

**SENARAI SEMAK CALON
CANDIDATE CHECK LIST**

Anda dikehendaki menyemak radas dan bahan, membaca soalan dan merancang eksperimen dalam tempoh lima minit yang pertama.

Tandakan (✓) pada ruangan yang disediakan sekiranya radas dan bahan yang disenaraikan dalam jadual dibekalkan.

You are required to review the apparatus and materials, read the questions and plan the experiment within the first five minutes.

Mark (✓) in the space provided if the apparatus and materials listed in the table are supplied.

Bil. No.	Radas / Bahan <i>Apparatus / Material</i>	Kuantiti <i>Quantity</i>	Ya (✓) / Tidak (X) <i>Yes (✓) / No (X)</i>
1.	Larutan glukosa 5% <i>5% glucose solution</i>	50 ml	
2.	Yis segera dalam plastik berzip <i>Instant yeast in ziplock plastic</i>	1.0 g	
3.	Yis segera dalam plastik berzip <i>Instant yeast in ziplock plastic</i>	1.5g	
4.	Larutan metilena biru 0.1% <i>0.1% methylene blue solution</i>	5 ml	
5.	1 ml minyak masak dalam picagari 1 ml/ 3 ml <i>1 ml cooking oil in 1 ml/ 3 ml syringe</i>	2	
6.	Air suling <i>Distilled water</i>	1	
7.	Tabung didih <i>Boiling tube</i>	2	
8.	Rak tabung didih <i>Boiling tube rack</i>	1	
9.	Jam randik <i>Stopwatch</i>	1	
10.	Silinder penyukat 25 ml / 50 ml <i>Measuring cylinder 25 ml/ 50 ml</i>	1	
11.	Kertas label <i>Label paper</i>	3	
12.	Rod kaca <i>Glass rod</i>	1	
13.	Penitis <i>Dropper</i>	2	

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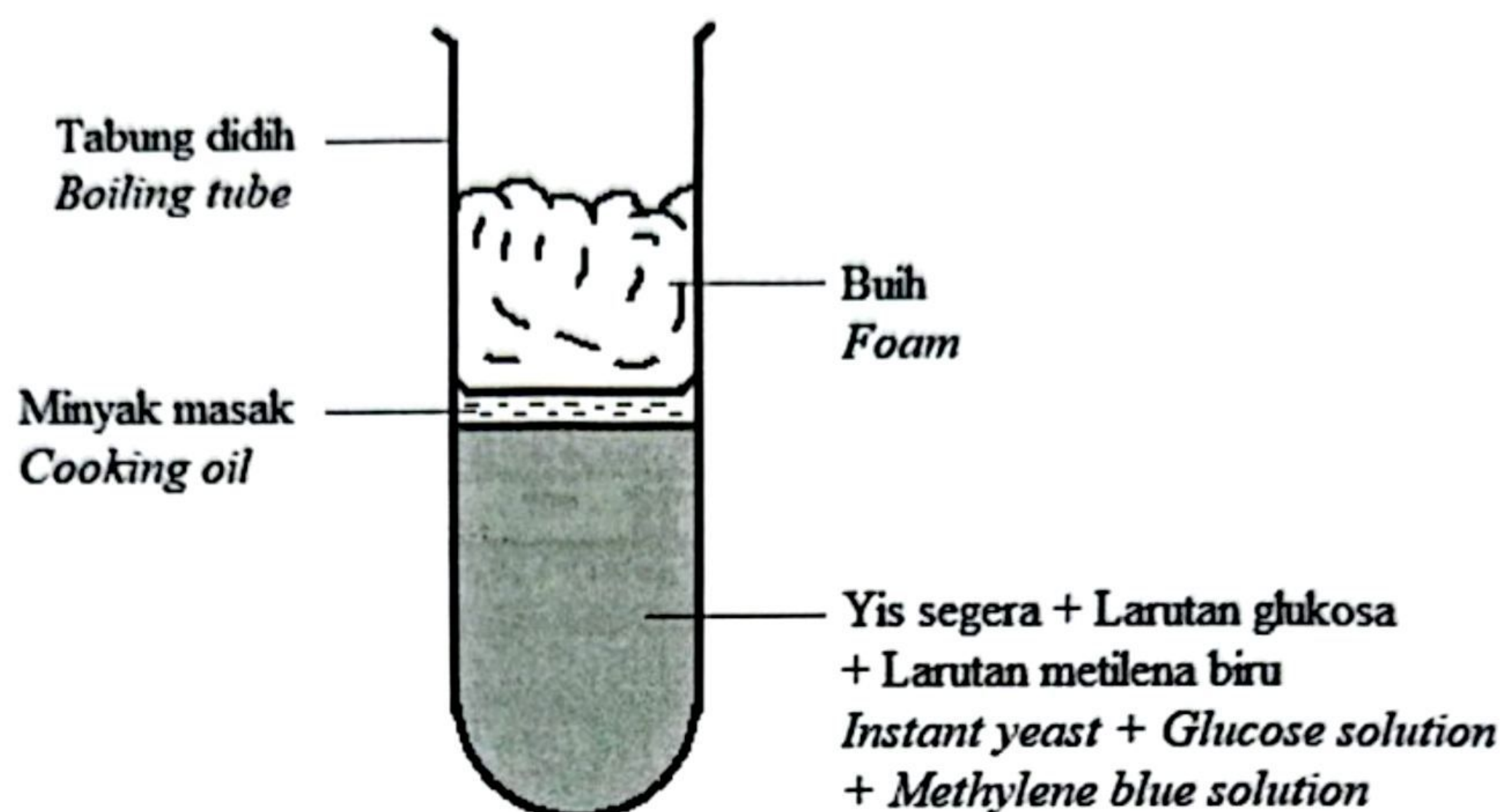
Keperluan oksigen biokimia (BOD) ialah jumlah oksigen yang diperlukan oleh mikroorganisma untuk menguraikan bahan organik di dalam air.

Biochemical oxygen demand (BOD) is the total amount of oxygen needed by microorganisms to decompose organic materials in water.

Anda dikehendaki menjalankan satu eksperimen untuk mengkaji kesan bilangan mikroorganisma terhadap tahap keperluan oksigen biokimia (BOD).

You are required to carry out an experiment to study the effect of the number of microorganisms on the level of biochemical oxygen demand (BOD).

1. Sediakan dua tabung didih dan labelkan X dan Y.
Prepare two boiling tubes and label them as X and Y.
2. Isikan tabung didih X dengan 15 ml larutan glukosa 5% dan 1.5 g yis segera.
Fill boiling tube X with 15 ml of 5% glucose solution and 1.5 g of instant yeast.
3. Kacau tabung didih X dengan menggunakan rod kaca sehingga bahan larut.
Stir boiling tube X using a glass rod until the material dissolves.
4. Tambahkan 4 titis larutan metilena biru 0.1% ke dalam tabung didih X dan goncang perlahan-lahan sehingga seluruh campuran bertukar menjadi warna biru.
Add 4 drops of 0.1% methylene blue solution into boiling tube X and shake gently until the entire mixture turns blue.
5. Tambahkan 1.0 ml minyak masak ke dalam tabung didih X dengan menggunakan picagari.
Add 1.0 ml of cooking oil into boiling tube X using a syringe.
6. Mulakan jam randik dengan serta merta.
Start the stopwatch immediately.
7. Perhatikan dan rekodkan masa yang diambil untuk warna larutan metilena biru 0.1% meluntur (**abaikan warna buih**) dalam Jadual 1. Rujuk Rajah 1.
*Observe and record the time taken for 0.1% methylene blue solution to decolourise (**ignore the colour of the foam**) in Table 1. Refer to Diagram 1.*



Rajah 1
Diagram 1

8. Ulang langkah 2 hingga 7 untuk tabung didih Y dengan 1.0 g yis segera.
Repeat steps 2 to 7 for boiling tube Y with 1.0 g of instant yeast.

- a) Apakah tujuan menambahkan lapisan minyak masak?
What is the purpose of adding a layer of cooking oil?

[1 markah]
[1 mark]

- b) Rekodkan pemerhatian dalam Jadual 1.
Record the observations in Table 1.

Tabung didih <i>Boiling tube</i>	Jisim yis segera (g) <i>Mass of instant yeast (g)</i>	Masa yang diambil untuk larutan metilena biru 0.1% meluntur (minit) <i>Time taken for 0.1% methylene blue solution to decolourise (minute)</i>
X	1.5	
Y	1.0	
Z	0.5	45

Jadual 1
Table 1

[2 markah]
[2 marks]

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SULIT

- c) Kirakan kadar pencemaran air bagi sampel dalam tabung didih X.
Calculate the water pollution rate for the sample in boiling tube X.

Kadar pencemaran air =
$$\frac{1}{\text{Masa warna larutan metilena biru 0.1\% meluntur}}$$

*Water pollution rate =
$$\frac{1}{\text{Time for the 0.1\% methylene blue solution to decolourise}}$$*

[2 markah]
[2 marks]

- d) (i) Apakah pembolehubah dimanipulasi secara operasi dalam eksperimen ini?
What is the operational manipulated variable in this experiment?

.....
[1 markah]
[1 mark]

- (ii) Terangkan bagaimana pembolehubah yang dinyatakan dalam (d)(i) dikendalikan.
Explain how the variable stated in (d)(i) is handled.

.....
[1 markah]
[1 mark]

- e) Dengan menggunakan data dalam Jadual 1, lukiskan graf masa yang diambil untuk warna larutan metilena biru 0.1% meluntur melawan jisim yis segera.

Using the data in Table 1, draw a graph of the time taken for 0.1% methylene blue solution to decolourise against mass of instant yeast.

[4 markah]

[4 marks]

- f) Nyatakan hubungan antara bilangan mikroorganisma dengan masa yang diambil untuk warna larutan metilena biru 0.1% meluntur.

State the relationship between the number of microorganisms and the time taken for 0.1% methylene blue solution to decolourise.

.....

.....

[2 markah]

[2 marks]

- g) Eksperimen ini diulangi dengan menggunakan campuran dalam tabung didih X yang telah dididihkan.

Ramalkan perubahan warna campuran dan terangkan jawapan anda.

This experiment is repeated using the mixture in boiling tube X that has been boiled.

Predict the colour change of the mixture and explain your answer.

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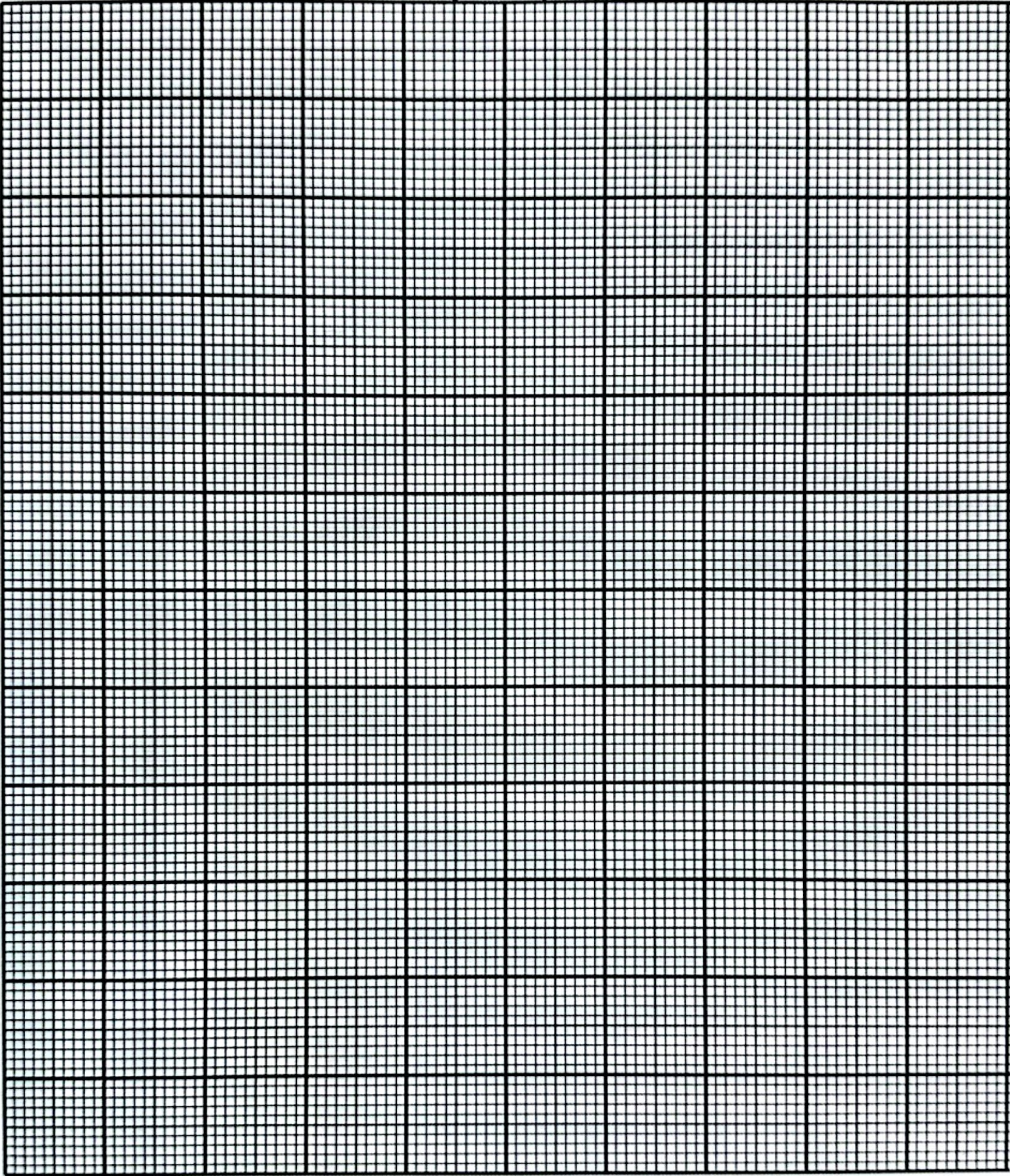
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[2 markah]

[2 marks]

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Graf masa yang diambil untuk warna larutan metilena biru 0.1% meluntur melawan jisim yis segera
Graph the time taken for 0.1% methylene blue solution for decolourise against mass of instant yeast



SOALAN TAMAT
END OF QUESTION

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