

Answer all question

Jawab semua soalan

1. A group of students carried out an experiment to investigate the relationship between the total surface area to volume ratio and the rate of coloured water diffusion. Three jelly cubes were prepared, with sides of 3 cm, 4 cm and 5 cm respectively as shown in Diagram 1. The cubes are labeled as P, Q and R.

Sekumpulan pelajar menjalankan eksperimen untuk menyasat hubungan antara jumlah luas permukaan per isipadu dengan kadar resapan cecair berwarna. Tiga kiub jeli disediakan, dengan panjang sisi masing-masing adalah 3 cm, 4 cm dan 5 cm sepertimana ditunjukkan dalam Rajah 1. Kiub-kiub tersebut dilabelkan sebagai P, Q dan R.

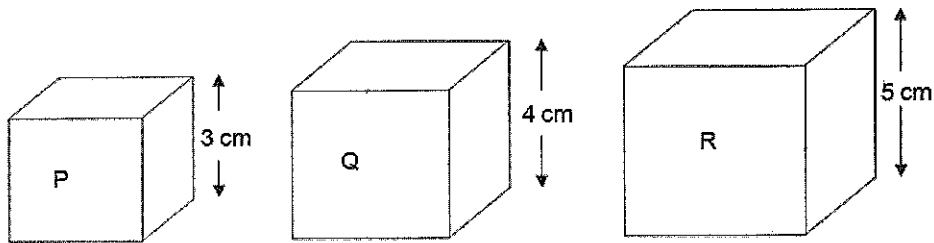


Diagram 1 /Rajah 1

A piece of sponge approximately 50 mm thick is placed on the floor of a basin. A little plasticines used to fasten the sponge onto the floor of the basin. 5% eosin solution is poured into the basin until 1mm away from the top of the sponge. The whole sponge is wet with the solution.

The jelly cubes are then placed slowly on the sponge, as shown in Diagram 2. The solution is added constantly to maintain its height of 1mm away from the sponge top.

Sekeping span berukuran 50 mm tebal diletakkan di dasar sebuah besen. Sedikit plastisin digunakan untuk melekapkan span kepada dasar besen. 5% larutan eosin ditambahkan ke dalam besen sehingga sejauh 1 mm daripada bahagian atas span. Keseluruhan span akan dibasahi oleh larutan tersebut.

Kiub-kiub jeli kemudiannya diletakkan di atas span perlahan-lahan, seperti ditunjukkan dalam Rajah 2. Larutan ditambah secara berterusan bagi mengekalkan ketinggian 1 mm dari bahagian atas span.

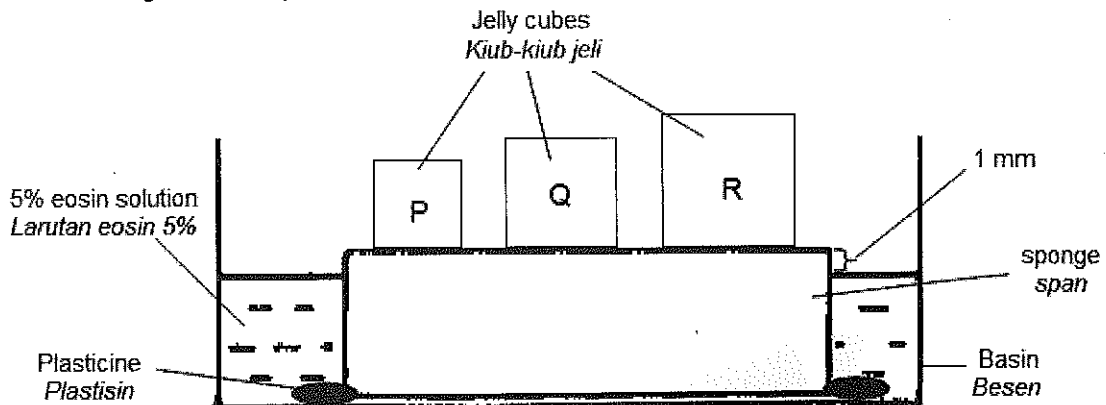


Diagram 2/Rajah 2

After 20 minutes, the cubes are taken out carefully and wiped with filter paper. They are cut vertically into two halves. The lower part of the cubes were coloured red. The height of the coloured portion is measured. The results are recorded in Table 1.

Selepas 20 minit, kiub-kiub tersebut dikeluarkan secara berhati-hati dan dilap dengan kertas tulas. Kiub-kiub tersebut kemudiannya dipotong kepada dua bahagian secara menegak. Bahagian bawah kiub kelihatan berwarna merah. Ketinggian bahagian berwarna kemudiannya diukur. Keputusan direkodkan dalam Jadual 1.

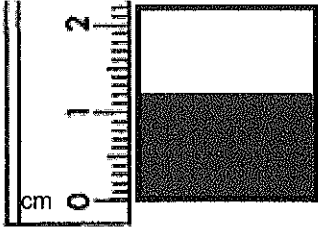
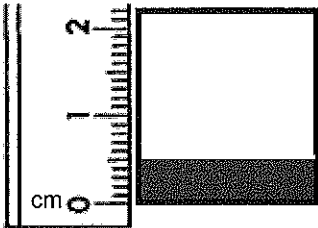
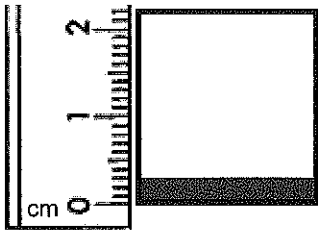
Cube Kiub	The length of the side (cm) Panjang sisi (cm)	The cut halves of the cubes Separuh bahagian kiub	The height of the red coloured portion (cm) Ketinggian bahagian berwarna merah (cm)
P	3		
Q	4		
R	5		

Table 1
Jadual 1

*For
Examiner's
use*

1(a)

a) Record the height of red coloured portion of the jelly P, Q and R in spaces in Table 1.

Catatkan ketinggian bahagian berwarna merah bagi jeli P, Q dan R di ruangan dalam Jadual 1.

[3 marks]
[3 markah]

b) The following list are apparatus and material which are used in the experiment.

Senarai berikut adalah radas dan bahan yang digunakan dalam eksperimen ini.

Plasticine	sponge	eosin solution
<i>Plastisin</i>	<i>span</i>	<i>larutan eosin</i>
Jelly cubes	basin	filter paper
<i>Kiub jeli</i>	<i>besen</i>	<i>kertas turas</i>

Complete Table 2 by classify all the items into the apparatus and material.

Lengkapkan Jadual 2 dengan mengelaskan semua item kepada bahan dan radas .

Apparatus <i>Radas</i>	Materials <i>Bahan</i>

Table 2
Jadual 2

[3 marks]
[3 markah]

1(b)

For
Examiner's
use

(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:

.....
.....
.....

[3 marks]
[3 markah]

1(c)(i)

(ii) State **two** inferences from the observations in (c) (i).
Nyatakan dua inferens daripada pemerhatian di (c) (i).

Inference from observation 1:
Inferens daripada pemerhatian 1:

.....
.....
.....

Inference from observation 2:
Inferens daripada pemerhatian 2

.....
.....
.....

[3 marks]
[3 markah]

1(c)(ii)

For
Examiner's
Use

- c) Complete Table 3 based on the experiment.
Lengkapkan Jadual 3 berdasarkan eksperimen itu.

Variable <i>Pembolehubah</i>	Method to handle the variable <i>Kaedah mengendali pembolehubah</i>
Manipulated variable: <i>Pembolehubah dimanipulasikan</i>
Responding variable: <i>Pembolehubah bergerakbalas</i>
Constant variable: <i>Pembolehubah dimalarkan</i>

1(d)

Table 3
Jadual 3

[3 marks]
[3 markah]

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

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.....

.....

1(e)

[3 marks]
[3 markah]

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

Bina satu jadual dan rekodkan semua data yang dikumpulipadaai eksperimen ini. Jadual hendaklan mengandungi tajuk-tajuk berikut:

- Length of the side of cubes
Panjang sisi kiub
- The total surface area per volume ratio
Jumlah luas permukaan per isipadu
- The height of the red-coloured portion of the cubes
Ketinggian bahagian berwarna merah pada kiub
- The rate of diffusion
Kadar resapan

Use the formula:
Gunakan formula :

	The height of the red coloured portion
The rate of water diffusion =	-----
	Time taken.
	<i>Ketinggian bahagian kiub yang berwarna</i>
<i>Kadar Resapan</i> =	-----
	<i>Masa diambil</i>

1(f)(i)

[3 marks]
[3 markah]

- (ii) Use the graph paper provided in page 9 to answer this question. Using the data in (1) (f) (i), draw the graph of the rate of water diffusion against the length of the sides of the cubes.

1(f)(ii)

Guna kertas graf yang disediakan di halaman 9 untuk menjawab soalan ini. Menggunakan data di 1(f)(i), lukis graf kadar resapan melawan panjang sisi kiub.

[3 marks]
[3 markah]

- (g) Based on the graph in 1(f)(ii), explain the relationship between the rate of diffusion and length of sides of cube

Berdasarkan graf dalam 1 (f)(ii), terangkan hubungan di antara kadar resapan dengan panjang sisi kiub.

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1(g)

[3 marks]
[3 markah]

- (h) State the operational definition for the rate of diffusion .
Nyatakan definisi secara operasi bagi kadar resapan.

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1(h)

[3 marks]
[3 markah]

- (i) The experiment is repeated using perforated cube R.
Predict the rate of diffusion.

Eksperimen diulang menggunakan kiub jeli R yang ditebuk dengan beberapa lubang.

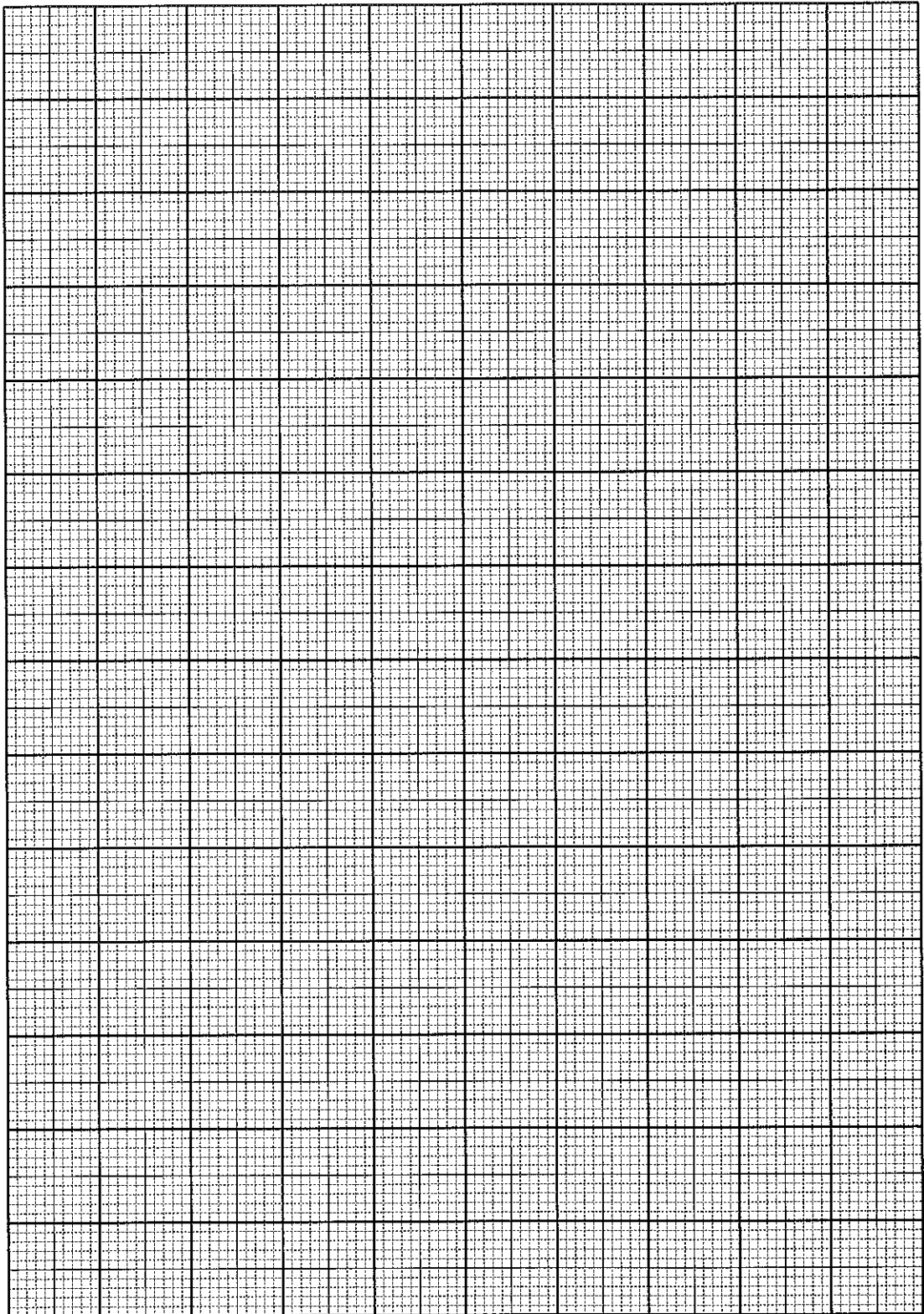
Ramalkan kadar resapannya.

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1(i)

[3 marks]
[3 markah]

Graph of rate diffusion against length of cubes
Graf kadar resapan melawan panjang sisi kiub



2. Human needs energy to maintain the body temperature at 37°C to carry out daily activities. The energy is gain from oxidation of food in body cell respiration. Energy value is measured in Joule per gram unit.
Based on the information, design a laboratory experiment to investigate the energy value in three types of food samples.

Manusia memerlukan tenaga untuk mengekalkan suhu badan pada 37°C untuk menjalankan aktiviti harian. Tenaga diperoleh daripada pengoksidaan makanan melalui respirasi sel. Nilai tenaga diukur dalam Joule per gram seunit. Berdasarkan maklumat, Reka bentuk eksperimen makmal untuk menyiasat nilai tenaga dalam tiga jenis sampel makanan.

The planning of your experiment must include the following aspects:
Perancangan eksperimen anda hendaklah meliputi aspek-aspek berikut:

- Problem Statement
Pernyataan masalah
- Hypothesis
Hipotesis
- Variables
Pembolehubah
- List of apparatus and material
Senarai bahan dan radas
- Procedure of experiment
Prosedur eksperimen
- Presentation of data
Persembahan data

[17 marks]
[17 markah]