

NAMA:

KELAS:



MAJLIS PENGETUA SEKOLAH MALAYSIA (MPSM)
NEGERI PERAK

MODUL INTERVENSI
MENENGAH ATAS
2026

FIZIK
KERTAS 2
2 JAM 30 MINIT

JANGAN BUKA MODUL 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. Modul ini adalah dalam dwibahasa.
- 4. Jawapan boleh ditulis dalam bahasa Melayu atau bahasa Inggeris.
- 5. Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.
- 6. Kerja mengira anda mesti ditunjukkan.
- 7. Calon dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogramkan.

Untuk Kegunaan Pemeriksa			
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			

Modul ini mengandungi **39** halaman bercetak

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 $F = ma$

KEGRAVITIAN
GRAVITATION

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 $g = 9.81 \text{ m s}^{-2} @ 9.81 \text{ N kg}^{-1}$

11 $G = 6.67 \times 10^{-11} \text{ N m}^2 \text{ kg}^{-2}$

12 Jisim Bumi, $M = 5.97 \times 10^{24} \text{ kg}$
Mass of Earth

13 Jejari Bumi, $R = 6.37 \times 10^6 \text{ m}$
Radius of Earth

HABA
HEAT

1 $Q = mc\theta$

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,

DAYA DAN GERAKAN II
FORCE AND MOTION II

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

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

TEKANAN
PRESSURE

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

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

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

ELEKTRIK
ELECTRICITY

$$1 \quad E = \frac{F}{Q}$$

$$2 \quad I = \frac{Q}{t}$$

$$3 \quad V = \frac{E}{Q}$$

$$4 \quad V = IR$$

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

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

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

Maximum kinetic energy

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

$$4 \quad V_{out} = \frac{R_2}{R_1 + R_2} V_{in}$$

FIZIK NUKLEAR
NUCLEAR PHYSICS

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

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

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

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

FIZIK KUANTUM
QUANTUM PHYSICS

$$1 \quad E = hf$$

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

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

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

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

$$6 \quad P = nhf$$

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

$$8 \quad W = hf_o$$

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

SULIT
[LIHAT HALAMAN SEBELAH]

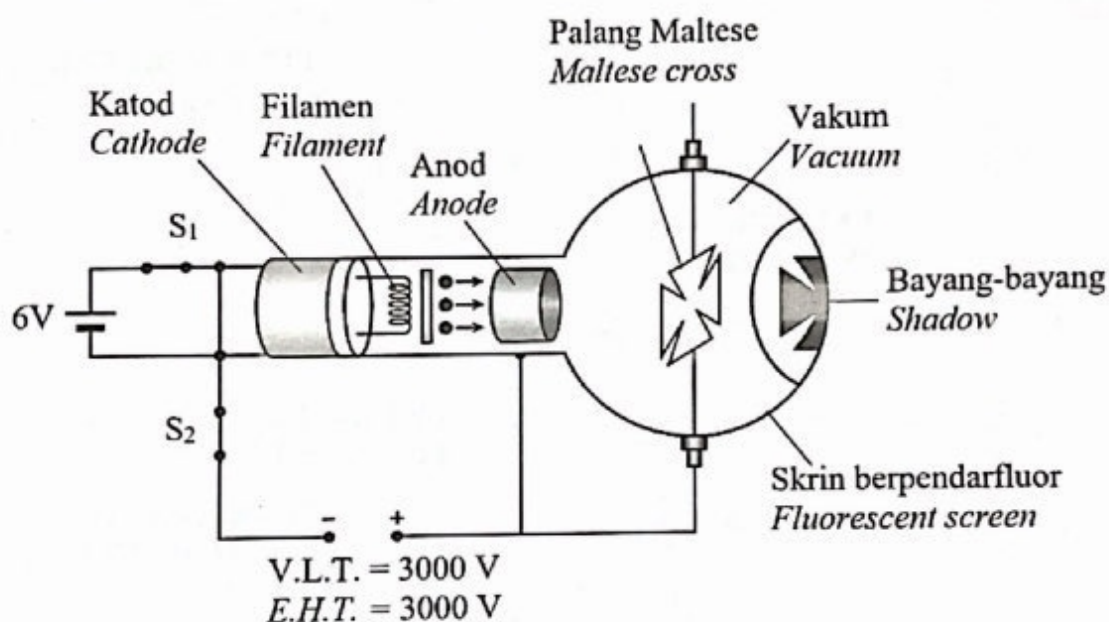
Bahagian A

[60 markah]

Jawab semua soalan.

- 1 Rajah 1 menunjukkan keratan rentas tiub palang Maltese yang digunakan untuk mengkaji sifat-sifat sinar katod. Sinar katod dihasilkan apabila elektron terpancar dari katod yang dipanaskan.

Diagram 1 shows a cross section of a Maltese cross tube which is used to study the characteristics of cathode rays. The cathode ray is produced when electrons emitted from a heated cathode.



Rajah 1
Diagram 1

- (a) Namakan proses pemancaran elektron dari katod yang dipanaskan.
Name the process of emitting electrons from the heated cathode.
-
- [1 markah / 1 mark]
- (b) Nyatakan perubahan tenaga yang dialami oleh elektron yang bergerak dari katod ke anod.
State the energy changes experienced by the electrons moved from cathode to anode.
-
- [1 markah / 1 mark]

- (c) Apabila suis S_1 dan S_2 ditutup, satu bayang-bayang terbentuk pada skrin berpendarfluor.

When the switches S_1 and S_2 are closed, a shadow formed on the fluorescent screen.

- (i) Mengapakah bayang-bayang boleh terbentuk pada skrin berpendarfluor?
Why is the shadow formed on the fluorescent screen?

.....

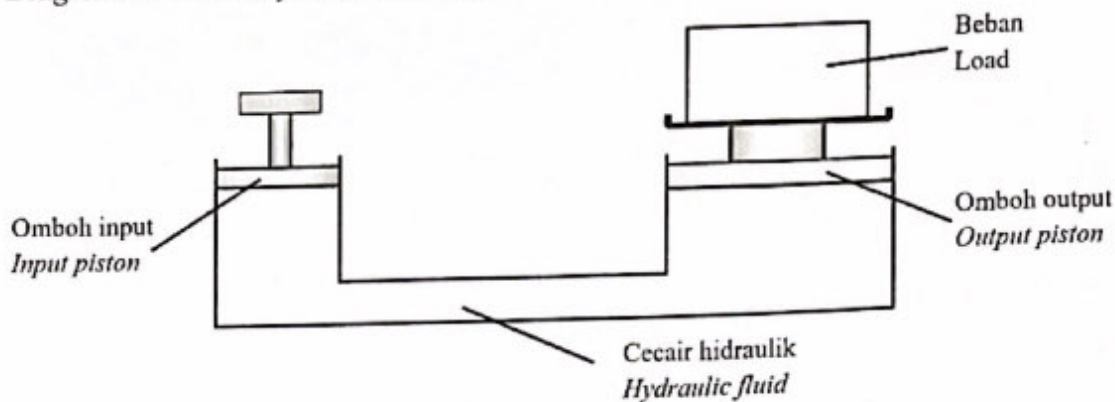
[1 markah / 1 mark]

- (ii) Berdasarkan jawapan di (c)(i), nyatakan satu ciri sinar katod.
Based on the answer in (c)(i), state one characteristic of cathode rays.

.....

[1 markah / 1 mark]

- 2 Rajah 2 menunjukkan satu sistem hidraulik.
Diagram 2 shows a hydraulic system.



Rajah 2
Diagram 2

- (a) Gariskan jawapan yang betul pada pernyataan di bawah.
Underline the correct answer in the statement below.

(Daya, Tekanan) dipindahkan secara seragam dari ombok input ke ombok output.
(Force, Pressure) is transmitted uniformly from input piston to output piston.

[1 markah / 1 mark]

- (b) Berdasarkan struktur sistem hidraulik di Rajah 2, berikan satu sebab mengapa beban yang berat dapat diangkat dengan mengenakan daya input yang kecil.
Based on the structure of the hydraulic system in Diagram 2, give one reason why a heavy load can be lifted up by applying a small input force.

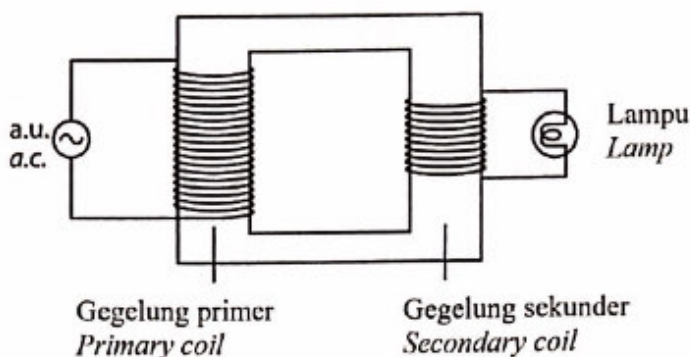
.....

[1 markah / 1 mark]

- (c) Dalam Rajah 2, luas keratan rentas ombok input dan ombok output masing-masing adalah 3 cm^2 dan 12 cm^2 . Hitungkan faktor penggandaan bagi sistem hidraulik itu.
In Diagram 2, the cross-sectional area of the input piston and the output piston are 3 cm^2 and 12 cm^2 respectively. Calculate the multiplying factor of the hydraulic system.

[3 markah / 3 marks]

- 3 Rajah 3 menunjukkan sebuah transformer ringkas yang disambungkan pada sebuah lampu. Transformer tersebut disambungkan ke bekalan kuasa 240 V.
Diagram 3 shows a simple transformer connected to a lamp. The transformer is connected to a 240 V power supply.



Rajah 3
Diagram 3

- (a) Nyatakan jenis transformer ringkas yang digunakan dalam Rajah 3.
State the type of simple transformer used in Diagram 3.

[1 markah / 1 mark]

- (b) Terangkan prinsip kerja transformer ringkas tersebut.
Explain the working principle of the simple transformer.

[2 markah / 2 marks]

- (c) Transformer pada Rajah 3 mempunyai kuasa input 150 W dan kecekapan 60%, hitung
The transformer in Diagram 3 has the input power of 150 W and the efficiency of 60%, calculate

- (i) Kuasa output yang terhasil dalam gegelung sekunder.
The output power produced in the secondary coil.

[2 markah / 2 marks]

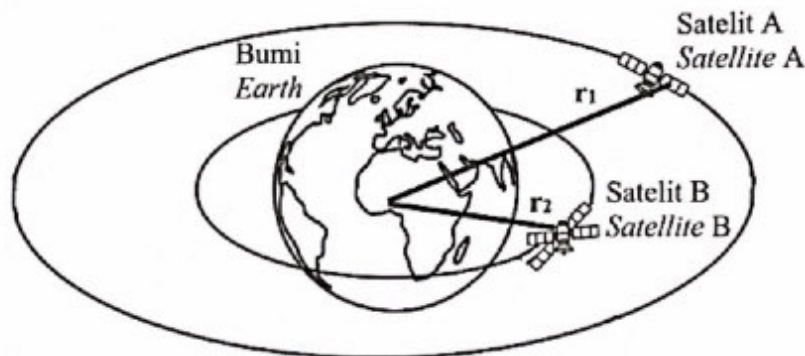
SULIT
 [LIHAT HALAMAN SEBELAH]

- (ii) Nyatakan satu kaedah bagi meningkatkan kecekapan transformer tersebut.
State one method to increase the efficiency of the transformer.

.....

[1 markah / 1 mark]

- 4 Rajah 4 menunjukkan sebuah satelit yang melakukan gerakan membulat mengelilingi Bumi dengan jejari orbit, r dan tempoh orbit, T .
Diagram 4 shows a satellite making circular motion around the Earth with radius of orbit, r and orbital period, T .



Rajah 4
 Diagram 4

- (a) Nyatakan Hukum Kepler Ketiga.
State Kepler's Third Law.

.....

[1 markah / 1 mark]

- (b) Dua satelit, A dan B, mengorbit Bumi. Satelit A berada pada jejari orbit yang lebih besar daripada satelit B.

Bandingkan tempoh orbit kedua-dua satelit dan terangkan jawapan anda berdasarkan Hukum Kepler Ketiga.

Two satellites, A and B, orbit the Earth. Satellite A has a larger radius of orbit than satellite B.

Compare the orbital period of both satellites and explain your answer based on Kepler's Third Law.

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

[2 markah / 2 marks]

- (c) Terbitkan hubungan antara tempoh orbit dan jejari orbit dengan menggunakan persamaan daya memusat dan daya graviti.

Derive the relationship between orbital period and radius of orbit using the formulae of centripetal force and gravitational force.

[3 markah / 3 marks]

- (d) Satelit A mengorbit Bumi dengan jejari orbit, $r_1 = 4.0 \times 10^7 \text{ m}$ dan tempoh orbit, $T_1 = 12 \text{ jam}$.

Satelit B mengorbit pada jejari orbit, $r_2 = 2.0 \times 10^7 \text{ m}$.

Hitung tempoh orbit satelit B dalam unit saat.

Satellite A orbits the Earth with radius of orbit, $r_1 = 4.0 \times 10^7 \text{ m}$ and orbital period, $T_1 = 12 \text{ hours}$.

Satellite B orbits with radius of orbit, $r_2 = 2.0 \times 10^7 \text{ m}$.

Calculate the orbital period of satellite B in the unit of second.

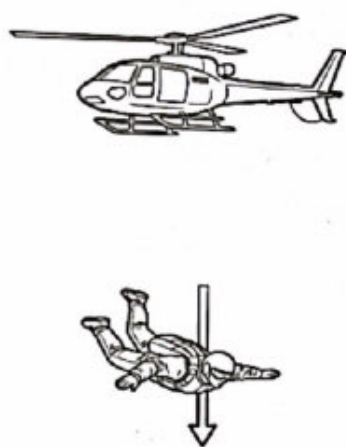
[3 markah / 3 marks]

- 5 Rajah 5.1 dan 5.2 menunjukkan dua orang penerjun yang mempunyai jisim yang sama terjun dari sebuah helikopter pada ketinggian yang sama. Penerjun di Rajah 5.1 mengalami masalah di mana payung terjunnya tidak terbuka. Penerjun di Rajah 5.2 pula berjaya membuka payung terjun. Kedua-dua penerjun mendarat pada masa yang berbeza.

Diagrams 5.1 and 5.2 show two parachutists with the same mass jumped from a helicopter at the same height.

The parachutist in Diagram 5.1 experienced a problem where his parachute did not open.

Parachutist in Diagram 5.2 managed to open the parachute. Both parachutists landed at different times.



Rajah 5.1
Diagram 5.1



Rajah 5.2
Diagram 5.2

- (a) Nyatakan Hukum Gerakan Newton Kedua.
State Newton's Second Law of Motion.

.....
.....

[1 markah / 1 mark]

- (b) Bandingkan gerakan kedua-dua penerjun dari segi:
Compare the motion of both parachutists in terms of:

- (i) rintangan udara
air resistance

.....

[1 markah / 1 mark]

SULIT
[LIHAT HALAMAN SEBELAH]

- (ii) pecutan
acceleration

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

- (iii) masa untuk sampai ke tanah.
time taken to reach the ground.

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

- (c) Berdasarkan jawapan di 5(b), deduksikan hubungan antara
Based on the answer in 5(b), deduce the relationship between

- (i) rintangan udara dan pecutan
air resistance and acceleration

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

- (ii) rintangan udara dan masa untuk sampai ke tanah.
air resistance and time taken to reach the ground.

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

- (d) (i) Berdasarkan Rajah 5.1, nyatakan daya yang terlibat apabila penerjun jatuh ke tanah.
Based on Diagram 5.1, state the force involved when the parachutist falls on the ground.

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

- (ii) Cadangkan **SATU** cara untuk mengurangkan daya yang dinyatakan dalam soalan 5(d)(i). Berikan justifikasi bagi jawapan anda.
*Suggest **ONE** way to reduce the force stated in 5(d)(i). Justify your answer.*

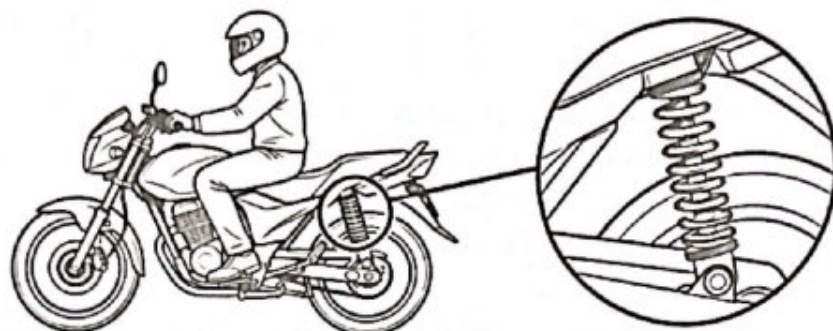
.....
[2 markah / 2 marks]

- 6 Rajah 6.1 dan 6.2 menunjukkan perbandingan dua spring motosikal yang serupa. Kedua-dua spring adalah kenyal dan dipasang pada sebuah motosikal. Spring pada Rajah 6.1 menampung beban 70 kg manakala spring pada Rajah 6.2 menampung beban 140 kg.

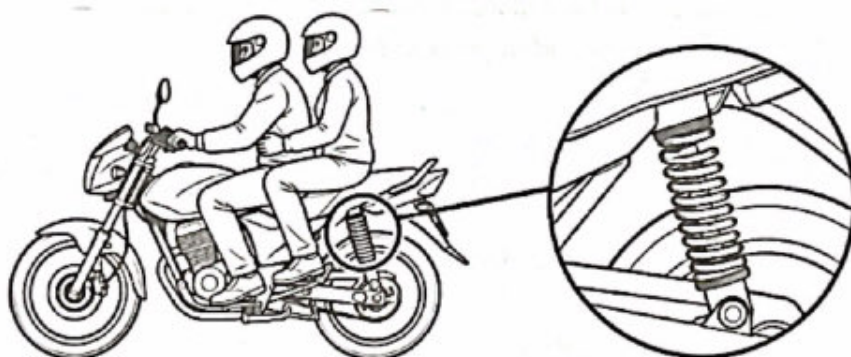
Diagrams 6.1 and 6.2 show a comparison of two similar motorcycle springs.

Both springs are elastic and are mounted on a motorcycle.

The spring in Diagram 6.1 supports a load of 70 kg while the spring in Diagram 6.2 supports a load of 140 kg.



Rajah 6.1
Diagram 6.1



Rajah 6.2
Diagram 6.2

- (a) Nyatakan maksud kekenyalan.
State the meaning of elasticity.

.....

.....

.....

[1 markah / 1 mark]

SULIT
[LIHAT HALAMAN SEBELAH]

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

(i) daya yang dikenakan ke atas spring
the force applied to the spring

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

(ii) jarak mampatan spring
the compression distance of the spring

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

(iii) pemalar spring.
spring constant.

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

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

(i) daya yang dikenakan ke atas spring dan jarak mampatan spring
the force applied to the spring and the compression distance of the spring

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

(ii) jarak mampatan spring dan tenaga keupayaan kenyal.
the compression distance of the spring and the elastic potential energy.

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

- (d) Nyatakan hukum fizik yang terlibat dalam situasi pada Rajah 6.1 dan 6.2.
State the physics law involved in the situations in Diagram 6.1 and 6.2.

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

SULIT
[LIHAT HALAMAN SEBELAH]

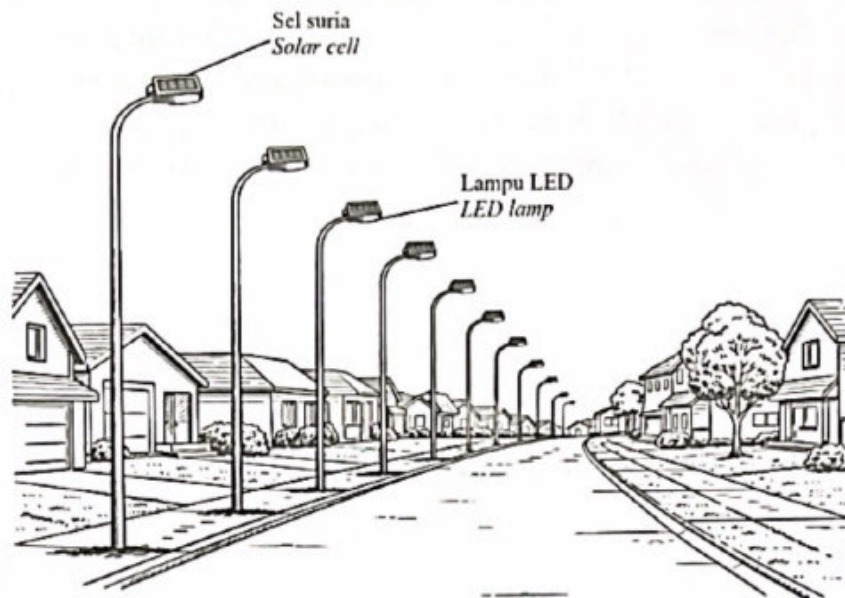
- (c) Dengan merujuk kepada Rajah 6.2,
With reference to Diagram 6.2,
- (i) apakah yang akan berlaku kepada jarak mampatan spring jika ketebalan dawai spring yang lebih besar digunakan?
what will happen to the compression distance of the spring if a larger thickness of spring wire is used?

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

- (ii) nyatakan satu sebab bagi jawapan anda di 6(c)(i).
state one reason for your answer in 6(c)(i).

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

- 7 Rajah 7 menunjukkan sederet lampu jalan di suatu kawasan perumahan.
Diagram 7 shows a row of street light in a housing area.



Rajah 7
Diagram 7

- (a)(i) Tandakan (✓) untuk jawapan yang betul dalam petak yang disediakan.
Tick (✓) for the correct answer in the box provided.

Kesan fotoelektrik berlaku apabila
Photoelectric effect occurs when

☐

frekuensi foton cahaya sama atau lebih tinggi daripada frekuensi ambang.
frequency of the photon of light is equal to or higher than the threshold frequency.

☐

frekuensi foton cahaya lebih rendah daripada frekuensi ambang.
frequency of the photon of light is lower than the threshold frequency.

[1 markah / 1 mark]

- (a)(ii) Apabila keadaan di 7(a)(i) tercapai, apakah yang akan berlaku kepada elektron-elektron dalam logam?
When the condition in 7(a)(i) is achieved, what will happen to the electrons in the metal?

.....

[1 markah / 1 mark]

SULIT
 [LIHAT HALAMAN SEBELAH]

- (b) Tenaga foton yang diterima oleh elektron dalam sel suria lampu LED ialah $5.0 \times 10^{-19} \text{ J}$ manakala tenaga minimum yang diperlukan untuk membebaskan fotoelektron daripada sel suria ialah $3.2 \times 10^{-19} \text{ J}$.
Hitung tenaga kinetik maksimum fotoelektron.

The photon energy received by the electrons in the solar cell of the LED lamp is $5.0 \times 10^{-19} \text{ J}$ while the minimum energy required to release a photoelectron from the solar cell is $3.2 \times 10^{-19} \text{ J}$.

Calculate the maximum kinetic energy of the photoelectron.

[2 markah / 2 marks]

- (c) Didapati lampu LED pada Rajah 7 kurang terang pada waktu malam. Nyatakan ciri-ciri sel suria yang sesuai untuk menggantikan sel suria sedia ada.

It was found that the LED lamp in Diagram 7 is not bright enough at night. State the characteristics of a suitable solar cell to replace the existing one.

Jadual 1 menunjukkan ciri-ciri bagi tiga buah sel suria yang berbeza.

Table 1 shows the characteristics of three different solar cells.

Sel suria <i>Solar cell</i>	Luas permukaan <i>Surface area</i>	Fungsi kerja <i>Work function</i>
X	Lebih besar <i>Bigger</i>	$1.76 \times 10^{-19} \text{ J}$
Y	Lebih kecil <i>Smaller</i>	$2.40 \times 10^{-19} \text{ J}$
Z	Lebih besar <i>Bigger</i>	$2.88 \times 10^{-19} \text{ J}$

Jadual 1

Table 1

SULIT

[LIHAT HALAMAN SEBELAH]



SERTAI TELEGRAM @exercise_students

Berdasarkan Jadual 1, nyatakan ciri-ciri sel suria yang sesuai untuk menghasilkan lampu LED yang lebih terang.
Based on Table 1, state the suitable characteristics of solar cell to produce brighter LED lamp.

- (i) Luas permukaan
Surface area

.....

Sebab
Reason

.....

.....

[2 markah / 2 marks]

- (ii) Fungsi kerja
Work function

.....

Sebab
Reason

.....

.....

[2 markah / 2 marks]

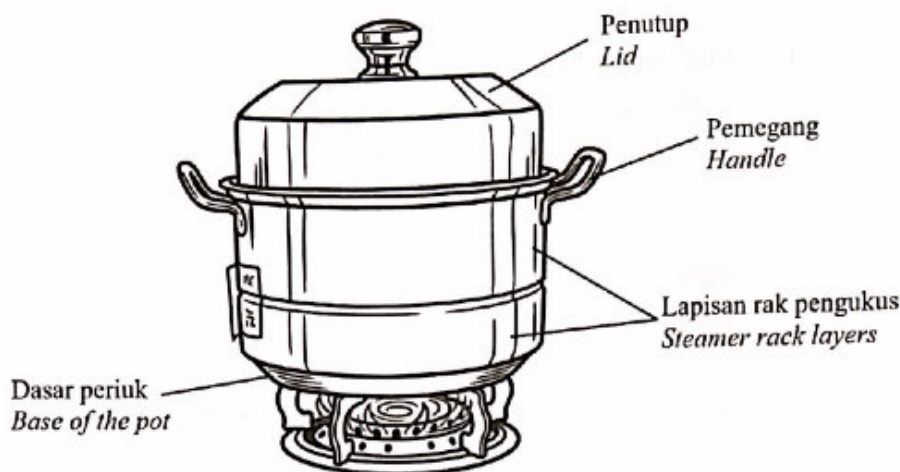
- (d) Berdasarkan jawapan anda dalam 7(c)(i) dan 7(c)(ii), tentukan sel suria yang paling sesuai.
Based on your answer in 7(c)(i) and 7(c)(ii), determine the most suitable solar cell.

.....

[1 markah / 1 mark]

- 8 Rajah 8 menunjukkan sebuah periuk pengukus yang digunakan untuk mengukus makanan.

Diagram 8 shows a steamer pot used to steam food.



Rajah 8
Diagram 8

- (a) Apakah yang dimaksudkan dengan haba?
What is meant by heat?

[1 markah / 1 mark]

- (b) Seekor ikan dimasak di dalam periuk pengukus pada Rajah 8. Sebanyak 0.5 kg air pada suhu 30°C dipanaskan sehingga mencapai 100°C . Hitungkan kuantiti tenaga haba yang diperlukan untuk meningkatkan suhu air tersebut daripada 30°C ke 100°C .
[Muatan haba tentu air, $c = 4200 \text{ J kg}^{-1} \text{ }^{\circ}\text{C}^{-1}$]
*A fish is cooked in the steamer pot in Diagram 8. 0.5 kg of water at a temperature of 30°C is heated until it reaches 100°C . Calculate the quantity of heat energy required to increase the temperature of water from 30°C to 100°C .
[Specific heat capacity of water, $c = 4200 \text{ J kg}^{-1} \text{ }^{\circ}\text{C}^{-1}$]*

[2 markah / 2 marks]

- (c) Periuk pengukus pada Rajah 8 mengambil masa yang terlalu panjang untuk mengukus makanan.

Nyatakan pengubahsuaian yang boleh dilakukan terhadap periuk pengukus tersebut supaya dapat mengukus makanan yang banyak dengan lebih cepat berdasarkan aspek-aspek berikut:

The steamer pot in Diagram 8 takes a long time to steam the food.

State the modifications that can be made to the steamer pot so that it can steam large quantities of food faster based on the following aspects:

- (i) Bahan untuk dasar periuk pengukus
Material for the base of the steamer pot

.....

Sebab
Reason

.....

[2 markah / 2 marks]

- (ii) Muatan haba tentu penutup
Specific heat capacity of the lid

.....

Sebab
Reason

.....

[2 markah / 2 marks]

- (iii) Bilangan lapisan rak pengukus
Number of steamer rack layers

.....

Sebab
Reason

.....

[2 markah / 2 marks]

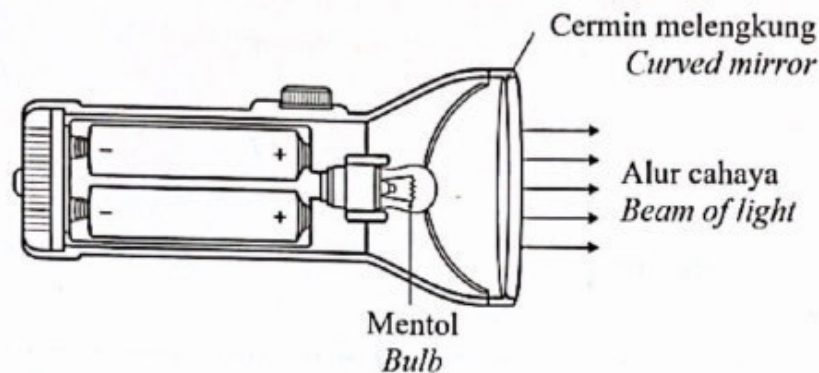
Bahagian B

[20 markah]

Bahagian ini mengandungi **dua** soalan. Jawab **satu** soalan.

- 9 Rajah 9.1 menunjukkan cermin melengkung di dalam sebuah lampu suluh. Cermin melengkung itu digunakan untuk memantulkan cahaya daripada mentol supaya menghasilkan alur cahaya yang terang ke hadapan.

Diagram 9.1 shows a curved mirror in a torchlight. The curved mirror is used to reflect light from the bulb to produce a bright beam of light forward.



Rajah 9.1
Diagram 9.1

- (a) Namakan fenomena gelombang yang digunakan oleh cermin melengkung dalam lampu suluh.

Name the wave phenomenon used by the curved mirror in the torchlight.

[1 markah/ 1 mark]

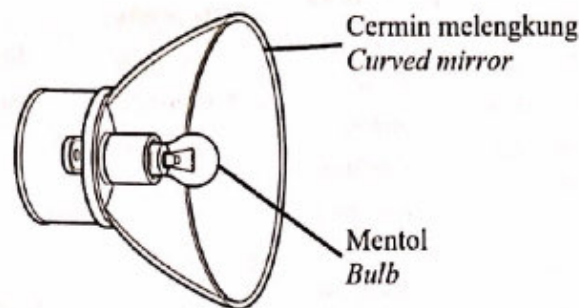
- (b) Berdasarkan fenomena yang dinamakan di 9(a), terangkan bagaimana lampu suluh menghasilkan alur cahaya yang terang ke hadapan.

Based on the phenomenon named in 9(a), explain how the torchlight produces a bright beam of light forward.

[4 markah/ 4 marks]

- (c) Rajah 9.2 menunjukkan cermin melengkung bagi sebuah lampu suluh. Jejari kelengkungan cermin itu ialah 12.5 cm. Mentol diletakkan 2.0 cm lebih jauh daripada titik fokus cermin.

Diagram 9.2 shows a curved mirror of a torchlight. The radius of curvature of the mirror is 12.5 cm. The bulb is placed 2.0 cm farther than the focal point of the mirror.



Rajah 9.2
Diagram 9.2

Hitung,
Calculate,

- (i) panjang fokus cermin melengkung.
focal length of the curved mirror.

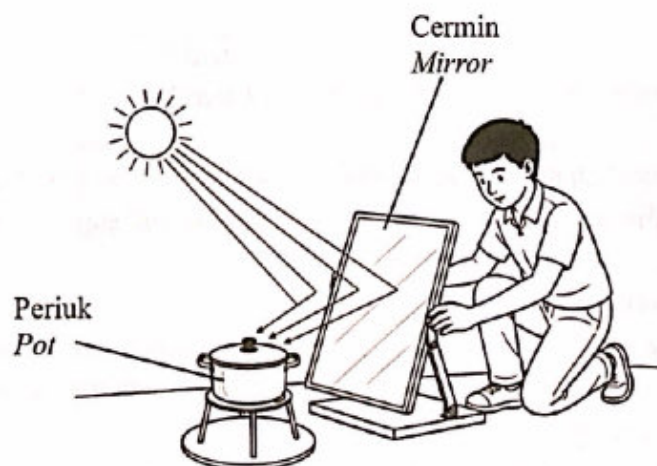
[2 markah/ 2 marks]

- (ii) jarak mentol dari cermin melengkung.
distance of the bulb from the curved mirror.

[3 markah/ 3 marks]

- (d) Rajah 9.3 menunjukkan seorang murid menyusun peralatan dapur solar untuk memasak air menggunakan sejenis cermin.

Diagram 9.3 shows a student arranging solar cooker equipment to heat water using a type of mirror.



Rajah 9.3
Diagram 9.3

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Jadual 2 menunjukkan ciri-ciri empat susunan dapur solar P, Q, R dan S.

Table 2 shows the characteristics of four solar cooker arrangements P, Q, R and S.

Susunan dapur solar <i>Solar cooker arrangement</i>	Jenis salutan permukaan cermin <i>Type of mirror surface coating</i>	Diameter cermin <i>Diameter of mirror</i>	Jenis cermin <i>Type of mirror</i>	Kedudukan periuk <i>Position of pot</i>
P	Salutan aluminium <i>Aluminium coating</i>	Besar <i>Large</i>	Cermin cekung <i>Concave mirror</i>	Di 2F <i>At 2F</i>
Q	Salutan aluminium <i>Aluminium coating</i>	Kecil <i>Small</i>	Cermin cembung <i>Convex mirror</i>	Di F <i>At F</i>
R	Salutan perak <i>Silver coating</i>	Besar <i>Large</i>	Cermin cekung <i>Concave mirror</i>	Di F <i>At F</i>
S	Salutan perak <i>Silver coating</i>	Kecil <i>Small</i>	Cermin cembung <i>Convex mirror</i>	Di 2F <i>At 2F</i>

Jadual 2

Table 2

Berdasarkan ciri-ciri susunan dapur solar dalam Jadual 2, anda dikehendaki memilih susunan dapur solar yang paling sesuai supaya air mendidih dengan cepat.

Berikan sebab-sebab bagi pilihan anda.

Based on the characteristics of the solar cooker arrangements in Table 2, you are required to choose the most suitable solar cooker arrangement so that the water boils quickly.

Give reasons for your choice.

[10 markah / 10 marks]

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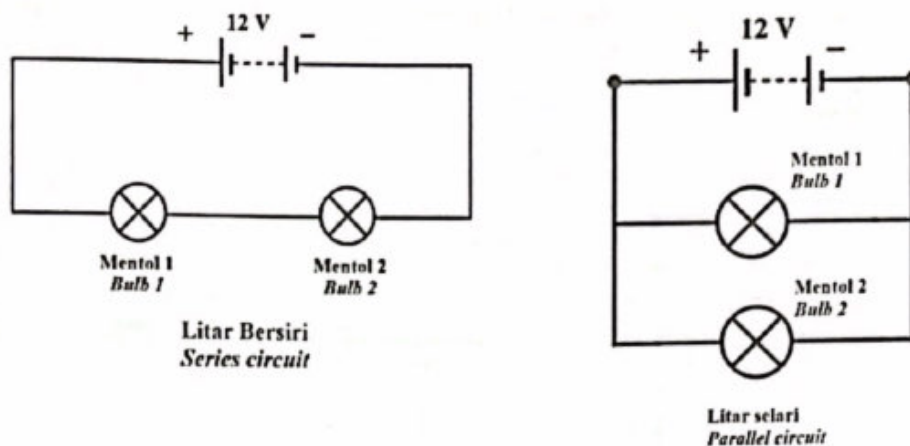
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SULIT
[LIHAT HALAMAN SEBELAH]

- 10 Rajah 10 menunjukkan dua mentol yang disambung secara bersiri dan selari kepada bateri.

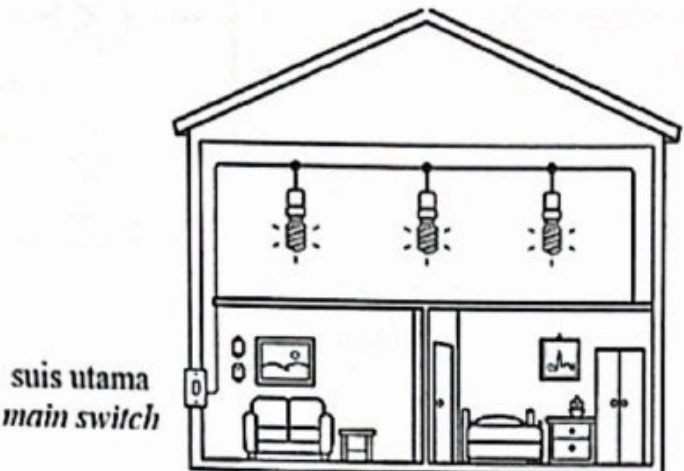
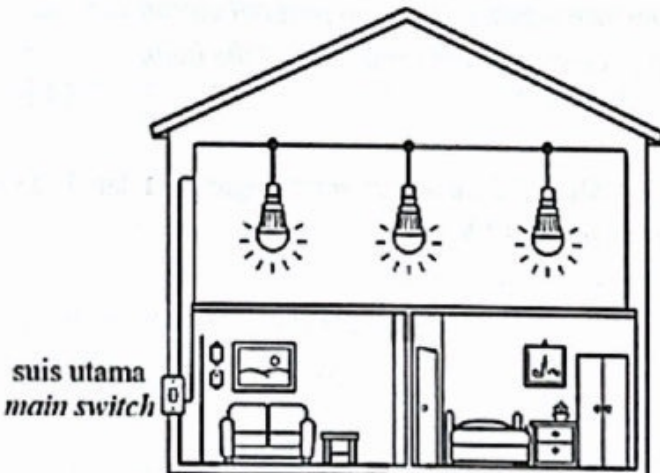
Diagram 10 shows two bulbs connected in series and in parallel to dry cells.

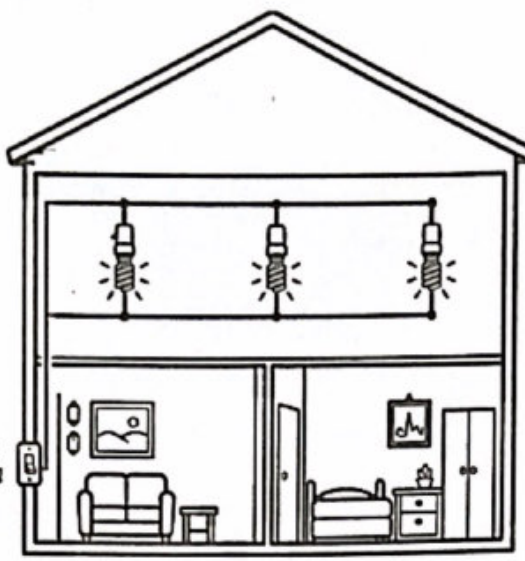
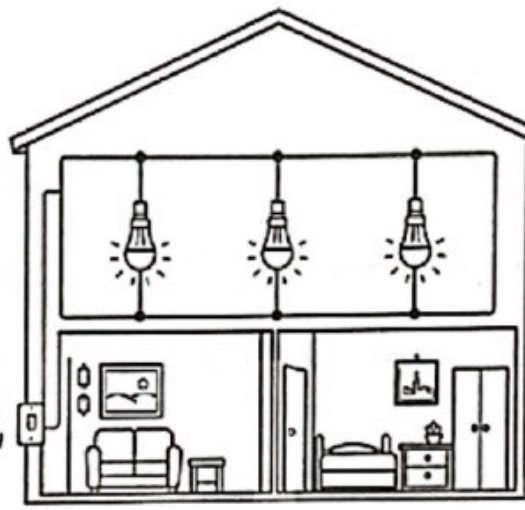


Rajah 10
Diagram 10

- (a) Nyatakan definisi arus elektrik.
State the definition of electric current.
[1 markah / 1 mark]
- (b) Terangkan dan bandingkan litar bersiri dan litar selari dari aspek arus elektrik, rintangan berkesan dan kecerahan mentol.
Explain and compare series circuit and parallel circuit in terms of electric current, effective resistance and brightness of the bulbs.
[4 markah / 4 marks]
- (c) Jika Mentol 1 dan Mentol 2 mempunyai rintangan $6\ \Omega$ dan $3\ \Omega$ masing-masing disambung kepada bateri 12 V.
Hitung:
If Bulb 1 and Bulb 2 have resistance of $6\ \Omega$ and $3\ \Omega$ respectively connected to dry cells of 12 V.
Calculate:
- (i) rintangan berkesan bagi kedua-dua litar di Rajah 10.
the effective resistance for both circuits in Diagram 10.
[2 markah / 2 marks]
- (ii) jumlah arus yang mengalir dalam setiap litar.
the sum of current flow in each circuit.
[3 markah / 3 marks]

- (d) Sebuah rumah ingin memasang sistem lampu yang lebih selamat dan menjimatkan tenaga.
A house owner wants to install a lighting system that is safer and energy efficient.

Sistem Lampu <i>Lighting System</i>	Ciri-ciri <i>Characteristics</i>
Sistem A <i>System A</i>  suis utama <i>main switch</i>	Menggunakan lampu pendafluor <i>Use fluorescent lamps</i> Kecekapan lampu adalah 20% <i>Efficiency of lamp is 20%</i> Fius pada suis utama <i>Fuse at main switch</i>
Sistem B <i>System B</i>  suis utama <i>main switch</i>	Menggunakan lampu LED <i>Use LED lamps</i> Kecekapan lampu adalah 80% <i>Efficiency of lamp is 80%</i> Tiada fius pada suis utama <i>No fuse at main switch</i>

Sistem C System C  suis utama main switch	Menggunakan lampu pendafluor Use fluorescent lamps Kecekapan lampu adalah 20% Efficiency of lamp is 20% Tiada fuis pada suis utama No fuse at main switch
Sistem D System D  suis utama main switch	Menggunakan lampu LED Use LED lamps Kecekapan lampu adalah 80% Efficiency of lamp is 80% Fius pada suis utama Fuse at main switch

Jadual 3
Table 3

Anda dikehendaki untuk menentukan sistem lampu yang paling sesuai berdasarkan ciri-ciri di Jadual 3. Berikan sebab-sebab bagi pilihan anda.
You are required to determine the most suitable lighting system based on the characteristics in Table 3. Give the reasons for your choice.

[10 markah / 10 marks]

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This image shows a full page of white paper with horizontal dotted lines, typical of primary school writing paper. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

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This image shows a full page of a handwriting practice worksheet. It consists of approximately 20 horizontal rows. Each row is defined by two parallel dashed lines, creating a series of uniform gaps for letter height. The lines are evenly spaced across the entire page, providing a guide for consistent letter formation. There is no text or other markings on the page.

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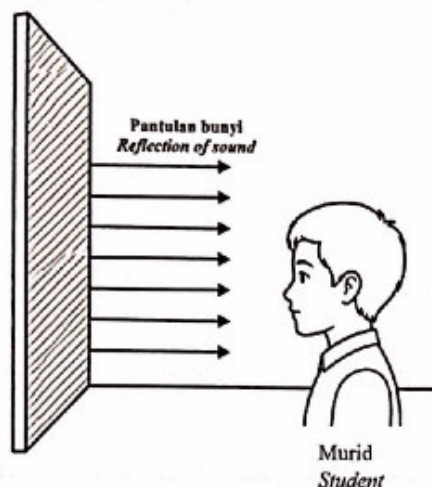
Bahagian C

[20 markah]

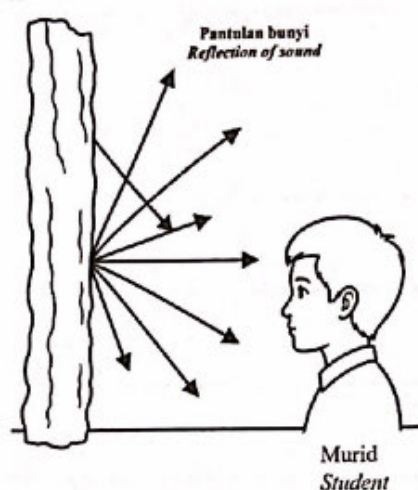
Soalan ini mesti dijawab.

- 11 Rajah 11 menunjukkan seorang murid yang sedang mendengar bunyi yang terpantul melalui dua jenis permukaan yang berbeza selepas dia menjerit ke arah dua dinding yang berbeza.

Diagram 11 shows a student listening to the reflected sound through two different types of surfaces after he shouts toward two different walls.



Rajah 11.1
Diagram 11.1



Rajah 11.2
Diagram 11.2

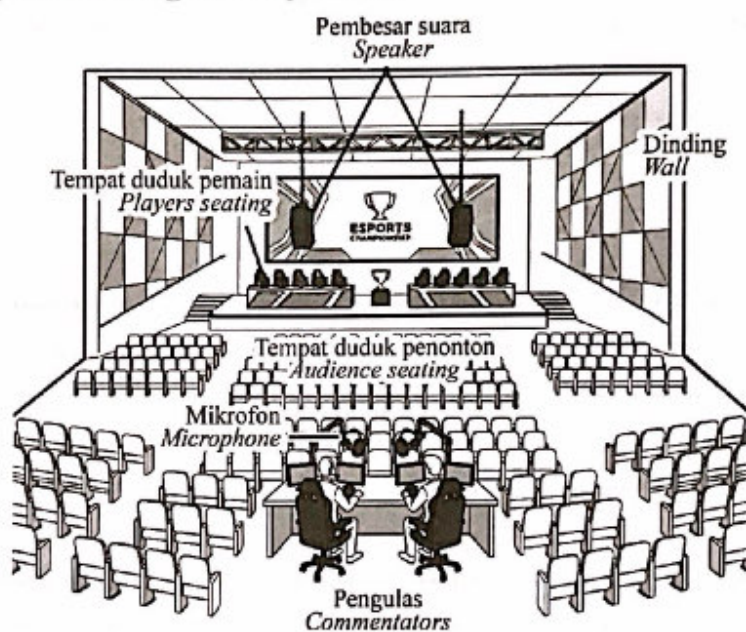
- (a) Apakah ciri gelombang bunyi yang akan berubah selepas berlakunya pantulan?
Which characteristic of sound waves will change after reflection occurs?
[1 markah / 1 mark]
- (b) Berdasarkan ciri-ciri gelombang bunyi, terangkan bagaimana murid itu dapat mendengar gelombang bunyi yang dipantulkan.
Based on the characteristics of sound waves, explain how the student can hear the reflected sound waves.
[4 markah / 4 marks]
- (c) Berdasarkan Rajah 11.1 dan 11.2, bandingkan jenis permukaan, arah pantulan gelombang bunyi dan kekuatan bunyi yang didengar.
Nyatakan hubungan antara jenis permukaan dan kekuatan bunyi yang didengar dan deduksikan hubungan antara kekuatan bunyi yang didengar dengan amplitud bunyi.
Based on Diagram 11.1 and 11.2, compare the type of surface, direction of reflection of sound waves and the loudness of sound heard. State the relationship between type of surface and loudness of sound heard and deduce the relationship between loudness of sound heard with amplitude of sound.
[5 markah / 5 marks]

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- (d) Rajah 11.3 menunjukkan sebuah arena e-sukan futuristik digunakan untuk pertandingan permainan realiti maya. Sistem audio berkuasa tinggi dipasang untuk memberi arahan taktikal kepada pemain dan menghasilkan kesan bunyi imersif semasa perlawanan. Namun, ramai penonton mengadu suara pengulas dan arahan ketua pasukan tidak dapat didengar dengan jelas kerana berlaku gema, gangguan bunyi dan bunyi siulan yang kuat semasa pertandingan berlangsung.

Diagram 11.3 shows a futuristic e-sports arena used for virtual reality gaming tournaments. A high-powered audio system is installed to deliver tactical instructions to players and produce immersive sound effects during matches. However, many spectators complain that the commentators' voices and team instructions cannot be heard clearly due to echoes, sound interference and loud screeching noises during the competition.



Rajah 11.3
Diagram 11.3

Sebagai jurutera akustik profesional, anda dikehendaki mengubah suai reka bentuk sistem audio arena tersebut meliputi kedudukan pembesar suara, kedudukan mikrofon, bahan penutup dinding, jarak antara dua pembesar suara serta beberapa ciri lain yang sesuai bagi menghasilkan kualiti audio yang lebih jelas dan stabil semasa pertandingan.

As a professional acoustic engineer, you are required to modify the arena audio system design including the position of loudspeakers, the position of microphones, wall covering material, the distance between two loudspeakers and several other suitable features to produce clearer and more stable audio quality during the tournament.

[10 markah / 10 marks]

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