

4531/3
Fizik
Kertas 3
Mei 2007
1 ½ jam



SEKTOR SEKOLAH BERASRAMA PENUH
KEMENTERIAN PELAJARAN MALAYSIA

PEPERIKSAAN PERTENGAHAN TAHUN TINGKATAN 5 2007

FIZIK
Kertas 3

Satu jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. Kertas soalan ini mengandungi dua bahagian :
Bahagian A dan **Bahagian B**.
2. Jawab semua soalan dalam **Bahagian A**.
Tuliskan jawapan bagi **Bahagian A** dalam ruang yang disediakan dalam kertas soalan.
3. Jawab **satu** soalan daripada **Bahagian B**.
Tuliskan jawapan **Bahagian B** pada ruangan yang disediakan..
Jawab **Bahagian B** dengan lebih terperinci.
Jawapan mestilah jelas dan logik..
4. Tunjukkan kerja mengira, ini membantu anda mendapat markah.
5. Gambarajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.
6. Markah yang diperuntukkan bagi setiap soalan atau ceraihan soalan ditunjukkan dalam kurungan.
7. Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh di programkan
8. Masa yang dicadangkan untuk menjawab **Bahagian A** ialah 60 minit dan **Bahagian B** ialah 30 minit.
9. Serahkan semua kertas jawapan anda di akhir peperiksaan

Kegunaan Pemeriksa			
Bahagian	Soalan	Markah Penuh	Markah
A	1	16	
	2	12	
B	3	12	
	4	12	
JUMLAH			

Kertas soalan ini mengandungi 11 halaman bercetak

Section A
[28 marks]
 Answer **all** question.

- 1 A student carries out an experiment to investigate the relationship between the object distance, u , image distance, v , and focal length, f , of a convex lens. The apparatus is set up as shown in Diagram 1.1

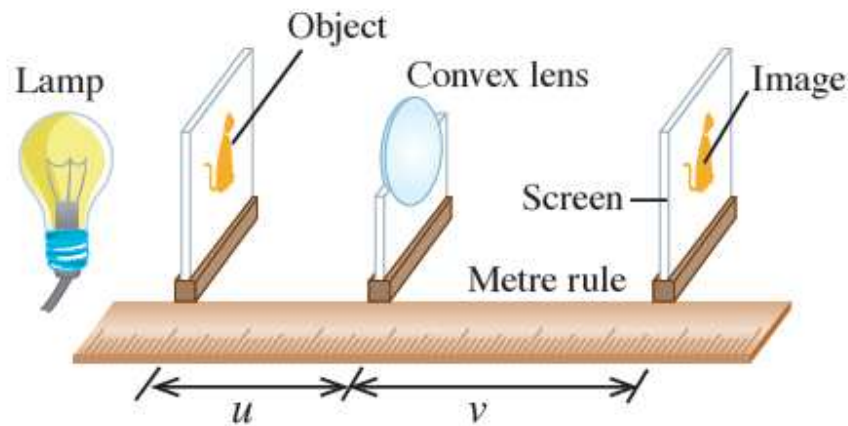


Diagram 1.1

At the beginning, the object is placed at the distance of 40.0 cm from the lens. The screen is adjusted to find the sharp image. The image distance is then measured by using the metre rule.

The above procedure is repeated by varying the values of u to be 35.0 cm, 30.0 cm, 25.0 cm and 20.0 cm.

Diagram 1.2, 1.3, 1.4, 1.5 and 1.6 show the end of the metre rule when the image distance, v , is measured.

(Note : For each diagram, the measurement of the image distance, v is started from the zero mark of the metre rule.)

(a) For the experiment described above, identify:

- (i) The manipulated variable

.....
 [1 mark]

- (ii) The responding variable

.....
 [1 mark]

- (iii) The constant variable

.....
 [1 mark]

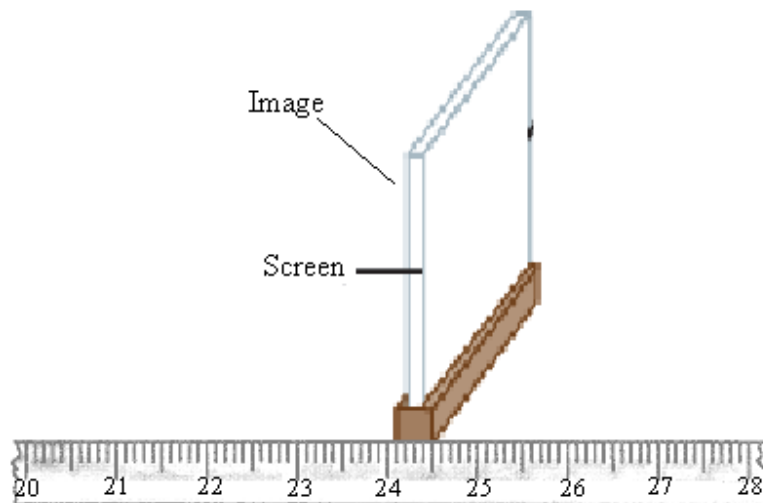


Diagram 1.2 : Object distance, $u = 40$ cm

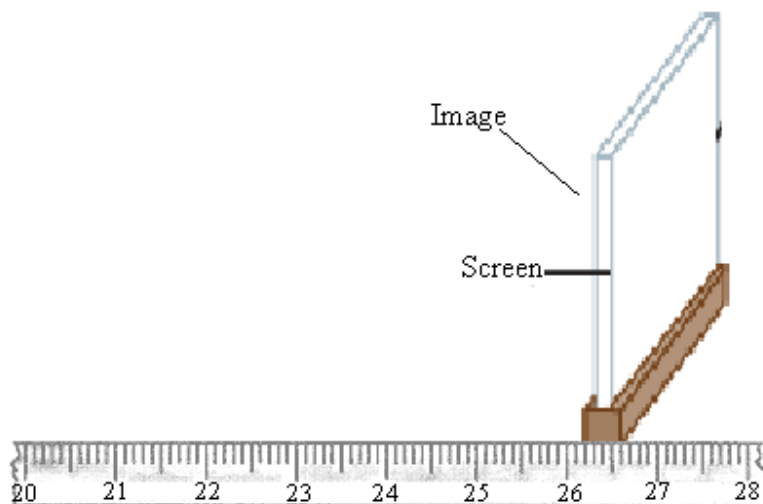


Diagram 1.3 : Object distance, $u = 35$ cm

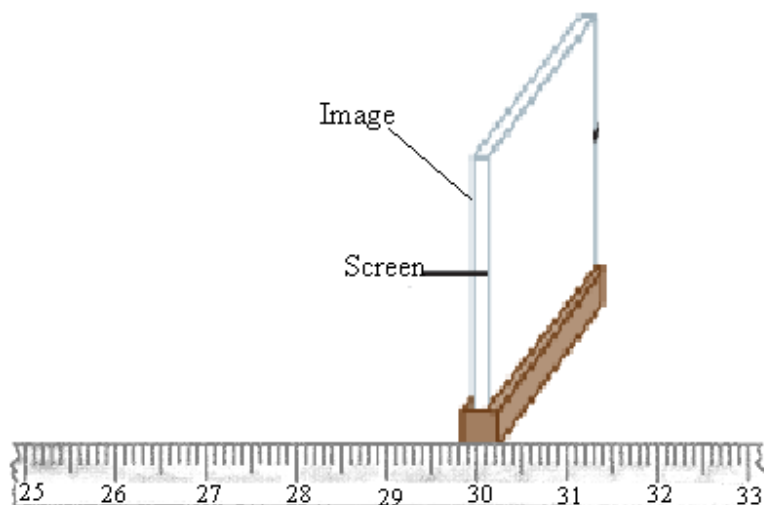


Diagram 1.4 : Object distance, $u = 30$ cm

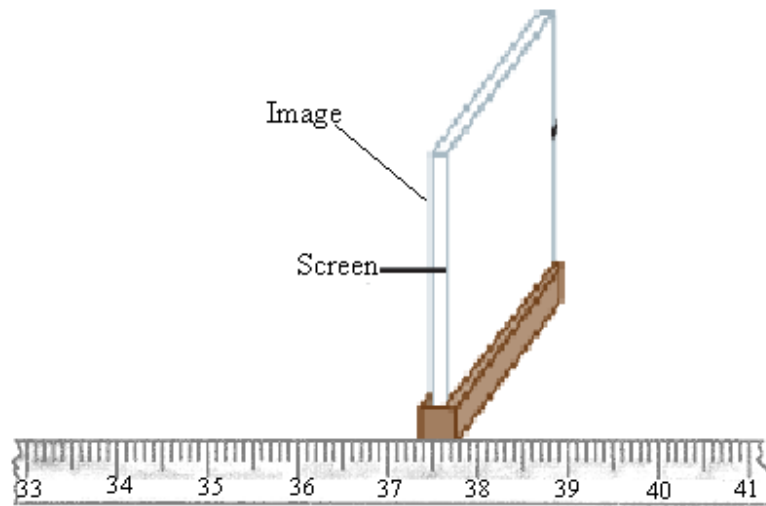


Diagram 1.5 : Object distance $u = 25$ cm

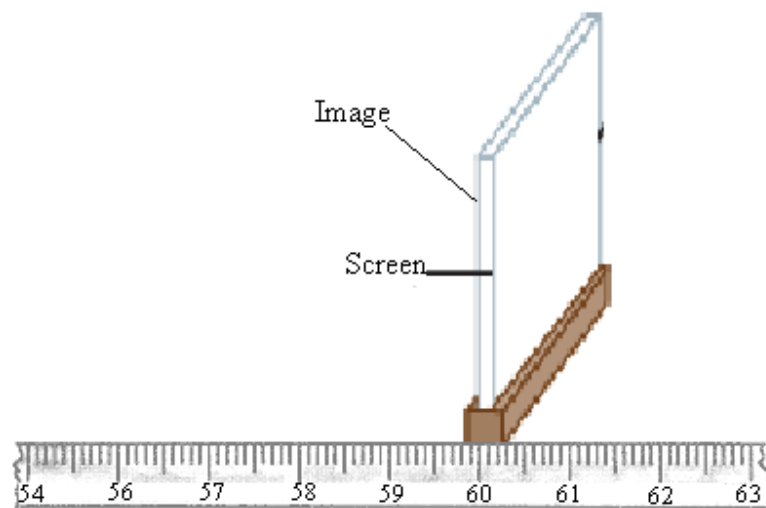


Diagram 1.6 : Object distance $u = 20$ cm

- (b) Based on diagram 1.2, 1.3, 1.4, 1.5 and 1.6, determine image distance, v when the object distance, u , is equal to 40 cm, 35 cm, 30 cm, 25 cm and 20 cm.

Tabulate the values of u , v , $\frac{1}{u}$ and $\frac{1}{v}$ in the space below.

[6 marks]

- (c) On the graph paper, plot a graph of $\frac{1}{v}$ against $\frac{1}{u}$

[5 marks]

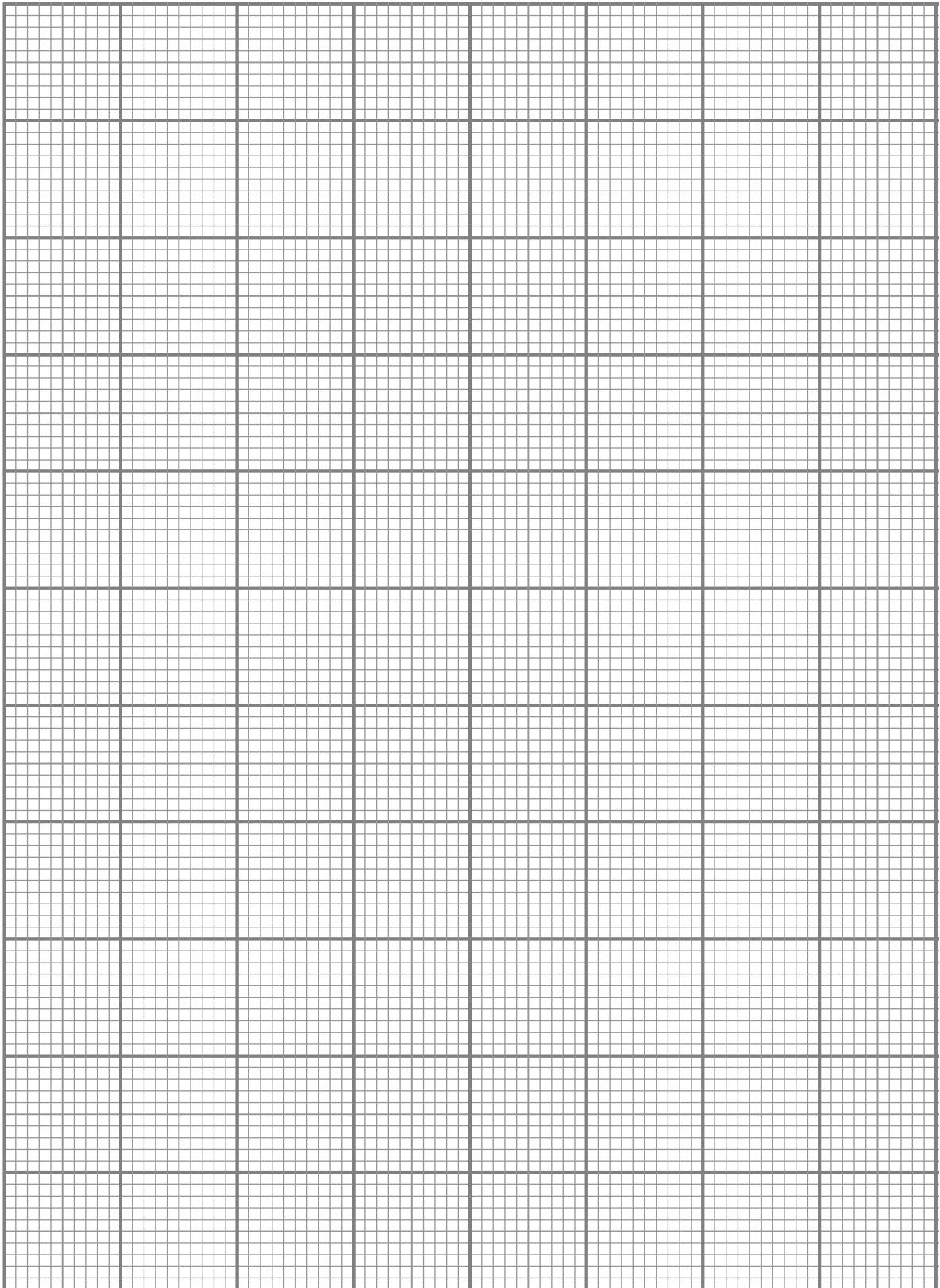
- (d) Based on your graph, state the relationship between $\frac{1}{v}$ and $\frac{1}{u}$

.....
[1 mark]

- (e) State **one** precaution that should be taken to improve the results of this experiment.

.....
[1 mark]

Graph of $\frac{1}{v}$ against $\frac{1}{u}$



- 2 A student carries out an experiment to study the interference of sound waves. He wants to investigate the relationship of the distance between two coherent sources of sound waves, a , and the distance between two consecutive of constructive interference, x . The distance between the location where the sound is detected, D , is 5 m. The results of the experiment is shown in the graph of x against $\frac{1}{a}$ as in Diagram 2.1.

(a) Based on the graph in diagram 2.1.

- (i) State the relationship between x and $1/a$.

..... [1 mark]

- (ii) Determine the value of x if $a = 4$ m.

[3 marks]

- (iii) Determine the value of a if $x = 1.0$ m

[1 marks]

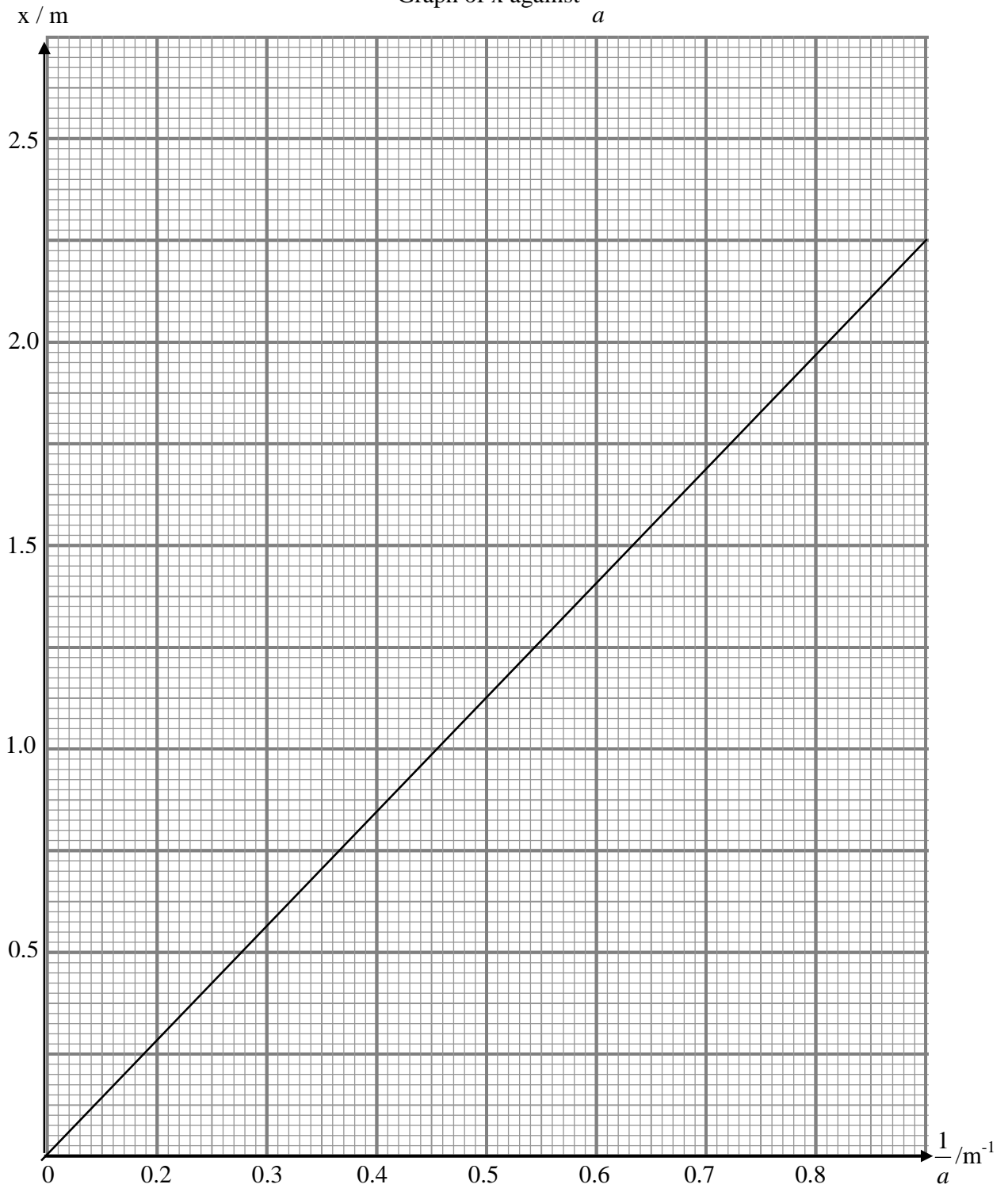
(b) The wavelength of sound waves, λ , is given by the equation

$$\lambda = \frac{ax}{D}$$

- (i) Calculate the gradient of the graph x against $\frac{1}{a}$.

[3 marks]

Graph of x against $\frac{1}{a}$



(ii) By using equation $\lambda = \frac{ax}{D}$ and the value of the gradient obtained in b (i), calculate the wavelength of sound waves, λ , used in this experiment.

[3 marks]

(c) State one precaution that should be taken to improve the results of this experiment.

.....
.....

[1 mark]

Section B
[12 marks]

Answer any one question.

3. Diagram 3.1 and 3.2 show two pots of different size filled with boiling water. It is observed that the temperature of the water in Diagram 3.1 drops at a faster rate than in Diagram 3.2.



Diagram 3.1



Diagram 3.2

Based on the information and observation above:

- a) State **one** suitable inference [1 mark]
- b) State **one** suitable hypothesis [1 mark]
- c) With the use of apparatus such as a beaker, stopwatch and other apparatus, describe an experiment framework to investigate the hypothesis stated in 3(b). In your description, state clearly the following:
- Aim of the experiment
 - Variables in the experiment
 - List of apparatus and materials
 - Arrangement of the apparatus
 - The procedure of the experiment which include the method of controlling the manipulated variable and the method of measuring the responding variable.
 - The way you would tabulate the data
 - The way you would analyze the data

[10marks]

- 4 Diagram 4.1 and 4.2 shows two roadside stalls selling “ABC” and “PAU”. Both stalls are using the same bulbs and batteries that are new. The bulb at the “ABC” stall is brighter than the bulb at the “PAU” stall.

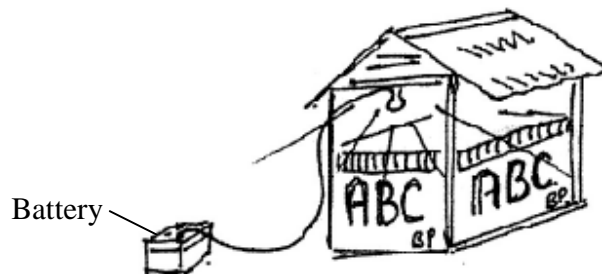


Diagram 4.1



Diagram 4.2

Based on the above information and observation:

- (a) State one suitable inference. [1 mark]
- (b) State one suitable hypothesis. [1 mark]
- (c) With the use of apparatus such as dry cells, a constantan wire and other apparatus, describe an experiment framework to investigate the hypothesis stated in 3(b).
 - (i) Aim of the experiment.
 - (ii) Variables in the experiment.
 - (iii) List of apparatus and materials.
 - (iv) Arrangement of apparatus.
 - (v) The procedure of experiment which include the method of controlling the manipulated variable and the method of measuring the responding variable.
 - (vi) The way you would tabulate the data.
 - (vii) The way you would analyse the data.[10 marks]

END OF QUESTION PAPER