PAPER 3

Time: 1 hour 30 minutes

This question paper consists of two questions: **Question 1** and **Question 2**.
Kertas soalan ini mengandungi dua soalan: **Soalan 1** *dan* **Soalan 2**.

Answer **all** *questions.*
Jawab **semua** *soalan.*

1 A group of students carried out an experiment to study the effect of relative humidity on the rate of transpiration of a balsam plant.
A potometer used in this experiment is shown in Diagram 1 on page **197**. The reduction in mass of the potometer is caused by the transpiration of plant.
Sekumpulan pelajar menjalankan satu eksperimen untuk mengkaji kesan kelembapan relatif ke atas kadar transpirasi pokok keembung.
Satu potometeryang digunakan dalam eksperimen ini ditunjukkan dalam Rajah 1 *di halaman* **197**. *Penurunan jisim potometer disebabkan oleh transpirasi tumbuhan.*

The following steps were carried out:
Langkah-langkah berikut telah dijalankan:

Step 1 : A balsam plant was selected and removed from the soil. Soil particles were removed from the roots of the plant under running water.

Langkah 1 : *Satu pokok keembung dipilih dan dicabut dari tanah. Partikel tanah disingkirkan daripada akar pokok itu di bawah air yang mengalir.*

Step 2 : The balsam plant was put into a conical flask which was filled with 100 ml of distilled water.

Langkah 2 : *Pokok keembung itu dimasukkan ke dalam kelalang kon yang diisikan dengan* 100 ml *air suling.*

Step 3 : A few drops of paraffin oil was placed on the surface of the distilled water in the conical flask.

Langkah 3 : *Beberapa titik minyak parafin diletakkan di atas permukaan air suling di dalam kelalang kon.*

Step 4 : The initial mass of the potometer was recorded.

Langkah 4 : *Jisim awal potometer direkod.*

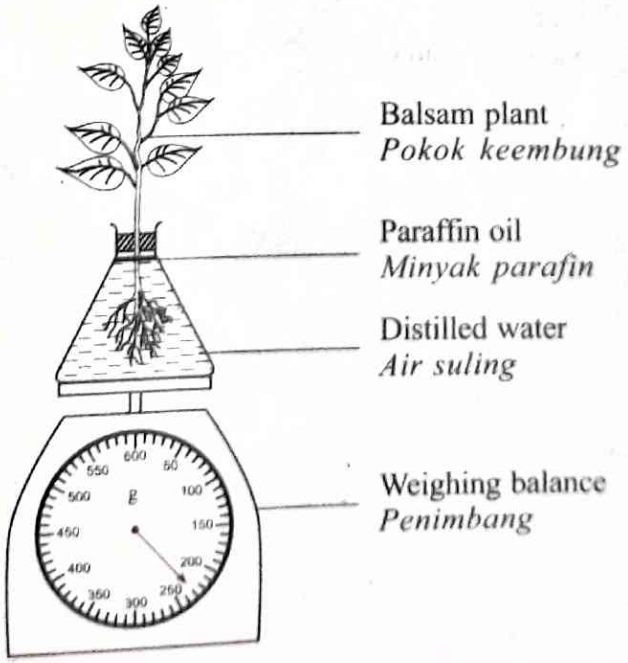


Diagram 1
Rajah 1

Step 5 : A transparent polythene bag was placed over the leafy part of the balsam plant as shown in Diagram 2.

Langkah 5 : *Beg politena lutsinar diletakkan pada bahagian pokok keembung yang berdaun seperti yang ditunjukkan dalam Rajah* 2.

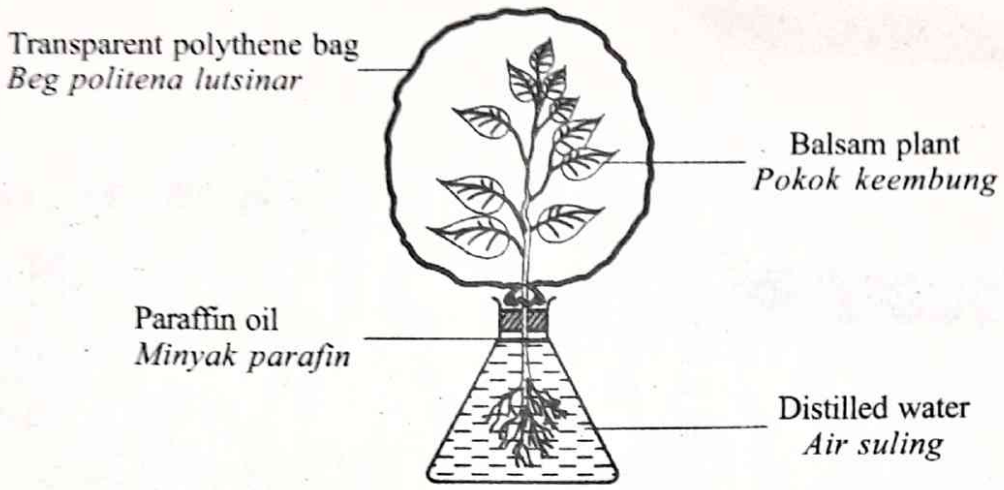


Diagram 2
Rajah 2

Step 6 : The balsam plant was placed under sunlight for 30 minutes.

Langkah 6 : *Pokok keembung itu diletakkan di bawah cahaya matahari selama* 30 *minit.*

Step 7 : After 30 minutes, the transparent polythene bag was removed and the final mass of potometer was recorded.

Langkah 7 : *Selepas* 30 *minit, beg politena lutsinar dikeluarkan dan jisim akhir potometer direkodkan.*

Step 8 : The experiment was repeated by placing anhydrous calcium chloride with the mass of 50 g and 100 g into the transparent polythene bag as shown in Diagram 3.

Langkah 8 : *Eksperimen diulang dengan meletakkan kalsium klorida kontang berjisim* 50 g *dan* 100 g *ke dalam beg politena lutsinar seperti yang ditunjukkan dalam Rajah* 3.

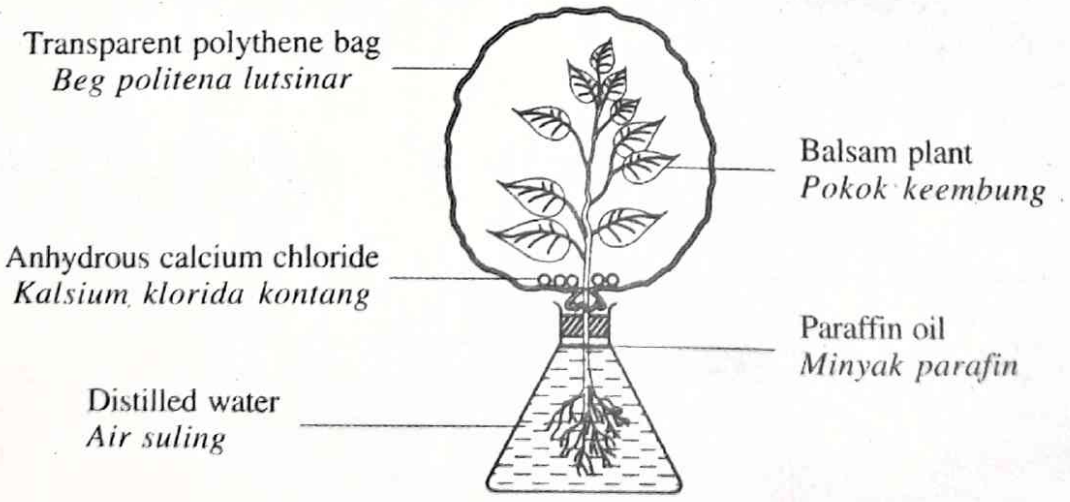
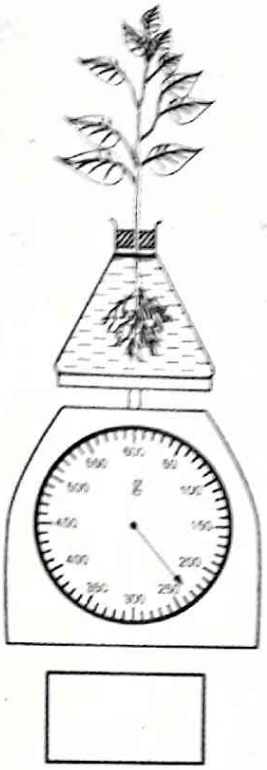
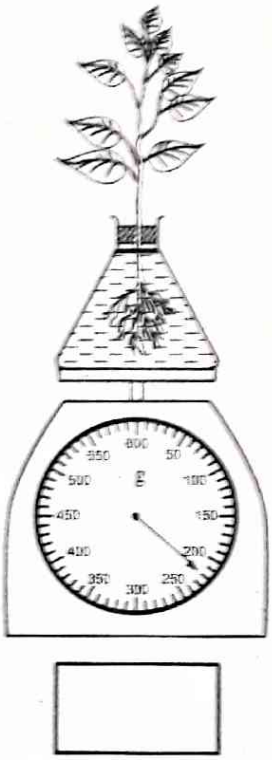
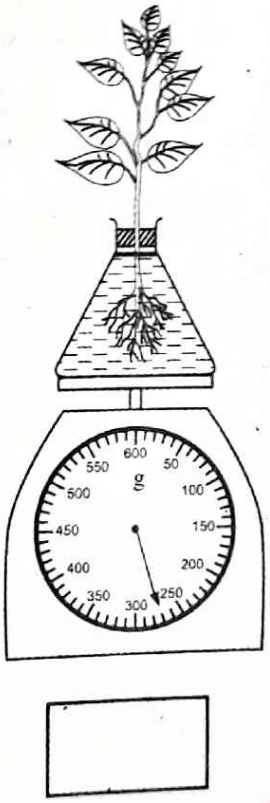
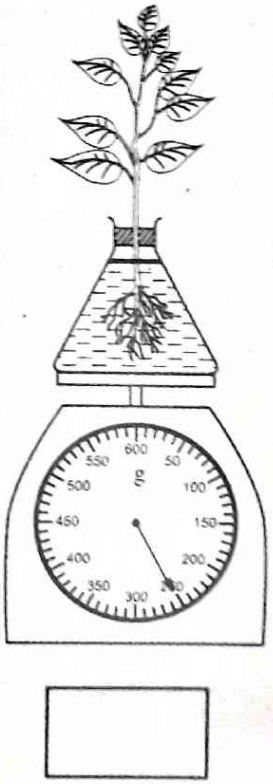


Diagram 3
Rajah 3

Table 1 shows the result of the experiment.
Jadual 1 *menunjukkan keputusan eksperimen itu.*

Mass of anhydrous calcium chloride (g) *Jisim kalsium klorida kontang (g)*	Mass of potometer (g) *Jisim potometer (g)*	
	Initial mass ***Jisim awal***	**Final mass** ***Jisim akhir***
0		
50		

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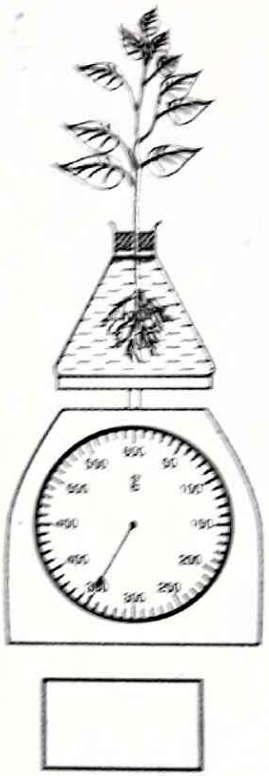
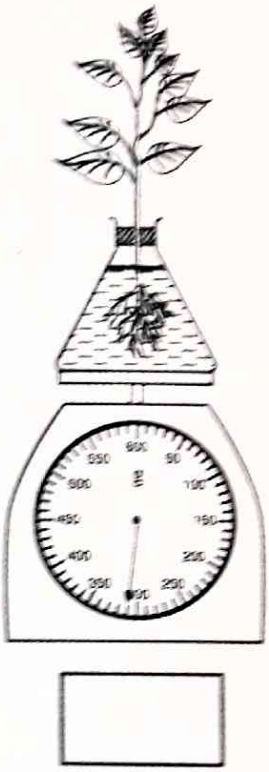
Mass of anhydrous calcium chloride (g) *Jisim kalsium klorida kontang (g)*	Mass of potometer (g) *Jisim potometer (g)*	
	Initial mass *Jisim awal*	Final mass *Jisim akhir*
100		

Table 1
Jadual 1

(a) Record the initial and final mass of potometer in the boxes provided in Table 1 on pages **199** and **200**.
Rekod jisim awal dan jisim akhir potometer dalam kotak yang disediakan dalam Jadual 1 di halaman **199** *dan* **200**.

1(a) 3

[3 marks]
[3 markah]

(b) (i) Based on Table 1, state **two** different observations.
Berdasarkan Jadual 1, nyatakan **dua** *pemerhatian yang berbeza.*
Observation 1:
Pemerhatian 1:

.....

.....

Observation 2:
Pemerhatian 2:

.....

.....

1(b)(i) 3

[3 marks]
[3 markah]

(ii) State **two** inferences which correspond to the observations in **1**(*b*)(i).
Nyatakan **dua** *inferens yang sepadan dengan pemerhatian di* **1**(*b*)(i).

Inference from observation 1:
Inferens daripada pemerhatian 1:

.....

.....

Inference from observation 2:
Inferens daripada pemerhatian 2:

.....

.....

[3 *marks*]
[3 *markah*]

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1(*b*)(ii)
3

(*c*) Complete Table 2 based on the experiment.
Lengkapkan Jadual 2 *berdasarkan eksperimen itu.*

Variable ***Pembolehubah***	**Method to handle the variable** ***Cara mengendali pembolehubah***
Manipulated variable *Pembolehubah dimanipulasikan*	....
Responding variable *Pembolehubah bergerak balas*	....
Constant variable *Pembolehubah dimalarkan*	....

Table 2
Jadual 2

[3 *marks*]
[3 *markah*]

1(*c*)
3

(*d*) State the hypothesis for the experiment.
Nyatakan hipotesis bagi eksperimen itu.

.....

.....

[3 *marks*]
[3 *markah*]

1(*d*)
3

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(e) (i) Construct a table and record all the data collected from the experiment.
Your table should have the following titles:
Bina satu jadual dan rekod semua data yang dikumpul daripada eksperimen itu.
Jadual anda hendaklah mengandungi tajuk-tajuk berikut:

- Mass of anhydrous calcium chloride
  Jisim kalsium klorida kontang
- Initial mass of potometer
  Jisim awal potometer
- Final mass of potometer
  Jisim akhir potometer
- Mass of water absorbed by roots after 30 minutes
  Jisim air yang diserap oleh akar selepas 30 minit
- The rate of transpiration
  Kadar transpirasi

$$\left[\text{The rate of transpiration} = \frac{\text{Mass of water absorbed by roots after 30 minutes}}{\text{Time}}\right]$$

$$\left[\textit{Kadar transpirasi} = \frac{\textit{Jisim air yang diserap oleh akar selepas 30 minit}}{\textit{Masa}}\right]$$

1(e)(i) 3

[3 *marks*]
[3 *markah*]

(ii) Use the graph paper provided on page **204** to answer this question.
Using the data in **1**(*e*)(i), draw a graph to show the rate of transpiration against the mass of anhydrous calcium chloride.
Guna kertas graf yang disediakan di halaman **204** *untuk menjawab soalan ini.*
Menggunakan data di **1**(*e*)(*i*), *lukis sebuah graf untuk menunjukkan kadar transpirasi melawan jisim kalsium klorida kontang.*

1(e)(ii) 3

[3 *marks*]
[3 *markah*]

(*f*) Based on the graph drawn in **1**(*e*)(ii), state the relationship between the mass of anhydrous calcium chloride and the rate of transpiration.
Explain your answer.
Berdasarkan graf yang dilukis di **1**(*e*)(ii), *nyatakan hubungan antara jisim kalsium klorida kontang dengan kadar transpirasi.*
Terangkan jawapan anda.

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.....

[3 *marks*]
[3 *markah*]

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1(*f*)

3

(*g*) Based on the result of this experiment, state the operational definition for transpiration.
Berdasarkan keputusan eksperimen ini, nyatakan definisi secara operasi bagi transpirasi.

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.....

.....

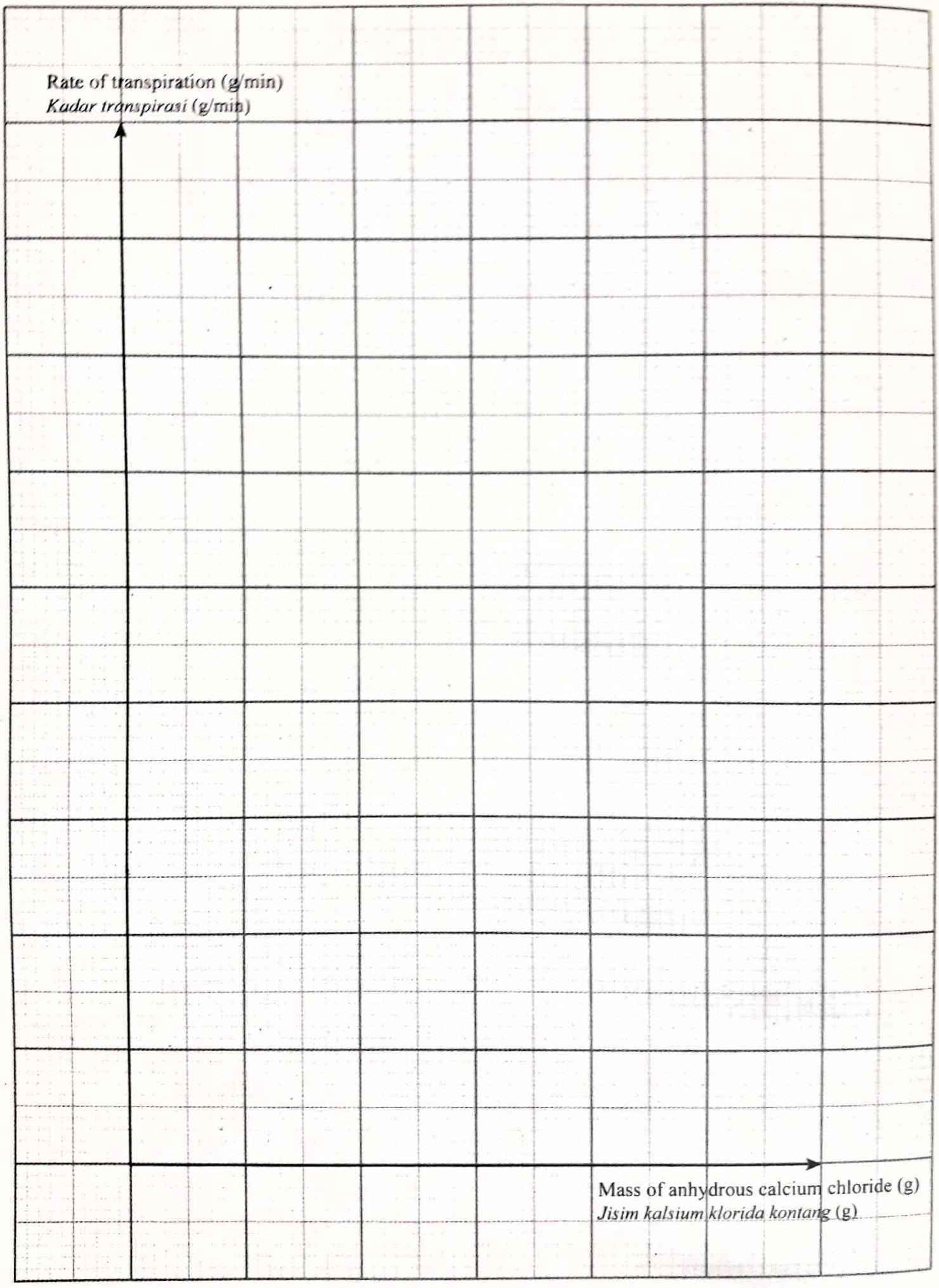
[3 *marks*]
[3 *markah*]

1(*g*)

3

Rate of transpiration against the mass of anhydrous calcium chloride

Kadar transpirasi melawan jisim kalsium klorida kontang



(h) A group of students carried out another experiment as shown in Diagram 4.
Sekumpulan pelajar menjalankan satu lagi eksperimen seperti ditunjukkan dalam Rajah 4.

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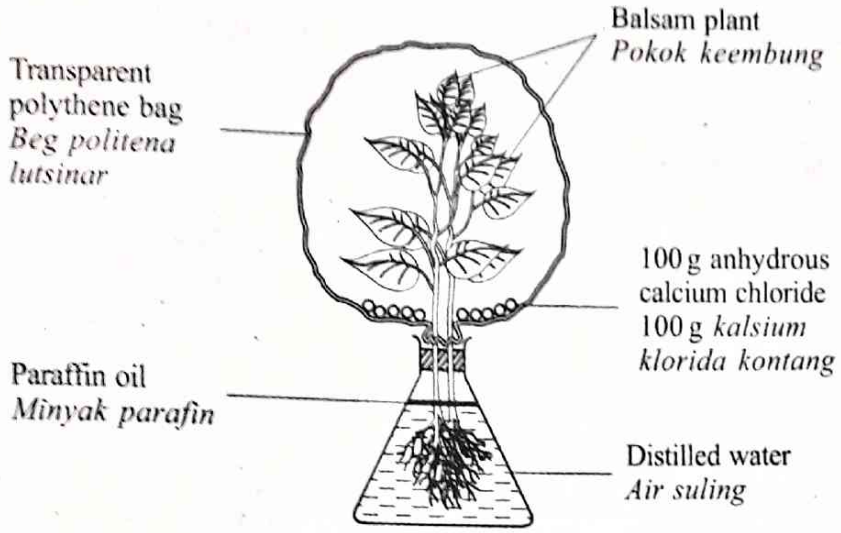

Diagram 4
Rajah 4

Predict the rate of transpiration for the plants.
Explain your answer.
Ramal kadar transpirasi bagi tumbuhan ini.
Terangkan jawapan anda.

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[3 *marks*]
[3 *markah*]

(i) The following list are the conditions that affect the rate of transpiration.
Senarai berikut ialah keadaan yang mempengaruhi kadar transpirasi.

Hazy *Berjerebu*	Drizzle *Gerimis*	Sunny day *Hari panas*
Windy day *Hari berangin*	Rainy day *Hari hujan*	Cloudy *Mendung*

Classify the above conditions which either will cause high rate of transpiration or low rate of transpiration in Table 3.
Kelaskan keadaan di atas sama ada akan menyebabkan kadar transpirasi tinggi atau kadar transpirasi rendah dalam Jadual 3.

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High rate transpiration *Kadar transpirasi tinggi*	Low rate transpiration *Kadar transpirasi rendah*

Table 3
Jadual 3

[3 *marks*]
[3 *markah*]

1(*i*) 3

Total 1 33

2 Plant can synthesize their own food through photosynthesis process in the presence of carbon dioxide and light. Sugar is formed and stored as chemical energy and oxygen gas is released.
Tumbuhan boleh mensintesis makanan sendiri melalui proses fotosintesis dengan kehadiran karbon dioksida dan cahaya. Gula terbentuk dan disimpan sebagai tenaga kimia dan gas oksigen dibebaskan.

Based on the above information, plan an experiment in the laboratory to study the effect of different carbon dioxide concentrations on the rate of photosynthesis of an aquatic plant.
The planning of your experiment should include the following aspects:
Berdasarkan maklumat di atas, rancang satu eksperimen dalam makmal untuk mengkaji kesan kepekatan karbon dioksida yang berlainan ke atas kadar fotosintesis suatu tumbuhan akuatik.
Perancangan eksperimen anda hendaklah meliputi aspek-aspek berikut:

- Problem statement
  Penyataan masalah
- Hypothesis
  Hipotesis
- Variables
  Pembolehubah
- List of apparatus and materials
  Senarai radas dan bahan
- Procedure of the experiment
  Prosedur eksperimen
- Presentation of data
  Persembahan data

[17 *marks*]
[17 *markah*]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT