

SULIT

4531/2

FIZIK

KERTAS 2

2 JAM 30 MINIT

NAMA:

TINGKATAN:



MAJLIS PENGETUA SEKOLAH MALAYSIA (MPSM)
NEGERI PERAK

MODUL KECEMERLANGAN SPM 2023

SET 1

FIZIK

KERTAS 2

2 JAM 30 MINIT

JANGAN BUKA KERTAS PEPERIKSAAN INI SEHINGGA DIBERITAHU

ARAHAN:

1. *Kertas peperiksaan ini mengandungi tiga bahagian: Bahagian A, Bahagian B dan Bahagian C.*
2. *Jawapan hendaklah ditulis pada ruang jawapan yang disediakan.*
3. *Kertas soalan ini adalah dalam dwibahasa.*
4. *Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.*
5. *Kerja mengira anda mesti ditunjukkan.*
6. *Calon dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogramkan.*

<i>Untuk Kegunaan Pemeriksa</i>			
Bahagian	Soalan	Markah Penuh	Markah Diperoleh
A	1	4	
	2	5	
	3	6	
	4	9	
	5	9	
	6	9	
	7	9	
	8	9	
B	9	20	
	10	20	
C	11	20	
Jumlah			

Kertas ini mengandungi 27 halaman bercetak.

4531/2

[Lihat halaman sebelah
SULIT

Maklumat berikut mungkin berfaedah. Simbol-simbol mempunyai makna yang biasa.
The following information may be useful. The symbols have their usual meaning.

DAYA DAN GERAKAN I
FORCE AND MOTION I

1. $a = \frac{v-u}{t}$
2. $v^2 = u^2 + 2as$
3. $s = ut + \frac{1}{2}at^2$
4. $W = mg$
5. Momentum, $p = mv$
6. $F = ma$
7. Daya impuls, $F = \frac{mv - mu}{t}$
Impulsive force, $F = \frac{mv - mu}{t}$

HABA
HEAT

1. $\theta = \frac{\ell_{\theta} - \ell_0}{\ell_{100} - \ell_0} \times 100^\circ$
2. Haba, $Q = mc\Delta\theta$ / Heat, $Q = mc\Delta\theta$
3. Haba, $Q = mL$ / Heat, $Q = mL$
4. Hukum Boyle, $P_1V_1 = P_2V_2$ /
Boyle's Law, $P_1V_1 = P_2V_2$
5. Hukum Charles, $\frac{V_1}{T_1} = \frac{V_2}{T_2}$ /
Charles's Law, $\frac{V_1}{T_1} = \frac{V_2}{T_2}$
6. Hukum Gay Lussac, $\frac{P_1}{T_1} = \frac{P_2}{T_2}$ /
Gay-Lussac's Law, $\frac{P_1}{T_1} = \frac{P_2}{T_2}$

KEGRAVITIAN
GRAVITATION

1. Daya gravity, $F = \frac{GMm}{r^2}$
Gravitational force, $F = \frac{GMm}{r^2}$
2. Pecutan gravity, $a = \frac{GM}{r^2}$ /
Gravitational acceleration, $a = \frac{GM}{r^2}$
3. Daya memusat, $F = \frac{mv^2}{r}$ /
Centripetal force, $F = \frac{mv^2}{r}$
4. Jisim Bumi, $M = \frac{4\pi^2 r^3}{GT^2}$ /
Mass of Earth, $M = \frac{4\pi^2 r^3}{GT^2}$
5. Tempoh orbit, $T^2 = \left(\frac{4\pi^2}{GM}\right)r^3$ /
Orbital period, $T^2 = \left(\frac{4\pi^2}{GM}\right)r^3$
6. $\frac{T_1^2}{r_1^3} = \frac{T_2^2}{r_2^3}$
7. Laju linear satelit, $v = \sqrt{\frac{GM}{r}}$ /
Satellite linear speed, $v = \sqrt{\frac{GM}{r}}$
8. Halaju lepas, $v_{lepas} = \sqrt{\frac{2GM}{R}}$ /
Escape velocity, $v_{escape} = \sqrt{\frac{2GM}{R}}$
9. Tenaga keupayaan gravity, $U = -\frac{GMm}{r}$ /
Gravitational potential energy, $U = -\frac{GMm}{r}$
10. Pecutan gravity Bumi /
Earth's gravitational acceleration
 $g = 9.81 \text{ms}^{-2}$

**GELOMBANG
WAVES**

1. $v = f\lambda$
2. $f = \frac{1}{T}$
3. $\lambda = \frac{ax}{D}$
4. $d = \frac{vt}{2}$
5. $c = 3.00 \times 10^8 \text{ ms}^{-1}$

**DAYA DAN GERAKAN II
FORCE AND MOTION II**

1. $F = kx$
2. $E_p = \frac{1}{2}kx^2 = \frac{1}{2}Fx$

**TEKANAN
PRESSURE**

1. $P = \frac{F}{A}$
2. $P = \rho gh$
3. $F_b = \rho Vg$
4. $\frac{F_1}{A_1} = \frac{F_2}{A_2}$

**CAHAYA DAN OPTIK
LIGHT AND OPTICS**

1. $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$
2. $n_1 \sin \theta_1 = n_2 \sin \theta_2$
3. $n = \frac{\sin i}{\sin r}$
4. $n = \frac{1}{\sin c}$
5. $n = \frac{H}{h}$
6. $n = \frac{c}{v}$
7. $m = \frac{v}{u} = \frac{h_i}{h_o}$

**ELEKTRIK
ELECTRICITY**

1. $E = \frac{F}{Q}$
2. $I = \frac{Q}{t}$
3. $V = \frac{E}{Q}$
4. $V = IR$
5. $R = \frac{\rho \ell}{A}$
6. $E = V + Ir$
7. $P = IV$
8. $P = \frac{E}{t}$
9. $E = \frac{V}{d}$

KEELEKTROMAGNETAN
ELECTROMAGNETISM

1. $\frac{V_s}{V_p} = \frac{N_s}{N_p}$
2. $\eta = \frac{P_{out}}{P_{in}} \times 100\%$

FIZIK NUKLEAR
NUCLEAR PHYSICS

1. $N = \left(\frac{1}{2}\right)^n N_o$
2. $E = mc^2$
3. $c = 3.00 \times 10^8 \text{ ms}^{-1}$
4. $1 \text{ u.j.a.} = 1.66 \times 10^{-27} \text{ kg}$

ELEKTRONIK
ELECTRONICS

1. $E = eV$
2. $E = \frac{1}{2}mv^2$
3. $\beta = \frac{I_C}{I_B}$

FIZIK KUANTUM
QUANTUM PHYSICS

1. $E = hf$
2. $f = \frac{c}{\lambda}$
3. $\lambda = \frac{h}{p}$
4. $\lambda = \frac{h}{mv}$
5. $E = \frac{hc}{\lambda}$
6. $p = nhf$
7. $hf = W + \frac{1}{2}mv^2_{maks}$
8. $W = hf_o$
9. $h = 6.63 \times 10^{-34} \text{ Js}$

BAHAGIAN A

Section A

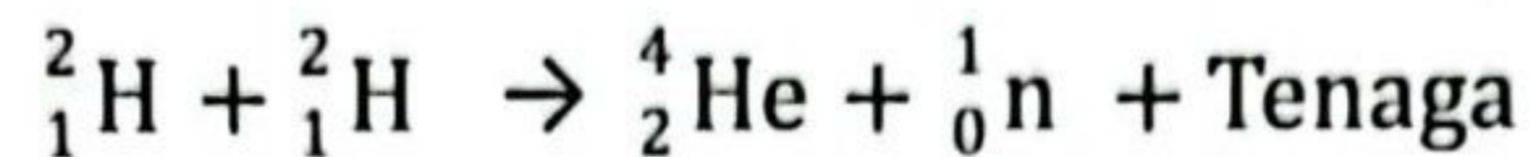
[60 markah]

[60 marks]

Jawab semua soalan.

Answer all questions.

- 1 Persamaan di bawah ialah tindak balas yang berlaku di teras matahari.
The following equation represents the reaction that occurs in the core of the sun.



- (a) (i) Namakan tindak balas yang berlaku.
Name the reaction that occurs.

.....
[1 markah / mark]

- (ii) Tandakan (✓) pada syarat untuk tindak balas dalam (a)(i) berlaku.
Tick (✓) the condition for the reaction in (a)(i) to occur.

Suhu tinggi
High temperature

Jisim tinggi
High mass

[1 markah / mark]

- (b) (i) Nyatakan cas bagi ${}^4_2\text{He}$.

State the charges of ${}^4_2\text{He}$.

.....
[1 markah / mark]

- (ii) Nyatakan bilangan neutron pada ${}^4_2\text{He}$.

State the number of neutrons in ${}^4_2\text{He}$.

.....
[1 markah / mark]

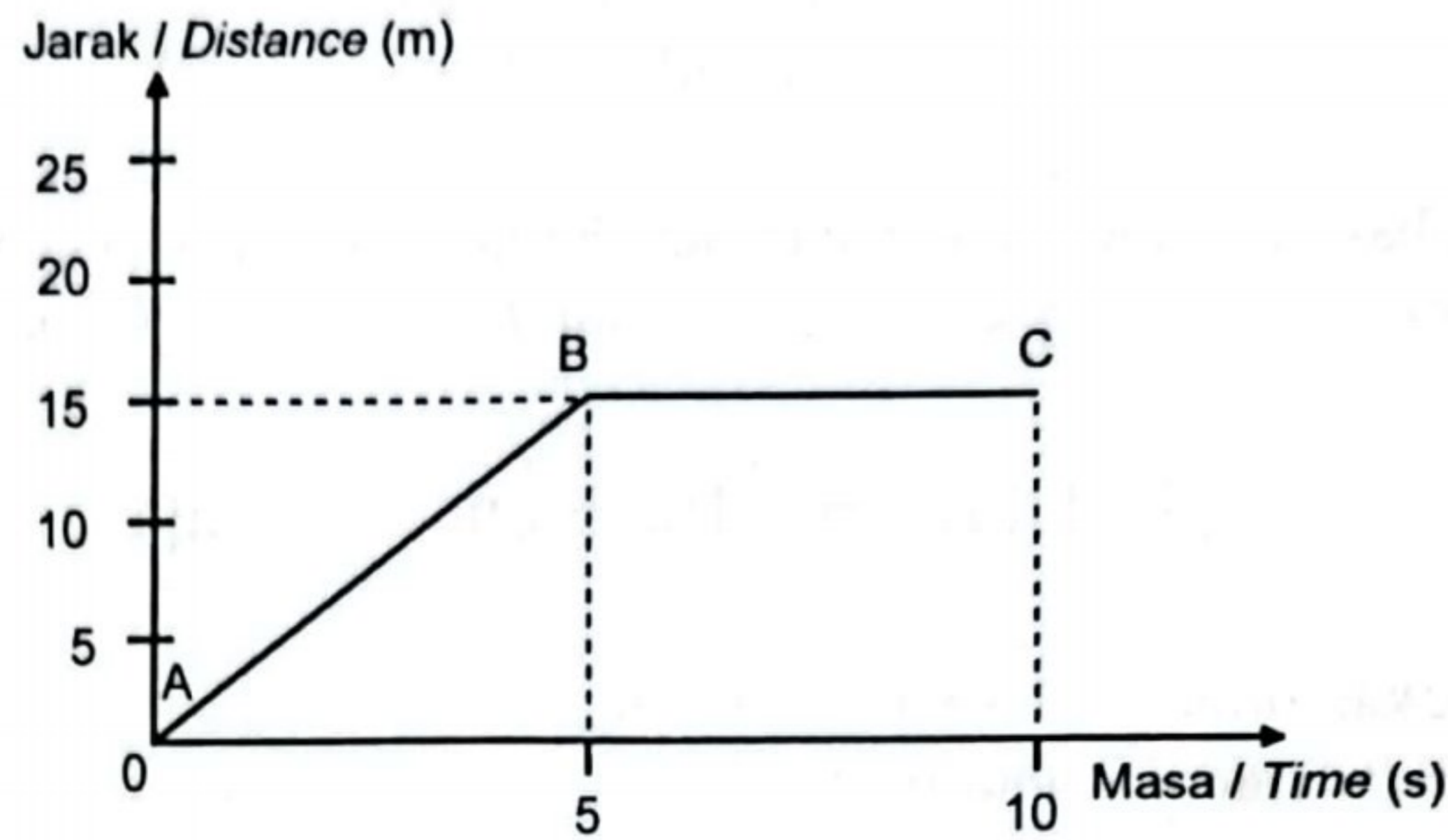
[Lihat halaman sebelah
SULIT

4531/2

Selamat mengulangkaji dari telegram@soalanpercubaanspm
Fizik K2 Trial Perak 2023

- 2 Rajah 2 menunjukkan graf jarak – masa bagi gerakan seorang pelari yang berlari dalam satu garis lurus.

Diagram 2 shows the distance-time graph for the motion of a runner who is running along a straight line.



Rajah 2
Diagram 2

- (a) Berdasarkan Rajah 2, berapakah jarak yang dilalui oleh pelari itu selepas 10 s?
Based on Diagram 2, what is the distance travelled by the runner after 10 s?

.....

[1 markah / mark]

- (b) Apakah kuantiti fizik yang diberikan oleh kecerunan graf pada Rajah 2?
What physical quantity is given by the gradient of the graph in Diagram 2?

.....

[1 markah / mark]

- (c) Huraikan gerakan pelari itu,
Describe the motion of the runner,

- (i) dari A ke B
from A to B,

.....

[1 markah / mark]

- (ii) dari B ke C
from B to C,

.....

[1 markah / mark]

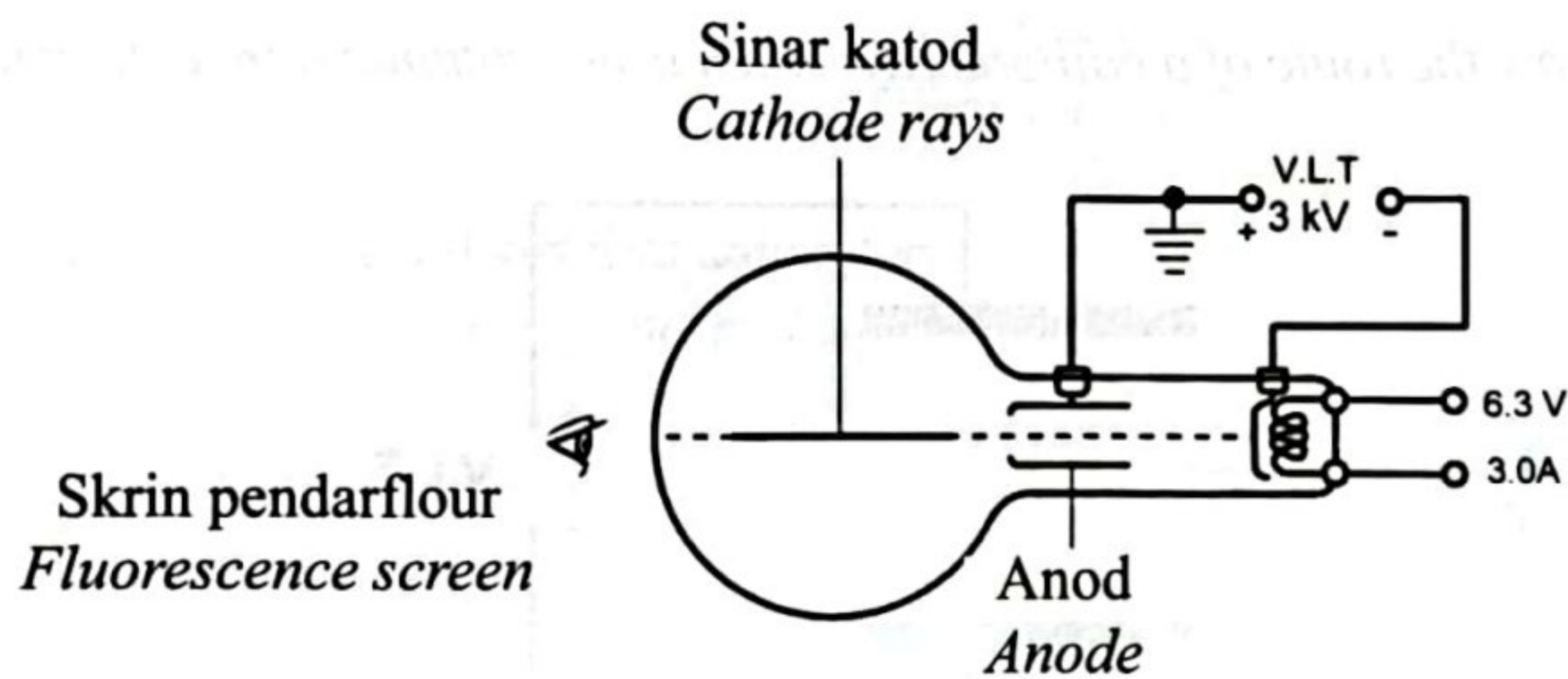
- (d) Apakah nilai pecutan dari A ke B?
What is the value for the acceleration from A to B?

.....

[1 markah / mark]

- 3 Rajah 3.1 menunjukkan sebuah tiub pemesongan yang digunakan untuk mengkaji sifat-sifat sinar katod.

Figure 3.1 shows a deflection tube used to study the properties of cathode rays.



Rajah 3.1
 Diagram 3.1

- (a) Apakah maksud sinar katod?
What is meant by cathode ray?

.....

[1 markah / mark]

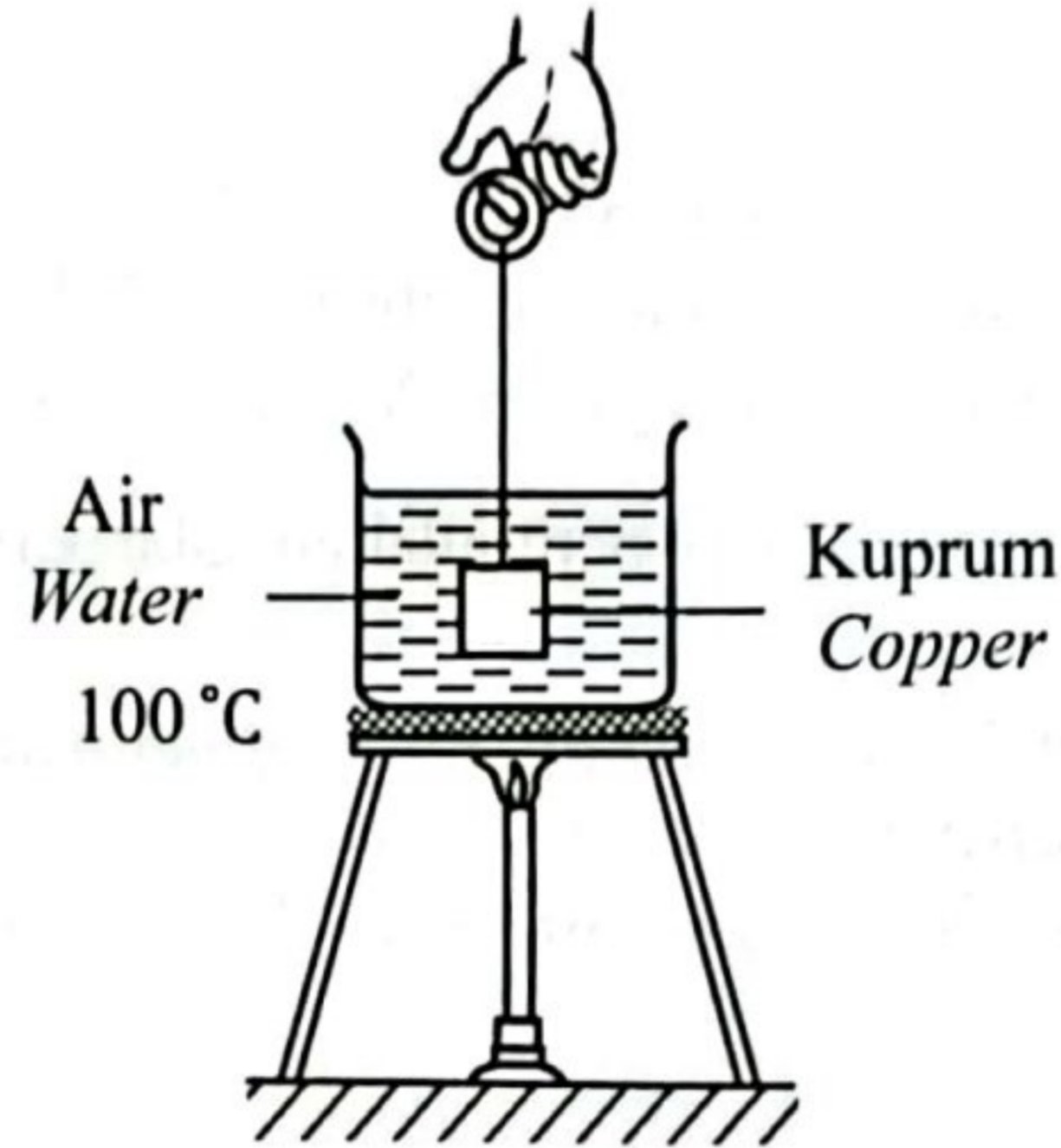
- (b) Nyatakan satu sebab mengapa VLT digunakan.
State the reason why EHT is used.

.....

[1 markah / mark]

- 4 Diagram 4.1 menunjukkan seorang murid menjalankan satu eksperimen dengan memasukkan bongkah kuprum bersuhu awal 30°C ke dalam bikar berisi air panas mendidih.

Diagram 4.1 show a student conducts an experiment by putting a copper block with initial temperature of 30°C into a beaker of boiling hot water.



Rajah 4.1
Diagram 4.1

- (a) Berikan maksud keseimbangan terma.
Give the definition of thermal equilibrium.

.....
[1 markah / mark]

- (b) (i) Apakah yang berlaku kepada suhu sfera logam selepas beberapa minit?
What happened to the temperature of the metal sphere after a few minutes?

.....
[1 markah / mark]

- (ii) Berikan sebab bagi jawapan anda di 4(b)(i).
Give a reason for your answer in 4(b)(i).

.....
[1 markah / mark]

[Lihat halaman sebelah
SULIT

- (c) Bongkah logam dalam Rajah 4.1 kemudiannya dipindahkan dengan cepat ke dalam bikar yang mengandungi 700 g air pada suhu 30°C seperti ditunjukkan dalam Rajah 4.2. Selepas 2 minit, suhu air malar pada 80°C .

The metal block in Diagram 4.1 is then quickly transferred to a beaker containing 700 g of water at 30°C as shown in Diagram 4.2. After 2 minutes, the temperature of water is constant at 80°C .

[Muatan haba tentu air ialah $4200\text{Jkg}^{-1}\text{C}^{-1}$]

[Muatan haba tentu kuprum ialah $387\text{Jkg}^{-1}\text{C}^{-1}$]

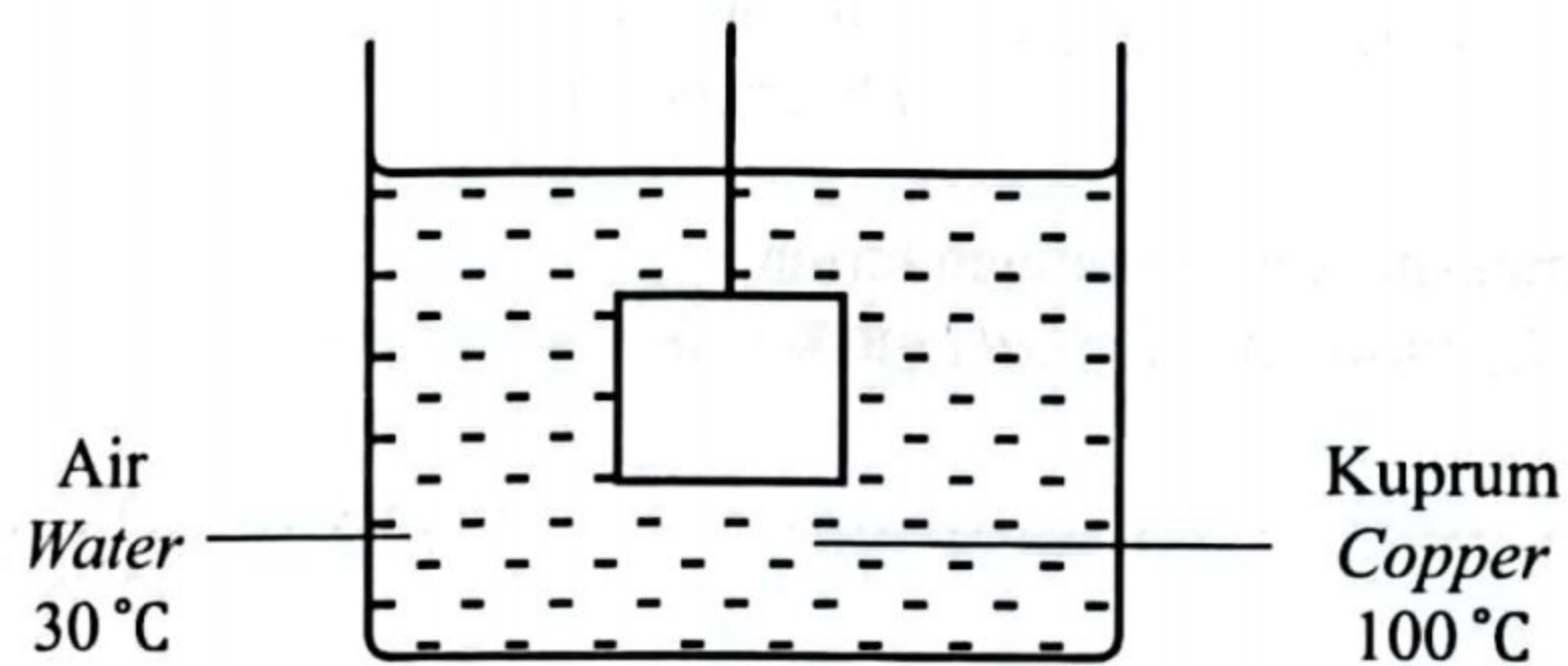
[The specific heat capacity of water is $4200\text{Jkg}^{-1}\text{C}^{-1}$]

[The specific heat capacity of copper is $387\text{Jkg}^{-1}\text{C}^{-1}$]

- (i) Pada Rajah 4.2, lukiskan arah pemindahan haba bersih antara blok kuprum dengan air.

On the Diagram 4.2 draw the direction of net heat transfer between the copper block and the water.

[1 markah / mark]



Rajah 4.2
Diagram 4.2

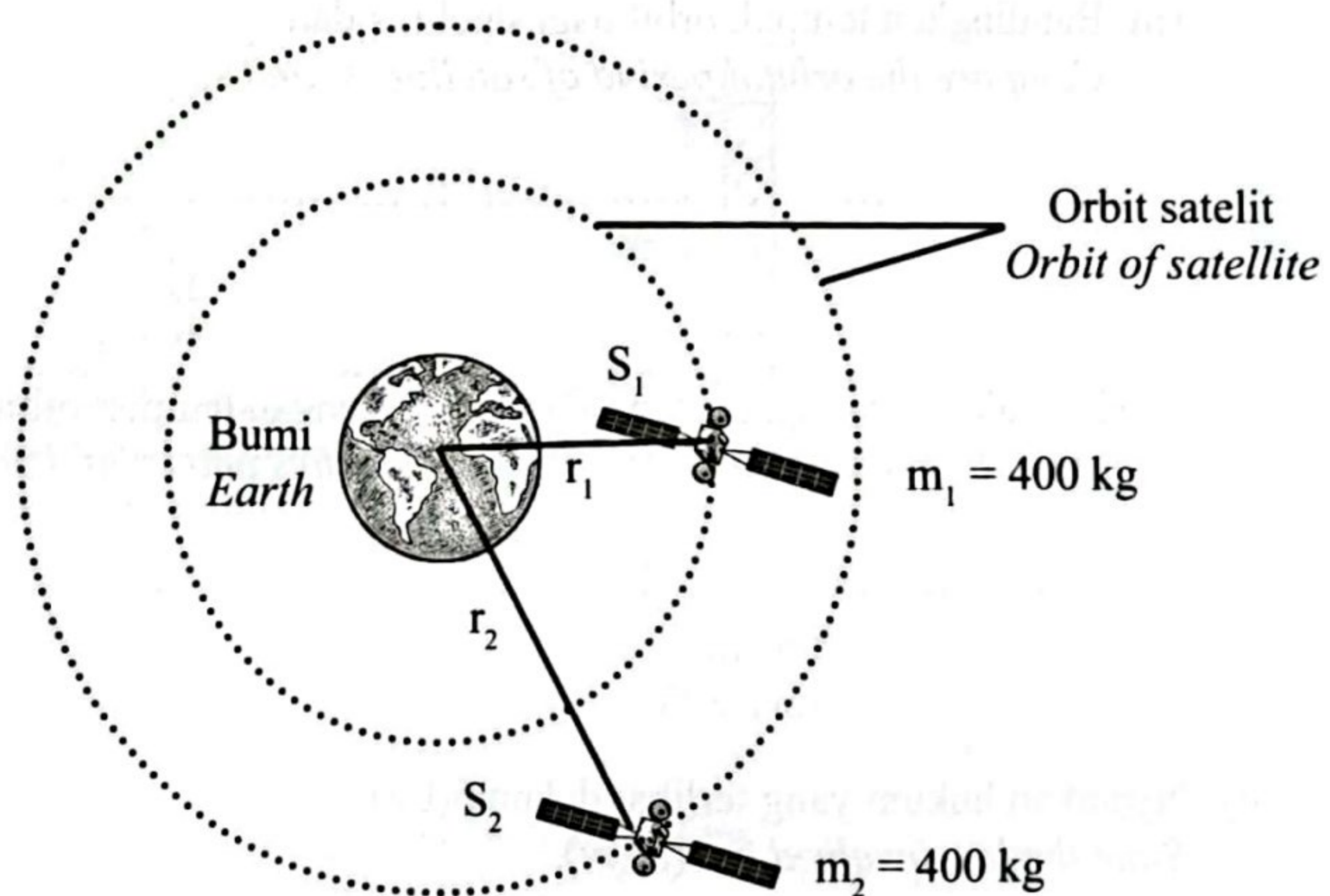
- (ii) Hitung haba yang dibebaskan oleh blok kuprum itu.
Calculate the heat released by the copper block.

[3 markah / marks]

- (iii) Muatan haba tentu kuprum ialah $387 \text{ Jkg}^{-1} \text{ } ^\circ\text{C}^{-1}$. Berapakah jisim kuprum yang digunakan dalam eksperimen di atas?
The specific heat capacity of copper is $387 \text{ Jkg}^{-1} \text{ } ^\circ\text{C}^{-1}$. What is the mass of copper used in the above experiment?

[2 markah / marks]

- 5 Rajah 5 menunjukkan dua satelit dan berjisim sama mengelilingi bumi.
Diagram 5 shows two satellites and of the same mass evolve around the earth.



Rajah 5
 Diagram 5

- (a) Jisim ialah kuantiti
Mass is a quantity.

[1 markah / mark]

[Lihat halaman sebelah
 SULIT

(b) Berdasarkan Rajah 5;
Based on Diagram 5;

(i) Bandingkan jisim satelit, m_1 dan m_2 .
Compare the mass of satellite, m_1 and m_2 .

.....
[1 markah / mark]

(ii) Bandingkan jejari orbit bagi satelit, r_1 dan r_2 .
Compare the orbital radius of satellite, r_1 and r_2 .

.....
[1 markah / mark]

(iii) Bandingkan tempoh orbit bagi satelit, s_1 dan s_2 .
Compare the orbital period of satellite, s_1 and s_2 .

.....
[1 markah / mark]

(iv) Nyatakan hubungan antara jejari orbit dengan tempoh orbit.
State the relationship between orbital radius and orbital period.

.....
[1 markah / mark]

(c) Nyatakan hukum yang terlibat dalam 5(b)(iv).
State the law involved in 5(b)(iv).

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

(d) (i) Apakah yang terjadi kepada tempoh orbit jika jisim satelit ditambah?
What happen to the orbital period if the mass is satellite is increased?

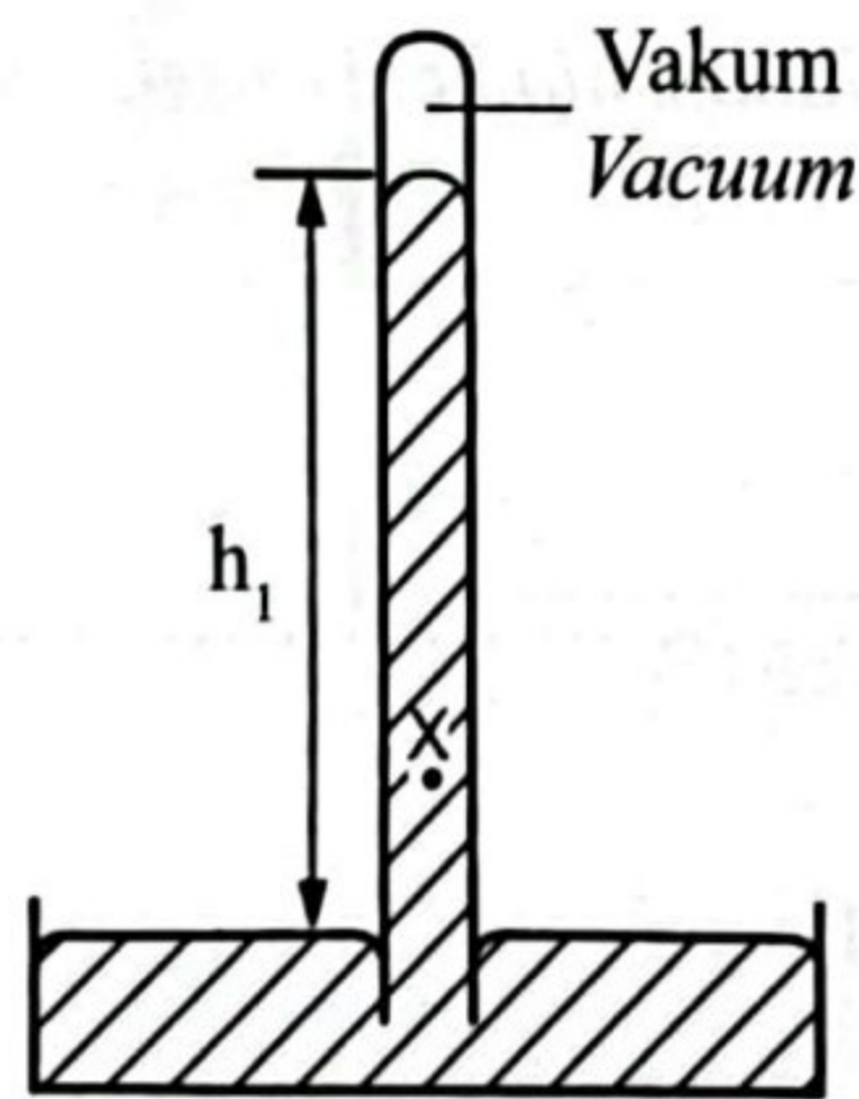
.....
[1 markah / mark]

- (ii) Terangkan jawapan anda di 5(d)(i).
 Explain your answer in 5(d)(i).

.....

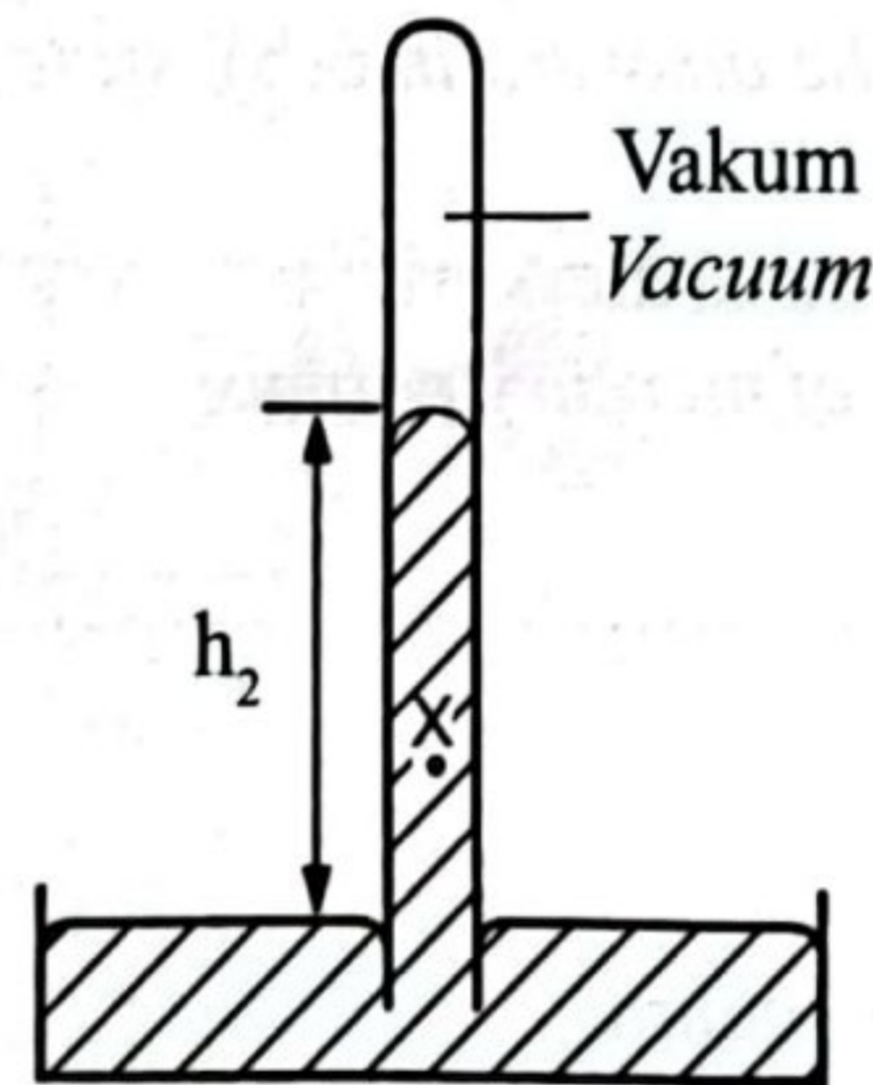
[2 markah / marks]

- 6 Rajah 6.1 menunjukkan aras turus merkuri, h_1 pada altitud 2000 m.
 Rajah 6.2 menunjukkan aras turus merkuri, h_2 di atas bukit pada altitud 3095 m.
 Figure 6.1 shows the level of the mercury column, h_1 at the altitude of 2000 m.
 Figure 6.2 shows the mercury column, h_2 level on top of a hill at the altitude of 3095 m.



Pada aras laut
 At sea level

Rajah 6.1
 Diagram 6.1



Di atas puncak bukit
 On top of the hill

Rajah 6.2
 Diagram 6.2

- (a) Apakah yang dimaksudkan dengan tekanan atmosfera?
 What is meant by atmospheric pressure?

.....

[1 markah / mark]

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

- (i) tinggi aras turus merkuri
 height of mercury column

.....

[1 markah / mark]

[Lihat halaman sebelah
 SULIT

(ii) ketinggian altitud
the altitude

.....

[1 markah / mark]

(iii) tekanan udara
the air pressures

.....

[1 markah / mark]

(c) Berdasarkan jawapan anda di 6(b), nyatakan hubungan antara ketinggian altitud dengan;

Based on the answers in 6(b), state the relationship between the altitude and;

(i) tinggi turus merkuri
height of mercury column

.....

[1 markah / mark]

(ii) tekanan udara
air pressures

.....

[1 markah / mark]

(d) Di puncak Gunung Kinabalu, tekanan atmosfera ialah kira-kira 60 peratus daripada tekanan atmosfera di aras laut.

At the summit of Mount Kinabalu, the atmospheric pressure is about 60 percent of the atmospheric pressure at sea level.

(i) Jika barometer 6.1 dibawa naik ke Gunung Kinabalu, apakah yang anda jangkakan pada lajur vakum dalam 6.1? Berikan alasan untuk itu.

If barometer 6.1 is brought up to the Mount Kinabalu, what do you expect to the column of vacuum in 6.1? Give a reason for that.

.....

.....

.....

[2 markah / marks]

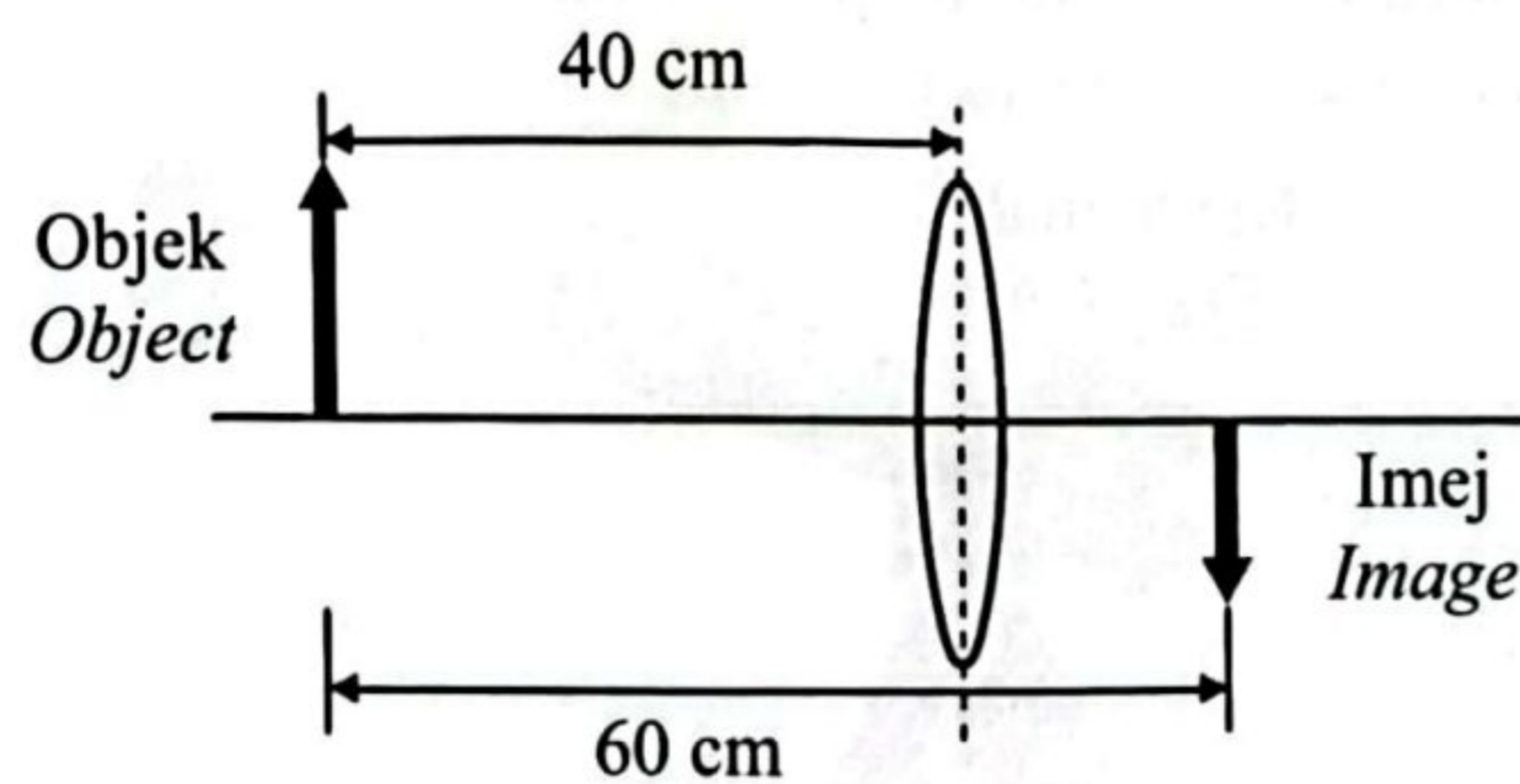
- (ii) Nyatakan satu penyesuaian yang perlu diambil oleh pendaki gunung untuk mengatasi kesan tekanan atmosfera pada altitud tinggi.
State one adaptations to be taken by the mountain climbers to overcome the effect of atmospheric pressure at high altitude.

.....

[1 markah / mark]

- 7 Rajah 7.1 menunjukkan satu objek diletakkan 40.0 cm di hadapan sebuah kanta cembung dan membentuk imej nyata.

Diagram 7.1 shows an object is placed 40.0 cm in front of a convex lens and formed real image.



Rajah 7.1
 Diagram 7.1

- (a) Apakah yang dimaksudkan dengan imej nyata?
What is the meaning of real image?

.....

[1 markah / mark]

- (b) Berdasarkan Rajah 7.1;
Based on Diagram 7.1;

- (i) Tentukan jarak imej, v .
Determine image distance, v .

.....

[1 markah / mark]

- (ii) Hitung panjang fokus, f kanta cembung.
Calculate focal length, f of the convex lens.

[2 markah / marks]

- (c) Rajah 7.2 menunjukkan sebuah teleskop astronomi.
Diagram 7.2 shows an astronomical telescope.



Rajah 7.2
 Diagram 7.2

Sebuah teleskop astronomi mengandungi satu kanta objek dan satu kanta mata.
 Jadual 7 menunjukkan tiga jenis kanta yang boleh digunakan sebagai kanta objek teleskop tersebut.

*An astronomical telescope contains an objective lens and an eyepiece lens.
 Table 7 shows three types of lens that can be used as objective lens of the telescope.*

Kanta <i>Lens</i>	Panjang fokus <i>Focal length</i>	Diameter kanta <i>Diameter of the lens</i>
P	1.0 cm	Kecil <i>Small</i>
Q	10.0 cm	Besar <i>Big</i>
R	100.0 cm	Besar <i>Big</i>

Jadual 7
 Table 7

Berdasarkan Jadual 7, nyatakan ciri-ciri kesesuaian kanta untuk digunakan sebagai kanta objek yang boleh menghasilkan imej yang jelas. Beri satu sebab untuk kesesuaian ciri itu.

Based on Table 7, state the suitable characteristics of the lens to be used as the objective lens that can produce a clear image. Give one reason for the suitable characteristic.

- (i) Panjang fokus
Focal length

.....

Sebab
Reason

.....

[2 markah / marks]

- (ii) Diameter kanta
Diameter of the lens

.....

Sebab
Reason

.....

[2 markah / marks]

- (d) Berdasarkan jawapan di 7(c)(i) dan 7(c)(ii), tentukan kanta yang paling sesuai digunakan sebagai kanta objek dalam teleskop astronomi.

Based on the answers in 7(c)(i) and 7(c)(ii), determine the most suitable lens to be used as the objective lens in an astronomical telescope.

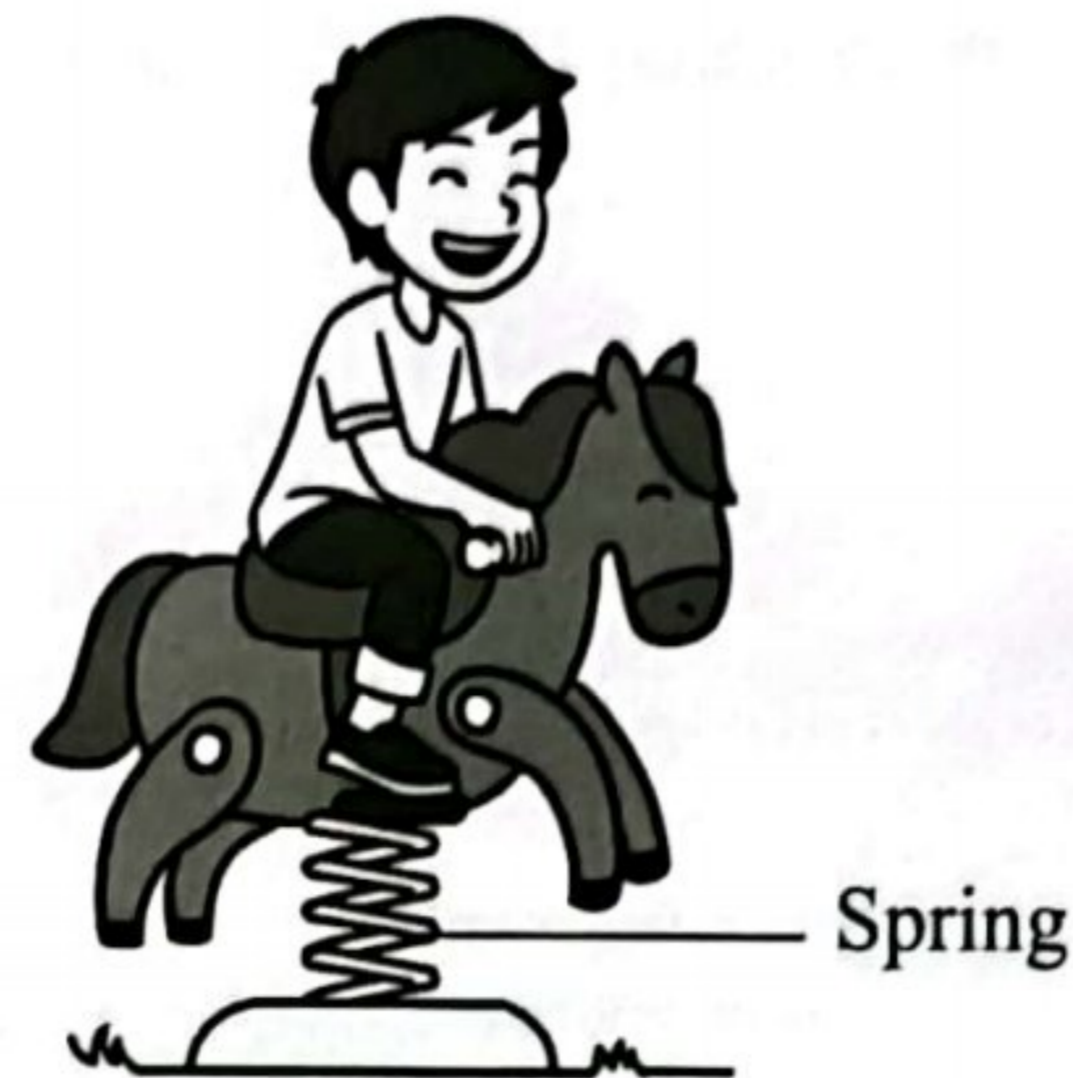
.....

[1 markah / mark]

[Lihat halaman sebelah
SULIT

- 8 Rajah 8 menunjukkan seorang budak bermain permainan kuda berspring di taman permainan kanak-kanak.

Diagram 8 shows a boy play a horse spring at the playground.



Rajah 8
Diagram 8

Apabila daya, F dikenakan, spring dimampatkan dan spring kembali ke kedudukan asalnya setelah daya dialihkan. Diberi daya $F = kx$ di mana k ialah pemalar spring dan x ialah pemampatan spring.

When force, F is applied, the spring compressed and return to its original position once the force is removed. Given $F = kx$ where k is the spring constant and x is the spring compression.

- (a) Namakan hukum fizik yang berkaitan dengan rumus daya di atas.
Name the physics law related with the above formula.

.....

[1 markah / mark]

- (b) Daya maksimum yang boleh dikenakan kepada spring bagi spring kuda itu ialah 600 N dan menyebabkan pemampatan spring maksimum 15 cm.
The maximum force can be applied to the spring of horse spring is 600 N and caused the maximum compression of the spring 15 cm.

Hitung pemalar k spring tersebut.

Calculate the spring constant of the spring.

[2 markah / marks]

- (c) Berdasarkan Rajah 8, cadangkan pengubahsuaian yang boleh dibuat kepada spring itu supaya dapat digunakan oleh kanak-kanak yang lebih berat dan beri sebab kepada jawapan anda.

Based on Diagram 8, suggest modification that can be made to the spring so that it can be used for a heavier kid and give reason for your answer.

- (i) Ketebalan dawai spring.
Thickness wire of the spring.

.....

Sebab
Reason

.....

[2 markah / marks]

- (ii) Diameter gegelung spring.
Diameter coil of spring.

.....

Sebab
Reason

.....

[2 markah / marks]

- (iii) Bahan spring
Material of spring

.....

Sebab
Reason

.....

[2 markah / marks]

BAHAGIAN B

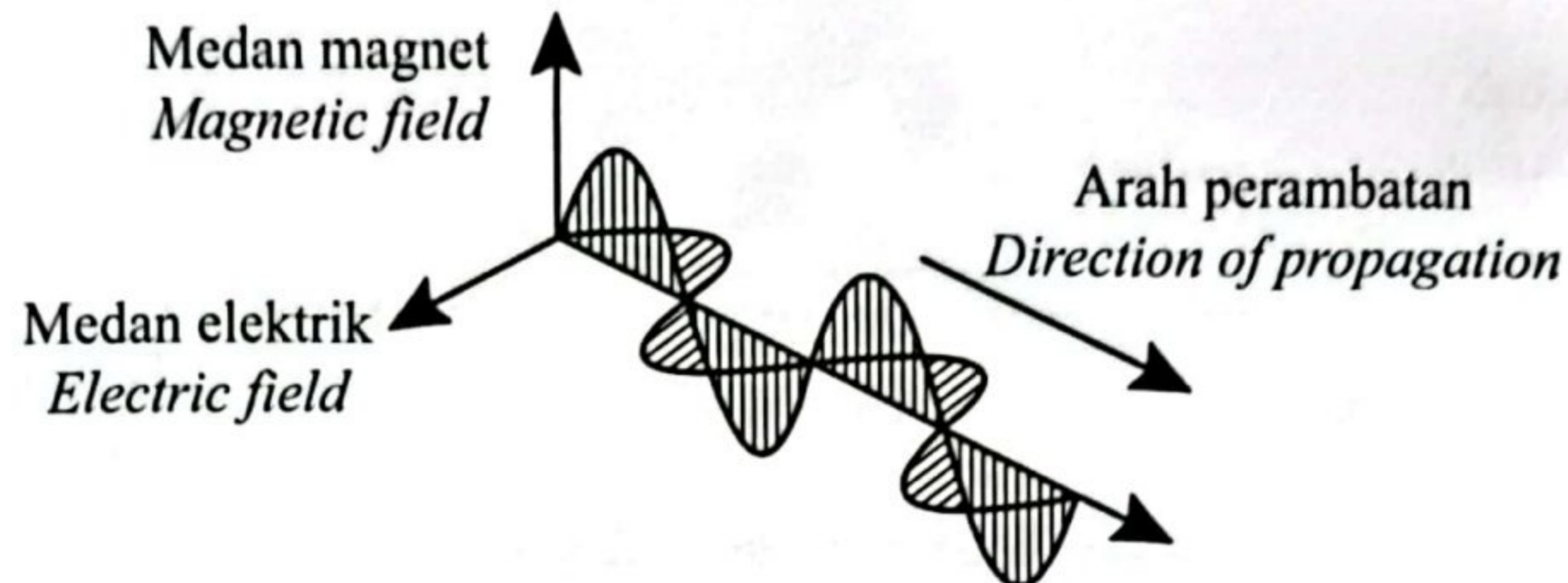
Section B

[20 markah]

[20 marks]

Jawab **satu** soalan di bahagian ini.
Answer one question in this section.

- 9 Rajah 9.1 menunjukkan satu gelombang elektromagnet.
Diagram 9.1 shows an electromagnetic wave.



Rajah 9.1
Diagram 9.1

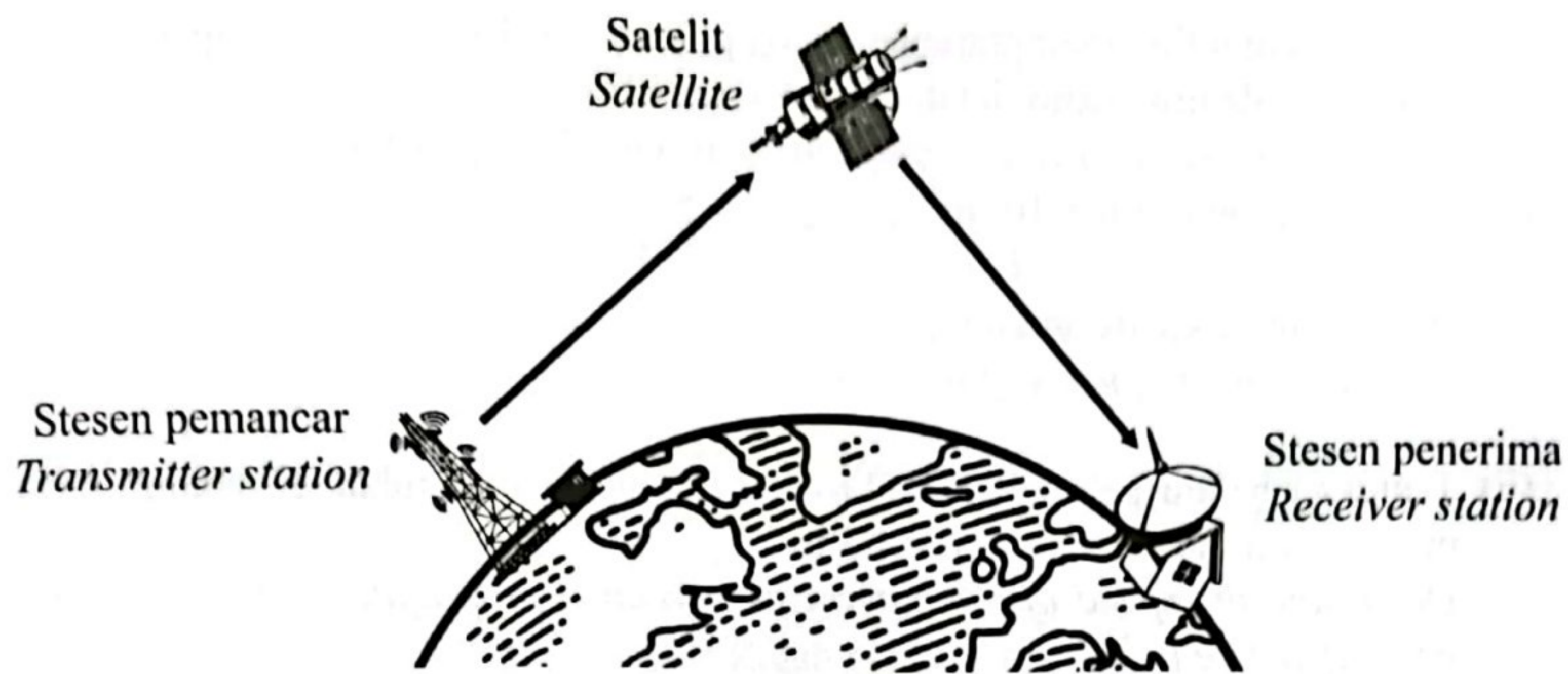
- (a) Apakah maksud gelombang elektromagnet?
What is electromagnetic wave?

[1 markah / mark]

- (b) Gelombang elektromagnet seperti cahaya tampak mempunyai sifat kedualan gelombang zarah. Terangkan.
Electromagnetic waves such as visible light have the properties of waves particle duality. Explain.

[4 markah / marks]

- (c) Rajah 9.2 menunjukkan satu sistem komunikasi yang melibatkan penghantaran terus isyarat gelombang elektromagnet dari stesen pemancar ke stesen penerima. Jarak di antara dua stesen yang jauh dan bentuk Bumi menyebabkan stesen penerima tidak dapat menerima isyarat yang jelas secara terus dari pemancar.
Figure 9.2 shows a communication system that involves the direct transmission of electromagnetic wave signals from a transmitting station to a receiving station. The distance between the two distant stations and the shape of the Earth make the receiving station unable to receive a clear signal directly from the transmitter.



Anda dikehendaki menyiasat ciri-ciri stesen pemancar seperti dalam Jadual 9. Terangkan kesesuaian setiap ciri stesen pemancar untuk digunakan bagi menghantar isyarat ke stesen penerima.

You are required to investigate the characteristics of the transmitting station as in Table 9.

Explain the suitability of each characteristic of a transmitting station to be used to transmit a signal to a receiving station.

Stesen pemancar <i>Transmitter station</i>	Jenis gelombang <i>Type of wave</i>	Kedudukan pemancar <i>Position of the transmitter</i>	Frekuensi <i>Frequency Hz</i>	Diameter cakera parabolik <i>Diameter of parabolic dish</i>
W	Gelombang radio <i>Radiowaves</i>	Rendah <i>Low</i>	5.0×10^3 Hz	Besar <i>Big</i>
X	Gelombang mikro <i>Microwaves</i>	Tinggi <i>Height</i>	3.0×10^6 Hz	Besar <i>Big</i>
Y	Gelombang radio <i>Radiowaves</i>	Rendah <i>Low</i>	1.5×10^3 Hz	Kecil <i>Small</i>
Z	Gelombang mikro <i>Microwaves</i>	Tinggi <i>Height</i>	1.2×10^5 Hz	Kecil <i>Small</i>

Jadual 9
Table 9

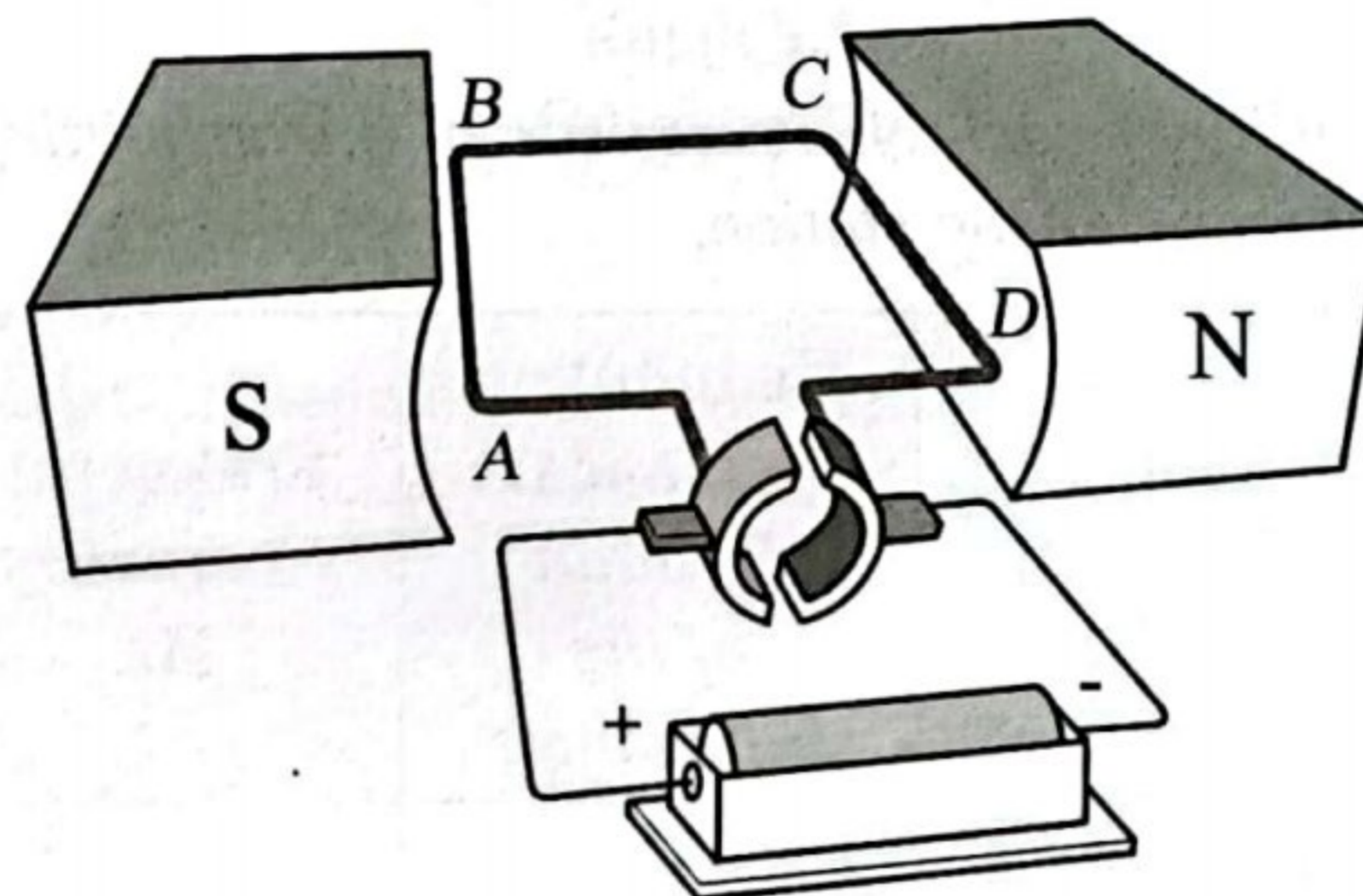
[10 markah / marks]

[Lihat halaman sebelah
SULIT

- (d) Satu gelombang mikro mempunyai panjang gelombang 1.0×10^4 cm. Laju gelombang elektromagnet dalam vakum ialah 3.0×10^8 ms⁻¹.
One microwave has a wavelength of 1.0×10^4 cm. The speed of an electromagnetic wave in a vacuum is 3.0×10^8 ms⁻¹.
- (i) Hitungkan frekuensi gelombang ini.
Calculate the frequency of this wave.
- (ii) Tentukan halaju gelombang mikro itu apabila ia merambat di dalam air yang mempunyai indeks biasan, $n = 1.333$.
Determine the speed of the microwaves when it propagates through the water with refractive index, $n = 1.333$.

[5 markah / marks]

- 10 Rajah 10.1 menunjukkan sebuah motor arus terus 12 V.
Diagram 10.1 shows a 12 V direct current motor.

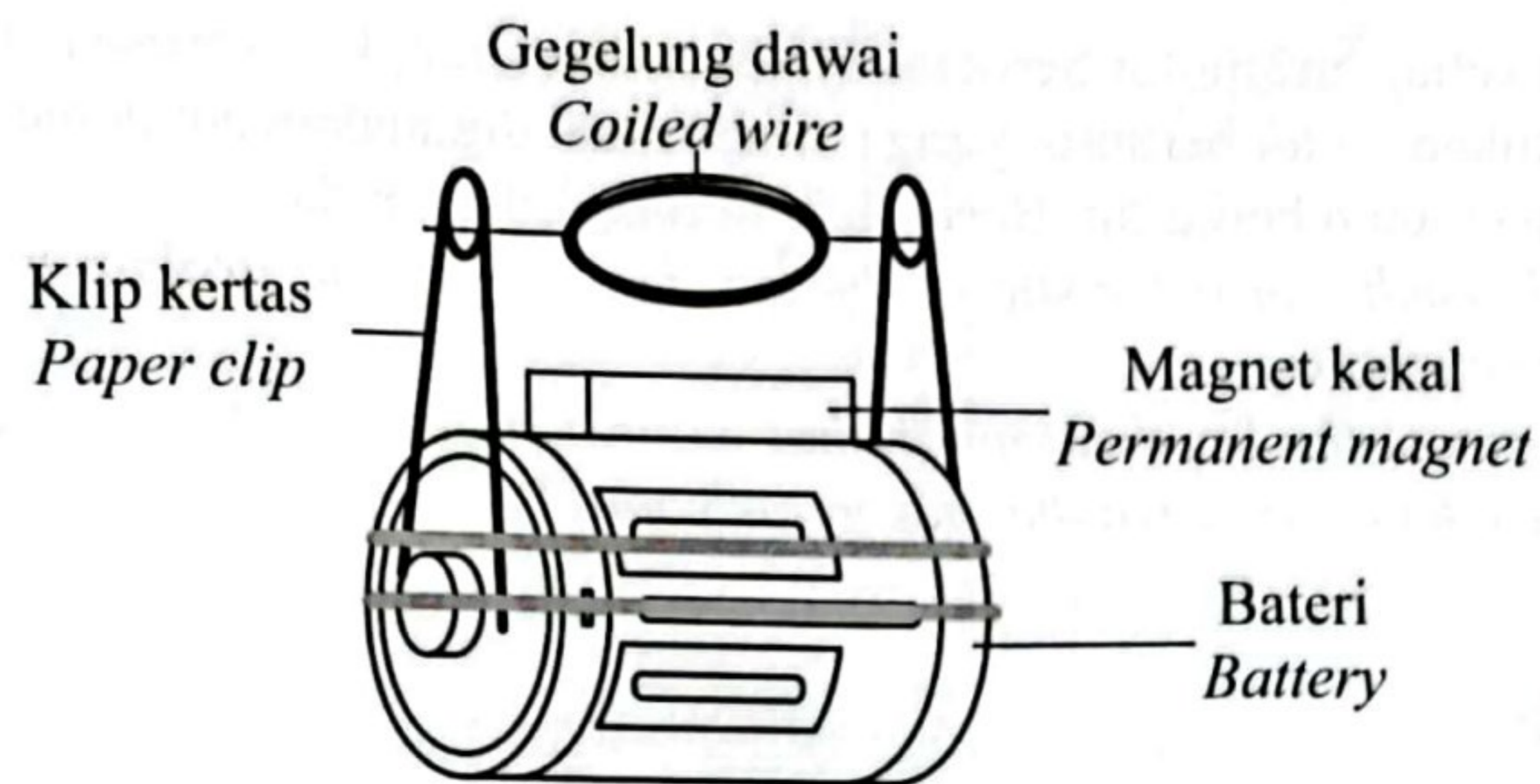


Rajah 10.1
Diagram 10.1

- (a) Apakah fungsi sebuah motor?
What is the function of a motor?

[1 markah / mark]

- (b) Rajah 10.2 menunjukkan satu model motor elektromagnet ringkas.
Diagram 10.2 shows a model of a simple electromagnet motor.







Rajah 10.2
Diagram 10.2

Berdasarkan Rajah 10.2, terangkan bagaimana gegelung dawai itu boleh berputar apabila litar dilengkapkan.

Based on Diagram 10.2, explain how the coil of wire can rotate when the circuit is completed.

[4 markah / marks]

- (c) Jadual 10 menunjukkan ciri-ciri empat buah motor berberus K, L, M dan N.
Table 10 shows the characteristics of four brushed motors K, L, M and N.

Motor berberus <i>Brushed motor</i>	Bilangan lilitan gegelung <i>Number of turns of coil</i>	Ketumpatan gegelung (kg m^{-3}) <i>Density of the coil (kg m^{-3})</i>	Kekuatan magnet kekal <i>Strength of permanent magnets</i>	Bilangan segmen dalam komutator <i>Number of segments in the commutator</i>
K	330	8960	Tinggi <i>High</i>	
L	400	11600	Rendah <i>Low</i>	
M	400	8960	Tinggi <i>High</i>	
N	330	11600	Rendah <i>Low</i>	

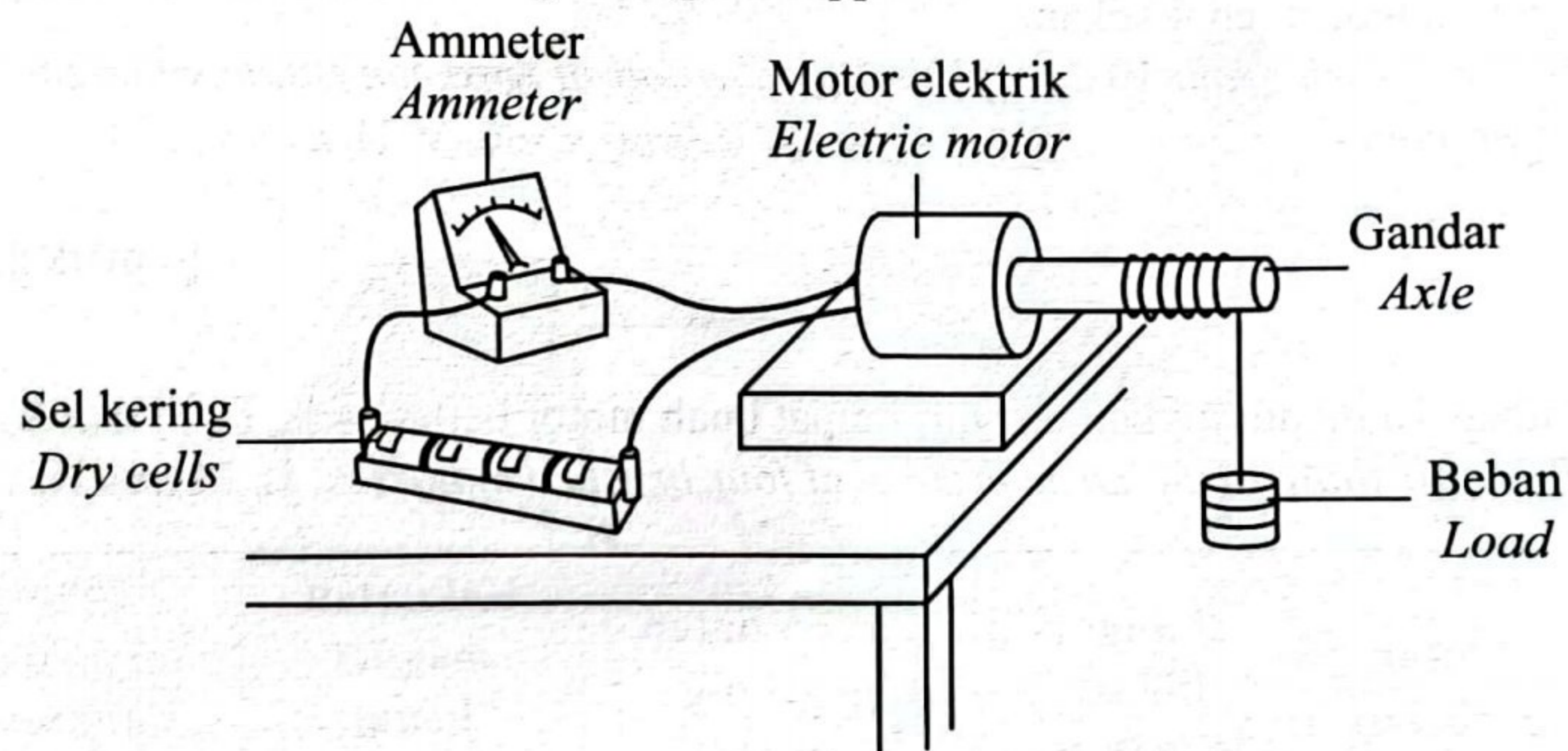
Jadual 10
Table 10

[Lihat halaman sebelah
SULIT

Kaji setiap ciri motor berberus tersebut dan terangkan kesesuaian setiap ciri.
 Tentukan motor berberus yang paling sesuai digunakan untuk mengangkat objek berat dengan lebih berkesan. Beri sebab untuk pilihan anda.
Study each characteristic of the brushed motor and explain the suitability of each characteristic.
Determine the brushed motor that is most suitable to be used to lift a heavy object more effectively. Give the reason for your choice.

[10 markah / marks]

- (d) Rajah 10.3 menunjukkan suatu beban berjisim 2.0 kg diangkat ke atas menggunakan motor elektrik. Motor elektrik itu berputar apabila bekalan voltan 6.0 V dibekalkan.
Diagram 10.3 shows a load of 2.0 kg is lifted up using an electric motor. The electric motor rotates when 6.0 V of voltage is supplied.



Rajah 10.3
 Diagram 10.3

- (i) Jika arus 0.5 A mengalir dalam motor selama 8 saat, hitungkan tenaga elektrik bagi motor itu.
If 0.5 A of current flows in the electric motor for 8 seconds, calculate the electrical energy of the motor.
- (ii) Jika kecekapan motor ialah 65%, berapa tinggikah motor itu dapat mengangkat beban ke atas dalam masa 8 saat?
If the efficiency of the motor is 65%, how high can the motor lift the load up within 8 seconds?

[5 markah / marks]

BAHAGIAN C**Section C**

[20 markah]

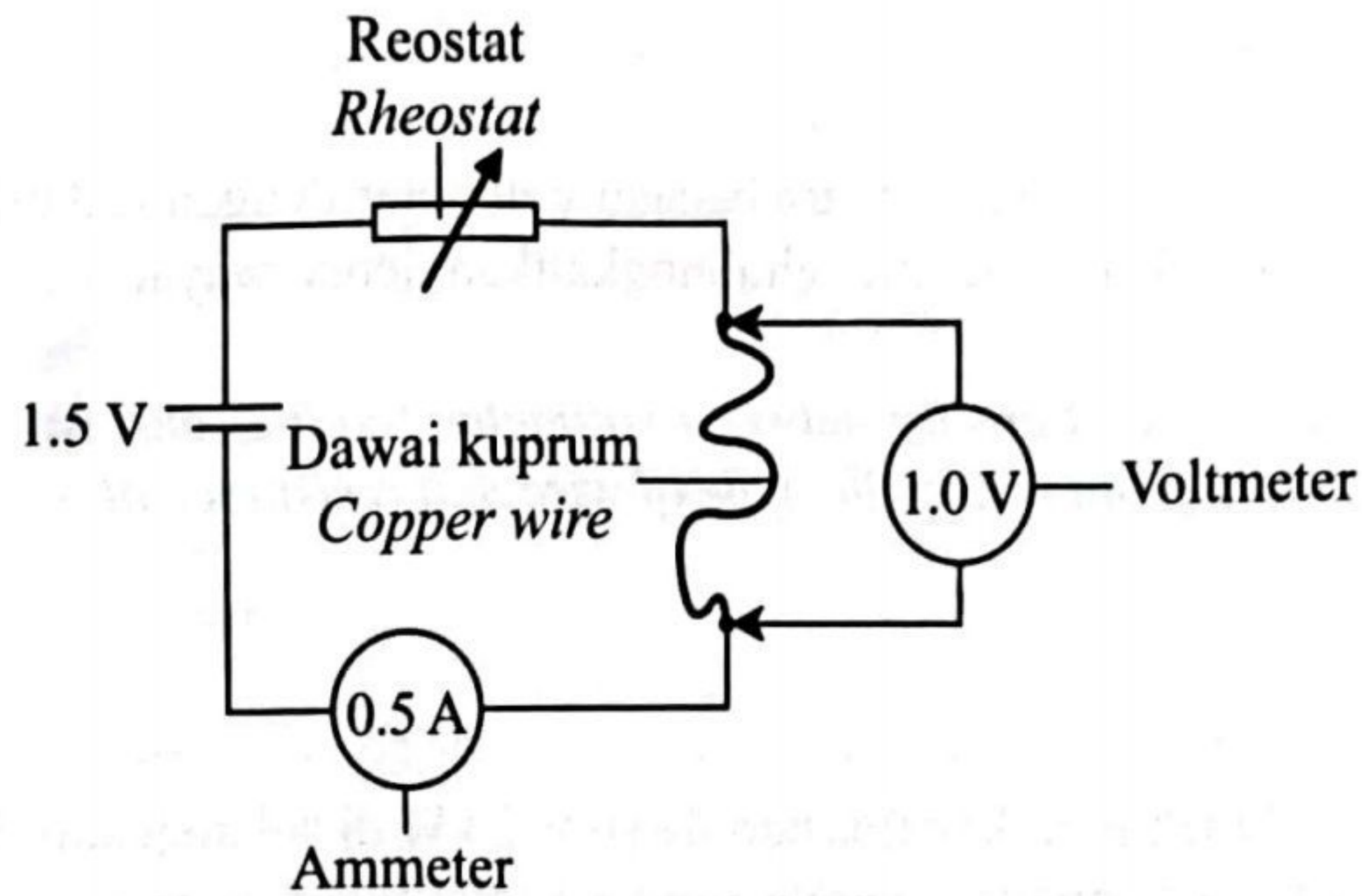
[20 marks]

Soalan ini mesti dijawab.

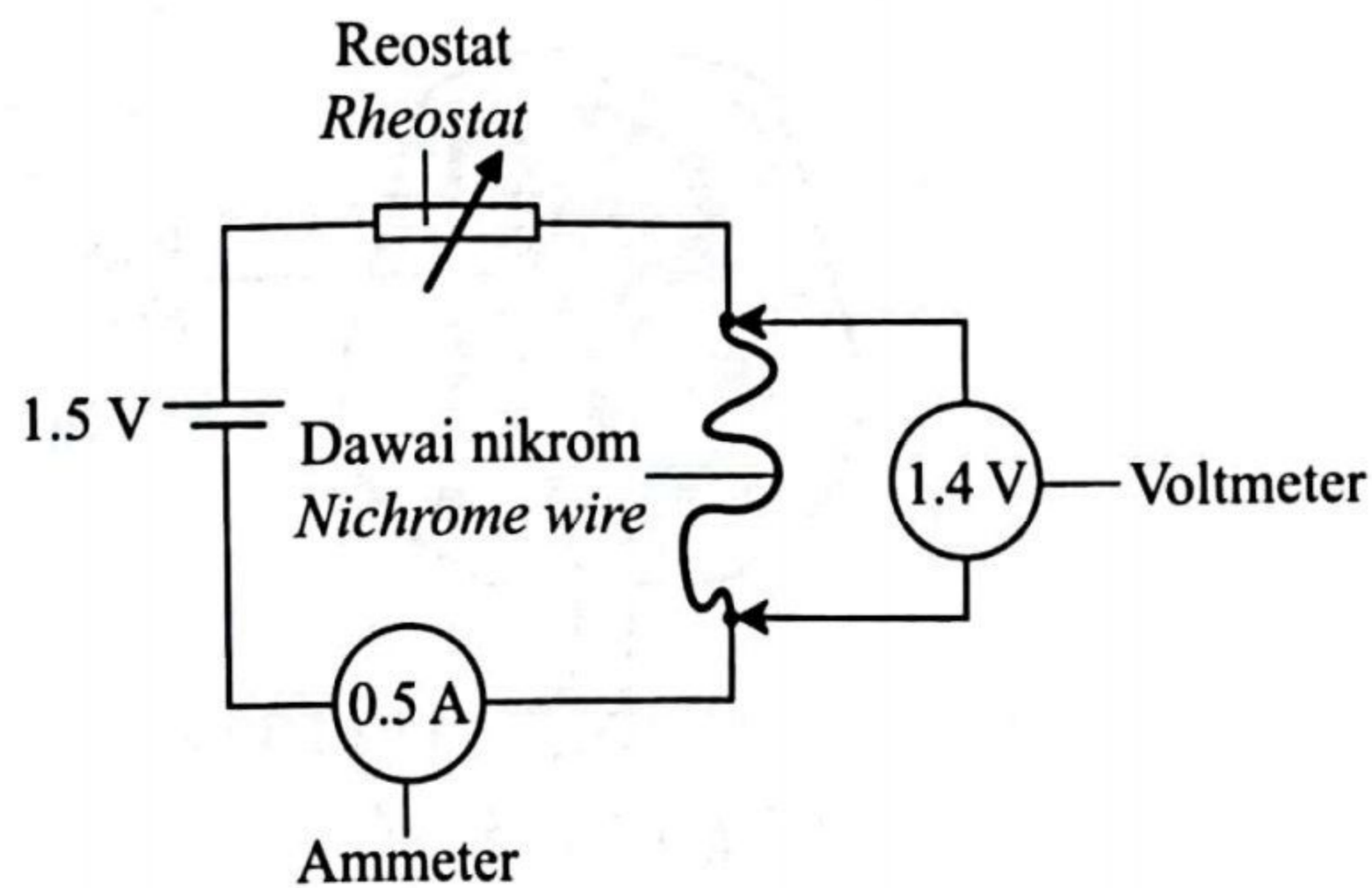
This question must be answered.

- 11 Rajah 11.1 dan Rajah 11.2 menunjukkan dua set radas bagi satu eksperimen yang dijalankan oleh seorang murid.

Diagram 11.1 and Diagram 11.2 show two set up of experiment carried out by a student.



Rajah 11.1
Diagram 11.1



Rajah 11.2
Diagram 11.2

[Lihat halaman sebelah
SULIT

4531/2

Selamat mengulangkaji dari telegram@soalanpercubaanspm

Fizik K2 Trial Perak 2023

- (a) Berikan maksud kerintangan dawai.
State the meaning of resistivity of wire.

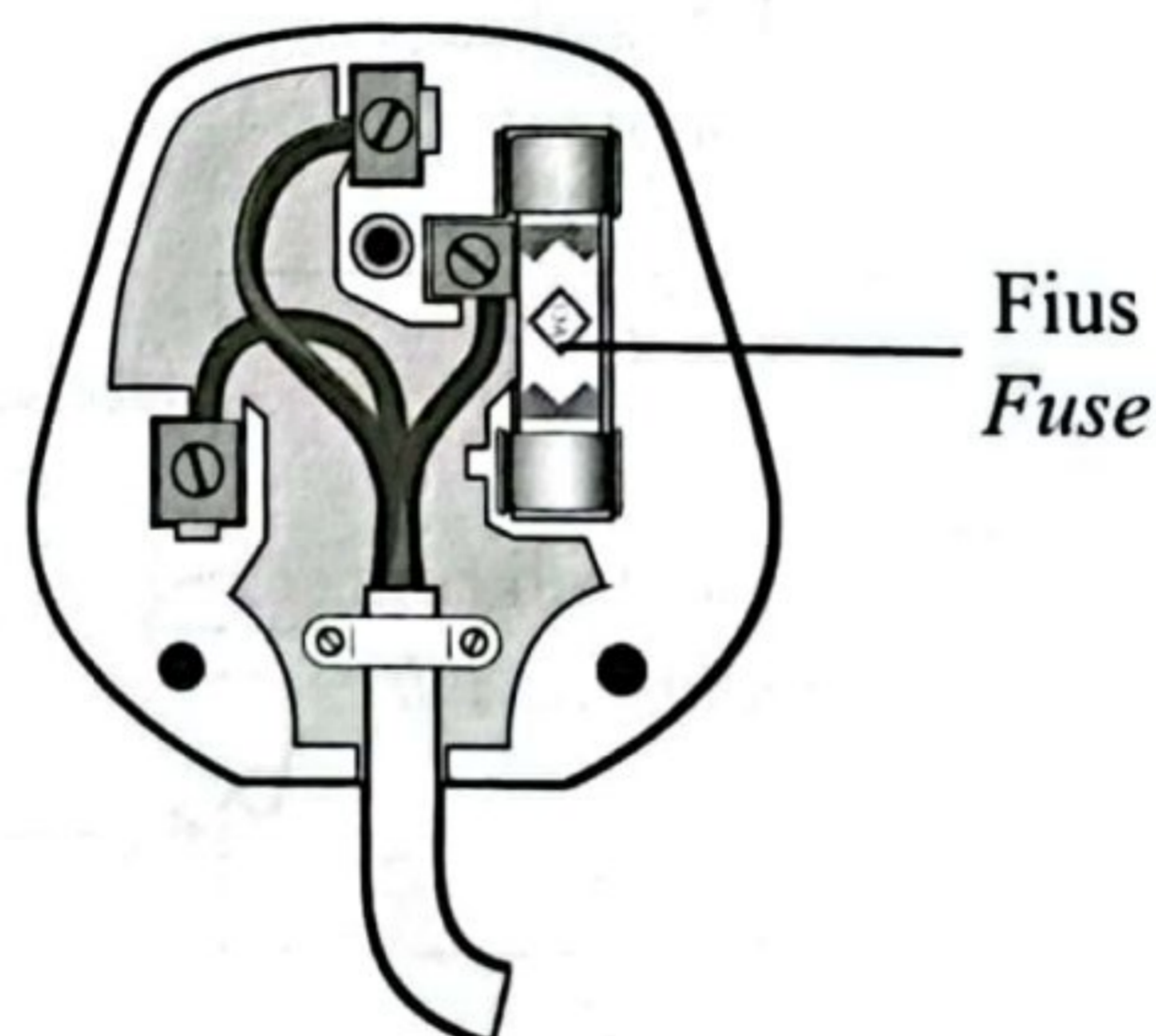
[1 markah / mark]

- (b) Berdasarkan Rajah 11.1 dan Rajah 11.2;
Based on Diagram 11.1 and Diagram 11.2;

- (i) bandingkan jenis wayar yang digunakan, bacaan ammeter dan bacaan voltmeter.
compare the type of wire used, the reading of the ammeter and the reading of the voltmeter.
- (ii) Nyatakan hubungan antara bacaan voltmeter dengan rintangan. Seterusnya, buat satu deduksi yang menghubungkan jenis wayar dawai dengan rintangan wayar.
State the relationship between voltmeter reading and resistance. Next, make a deduction that relates the type of wire and resistance of wire.

[5 markah / marks]

- (c) Rajah 1.3 menunjukkan fius berlabel 6 V, 24 W di dalam palam 3-pin yang digunakan untuk memutuskan litar apabila ada arus yang berlebihan mengalir.
Figure 11.3 shows a fuse labelled 6 V, 24 W inside the 3-pin plug that is used to break the circuit when there is excessive current flowing.



Rajah 11.3
Diagram 11.3

Fius tersebut tidak melebur apabila arus berlebihan mengalir melaluinya dan ini menyebabkan alat elektrik rosak. Anda dikehendaki untuk mengubahsuaikan fuis dalam Rajah 11.3 untuk memastikan fuis tersebut dapat melindungi alat elektrik daripada rosak.

The fuse does not melt when excessive current flows through it and this causes electrical equipment to be damaged. You are required to modify the fuse in Figure 11.3 to ensure that the fuse can protect electrical appliances from being damaged.

Nyatakan dan terangkan pengubahsuaian berdasarkan aspek-aspek kerintangan dawai, takat lebur dawai, nilai fuis dan aspek-aspek lain yang sesuai.

State and explain the modifications based on the aspects of the resistance of the wire, the melting point of the wire, the value of the fuse and other appropriate aspects.

[10 markah / marks]

(d) Baca pernyataan di bawah.

Read the statement below.

Pengeluaran kenderaan elektrik (EV) sedang mengalami pertumbuhan pesat dan perlahan-lahan mula memasuki medium pengeluaran kereta arus perdana. Pembuatan segmen tersebut juga semakin hari semakin bertambah baik dari segi penciptaan teknologi dan penjimatan tenaga.

Electric vehicle (EV) production is experiencing rapid growth and is slowly starting to enter the medium of mainstream car production. The manufacturing of the segment is also improving day by day in terms of technology creation and energy saving.

Nyatakan dan jelaskan dua ciri kereta elektrik (EV).

State and explain two properties of the electric vehicle (EV).

[4 markah / marks]

**KERTAS PEPERIKSAAN TAMAT
END OF EXAM PAPER**