

1. Diagram 1 shows three pieces of baby clothes that have rice porridge impurities. The three pieces of clothing were washed using detergent powder containing Y enzyme with three different temperatures P, Q, R

Rajah 1 menunjukkan tiga helai pakaian bayi terkena bubur nasi. Ketiga- tiga helai baju tersebut telah dicuci menggunakan bahan pencuci yang menggunakan enzim Y dengan tiga suhu yang berbeza.

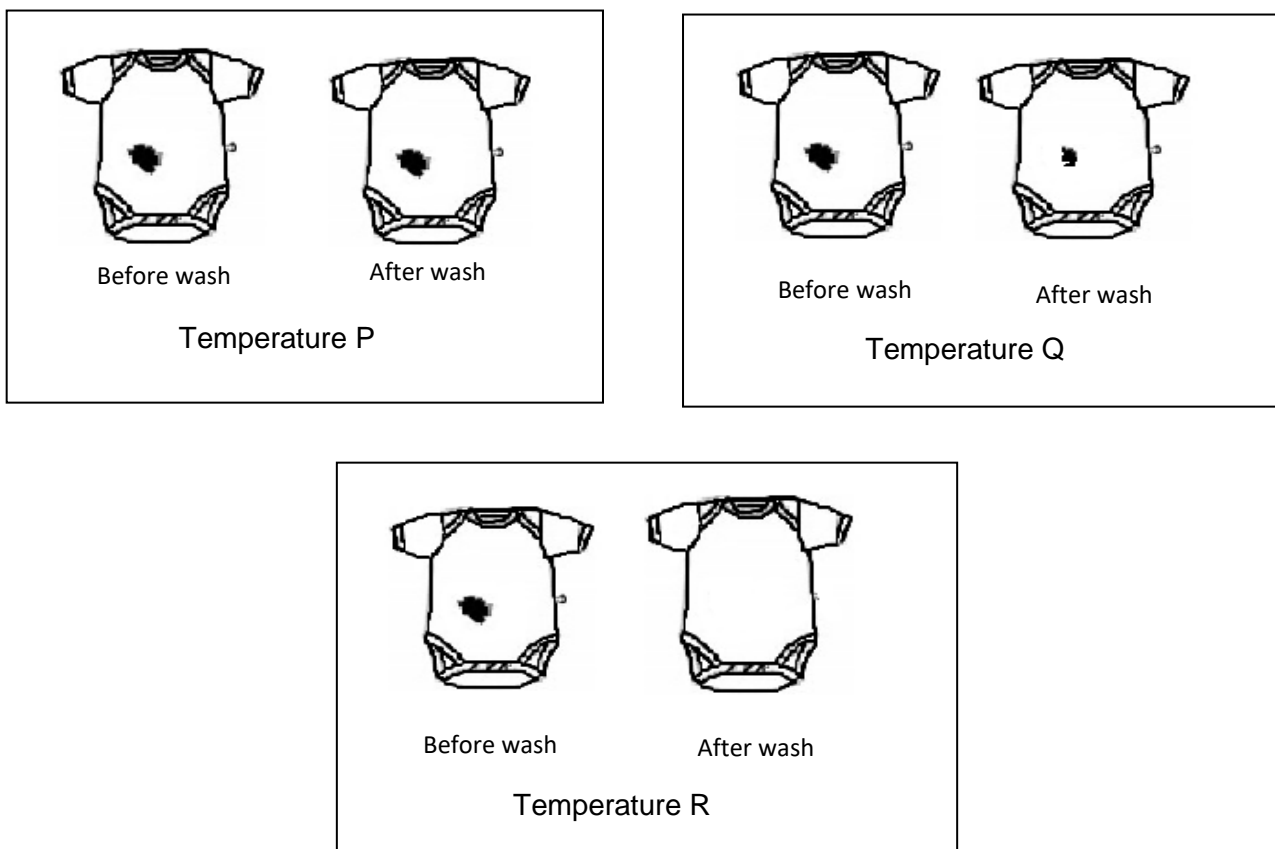


Diagram 1
Rajah 1

Based on Diagram 1, a group of students carried out an experiment to investigate the effect of temperature on the reaction of salivary amylase. The following steps were carried out:

Berdasarkan Rajah 1 sekumpulan pelajar menjalankan satu eksperimen untuk menyiasat kesan suhu terhadap tindak balas amilase liur. Langkah langkah yang dijalankan adalah seperti berikut:

- Step 1: Three test tubes P, Q, and R were filled with 2 ml of 0.5% salivary amylase respectively.
Tiga tabung uji P, Q, dan R diisi dengan 2 ml larutan 0,5% amilase liur
- Step 2: 2 ml of 1% starch suspension were added into each test tube and the contents were stirred.
2ml larutan kanji 1% ditambah ke dalam setiap tabung uji dan kandungan tersebut dikacau.



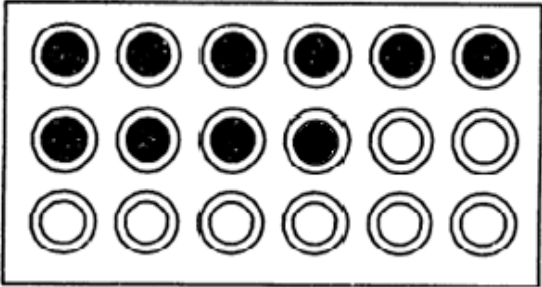
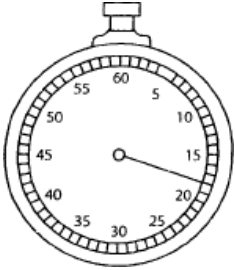
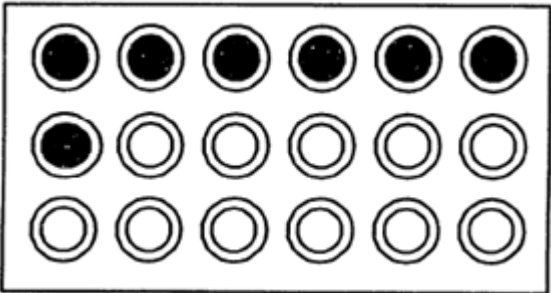
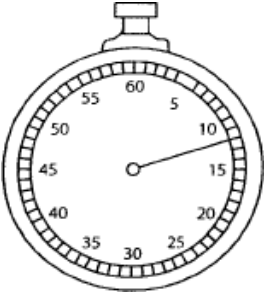
Step 3: Every 2 minutes a drop of mixture from each test tube was mixed with a drop of iodine solution on a white tile.

Setiap 2 minit setitik larutan dari tabung uji dicampurkan dengan larutan iodin di atas jubin putih.

Step 4: All test tubes are immersed in a water bath at difference temperature as shown in diagram below.

Semua tabung uji dimasukkan ke dalam kukus air pada suhu yang berbeza.

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

Test Tube/ Temperature (°C) <i>Tabung Uji/ Suhu (°C)</i>	The colour of iodine solution starting from minute 0 <i>Warna larutan iodin bermula dari 0 minit</i>				Time taken for the starch to be hydrolysed completely (minute) <i>Masa yang diambil untuk menghidrolisis kanji dengan lengkap (minit)</i>
		Dark blue		Yellow (no change)	
P (10°C)					(minutes) (minit)
Q (40°C)					(minutes) (minit)

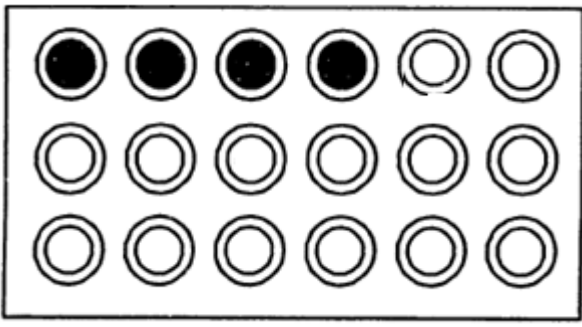
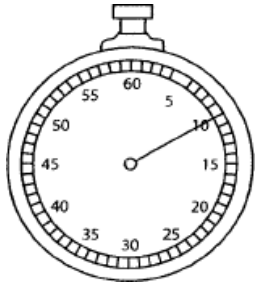
<p>R(37°C)</p>		 <p>.....(minutes) (<i>minit</i>)</p>
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Table 1.1
Jadual 1.1

- (a) Record the time taken for the starch to be hydrolysed completely in the boxes provided in Table 1.1 above.
Rekod masa yang diambil untuk menghidrolisis kanji dengan lengkap dalam Jadual 1.1 di atas

[3 marks]
[3 markah]

- (b)(i) Based on Table 1.1, state **two** different observations on the relationship between the temperature and the time taken for the starch to be hydrolysed completely.
*Berdasarkan Jadual 1.1, nyatakan **dua** pemerhatian tentang hubungan diantara suhu dan masa yang diambil untuk menghidrolisis kanji dengan lengkap.*

Observation 1:

Pemerhatian 1:

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Observation 2:

Pemerhatian 2:

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.....

.....

[3 marks]
[3 markah]

3

3

- (b)(ii) State the inference which corresponds to the observation made in 1(b)(i).
Nyatakan inferens yang sepadan dengan pemerhatian di 1(b)(i).

[3 marks]
 [3 markah]

Inference 1:

Inferens 1:

Inference 2:

Inferens 2:

3

- (c) Complete Table 1.2 based on this experiment.
Lengkapkan jadual 1.2 berdasarkan eksperimen ini.

[3 marks]
 [3 markah]

Variable <i>Pembolehubah</i>	Method to handle the variable <i>Cara mengendalikan pembolehubah</i>
Manipulated variable <i>Pembolehubah dimanipulasikan</i>	----- ----- -----
Responding variable <i>Pembolehubah bergerak balas</i>	----- ----- -----
Controlled variable <i>Pembolehubah dimalarkan</i>	----- ----- -----

Table 1.2
Jadual 1.2

3

(d) The following list is part of the apparatus and material used in this experiment.
Senarai berikut adalah sebahagian daripada radas dan bahan yang digunakan dalam eksperimen ini .

Thermometer, Stopwatch, Starch suspension, Water bath, Salivary amylase, Syringe
Termometer, Jam randik, Ampaian kanji, Kukus air, Amilase liur, Picagari

Complete Table 1.3 by matching each variable with the apparatus and material used in this experiment.

Lengkapkan Jadual 1.3 dengan memadankan setiap pembolehubah dengan radas dan bahan yang digunakan dalam eksperimen ini.

[3 marks]
 [3 markah]

3

Variables <i>pembolehubah</i>	Apparatus <i>Radas</i>	Material <i>Bahan</i>
Manipulated <i>Dimanipulasikan</i>		
Responding <i>Bergerak balas</i>		
Controlled <i>Dimalarkan</i>		

Table 1.3
Jadual 1.3

(e) State the hypothesis for this experiment. [3 marks]
Nyatakan hipotesis bagi eksperimen ini. [3 markah]

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3

(f) (i) Based on Table 1.1, construct a table and record the result of the experiment which includes the following aspects:

Berdasarkan Jadual 1.1, bina satu jadual dan rekodkan keputusan eksperimen yang meliputi aspek aspek berikut:

- Temperature
Suhu
- The time taken for starch to be hydrolysed completely,
Masa yang diambil untuk menghidrolisiskan kanji dengan lengkap,
- The rate of enzyme activity
Kadar tindak balas enzi

[3 marks]
[3 markah]

	3
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(f)(ii) Based on the data in 1(f)(i), draw a graph on the page 9 to show the relationship between the temperature and the rate of amylase activity on the graf paper provided.

Berdasarkan data dalam 1(f)(i) lukis graf di muka surat 9 untuk menunjukkan hubungan diantara suhu dan kadar tindak balas enzim amilase pada kertas graf yang disediakan

[3 marks]
[3 markah]

	3
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- (g) Based on the graph in (f)(ii), explain the relationship between the temperature and the rate of amylase activity
Berdasarkan graf anda dalam (f)(ii) Terangkan tentang hubungan antara suhu dan kadar tindak balas enzim amilase.

[3 marks]
 [3 markah]

	3
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- (h) Based on the experiment, define operationally what enzyme is.
Berdasarkan eksperimen, apakah maksud enzim secara operasi.

[3 marks]
 [3 markah]

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The experiment is repeated with test tube P is added with 2 ml of 0.5% salivary amylase and 2 ml of 1% starch suspension . Predict the time taken for starch to be hydrolysed completely by the amylase in test tube P if the temperature is at 20°C

Explain your answer.

Eksperimen ini diulang dengan mencampurkan 2 ml 0.5% enzim amilase liur dan 2ml 1% ampaiian kanji kedalam tabung uji P. Ramalkan masa yang diambil oleh amilase liur untuk menghidrolisiskan ampaiian kanji dengan lengkap jika suhu diubah kepada 20°C.

Terangkan jawapan anda .

[3 marks]
 [3 markah]

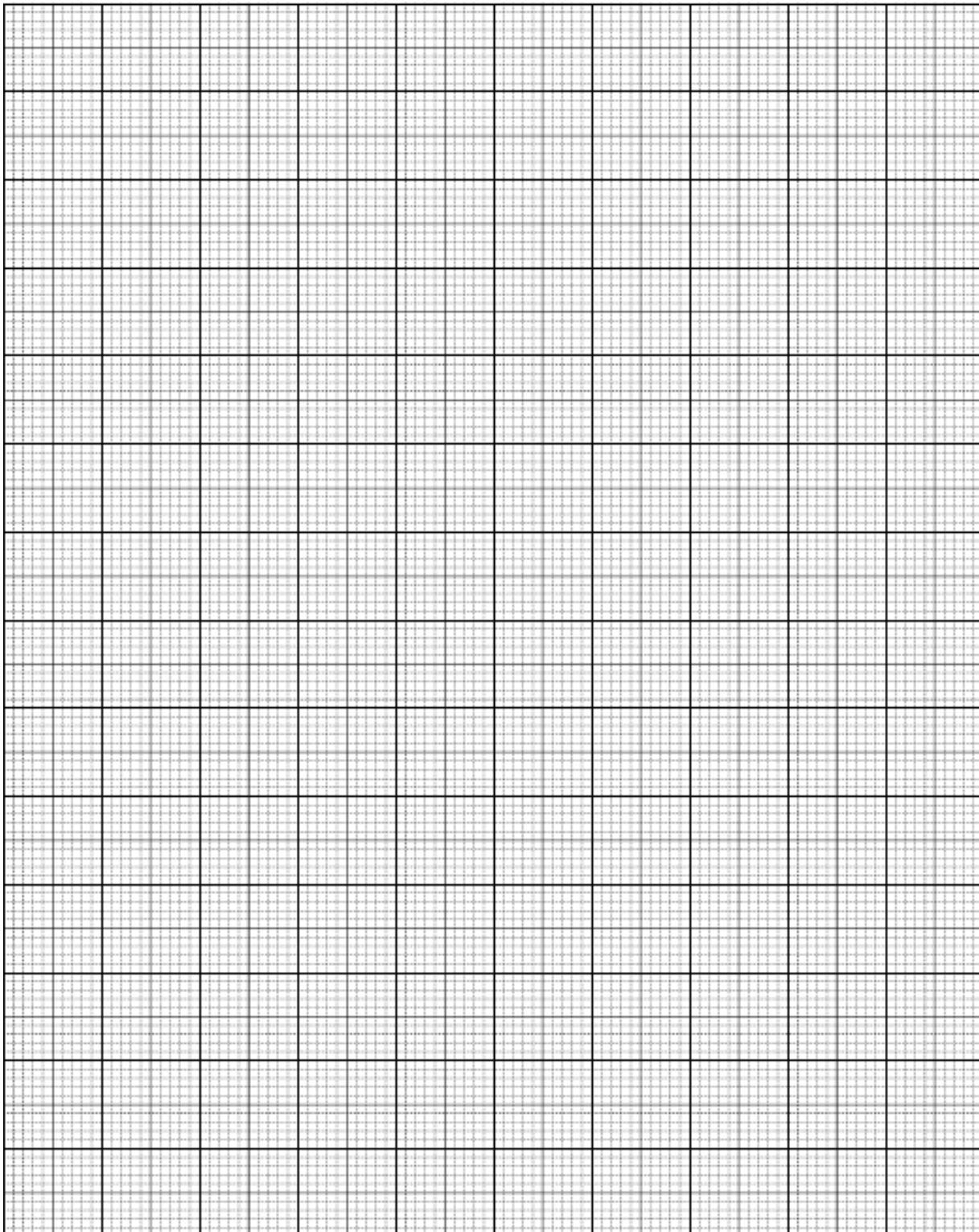
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Graf of rate of reaction of salivary amylase against temperature
Graf kadar tindak balas amilase liur melawan suhu



2. En Azmeer an agricultural officer, wants to help the orchard farmers in Kampung A to reduce the crop pests, squirrels which has increased in population. To ensure that all the squirrels are completely killed, the use of poison for squirrels is most effective. To buy enough squirrel poison, the number of squirrels in a particular location in Kampung A must be estimated.

En Azmeer seorang pegawai pertanian berhasrat membantu pekebun buah-buahan di Kampung A bagi mengurangkan perosak tanaman iaitu tupai yang semakin meningkat populasinya. Bagi memastikan tupai dapat dihapuskan sepenuhnya, penggunaan racun untuk tupai adalah difikirkan paling berkesan. Untuk membeli racun tupai yang mencukupi, jumlah tupai di lokasi tertentu dalam Kampung A mesti dianggarkan terlebih dahulu.

Based on the information above, plan a laboratory experiment to study the estimated population of squirrels at several locations in Kampung A, which are in Rambutan Gardens, Mustard Gardens and Chilies Gardens.

Berdasarkan maklumat di atas, rancang satu eksperimen makmal untuk mengkaji anggaran populasi tupai di beberapa lokasi dalam Kampung A iaitu di Kebun Rambutan, Kebun Sawi dan Kebun Cili.

Your experiment planning should cover the following aspects:

Perancangan eksperimen anda hendaklah meliputi aspek-aspek berikut:

- Statement of problem
Pernyataan masalah
- Hypothesis
Hipotesis
- Variables
Pembolehubah
- Materials and apparatus
Radas dan Bahan
- Experimental procedure
Prosedur eksperimen
- Presentation of data
Persembahan data

[17 marks

[17markah]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

INFORMATION TO CANDIDATES
MAKLUMAT KEPADA CALON

1. This question paper consists of two questions. **Question 1** and **Question 2**
*Kertas soalan ini mengandungi dua soalan: **Soalan 1** dan **Soalan 2**.*
2. Answer **all** questions. Write your answers for **Question 1** in the spaces provided in this question
*Jawab **semua** soalan. Tulis jawapan anda bagi **Soalan 1** pada ruang yang disediakan dalam kertas soalan ini.*
3. Write your answers for **Question 2** on the 'helaian tambahan' provided by the invigilator. You may use equations, diagrams, tables, graphs and other suitable methods to explain your answer.
Tulis jawapan anda bagi Soalan 2 dalam helaian tambahan yang dibekalkan oleh pengawas peperiksaan. Anda boleh menggunakan persamaan, rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda.
4. Show your working, it may help you get marks.
Tunjukkan kerja mengira, ini membantu anda mendapatkan markah.
5. The diagrams in the questions are not drawn to scale unless stated.
Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.
6. The marks allocated for each question or sub-part of a question are shown in brackets. *Markah yang diperuntukkan bagi setiap soalan atau ceraian soalan ditunjukkan dalam kurungan.*
7. If you wish to change your answer, cross out the answer that you have done. Then write down the new answer.
Jika anda hendak menukar jawapan, batalkan jawapan yang telah dibuat. Kemudian tulis jawapan yang baru.
8. You may use a scientific calculator.
Anda dibenarkan menggunakan kalkulator saintifik.
9. You are advised to spend 45 minutes to answer **Question 1** and 45 minutes for **Question 2**.
*Anda dinasihati supaya mengambil masa 45 minit untuk menjawab **Soalan 1** dan 45 minit untuk **Soalan 2**.*
10. Detach **Question 2** from this question paper. Tie the 'helaian tambahan' together with this question paper and hand in to the invigilator at the end of the examination.
*Ceraikan **Soalan 2** daripada kertas soalan ini. Ikat helaian tambahan bersama-sama kertas soalan ini dan serahkan kepada pengawas peperiksaan pada akhir peperiksaan.*