



KEMENTERIAN PENDIDIKAN
Jabatan Pendidikan Negeri Terengganu

**MODUL
PERKEMBANGAN PEMBELAJARAN
SPM 2023**

MPP 3

**FIZIK
KERTAS 2**

NAMA :

KELAS :

DIBIYAI OLEH KERAJAAN NEGERI



Tidak dibenarkan menyunting dan mencetak mana-mana bahagian dalam modul ini tanpa kebenaran Pengarah Pendidikan Negeri Terengganu

Rumus-rumus berikut boleh membantu anda menjawab soalan. Simbol-simbol yang diberi adalah yang biasa digunakan

DAYA DAN GERAKAN I
FORCE AND MOTION I

- 1 $v = u + at$
- 2 $s = \frac{1}{2}(u + v)t$
- 3 $s = ut + \frac{1}{2}at^2$
- 4 $v^2 = u^2 + 2as$
- 5 Momentum = mv
- 6 $F = ma$
- 7 $g = 9.81 \text{ m s}^{-2}$ @ 9.81 N kg^{-1}

KEGRAVITIAN
GRAVITATIONAL

- 1 $F = \frac{Gm_1m_2}{r^2}$
- 2 $g = \frac{GM}{r^2}$
- 3 $F = \frac{mv^2}{r}$
- 4 $a = \frac{v^2}{r}$
- 5 $v = \frac{2\pi r}{T}$
- 6 $\frac{T_1^2}{r_1^3} = \frac{T_2^2}{r_2^3}$
- 7 $v = \sqrt{\frac{GM}{r}}$
- 8 $u = -\frac{GMm}{r}$
- 9 $v = \sqrt{\frac{2GM}{r}}$
- 10 $G = 6.67 \times 10^{-11} \text{ N m}^2 \text{ kg}^{-1}$

HABA
HEAT

- 1 $Q = mc\Delta\theta$
- 2 $Q = ml$
- 3 $Q = Pt$
- 4 $P_1V_1 = P_2V_2$
- 5 $\frac{V_1}{T_1} = \frac{V_2}{T_2}$
- 6 $\frac{P_1}{T_1} = \frac{P_2}{T_2}$

GELOMBANG
WAVES

- 1 $V = f\lambda$
- 2 $\lambda = \frac{ax}{D}$

CAHAYA DAN OPTIK
LIGHT AND OPTICS

- 1 $n = \frac{c}{v}$
- 2 $n = \frac{\sin i}{\sin r}$
- 3 $n = \frac{1}{\sin c}$
- 4 $n = \frac{H}{h}$
- 5 $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$
- 6 $n_1\sin\theta_1 = n_2\sin\theta_2$
- 7 Pembesaran linear, $m = \frac{v}{u}$
Linear magnification, $m = \frac{v}{u}$

DAYA DAN GERAKAN II
FORCE AND MOTION II

$$1 \quad F = kx \quad 3 \quad E = \frac{1}{2} kx^2$$

$$2 \quad E = \frac{1}{2} Fx$$

TEKANAN
PRESSURE

$$1 \quad P = \frac{F}{A}$$

$$2 \quad P = h\rho g$$

$$3 \quad \rho = \frac{m}{V}$$

ELEKTRIK
ELECTRICITY

$$1 \quad E = \frac{F}{Q} \quad 6 \quad \varepsilon = V + Ir$$

$$2 \quad I = \frac{Q}{t} \quad 7 \quad P = VI$$

$$3 \quad V = \frac{E}{Q} \quad 8 \quad P = \frac{E}{t}$$

$$4 \quad V = IR \quad 9 \quad E = \frac{V}{d}$$

$$5 \quad R = \frac{\rho l}{A}$$

KEELEKTROMAGNETAN
ELECTROMAGNETISM

$$1 \quad \frac{V_s}{V_p} = \frac{N_s}{N_p}$$

$$2 \quad \eta = \frac{\text{Kuasa output}}{\text{Kuasa input}} \times 100\%$$

$$\eta = \frac{\text{Output power}}{\text{Input power}} \times 100\%$$

ELEKTRONIK
ELECTRONICS

$$1 \quad \text{Tenaga keupayaan elektrik, } E = eV$$

Electrical potential energy, } E = eV

$$2 \quad \text{Tenaga kinetik maksimum, } E = \frac{1}{2} mv^2$$

Maximum kinetics energy, } E = \frac{1}{2} mv^2

$$3 \quad \beta = \frac{I_c}{I_B}$$

FIZIK NUKLEAR
NUCLEAR PHYSICS

$$1 \quad N = \left(\frac{1}{2}\right)^n N_0$$

$$2 \quad E = mc^2$$

$$3 \quad c = 3.00 \times 10^8 \text{ m s}^{-1}$$

$$4 \quad 1 \text{ u.j.a.} = 1.66 \times 10^{-27} \text{ kg}$$

$$1 \text{ u.m.u.} = 1.66 \times 10^{-27} \text{ kg}$$

FIZIK KUANTUM
QUANTUM PHYSICS

$$1 \quad E = hf$$

$$2 \quad f = \frac{c}{\lambda}$$

$$3 \quad \lambda = \frac{h}{p}$$

$$4 \quad \lambda = \frac{h}{mv}$$

$$5 \quad E = \frac{hc}{\lambda}$$

$$6 \quad p = nhf$$

$$7 \quad hf = W + \frac{1}{2} mv_{\text{maks}}^2$$

$$8 \quad w = hf_0$$

$$9 \quad h = 6.63 \times 10^{-34} \text{ J s}$$

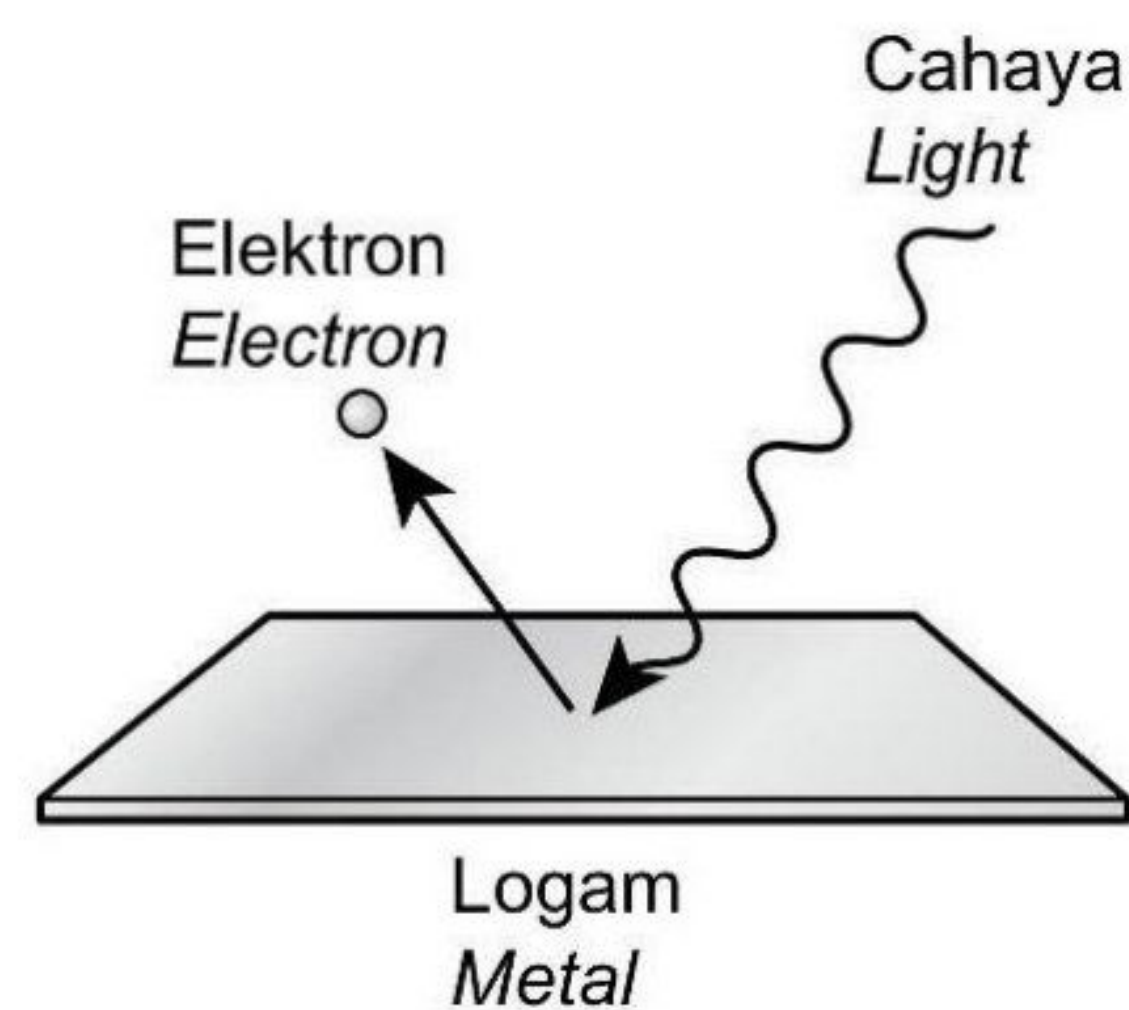
Bahagian A
Section A

[60 markah]

[60 marks]

Jawab **semua** soalan dalam bahagian ini.
Answer **all** questions in this section.

1. Rajah 1 menunjukkan sinar cahaya pada frekuensi tertentu menyinari permukaan logam. Elektron terpancar daripada permukaan logam tersebut.
Diagram 1 shows light rays at a certain frequency illuminate on a metal surface. Electrons are emitted from the metal surface.



Rajah 1
Diagram 1

- (a) Tanda (✓) bagi jawapan yang betul pada petak yang disediakan.
Mark with (✓) for the correct answer in the box provided.

Fenomena ini dikenali sebagai
This phenomenon is known as

- | | |
|--------------------------|--|
| <input type="checkbox"/> | <i>pancaran termion</i>
<i>thermionic emission</i> |
| <input type="checkbox"/> | <i>kesan fotoelektrik</i>
<i>photoelectric effect</i> |

[1 markah]
[1 mark]

- (b) Namakan frekuensi minimum yang dapat mengeluarkan elektron daripada permukaan logam apabila disinari cahaya.
Name the minimum frequency that allows electrons to be emitted from the metal surface when light is illuminated.

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

- (c) (i) Apakah yang akan berlaku kepada tenaga kinetik elektron apabila keamatan cahaya bertambah?
What will happen to the kinetic energy of electron when the intensity of light increases?

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

- (ii) Jelaskan jawapan anda dalam (c)(i).
Explain your answer in (c)(i).

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

2. Rajah 2.1 menunjukkan seorang pelajar memerhati sebatang pensel yang berada di dalam sebuah cawan. Pencil kelihatan bengkok disebabkan oleh fenomena pembiasan cahaya.

Diagram 2.1 shows a student observing a pencil inside a cup. The pencil appears to bend due to the phenomenon of refraction of light.



Rajah 2.1
Diagram 2.1

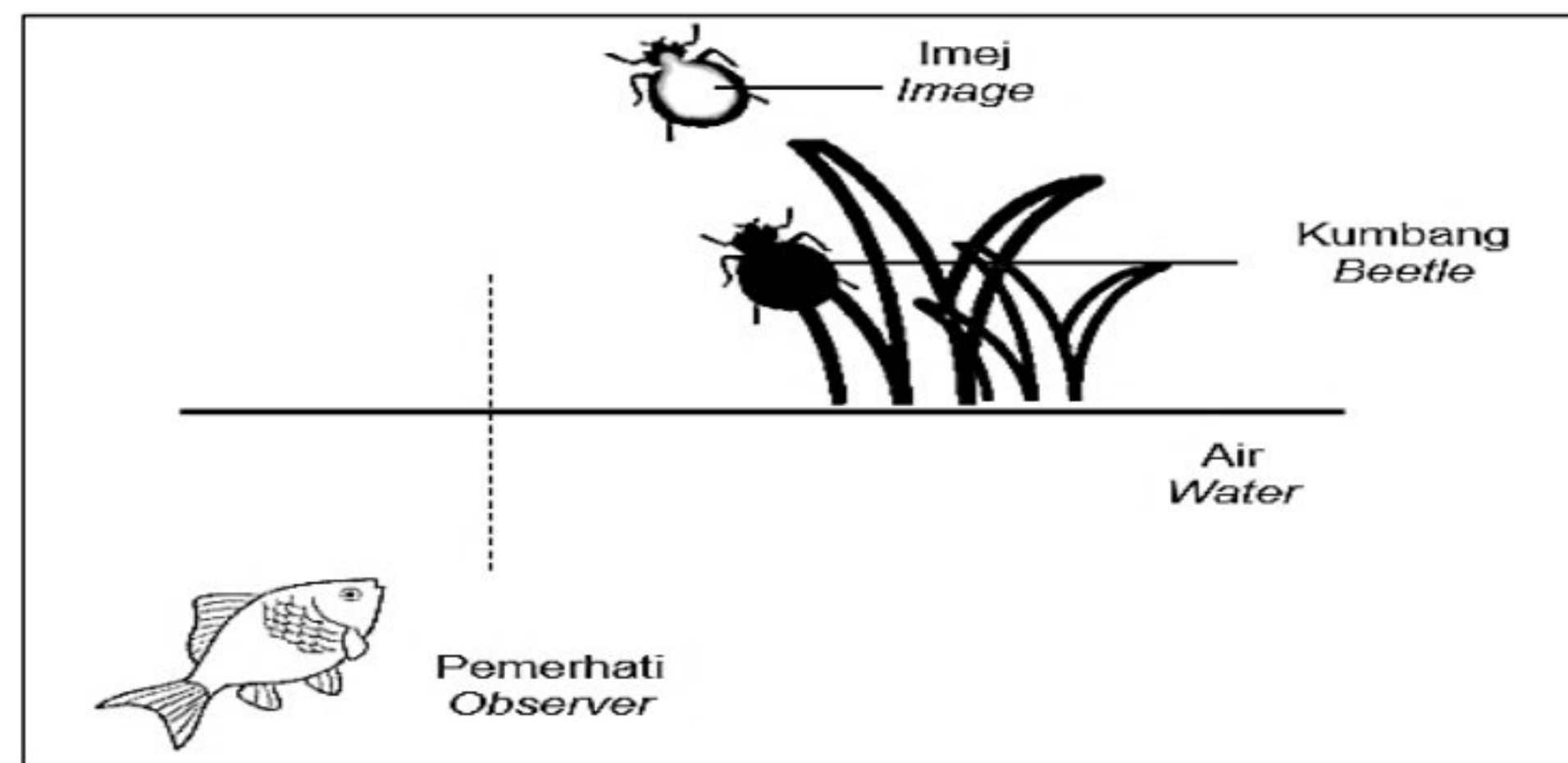
- (a) Apakah yang dimaksudkan dengan pembiasan cahaya?
What is the meaning of the refraction of light?

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

- (b) Terangkan bagaimana fenomena dalam Rajah 2.1 boleh berlaku.
Explain how phenomena in Diagram 2.1 can occur.

.....
.....
.....
[2 markah]
[2 marks]

- (c) Berdasarkan Rajah 2.2, lengkapkan gambarajah sinar cahaya untuk menunjukkan kedudukan imej yang diperhatikan oleh ikan itu.
Based on Diagram 2.2, Complete the ray diagram below to show the position of image observed by the fish.



Rajah 2.2
Diagram 2.2

[2 markah]
[2 marks]

3. Iodin-131 adalah satu radioisotop bagi iodin.
Suatu sampel radioisotop yang mengandungi 200 g iodin-131 mengalami proses reputan. Separuh hayat iodin-131 adalah 8 hari.

Iodine-131 is a radioisotope of iodine.

A radioisotope sample that contains 200 g of iodine-131 undergoes a decay process. The half-life of iodine-131 is 8 days.

- (a) Apakah maksud separuh hayat?
What is the meaning of half-life?

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

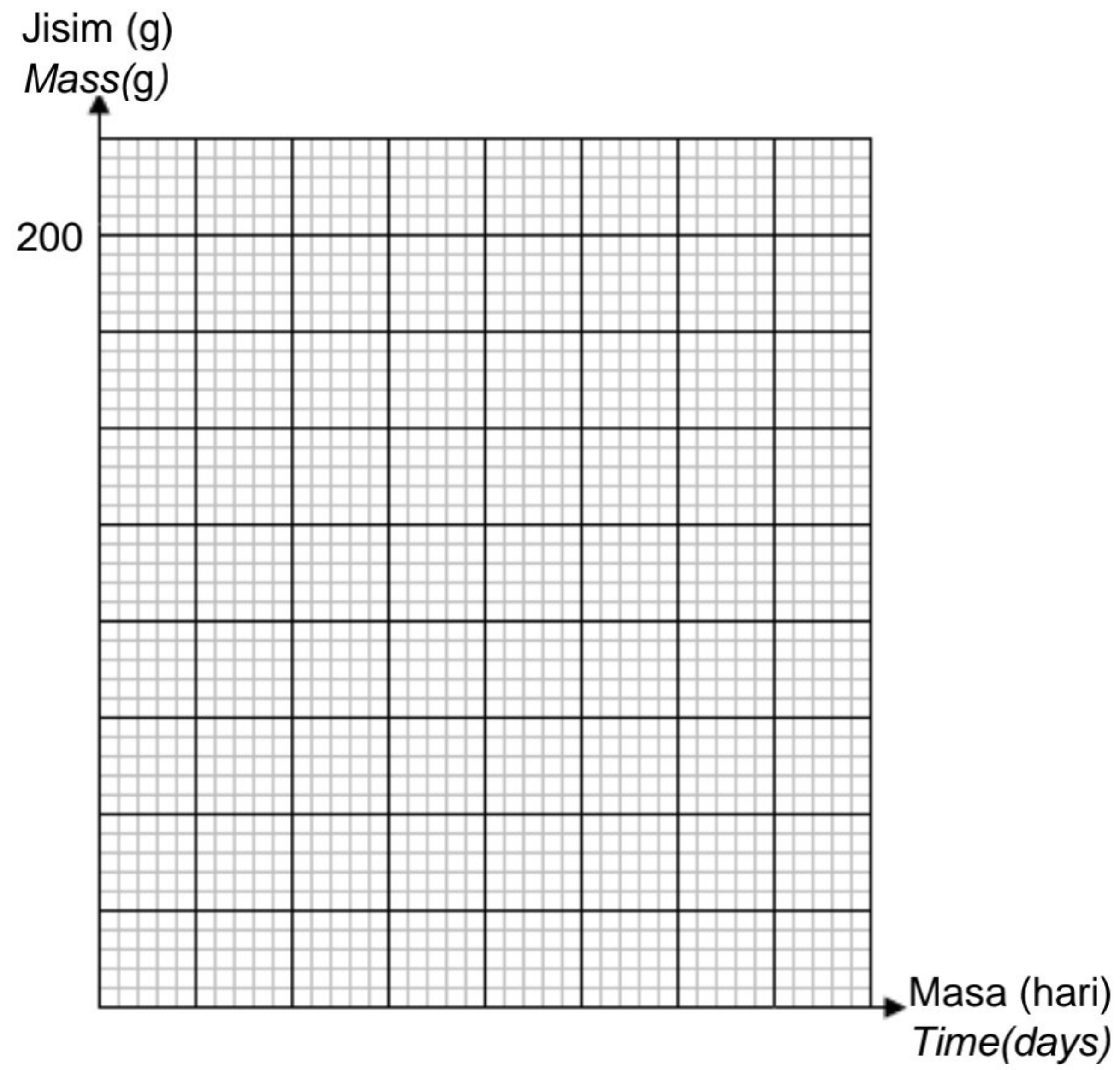
- (b) Beri satu sebab mengapa iodin-131 mengalami proses reputan.
Give one reason why iodine-131 undergoes a decay process.

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

- (c) (i) Hitung jisim iodin-131 selepas 32 hari.
Calculate the mass of iodine-131 after 32 days.

.....
[2 markah]
[2 marks]

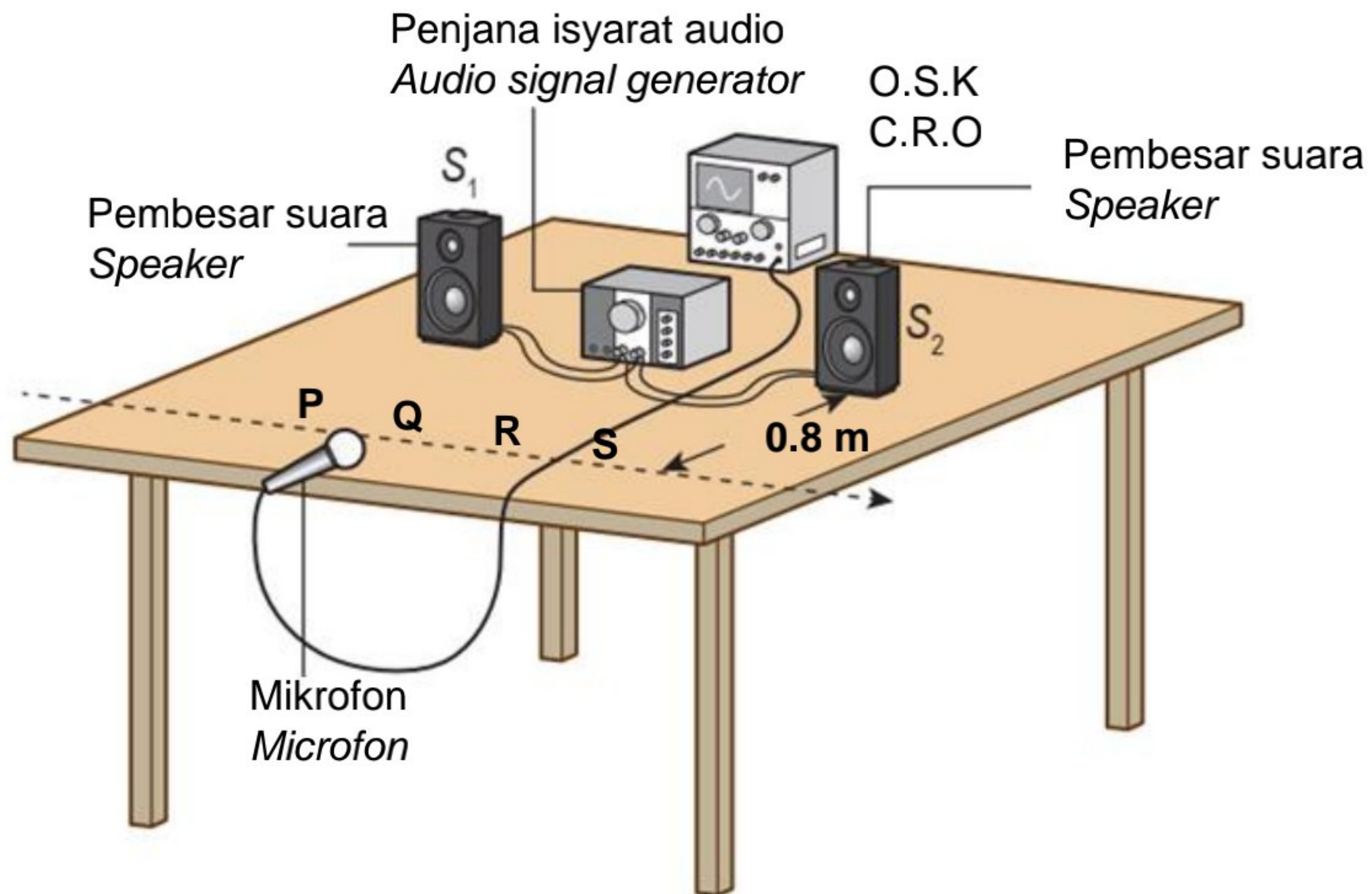
- (ii) Pada Rajah 3, lakar graf untuk menunjukkan proses reputan lodin-131.
On Diagram 3, sketch a graph to show the decay process of Iodine-131.



Rajah 3
Diagram 3

[2 markah]
[2 marks]

4. Rajah 4 menunjukkan set penjana audio beserta dua buah pembesar suara yang disusun bersama-sama dengan set mikrofon dan osiloskop sinar katod (O.S.K). Dua pembesar suara mengeluarkan sumber yang koheren. Mikrofon digerakkan sepanjang garis PQRS untuk mengesan perubahan amplitud bunyi.
 Diagram 4 shows an audio generator set with two loudspeakers arranged together with a microphone set and a cathode ray oscilloscope (C.R.O). The speakers produce coherent wave source. The microphone is moved along the PQRS line to detect changes in amplitude of the sound.



Rajah 4
 Diagram 4

- (a) Apakah maksud sumber gelombang koheren?
 What is meant by coherent wave source?

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

- (b) Setelah eksperimen dijalankan, bunyi beramplitud tinggi dikesan pada titik P dan R, manakala bunyi beramplitud rendah pada titik Q dan S. Jelaskan mengapa.
After the experiment was carried out, high-amplitude sounds were detected at points P and R, while low-amplitude sounds were detected at points Q and S. Explain why.

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

[3 markah]
[3 marks]

- (c) Penjana audio dilaraskan dengan frekuensi 1000 Hz dan laju gelombang bunyi diudara adalah 330 m s^{-1} . Jika jarak antara dua pembesar suara adalah 75 cm, hitungkan
The audio generator is adjusted to a frequency of 1000 Hz and the speed of sound waves in air is 330 m s^{-1} . If the distance between the two speakers is 75 cm, calculate

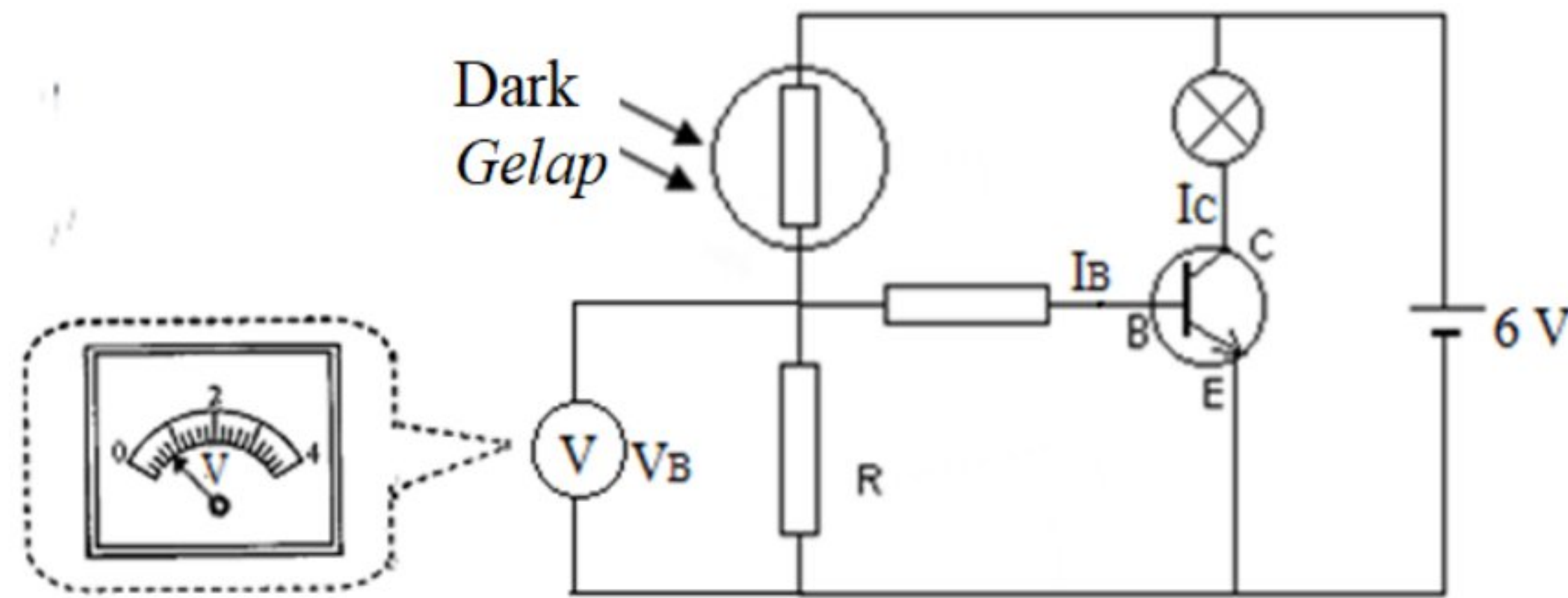
- (i) panjang gelombang bunyi yang dikeluarkan, λ
the wavelength of the sound, λ

[2 markah]
[2 marks]

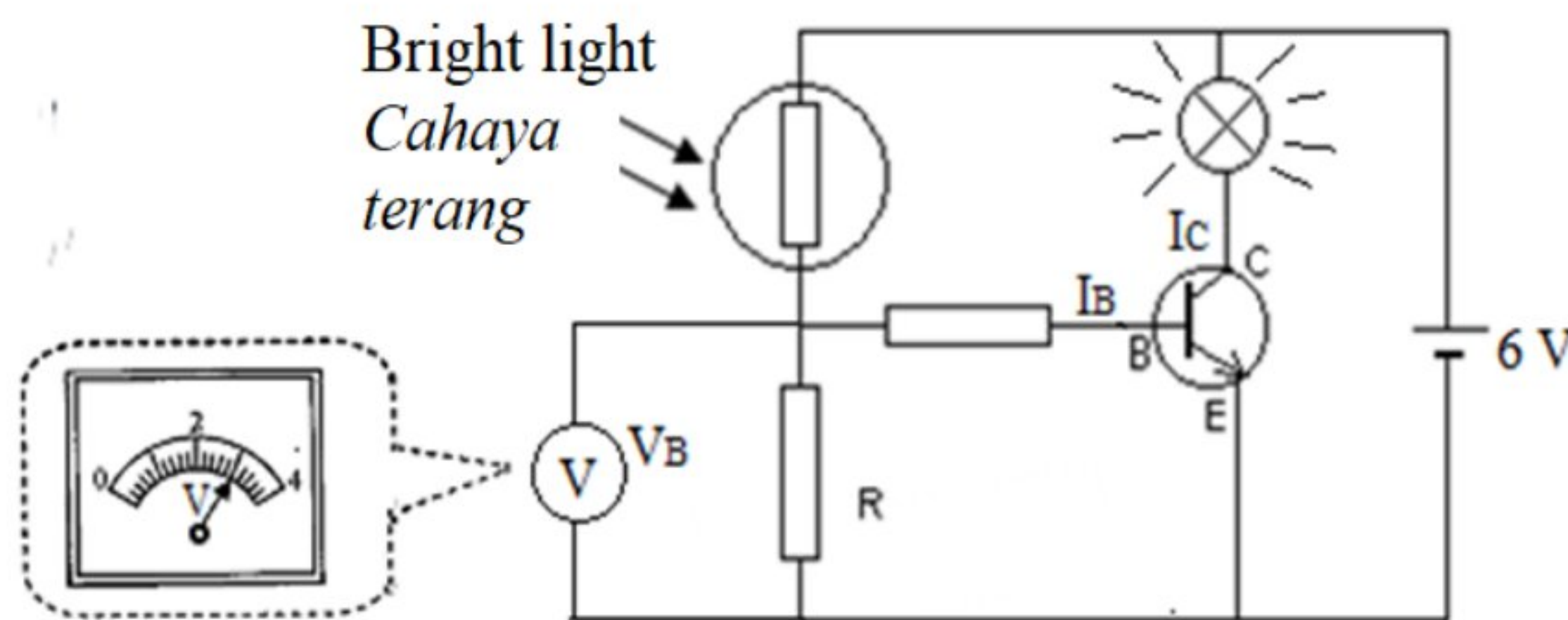
- (ii) Jarak antara titik P dan titik S.
Distance between point P and point S.

[3 markah]
[3 marks]

5. Rajah 5.1 dan Rajah 5.2 menunjukkan dua litar bertransistor yang serupa yang berada dalam dua keadaan.
 Diagram 5.1 and Diagram 5.2 shows two identical circuits of transistor that are in two states.



Rajah 5.1
 Diagram 5.1



Rajah 5.2
 Diagram 5.2

- (a) Apakah jenis transistor yang digunakan?
 What is the type of transistor used?
-
- [1 markah]
 [1 mark]
- (b) Berdasarkan Rajah 5.1 dan Rajah 5.2, bandingkan
 Based on Diagram 5.1 and Diagram 5.2, compare
- (i) voltan tapak, V_B
 the base voltage, V_B
-
- [1 markah]
 [1 mark]
- (ii) nyalaan mentol
 lighting of the bulb
-
- [1 markah]
 [1 mark]

- (iii) arus tapak, I_B
the base current, I_B

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

- (c) Berdasarkan jawapan dalam 5 (b), nyatakan hubungan antara
Based on the answers in 5 (b), state the relationship between

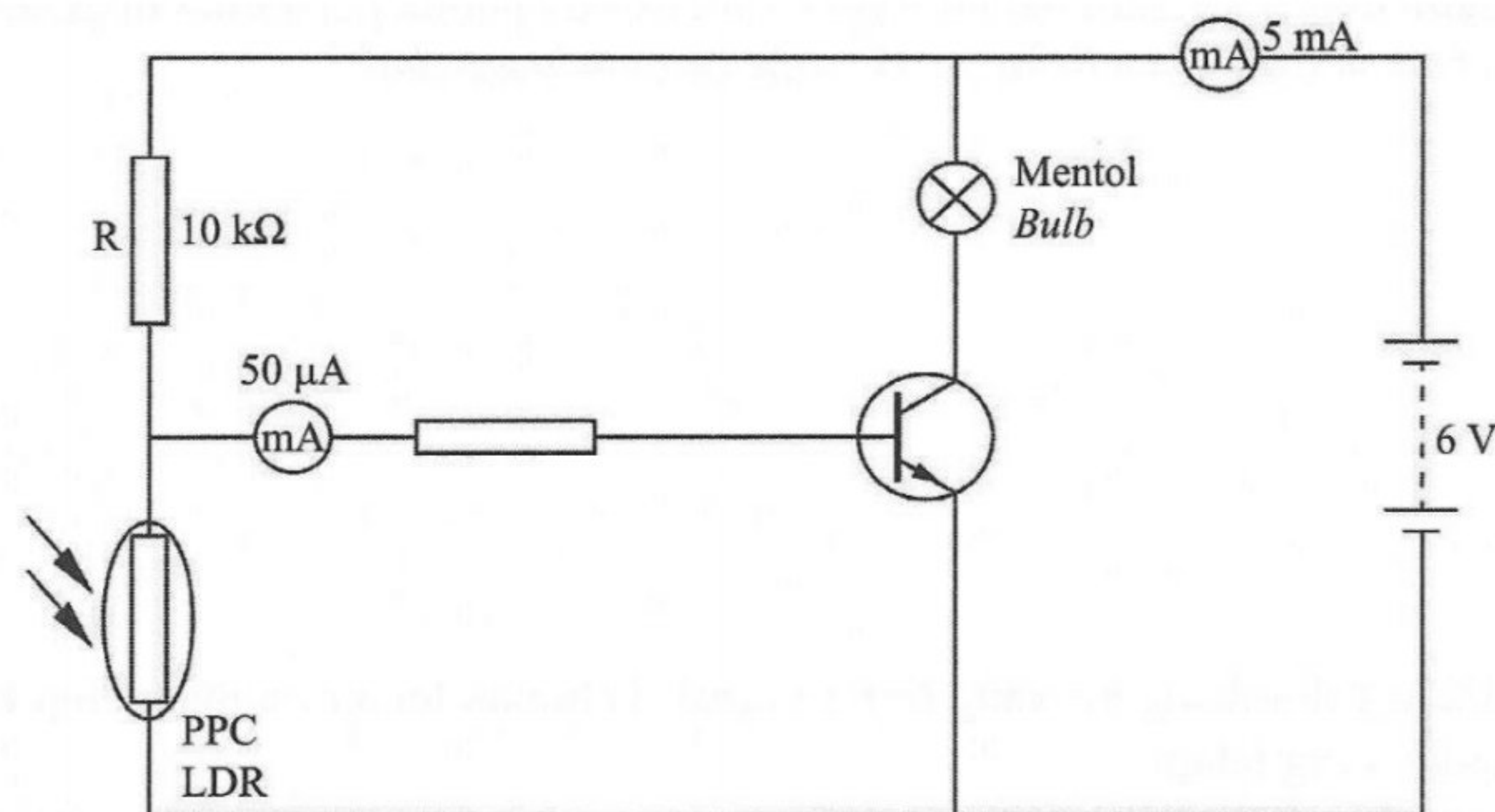
- (i) voltan tapak dengan arus tapak.
the base voltage with the base current.

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

- (ii) arus tapak dengan arus pengumpul.
base current with the collector current.

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

- (d) Rajah 5.3 suatu litar transistor yang mengandungi perintang peka cahaya (PPC).
Diagram 5.3 shows a transistor circuit that consist of light dependent resistor (LDR).



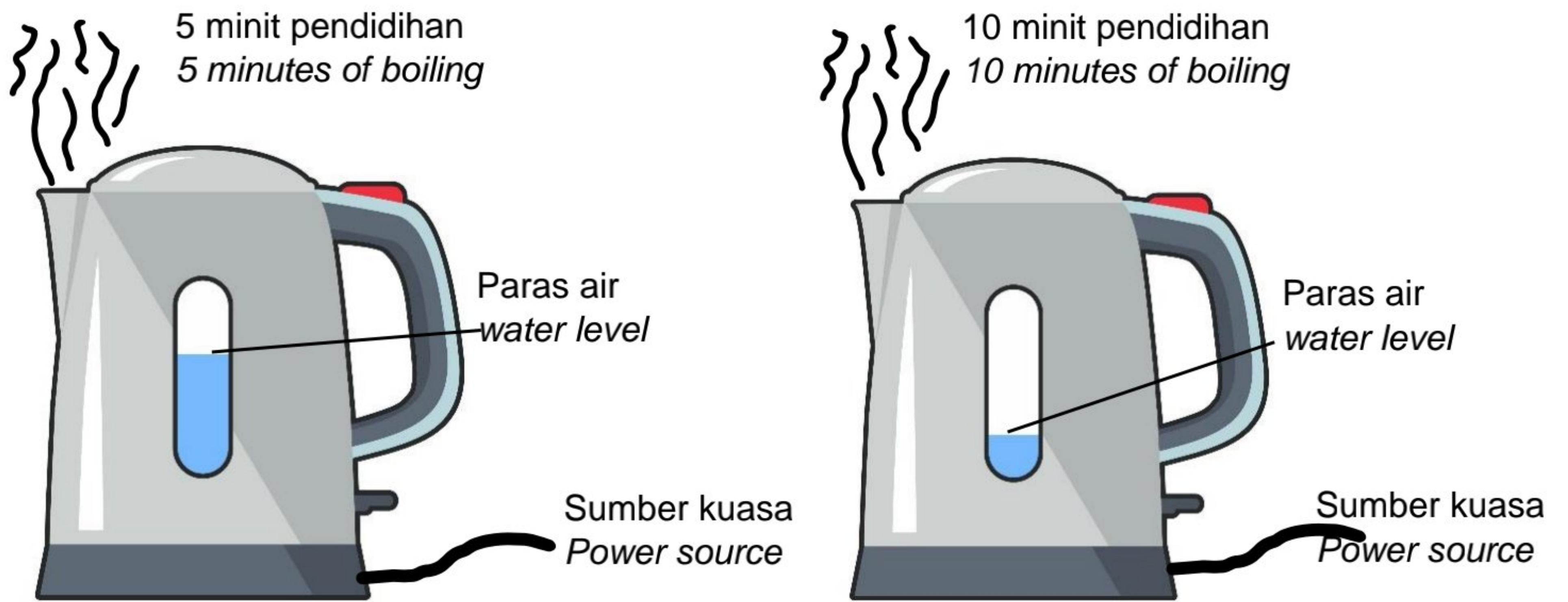
Rajah 5.3
Diagram 5.3

Apabila PPC mengesan cahaya, beza keupayaan PPC ialah 1.2 V. Hitung rintangan PPC.

When LDR detected, potential difference of LDR is 1.2 V. Calculate the resistance of LDR.

[3 markah]
[3 marks]

6. Rajah 6.1 dan Rajah 6.2 menunjukkan paras air sebuah cerek elektrik yang sedang mendidih.
 Diagram 6.1 and Diagram 6.2 show the water level of an electric kettle that is boiling.



Rajah 6.1
 Diagram 6.1

Rajah 6.2
 Diagram 6.2

- (a) Namakan jenis haba yang diserap semasa proses pendidihan.
 Name the type of heat absorbed during the boiling process.

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

- (b) Berikan sebab mengapa tiada perubahan suhu semasa proses pendidihan air.
 Give a reason why there is no change in temperature during the boiling process of water.

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

- (c) Berdasarkan Rajah 6.1 dan Rajah 6.2, bandingkan
 Based on Diagram 6.1 and Diagram 6.2, compare

- (i) masa pendidihan air.
 boiling time.

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

- (ii) tenaga haba yang diserap oleh air.
heat energy absorbed by water.

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

- (iii) kuantiti air yang berubah menjadi wap.
amount of water that turns into steam.

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

- (d) Berdasarkan jawapan anda di 6(c), nyatakan hubungan antara
Based on your answer in 6(c), state the relationship between

- (i) masa pendidihan dengan tenaga haba yang diserap oleh air.
boiling time with heat energy absorbed by water.

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

- (ii) tenaga haba yang diserap oleh air dengan kuantiti air yang berubah
menjadi wap.
*heat energy absorbed by water with the amount of water that turns into
steam.*

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

- (e) Jika tenaga haba yang diserap oleh air dalam Rajah 6.1 adalah
 2.40×10^5 J. Hitungkan jisim air yang telah bertukar menjadi wap air.
[Haba pendam tentu pengewapan air, $l_v = 2.26 \times 10^6$ J kg⁻¹]
*If the heat energy absorbed by water in Diagram 6.1 is
 2.40×10^5 J. Calculate the mass of water that has turned into steam.
[Specific latent heat of vaporization of water, $l_v = 2.26 \times 10^6$ J kg⁻¹]*

.....
[2 markah]
[2 marks]

7. Rajah 7 menunjukkan prinsip kerja dapur aruhan.
Diagram 7 shows the working principle of an induction cooker.



Rajah 7
 Diagram 7

- (a) Apakah konsep yang membolehkan dapur aruhan berfungsi ?
What is the concept enables an induction cooker to work ?

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

- (b) Terangkan bagaimana dapur aruhan dalam Rajah 7 boleh digunakan untuk memasak ?
Explain how the induction cooker in Diagram 7 can be used for cooking ?

.....

 [3 markah]
 [3 marks]

- (c) Jadual 7 menunjukkan tiga jenis dapur aruhan dengan spesifikasi yang berlainan.
Table 7 shows three types of induction cooker with different specifications.

Dapur aruhan <i>Induction cooker</i>	Jenis arus yang dibekalkan <i>Type of current supply</i>	Bilangan gegelung <i>Number of coils</i>
P	Arus ulang-alik <i>Alternating current (a.c)</i>	5
Q	Arus terus <i>Direct current (d.c)</i>	10
R	Arus ulang-alik <i>Alternating current (a.c)</i>	15

Jadual 7
 Table 7

Berdasarkan Jadual 7, nyatakan ciri-ciri yang sesuai untuk meningkatkan kecekapan dapur aruhan.
Based on Table 7, state the characteristics that are suitable to increase the efficiency of induction cooker.

- (i) Jenis arus yang dibekalkan
Type of current supply

.....
Sebab
Reason

.....
[2 markah]
[2 marks]

- (ii) Bilangan gegelung
Number of coils

.....
Sebab
Reason

.....
[2 markah]
[2 marks]

- (d) Berdasarkan jawapan dalam 7(c)(i) dan 7(c)(ii), pilih dapur aruhan yang paling cekap.
Based on the answers in 7(c)(i) and 7(c)(ii), choose the most efficient induction cooker.

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

- 8 Rajah 8 menunjukkan seorang atlet sedang memutar tukul besi dalam acara sukan lontar tukul besi.

Diagram 8 shows an athlete spinning a hammer in a hammer throw sport event.



Rajah 8
Diagram 8

Daya memusat yang bertindak ke atas tukul besi ketika diputar adalah daya tegangan tali keluli tersebut.

The centripetal force acting on the hammer when rotated is the tension of steel wire.

- (a) *Apakah daya memusat?*
What is centripetal force?

.....

[1 markah]

[1 mark]

- (b) Tukul besi berjisim 4 kg itu diputar dalam satu bulatan ufuk berjejari 1.6 m dengan laju linear 25 m s^{-1} . Hitung daya memusat yang bertindak ke atas tukul besi itu.

The hammer of mass 4 kg is rotated in a horizontal circle of radius 1.6 m with a linear speed of 25 m s^{-1} . Calculate the centripetal force acted on the hammer.

[2 markah]

[2 marks]

- (d) Lontar tukul besi merupakan satu acara melibatkan kekuatan. Pelontar tukul besi dikehendaki melontar satu bola logam yang dipasang dengan dawai keluli kepada pemegang cengkaman sejauh yang mungkin. Berdasarkan aspek berikut, cadangkan spesifikasi yang sesuai bagi lontaran tukul besi untuk menghasilkan jarak lontaran mendarat yang tinggi selepas pusingan dibuat.

The hammer throw is regarded as a strength event. The hammer thrower is required to throw a steel ball with a steel wire attached to it as far as possible. Based on the following aspects, suggest the suitable characteristics of the hammer throw to produce higher landing distance after spinning.

- (i) Panjang tali keluli
Length of steel spring

.....
Sebab
Reason

.....
[2 markah]
[2 marks]

- (ii) Laju linear tukul besi ketika diputar.
Linear speed of the hammer when it is rotated.

.....
Sebab
Reason

.....
[2 markah]
[2 marks]

- (iii) Sudut lontaran
Angle of hammer throwing

.....
Sebab
Reason

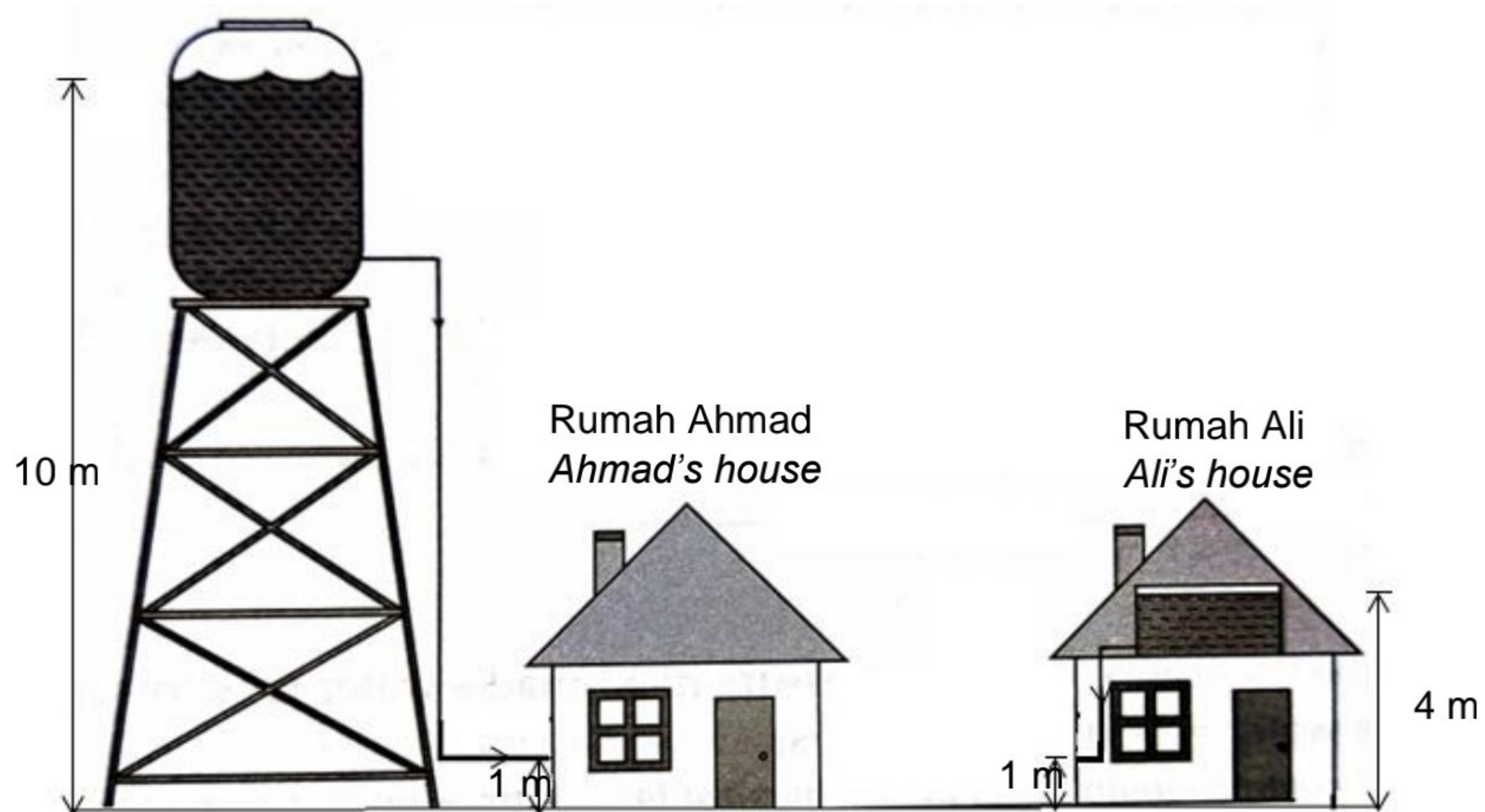
.....
[2 markah]
[2 marks]

Bahagian B
Section B

[20 markah]
[20 marks]

Bahagian ini mengandungi **dua** soalan, Jawab **satu** soalan
*This section contains **two** questions, Answer **one** question.*

9. Rajah 9 menunjukkan menara tangki air di rumah Ahmad dan tangki air di rumah Ali. Pili air kedua-dua rumah itu terletak pada jarak sama iaitu 1 m daripada permukaan tanah.
Diagram 9 shows a water tank tower of Ahmad's house and water tank in Ali's house. The water taps of both houses are located at a same distance of 1 m from the ground surface.



Rajah 9
Diagram 9

- (a) Nyatakan konsep fizik yang menyebabkan air keluar selepas pili dibuka.
State the physics concept that causes water to come out after the tap is opened.
[1 markah]
[1 mark]
- (b) Terangkan mengapa pili air dirumah Ahmad mengeluarkan air lebih laju berbanding pili air dirumah Ali.
Explain why the tap in Ahmad's house produces water more faster than tap in Ali's house.
[4 markah]
[4 marks]

- (c) Ali juga ingin membina sebuah menara tangki air tetapi dia mempunyai kawasan sekitar rumah yang terhad. Dia mengambil keputusan untuk meletakkan tangki air itu di atas bumbung rumahnya.

Ali also wants to build a water tank tower, but he has a limited area around his house. He decided to install the water tank on his house roof.

Tangki air <i>Water tank</i>	Ketebalan dinding <i>Thickness of wall</i>	Saiz <i>Size</i>	Ketumpatan <i>Density</i>	Jarak di antara tangki air dengan pili <i>Distance between water tank and tap.</i>
J	Tebal <i>Thick</i>	Besar <i>Big</i>	Rendah <i>Low</i>	2 m
K	Nipis <i>Thin</i>	Kecil <i>Small</i>	Tinggi <i>High</i>	2 m
L	Tebal <i>Thick</i>	Besar <i>Big</i>	Rendah <i>Low</i>	4 m
M	Nipis <i>Thin</i>	Kecil <i>Small</i>	Tinggi <i>High</i>	4 m

Jadual 9
Table 9

Anda dikehendaki untuk mengkaji ciri-ciri tangki air seperti yang ditunjukkan dalam Jadual 9.

Terangkan kesesuaian setiap ciri tangki air untuk dipasang di atas bumbung. Tentukan tangki air yang paling sesuai supaya air mengalir lebih laju dan tangki air tahan lama serta mudah dipasang. Beri sebab bagi pilihan anda.

You are required to investigate the characteristics of a water tank as shown in Table 9.

Explain the suitability of each characteristic of the water tank to be installed on the roof. Determine the most suitable water tank so that water can flow faster, and water tank is long lasting and easy to install. Give reasons for your choice.

[10 markah]

[10 marks]

- (d) (i) Hitung perbezaan tekanan air pada pili di rumah Ahmad dengan pili di rumah Ali. [Ketumpatan air = $1\,000\text{ kg m}^{-3}$]
Calculate the difference of water pressure in tap at Ahmad's house and tap at Ali's house. [Density of water = $1\,000\text{ kg m}^{-3}$]

[3 markah]

[3 marks]

- (ii) Terangkan apakah akan berlaku kepada tekanan air di rumah Ahmad jika dia menggantikan tangki airnya dengan tangki baru yang berdiameter lebih besar tetapi ketinggiannya sama.
Explain what will happen to the water pressure in Ahmad's house if he replaces his water tank with a new tank with a larger diameter but the same height.

[2 markah]

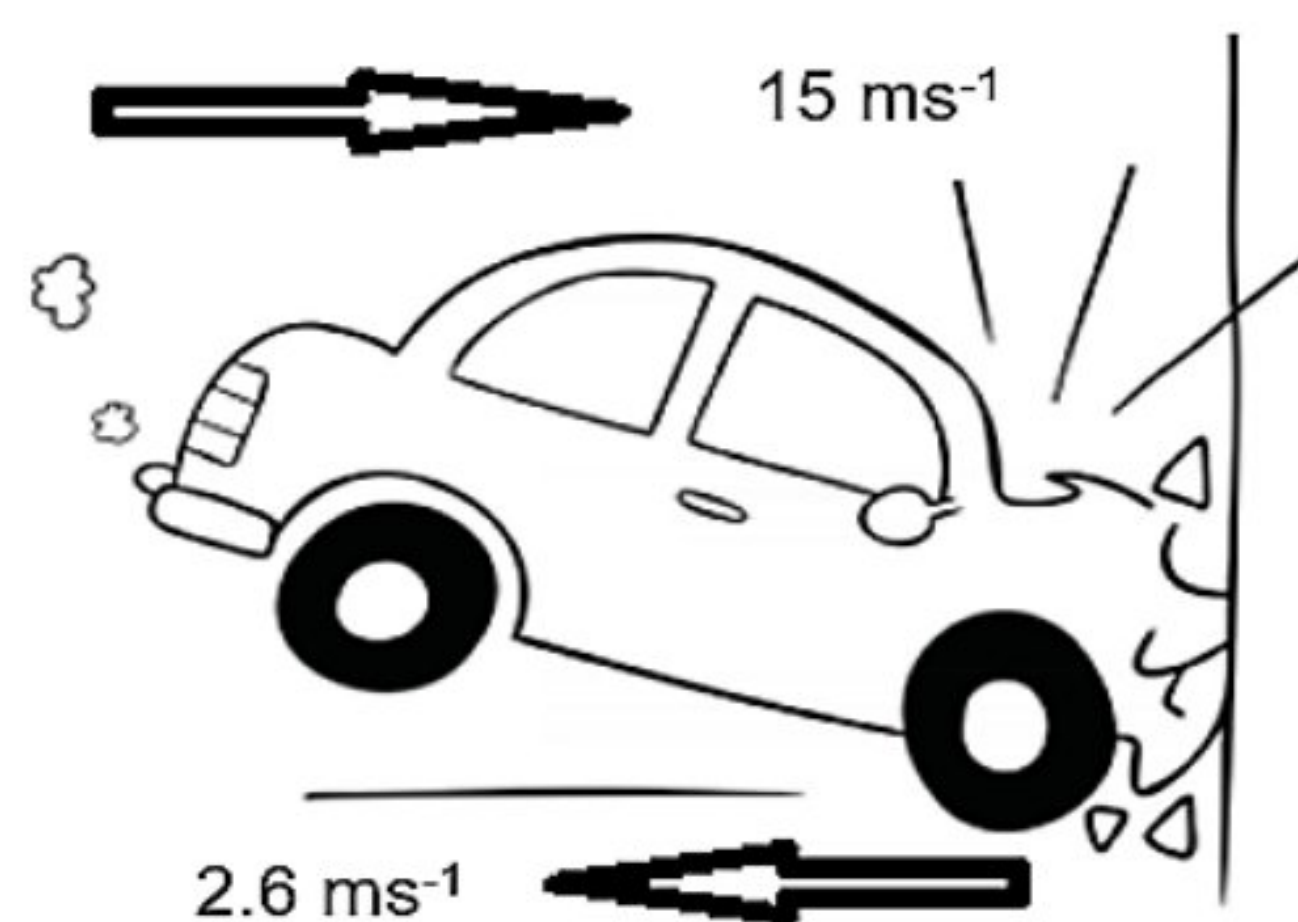
[2 marks]

10. Rajah 10.1 menunjukkan seorang pemain bola lisut meneruskan lontarannya selepas bola itu bergerak ke hadapan. Tindakan pemain tersebut dinamakan aksi 'ikut lajak'. *Diagram 10.1 shows a softball player continuing his throw after the ball moves forward. The player's action is called 'follow through'.*



Rajah 10.1
Diagram 10.1

- (a) Apakah yang dimaksudkan dengan impuls?
What is the meaning of impulse?
- [1 markah]
[1 mark]
- (b) Terangkan bagaimana aksi 'ikut lajak' dapat menambahkan jarak gerakan bola lisut itu.
Explain how 'follow through' action can increase the distance of motion of the softball.
- [4 markah]
[4 marks]
- (c) Rajah 10.2 menunjukkan suatu ujian perlanggaran kereta. Kereta berjirim 1500 kg melanggar dinding dengan kelajuan 15 m s^{-1} . Kereta itu melantun semula dengan kelajuan 2.6 m s^{-1} . Jika masa impak ialah 150 ms. Hitungkan:
Diagram 10.2 shows a car collision test. A car of mass 1500 kg hits a wall with a speed of 15 m s^{-1} . The car rebounds at a speed of 2.6 m s^{-1} . If the impact time is 150 ms. Calculate the:



Rajah 10.2
Diagram 10.2

- (i) impuls yang terhasil dalam perlanggaran.
impulse produced in the collision.





[2 markah]
[2 marks]

- (ii) daya impuls yang dikenakan ke atas kereta.
impulsive force acting on the car.

[3 markah]
[3 marks]

- (d) Jadual 10 menunjukkan jenis kayu hoki dengan ciri-ciri yang berbeza. Anda dikehendaki menentukan ciri-ciri kayu hoki yang paling sesuai untuk digunakan oleh pasukan hoki pada permainan tahap tinggi.

Table 10 shows different types of hockey sticks with different characteristics. You are required to determine the most suitable characteristics of hockey sticks to be used by the hockey teams at high-level matches.

Kayu hoki dan ciri-ciri. <i>Hockey stick and characteristics</i>	Kayu hoki dan ciri-ciri. <i>Hockey stick and characteristics</i>
<p>P</p>  <ul style="list-style-type: none"> • Ketumpatan bahan : tinggi <i>Material density: high</i> • Bahan kayu hoki : gentian karbon <i>Hockey stick material: Carbon fibre</i> • Ukuran kayu hoki : panjang <i>Length of hockey stick: long</i> • Kelenturan : tinggi <i>Flexibility: high</i> 	<p>Q</p>  <ul style="list-style-type: none"> • Ketumpatan bahan : tinggi <i>Material density: high</i> • Bahan kayu hoki : gentian karbon <i>Hockey stick material: Carbon fibre</i> • Ukuran kayu hoki : pendek <i>Length of hockey stick: short</i> • Kelenturan : rendah <i>Flexibility: low</i>
<p>R</p>  <ul style="list-style-type: none"> • Ketumpatan bahan : rendah <i>Material density: low</i> • Bahan kayu hoki : gentian karbon <i>Hockey stick material: Carbon fibre</i> • Ukuran kayu hoki : panjang <i>Length of hockey stick: long</i> • Kelenturan : tinggi <i>Flexibility: high</i> 	<p>S</p>  <ul style="list-style-type: none"> • Ketumpatan bahan : rendah <i>Material density: low</i> • Bahan kayu hoki : gentian kaca <i>Hockey stick material: fiberglass</i> • Ukuran kayu hoki : pendek <i>Length of hockey stick: short</i> • Kelenturan : rendah <i>Flexibility: low</i>

Jadual 10
Table 10

Terangkan kesesuaian ciri -ciri kayu hoki dalam Jadual 10 untuk digunakan oleh pasukan hoki dalam permainan tahap tinggi.

Pilih kayu hoki yang paling sesuai dan berikan sebab untuk pilihan anda.

Explain the suitability characteristics of the hockey sticks in Table 10 to be used by the hockey teams at high-level matches.

Choose the most suitable hockey sticks and give the reasons for your choice.

[10 markah]

[10 marks]

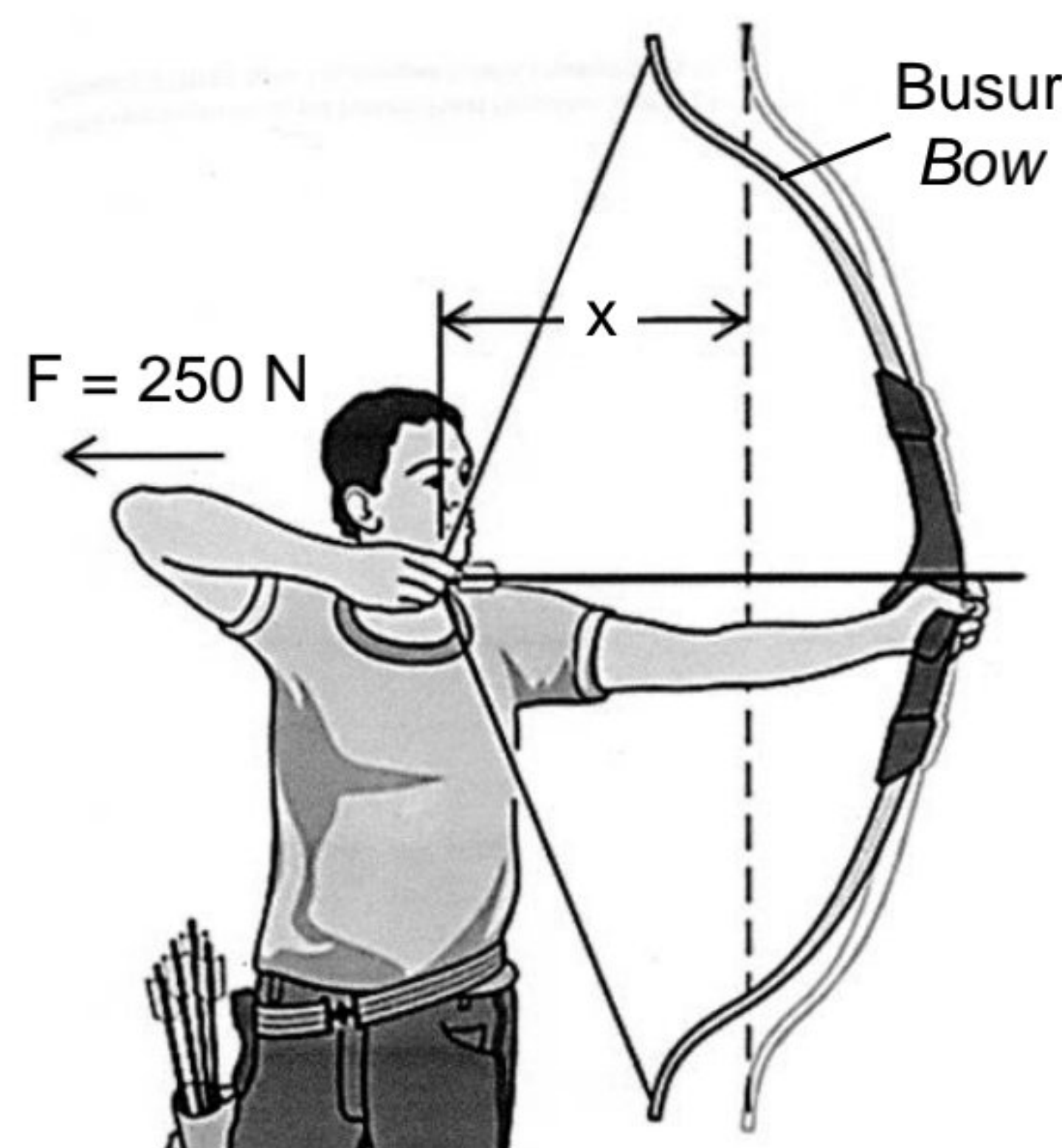
Bahagian C
Section C

[20 markah]
[20 marks]

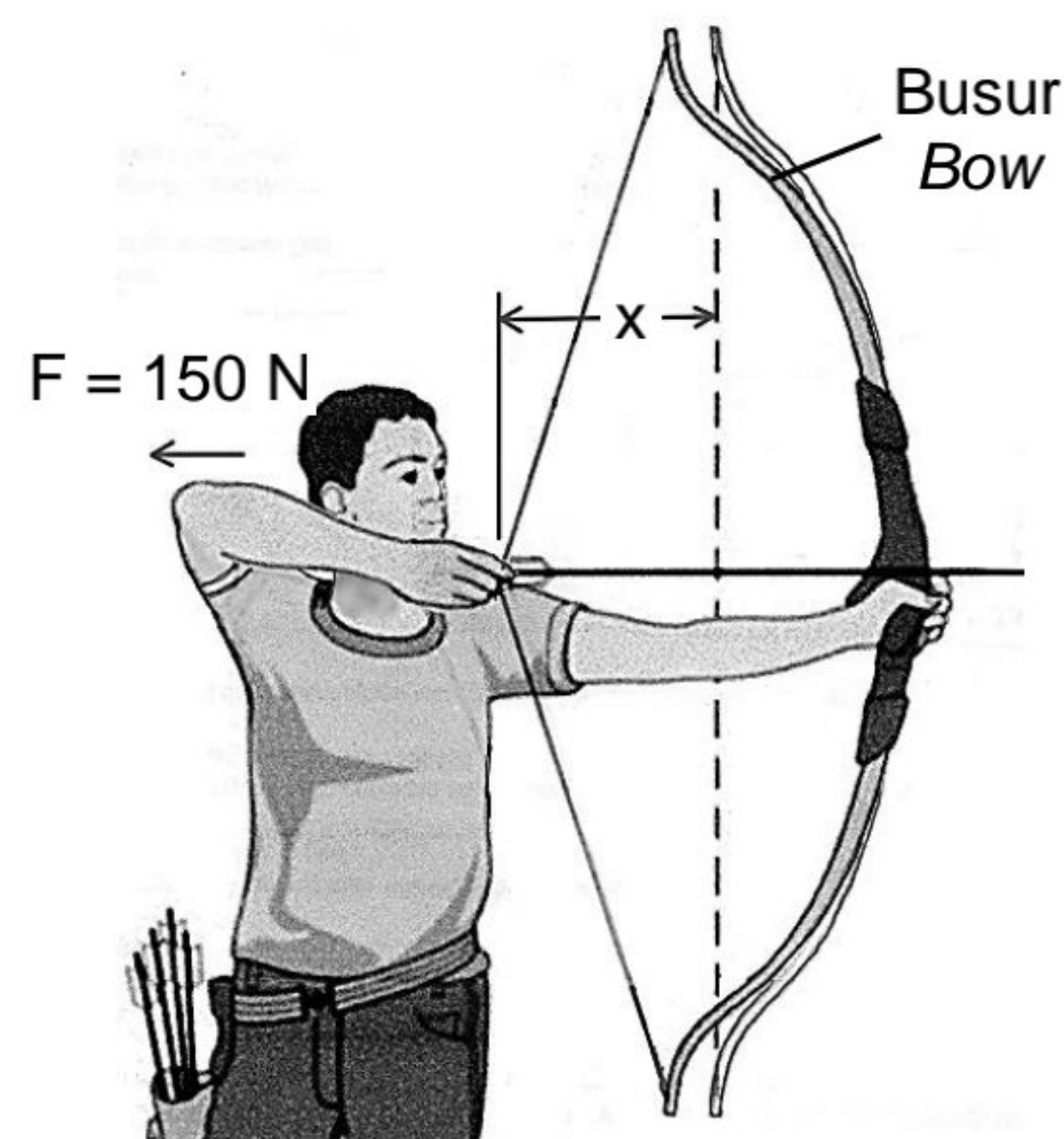
Soalan ini **mesti** dijawab
*This question **must** be answered.*

11. Seorang pemanah menjalani latihan memanah menggunakan alatan yang sama dengan menggunakan daya awal, F seperti yang ditunjukkan dalam Rajah 11.1 dan Rajah 11.2.

An archer practices archery using the same equipment by applying an initial force, F as shown in Diagram 11.1 and Diagram 11.2.



Rajah 11.1
Diagram 11.1



Rajah 11.2
Diagram 11.2

Apabila anak panah dilepaskan, ia akan bergerak dengan suatu kelajuan disebabkan kekenyalan busur.

When the arrow is released, it will travel at a speed due to the elasticity of the bow.

- (a) Apakah yang dimaksudkan dengan kekenyalan?
What is the meaning of elasticity?

[1 markah]
[1 mark]

- (b) Berdasarkan Rajah 11.1 dan Rajah 11.2, bandingkan
Based on Diagram 11.1 and Diagram 11.2, compare

- (i) Daya awal, F
Initial force, F
- (ii) Jarak regangan, x
Stretching distance, x
- (iii) Pemalar spring busur
Spring constant of bow

[3 markah]
[3 marks]

- (c) Nyatakan hubungan antara daya awal dengan jarak regangan dan seterusnya nyatakan satu hukum yang menerangkan hubungan tersebut.

State the relationship between the initial force and the stretching distance and then state a law that explains the relationship.

[2 markah]

[2 marks]

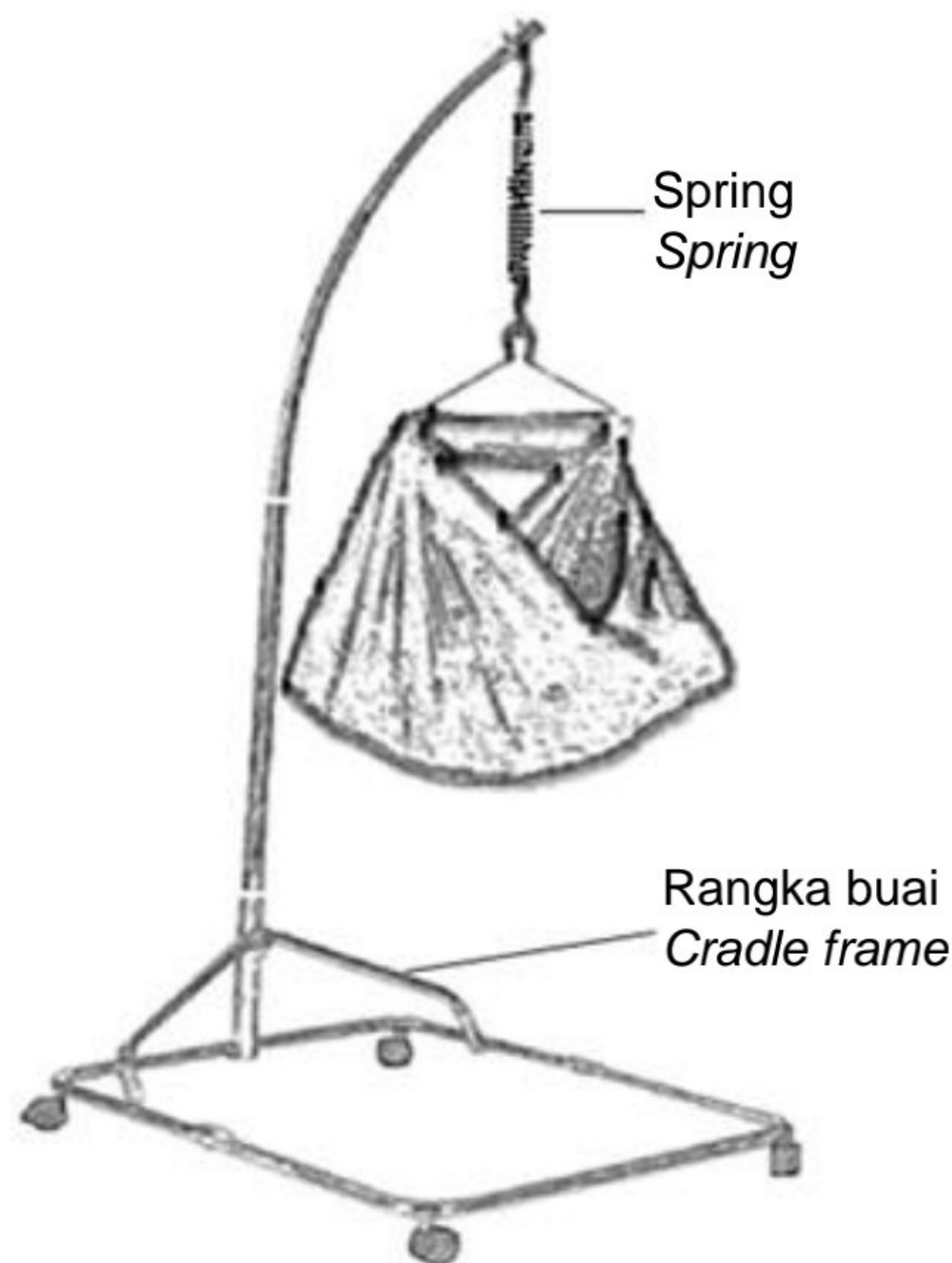
- (d) Berdasarkan Rajah 11.1 dan Rajah 11.2, kaedah yang manakah akan menghasilkan jarak panahan yang lebih jauh? Terangkan jawapan anda.

Based on Diagram 11.1 and Diagram 11.2, which method will produce a further shooting distance? Explain your answer.

[4 markah]

[4 marks]

- (e) Rajah 11.3 menunjukkan sebuah buaian yang digunakan untuk menidurkan bayi. *Diagram 11.3 shows a cradle used to put a baby to sleep.*



Rajah 11.3
Diagram 11.3

Anda dikehendaki memberi cadangan untuk memperbaiki rekabentuk buaian tersebut supaya ianya dapat meletakkan bayi yang lebih besar.

Terangkan cadangan anda berdasarkan ciri-ciri spring dan ciri-ciri rangka buaian supaya lebih selamat dan mudah digunakan.

You are required to give suggestions to improve the design of the cradle so that it can accommodate a larger baby.

Explain your recommendations based on the characteristics of the spring and the characteristics of the cradle frame so that it is safer and easier to use.

[10 markah]

[10 marks]

**SOALAN TAMAT
END OF QUESTION**