

**Projek Gemilang
Sains PMR
Koleksi Percubaan 2006-Terkini
Soalan 8 (Experiment)
Siri 1.0**

**Disediakan oleh:
En. Ismadey Bin Ismail**



Nama :
Kelas :



CONTENTS

	TOPIC	MARKS
FORM 1		
CHAP 3	MATTER	
CHAP 5	THE AIR AROUND US	
CHAP 7	HEAT	
FORM 2		
CHAP 4	INTERDEPENDENCE AMONG LIVING ORGANISMS AND THE ENVIROMENT	
CHAP 5	WATER AND SOLUTION	
CHAP 6	AIR PRESSURE	
CHAP 7	DYNAMICS	
CHAP 10	SIMPLE MACHINE	
FORM 3		
CHAP 2	BLOOD CIRCULATION AND TRANSPORT	
CHAP 4	REPRODUCTION	
CHAP 6	LAND AND ITS RESOURCES	
CHAP 7	ELECTRICITY	
CHAP 8	GENERATION OF ELECTRICITY	

CHAPTER 3
MATTER

FORM 1 – KLANG 07

A student carried out an experiment to study the volume of a regular-shaped object as shown in figure 8.1.

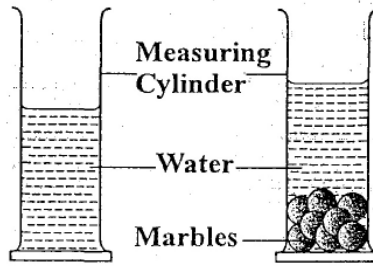


Figure 8.1

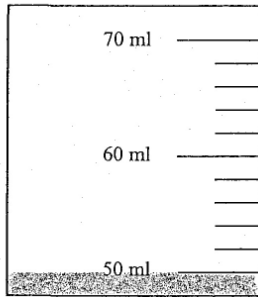
The student takes the following steps:

Step 1: pour 50cm^3 of water into a measuring cylinder.

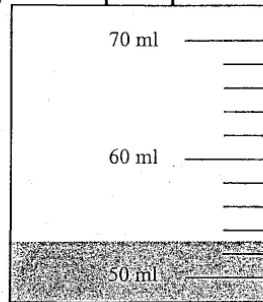
Step 2: 10 marbles of the same size are set aside.

Step 3: put two marble at a time into the measuring cylinder and record the volume of water.

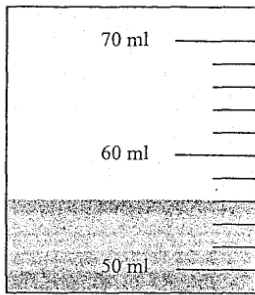
(a)(i) Record the measuring cylinder reading in the space provided.



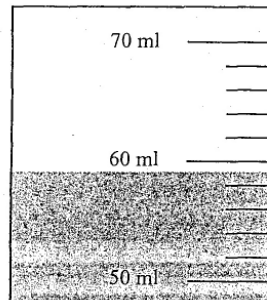
Number of marble =0
Measuring cylinder reading = 50cm^3



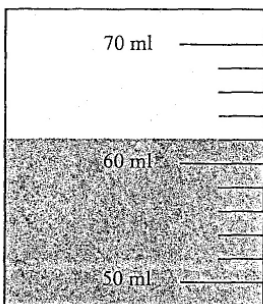
Number of marble =2
Measuring cylinder reading = _____ cm^3



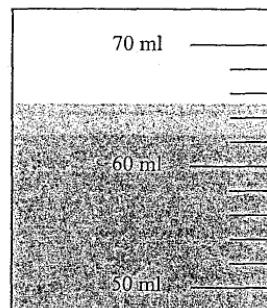
Number of marble =4
Measuring cylinder reading = _____ cm^3



Number of marble =6
Measuring cylinder reading = _____ cm^3



Number of marble =8



Number of marble =10

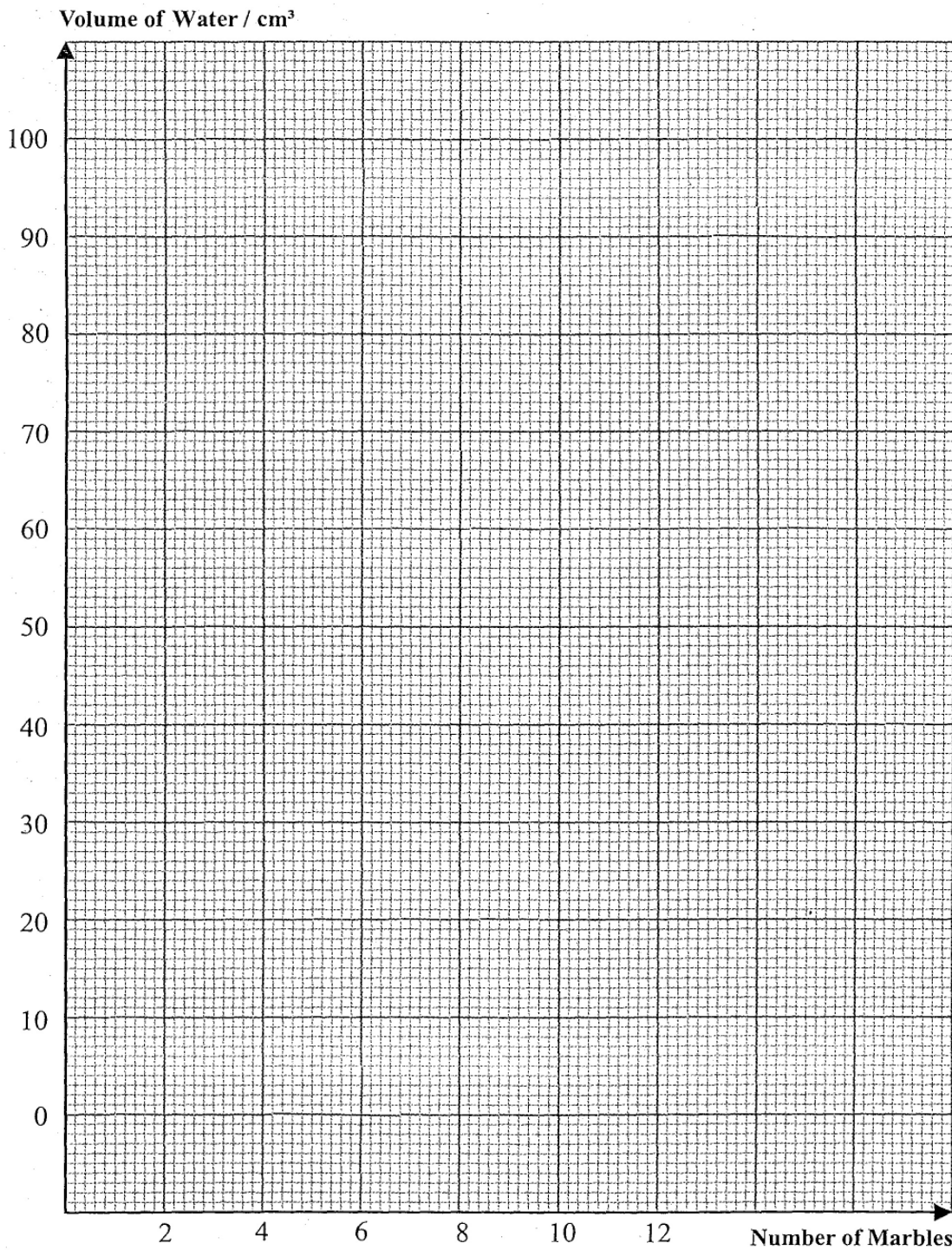
Measuring cylinder reading = _____ cm³ Measuring cylinder reading = _____ cm³
 [2 marks]

(b) State the variables in the experiment.

(i) manipulated variable	
(ii) responding variables	
(iii) fixed variables	

[3marks]

(c) Using record the measuring cylinder, draw a graph of volume of water against number of marble.



- (d) State the relationship between the number of marble and the volume of water. [2marks]

- (e) Predict the volume of water if 20 marbles of the same size are used. [1 mark]

- (f) If every marble used in the experiment has a density of 1.2g/cm^3 , calculate the mass of the marble. [1mark]

Use the following formula:

$$\text{Density} = \frac{\text{mass}}{\text{volume}}$$

- (g) State a conclusion that can be made from this experiment. [2marks]

[1mark]

CHAPTER 5
THE AIR AROUND US

FORM 1 – PERAK 08

A student carries out an experiment to investigate the effect of the volume of the glass container on how long a candle burns in Diagram 8.1.

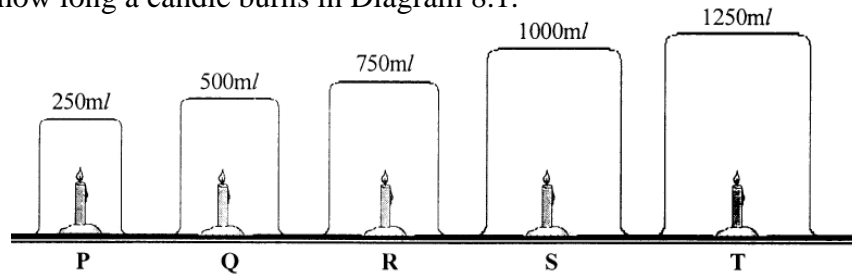


Diagram 8.1

The student takes the following steps:

Step 1 : Five candles are stuck to a cardboard.

Step 2 : The candles are lighted up and covered with five different sizes of containers P, Q, R, S and T simultaneously, as shown in Diagram 8.1

Step 3 : The time taken for the flame of all candles to go out is recorded using a stopwatch.

(a) The reading of the stopwatch in Diagram 8.2 shows the time taken for container S. record the reading and complete Table 8.3 below

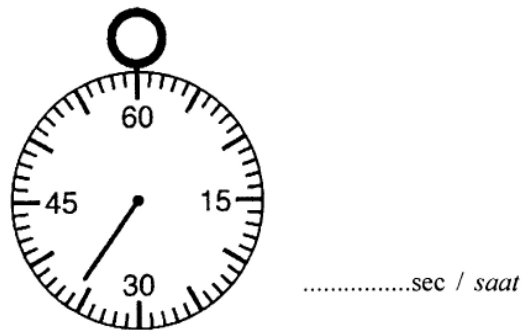


Diagram 8.2

Container	P	Q	R	S	T
Volume of glass container	250ml	500ml	750ml	1000ml	1250ml
Time taken (s)	11	18	30		47

Table 8.2

[1mark]

(b) State the variables in the experiment.

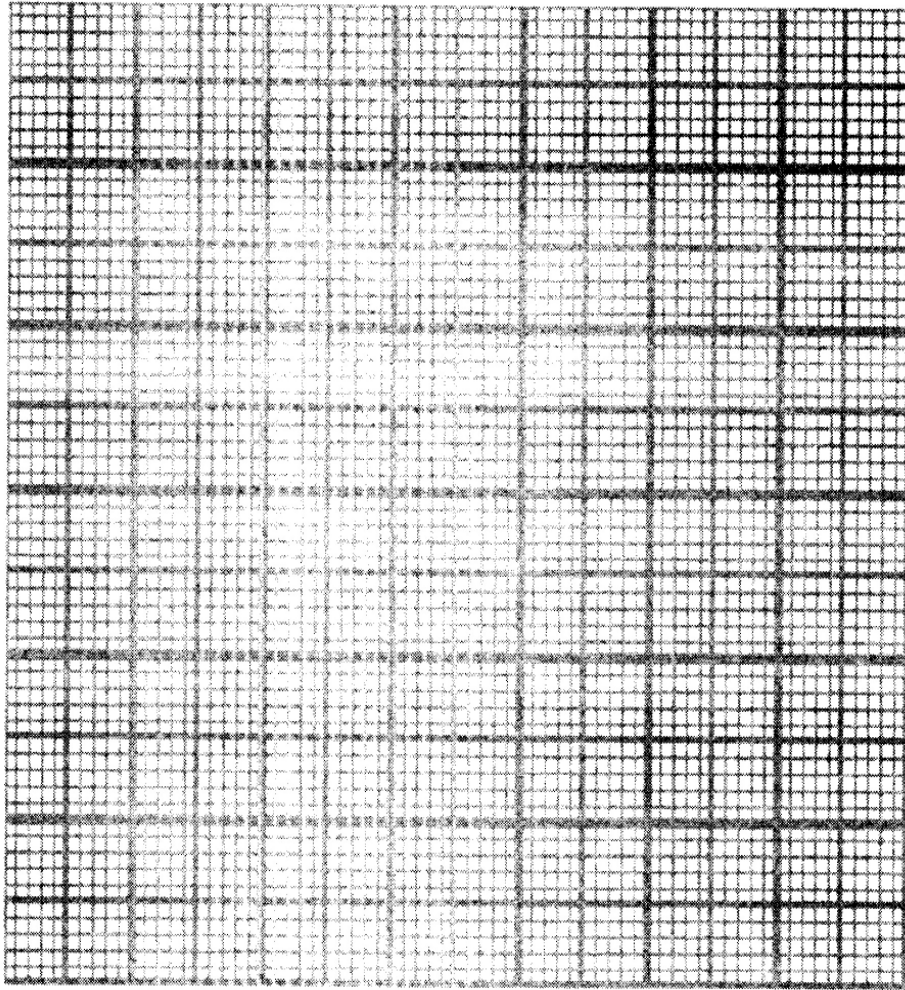
(i) manipulated variable	
(ii) responding variables	
(iii) constant variables	

[3marks]

(c) State the hypothesis for the experiment?

_____ [1mark]

- (d) Based on the reading in Table 8.2, draw a graph to show the volume of the glass container with the time taken



[3marks]

- (e)(i) From the graph in (d), what is the time taken for the candle to go out if the volume of glass container is 900ml.

_____ [1mark]

- (ii) What is the relationship between the volume of glass container and the time taken for candles to go out.

[1mark]

- (f)(i) What happen to the time taken if the glass container is filled with exhaled air before it covers the candle.

_____ [1mark]

- (ii) State your inference for your answer given in (f)(i)

_____ [1mark]

CHAPTER 5
THE AIR AROUND US

FORM 1 – KELANTAN 08

A student carried out an experiment to investigate the effect of air quantity on burning of candle.

(a) Record the stop watch reading in the space provided.

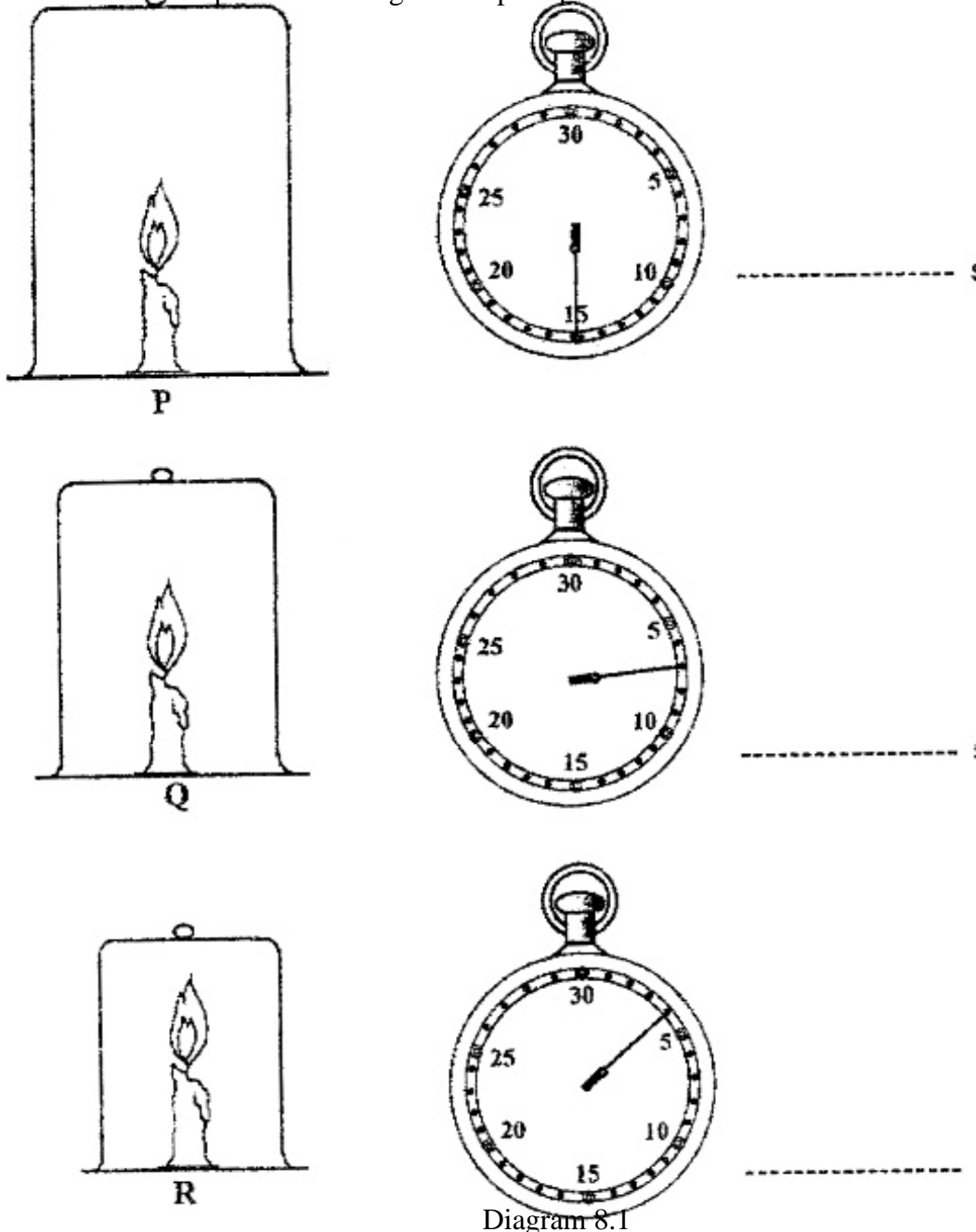


Diagram 8.1

Based on Diagram 8.1, record the stopwatch in Table 8.2

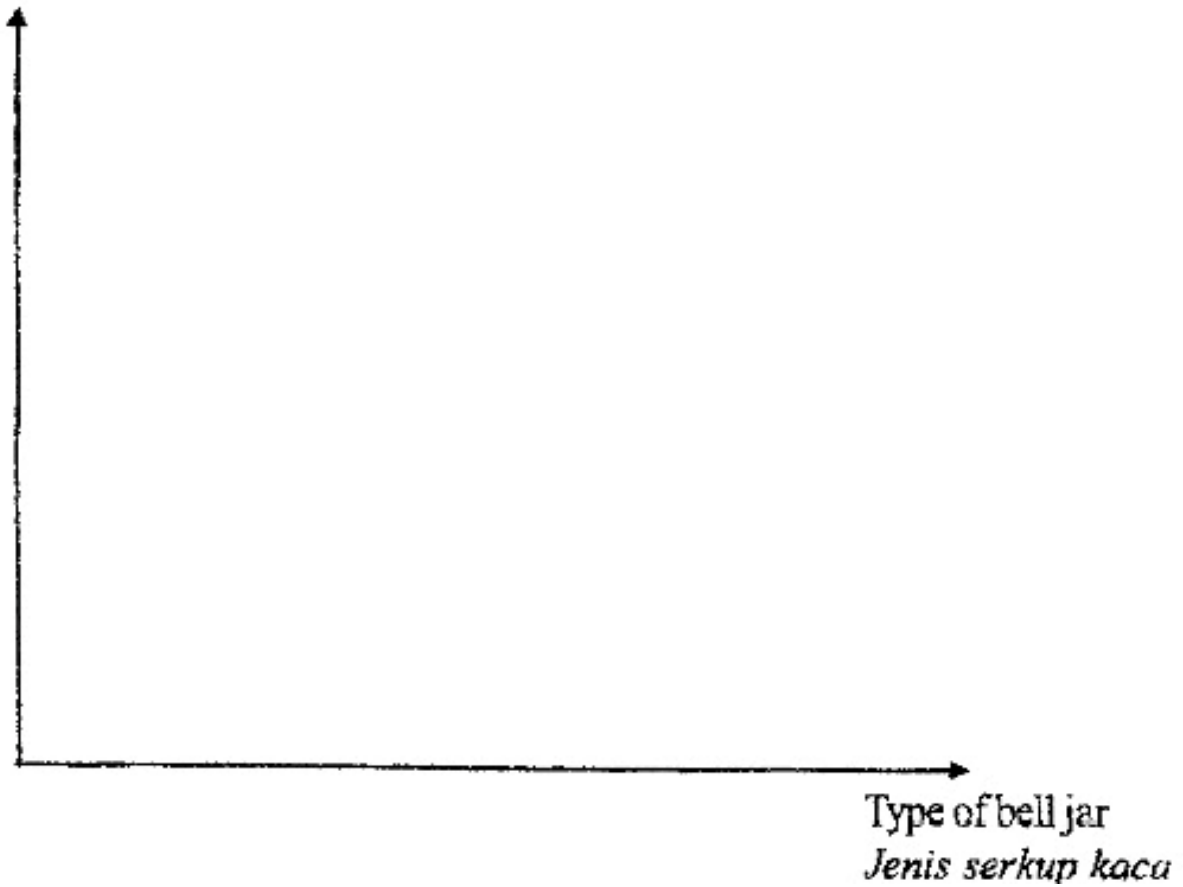
Bell jar	Stopwatch reading
P	
Q	
R	

Table 8.2

[3marks]

(c)Based on Table 8.2 draw a bar chart to show stopwatch reading in the different bell jar.

Stopwatch reading
Bacaan jam randik



[2marks]

(d) State the variables involved in the experiment.

(i) manipulated variable	
(ii) responding variables	
(iii) constant variables	

[3marks]

(e) Based on the experiment, state the hypothesis.

[1mark]

(f) Predict the time taken for candle to extinguish if is put in a bell jar bigger than P.

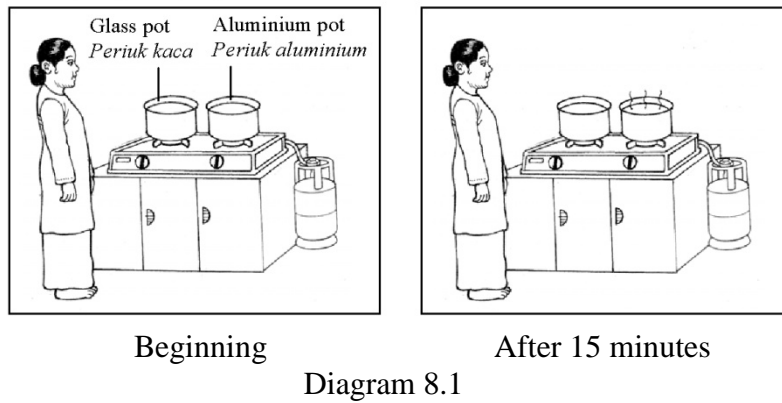
[1mark]

(g) Based on the experiment, what can be deduce about the meaning of ‘combustion of candle’.

[1mark]

FORM 1 – N. SEMBILAN 08

(a) Diagram 8.1 shows a housewife is cooking soup using different type of pot.



(i) Based on the observation in Diagram 8.1, state the difference in the hotness of the soup in the pot after 15 minutes.

_____ [1mark]

(ii) What inference can be made based on Diagram 8.1?

_____ [1mark]

(iii) What your hypothesis on your observation in Diagram 8.1

_____ [1mark]

(b) Diagram 8.2 shows the apparatus set-up of an experiment to study the conductivity of different type of rod.

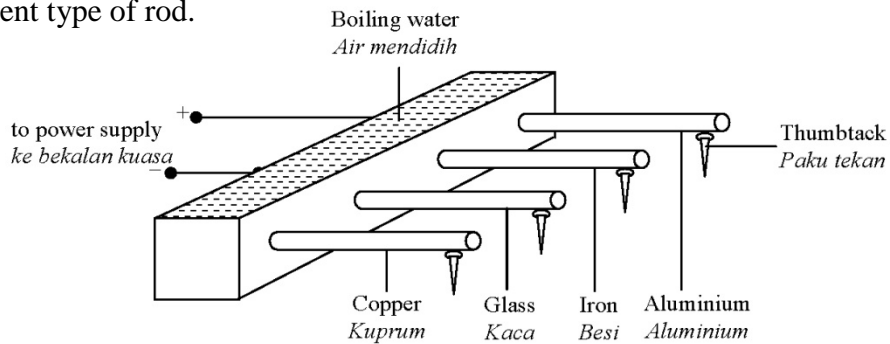


Diagram 8.2

The time for each thumbtack to drop is shown by the stop-watch in Diagram 8.3

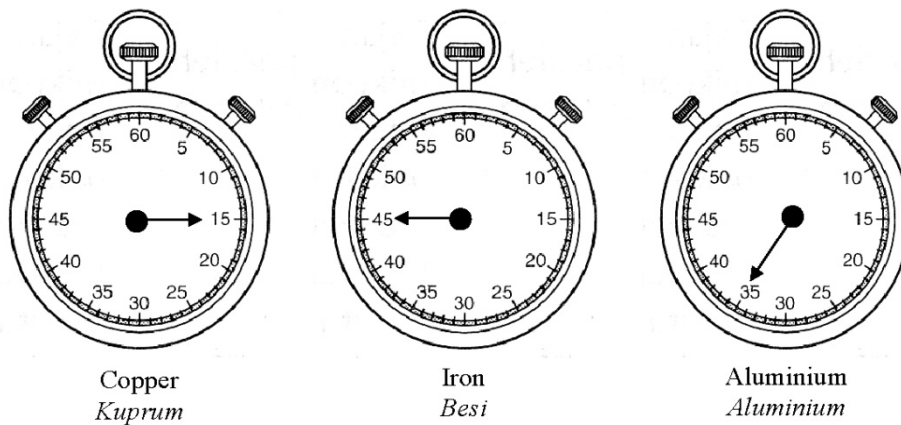


Diagram 8.3

Based on Diagram 8.3, record the reading of the stopwatch in Table 8.4

Type of rod	Copper	Glass	Iron	Aluminium
Time/s		60		

Table 8.4

[3 marks]

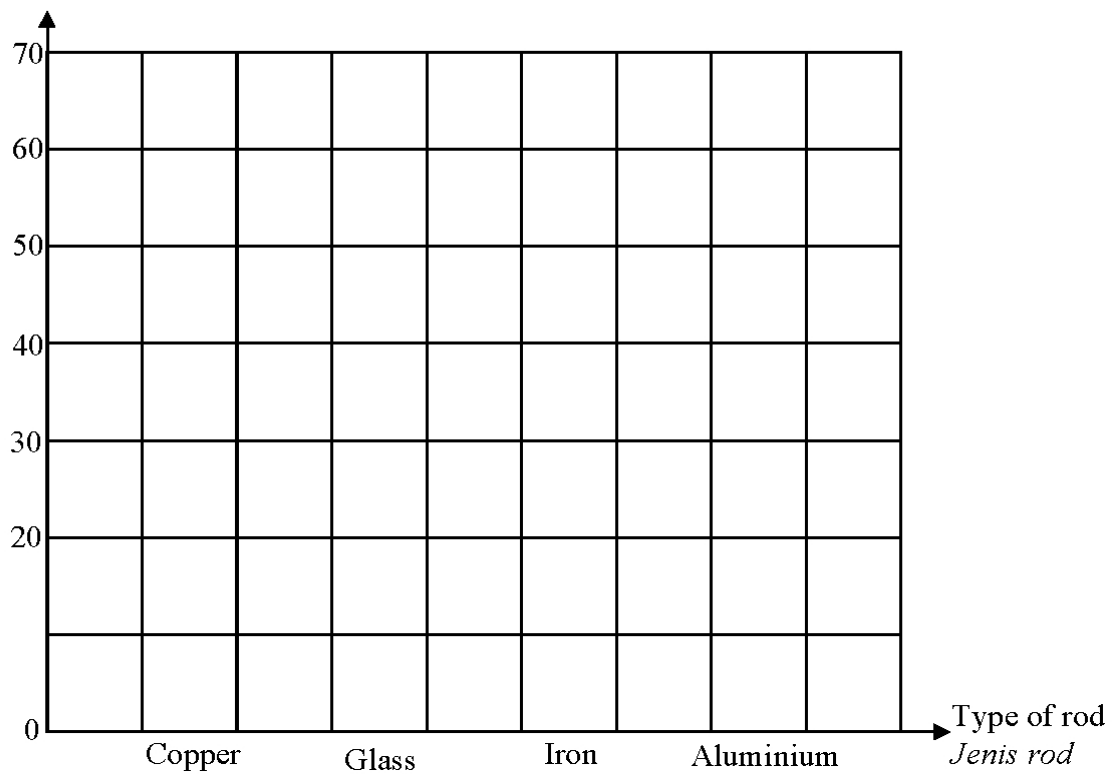
(c) State the variables involved in the experiment.

(i) manipulated variable	
(ii) responding variables	
(iii) constant variables	

[3marks]

(d) Based on table 8.4, draw a bar chart of time against type of rod.

Time/s
Masa/s



[2marks]

(e) Based on graph drawn in 8(d), state the operational definition of good heat conductor.

[1mark]

- (a) Diagram 8.1 shows two shirts of different colours which are being dried under the same conditions.

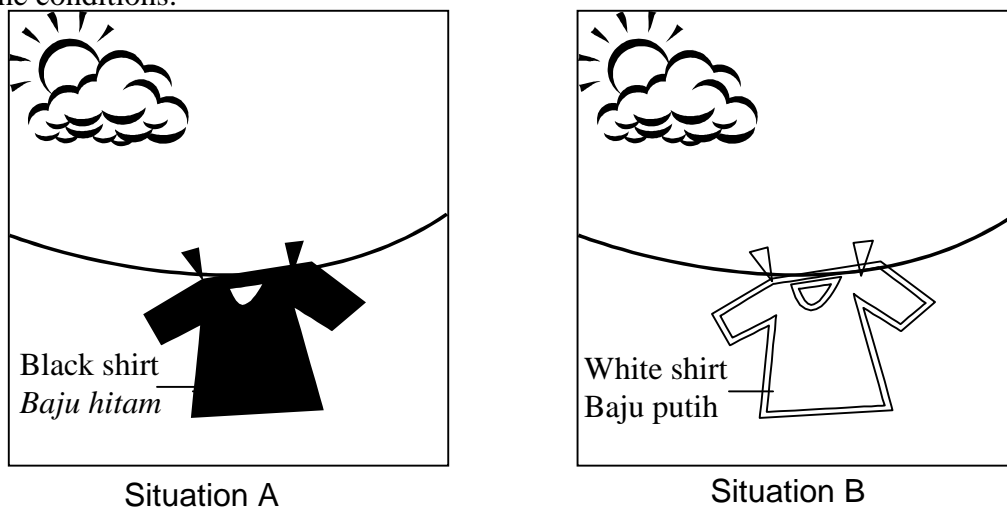


Diagram 8.1

- (i) Based on your observations in Figure 8.1, state the difference in the time taken for the shirts to dry in Situation A and Situation B.

[1mark]

- (ii) What inference can be made based on Situation A & Situation B in Diagram 8.1?

[1mark]

- (iii) State **one** hypothesis based on your observations in Figure 8.1.

[1mark]

- (b) A student carried out an experiment to investigate the absorption of heat by different types of surfaces. The initial temperatures of the flasks were taken. The flasks were then heated for 5 minutes before the final temperature of the flasks were taken.

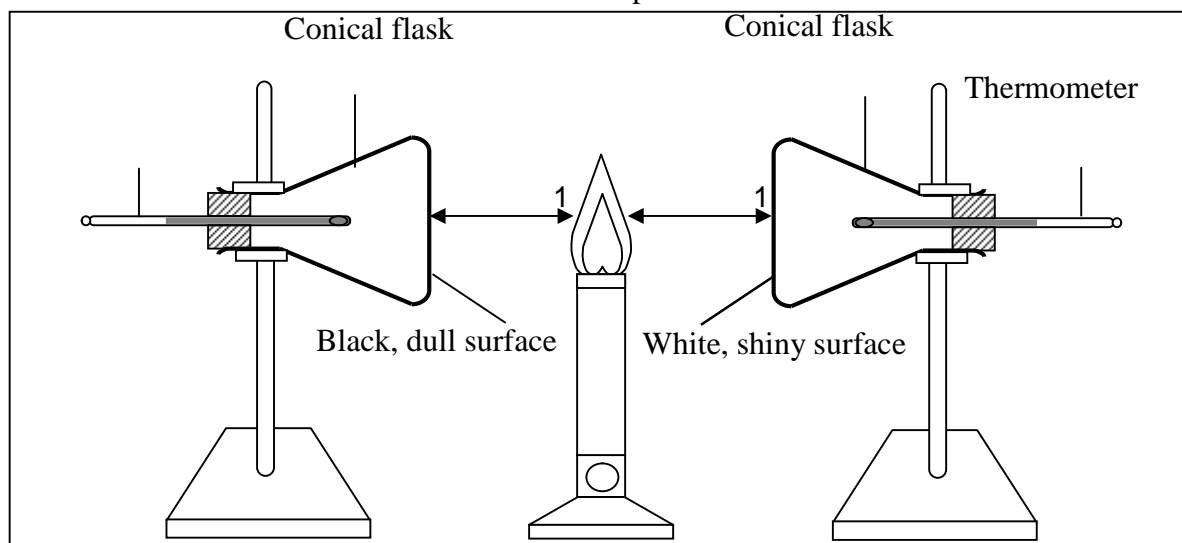


Diagram 8.2

- (i) Diagram 8.3 shows the final reading of thermometers P and Q. Record the readings in Table 8.4 and calculates the rise in temperature in each flask.

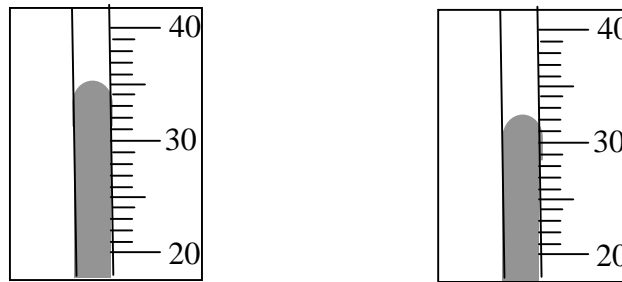


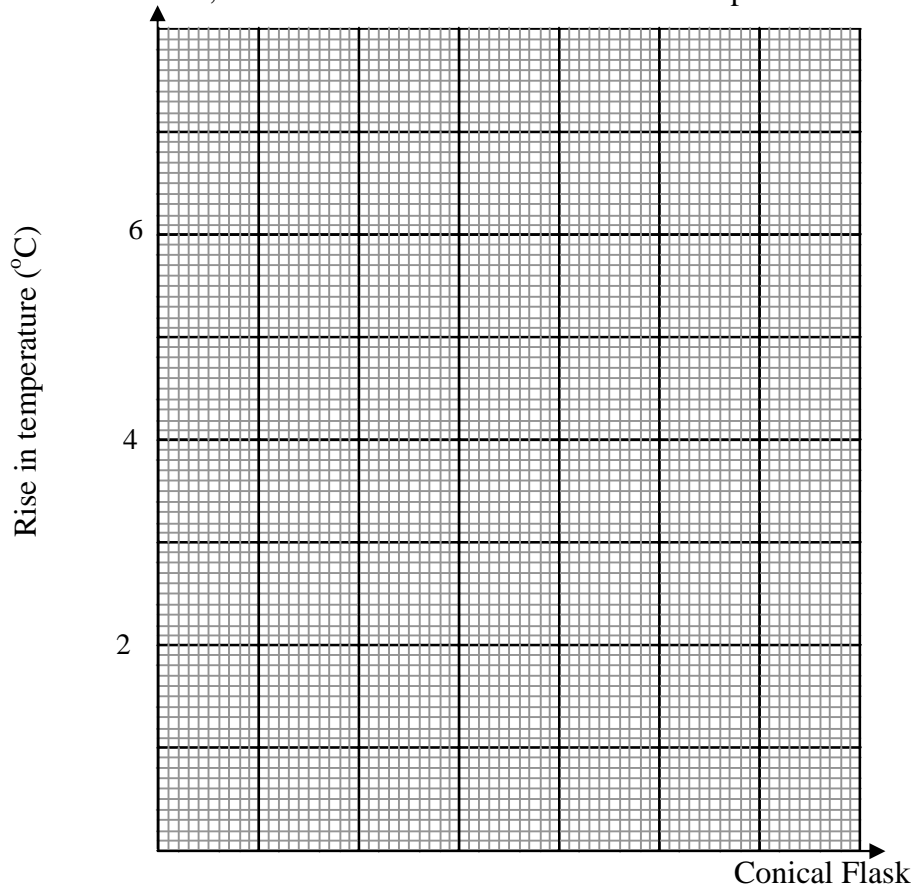
Diagram 8.3

	P	Q
Initial temperature (°C)	28	28
Final temperature (°C)		
Rise in temperature (°C)		

Table 8.4

[2 marks]

- (ii) Based on Table 8.4, draw a bar chart to show the rise in temperature in P and Q.



[2 marks]

- (iii) Based on the bar chart, what can you say about the rise in temperature in the conical flasks?

[1mark]

- (iv) What is the relationship between the colour of the surface and the rate of heat absorption?

[1mark]

- (c) State the variables involved in the experiment.

(i) manipulated variable	
(ii) responding variables	
(iii) constant variables	

[3marks]

Diagram 8.1 shows an experiment to investigating the factor required for photosynthesis.

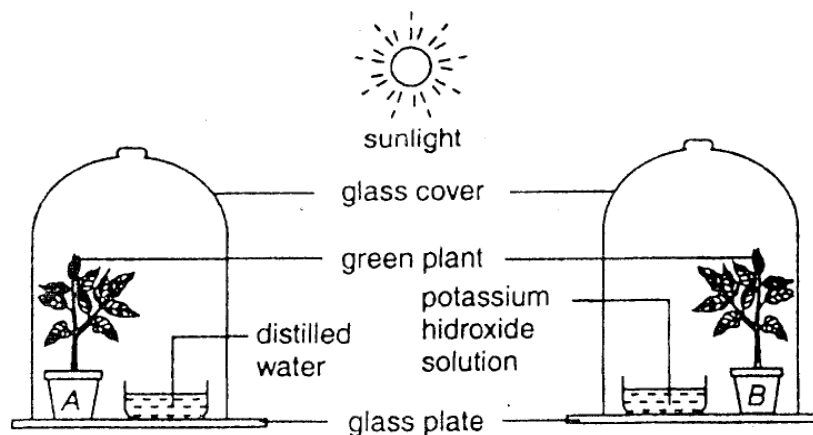


Diagram 8.1

- Step 1 : two potted plants are placed in the darks for two days.
 Step 2 : the apparatus shown in Diagram 8.1 is replaced. The apparatus is placed under the sun for two day.
 Step 3 : a leaf is plucked from each plants and tested for the present of starch.

(a) Why are the plants kept in the dark two days before the experiment?

[1mark]

(b) What is the function of potassium hydroxide solution?

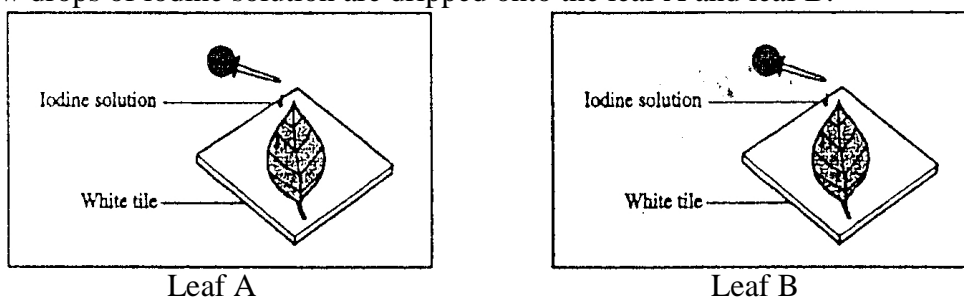
[1mark]

(c) State the variables involved in the experiment.

(i) manipulated variable	
(ii) responding variables	
(iii) constant variables	

[3marks]

(d) A few drops of iodine solution are dripped onto the leaf A and leaf B.



- (i) Fill in the table 8.1, to observe the expected results.

Leaf	Change in colour
A	
B	

Table 8.1

- (e) Write down the word equation of photosynthesis process?

[2marks]

[2mark]

- (f) Based on Diagram 8.1 and Diagram 8.2, state the operational definition of photosynthesis.

[1mark]

- (g) What is the conclusion of the experiment?

[1mark]

Diagram 8.1, shows an experiment to see how temperature affects the amount of sugar that will dissolve in a beaker of water until it becomes saturated. Each beaker contains the same volume of distilled water at different temperature and the mixture is stirred at the same rate.

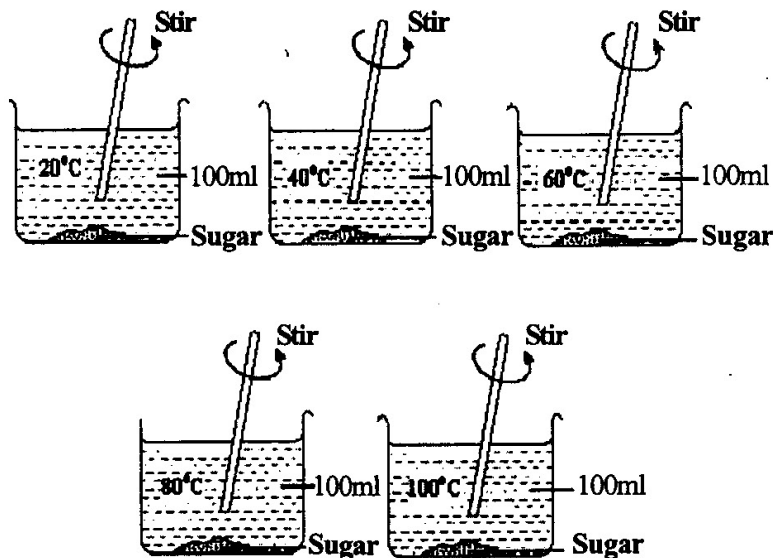


Diagram 8.1

- (a) In the experiment, state:
- (i) the solute : _____
 - (ii) the solvent : _____
- [2marks]

- (b) Suggest a hypothesis for this experiment.
- _____
- _____
- [1mark]

- (c) State the variables involved in the experiment.
- | | |
|---------------------------|--|
| (i) manipulated variable | |
| (ii) responding variables | |
| (iii) constant variables | |
- [3marks]

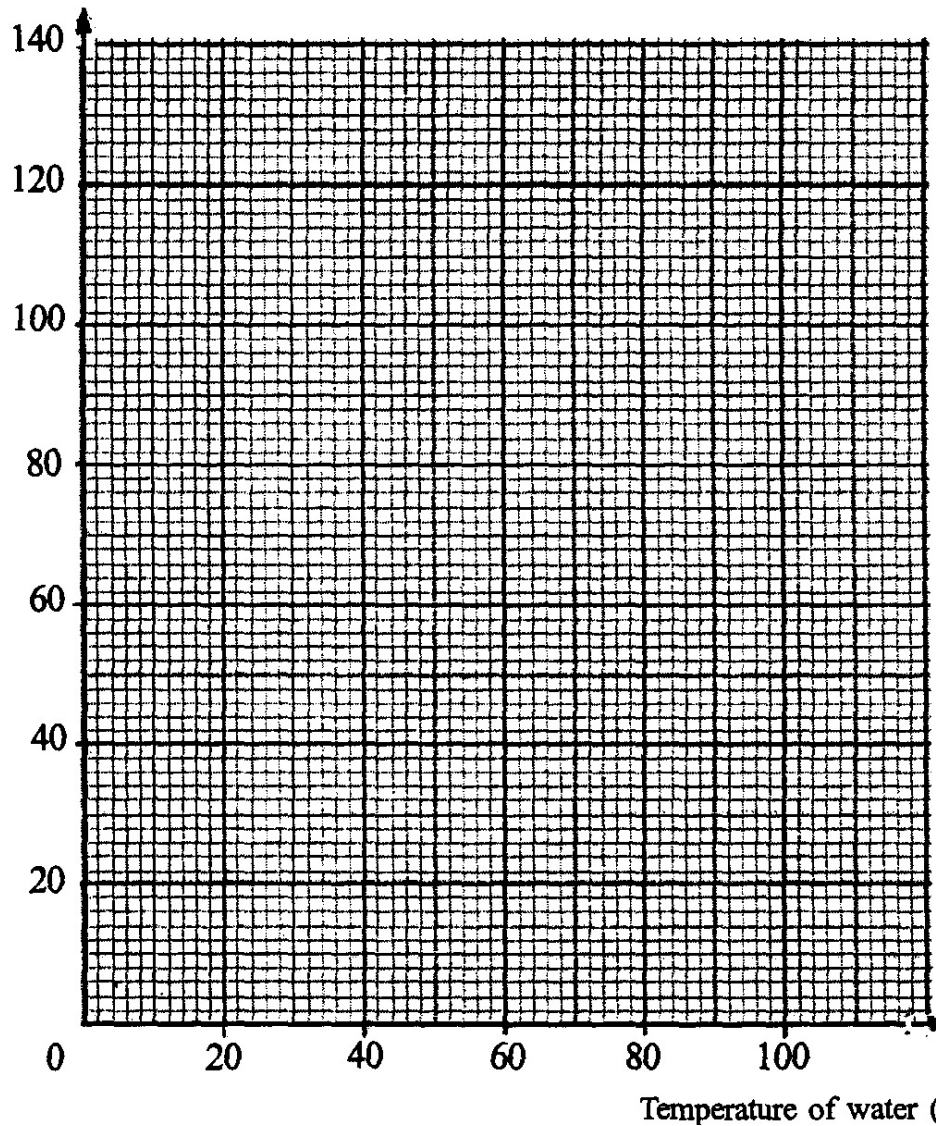
The amount of sugar dissolved in each beaker is recorded as shown in Table 8.2

Temperature (°C)	Amount of sugar dissolved(g)
20	15
40	45
60	75
80	105
100	135

Table 8.2

- (d) Based on table 8.2, plot graph to show the amount of sugar dissolved against temperature.

Amount of sugar dissolved (g)



- (e) Based on the graph, find amount of sugar dissolved when the temperature of the water in the beaker is at 70°C. [2marks]

_____ [1mark]

- (f) What is the relationship between manipulated variable and responding variable?

_____ [1mark]

- (g) What inference can you make from this experiment?

_____ [1mark]

- (h) Give one factor that affects solubility.

_____ [1mark]

Diagram 8.1 shows a girl drying some clothes in two different surroundings. She discovered that it took two hours to dry the clothes in surrounding A, and three hours in surrounding B.

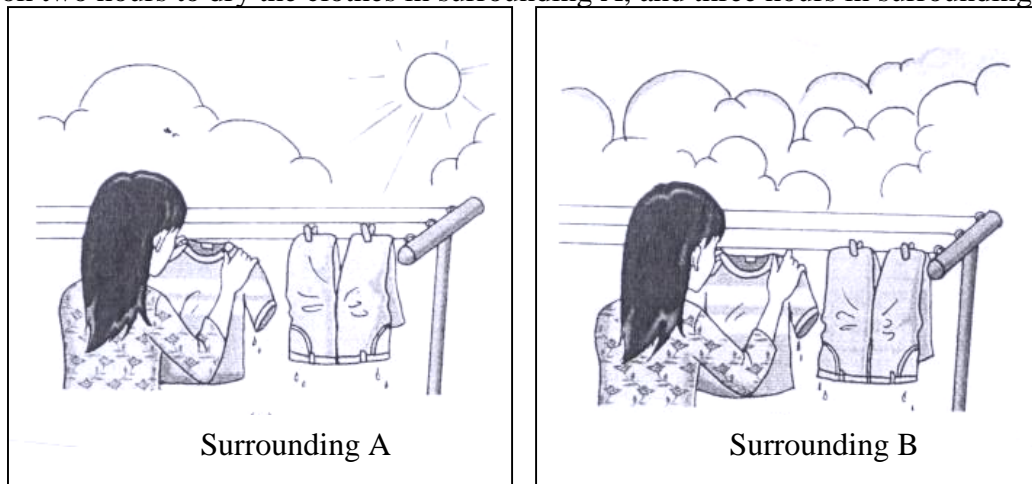


DIAGRAM 8.1

- (i) Based on the observations in Diagram 8.1, state the difference in the temperature of the surroundings A and B.

[1 mark]

- (ii) What inference can be made based on Diagram 8.1?

[1 mark]

- (iii) State **one** hypothesis based on your observation in Diagram 8.1.

[1 mark]

- (b) A student carried out an experiment to investigate the situations in Diagram 8.1. The set-up of the apparatus is shown in Diagram 8.2.

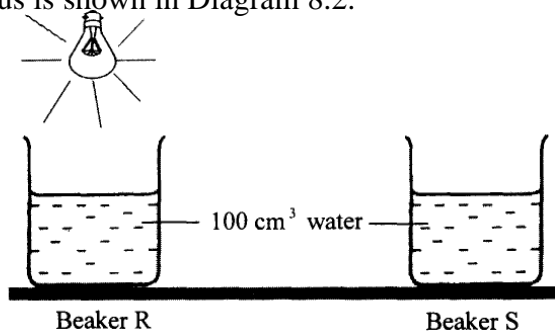
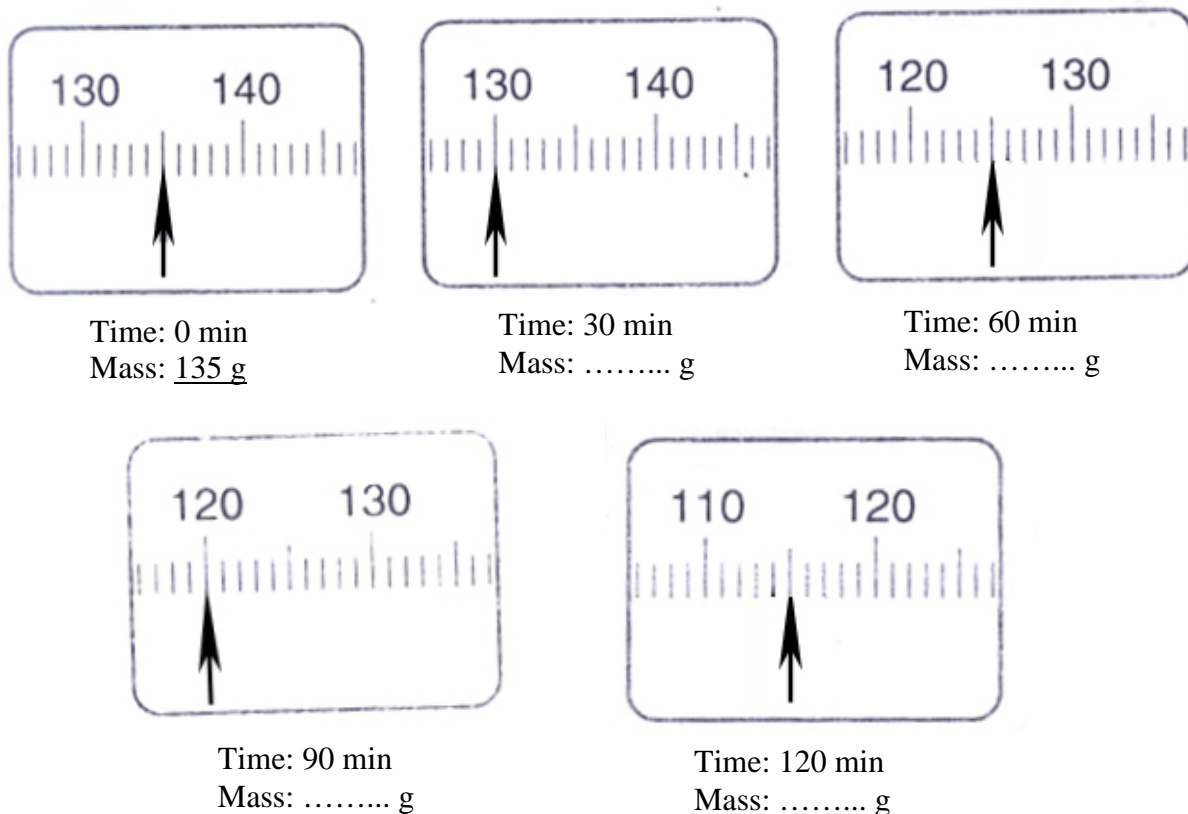


DIAGRAM 8.2

The steps taken by the student are as follow:

- Step 1: Beaker R is filled with 100 cm^3 of water and the mass of beaker R and its content is determined using a lever balance.
- Step 2: Beaker S is filled with 100 cm^3 of water and the mass of beaker S and its content is determined using a lever balance.
- Step 3: Both beakers are placed in the laboratory. A lighted lamp is placed above beaker R.
- Step 4: The mass of beakers R and S with their contents are determined every 30 minutes for 2 hours.

- (i) Record the reading of the lever balance for the mass of beaker R and its content in the space provided. Then, complete Table 8.1.



[2 marks]

Time / min.	0	30	60	90	120
Mass of beaker R / g	135	.....	.....	.....	.....
Mass of beaker S / g	135	133	131	129	127

TABLE 8.1

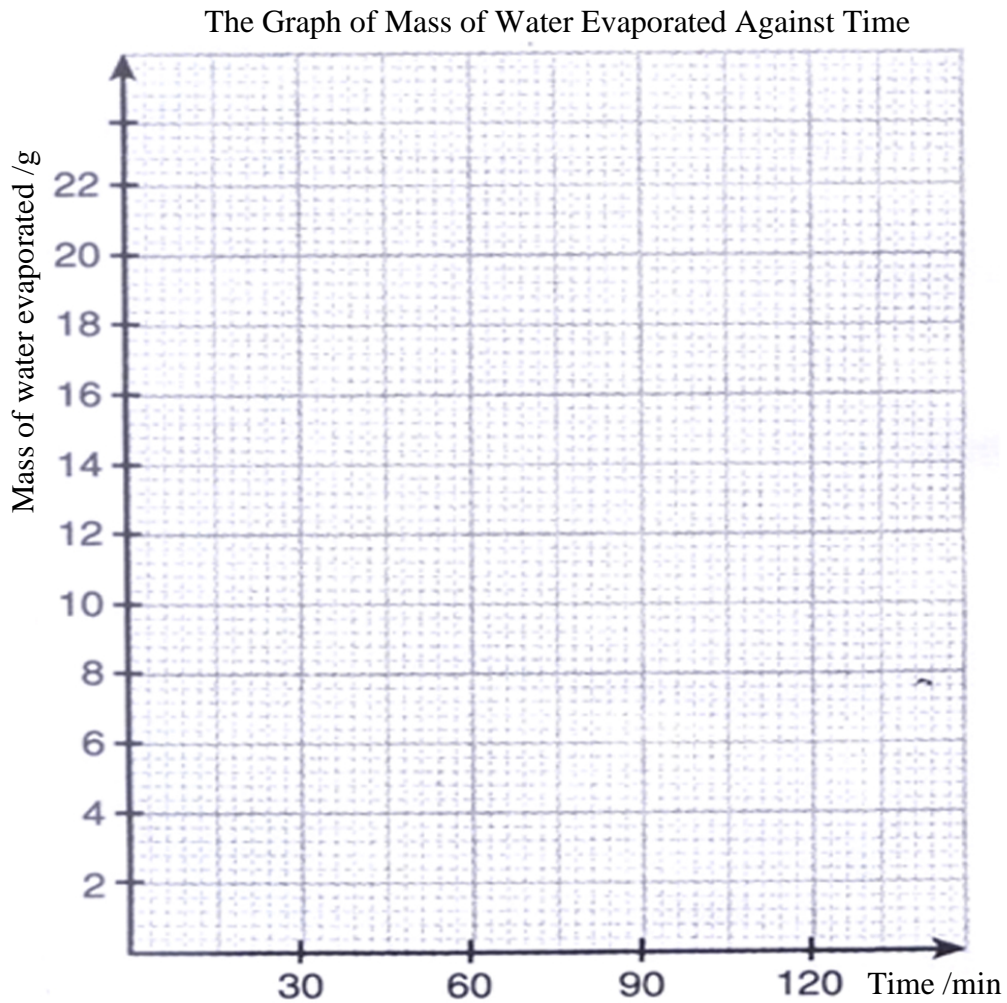
- (ii) Calculate the mass of water evaporated from beaker R. Complete Table 8.2.

Time / min.		0	30	60	90	120
Mass of water evaporated / g	Beaker R	0	.....	.....	.....	.....
	Beaker S	0	2	4	6	8

TABLE 8.2

[1 mark]

- (c) Based on the data in table 8.2, plot the graph of the mass of water evaporated against time for both beakers R and S on the same axis.



[2 marks]

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

Manipulated variable:	.....
Responding variable:	.....

[2 marks]

- (e) State the relationship between temperature of surrounding and the rate of evaporation.

[1 mark]

- (f) Based on the graph plotted in 8(c), state the operational definition of “**the rate of evaporation**” of water.

[1 mark]

- (a) Table 8.1 shows the air pressure of tyre of three different vehicles.



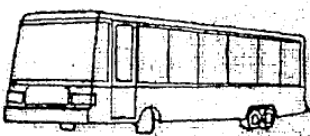
Vehicle <i>Kenderaan</i>	Air pressure of tyre <i>Tekanan udara tayar</i>
 Car <i>Kereta</i>	220 kPa
 Lorry <i>Lori</i>	400 kPa
 Bus <i>Bas</i>	500 kPa

Table 8.1

- (i) Based on the Table 8.1, state the difference in the air pressure of the bus and the lorry.

[1 mark]

- (ii) State the relationship between size of vehicles and air pressure in the tyres.

[1 mark]

- (b) A student carries out an experiment to study how the temperature affects the air pressure. Diagram 8.2 shows the arrangement of apparatus for the experiment.

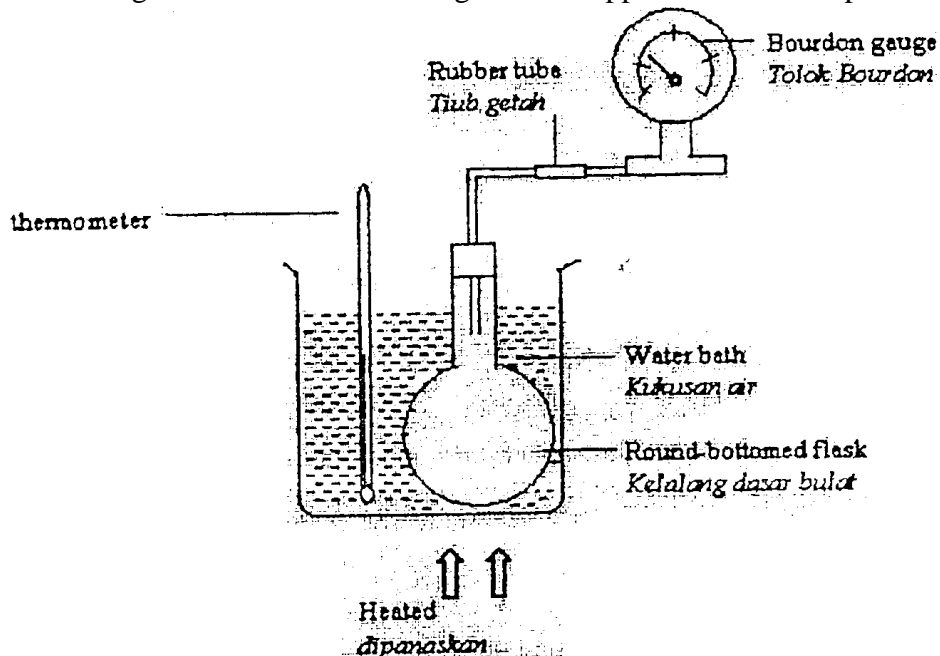
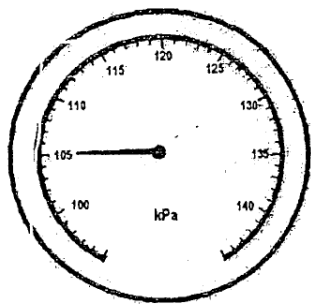


Diagram 8.2

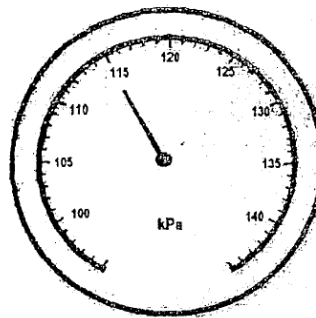
The student takes the following steps:

1. The apparatus is setup as shown in Diagram 8.2
2. The water bath is heated until the temperature of water reaches 30°C and the Bourdon gauge reading is recorded.
3. Repeats step 2 with the temperature of water 40°C , 50°C , 60°C and 70°C .

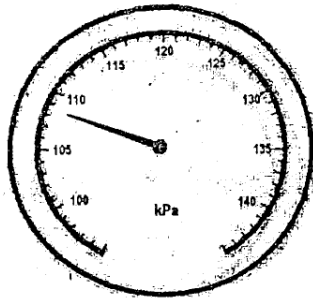
(i) Record the bourdon gauge reading in the space provided.



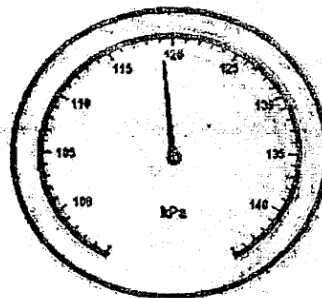
The temperature of water = 30 °C
Suhu air
 Bourdon gauge reading = 105 kPa
Bacaan tolok Bourdon



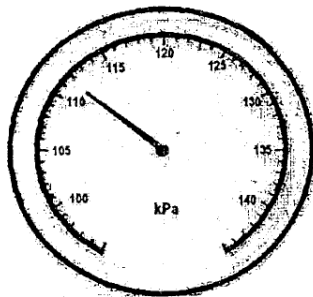
The temperature of water = 60° C
Suhu air
 Bourdon gauge reading = kPa
Bacaan tolok Bourdon



The temperature of water = 40° C
Suhu air
 Bourdon gauge reading = kPa
Bacaan tolok Bourdon



The temperature of water = 70° C
Suhu air
 Bourdon gauge reading = kPa
Bacaan tolok Bourdon



The temperature of water = 50° C
Suhu air
 Bourdon gauge reading = kPa
Bacaan tolok Bourdon

Diagram 8.3

(ii) Based on Diagram 8.3, complete Table 8.4 by recording the Bourdon gauge reading on the respective temperature of air.

Temperature (°C)	30	40	50	60	70
Bourdon gauge reading (kPa)	105.0				

Table 8.4

[2 marks]

(c) State one inference from the experiment.

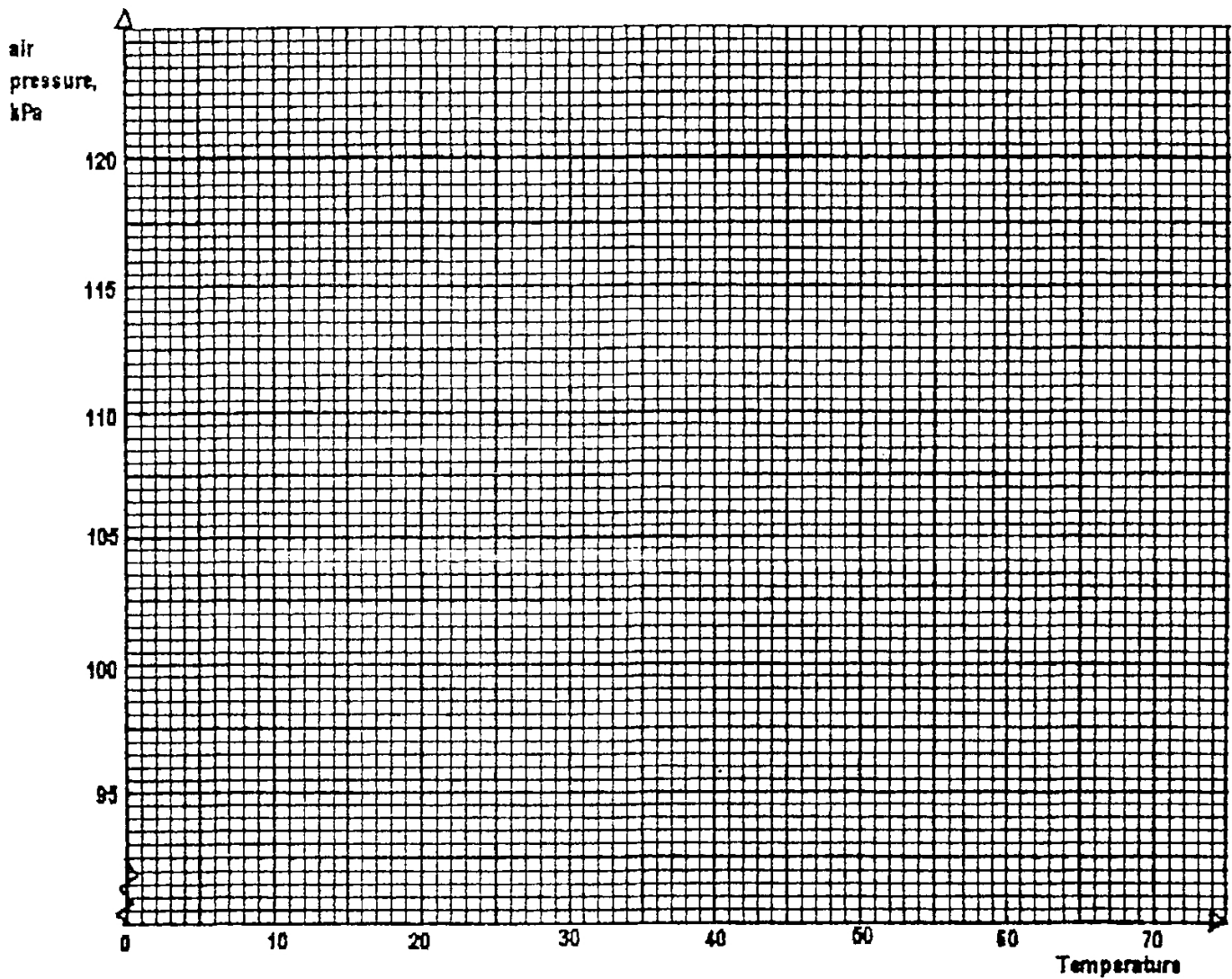
_____ [1 mark]

(d) State the variables involved in the experiment.

(i) manipulated variable	
(ii) responding variables	
(iii) constant variables	

[3marks]

(e) Using Table 8.4, draw a graph of air pressure against temperature.



[2marks]

(f) Based on the graph, state the relationship between the temperature and the air pressure.

[1 mark]

(g) Based on graph in (e), predict the bourdon gauge reading if the temperature is 0°C.

[1 mark]

A student carried out an experiment to study how different types of surfaces affect the magnitude of frictional force. The reading of the spring balance after the wooden block was placed on the table, glass plate and sandpaper are shown in Diagram 8.1

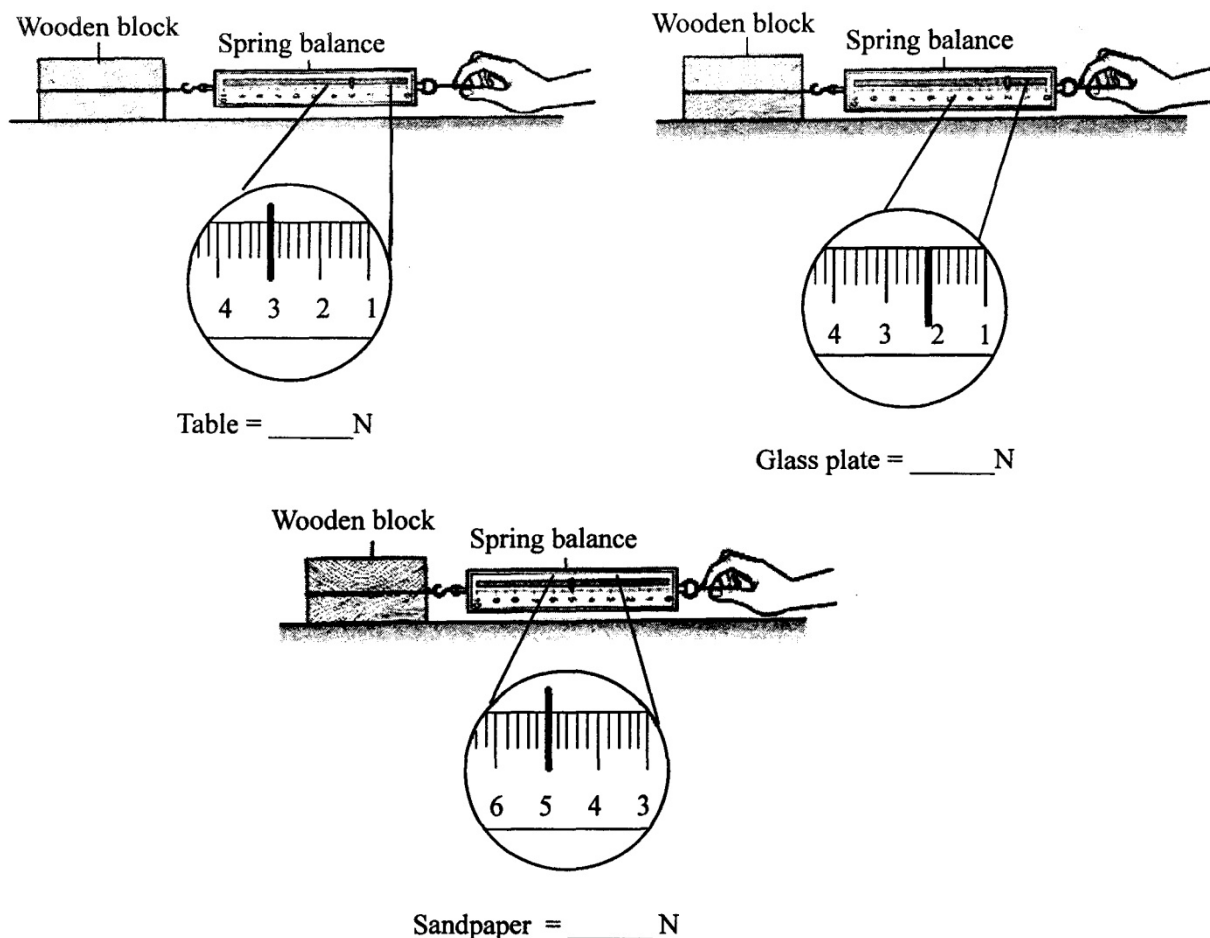


Diagram 8.1

(a) State the variables involved in the experiment.

manipulated variable	
responding variables	
constant variables	Mass of wooden block, force exerted on the wooden block

[2marks]

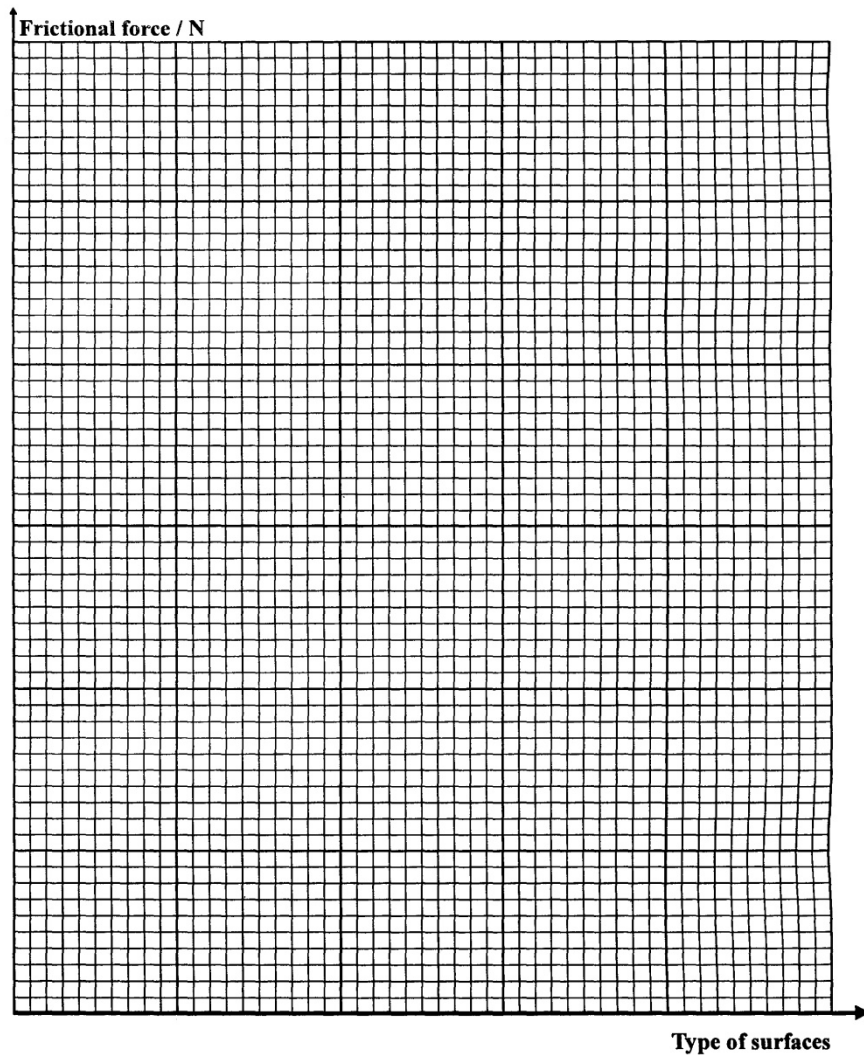
(b) Based on diagram 8.1, record the reading of the frictional force in Table 8.2.

Type of surface	Frictional force / N
Table	
Glass plate	
Sandpaper	

Table 8.2

[3marks]

- (c) Based on table 8.2, draw a bar chart to show the frictional force produced by different type of surfaces.



- (d) Based on the bar chart in (c), what can you say about the frictional force? [3marks]

[1 mark]

- (e) State one inference from the experiment.

[1 mark]

- (f) The wooden block was placed on a smaller surface area in contact. Will be magnitude of the frictional force change? Explain your answer?

[2 mark]

- (g) Based on the experiment, state the relationship between the type of surface area and the frictional force.

[1 mark]

Diagram 8.1 shows the apparatus set-up and the initial reading of the pointer in an experiment.

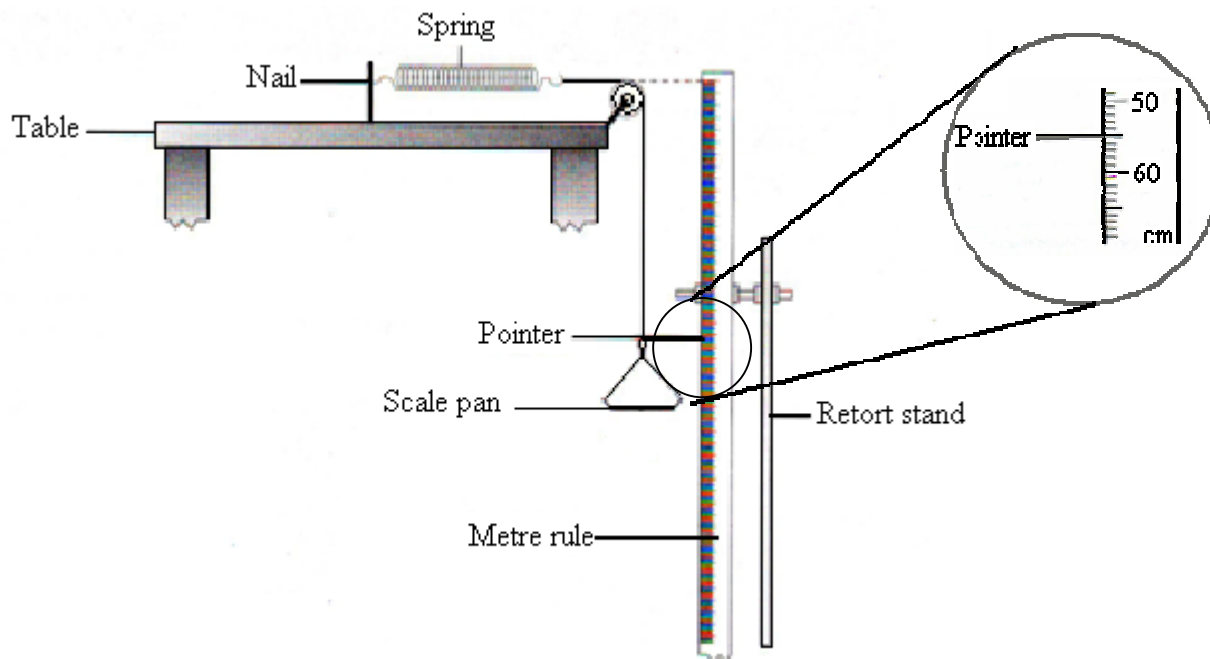


DIAGRAM 8.1

The experiment is carried out in the following way:

Step 1: The initial position of the pointer is recorded.

Step 2: A 100g load is put on the scale pan and the new position of the pointer is recorded.

Step 3: The 100g load is removed and the first two steps are repeated with 200g, 300g, 400g and 500g loads.

(a) Based on Diagram 8.1, record the initial reading of the pointer.

_____ cm

[1 mark]

(b) Table 8.1 shows the results of this experiment.

Mass of load /g	100	200	300	400	500
Pointer position /cm	57	59	61	63	65

Table 8.1

State the variables involved in the experiment.

manipulated variable	
responding variables	
constant variables	

[3marks]

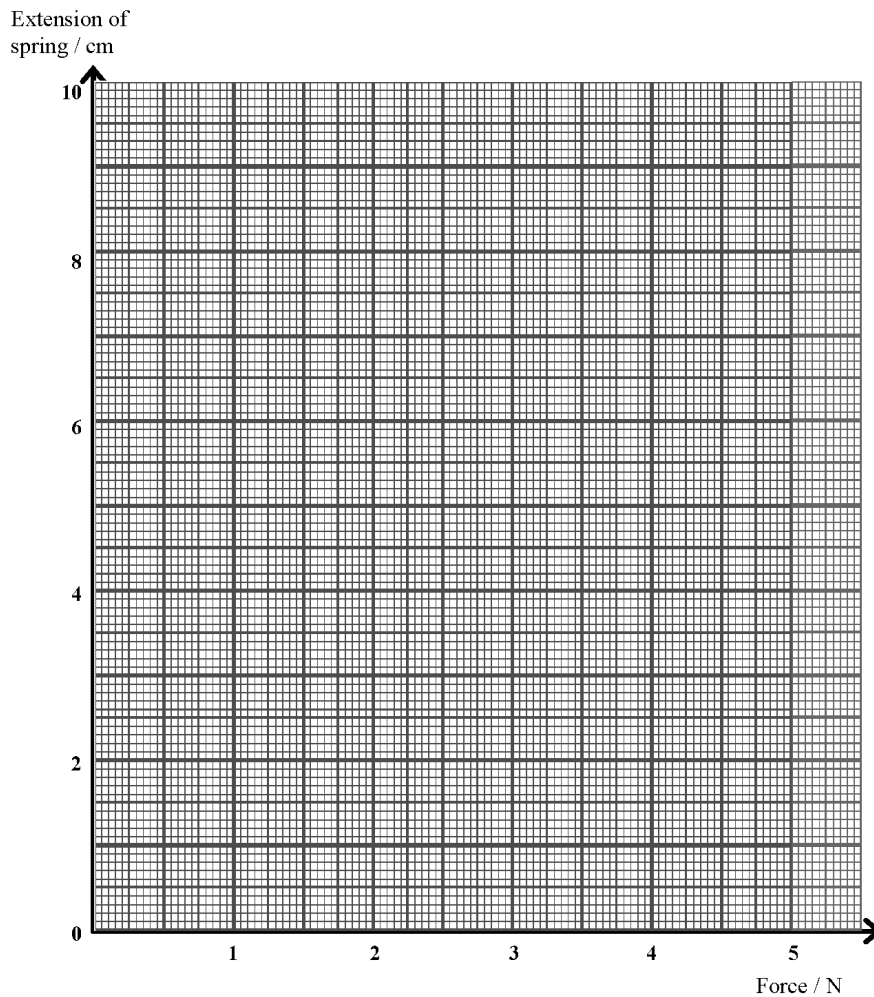
- (c) Complete Table 8.2 by calculating the force and the extension produced.
(Assume 1kg = 10N)

Mass of load /g	Force /N	Extension of spring /cm
100	1	2
200		
300		
400		
500		

Table 8.2

[3 marks]

- (d) For this part of the question, use the graph paper provided on page 14.
Based on Table 8.2, draw a graph of extension of spring against force.



[2 marks]

- (e) Based on the graph drawn in 8(d),
(i) Predict the extension of spring when a load of 450g is added to the scale pan.
..... cm

[1 mark]

- (ii) State the relationship between the extension of spring and the force exerted on it.

_____ [1 mark]

- (f) What can you deduce about the meaning of **extension of spring**?

_____ [1 mark]

(a) A boy is using two different length of poles to lift a stone.

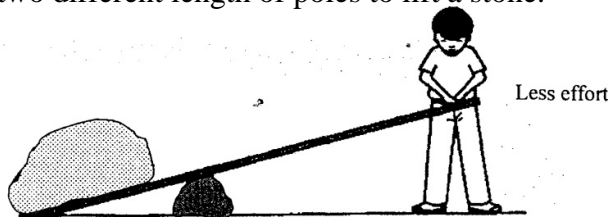


FIGURE 8.1

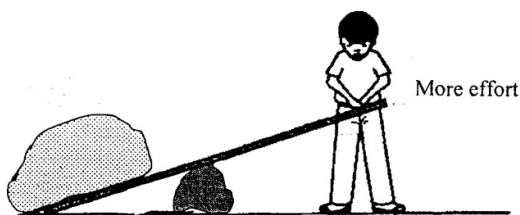


FIGURE 8.2

(i) Based on the observations in Figure 8.1 and 8.2, state the different length of poles to lift a stone .

[1 mark]

(ii) What inference can be made based on figure 8.1 and figure 8.2?

[1 mark]

(iii) state your hypothesis based on your observation in figure 8.1 and 8.2.

[1 mark]

(b) A student carries out an experiment to investigate the situation in figure 8.1 and 8.2. figure 8.3 shows the arrangement of the apparatus for an experiment.

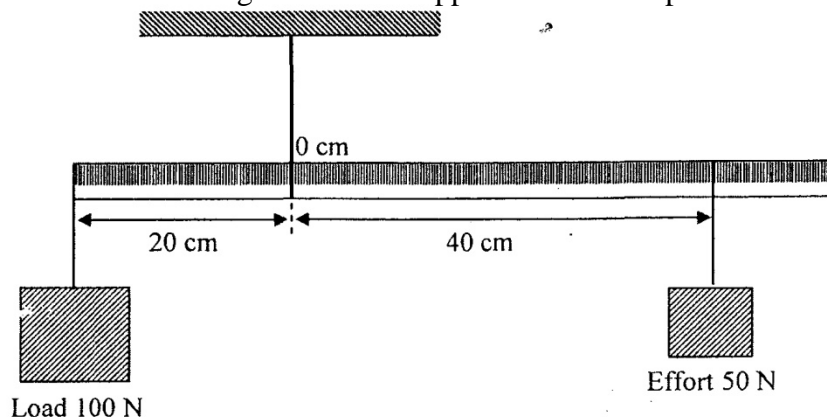


Figure 8.3

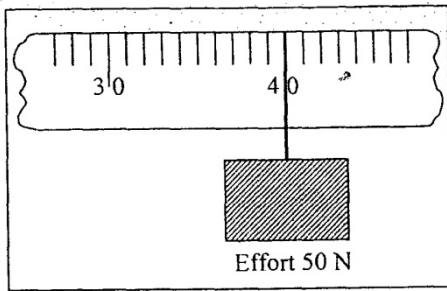
The student takes the following steps:

Step 1 : Hang a weight of 100N at 20cm from the fulcrum and hang another weight of 50N on the other side of the fulcrum until the lever comes to equilibrium.

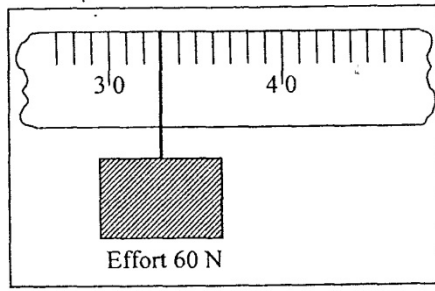
Step 2 : Record the distance of effort

Step 3 : Repeat steps 1 and 2 by changing weight of 60N, 70N, 90N and 100N respectively.

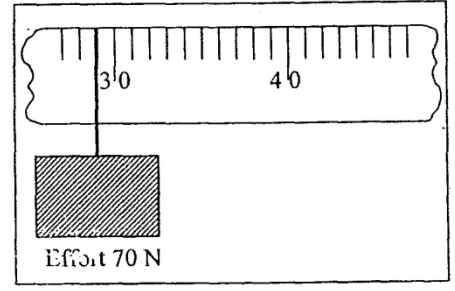
(i) record the distance of effort in the space provided.



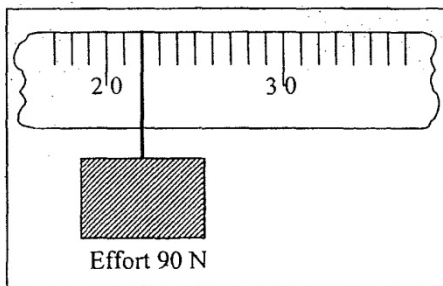
Effort = 50N
Distance of effort = 40cm



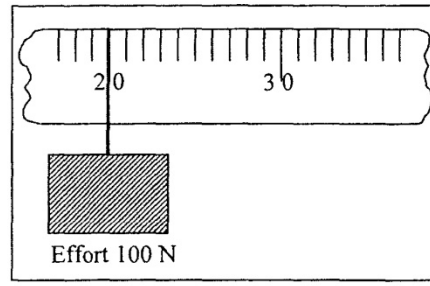
Effort = 60N
Distance of effort = ____ cm



Effort = 70N
Distance of effort = __ cm



Effort = 90N
Distance of effort = ____ cm



Effort = 100N
Distance of effort = __ cm

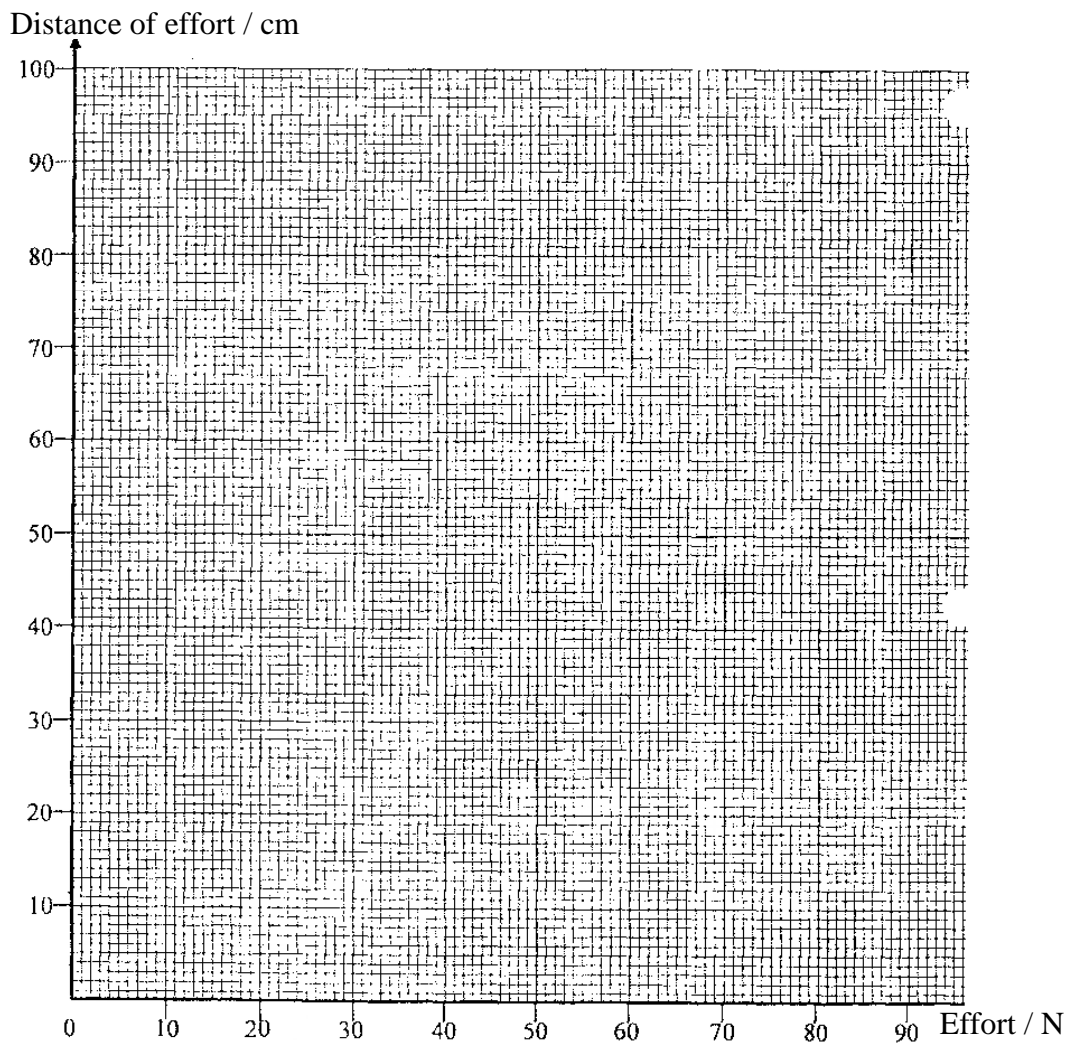
[2marks]

(ii) complete table 8.4 by recording the distance of effort on the respective effort.

Effort(N)	50	60	70	90	100
Distance of effort (cm)					

Table 8.4

(c) Using table 8.4, draws a graph of distance of effort against the effort.



[2marks]

(i) State the relationship between the distance of effort and the effort

[1 mark]

(ii) From the graph, predict the distance of effort when the effort is 80N.

[1 mark]

(d) State the variables involved in the experiment.

(i) manipulated variable	
(ii) responding variables	
(iii) constant variables	Load, load distance

[2marks]

(e) Based on the experiment, state the relationship between the length of the pole and the effort needed to lift the load

[1 mark]

Diagram 8.1, show two identical set-up of apparatus to study the rate of transpiration in a plant. The set up was left for three day under different conditions P and Q, the final reading were recorded in Table 8.1.

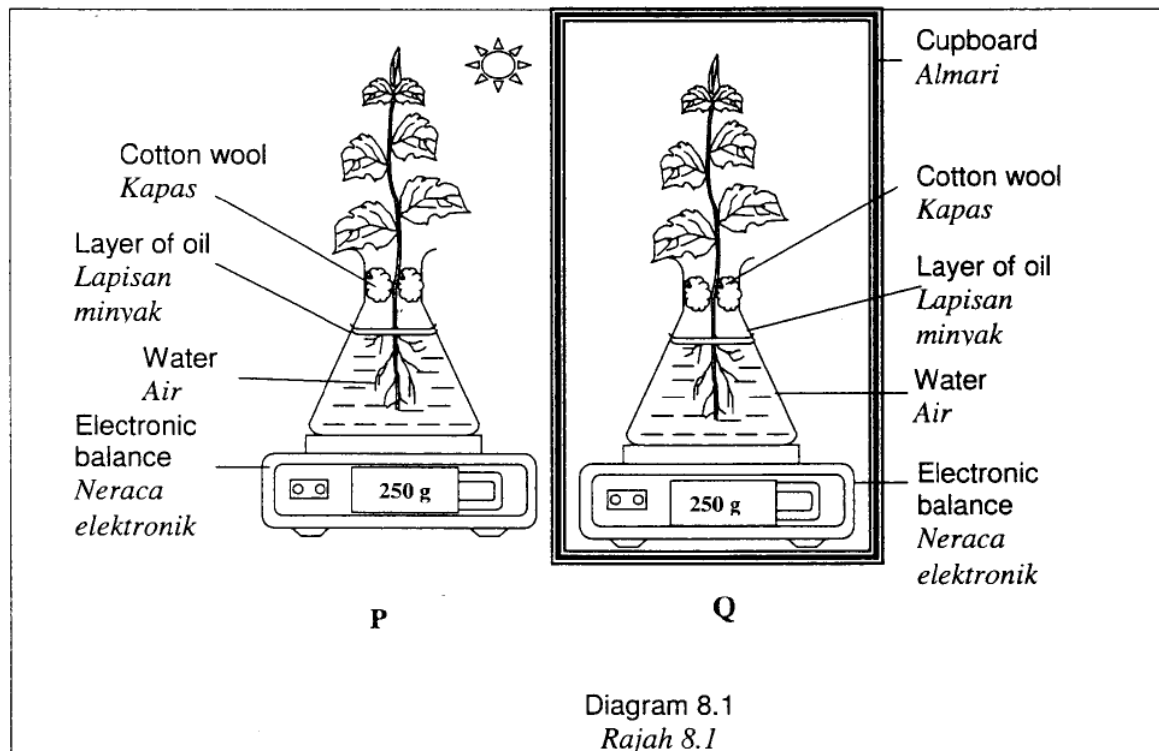


Diagram 8.1
Rajah 8.1

- (a) Based on diagram 8.1, record the mass of the apparatus at the start of the experiment in table 8.1. [1mark]
- (b) Calculate the mass loss at the end of the experiment. Record in table 8.1 [2marks]

Condition	Mass of apparatus (g)	
	P	Q
	Under the hot sun	In a cupboard
At the start		
At the end	210	235
Mass loss		

Table 8.1

- (c) State the variables involved in the experiment.

(i) manipulated variable	
(ii) responding variables	
(iii) constant variables	

[3marks]

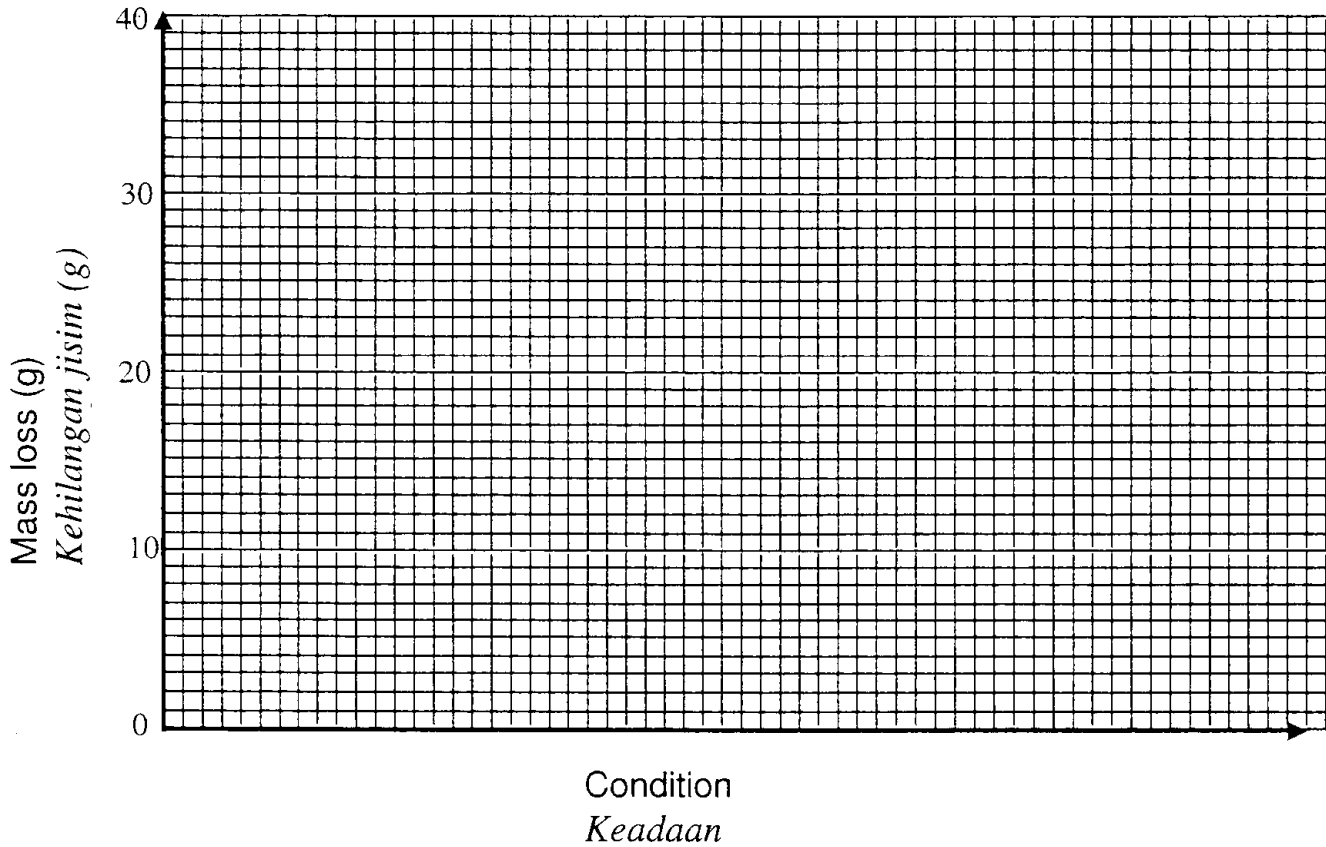
- (d) State a hypothesis based on the results in table 8.1

[1 mark]

(e) What can you infer from the reading in table 8.1?

[1 mark]

(f) Based on the reading in table 8.1, draws a bar chart to show the mass loss in P and Q.



[2marks]

(g) Predict the mass loss if the apparatus is placed in a windy place.

[1 mark]

(h) Define operationally the 'rate of transpiration'?

[1 mark]

Diagram 8.1 shows an activity to study germination of seeds.
The average length of radicles in each container is taken every two days.

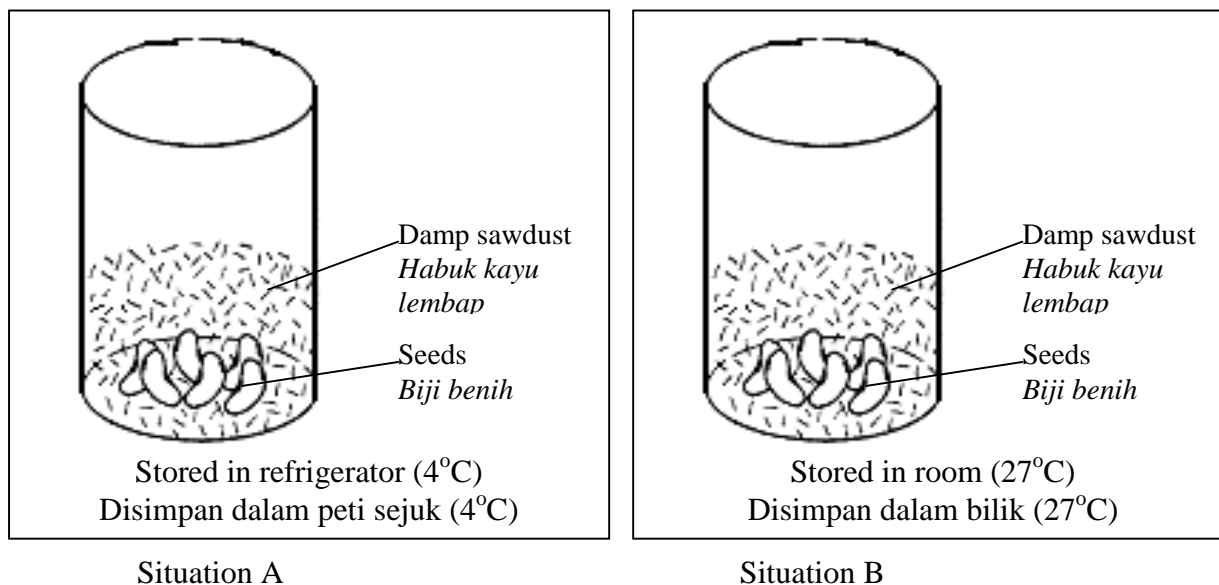


Diagram 8.1

Table 8.1 shows the result of this activity.

Times (day)	2	4	6	8
Average length of radicle in situation A (cm)	0	0	0	0
Average length of radicle in situation B (cm)	1.0	2.0	3.2	5.8

Table 8.1

- (a)(i) Based on your observation in Diagram 8.1 and Table 8.1,
Sstate the differences in the average length of radicle in Situation A and Situation B.

[1 mark]

- (ii) State an inference.

[1 mark]

- (iii) State a hypothesis.

[1 mark]

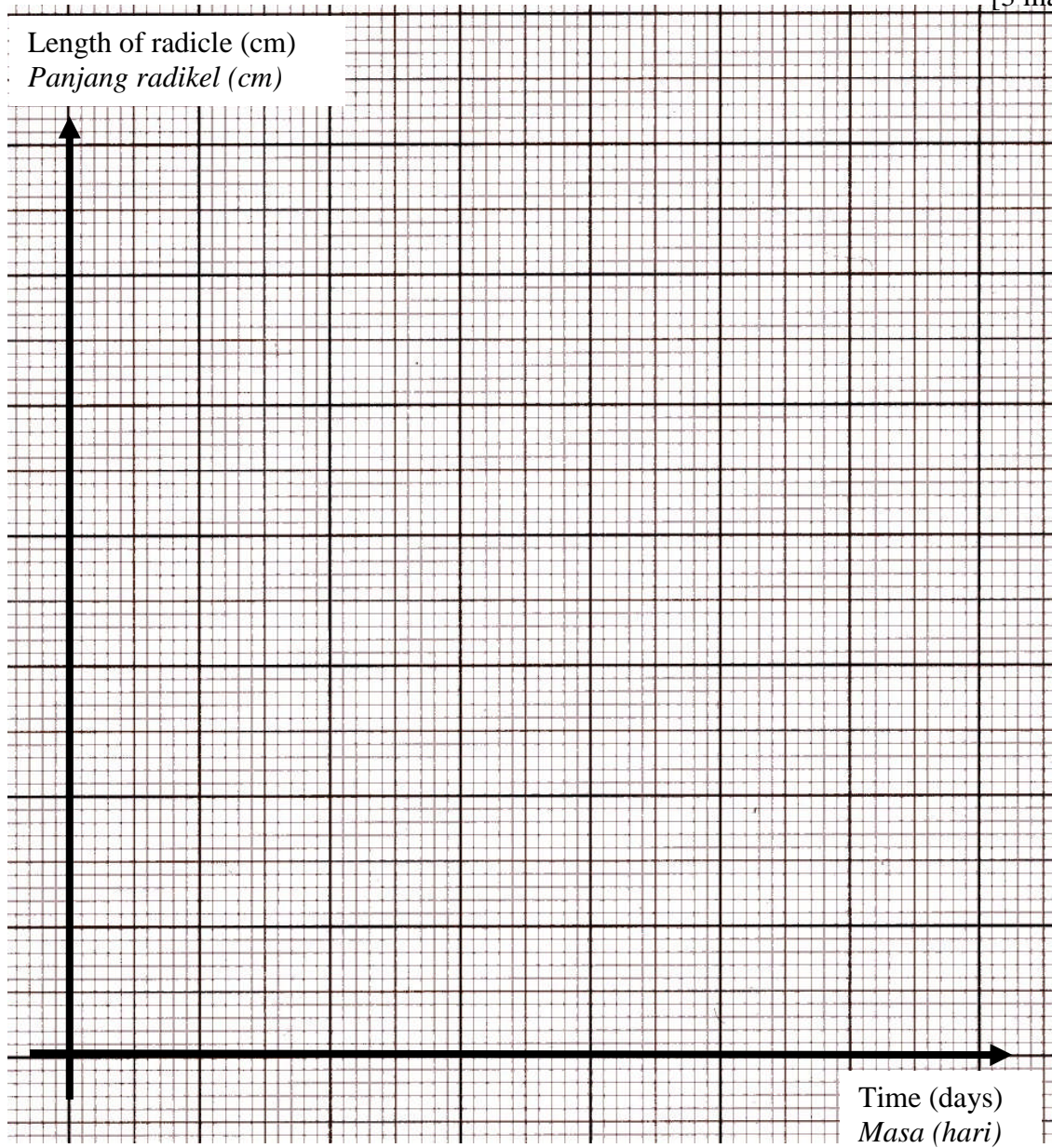
- (b) State the variables involved in the experiment.

(i) manipulated variable	
(ii) responding variables	
(iii) constant variables	

[3marks]

- c) Based on Table 8.1, plot a graph of average length of radicle in Situation B against time using the graph paper provided.

[3 marks]



- d) Based on the graph drawn in 8(c), state the relationship between average lengths of radicle and time.

_____ [1 mark]

- e) Predict what will happen to average length of radicle in situation B when left for more than 10 days

_____ [1 mark]

- f) Based on the experiment, what can you deduce about the meaning of **germination of seeds**?

_____ [1 mark]

Diagram 8.1 shows a stage in germination.

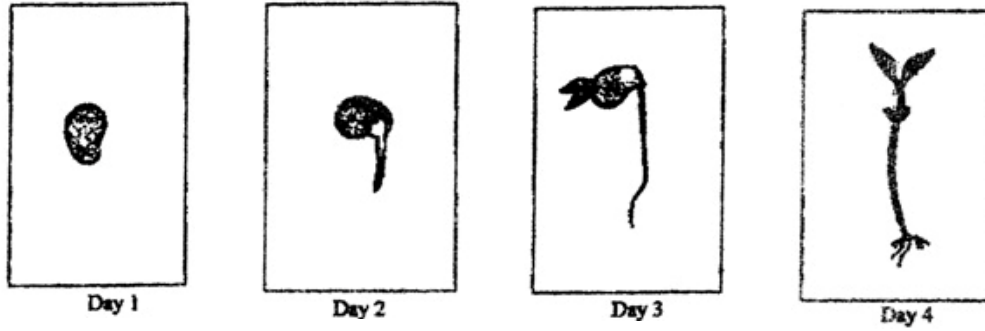


Diagram 8.1

(a) Based on diagram 8.1:

(i) State one different of physical change between the first and second day of germination.

[1 mark]

(ii) What inference can be made?

[1 mark]

(iii) Predict the size of cotyledons on fifth day of germination.

[1 mark]

(b) Diagram 8.2 shows the radicle's length according to days of germination.

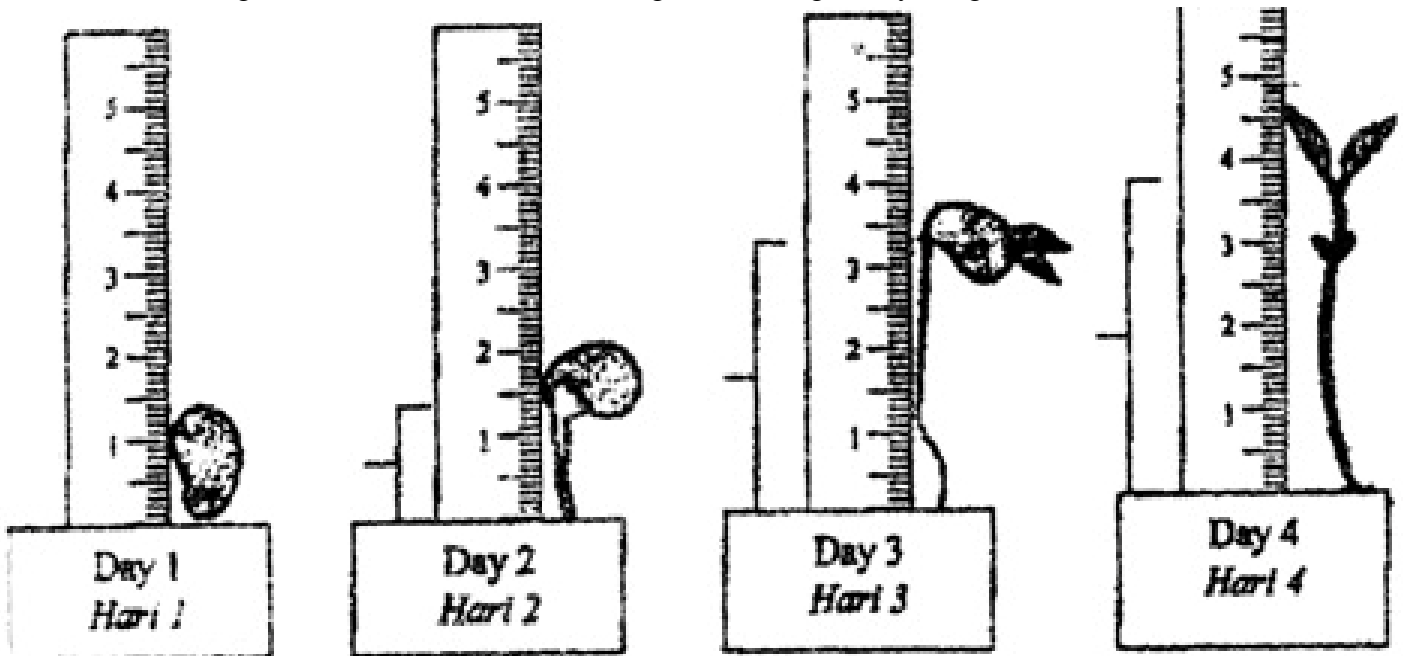


Diagram 8.2

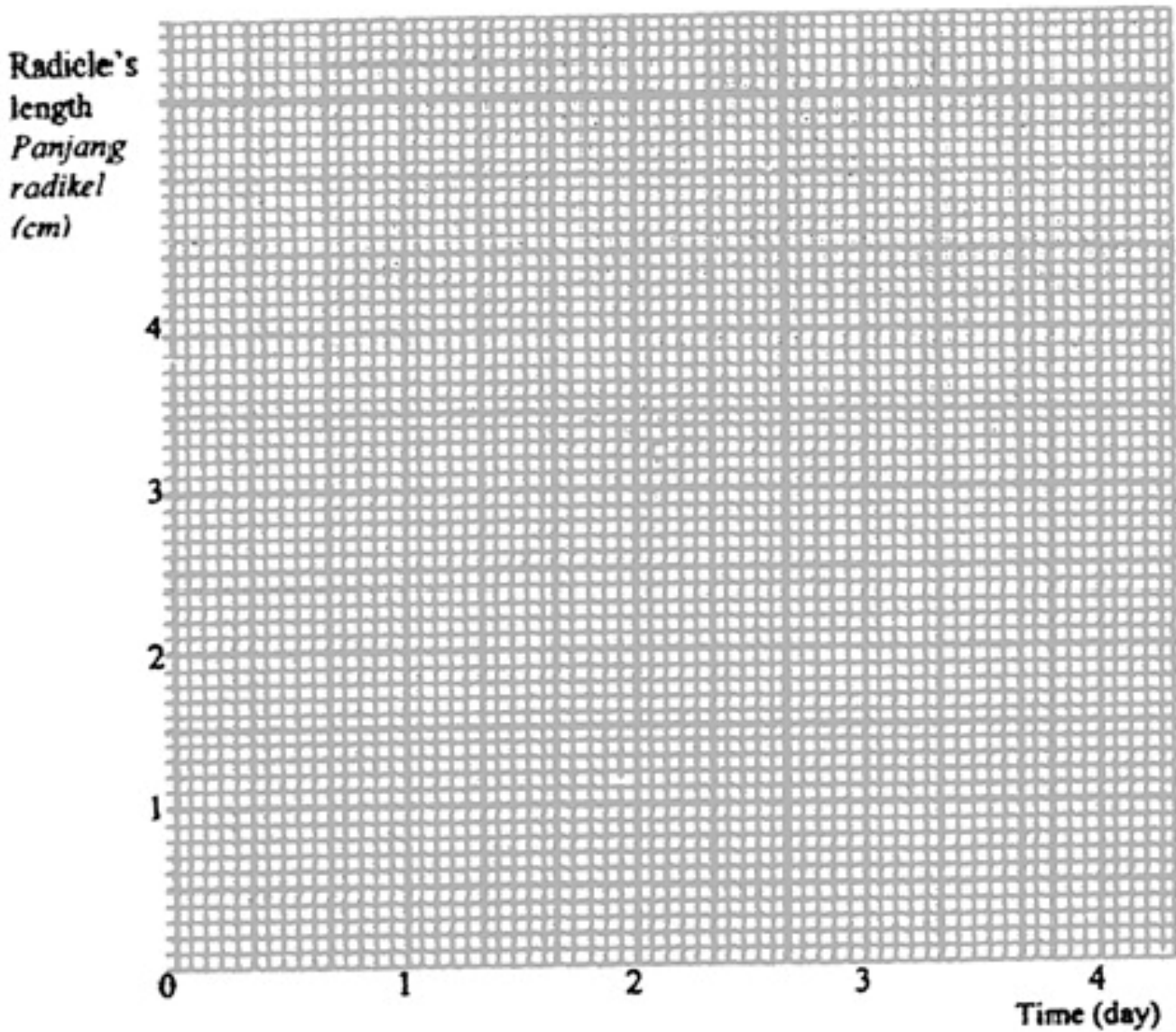
Based on diagram 8.2, record the length of radicle in table 8.3

Time(day)	1	2	3	4
Length of radicle(cm)				

Table 8.3

[2marks]

(c) Based on table 8.3, draw a graph of the radicle's length against time.



(d) Based on the graph, state the relationship between the radicle's length and time. [2marks]

[1 mark]

(e) Diagram 8.4 and table 8.5, show a set of apparatus used in an experiment to study the factors affecting germination of seeds and the result.

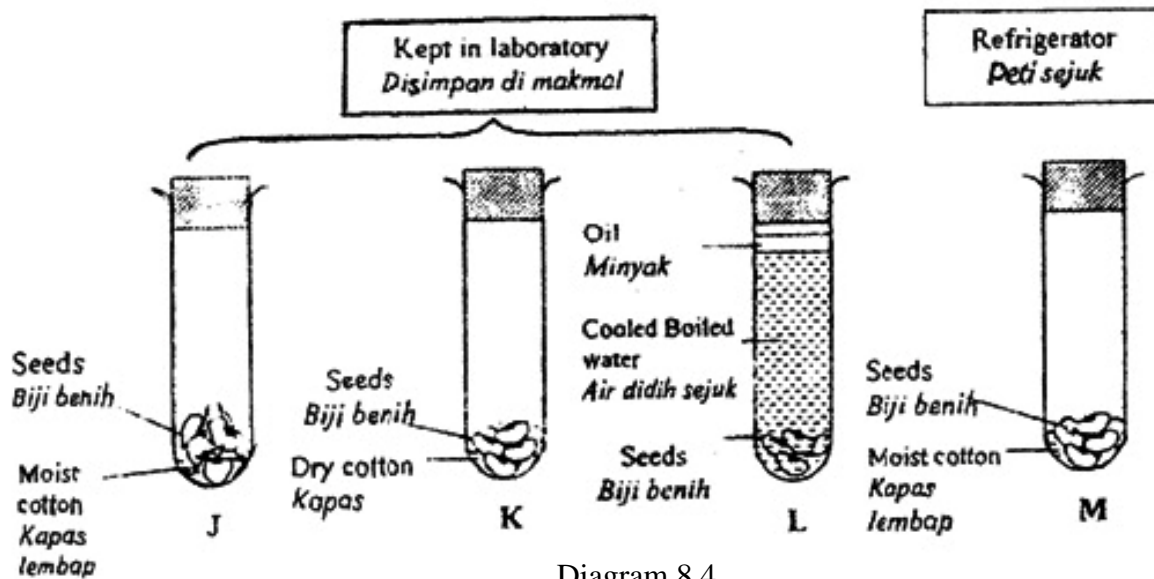


Diagram 8.4

Test tube	Observation
J	Seeds germination
K	Seeds do not germinate
L	Seeds do not germinate
N	Seeds do not germinate

Table 8.5

Based on diagram 8.4 and table 8.5:

(i) State the variables involved in the experiment.

(i) manipulated variable	
(ii) responding variables	
(iii) constant variables	Type of seed

[2marks]

(ii) State the action taken which enable the seed to germinate.

_____ [1 mark]

(iii) What can you observe to determine the germination occurred?

 _____ [1 mark]

A student observes that a car which uses petrol and a lorry which uses diesel produce different amount of soot. The range of the boiling point for petrol is $40^{\circ}\text{C} - 75^{\circ}\text{C}$ and the boiling point for diesel is $230^{\circ}\text{C} - 250^{\circ}\text{C}$.



Figure 8.1



Figure 8.2

- (i) Based on the observation in Figures 8.1 and 8.2, state the difference in the amount of soot formed.

[1 mark]

- (ii) What inference can be made based on Figures 8.1 and 8.2?

[1 mark]

- (iii) State your hypothesis based on your observation in Figures 8.1 and 8.2.

[1 mark]

A student carries out an experiment to investigate the situation in question 8(a). Figure 8.3 shows the arrangement of apparatus for the experiment.

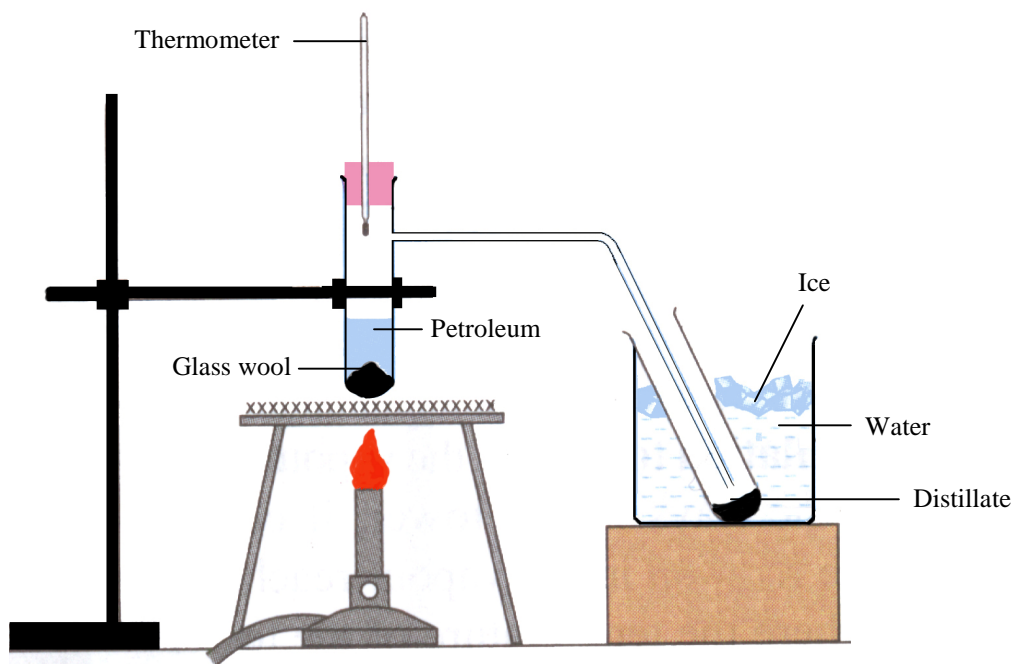


Figure 8.3

The petroleum is heated and the distillate is collected at four different ranges of temperature.

Table 8.4 shows the boiling point of different fractions. Record the thermometer readings in the Table 8.4.

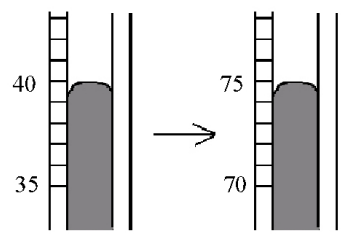
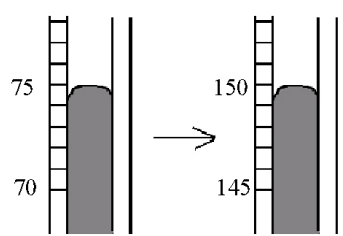
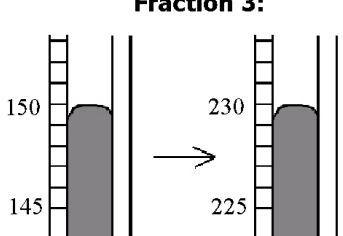
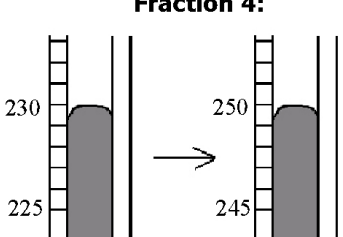
Fraction	Range of temperature , °C	Colour of Distillate
<p>Fraction 1:</p> 	40°C – 75°C	Colourless
<p>Fraction 2:</p> 		Yellow
<p>Fraction 3:</p> 		Yellowish brown
<p>Fraction 4:</p> 		Brown

Table 8.4

[2 marks]

- (c) Equal amount of the distillate from each fraction are placed in separate evaporating dishes. The distillate are then lighted using a burning splinter. A piece of filter paper is held at the top of each burning distillate as shown in Figure 8.5 for 30 seconds.

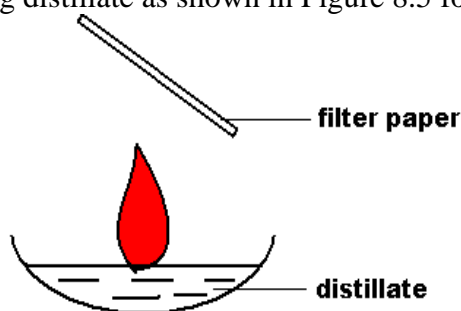


Figure 8.5

(i) State the variables involved in figure 8.5

(i) manipulated variable	
(ii) responding variables	
(iii) constant variables	Amount of distillate

[2marks]

(ii) Figure 8.6 (c) shows the amount of soot formed in the combustion of fraction 3. Complete Figure 8.6 (a),(b) and (d) to show the amount of soot produced.

(Assumption: The number of black spots (●) indicates the amount of soot produced).

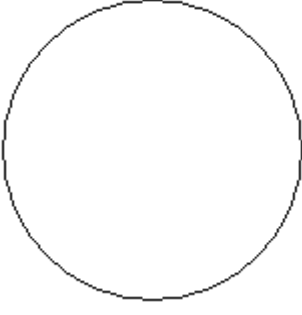
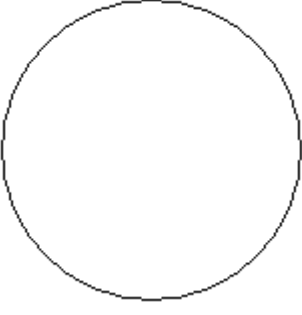
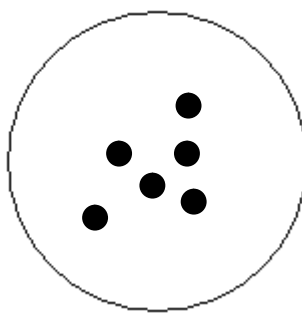
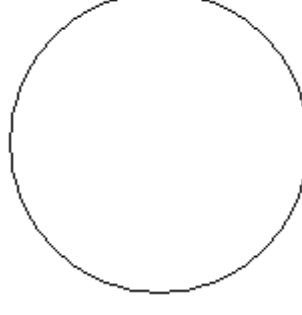
	
a : Fraction 1	b : Fraction 2
	
c : Fraction 3	d : Fraction 4

Table 8.5

[2 marks]

(iii) State relationship between the temperature of the fractions and amount of soot formed.

[1 mark]

(iv) Based on the observation in (c) (ii), predict the amount of soot produced from the combustion of fraction with the boiling point of 300°C.

[1 mark]

(v) Based on Table 8.4, state the relationship between the boiling point and colour of fractions.

[1 mark]

A student carried out an experiment to study the relationship between resistance and current. Diagram 8.1 shows the arrangement of apparatus for the experiment.

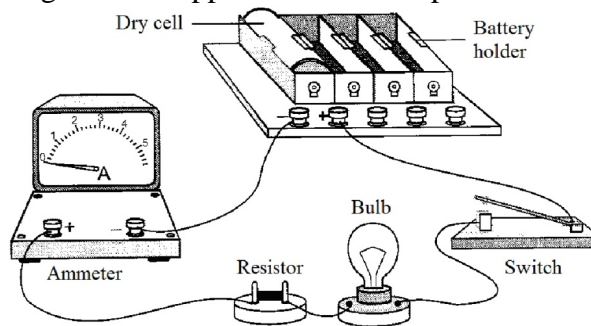


Diagram 8.1

The procedure of experiment is as follows:

Step 1: set up the circuit using the 1Ω resistor.

Step 2: Close the switch & observe the brightness of bulb and record the ammeter reading.

Step 3: repeat step 2 with a 2Ω, 5 Ω and 10 Ω resistor respectively.

(a) State the variables involved in the experiment.

(i) manipulated variable	
(ii) responding variables	
(iii) constant variables	

[3marks]

(b) Diagram 8.2 shows the reading of the ammeter when different resistor are connected to the circuit.

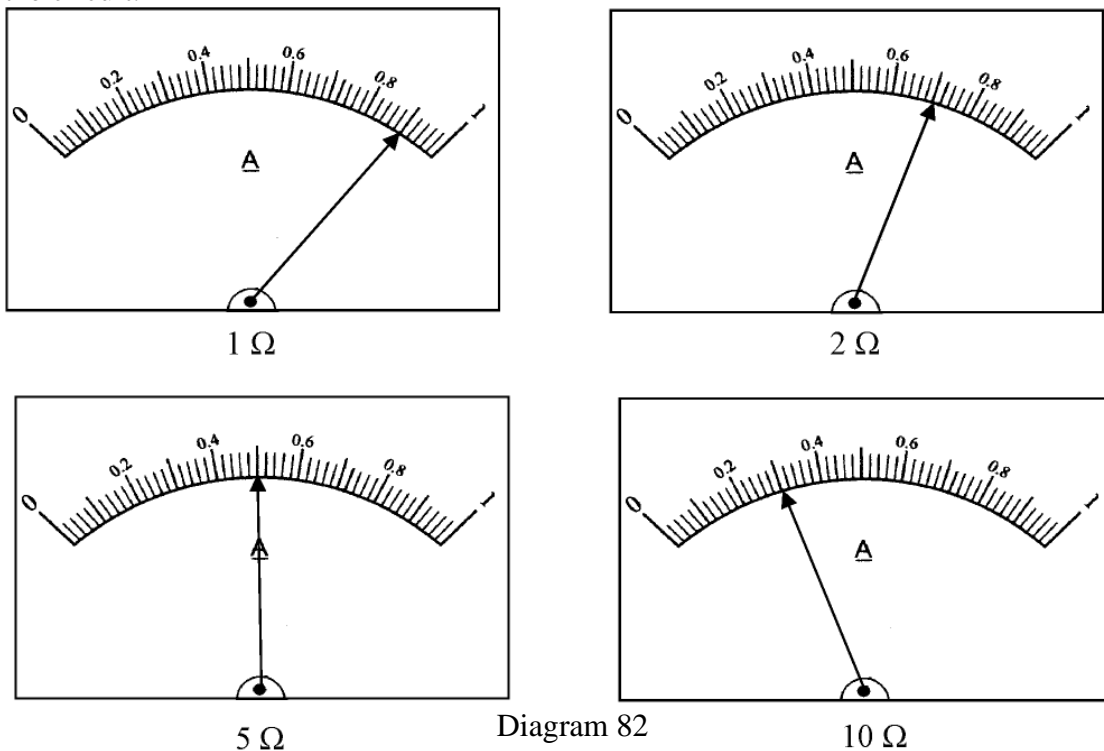


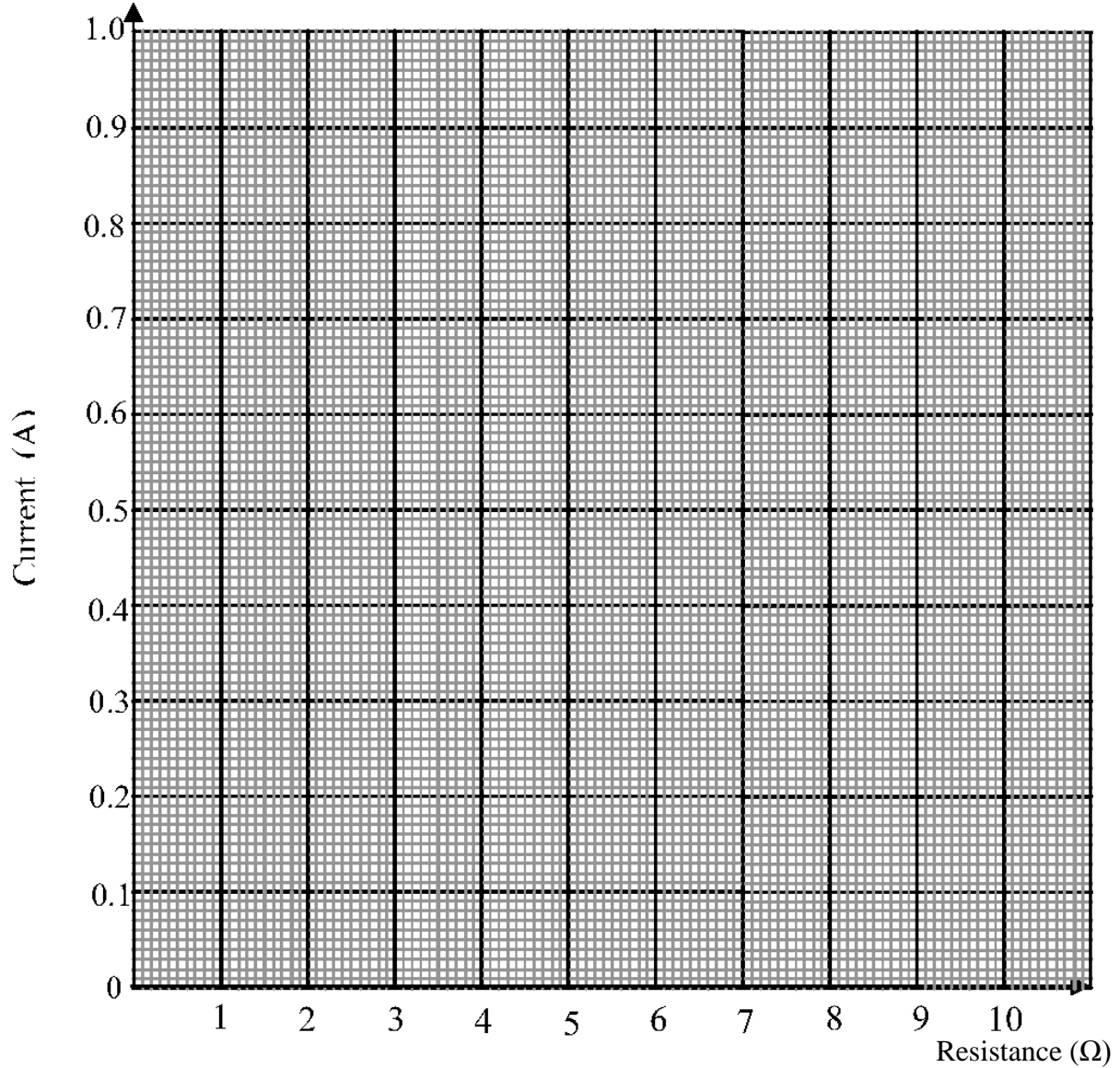
Diagram 8.2

Complete table 8.3 by recording the reading of the ammeter as shown in diagram 8.2

Resistance(Ω)	1	2	5	10
Ammeter reading (A)				

[3 marks]

- (c) Based on the reading in table 8.3, plot a graph of current, I against resistance, R .



[2marks]

- (d) Based on the graph in question (c),
 (i) State your inference.

_____ [1 mark]

- (ii) State the relationship between resistance and current.

_____ [1 mark]

- (iii) Predict the reading of ammeter when the resistance is 8Ω

_____ [1 mark]

- (e) Based on diagram 8.2, state the operational definition of current.

_____ [1 mark]

Diagram 8.1 shows an electrical circuit to study the relationship between voltage, current and resistance.

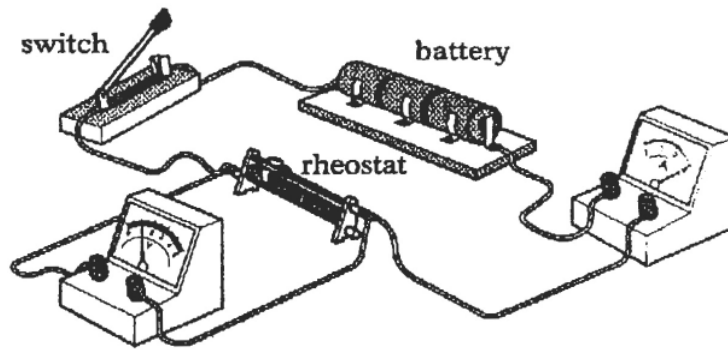


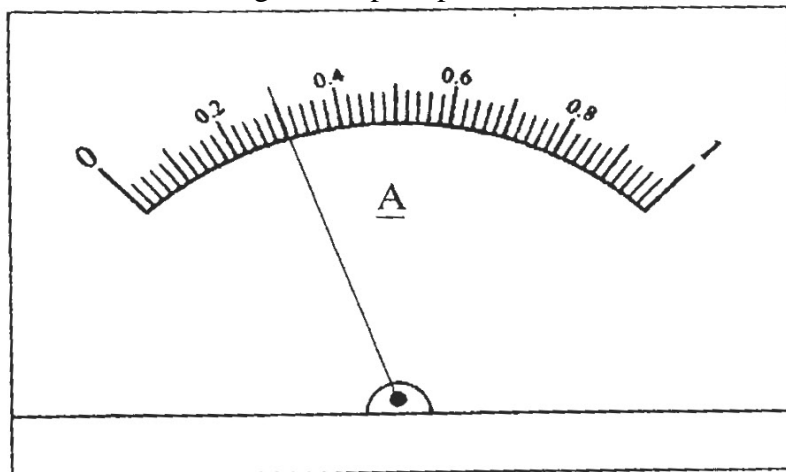
Diagram 8.1

This experiment is repeated using two, three and four dry cells connected in series. This ammeter and voltmeter reading are recorded. The result is as shown in table 8.2.

Number of dry cells	Current (A)	Voltage (V)
0	0	0
1	0.1	1.5
2	0.2	3.0
3	0.3	4.5
4	0.4	X

Table 8.2

- (a) Record the ammeter reading in the space provided.



Ammeter reading = _____ A

[1mark]

- (b) State the variables involved in the experiment.

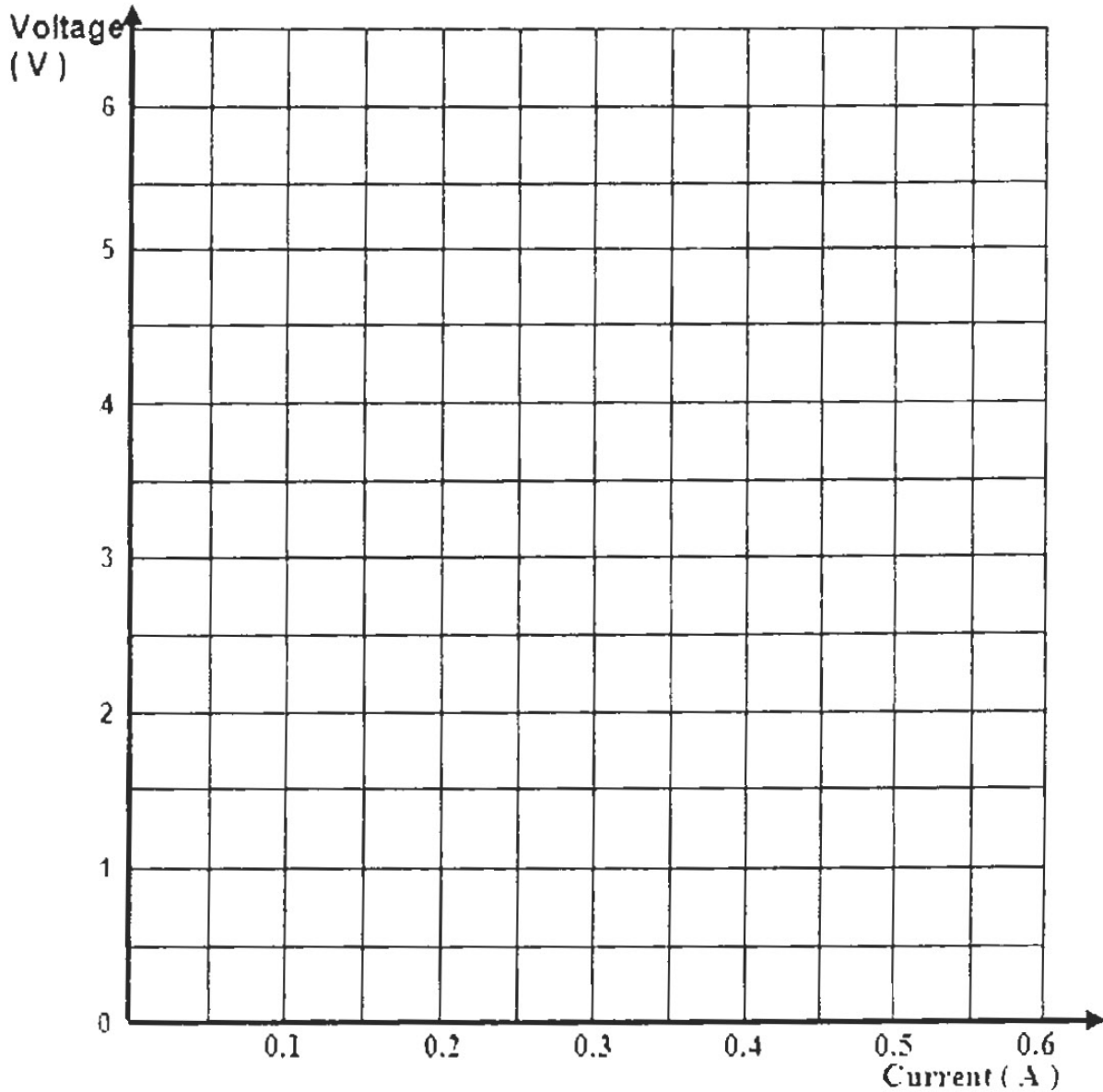
(i) manipulated variable	
(ii) responding variables	
(iii) constant variables	Length of wire, type of dry cells, type of wire

[2marks]

- (c) Based on table 8.1, find the value of X.

_____ [1 mark]

- (d) Based on the information in table 8.2, plot a graph to show the relationship between voltage and current.



[2marks]

- (e)(i) Based on the graph, what is the relationship between voltage and current?

[1 mark]

- (ii) Write a relationship between voltage, current and resistance according to Ohm's law.

[1 mark]

- (iii) Predict what will happened to the ammeter reading if the rheostat is replaced with short length of copper wire?

[1 mark]

- (f) Draw a parallel circuit in symbols using the following components.

Connecting wire Switch One voltmeter Two bulbs Two dry cells

[2marks]

- (g) The electrical wiring system in houses is in parallel circuits. Give one advantages of this system.

[1 mark]

A student carried out an experiment to study the functions of a simple transformer as shown in Diagram 8.0 with an a.c input of 12V.

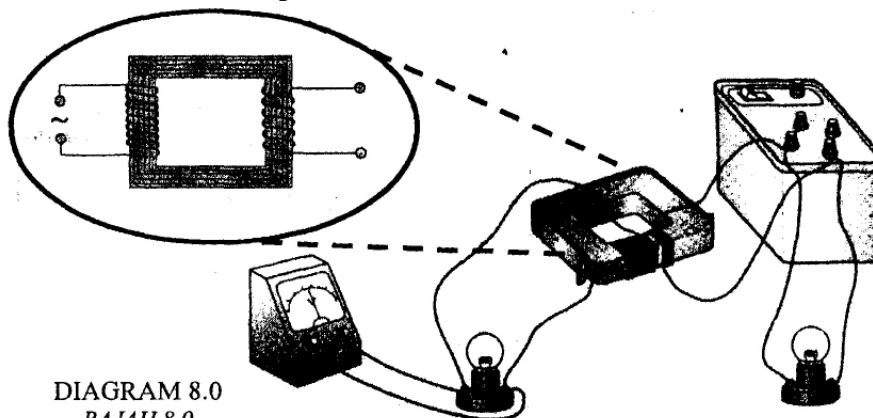


DIAGRAM 8.0
RAJAH 8.0

Table 8.1 below show the results of the experiment.

Number of turns in primary coil	Number of turns in secondary coil	Output voltage (V)
20	10	6
20	20	12
20	30	18
20	40	X
20	50	30

Table 8.1

- (a) based on the result in table 8.1, calculate the value of X.

_____ [1 mark]

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

(i) manipulated variable	
(ii) responding variables	
(iii) constant variables	

[3marks]

- (c)(i) What inference can be made based on table 8.1?

_____ [1 mark]

- (ii) State one hypothesis based on your observation in table 8.1.

_____ [1 mark]

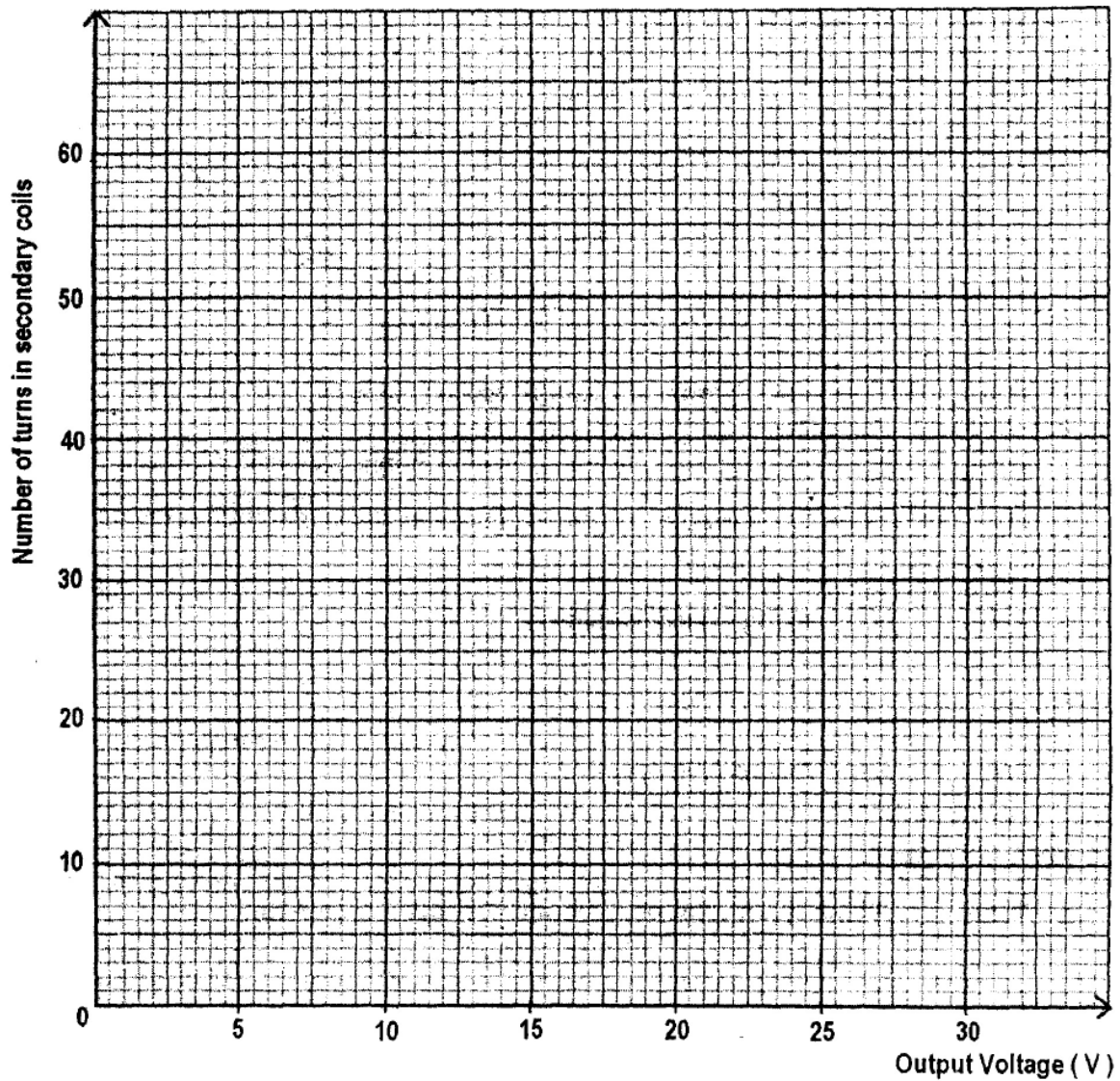
- (d)(i) What type of transformer is formed at the end of this experiment?

_____ [1 mark]

- (ii) Give one reason for (d)(i)

_____ [1 mark]

- (e) Based on the reading in table 8.1, draw a graph to show the relationship between the number of turns in secondary coil and the output voltage.



- (f) Based on graph in (e), predict the output voltage when the number of turns in secondary coil is 55. [2marks]

_____ [1 mark]

- (g) State the general function of a transformer.

_____ [1 mark]