

NAMA : TINGKATAN :

MODUL PENINGKATAN PRESTASI MURID TINGKATAN 5

TAHUN 2023

FIZIK

KERTAS 2

DUA JAM TIGA PULUH MINIT

JANGAN BUKA MODUL INI SEHINGGA DIBERITAHU

1. Kertas modul ini adalah dalam dwibahasa.
2. Soalan dalam bahasa Melayu mendahului soalan yang sepadan dalam bahasa Inggeris.
3. Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam bahasa Inggeris atau bahasa Melayu.
4. Anda dibenarkan menggunakan kalkulator saintifik.
5. Anda dinasihati supaya mengambil masa 90 minit untuk menjawab soalan dalam **Bahagian A**, 30 minit untuk **Bahagian B** dan 30 minit untuk **Bahagian C**.

<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			

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 $F = ma$

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 $\frac{P_1}{T_1} = \frac{P_2}{T_2}$

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 $v = \sqrt{\frac{2GM}{r}}$

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 $F = kx$

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

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

TEKANAN
PRESSURE

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

2 $P = hpg$

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

ELEKTRONIK
ELECTRONICS

1 Tenaga keupayaan elektrik, $E = eV$
Electrical potential energy, E = eV

2 Tenaga kinetik maksimum, $E = \frac{1}{2}mv^2$
Maximum kinetic energy, E = $\frac{1}{2}mv^2$

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

FIZIK NUKLEAR
NUCLEAR PHYSICS

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

2 $E = mc^2$

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

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

ELEKTRIK
ELECTRICITY

1 $E = \frac{F}{q}$

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

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

4 $V = IR$

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

6 $\epsilon = V + Ir$

7 $P = VI$

8 $P = \frac{E}{t}$

9 $E = \frac{V}{d}$

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 $hf = W + \frac{1}{2}mv^2 \text{ maks}$

8 $W = hf_0$

9 $g = 9.81 \text{ m s}^{-2} @ 9.81 \text{ N kg}^{-1}$

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

11 $h = 6.63 \times 10^{-34} \text{ J s}$

KEELEKTROMAGNETAN
ELETROMAGNETISM

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

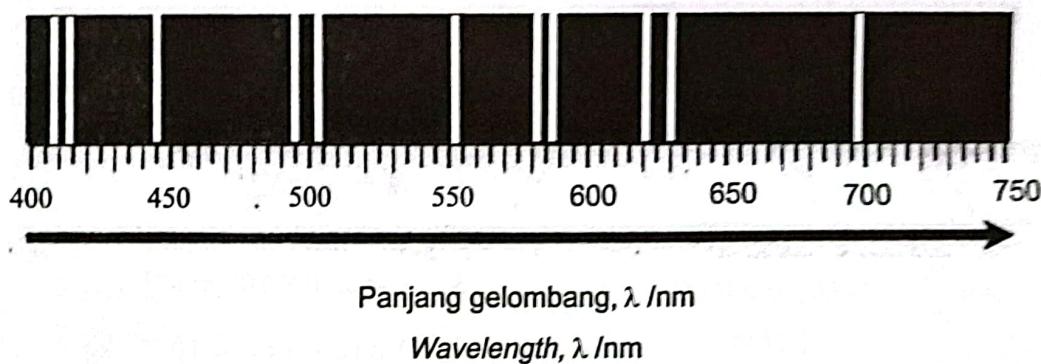
2 $\eta = \frac{\text{Kuasa output}}{\text{Kuasa input}} \times 100\%$

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

Bahagian A**[60 markah]****Jawab semua soalan.**

- 1 Rajah 1 menunjukkan satu spektrum gelombang elektromagnet.

Diagram 1 shows an electromagnetic wave spectrum.



Rajah 1
Diagram 1

- (a) Tandakan (✓) untuk jawapan yang betul dalam kotak yang disediakan.

Tick (✓) for the correct answer in the box provided.

Jenis spektrum yang ditunjukkan dalam Rajah 1 adalah

The type of spectrum shown in Diagram 1 is

spektrum garis

line spectrum

spektrum selanjar

continuous spectrum

[1 markah]

[1 mark]

- (b) Nyatakan bagaimana spektrum dalam 1(a) terhasil.

State how the spectrum in 1(a) is produced.

.....
.....

[1 markah]

[1 mark]

- (c) Menurut Teori Fizik Kuantum, tenaga cahaya wujud dalam bentuk foton.

Based on Quantum Physics Theory, light energy exists in the form of photon.

- (i) Apakah yang dimaksudkan dengan foton?

What is the meaning of photon?

.....
.....

[1 markah]

[1 mark]

- (ii) Apakah yang berlaku kepada tenaga foton sekiranya frekuensi gelombang cahaya berkurang?

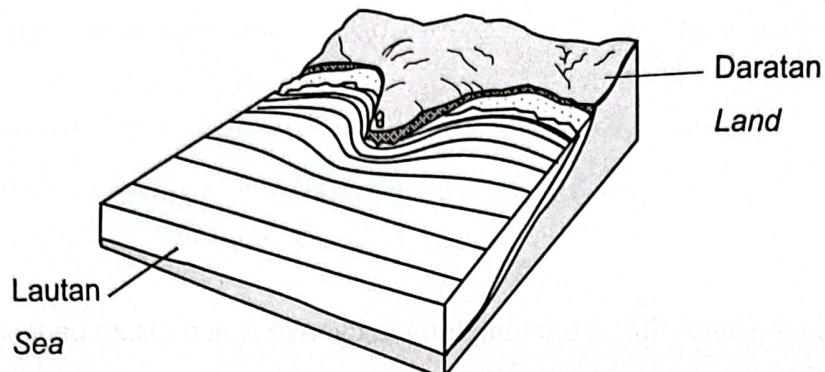
What happens to the photon energy if the frequency of the light wave decreased?

.....
.....

[1 markah]

[1 mark]

- 2 Rajah 2.1 menunjukkan pembiasan gelombang air apabila mendekati pantai.
Diagram 2.1 shows the refraction of water waves when approaching the beach.



Rajah 2.1

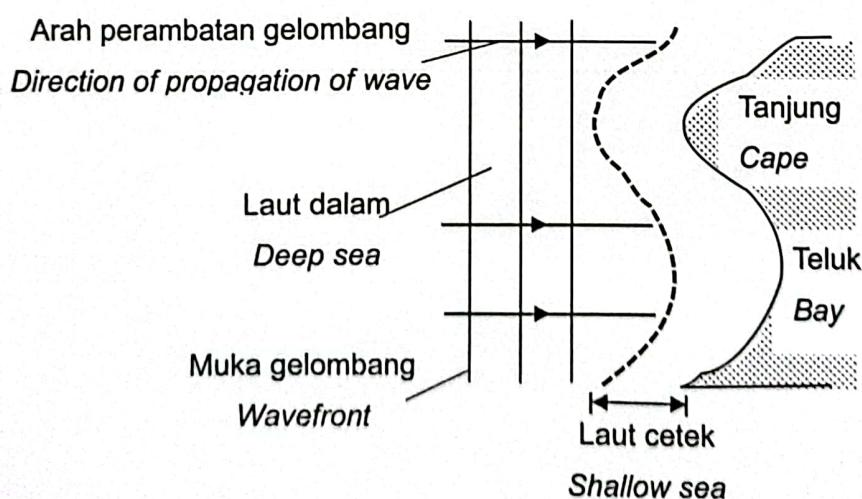
Diagram 2.1

- (a) Apakah maksud pembiasan gelombang?
What is the meaning of refraction of waves?

..... [1 markah]

..... [1 mark]

- (b) Rajah 2.2 menunjukkan perambatan gelombang air dari kawasan laut dalam.
Diagram 2.2 shows the propagation of water wave from the deep sea region.



Rajah 2.2

Diagram 2.2

Pada Rajah 2.2,

On Diagram 2.2,

- (i) lengkapkan arah perambatan gelombang air di laut cetek.

complete the direction of propagation of water wave in the shallow sea.

[1 markah]

[1 mark]

- (ii) lukiskan muka gelombang bagi gelombang air di laut cetek.

draw the wavefronts of the water waves in the shallow sea.

[1 markah]

[1 mark]

- (c) Laju gelombang air di laut cetek dan laut dalam masing-masing ialah 4.0 m s^{-1} dan 9.0 m s^{-1} . Panjang gelombang di laut dalam ialah 5.0 m.

Hitungkan panjang gelombang di laut cetek.

The speed of water waves in shallow sea and deep sea are 4.0 m s^{-1} and 9.0 m s^{-1} respectively. The wavelength in the deep sea is 5.0 m.

Calculate the wavelength in the shallow sea.

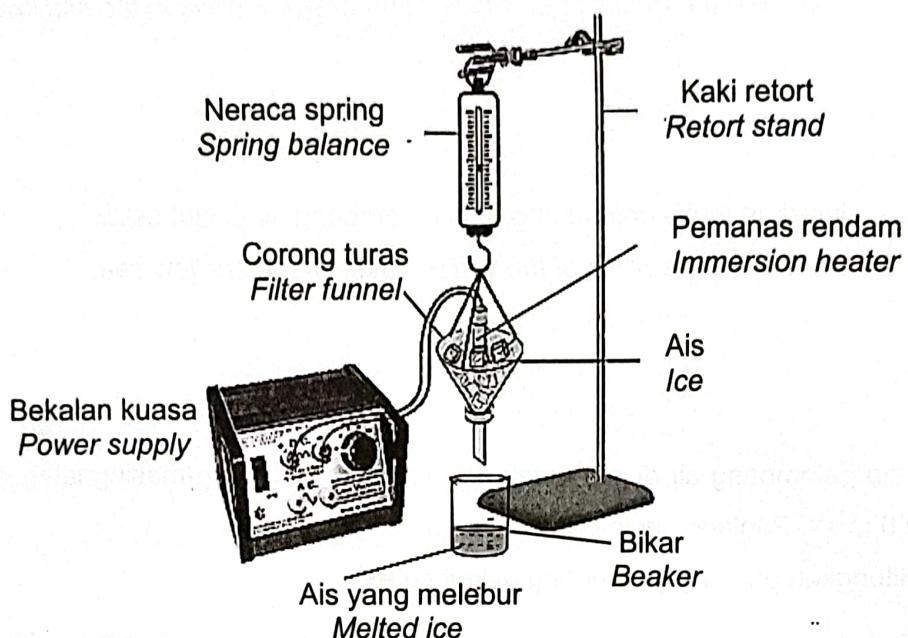
[2 markah]

[2 marks]

- 3 Rajah 3.1 menunjukkan 0.6 kg ais sedang dipanaskan oleh sebuah pemanas rendam 1000 W. Haba pendam tentu pelakuran bagi ais ialah $334\ 000\ \text{J kg}^{-1}$.

Diagram 3.1 shows 0.6 kg of ice is heated using a 1000 W immersion heater.

Specific latent heat of fusion of ice is $334\ 000\ \text{J kg}^{-1}$.

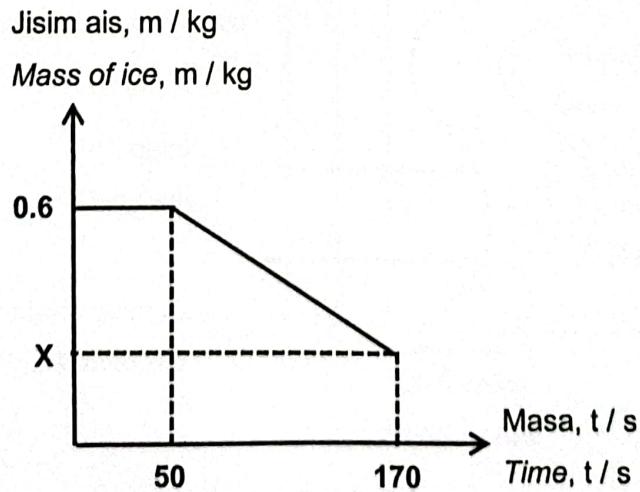


Rajah 3.1

Diagram 3.1

Rajah 3.2 menunjukkan graf jisim ais, m, berubah dengan masa, t ketika pemanasan.

Diagram 3.2 shows a graph of mass of ice, m, change with time, t during heating.



Rajah 3.2

Diagram 3.2

- (a) Apakah yang dimaksudkan dengan haba pendam tentu pelakuran?

What is the meaning of specific latent heat of fusion?

.....

[1 markah]

[1 mark]

- (b) Berdasarkan Rajah 3.2,

Based on Diagram 3.2,

- (i) hitungkan kuantiti haba yang diserap oleh ais ketika peleburan.

Andaikan tiada haba terbebas ke persekitaran.

calculate the quantity of heat absorbed by the ice during melting.

Assume no heat released to the surrounding.



[2 markah]

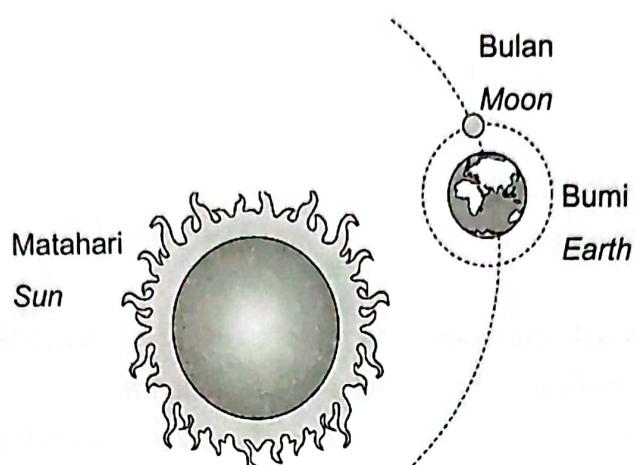
[2 marks]

- (ii) tentukan nilai X.

determine the value of X.

- 4 Rajah 4.1 menunjukkan kedudukan Matahari, Bumi dan Bulan.

Diagram 4.1 shows the position of the Sun, Earth and Moon.



Rajah 4.1

Diagram 4.1

- (a) Nyatakan Hukum Kegratitian Semesta Newton.

State the Newton's Universal Law of Gravitation.

.....
.....

[1 markah]

[1 mark]

(b) Diberikan

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

$$\text{Jisim Matahari} = 1.99 \times 10^{30} \text{ kg}$$

$$\text{Jisim Bumi} = 5.97 \times 10^{24} \text{ kg}$$

$$\text{Jejari Bumi} = 6.37 \times 10^6 \text{ m}$$

$$\text{Jarak di antara pusat Matahari dan pusat Bumi} = 1.5 \times 10^{11} \text{ m}$$

Given

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

$$\text{Mass of the Sun} = 1.99 \times 10^{30} \text{ kg}$$

$$\text{Mass of the Earth} = 5.97 \times 10^{24} \text{ kg}$$

$$\text{Earth radius} = 6.37 \times 10^6 \text{ m}$$

$$\text{Distance between the centre of the Sun and the centre of the Earth} = 1.5 \times 10^{11} \text{ m}$$

Hitungkan daya graviti antara Bumi dan Matahari.

Calculate the gravitational force between the Earth and the Sun.

[2 markah]

[2 marks]

(c) .

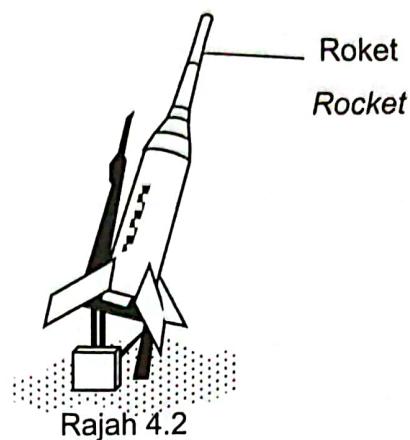


Diagram 4.2

Rajah 4.2 menunjukkan sebuah roket berada di tapak pelancaran.

Diagram 4.2 shows a rocket at a launch site.

- (i) Roket yang berada di tapak pelancaran mengalami daya graviti 5.0×10^5 N. Hitungkan jisim roket.

The rocket at the launch site experiences gravitational force of 5.0×10^5 N.

Calculate the mass of the rocket.

[3 markah]

[3 marks]

- (ii) Jika roket berada 100 km dari permukaan Bumi, apakah perubahan terhadap daya graviti yang bertindak ke atas roket tersebut?

If the rocket is 100 km from the Earth's surface, what is the change of gravitational force acted on the rocket?

.....
[1 markah]

[1 mark]

- (d) Mengikut Hukum Kegratitian Semesta Newton, dua orang di permukaan Bumi akan mengalami daya graviti.

Terangkan mengapa kesan daya tersebut tidak dirasai?

According to Newton's Universal Law of Gravitation, two persons on the surface of the Earth experience the gravitational force.

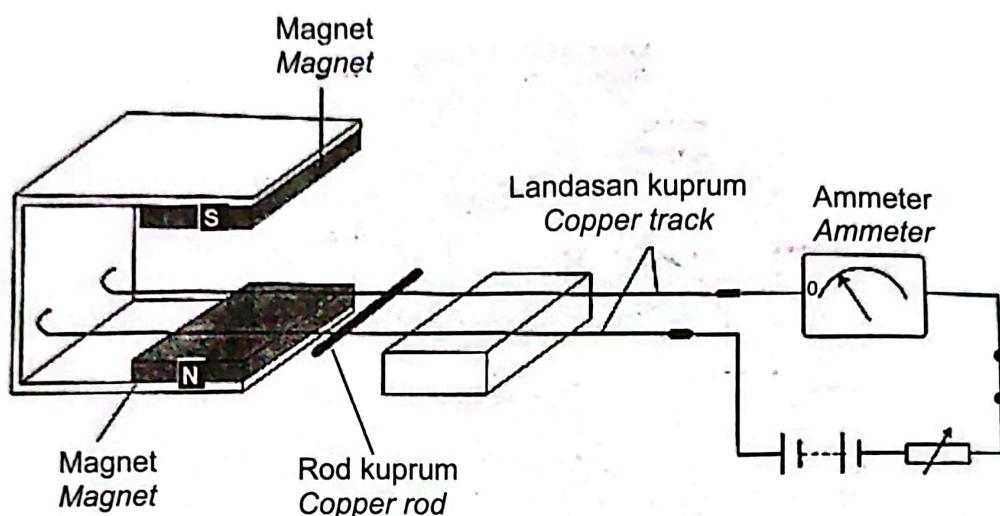
Explain why the effect of the force is not felt?

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

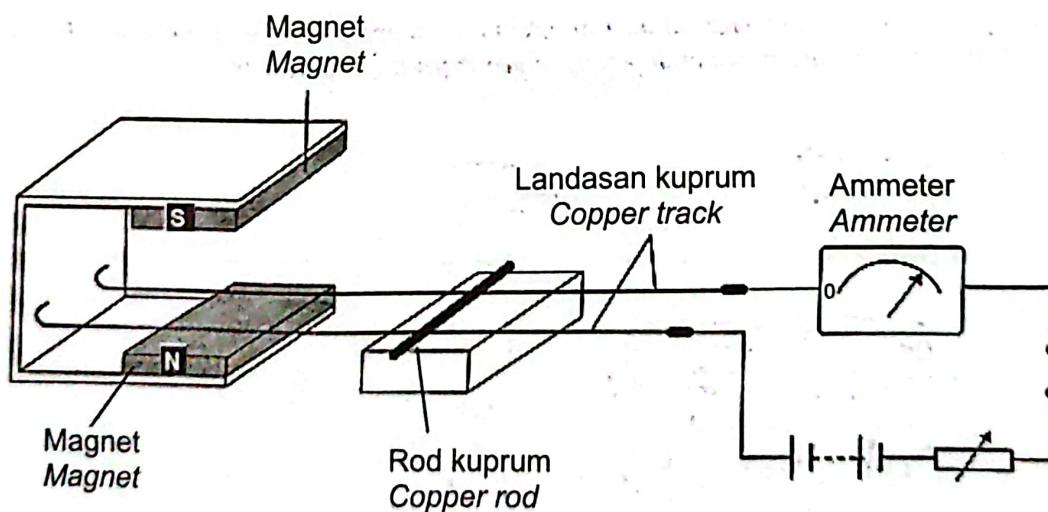
[2 markah]

[2 marks]

- 5 Rajah 5.1 dan Rajah 5.2 menunjukkan susunan radas suatu eksperimen untuk mengkaji hubungan antara arus dan daya yang bertindak pada suatu konduktor apabila suis ditutup. *Diagram 5.1 and Diagram 5.2 shows the arrangement of the apparatus in an experiment to study the relationship between the current and the force acting on a conductor when the switch is closed.*



Rajah 5.1
Diagram 5.1



Rajah 5.2
Diagram 5.2

- (a) Namakan petua yang digunakan untuk menentukan arah daya yang bertindak pada konduktor.

Name the rule used to determine the direction of force acted on the conductor.

.....

[1 markah]

[1 mark]

- (b) Perhatikan Rajah 5.1 dan 5.2. Bandingkan

Observe Diagram 5.1 and Diagram 5.2. Compare

- (i) bacaan ammeter.

the ammeter reading.

.....

[1 markah]

[1 mark]

- (ii) jarak gerakan rod kuprum.

the distance travelled by the copper rod.

.....

[1 markah]

[1 mark]

- (iii) kekuatan medan magnet bagi magnet kekal.

the magnetic field strength of the permanent magnet.

.....

[1 markah]

[1 mark]

- (c) Berdasarkan jawapan anda dalam 5(b), nyatakan hubungan antara magnitud arus dengan jarak gerakan rod kuprum.

Based on your answer in 5(b), state the relationship between the magnitude of current and the distance travelled by the copper rod.

.....

.....

[1 markah]

[1 mark]

- (d) Seterusnya, deduksikan hubungan antara magnitud arus dengan daya magnet yang dihasilkan.

Hence, deduce the relationship between the magnitude of the current and the magnetic force produced.

.....
.....

[1 markah]

[1 mark]

- (e) Apakah yang akan berlaku kepada jarak gerakan rod kuprum jika magnet yang lebih kuat digunakan?

What will happen to the distance travelled by the copper rod if a stronger magnet is used?

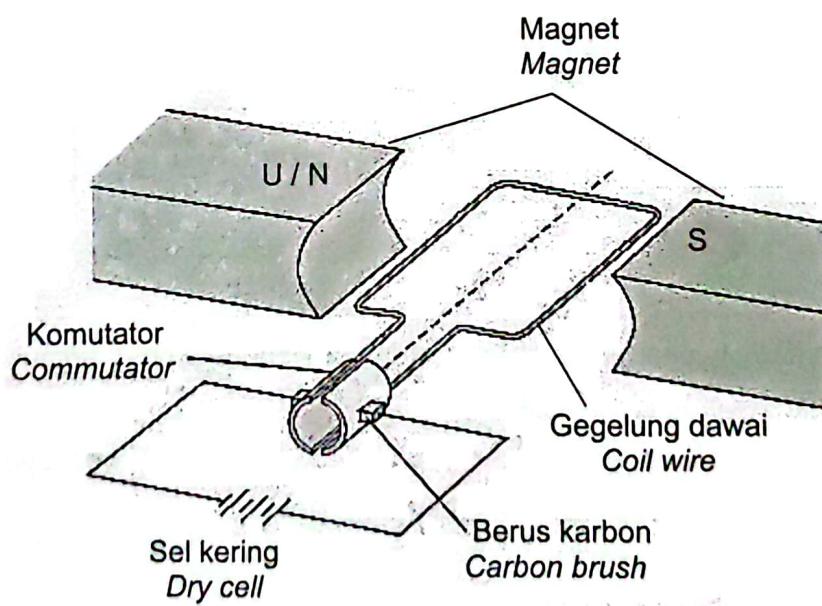
.....
.....

[1 markah]

[1 mark]

- (f) Rajah 5.3 menunjukkan struktur ringkas sebuah motor arus terus.

Diagram 5.3 shows a simple structure of a direct current motor.



Rajah 5.3

Diagram 5.3

Pada Rajah 5.3, tandakan

On Diagram 5.3, mark

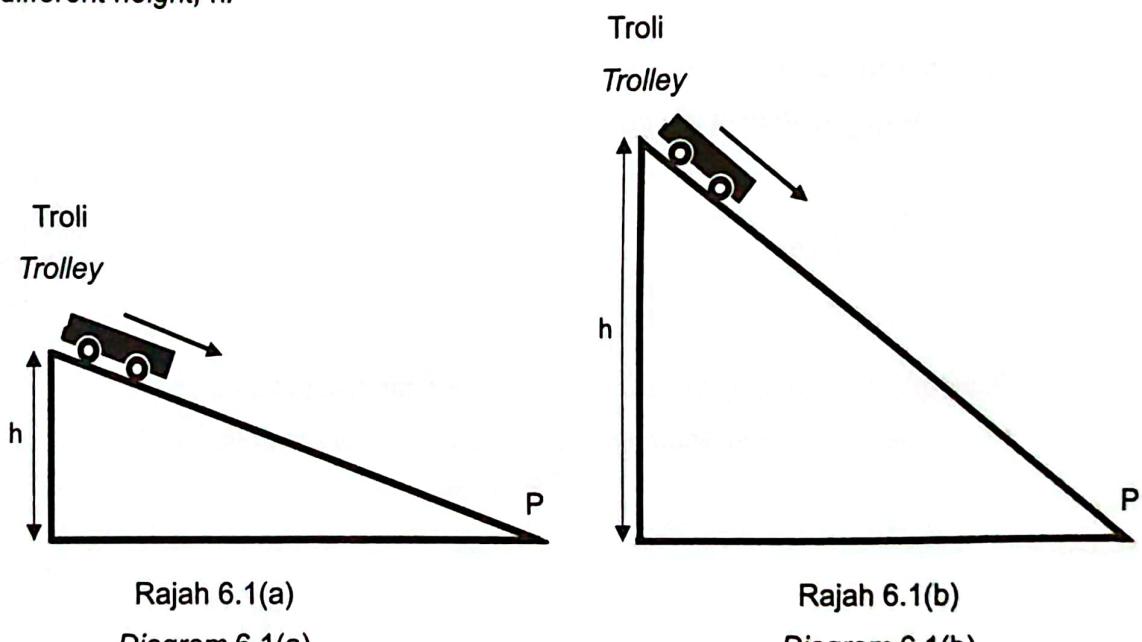
- (i) arah aliran arus pada gegelung dawai.
the direction of the current flow in the coiled wire.
- (ii) arah gerakan gegelung dawai.
the direction of motion of the coiled wire.

[2 markah]

[2 marks]

- 6 Rajah 6.1(a) dan Rajah 6.1(b) menunjukkan sebuah troli yang bergerak menuruni satah condong dengan ketinggian, h yang berbeza.

Diagram 6.1(a) and Diagram 6.1(b) show a trolley moves down on inclined plane with different height, h .



- (a) Apakah yang dimaksudkan dengan momentum?

What is the meaning of momentum?

[1 markah]

[1 mark]

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

- (i) ketinggian satah condong.
the height of the inclined plane.

.....
[1 markah]

[1 mark]

- (ii) halaju troli di P.
the velocity of the trolley at P.

.....
[1 markah]

[1 mark]

- (iii) momentum troli di P.
the momentum of the trolley at P.

.....
[1 markah]

[1 mark]

- (c) Hubungkaitkan ketinggian satah condong dengan halaju troli di P.
Relate the height of inclined plane and the velocity of the trolley at P.

.....
[1 markah]

[1 mark]

- (d) Nyatakan hubungan antara halaju troli dengan momentum.
State the relationship between the velocity of the trolley and its momentum.

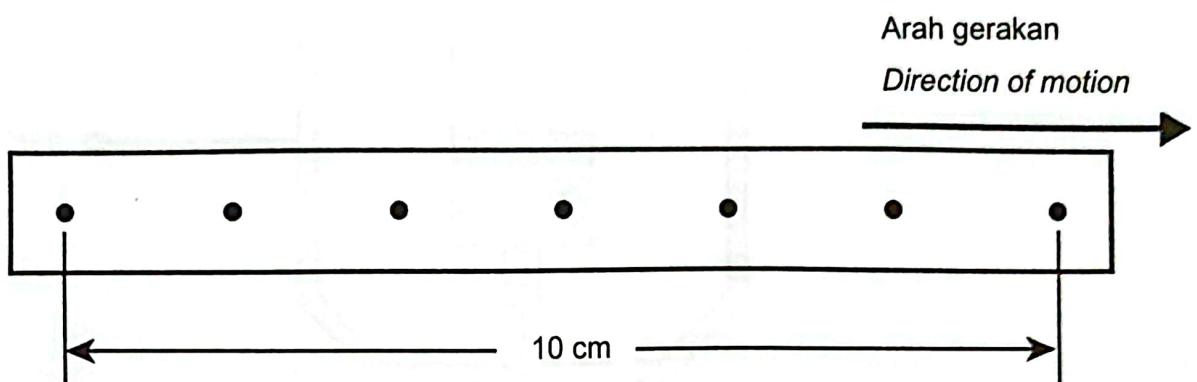
.....
[1 markah]

[1 mark]

- (e) Rajah 6.2 menunjukkan keratan pita detik bagi gerakan sebuah troli dengan jisim 4 kg. Frekuensi jangka masa detik yang digunakan ialah 50 Hz.

Diagram 6.2 shows a strip of ticker tape for a motion of a trolley with mass of 4 kg.

Frequency of the ticker timer used is 50 Hz.



Rajah 6.2

Diagram 6.2

Berdasarkan pita detik tersebut, hitungkan

Based on the ticker tape, calculate

- (i) halaju troli.

velocity of the trolley.

[2 markah]

[2 marks]

- (ii) momentum troli.

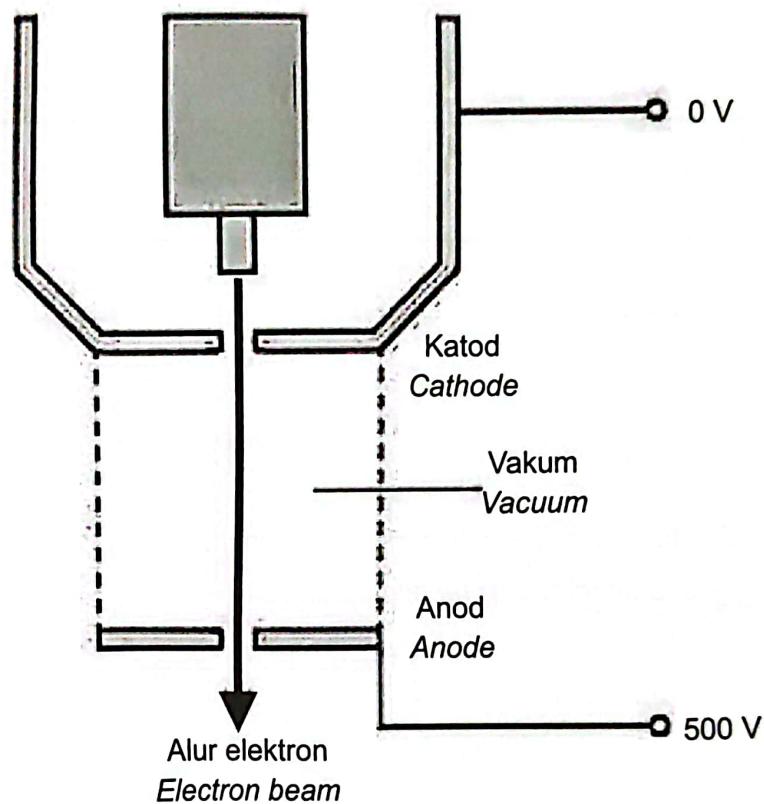
momentum of the trolley.

[1 markah]

[1 mark]

- 7 Rajah 7.1 menunjukkan alur elektron yang dipecutkan dari katod ke anod dalam ruang vakum. Beza keupayaan merentasi elektrod ialah 500 V.

Diagram 7.1 shows an electron beam that is accelerated from the cathode to the anode in a vacuum space. The potential difference across the electrodes is 500 V.



Rajah 7.1

Diagram 7.1

- (a) Nyatakan jenis gerakan alur elektron yang bergerak merentasi elektrod di dalam ruang vakum.

State the type of motion of the electron beam which moves across the electrodes in the vacuum space.

..... [1 markah]

[1 mark]

- (b) Hitung halaju maksimum elektron merentasi katod dan anod.

Calculate the maximum velocity of the electron across cathode and anode.

[Jisim elektron, $m = 9.11 \times 10^{-31}$ kg, cas satu elektron, $e = 1.6 \times 10^{-19}$ C]

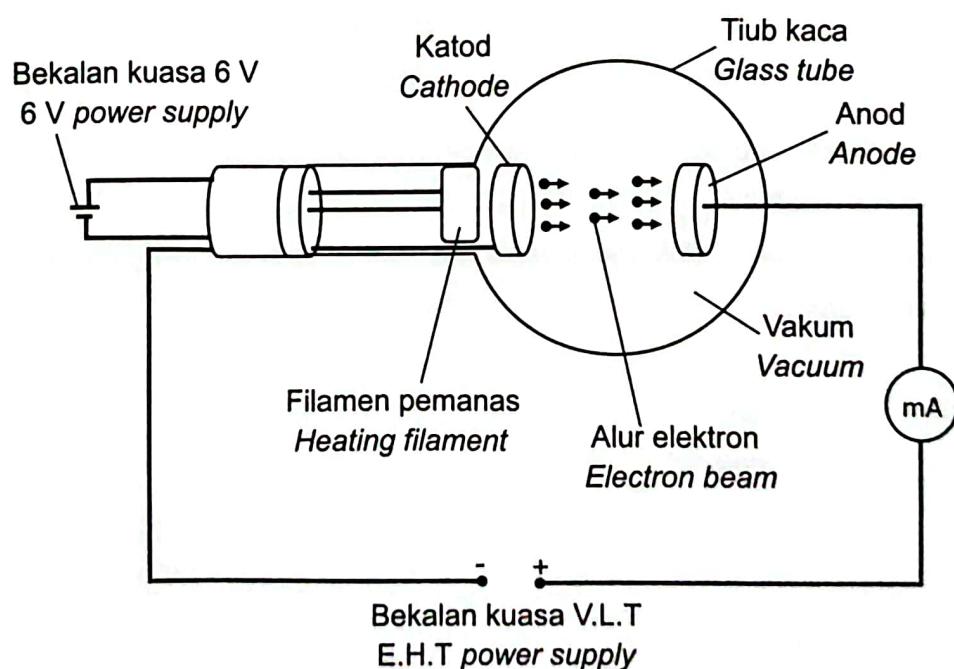
[Mass of an electron, $m = 9.11 \times 10^{-31}$ kg, charge of an electron, $e = 1.6 \times 10^{-19}$ C]

[3 markah]

[3 marks]

- (c) Rajah 7.2 menunjukkan penghasilan sinar katod dalam sebuah tiub vakum.

Diagram 7.2 shows the production of cathode rays in a vacuum tube.



Rajah 7.2

Diagram 7.2

Jadual 1 menunjukkan ciri-ciri bagi filamen pemanas P, Q dan R.

Table 1 shows the characteristics of the heating filament P, Q and R.

Filamen pemanas <i>Heating filament</i>	Jenis bahan <i>Type of material</i>	Bentuk <i>Shape</i>
P	Tungsten <i>Tungsten</i>	
Q	Kuprum <i>Copper</i>	
R	Aluminium <i>Aluminium</i>	

Jadual 1

Table 1

Berdasarkan Jadual 1, nyatakan ciri-ciri yang sesuai bagi suatu filamen pemanas.

Berikan sebab.

Based on Table 1, state the suitable characteristics of a heating filament.

Give a reason.

(i) Jenis bahan

Type of material

.....

Sebab

Reason

.....

[2 markah]

[2 marks]

(ii) Bentuk

Shape

.....

Sebab

Reason

.....

[2 markah]

[2 marks]

(d) Berdasarkan jawapan anda di 7(c)(i) dan 7(c)(ii), tentukan filamen pemanas yang paling sesuai.

Based on your answer in 7(c)(i) and 7(c)(ii), determine the most suitable heating filament.

.....

[1 markah]

[1 mark]

- 8 Rajah 8.1 menunjukkan sebuah lampu LED yang berlabel 240 V, 12 W.

Diagram 8.1 shows a LED lamp labelled 240 V, 12 W.



Rajah 8.1

Diagram 8.1

- (a) Apakah yang dimaksudkan dengan label 240 V, 12 W?

What is the meaning of label 240 V, 12 W?

..... [1 markah]

[1 mark]

- (b) Hitung tenaga elektrik yang digunakan oleh lampu LED dalam masa 5 jam.

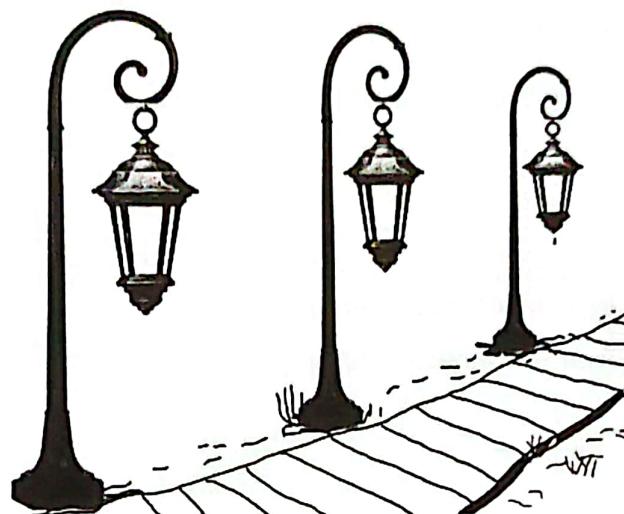
Calculate the electrical energy used by LED lamp in 5 hours.

..... [2 markah]

[2 marks]

- (c) Rajah 8.2 menunjukkan susun atur lampu yang akan dibina untuk menerangi halaman sebuah kediaman pada waktu malam.

Diagram 8.2 shows the layout of the lights that will be built to illuminate the courtyard of a residence at night.



Rajah 8.2

Diagram 8.2

Nyatakan ciri-ciri dawai yang digunakan dalam sistem pendawaian lampu supaya dapat mengurangkan penggunaan tenaga elektrik dan berfungsi dengan berkesan.

State the characteristics of the wire used in the lamp wiring system to reduce the electrical energy consumption and can function effectively.

- (i) Jenis dawai penyambung

Type of connecting wire

.....

Sebab

Reason

.....

[2 markah]

[2 marks]

(ii) Luas keratan rentas

Cross section area

.....

Sebab

Reason

.....

[2 markah]

[2 marks]

(iii) Jenis sambungan lampu

Type of connection of lamps

.....

Sebab

Reason

.....

[2 markah]

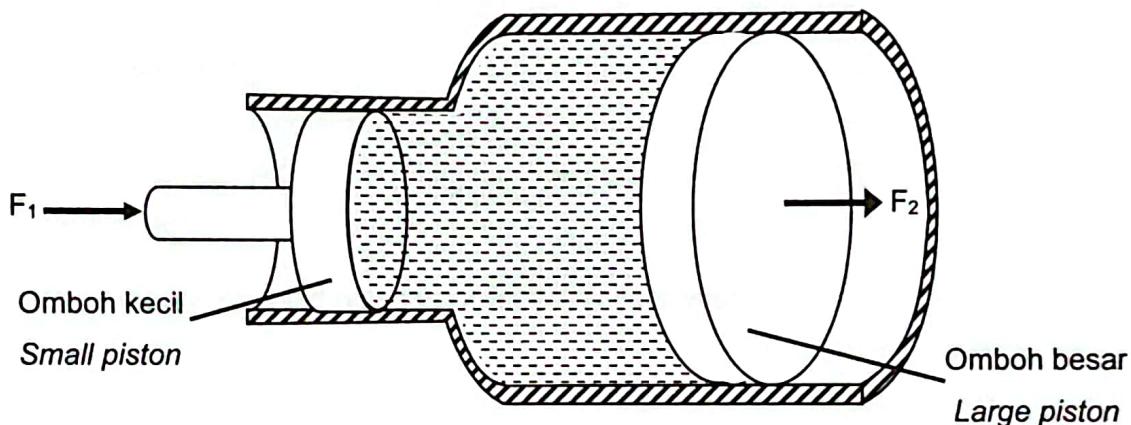
[2 marks]

Bahagian B

[20 markah]

Bahagian ini mengandungi dua soalan. Jawab satu soalan.

- 9** Rajah 9.1 menunjukkan struktur ringkas sebuah sistem hidraulik.

Diagram 9.1 shows a simple structure of a hydraulic system.

Rajah 9.1

Diagram 9.1

- (a) Nyatakan prinsip yang diaplikasikan pada sistem hidraulik itu.

State the principle applied to the hydraulic system.

[1 markah]

[1 mark]

- (b) Terangkan prinsip kerja sistem hidraulik.

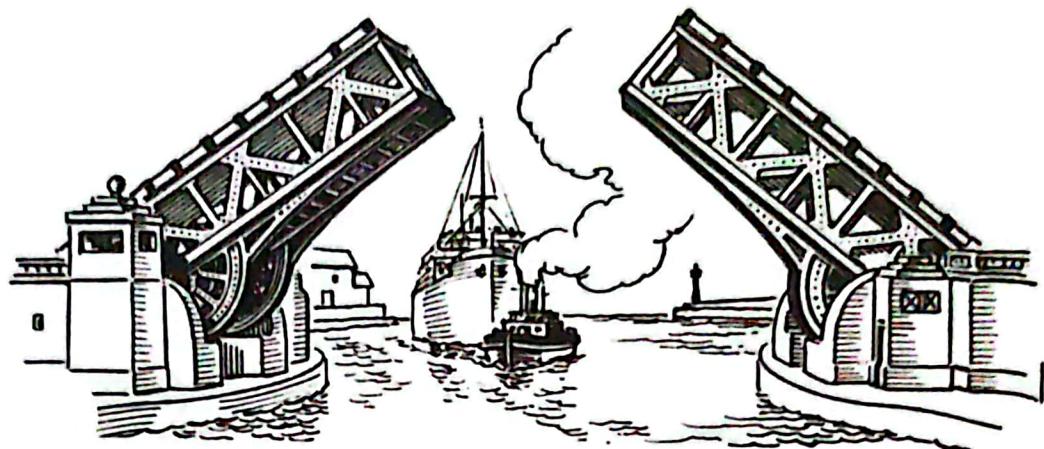
Explain the working principle of the hydraulic system.

[4 markah]

[4 marks]

- (c) Rajah 9.2 menunjukkan sebuah jambatan hidraulik.

Diagram 9.2 shows a hydraulic bridge.



Rajah 9.2

Diagram 9.2

Anda dikehendaki menyiasat ciri-ciri bagi jambatan hidraulik seperti yang ditunjukkan dalam Jadual 2.

You are required to investigate the characteristics of a hydraulic bridge as shown in Table 2.

Jambatan hidraulik <i>Hydraulic bridge</i>	Nisbah luas keratan rentas omboh besar dan omboh kecil <i>The ratio of the cross-sectional area of a large piston and a small piston</i>	Jisim jambatan <i>Mass of bridge</i>	Bendaril yang digunakan di dalam sistem hidraulik <i>Fluid used in hydraulic system</i>	Injap pelepas <i>Release valve</i>
P	1:1	Besar <i>Large</i>	Cecair <i>Liquid</i>	Tiada <i>Not exist</i>
Q	5:1	Kecil <i>Small</i>	Cecair <i>Liquid</i>	Ada <i>Exist</i>
R	1:5	Besar <i>Large</i>	Gas <i>Gas</i>	Ada <i>Exist</i>
S	3:2	Kecil <i>Small</i>	Cecair <i>Liquid</i>	Tiada <i>Not exist</i>

Jadual 2

Table 2

Terangkan kesesuaian setiap ciri jambatan hidraulik. Tentukan jambatan hidraulik yang dapat dikendalikan dengan lebih cekap.

Explain the suitability of each characteristic of hydraulic bridge. Determine the hydraulic bridge that can be operated more effective.

[10 markah]

[10 marks]

- (d) Dalam model jambatan hidraulik itu, luas keratan rentas bagi omboh besar dan omboh kecil masing-masing adalah 0.01 m^2 dan 0.002 m^2 . Daya 5 N dikenakan pada omboh kecil.

In the model of hydraulic bridge, the cross-sectional area of the large piston and the small piston are 0.01 m^2 and 0.002 m^2 respectively. A force of 5 N is applied to the small piston.

Hitung

Calculate

- (i) tekanan, P yang terhasil pada omboh kecil.
the pressure, P produced on the small piston.

[2 markah]

[2 marks]

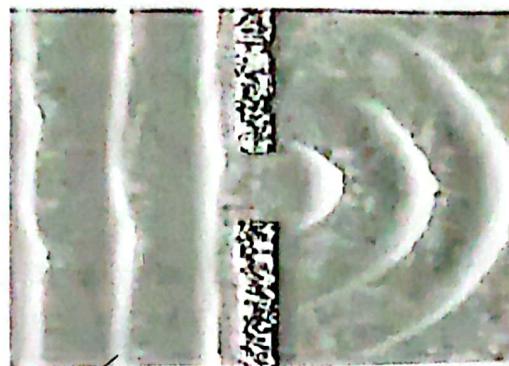
- (ii) daya, F yang dikenakan pada omboh besar.
the force, F exerted on the large piston.

[3 markah]

[3 marks]

- 10 Rajah 10.1 menunjukkan corak muka gelombang bagi gelombang air.

Diagram 10.1 shows the wavefront pattern of water wave.



Muka gelombang tuju
Incident wavefront

Penghalang
Barrier

Rajah 10.1

Diagram 10.1

- (a) Namakan fenomena yang terlibat.

Name the phenomenon involved.

[1 markah]

[1 mark]

- (b) Berdasarkan Rajah 10.1,

Based on Diagram 10.1,

- (i) apakah yang berlaku kepada amplitud dan laju gelombang tersebut selepas melalui penghalang?

what happened to the amplitude and speed of the wave after passes through the barrier?

[2 markah]

[2 marks]

- (ii) Jelaskan jawapan anda di 10(b)(i).

Explain your answer in 10(b)(i).

[2 markah]

[2 marks]

- (c) Rajah 10.2 menunjukkan menara pemancar yang digunakan dalam pemancaran gelombang elektromagnet untuk tujuan telekomunikasi.

Diagram 10.2 shows a transmission tower being used for transmission of electromagnetic waves in telecommunication.



Rajah 10.2

Diagram 10.2

Jadual 3 menunjukkan spesifikasi bagi empat sistem pemancaran S, T, U dan V yang boleh digunakan untuk memancarkan gelombang elektromagnet dalam telekomunikasi.

Table 3 shows the specifications of four transmitting systems, S, T, U and V, that can be used for transmitting electromagnetic waves in telecommunication.

Sistem pemancaran <i>Transmitting system</i>	Jenis gelombang yang dipancarkan <i>Type of waves transmitted</i>	Lokasi menara pemancar <i>Location of transmission tower</i>	Bilangan menara geganti <i>Number of relay tower</i>	Frekuensi gelombang <i>Frequency of waves</i>
S	Gelombang radio <i>Radio waves</i>	Atas bukit <i>Hilltops</i>	Banyak <i>More</i>	Rendah <i>Low</i>
T	Gelombang mikro <i>Microwaves</i>	Paras laut <i>Sea level</i>	Kurang <i>Less</i>	Tinggi <i>High</i>
U	Gelombang radio <i>Radio waves</i>	Paras laut <i>Sea level</i>	Kurang <i>Less</i>	Tinggi <i>High</i>
V	Gelombang mikro <i>Microwaves</i>	Atas bukit <i>Hilltops</i>	Banyak <i>More</i>	Tinggi <i>High</i>

Jadual 3

Table 3

Kaji dan tentukan sistem pemancaran yang paling sesuai untuk meningkatkan kualiti penghantaran isyarat.

Study and determine the most suitable transmitting systems to improve the quality of transmission of signal.

- (i) Terangkan kesesuaian bagi setiap spesifikasi.

Explain the suitability for each specification.

[8 markah]

[8 marks]

- (ii) Pilih sistem yang paling sesuai. Berikan sebab untuk pilihan anda.

Choose the most suitable system. Give reason for your choice.

[2 markah]

[2 marks]

- (d) Bot nelayan yang besar menggunakan gelombang ultrasonik untuk mengesan sekumpulan ikan di bawah bot.

A large fishing boat uses ultrasonic wave to detect the location of a shoal of fish below the boat.

Laju gelombang ultrasonik $1\ 500\text{ m s}^{-1}$ ditujukan ke arah ikan, hitungkan

Ultrasonic wave of speed $1\ 500\text{ m s}^{-1}$ is directed to the fish, calculate

- (i) frekuensi gelombang itu, jika panjang gelombang ialah 3.2 cm ,
the wave frequency, if the wavelength is 3.2 cm ,

[2 markah]

[2 marks]

- (ii) kedalaman ikan, jika gema diterima selepas 73 ms .

the depth of the fish if the echo is received after 73 ms .

[3 markah]

[3 marks]

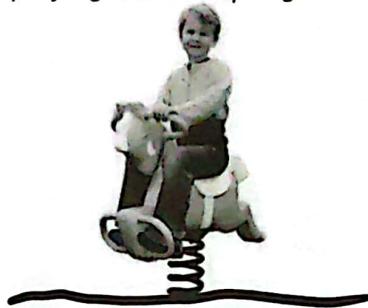
Bahagian C

[20 markah]

Soalan ini mesti dijawab.

- 11 Rajah 11.1 menunjukkan seorang budak bermain kuda berspring.

Diagram 11.1 shows a boy playing a horse spring.



Rajah 11.1

Diagram 11.1

- (a) Nyatakan hukum Hooke.

State Hooke's law.

[1 markah]

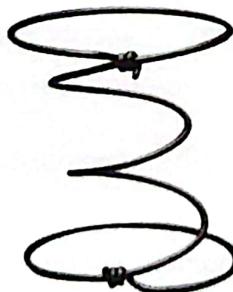
[1 mark]

- (b) Rajah 11.2(a) menunjukkan panjang asal spring itu sebelum satu beban diletakkan di atasnya.

Rajah 11.2(b) menunjukkan spring yang sama selepas beban itu dialihkan.

Diagram 11.2(a) shows the original length of a spring before a load is placed on it.

Diagram 11.2(b) shows the same spring after the load is removed.



Rajah 11.2(a)

Diagram 11.2(a)

Rajah 11.2(b)

Diagram 11.2(b)

Menggunakan konsep fizik yang betul, jelaskan perubahan keadaan spring itu.

Using the correct physics concept, explain the changes of the condition of spring.

[4 markah]

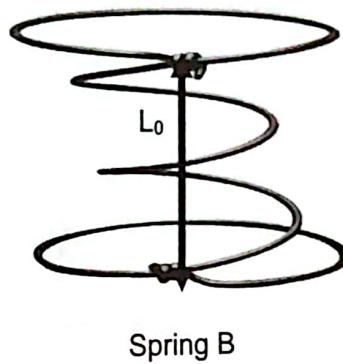
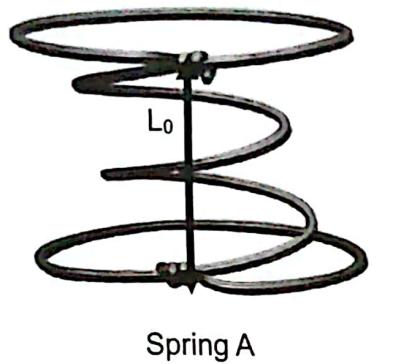
[4 marks]

(c) Rajah 11.3(a) menunjukkan panjang awal, L_0 spring A dan spring B.

Rajah 11.3(b) menunjukkan panjang spring, L_1 selepas diletakkan beban 100 N di atasnya.

Diagram 11.3(a) shows the initial length, L_0 of spring A and spring B.

Diagram 11.3(b) shows the length of the spring, L_1 after a load of 100 N is put on it.



Spring A

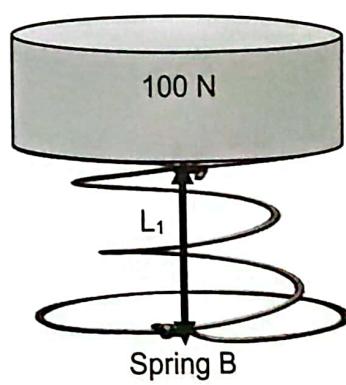
Spring B

Rajah 11.3(a)

Diagram 11.3(a)



Spring A



Spring B

Rajah 11.3(b)

Diagram 11.3(b)

Dengan menggunakan Rajah 11.3(a) dan Rajah 11.3(b), bandingkan panjang awal spring, ketebalan spring dan pemampatan spring.

Hubungkaitkan ketebalan spring dengan pemampatan spring untuk membuat kesimpulan berkaitan hubungan antara ketebalan spring dengan pemalar spring.

By using Diagram 11.3(a) and Diagram 11.3(b), compare the initial length of spring, thickness of spring and compression of spring.

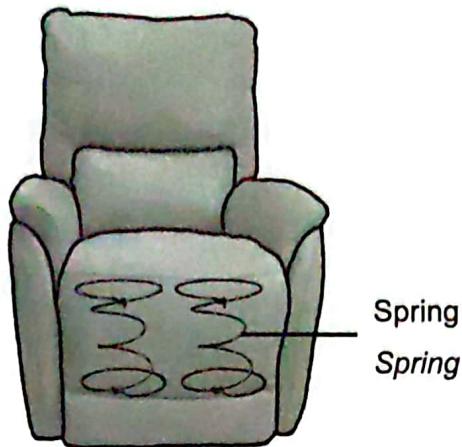
Relate the thickness of spring and the compression of spring to make a deduction regarding the relationship between the thickness of spring and the spring constant

[5 markah]

[5 marks]

- (d) Rajah 11.4 menunjukkan sebuah sofa yang menggunakan spring sebagai penyokong beban.

Diagram 11.4 shows a sofa that uses springs as a load supporter.



Rajah 11.4

Diagram 11.4

Menggunakan konsep fizik yang sesuai, cadangkan penggunaan bahan dan reka bentuk sofa yang sesuai untuk menampung seseorang yang berjisim besar dan lebih selesa.

Cadangan anda mestilah merangkumi ciri-ciri spring dan ciri tambahan.

Using appropriate physics concepts, suggest the use of materials and appropriate design of sofa that can accommodate a person with a larger mass and more comfortable.

Your proposal must include the characteristics of the spring and the additional features.

[10 markah]

[10 marks]

TAMAT