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.*

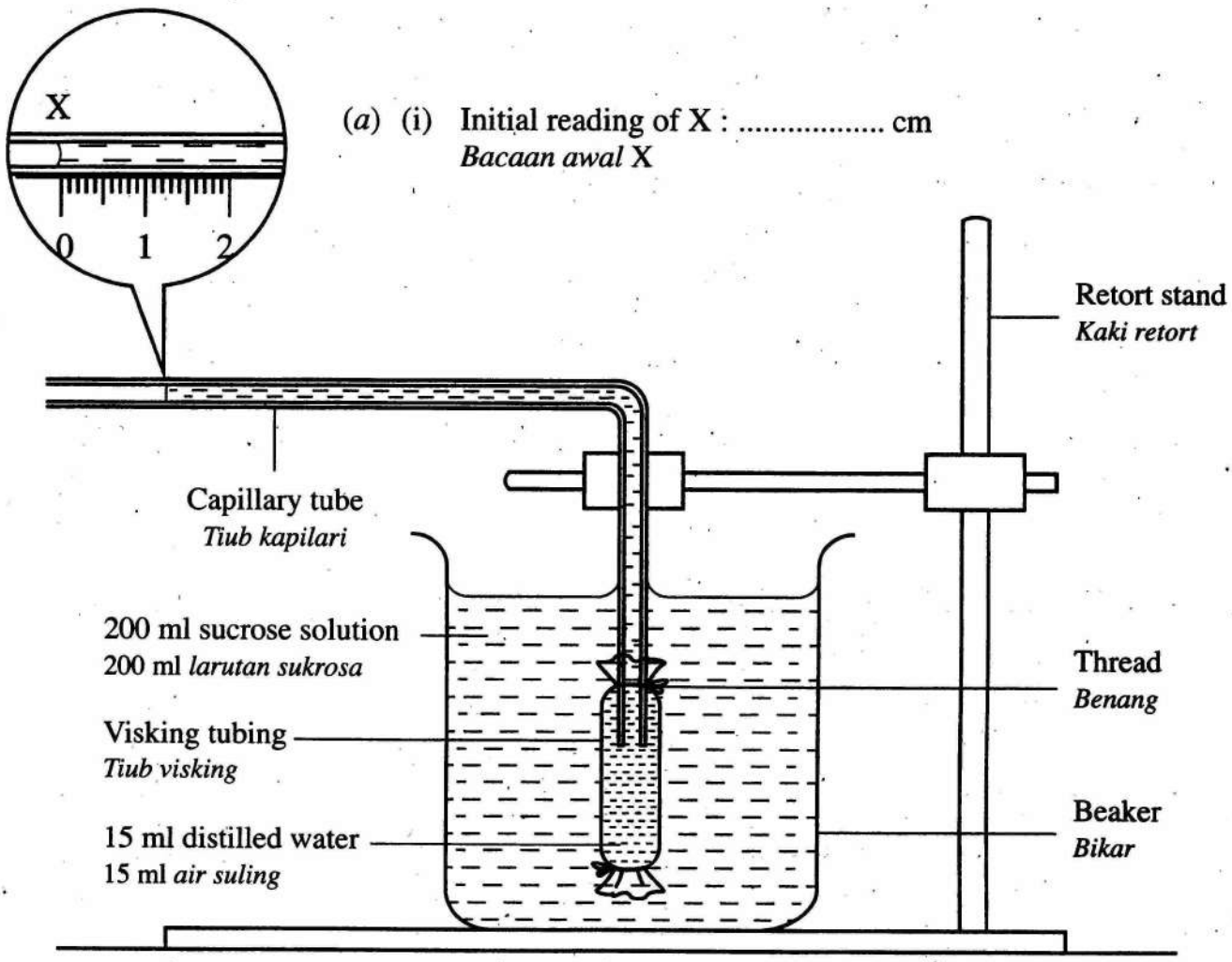
1 Plasma membrane is a semi-permeable membrane that regulates the movement of substances into and out of the cell. Two factors that influence the movement of substances are size and polarity of the molecule.

A group of students has carried out an experiment to study the rate of movement of substances across a semi-permeable visking tubing. The visking tubing which contain distilled water is immersed in different concentrations of sucrose solution for 20 minutes.

Membran plasma adalah membran separa telap yang mengawal atur pergerakan bahan masuk dan keluar daripada sel. Dua faktor yang mempengaruhi pergerakan bahan adalah saiz molekul dan sifat kekutuban molekul.

Sekumpulan murid menjalankan eksperimen untuk mengkaji kadar pergerakan bahan merentasi satu tiub visking separa telap. Tiub visking yang mengandungi air suling direndam dalam larutan sukrosa yang berbeza kepekatan selama 20 minit.

Diagram 1 shows the apparatus set-up for this experiment. X at the capillary tube represents initial reading of distilled water for each set of experiment.
Rajah 1 *menunjukkan susunan radas dalam eksperimen ini.* X *pada tiub kapilari mewakili bacaan awal air suling bagi setiap set eksperimen.*



(*a*) (i) Initial reading of X : ..... cm
Bacaan awal X

Diagram 1
Rajah 1

Table 1 shows the results of this experiment.
Jadual 1 menunjukkan keputusan eksperimen ini.

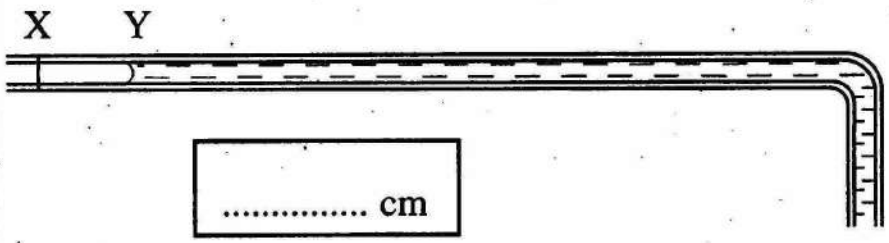
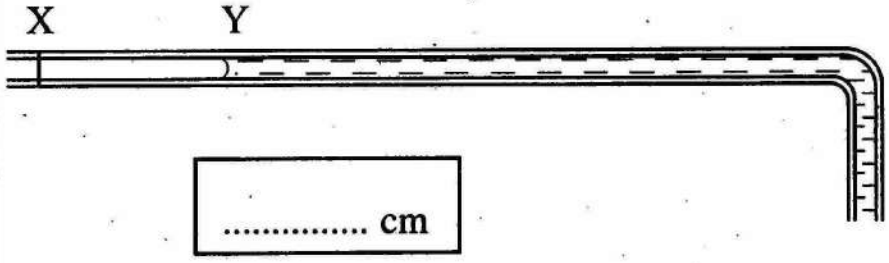
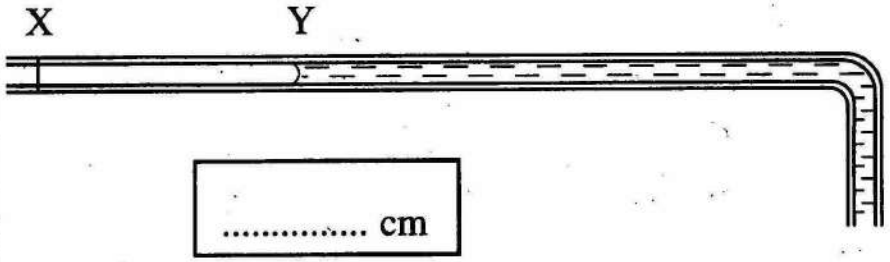
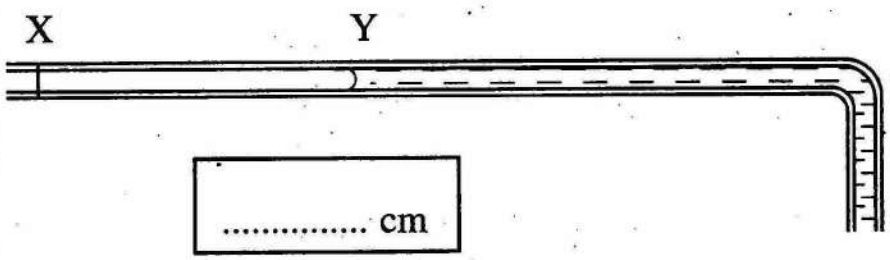
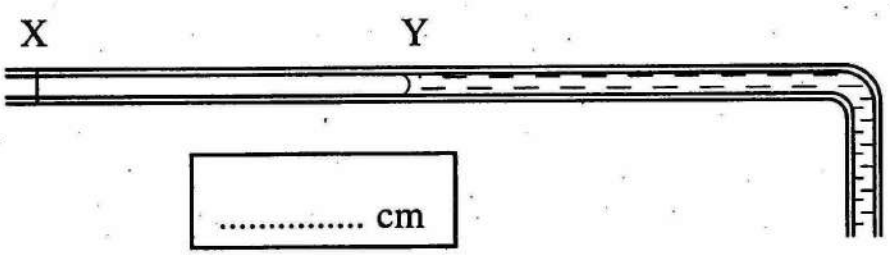
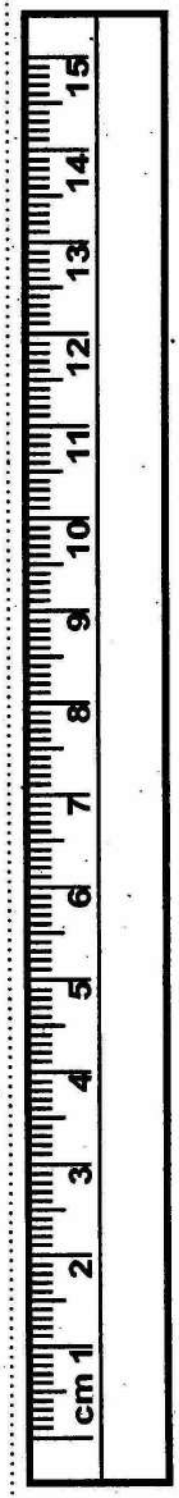
Concentration of sucrose solution (%) *Kepekatan larutan sukrosa (%)*	**Distance of the movement of distilled water from X to Y in the capillary tube after 20 minutes (cm)** *Jarak pergerakan air suling dari X ke Y dalam tiub kapilari selepas 20 minit* (cm)
5	 ..... cm
10	 ..... cm
15	 ..... cm
20	 ..... cm
25	 ..... cm

Table 1
Jadual 1

Detach the ruler and use it to anser Question 1(*a*)(ii).
Cerai dan gunakan pembaris ini untuk menjawab Soalan 1(a)(ii).



(*a*) (i) Record the initial reading X (in cm) in Diagram 1
Rekod bacaan awal X *(dalam* cm*) pada Rajah* 1

(ii) Measure and record the distance from X to Y in Table 1 by using the ruler
Ukur dan rekod jarak X *ke* Y *dalam Jadual* 1 *dengan menggunakan pembaris*

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

(*b*) Based on Diagram 1, classify all the items into materials and apparatus in Table 2.
Berdasarkan Rajah 1, *kelaskan semua item kepada bahan dan radas dalam Jadual* 2.

Material *Bahan*	**Apparatus** *Radas*

Table 2
Jadual 2

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

(*c*) (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*:*

.....

.....

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

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

Inference from observation 1:
Inferens daripada pemerhatian 1*:*

.....

.....

Inference from observation 2:
Inferens daripada pemerhatian 2:

.....

.....

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

(*d*) Complete Table 3 based on this experiment.
Lengkapkan Jadual 3 berdasarkan eksperimen ini.

Variable ***Pemboleh ubah***	**Method to handle the variable** ***Kaedah mengendali pemboleh ubah***
Manipulated variable *Pemboleh ubah dimanipulasikan*	....
Responding variable *Pemboleh ubah bergerak balas*	....
Constant variable *Pemboleh ubah dimalarkan*	....

Table 3
Jadual 3

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

(*e*) State the hypothesis for this experiment.
Nyatakan hipotesis bagi eksperimen ini.

.....

.....

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

(*f*) (i) Construct a table and record all the data collected from this experiment.
Your table should have the following titles:

Bina satu jadual dan rekod semua data yang dikumpul daripada eksperimen ini.
Jadual anda hendaklah mengandungi tajuk-tajuk berikut:

- Concentration of sucrose solution
  Kepekatan larutan sukrosa
- Distance from X to Y of distilled water in the capillary tube
  Jarak dari X ke Y bagi air suling dalam tiub kapilari
- Rate of water diffusion out of the visking tubing
  Kadar resapan air keluar dari tiub visking
- Use the formula:
  Gunakan formula:

Rate of water diffusion out of the visking tubing	=	$\dfrac{\text{Distance from X to Y of distilled water in the capillary tube}}{\text{Time}}$
Kadar resapan air keluar dari tiub visking		$\dfrac{\textit{Jarak dari X ke Y of bagi air suling dalam tiub kapilari}}{\textit{Masa}}$

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

(ii) Use the graph paper provided to answer this question.
Using the data in **1**(*f*)(i), draw a graph for the rate of water diffusion out of the visking tubing against the concentration of sucrose solution.

Guna kertas graf yang disediakan untuk menjawab soalan ini.
Menggunakan data di **1**(*f*)(*i*), *lukis graf bagi kadar resapan air keluar dari tiub visking melawan kepekatan larutan sukrosa.*

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

(*g*) Based on the graph in **1**(*f*)(ii), explain the relationship between the rate of water diffusion out of the visking tubing and the concentration of sucrose solution.
Berdasarkan graf di **1**(*f*)(*ii*), *terangkan hubungan antara kadar resapan air keluar dari tiub visking dengan kepekatan larutan sukrosa.*

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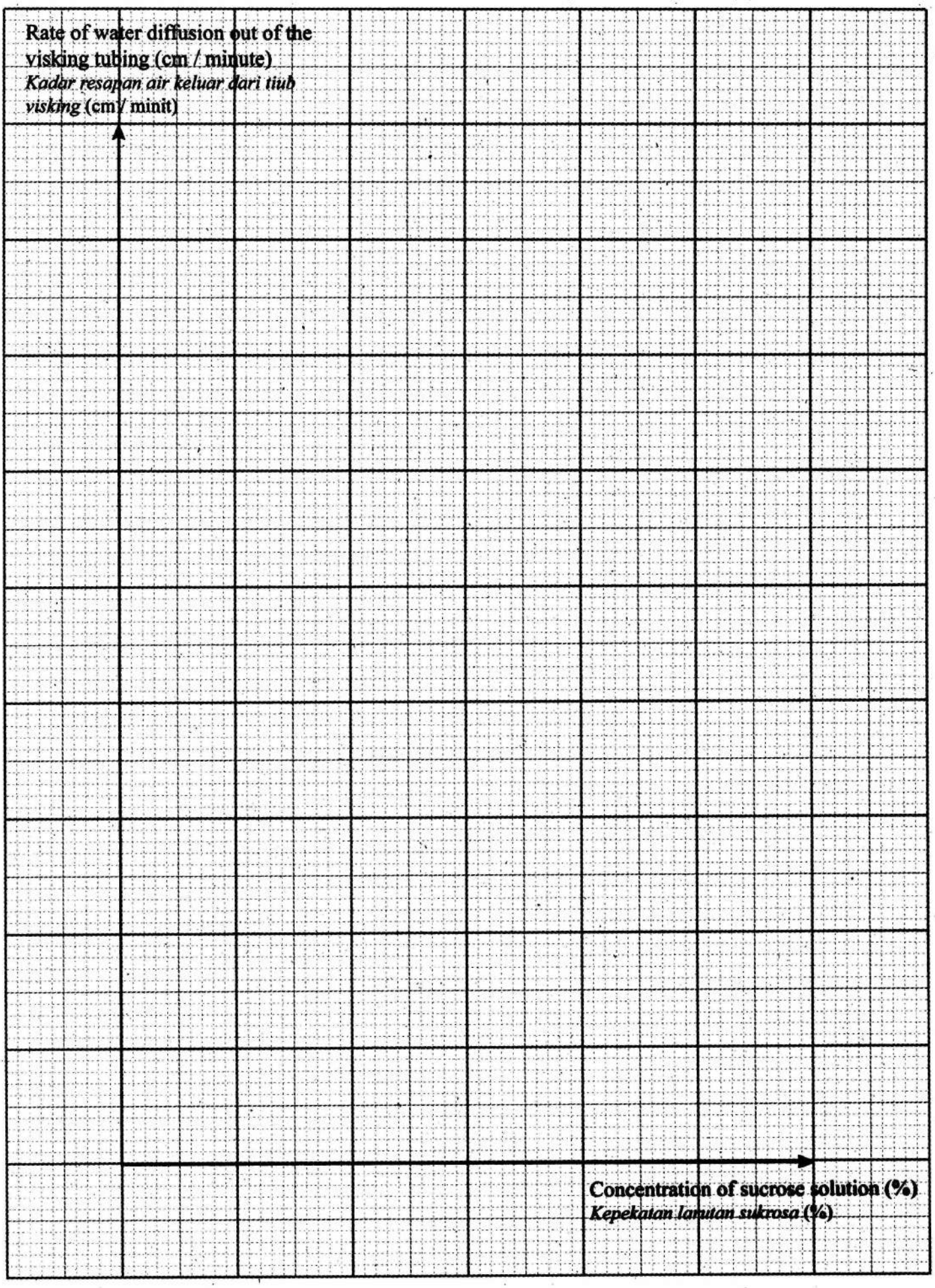
[3 *marks*]
[3 *markah*]

Rate of water diffusion out of the visking tubing against the concentration of sucrose solution
Kadar resapan air keluar dari tiub visking melawan kepekatan larutan sukrosa



(*h*) Based on the result of this experiment, state the operational definition of diffusion.
Berdasarkan keputusan eksperimen ini, nyatakan definisi secara operasi bagi resapan.

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.....

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

(*i*) Another group of students has carried out the same experiment by replacing distilled water in the visking tubing with 10% starch suspension. The visking tubing is immersed in 5% sucrose solution.
Predict the direction of substance movement in the capillary tube of this experiment.
Explain your prediction.

Sekumpulan murid yang lain menjalankan eksperimen yang sama dengan menggantikan air suling di dalam tiub visking dengan ampaian kanji 10%. *Tiub visking tersebut direndam dalam larutan sukrosa* 5%.
Ramalkan arah pergerakan bahan dalam tiub kapilari bagi eksperimen ini.
Terangkan ramalan anda.

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

2 Diagram 2 shows a conversation between a pastry chef and her student.
Rajah 2 menunjukkan perbualan antara seorang chef pastri dengan muridnya.

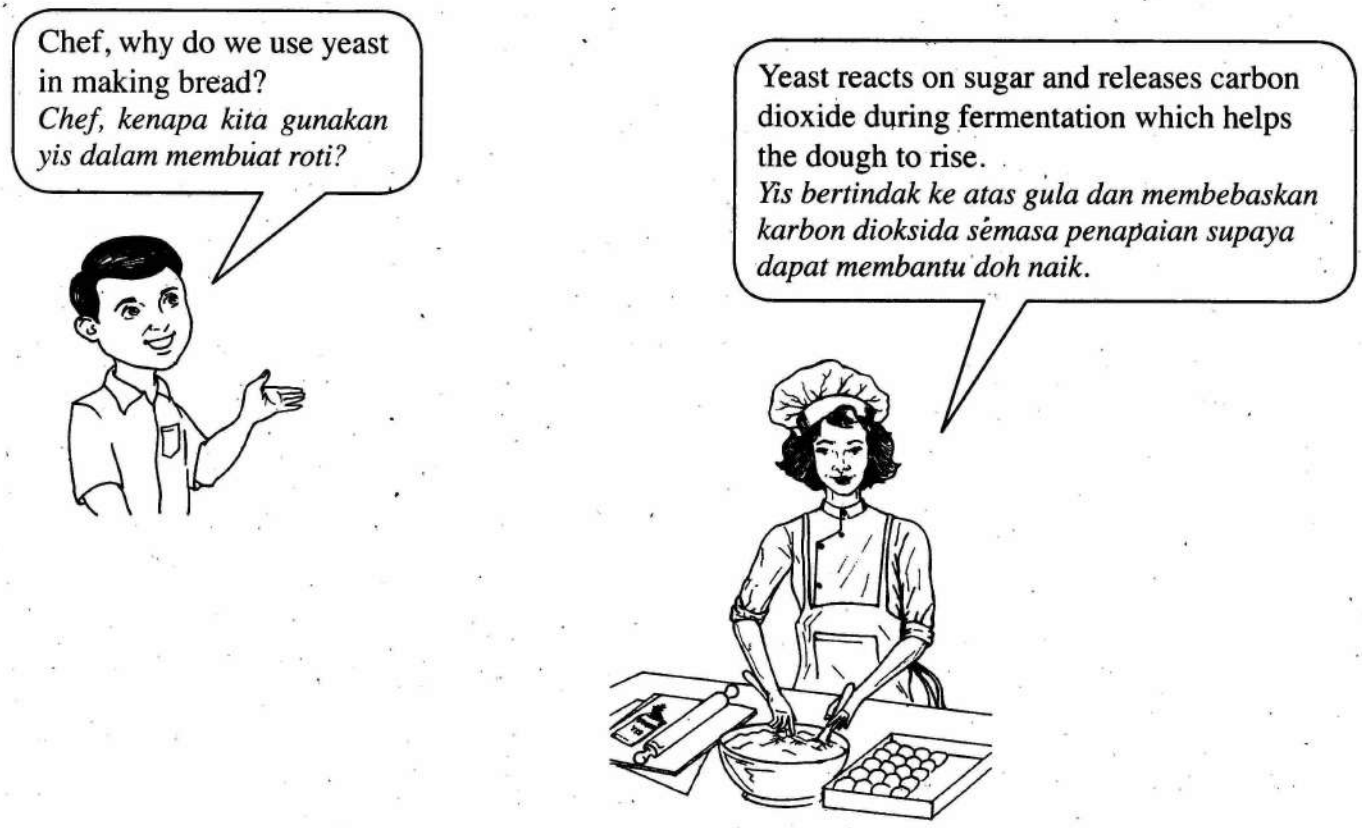

Diagram 2
Rajah 2

Referring to conversation in Diagram 2, design a laboratory experiment to investigate the effect of glucose concentration on anaerobic respiration in yeast.
The planning of your experiment must include the following aspects:
Merujuk kepada perbualan dalam Rajah 2, rangka satu eksperimen dalam makmal untuk menyiasat kesan kepekatan glukosa ke atas respirasi anaerobik dalam yis.
Perancangan eksperimen anda hendaklah meliputi aspek-aspek berikut:

- Problem statement
  Pernyataan masalah
- Hypotesis
  Hipotesis
- Variables
  Pemboleh ubah
- List of apparatus and materials
  Senarai radas dan bahan
- Experimental procedure of method
  Kaedah atau prosedur eksperimen
- Presentation of data
  Cara data dipersembahkan

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

END OF QUESTION PAPER
KERTAS PEPERIKSAAN TAMAT