

Nama:

Kelas:

SULIT
4551/3
Biologi
Kertas 3
Ogos
2019

4551/3

1½ jam



MAKTAB RENDAH SAINS MARA

PEPERIKSAAN AKHIR SIJIL PENDIDIKAN MRSM 2019

BIOLOGI

Kertas 3

Satu jam tiga puluh minit

JANGAN BUKA KERTAS PEPERIKSAAN INI SEHINGGA DIBERITAHU

1. Tulis **nama** dan **kelas** anda pada ruangan yang disediakan.
2. Kertas peperiksaan ini adalah dalam dwibahasa.
3. Soalan dalam bahasa Inggeris mendahului soalan yang sepadan dalam bahasa Melayu.
4. Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam bahasa Inggeris atau bahasa Melayu.
5. Calon dikehendaki membaca maklumat di halaman belakang buku soalan ini.

| Untuk Kegunaan Pemeriksa | | |
|--------------------------|--------------|------------------|
| Kod Pemeriksa : | | |
| Soalan | Markah Penuh | Markah Diperoleh |
| 1 | 33 | |
| 2 | 17 | |
| Jumlah | 50 | |

Kertas peperiksaan ini mengandungi 14 halaman bercetak.

4551/3

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[Lihat halaman sebelah
SULIT

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

- 1 Auxins are growth hormone produced in the apical meristem at the shoot tips. Auxin promotes cell elongation.

A group of students has carried out an experiment to study the effect of different concentrations of auxin on the growth rate of mustard shoot.

Auksin adalah hormon pertumbuhan yang dihasilkan di meristem apeks pada hujung pucuk. Auksin merangsang pemanjangan sel.

Sekumpulan murid menjalankan eksperimen untuk mengkaji kesan perbezaan kepekatan auksin terhadap kadar pertumbuhan pucuk sawi.

Six mustard seedlings were planted under the same condition and watered with same volume of water twice a day. After the seedlings germinated, 2 ml of auxin solution with different concentrations was sprayed onto the shoot of mustard once a day. The initial height of the mustard shoot, X was measured and recorded as shown in the Diagram 1. After six days, the heights of the mustard shoot were measured again.

Enam anak benih sawi ditanam dibawah keadaan yang sama dan disiram dengan isipadu air yang sama dua kali sehari. Setelah biji benih bercambah, 2 ml larutan auksin yang berbeza kepekatan disembur pada pucuk sawi sehari sekali. Ketinggian awal pucuk sawi, X diukur dan direkod seperti yang ditunjukkan pada Rajah 1. Selepas enam hari, ketinggian pucuk sawi diukur semula.

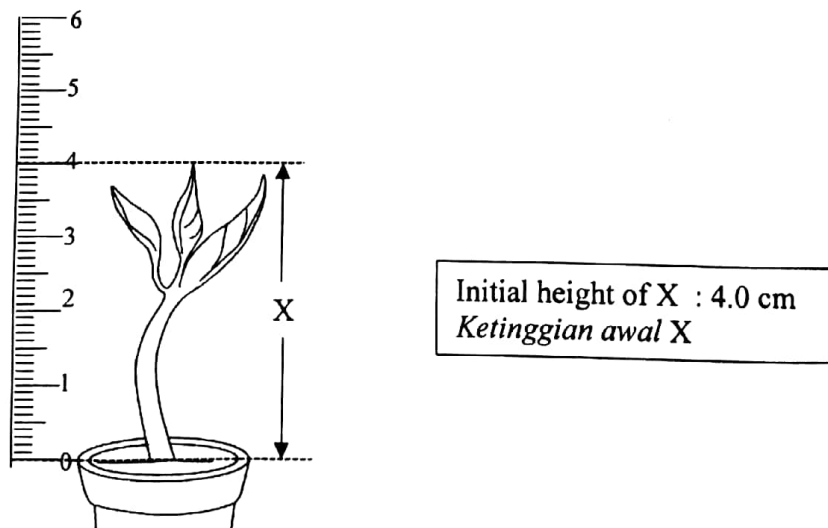
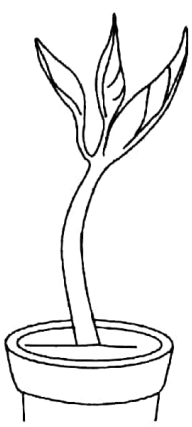

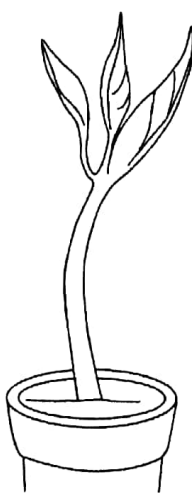
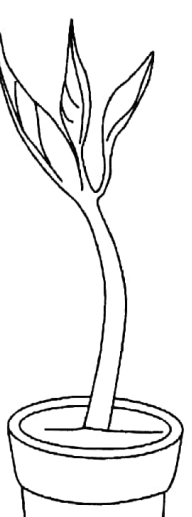


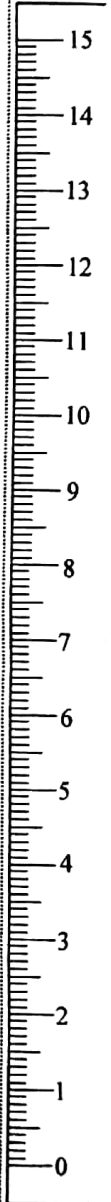
Diagram 1
Rajah 1

Table 1 shows the result of the experiment after six days.

Jadual 1 menunjukkan keputusan eksperimen selepas enam hari.

| Concentration of auxin (mgL^{-1}) <i>Kepekatan auksin (mgL^{-1})</i> | Final height of the mustard shoots after six days (cm) <i>Ketinggian akhir pucuk sawi selepas enam hari (cm)</i> | |
|--|---|--|
| | 1 | 2 |
| 0.01 |  |  |
| 0.05 |  |  |

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



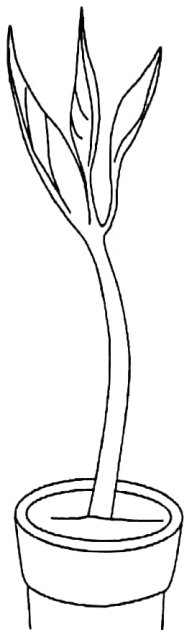
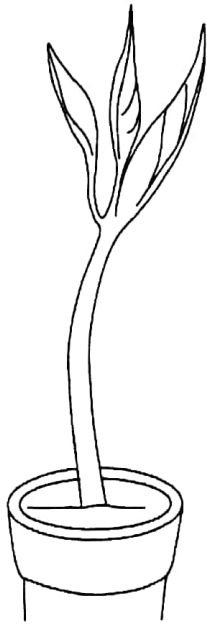
| | | |
|------|---|---|
| 0.07 |  |  |
|------|---|---|

Table 1
Jadual 1

- (a) Measure and record the final height of mustard shoot in Table 1 on page 3 and 4.
Ukur dan rekod ketinggian akhir pucuk sawi dalam Jadual 1 di halaman 3 dan 4.

[3 marks]

[3 markah]

1(a)

3

- (b) The following list are items used by the student during the experiment.

Senarai berikut ialah item-item yang digunakan oleh pelajar semasa eksperimen.

| | | |
|--|--------------------------|-----------------------|
| Mustard seedling <i>Anak benih sawi</i> | Ruler <i>Pembaris</i> | <i>Larutan auksin</i> |
| Water <i>Air</i> | Pot <i>Pasu</i> | Soil <i>Tanah</i> |

Classify all the items into materials and apparatus in Table 2.

Kelaskan semua item kepada bahan dan radas dalam Jadual 2.

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

Table 2
Jadual 2

[3 marks]

[3 markah]

1(b)

3

[Lihat Halaman Sebelah]

- (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 the experiment.

Lengkapkan Jadual 3 berdasarkan eksperimen ini.

| Variable <i>Pemboleh ubah</i> | Method to handle the variable <i>Cara mengendali pemboleh ubah</i> |
|--|---|
| Manipulated variable <i>Pemboleh ubah dimanipulasikan</i> | |
| | |
| | |
| | |
| Responding variable <i>Pemboleh ubah bergerak balas</i> | |
| | |
| | |
| | |
| Constant variable <i>Pemboleh ubah dimalarkan</i> | |
| | |
| | |
| | |

Table 3
Jadual 3

[3 marks]
[3 markah]

- (e) State the hypothesis for the experiment.

Nyatakan hipotesis bagi eksperimen ini.

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

[3 marks]
[3 markah]

[Lihat Halaman Sebelah]

1(d)

3

1(e)

3

- (f) (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 dikumpulkan dalam eksperimen itu. Jadual anda hendaklah mengandungi tajuk-tajuk berikut:

- Concentration of auxin solution
Kepekatan larutan auksin
- Height of mustard shoot / *Ketinggian pucuk sawi*
 - Initial / *Awal*
 - Final / *Akhir*
 - Average / *Purata*
- Difference in height of mustard shoot
Perbezaan ketinggian pucuk sawi
- Growth rate of mustard shoot
Kadar pertumbuhan pucuk sawi

Use the formula:

Gunakan formula:

| | | |
|-------------------------------------|---|--|
| | | Difference in height of mustard shoot |
| Growth rate of mustard shoot | = | Time |
| | | |
| <i>Kadar pertumbuhan pucuk sawi</i> | = | <i>Perbezaan ketinggian pucuk sawi</i> |
| | | <i>Masa</i> |

1(f)(i)

3

[3 marks]
[3 markah]

- (ii) Use the graph paper provided on page 10 to answer this question.

Using the data in 1(f)(i), draw a graph of growth rate of mustard shoot against the concentration of auxin solution.

Guna kertas graf yang disediakan di halaman 10 untuk menjawab soalan ini.

Menggunakan data di 1(f)(i), lukis satu graf bagi kadar pertumbuhan pucuk sawi melawan kepekatan larutan auksin.

[3 marks]

[3 markah]

1(f)(ii)

| |
|---|
| 3 |
|---|

- (g) Based on the graph in 1(f)(ii), state the relationship between growth rate of mustard shoot and the concentration of auxin solution.

Berdasarkan graf di 1(f)(ii), terangkan hubungan antara kadar pertumbuhan pucuk sawi dengan kepekatan larutan auksin..

.....

.....

.....

.....

[3 marks]

[3 markah]

1(g)

| |
|---|
| 3 |
|---|

- (h) Based on the result of this experiment, state the operational definition of growth.

Berdasarkan keputusan eksperimen ini, nyatakan definisi secara operasi bagi pertumbuhan.

.....

.....

.....

.....

.....

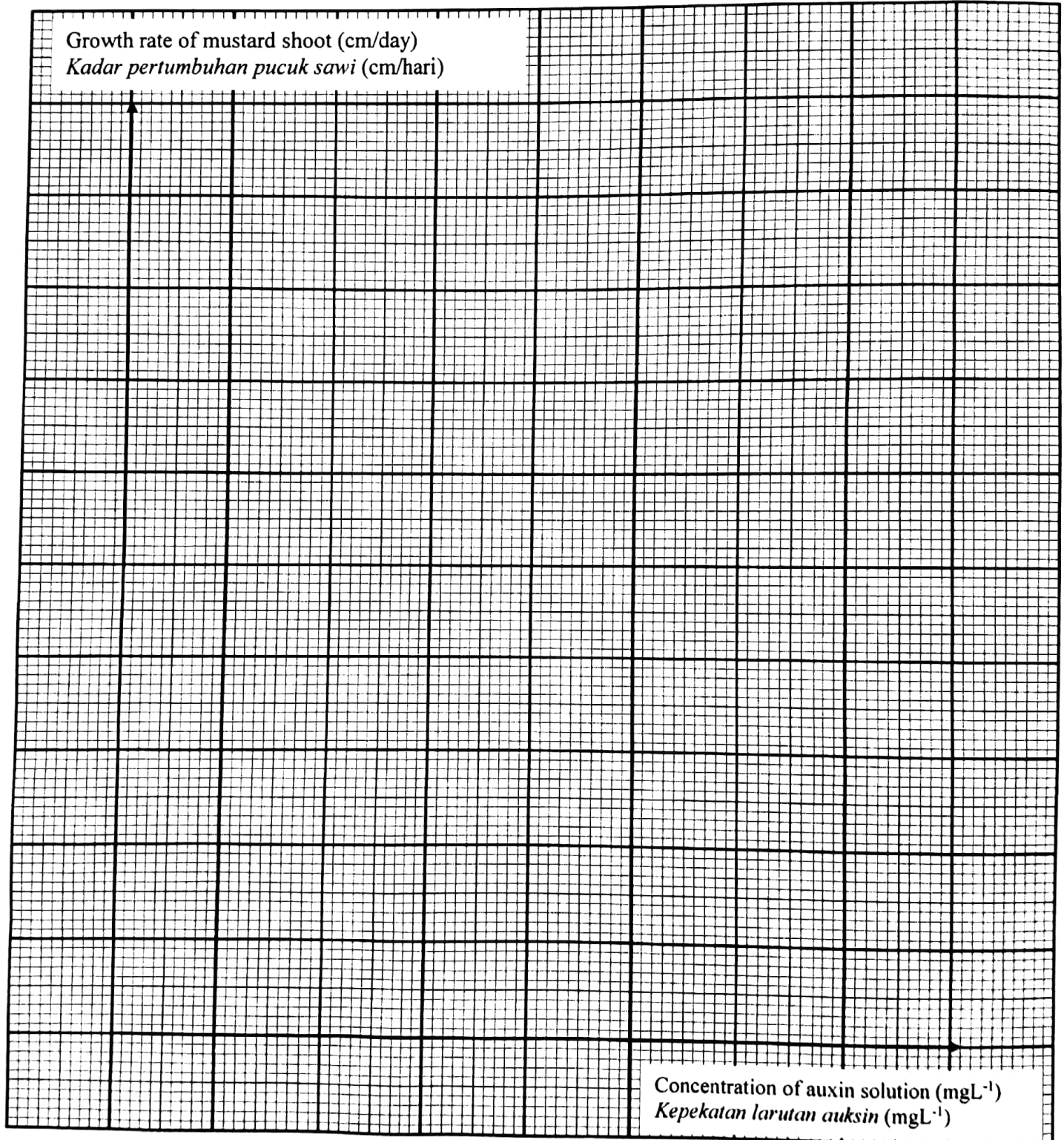
[3 marks]

[3 markah]

1(h)

| |
|---|
| 3 |
|---|

Growth rate of mustard shoot against the concentration of auxin solution
Kadar pertumbuhan pucuk sawi melawan kepekatan larutan auksin



- (i) Another experiment was carried out as shown in Diagram 2.
Satu eksperimen lain dijalankan seperti ditunjukkan dalam Rajah 2.

0.05 mgL⁻¹
 auxin solution
larutan auksin

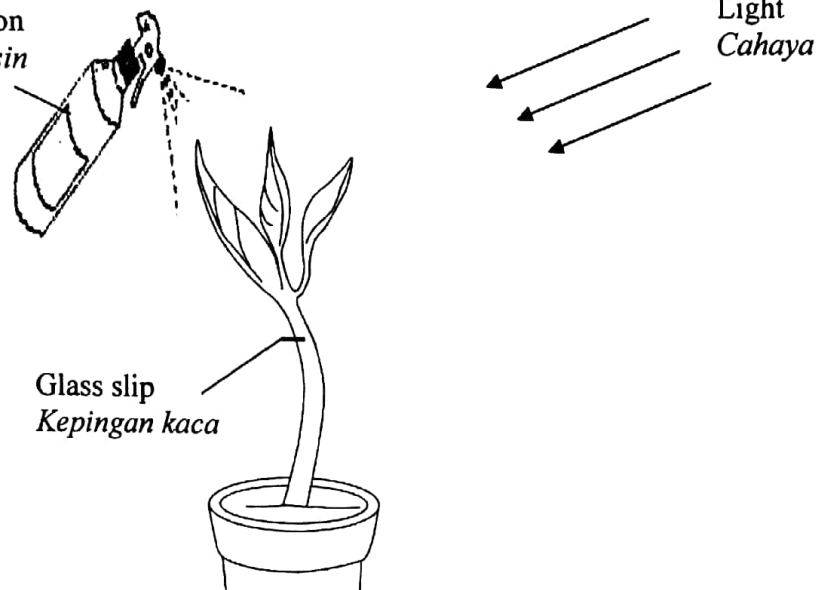


Diagram 2
Rajah 2

Predict the direction of growth of mustard shoot after six days.
 Explain your prediction.

Ramalkan arah pertumbuhan pucuk sawi selepas enam hari.
Terangkan ramalan anda.

.....

.....

.....

.....

[3 marks]
 [3 markah]

1(i)

| |
|---|
| 3 |
|---|

Total
1

| |
|----|
| 33 |
|----|

[Lihat Halaman Sebelah]

SULIT

- 2 Diagram 3.1 shows a man working at cowhide leather processing factory. Trypsin enzymes are used to remove hair from the hides.

Rajah 3.1 menunjukkan seorang pekerja di kilang pemprosesan kulit lembu. Enzim tripsin digunakan untuk menanggalkan bulu daripada kulit haiwan.

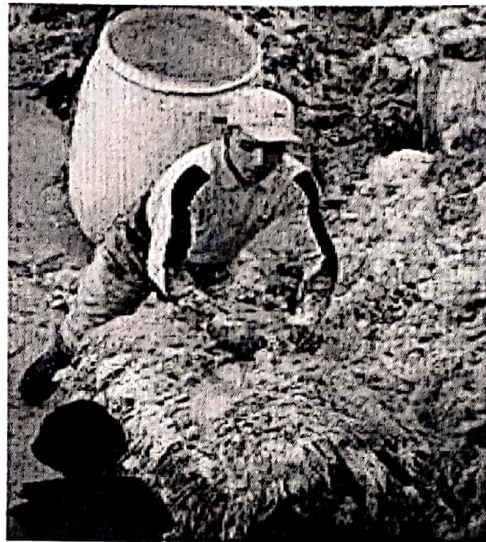


Diagram 3.1

Rajah 3.1

Table 4 shows the percentage of hair removed from the cowhide pieces after soaking in three different solution X, Y and Z.

Jadual 4 menunjukkan peratus bulu yang tertanggal daripada kepingan kulit lembu selepas direndam dalam tiga larutan yang berbeza iaitu X, Y dan Z.

| Solution Larutan | Percentage of hair removed (%) Peratus bulu yang tertanggal (%) |
|---|--|
| X (water, trypsin and vinegar) (air, tripsin dan cuka) | 0 |
| Y (water and trypsin) (air dan tripsin) | 0 |
| Z (water, trypsin and lime powder) (air, tripsin dan serbuk kapur) | 80 |

Based on the above information, plan a laboratory experiment to investigate the effect of pH on the rate of trypsin reaction.

Berdasarkan maklumat di atas, rancang satu eksperimen dalam makmal untuk mengkaji kesan pH terhadap kadar tindakbalas tripsin.

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
Pemboleh ubah
- List of apparatus and materials
Senarai radas dan bahan
- Experimental procedure or method
Kaedah atau prosedur eksperimen
- Presentation of data
Cara data dipersembahkan

[17 marks]

[17 markah]

END OF QUESTION PAPER
KERTAS PEPERIKSAAN TAMAT

[Lihat Halaman Sebelah]