

T4 B5 GENETIK

1. Rajah 5 menunjukkan suatu proses semasa meiosis.

*Diagram 5 shows a process during meiosis.*



Rajah 5  
Diagram 5

Apakah proses itu?

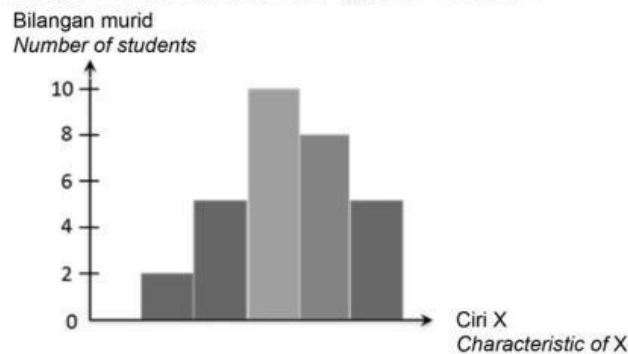
*What is the process?*

- A Mitosis  
*Mitosis*
- B Pindah silang  
*Crossing over*
- C Persenyawaan  
*Fertilisation*
- D Replikasi DNA  
*DNA replication*

**SOALAN 4 [KEDAH 2023 S9]**

Rajah 6 menunjukkan histogram yang mewakili sejenis variasi.

*Diagram 6 shows a histogram that represents a type of variation.*



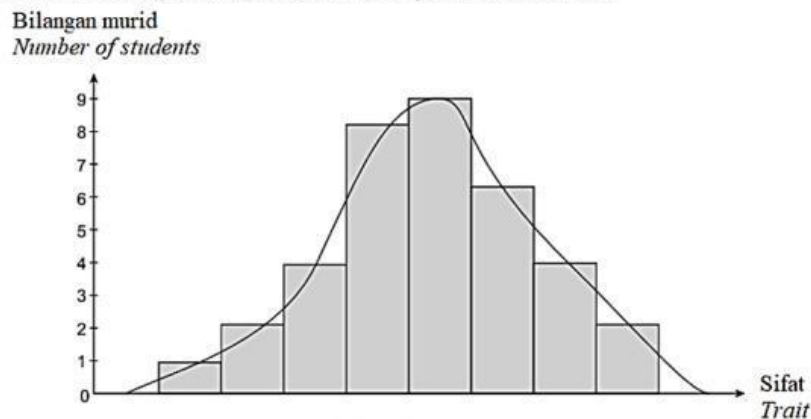
Rajah 6  
Diagram 6

Antara yang berikut, yang manakah benar mengenai variasi tersebut? *Which of the following is true about the variation?*

- A Merupakan variasi tak selanjar  
*Is a continuous variation*
- B Contoh variasi ialah ketinggian  
*An example of variation is height*
- C Tidak dipengaruhi oleh persekitaran  
*Not affected by the environment*
- D Menunjukkan perbezaan yang ketara  
*Shows no significant difference*

## MODUL I-READY SAINS SPM

3. Rajah 5 menunjukkan histogram yang mewakili sejenis variasi.  
Diagram 5 shows a histogram representing a type of variation.

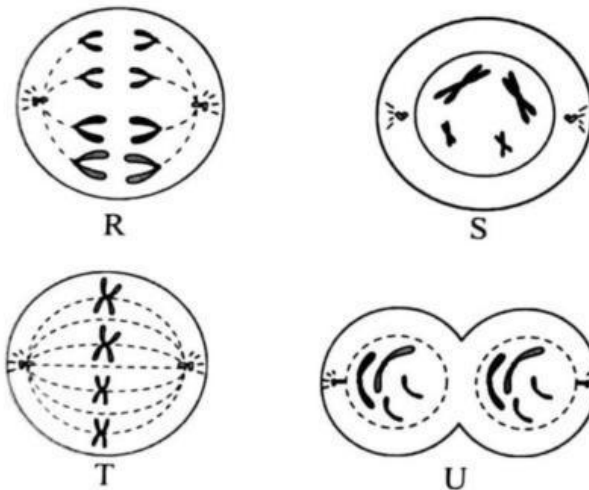


Rajah 5 / Diagram 5

Apakah ciri yang diwakili oleh histogram di atas?

What characteristic is represented by the histogram above?

- A Ketinggian  
Height
- B Kumpulan darah  
Blood group
- C Jenis cuping telinga  
Types of earlobes
- D Kebolehan menggulung lidah  
Ability to roll the tongue
4. Rajah 5 menunjukkan beberapa peringkat yang berlaku dalam pembahagian sel secara mitosis.  
Diagram 5 shows several stages that occur in mitosis.



Rajah / Diagram 5

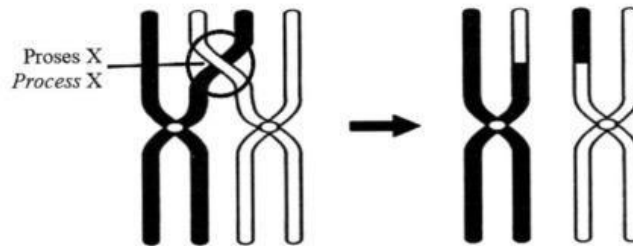
Antara yang berikut, yang manakah menunjukkan susunan peringkat-peringkat mitosis mengikut urutan yang betul?

Which of the following shows the **correct** order of the stages of mitosis?

- A T, U, S, R                      C S, T, R, U
- B R, S, T, U                      D U, T, S, R

## MODUL i-READY SAINS SPM

5. Rajah 2 menunjukkan satu proses semasa pembahagian sel.  
Diagram 2 shows a process during cell division.



Rajah 2  
Diagram 2

Apakah proses X?

What is process X?

- |          |                                               |          |                                |
|----------|-----------------------------------------------|----------|--------------------------------|
| <b>A</b> | Replikasi kromosom<br>Chromosomal replication | <b>B</b> | Sitokinesis<br>Cytokinesis     |
| <b>C</b> | Kromosom homolog<br>Homologous chromosomes    | <b>D</b> | Pindah silang<br>Crossing over |

6. Jika seorang budak lelaki mempunyai ayah yang normal ( $X^HY$ ) dan ibu yang merupakan pembawa hemofilia ( $X^HX^h$ ), berapakah peratus budak lelaki itu akan mewarisi penyakit tersebut?

If a boy's father is normal ( $X^HY$ ) and his mother is a carrier for haemophilia ( $X^HX^h$ ), what is the percentage that the boy will inherit the disease?

- A 25%  
B 50%  
C 75%  
D 100%

### BAHAGIAN A

1. Sekumpulan pelajar Tingkatan 5 menjalankan eksperimen untuk mengenal past! kumpulan darah mereka di makmal. Jadual 1 menunjukkan kumpulan darah bagi 30 orang pelajar tersebut.

A group of Form 5 students conduct an experiment to identify their blood group in the laboratory. Table 1 shows the blood group of the 30 students.

|    |    |    |    |    |    |
|----|----|----|----|----|----|
| O  | B  | AB | AB | B  | O  |
| A  | AB | A  | AB | O  | AB |
| AB | O  | B  | B  | AB | AB |
| B  | B  | A  | A  | A  | B  |
| O  | B  | AB | O  | AB | A  |

- a) Berdasarkan Jadual 1 di atas, lengkapkan jadual di bawah

Based on Table 1 above, complete the table below.

|                                      |          |          |           |          |
|--------------------------------------|----------|----------|-----------|----------|
| Kumpulan darah<br>Blood group        | <b>A</b> | <b>B</b> | <b>AB</b> | <b>O</b> |
| Bilangan murid<br>Number of students |          |          |           |          |

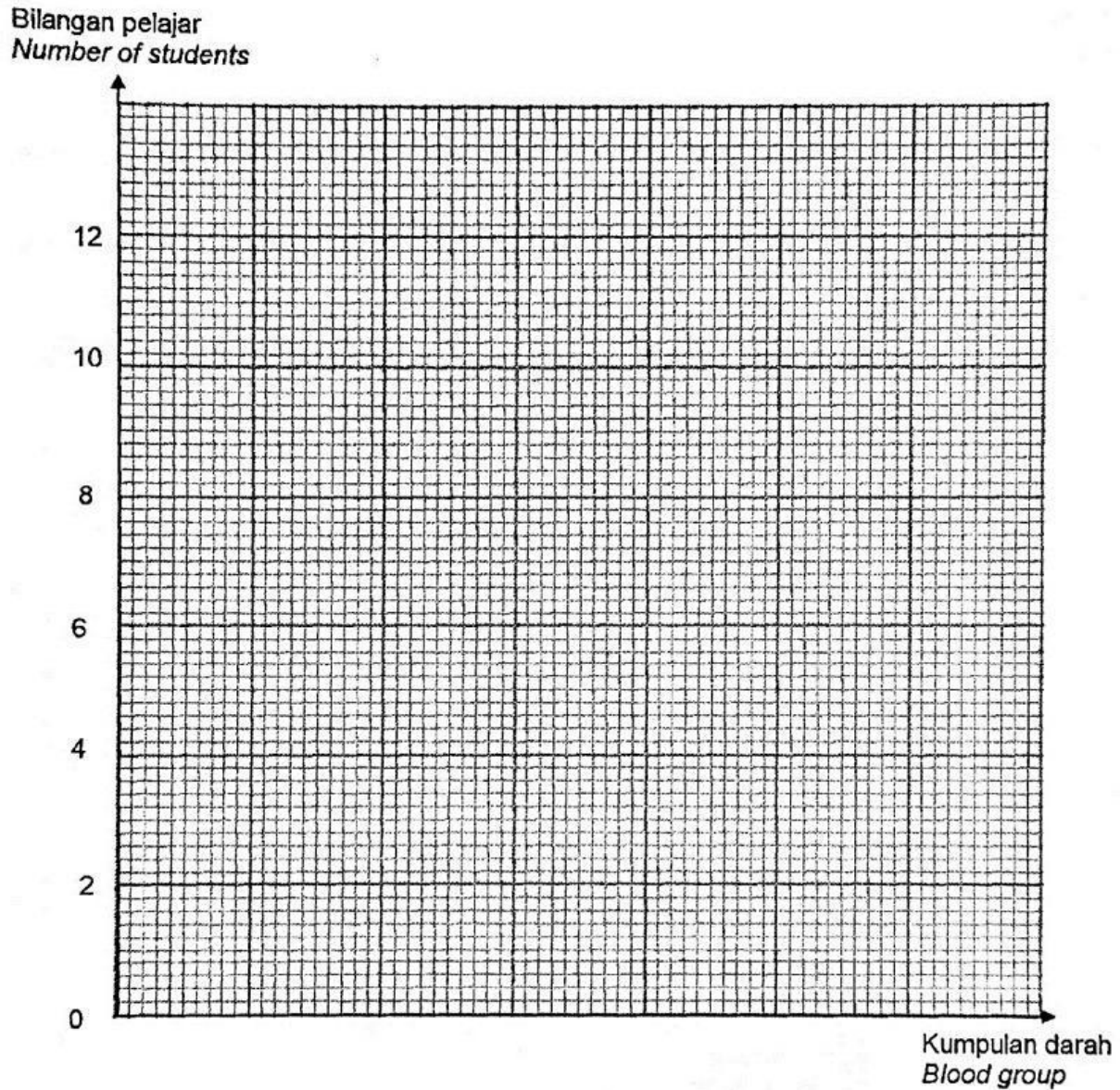
[1 markah / mark]



## MODUL I-READY SAINS SPM

b) Berdasarkan Jadual di 1 (a), plotkan graf bar yang menunjukkan bilangan murid melawan kumpulan darah.

*Based on the Table in 1 (a), plot the bar chart that shows the number of students against blood group.* [2 markah / marks]



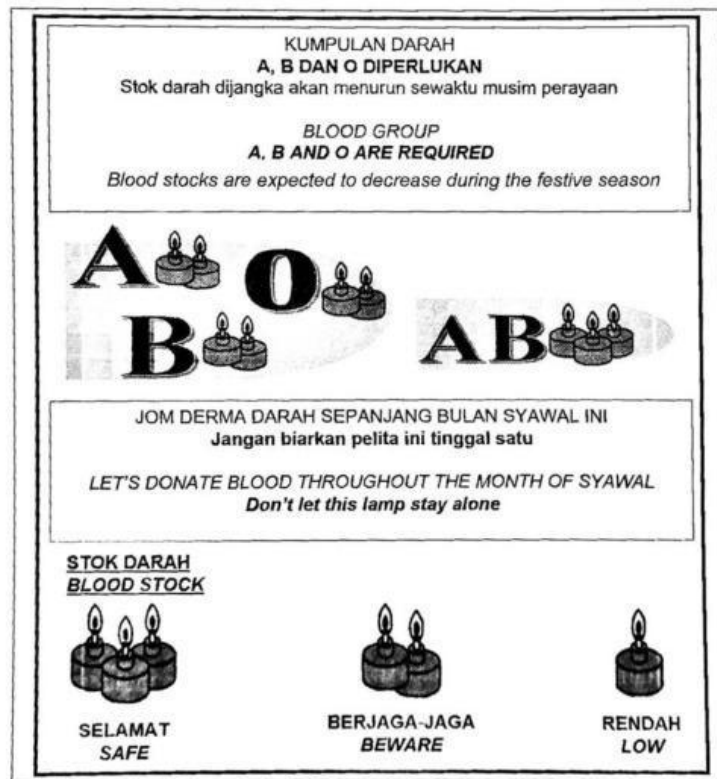
c) Apakah jenis variasi di atas?  
*What kind of variation is above?*

.....  
[1 markah / mark]

## MODUL I-READY SAINS SPM

- d) Rajah 1 menunjukkan stok darah di Pusat Darah Negara. Stok darah kumpulan AB adalah selamat.

*Diagram 1 shows the blood stock at the National Blood Center. AB group blood stocks are safe.*



Pada pendapat anda, mengapakah penggunaan darah AB paling selamat ?

*In your opinion, why is the use of AB blood the safest?*

[1 markah / mark]

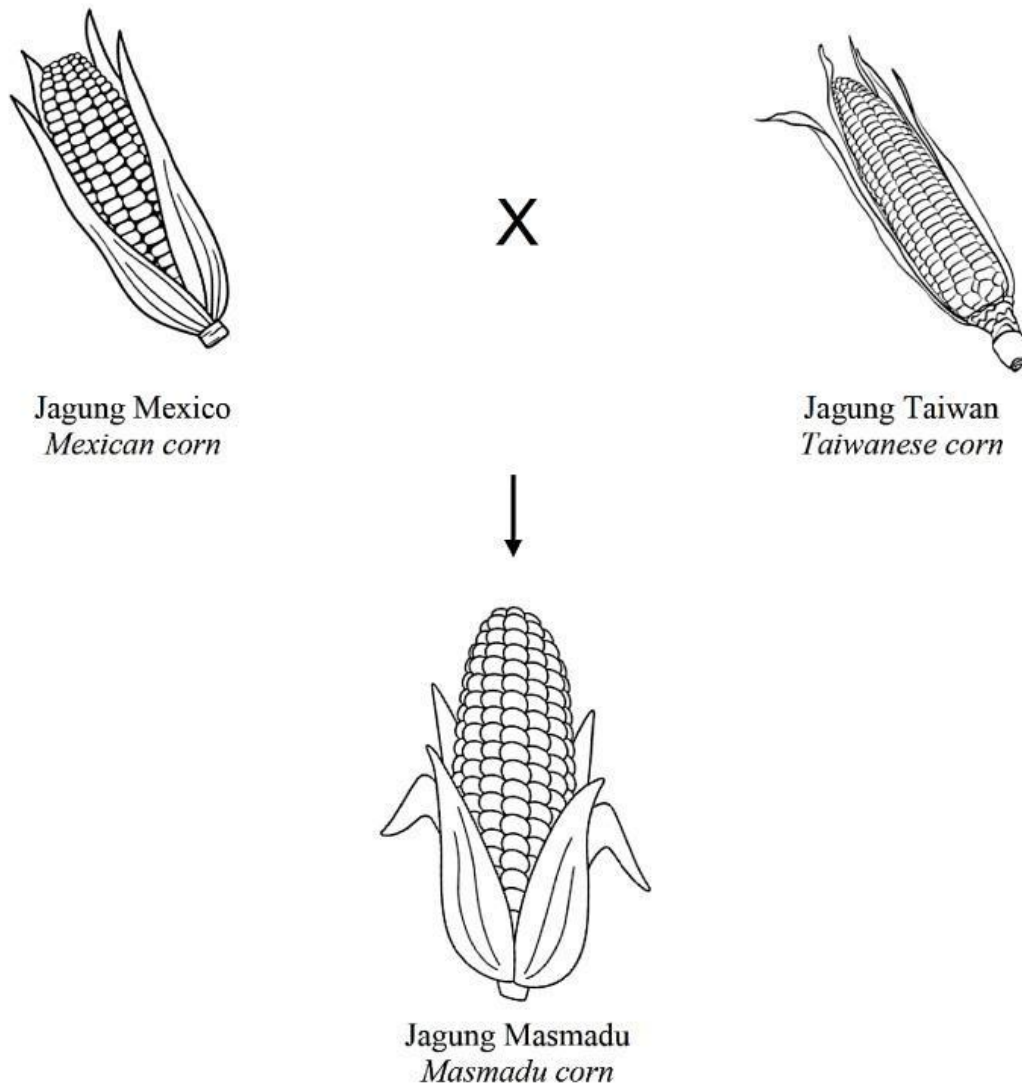
**BAHAGIAN B**

1. Organisma Termodifikasi Genetik (GMO) adalah satu kaedah teknologi kejuruteraan genetik yang digunakan untuk tujuan tertentu.

Rajah 6.1 menunjukkan GMO yang dijalankan ke atas buah jagung.

*Genetically Modified Organism (GMO) is a method of genetic engineering technology used for specific purposes.*

*Diagram 6.1 shows GMOs that have been carried out on corn.*



Rajah 6.1  
Diagram 6.1

- (a) Berdasarkan Rajah 6.1,  
*Based on Diagram 6.1,*  
(i) bagaimanakah kaedah GMO ini dijalankan?  
*how is this GMO method carried out?*
- .....



## MODUL I-READY SAINS SPM

[1 markah][1 mark]

- (ii) nyatakan **satu** tujuan kaedah ini.  
*state one purpose of this method.*

.....

.....

[1 markah][1 mark]

- (b) Encik Ahmad ialah pengusaha ladang jagung. Beliau sedar terdapat kebaikan dan keburukan kaedah GMO ke atas tanamannya.

Wajarkan keburukan kaedah GMO pada tanaman.

*Mr. Ahmad is a corn farm operator. He is aware that there are advantages and disadvantages of GMO method to the crops.*

*Justify the disadvantages of GMO methods on crops.*

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[2 markah][2 marks]

- (c) Rajah 6.2 menunjukkan maklumat bagi dua jenis kejuruteraan genetik.

*Diagram 6.2 shows information for two types of genetic engineering.*

| DNA Rekombinan<br><i>Recombinant DNA</i>                                                                                                                                                                                                                                                                                       | Terapi Gen<br><i>Gene Therapy</i>                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>Menggabungkan dua spesis berbeza<br/><i>Combines two different species</i></li><li>Menghasilkan produk baru seperti insulin<br/><i>Produces new product such as insulin</i></li><li>Merawat pelbagai jenis penyakit kronik<br/><i>Treats various types of chronic diseases</i></li></ul> | <ul style="list-style-type: none"><li>Menyisipkan gen normal ke dalam sel atau tisu<br/><i>Inserting normal gene into cells or tissues</i></li><li>Memperbaiki gen-gen mutan (abnormal / rosak)<br/><i>Fixing mutant genes (abnormal / defective)</i></li><li>Merawat penyakit berkaitan genetik<br/><i>Treating genetics-related diseases</i></li></ul> |

Rajah 6.2  
*Diagram 6.2*

## MODUL I-READY SAINS SPM

Banding bezakan kedua-dua jenis kejuruteraan genetik tersebut.  
*Compare and contrast the two types of genetic engineering.*

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[2 markah][2 marks]