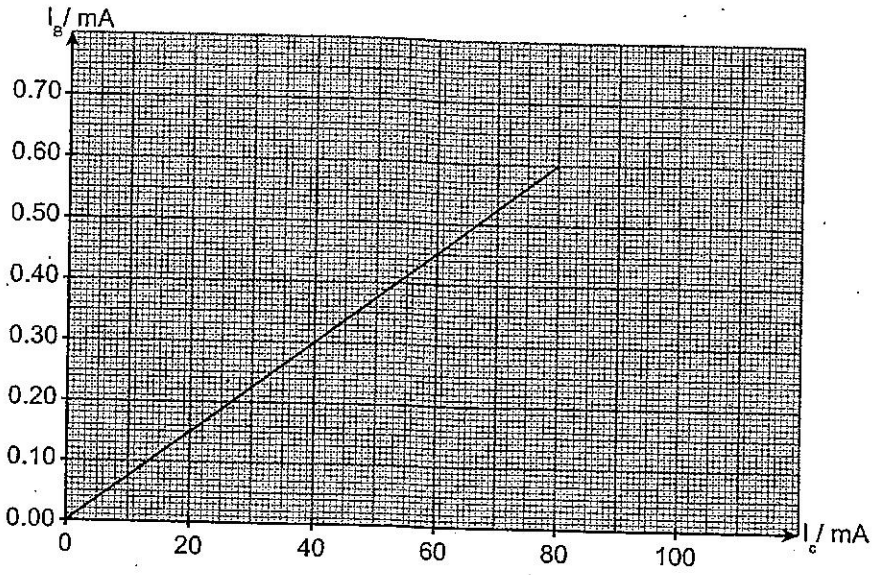


Diagram 2 / *Rajah 2*

(a) Base on the graph in Diagram 2:

(i) State the relationship between I_B and I_C. [1 mark]

.....

.....

(ii) Determine I_C when $I_B = 0.28$ mA [3 marks]

.....

Calculate the gradient , k, of the graph. [4 marks]

(ii) Given that $n = \frac{1}{k}$, where n is the amplification factor.

Calculate the amplification factor of the transistor. [2 marks]

(c) State two precautions for this experiment. [2 marks]

1.....

.....

.....

2.....

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.....

SECTION B

Answer one question

3 Diagram 3.1 shows a worker pushing a loaded trolley. Diagram 3.2 shows two worker pushing the same trolley. It is observed that the trolley in Diagram 3.2 accelerates at a greater rate.

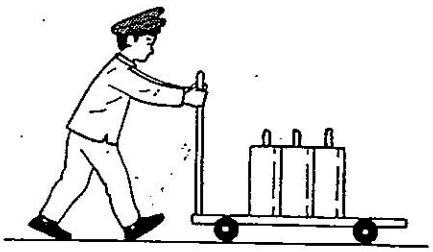

Diagram 3.1 / *Rajah 3.1*

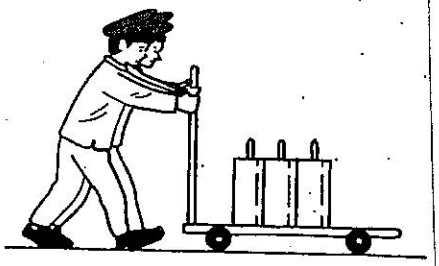

Diagram 3.2 / *Rajah 3.2*

(a) State one suitable inference. [1 mark]

.....

.....

(b) State one hypothesis that could be investigated. [1 mark]

.....

.....

(c) With the use of apparatus such as a trolley, a ticker timer, rubber bands and other apparatus, describe an experiment to investigate the hypothesis stated in (b).
In your description, state clearly the following:

i) The aim of the experiment.
ii) The variables in the experiment.
iii) The list of apparatus and materials.
iv) The procedure of the experiment, which include the method of controlling the manipulated variable and the method of measuring the responding variable.
v) The way to tabulate the data.
vi) The way to analyse the data. [10 marks]

Diagram 4.1 and 4.2 show the circuits where a bulb is lighted up by one dry cell.

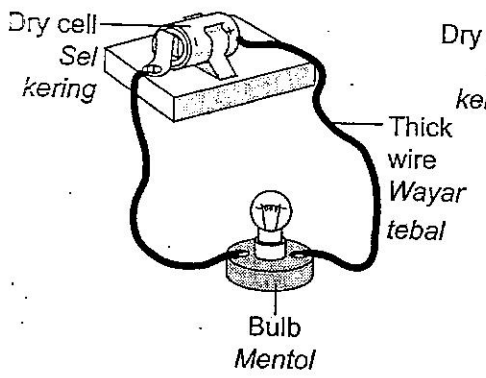

Diagram 4.1 / *Rajah 4.1*

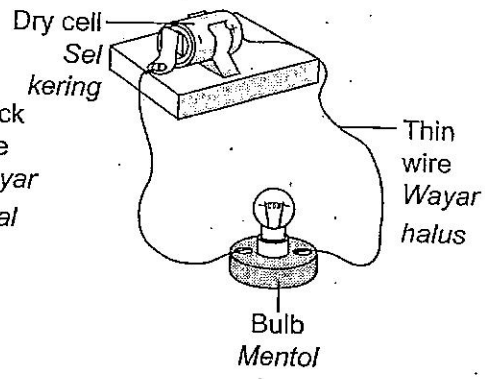

Diagram 4.2 / *Rajah 4.2*

It is observed that the bulb in diagram 4.1 is brighter that that in diagram 4.2.

(a) State one suitable inference. [1 mark]

.....

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(b) State one hypothesis that could be investigated. [1 mark]

.....

.....

(c) With the use of apparatus such as a voltmeter, an ammeter, a constantan wire and other apparatus, describe an experiment to investigate the hypothesis stated in (b). In your description, state clearly the following:

i) The aim of the experiment.
ii) The variables in the experiment.
iii) The list of apparatus and materials.
iv) The procedure of the experiment, which include the method of controlling the manipulated variable and the method of measuring the responding variable.
v) The way to tabulate the data.
vi) The way to analyse the data. [10 marks]