

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

The following formulae may help you to answer the questions. The symbols given are often used.

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 Daya graviti / *Gravitational force*
 $F = \frac{Gm_1m_2}{r^2}$
- 2 Pecutan graviti / *Gravitational acceleration*
 $g = \frac{GM}{r^2}$
- 3 Daya memusat / *Centripetal force*
 $F = \frac{mv^2}{r}$
- 4 $a = \frac{v^2}{r}$
- 5 $v = \frac{2\pi r}{T}$
- 6 $\frac{T_1^2}{T_2^2} = \frac{r_1^3}{r_2^3}$
- 7 $v = \sqrt{\frac{GM}{r}}$
- 8 $u = -\frac{GMm}{r}$
- 9 Halaju lepas / *Escape velocity*
 $v = \sqrt{\frac{2GM}{r}}$
- 10 $g = 9.81 \text{ m s}^{-2}$ @ 9.81 N kg^{-1}
- 11 Pemalar graviti / *Gravitational constant*
 $G = 6.67 \times 10^{-11} \text{ N m}^2 \text{ kg}^{-2}$

HABA
HEAT

- 1 Haba / *Heat*, $Q = mc\Delta\theta$
- 2 Haba / *Heat*, $Q = m\ell$
- 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 OPTIC

- 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, $m = \frac{h_i}{h_o} = \frac{v}{u}$
Linear magnification, $m = \frac{h_i}{h_o} = \frac{v}{u}$

DAYA DAN GERAKAN II
FORCE AND MOTION II

1 $F = kx$

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

TEKANAN
PRESSURE

1 Tekanan / Pressure, $P = \frac{F}{A}$

2 Tekanan cecair / Liquid pressure, $P = h\rho g$

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

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 $\varepsilon = V + Ir$

7 $P = VI$

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

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

ELEKTROMAGNET
ELECTROMAGNETISM

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

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

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

ELEKTRONIK
ELECTRONICS

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

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

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

FIZIK NUKLEAR
NUCLEAR PHYSICS

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

2 $E = mc^2$

3 $c = 3.0 \times 10^8 \text{ m s}^{-1}$

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

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

8 $W = hf_0$

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

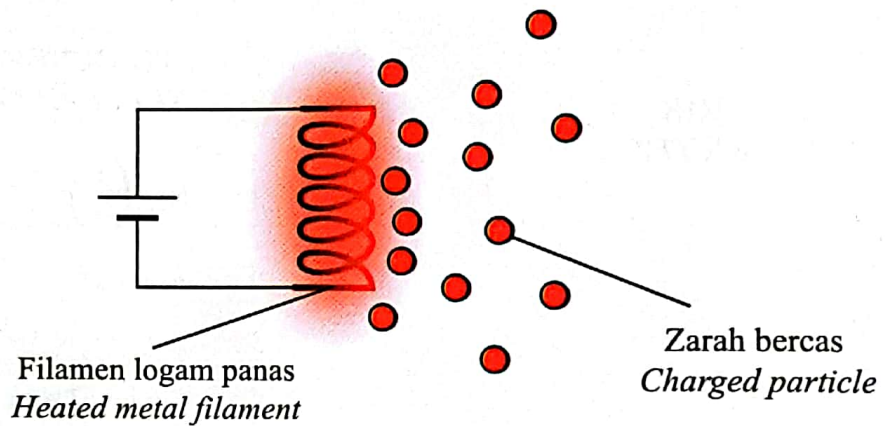
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Bahagian A
Section A

[60 markah]
[60 marks]

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

- 1 Rajah 1 menunjukkan satu proses di mana zarah bercas dibebaskan daripada permukaan filamen logam yang panas.
Diagram 1 shows a process where charged particles are released from the surface of a heated metal filament.



Rajah 1
Diagram 1

- (a) Namakan proses tersebut.
Name the process.

1(a)

1

[1 markah]
[1 mark]

- (b) Lengkapkan ayat berikut dengan menandakan (✓) jawapan yang betul.
Complete the following sentence by ticking (✓) the correct answer.

Zarah bercas yang digambarkan adalah
The charged particles illustrated are

proton
protons

elektron
electrons

1(b)

1

[1 markah]
[1 mark]

(c) Apakah yang akan berlaku kepada bilangan zarah bercas yang dibebaskan jika bekalan kuasa ditingkatkan?

What will happen to the number of charged particles released if the power supply is increased?

.....

[1 markah]

[1 mark]

1(c)

1

(d) Satu pancaran zarah berhalaju tinggi terhasil apabila bekalan voltan lampau tinggi (V.L.T.) disambungkan merentasi filamen dalam Rajah 1.

Namakan pancaran yang terhasil.

A ray of high velocity particles is produced when an extra high tension (E.H.T.) power supply is connected across the filament in Diagram 1.

Name the ray produced.

.....

[1 markah]

[1 mark]

1(d)

1

Total
A1

4

Tempoh orbit, T dan jejari orbit, R bagi Bumi dan Marikh diberi dalam Jadual 2.
The orbital period, T and orbital radius, R for Earth and Mars is given in Table 2.

Planet Planet	Tempoh orbit, T Orbital period, T (s)	Jejari orbit, R Orbital radius, R (m)	$\frac{T^2}{R^3} \left(\frac{s^2}{m^3} \right)$
Bumi Earth	3.16×10^7	1.50×10^{11}	2.98×10^{-19}
Marikh Mars	5.93×10^7	2.28×10^{11}	2.98×10^{-19}

Jadual 2
Table 2

- (a) Bandingkan nisbah $\frac{T^2}{R^3}$ untuk Bumi dan Marikh.

Compare the ratio of $\frac{T^2}{R^3}$ for Earth and Mars.

2(a)

	1
--	---

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

- (b) Nyatakan hukum fizik berkaitan dengan planet yang menerangkan jawapan di 2(a).

State the law of physics related to planets that explains the answer in 2(a).

2(b)

	1
--	---

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

- (c) Musytari adalah planet kelima dalam sistem suria. Diberi bahawa jejari orbit, bagi Musytari adalah 5.2 kali lebih besar daripada jejari orbit Bumi, hitungkan
- Jupiter is the fifth planet in the solar system. Given that the orbital radius of Jupiter is 5.2 times larger than Earth's orbital radius, calculate*

- (i) jejari orbitnya.
its orbital radius.

[1 markah]
[1 mark]

2(c)(i)

	1
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- (ii) tempoh orbitnya.
its orbital period.

[2 markah]
[2 marks]

2(c)(ii)

	2
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Total
A2

	5
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Untuk
Kegunaan
Pemeriksa

3

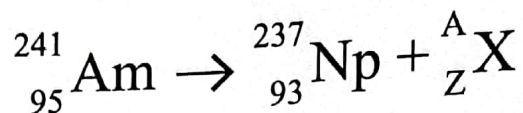
Nukleus americium-241 mengalami pereputan radioaktif untuk menjadi nukleus neptunium-237 dengan memancarkan satu zarah. Rajah 3 menunjukkan persamaan yang menerangkan reputan radioaktif itu.

Simbol A_ZX mewakili zarah yang dipancarkan.

The nucleus of americium-241 undergoes radioactive decay to become the nucleus of neptunium-237 by emitting a single particle.

Diagram 3 shows the equation that describes the radioactive decay.

The symbol A_ZX represents the particle emitted.



Rajah 3
Diagram 3

- (a) Apakah yang dimaksudkan dengan reputan radioaktif?

What is meant by radioactive decay?

3(a)

	1
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.....

.....

[1 markah]

[1 mark]

- (b) Berdasarkan Rajah 3,
Based on Diagram 3,

- (i) tentukan nilai A dan Z.
determine the values of A and Z.

3(b)(i)

	2
--	---

[2 markah]

[2 marks]

- (ii) apakah zarah yang dipancarkan?
what is the particle emitted?

3(b)(ii)

	1
--	---

.....

[1 markah]

[1 mark]

- (c) Isotop neptunium-239 mempunyai separuh hayat selama 2 hari. Jika 2.0 g neptunium dihasilkan pada hari Rabu, berapakah baki jisim neptunium pada hari Khamis minggu berikutnya?

Isotope neptunium-239 has a half-life of 2 days. If 2.0 g of neptunium is produced on Wednesday, what is the remaining mass of neptunium on Thursday of the following week?

[2 markah]
[2 marks]

3(c)

2

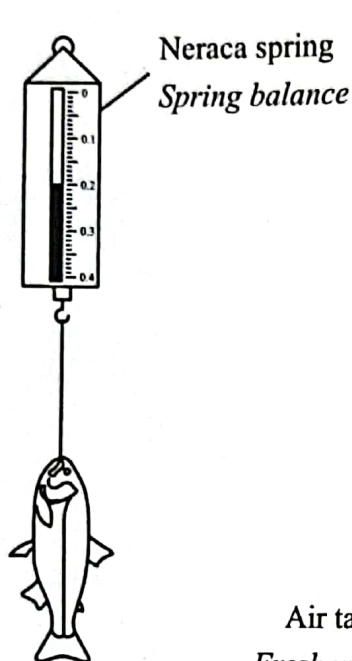
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6

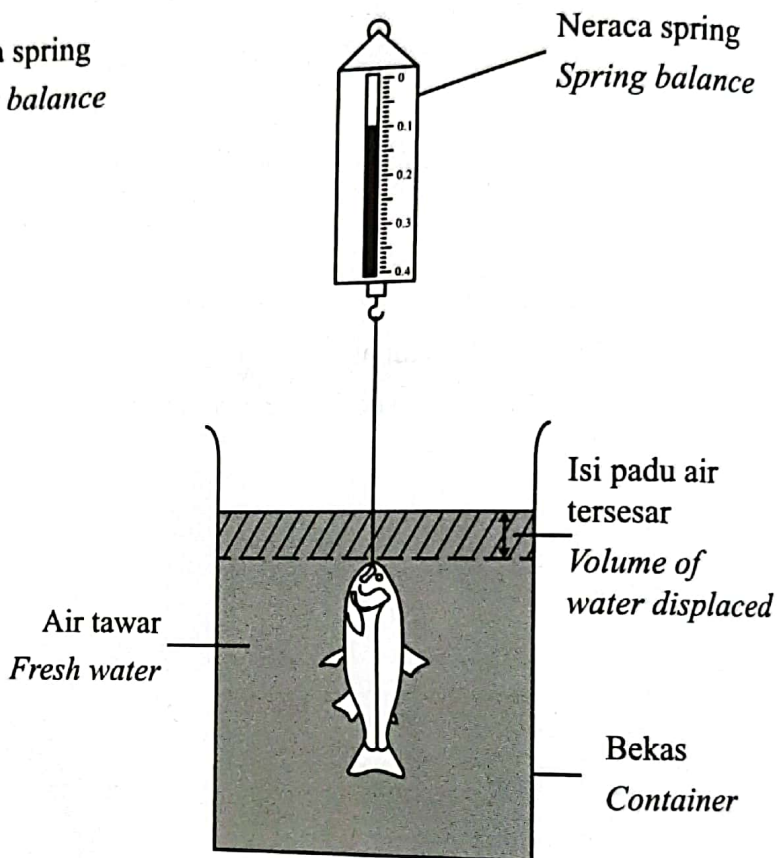
4

Rajah 4.1 menunjukkan seekor ikan digantung pada neraca spring dengan bacaan 0.2 N. Rajah 4.2 menunjukkan ikan itu kemudiannya direndam sepenuhnya ke dalam bekas berisi air tawar. Adalah diperhatikan bahawa air di dalam bekas tersesar dan bacaan neraca spring berkurang menjadi 0.1 N.

Diagram 4.1 shows a fish suspended on a spring balance that shows a reading of 0.2 N. Diagram 4.2 shows the fish is then completely immersed into a container filled with fresh water. It is observed that the water in the container is displaced and the spring balance reading is reduced to 0.1 N.



Rajah 4.1
Diagram 4.1



Rajah 4.2
Diagram 4.2

- (a) Apakah maksud berat?
What is the meaning of weight?

4(a)

	1
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.....

[1 markah]
[1 mark]

- (b) (i) Apakah perbezaan antara bacaan neraca spring dalam Rajah 4.1 dan Rajah 4.2?

What is the difference between the spring balance reading in Diagram 4.1 and Diagram 4.2?

.....

[1 markah]
[1 mark]

4(b)(i)

	1
--	---

- (ii) Namakan daya yang diwakili oleh nilai dalam 4(b)(i).

Name the force that is represented by the value in 4(b)(i).

.....

[1 markah]
[1 mark]

4(b)(ii)

	1
--	---

- (iii) Apakah berat air yang disesarkan oleh ikan?

What is the weight of water displaced by the fish?

.....

[1 markah]
[1 mark]

4(b)(iii)

	1
--	---

- (iv) Hubung kaitkan jawapan di 4(b)(ii) dengan berat air yang disesarkan.

Relate the answer in 4(b)(ii) with weight of water displaced.

.....

[1 markah]
[1 mark]

4(b)(iv)

	1
--	---

- (c) Hitung isi padu air yang disesarkan oleh ikan.

[Ketumpatan air = 1 000 kg m⁻³]

Calculate the volume of water displaced by the fish.

[Density of water = 1 000 kg m⁻³]

.....

[2 markah]
[2 marks]

4(c)

	2
--	---

Untuk
Kegunaan
Pemeriksa

4(d)(i)

	1
--	---

- (d) (i) Apakah yang akan berlaku kepada bacaan neraca spring dalam Rajah 4.2 sekiranya ikan itu direndam sepenuhnya ke dalam air laut?
What will happen to the spring balance reading in Diagram 4.2 if the fish is completely immersed into sea water?

[1 markah]

[1 mark]

4(d)(ii)

	1
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- (ii) Beri sebab bagi jawapan anda di 4(d)(i).
Give a reason for your answer in 4(d)(i).

[1 markah]

[1 mark]

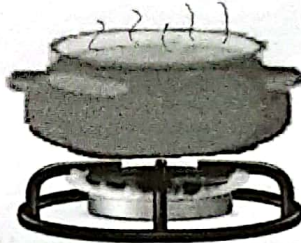
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A4

	9
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- 5 Rajah 5.1 dan Rajah 5.2 menunjukkan periuk tanah liat dan periuk kuprum yang mempunyai jisim yang sama. Kedua-dua periuk itu dipanaskan dengan jumlah haba yang sama selama 10 minit.

Diagram 5.1 and Diagram 5.2 show a clay pot and copper pot of the same mass. Both pots are heated with the same amount of heat for 10 minutes.



Muatan haba tentu, c , periuk tanah liat = $900 \text{ J kg}^{-1} \text{ }^\circ\text{C}^{-1}$
Specific heat capacity, c , clay pot = $900 \text{ J kg}^{-1} \text{ }^\circ\text{C}^{-1}$

Kenaikan suhu, $\Delta\theta = 8 \text{ }^\circ\text{C}$
Increase in temperature, $\Delta\theta = 8 \text{ }^\circ\text{C}$

Rajah 5.1
 Diagram 5.1



Muatan haba tentu, c , periuk kuprum = $390 \text{ J kg}^{-1} \text{ }^\circ\text{C}^{-1}$
Specific heat capacity, c , cooper pot = $390 \text{ J kg}^{-1} \text{ }^\circ\text{C}^{-1}$

Kenaikan suhu, $\Delta\theta = 26 \text{ }^\circ\text{C}$
Increase in temperature, $\Delta\theta = 26 \text{ }^\circ\text{C}$

Rajah 5.2
 Diagram 5.2

- (a) Apakah yang dimaksudkan dengan muatan haba tentu?
What is meant by specific heat capacity?

.....

[1 markah]

[1 mark]

5(a)

	1
--	---

Untuk
Kegunaan
Pemeriksa

(b) Berdasarkan Rajah 5.1 dan Rajah 5.2,
Based on Diagram 5.1 and Diagram 5.2,

5(b)(i)

	1
--	---

(i) bandingkan muatan haba tentu, c .
compare the specific heat capacity, c .

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

5(b)(ii)

	1
--	---

(ii) bandingkan kenaikan suhu, $\Delta\theta$.
compare the increase in temperature, $\Delta\theta$.

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

5(b)(iii)

	1
--	---

(iii) bandingkan tenaga haba yang dibekalkan.
compare the heat energy supplied.

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

(iv) nyatakan hubungan antara muatan haba tentu, c dengan kenaikan suhu, $\Delta\theta$.

state the relationship between the specific heat capacity, c , and the increase in temperature, $\Delta\theta$.

5(b)(iv)

	1
--	---

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

- (c) Rajah 5.3 menunjukkan suatu kualiti yang digunakan untuk menggoreng telur.
Diagram 5.3 shows a pan used for frying eggs.



Rajah 5.3
Diagram 5.3

- (i) Nyatakan **satu** ciri kualiti yang membolehkannya menggoreng telur dengan cepat.

State one characteristic of the pan which enables it to fry the eggs faster.

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

5(c)(i)

	1
--	---

- (ii) Nyatakan **satu** bahan yang sesuai digunakan sebagai pemegang kualiti.

State one suitable material to use as the pan handle.

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

5(c)(ii)

	1
--	---

- (iii) Berikan **dua** sebab bagi pilihan anda di 5(c)(ii).

Give two reasons for your choice in 5(c)(ii).

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

5(c)(iii)

	2
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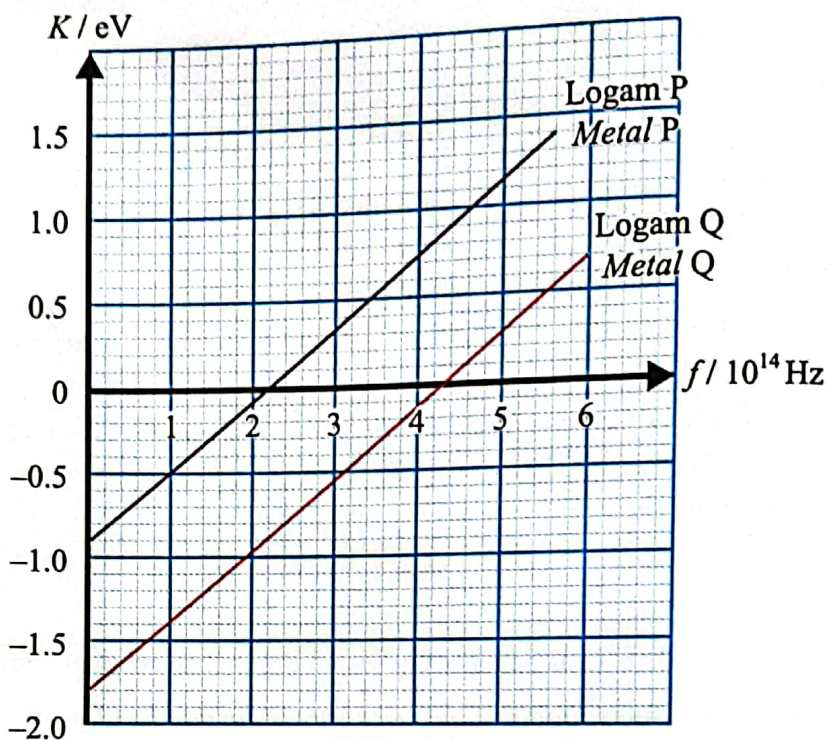
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A5

	9
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6

Rajah 6 menunjukkan graf tenaga kinetik maksimum, K fotoelektron melawan frekuensi cahaya, f , bagi dua jenis logam yang berbeza.

Diagram 6 shows the graph of the maximum kinetic energy, K of photoelectrons against light frequency, f , for two different types of metal.



Rajah 6
Diagram 6

Pintasan-x adalah frekuensi ambang, manakala pintasan-y adalah negatif fungsi kerja, W bagi logam masing-masing.

The x-intercept is the threshold frequency while the y-intercept is the negative work function, W of the respective metals.

- (a) Apakah yang dimaksudkan dengan frekuensi ambang?
What is meant by threshold frequency?

6(a)

	1
--	---

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

- (b) Berdasarkan Rajah 6,
Based on Diagram 6,

- (i) bandingkan frekuensi ambang bagi logam P dan logam Q.
compare the threshold frequencies for metal P and metal Q.

6(b)(i)

	1
--	---

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

- (ii) bandingkan fungsi kerja bagi logam P dan logam Q.
compare the work function for metal P and metal Q.

	1
--	---

[1 markah]
[1 mark]

- (iii) bandingkan kecerunan graf bagi logam P dan logam Q.
compare the gradients of the graph for metal P and metal Q.

6(b)(iii)

	1
--	---

[1 markah]
[1 mark]

- (iv) hubung kaitkan frekuensi ambang dan fungsi kerja.
relate the threshold frequency and the work function.

6(b)(iv)

	1
--	---

[1 markah]
[1 mark]

- (c) (i) Berdasarkan maklumat di Rajah 6, nyatakan persamaan Fotoelektrik Einstein jika kecerunan graf adalah m dan fungsi kerja adalah W .
Based on the information in Diagram 6, state Einstein's Photoelectric equation if the gradient of the graph is m and the work function is W .

6(c)(i)

	1
--	---

[1 markah]
[1 mark]

- (ii) Tentukan kecerunan graf untuk logam Q.
Nyatakan apa yang diwakili oleh kecerunan graf.
[Diberi $1 \text{ eV} = 1.6 \times 10^{-19} \text{ J}$]
*Determine the gradient of graph for metal Q.
State what the gradient of the graph represents.
[Given $1 \text{ eV} = 1.6 \times 10^{-19} \text{ J}$]*

6(c)(ii)

	3
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[3 markah]
[3 marks]

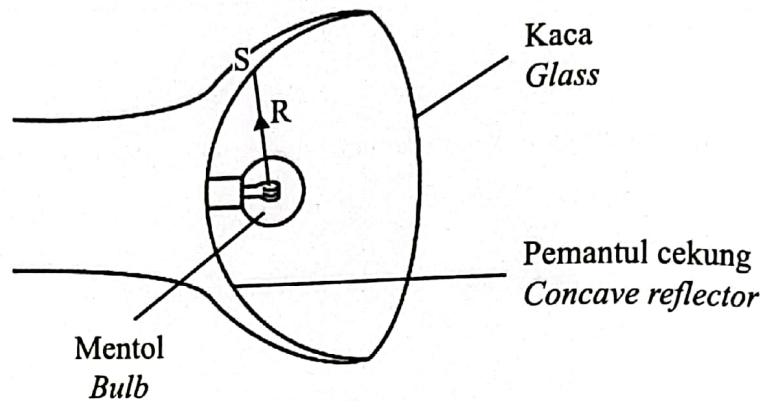
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A6

	9
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Rajah 7 menunjukkan kedudukan pemantul cekung dan mentol di dalam sebuah lampu suluh.

Diagram 7 shows the position of a concave reflector and a bulb in a torch light.



Rajah 7
Diagram 7

7(a)
[]
[1]

- (a) Apakah maksud titik fokus?
What is the meaning of focal point?

[1 markah]
[1 mark]

7(b)
[]
[1]

- (b) Diberi bahawa jejari kelengkungan pemantul cekung di dalam lampu suluh pada Rajah 7 adalah 10 cm. Pada jarak apakah mentol perlu diletakkan pada paksi utama cermin untuk menghasilkan sinar pantulan yang selari?

It is given that the radius of curvature of the concave reflector in the torch light in Diagram 7 is 10 cm. At what distance must the bulb be placed on the principal axis of the mirror to produce parallel reflected rays?

[1 markah]
[1 mark]

7(c)
[]
[2]

- (c) Mentol dalam Rajah 7 terletak 2 cm dari pemantul cekung. Sinar R dari mentol ditujukan ke titik S pada pemantul.

Lengkapkan lintasan cahaya sinar R pada Rajah 7.

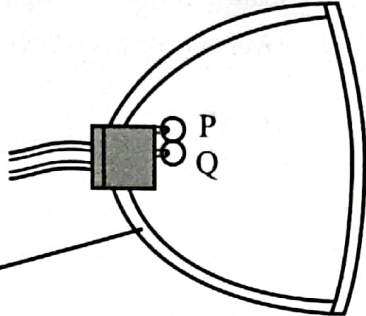
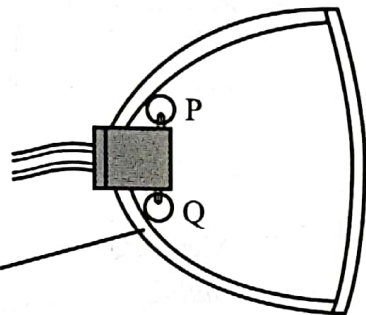
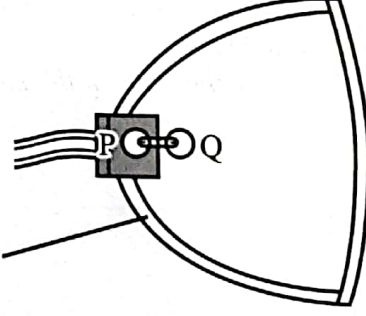
The bulb in Diagram 7 is placed 2 cm from the concave reflector. Ray R from the bulb is directed to point S on the reflector.

Complete the path of light ray R on Diagram 7.

[2 markah]
[2 marks]

(d) Jadual 7 menunjukkan kedudukan mentol bagi tiga lampu depan kereta X, Y dan Z.

Table 7 shows the bulb positions for the three headlamps of cars X, Y and Z.

Lampu depan kereta <i>Headlamp of cars</i>	Kedudukan mentol P dan Q <i>Position of bulbs P and Q</i>
X	 <p>Pemantul Reflector</p>
Y	 <p>Pemantul Reflector</p>
Z	 <p>Pemantul Reflector</p>

Jadual 7
Table 7

Untuk
Kegunaan
Pemeriksa

Berdasarkan spesifikasi dalam Jadual 7 dan pengetahuan anda mengenai titik fokus, nyatakan kedudukan mentol yang sesuai bagi lampu depan sebuah kereta untuk melihat objek dekat dan jauh pada waktu malam.

Beri sebab untuk kesesuaian bagi setiap kedudukan mentol tersebut.

Based on the specifications in Table 7 and your knowledge of the focal point, state the suitable position of the bulb for the headlamp of a car to see near and distant objects at night.

Give reasons for the suitability of each bulb position.

(i) Mentol P.

Bulb P.

.....

Sebab:

Reason:

.....

[2 markah]

[2 marks]

7(d)(i)

2

(ii) Mentol Q.

Bulb Q.

.....

Sebab:

Reason:

.....

[2 markah]

[2 marks]

7(d)(ii)

2

(e) Berdasarkan jawapan dalam 7(d), lampu depan kereta manakah yang paling sesuai untuk melihat objek dekat dan jauh pada waktu malam?

Based on the answer in 7(d), which car headlamp of the car is most suitable for seeing near and distant objects at night?

.....

[1 markah]

[1 mark]

7(e)

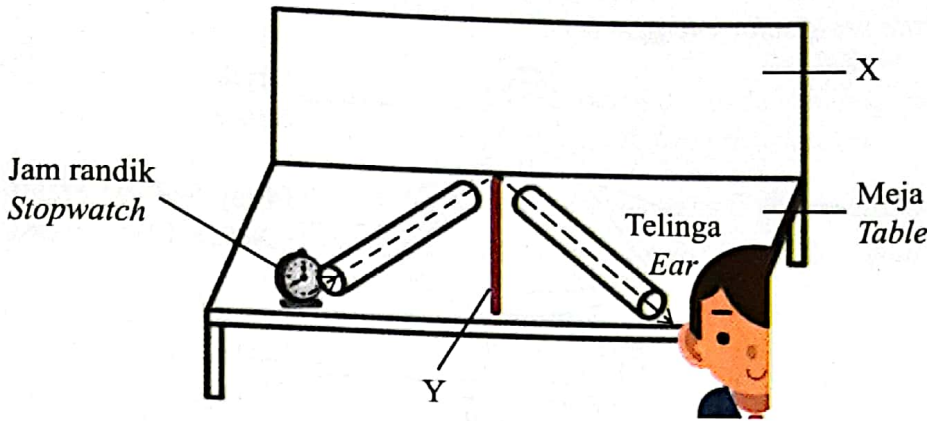
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Total
A7

9

4531/2

- 8 Rajah 8.1 menunjukkan susunan radas untuk menyiasat pantulan gelombang bunyi.
Diagram 8.1 shows the apparatus set-up to investigate the reflection of sound waves.



Rajah 8.1
Diagram 8.1

- (a) (i) Apakah jenis gelombang progresif bagi gelombang bunyi?
What type of progressive wave is a sound wave?

.....

[1 markah]
[1 mark]

8(a)(i)

	1
--	---

- (ii) Nyatakan jenis bahan yang digunakan untuk X dan Y.
State the type of material that is used for X and Y.

X :

Y :

[2 markah]
[2 marks]

8(a)(ii)

	2
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- (iii) Beri sebab bagi jawapan anda di 8(a)(ii).
Give reasons for your answer in 8(a)(ii).

X :

Y :

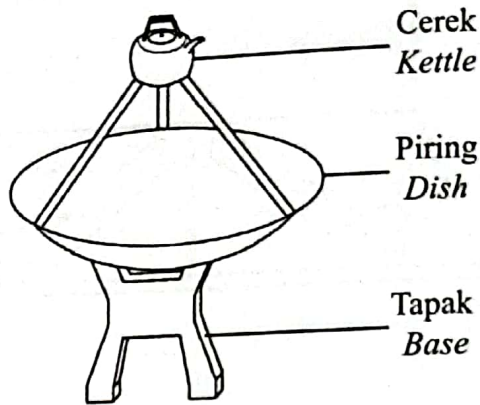
[2 markah]
[2 marks]

8(a)(iii)

	2
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Untuk
Kegunaan
Pemeriksa

- (b) Rajah 8.2 menunjukkan reka bentuk sebuah piring yang dibuat oleh seorang murid untuk mendidihkan air di dalam cerek menggunakan tenaga suria.
 Diagram 8.2 shows the design of a dish made by a student to boil water in a kettle using solar energy.



Rajah 8.2
Diagram 8.2

Anda dikehendaki untuk mengubah suai reka bentuk piring di dalam Rajah 8.2 supaya air mendidih dalam masa yang lebih singkat.

Nyata dan terangkan pengubahsuaian berdasarkan aspek-aspek berikut:

You are required to modify the dish design in Diagram 8.2 so that the water boils in a shorter time.

State and explain the modifications based on the following aspects:

- (i) Jenis permukaan piring.

The type of surface of the dish.

.....

Sebab:

Reason:

.....

[2 markah]
[2 marks]

- (ii) Orientasi piring.

The orientation of the dish.

.....

Sebab:

Reason:

.....

[2 markah]
[2 marks]

8(b)(i)

	2
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8(b)(ii)

	2
--	---

Total
A8

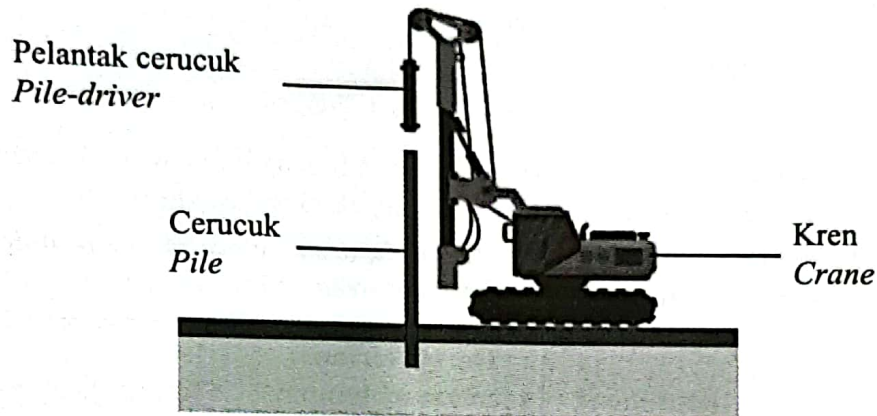
	9
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Bahagian B
Section B

[20 markah]
[20 marks]

Jawab mana-mana **satu** soalan daripada bahagian ini.
Answer any one question from this section.

- 9 Rajah 9.1 menunjukkan sistem pelantak cerucuk yang digunakan dalam pembinaan bangunan.
Diagram 9.1 shows a pile driving system that is used in building construction.



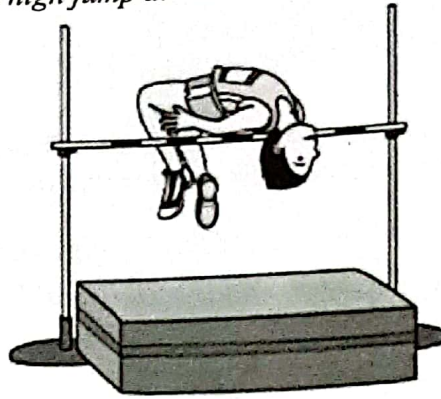
Rajah 9.1
Diagram 9.1

- (a) Apakah maksud impuls?
What is the meaning of impulse?
- (b) Huraikan bagaimana cerucuk itu dibenamkan ke dalam tanah.
Describe how the pile is driven into the ground.

[1 markah]
[1 mark]

[4 markah]
[4 marks]

- (c) Rajah 9.2 menunjukkan seorang atlet lompat tinggi sedang beraksi.
Diagram 9.2 shows a high jump athlete in action.



Rajah 9.2
Diagram 9.2

Jadual 9 menunjukkan spesifikasi P, Q, R dan S yang digunakan oleh seorang atlet lompat tinggi untuk meningkatkan prestasi dan mengelakkan kecederaan.

Table 9 shows specifications P, Q, R and S, used by a high jump athlete to improve his performance and to avoid injury.

Spesifikasi bagi atlet <i>Specification for athlete</i>	Jenis kasut <i>Type of shoes</i>	Halaju larian sebelum melompat <i>Running speed before jump</i>	Teknik jatuhan <i>Falling technique</i>	Tilam <i>Mattress</i>
P	Dengan spike <i>With spikes</i>	Tinggi <i>High</i>	Bengkokkan badan <i>Bends body</i>	Tebal <i>Thick</i>
Q	Tiada spike <i>Without spikes</i>	Rendah <i>Low</i>	Luruskan badan <i>Straightens body</i>	Tebal <i>Thick</i>
R	Tiada spike <i>Without spikes</i>	Tinggi <i>High</i>	Luruskan badan <i>Straightens body</i>	Nipis <i>Thin</i>
S	Dengan spike <i>With spikes</i>	Rendah <i>Low</i>	Bengkokkan badan <i>Bends body</i>	Nipis <i>Thin</i>

Jadual 9
Table 9

Anda dikehendaki menentukan kesesuaian spesifikasi untuk atlet lompat tinggi bagi meningkatkan prestasi dan mengelakkan kecederaan.

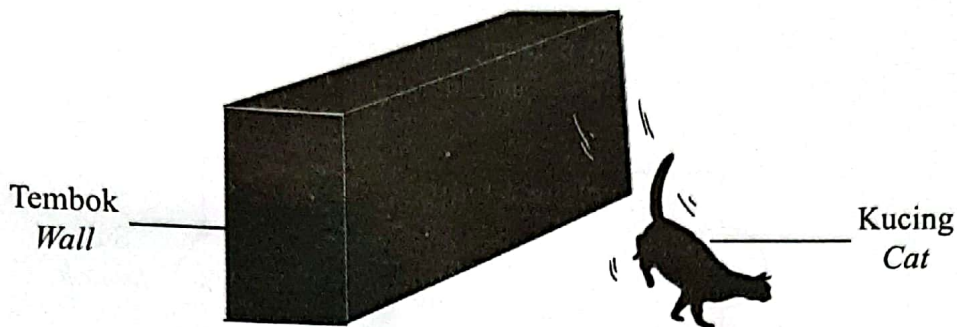
Terangkan kesesuaian setiap spesifikasi. Pilih spesifikasi yang paling sesuai bagi atlet dan beri sebab untuk pilihan anda.

You are required to determine the suitability of the specifications for high jump athletes to improve performance and avoid injury.

Explain the suitability of each specification. Choose the most suitable specification for the athlete and give reasons for your choice.

[10 markah]
[10 marks]

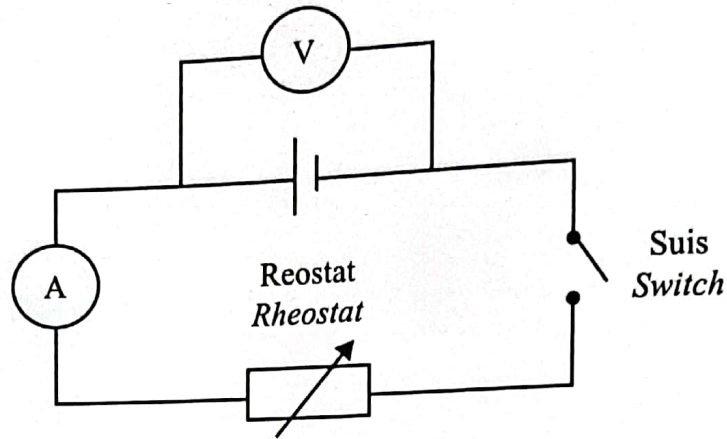
- (d) Rajah 9.3 menunjukkan seekor kucing yang berjisim 5 kg, melompat dari suatu tembok. Kucing itu membengkokkan kakinya semasa mendarat.
Diagram 9.3 shows a cat with a mass of 5 kg, jumping off a wall. The cat bends its legs when landing.



Rajah 9.3
 Diagram 9.3

- (i) Mengapakah kucing itu membengkokkan kakinya semasa mendarat?
Why does the cat bend its legs when landing?
- [1 markah]
 [1 mark]
- (ii) Hitungkan impuls kucing itu ketika mencecah tanah jika halaju seurus sebelum mendarat ialah 6 m s^{-1} .
Calculate the impulse of the cat when it touched the ground if the velocity just before landing is 6 m s^{-1} .
- [2 markah]
 [2 marks]
- (iii) Hitungkan daya impuls yang terhasil jika masa yang diambil untuk berhenti ialah 2.0 s.
Calculate the impulsive force produced if the time taken to stop is 2.0 s.
- [2 markah]
 [2 marks]

- 10 Rajah 10.1 menunjukkan satu litar elektrik bagi satu eksperimen untuk menentukan daya gerak elektrik (d.g.e.) dan rintangan dalam sel kering.
 Diagram 10.1 shows an electric circuit of an experiment to determine the electromotive force (e.m.f.) and internal resistance of dry cell.



Rajah 10.1
 Diagram 10.1

- (a) Apakah yang dimaksudkan dengan daya gerak elektrik (d.g.e.)?
 What is meant by electromotive force (e.m.f.)?

[1 markah]

[1 mark]

- (b) Dengan bantuan graf, terangkan bagaimana daya gerak elektrik (d.g.e.) dan rintangan dalam sebuah sel kering boleh ditentukan.

With the aid of a graph, explain how the electromotive force (e.m.f.) and the internal resistance of a dry cell can be determined.

[4 markah]

[4 marks]

- (c) Rajah 10.2 menunjukkan sebuah bateri kereta yang mengandungi enam sel. Setiap sel mempunyai d.g.e. sebanyak 2 V.

Diagram 10.2 shows a car battery which contains six cells. Each cell has an e.m.f. of 2 V.



Rajah 10.2

Diagram 10.2

Bateri kereta seharusnya dapat membekalkan arus yang sangat tinggi kepada motor "starter" selain mengaktifkan bahagian lain kereta seperti lampu, penghawa dingin dan sistem audio.

Jadual 10 menunjukkan spesifikasi bagi empat bateri kereta yang berlainan W, X, Y dan Z yang terdapat di pasaran.

The car battery should be able to supply very high current to the starter motor in addition to activating other parts of the car such as lights, air conditioning and audio system.

Table 10 shows the specifications of four different types of car batteries W, X, Y and Z that are available for purchase.

Bateri kereta <i>Car battery</i>	Rintangan dalam/ Ω <i>Internal resistance/ Ω</i>	Jenis bateri <i>Type of battery</i>	Susunan sel-sel <i>Arrangement of cells</i>	Kadar pengoksidaan <i>Rate of oxidation</i>
W	Rendah <i>Low</i>	Bateri air <i>Wet battery</i>	Selari <i>Parallel</i>	Tinggi <i>High</i>
X	Rendah <i>Low</i>	Bateri kering <i>Dry battery</i>	Sesiri <i>Series</i>	Rendah <i>Low</i>
Y	Tinggi <i>High</i>	Bateri air <i>Wet battery</i>	Sesiri <i>Series</i>	Tinggi <i>High</i>
Z	Tinggi <i>High</i>	Bateri kering <i>Dry battery</i>	Selari <i>Parallel</i>	Rendah <i>Low</i>

Jadual 10

Table 10

Terangkan kesesuaian setiap spesifikasi bateri kereta supaya bateri itu dapat menjana voltan yang cukup tinggi, tidak memerlukan penyelenggaraan dan tahan lama.

Tentukan bateri yang paling sesuai untuk digunakan dan beri sebab untuk pilihan anda.

Explain the suitability of each car battery specification so that the battery can generate a high enough voltage, does not require maintenance and is long lasting.

Determine the most suitable car battery to be used and give reasons for your choice.

[10 markah]

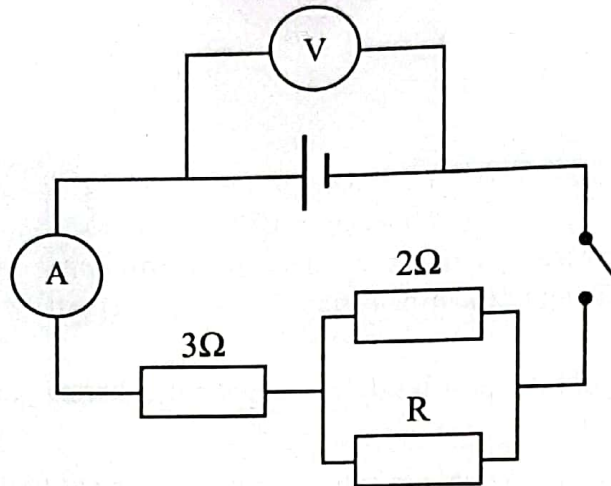
[10 marks]

[Lihat halaman sebelah

- (d) Rajah 10.3 menunjukkan sebuah litar elektrik dengan sebiji sel kering, d.g.e. 1.5 V. Apabila suis ditutup, bacaan voltmeter dan bacaan ammeter masing-masing adalah 1.2 V dan 0.3 A.

Diagram 10.3 shows an electric circuit with a dry cell, e.m.f. 1.5 V.

When the switch is closed, the reading of the voltmeter and ammeter are 1.2 V and 0.3 A respectively.



Rajah 10.3
Diagram 10.3

Hitung
Calculate

- (i) rintangan dalam untuk sel kering.
the internal resistance of the dry cell.
- (ii) nilai R.
the value of R.

[5 markah]
[5 marks]

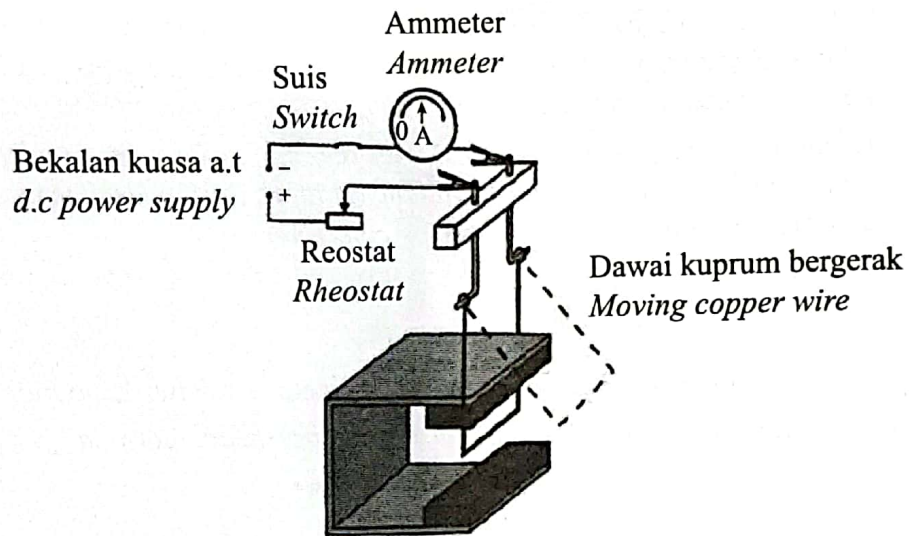
Bahagian C
Section C

[20 markah]
[20 marks]

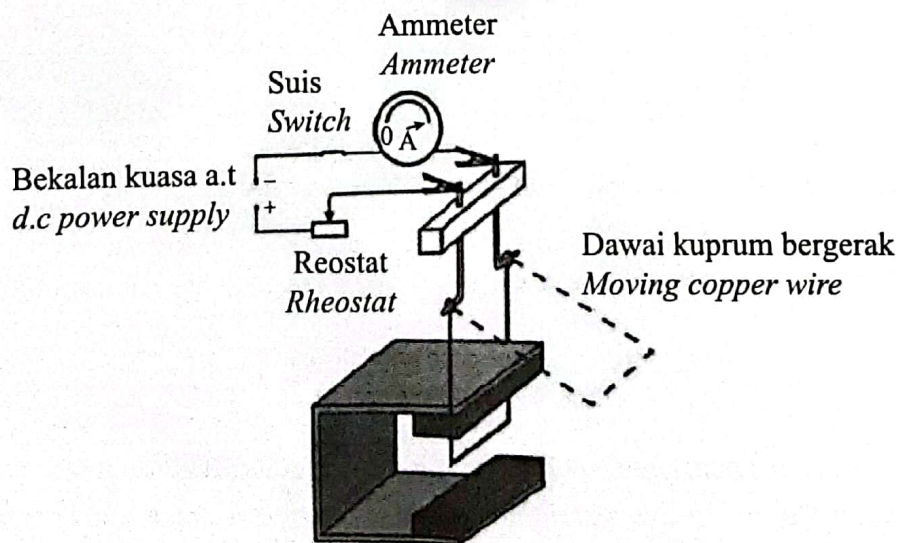
Jawab **semua** soalan dalam bahagian ini.
Answer all question in this section.

- 11 Rajah 11.1 dan Rajah 11.2 menunjukkan dawai kuprum bergerak disambungkan kepada ammeter, reostat, suis dan bekalan kuasa. Dawai kuprum itu diletakkan di antara dua magnet Magnadur.

Diagram 11.1 and Diagram 11.2 show a moving copper wire connected to an ammeter, rheostat, switch and power supply. The copper wire is placed between two Magnadur magnets.



Rajah 11.1
Diagram 11.1



Rajah 11.2
Diagram 11.2

- (a) Apakah maksud medan lastik?
What is the meaning of catapult field?

[1 markah]
[1 mark]

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

- (i) bandingkan bacaan ammeter, sudut pesongan dawai kuprum bergerak dan kekuatan medan magnet.
compare the reading of the ammeter, angle of deflection of the moving copper wire and the strength of the magnetic field.

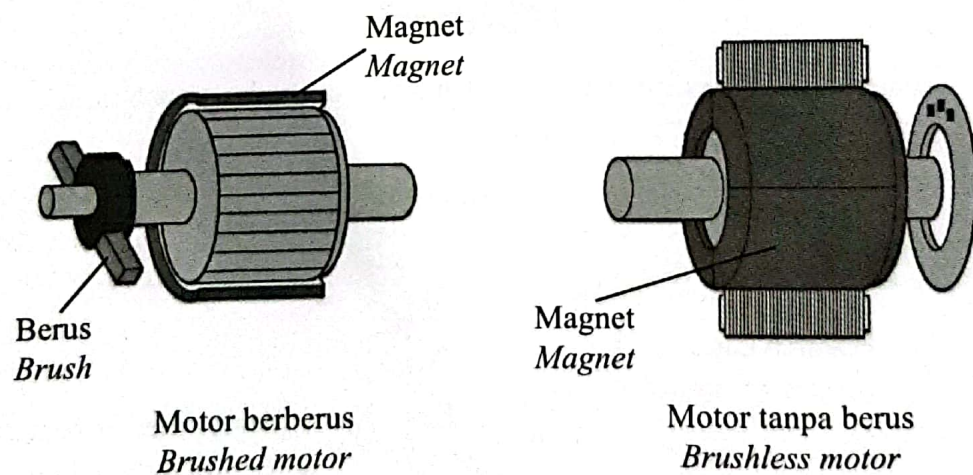
compare the reading of the ammeter, angle of deflection of the moving copper wire and the strength of the magnetic field.

- (ii) hubung kaitkan bacaan ammeter dengan sudut pesongan dawai kuprum bergerak untuk membuat deduksi tentang hubungan antara magnitud arus dengan daya ke atas konduktor pembawa arus.
relate the reading of the ammeter with the angle of deflection of the moving copper wire to make a deduction regarding the relationship between the magnitude of current and the force on the current-carrying conductor.

relate the reading of the ammeter with the angle of deflection of the moving copper wire to make a deduction regarding the relationship between the magnitude of current and the force on the current-carrying conductor.

[5 markah]
[5 marks]

- (c) Rajah 11.3 menunjukkan dua jenis motor iaitu motor berberus dan motor tanpa berus.
Diagram 11.3 shows two types of motor namely brushed motor and brushless motor.



Rajah 11.3
Diagram 11.3

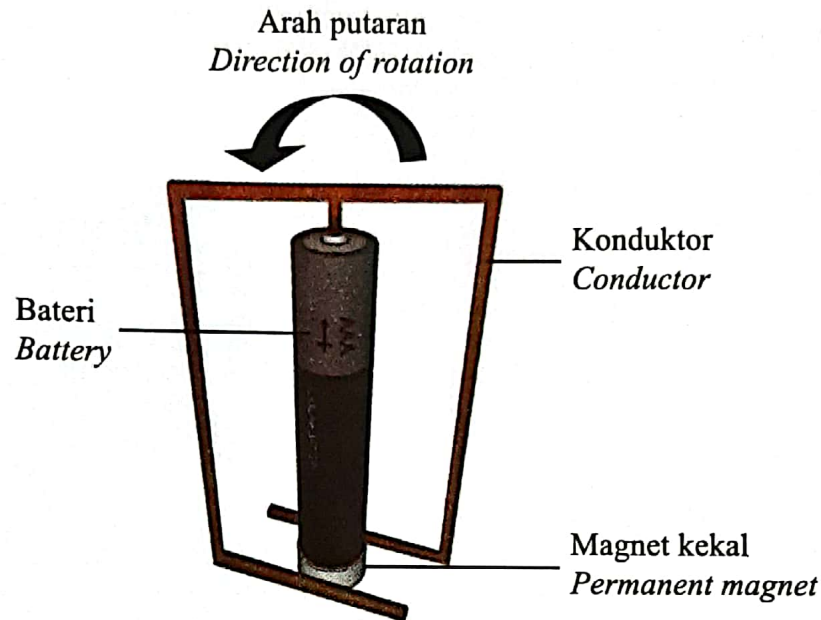
Terangkan persamaan dan perbezaan antara motor berberus dan motor tanpa berus.

Explain the similarities and differences between brushed motor and brushless motor.

[4 markah]
[4 marks]

- (d) Rajah 11.4 menunjukkan satu motor homopolar ringkas yang terdiri daripada magnet, bateri dan konduktor. Interaksi antara medan magnet daripada arus elektrik dalam konduktor dan medan magnet daripada magnet kekal menghasilkan daya, yang menyebabkan konduktor berputar mengelilingi bateri.

Diagram 11.4 shows a simple homopolar motor consisting of a magnet, a battery and a conductor. The interaction between the magnetic field from the electric current in the conductor and the magnetic field from the permanent magnet produces a force, which causes the conductor to rotate around the battery.



Rajah 11.4
Diagram 11.4

Cadangkan pengubahsuaian yang boleh dilakukan pada motor homopolar dalam Rajah 11.4 supaya konduktor berpusing lebih laju.

Nyata dan beri penerangan tentang pengubahsuaian itu berdasarkan jenis bahan dan ciri-ciri magnet, jenis bahan dan ciri-ciri konduktor dan ciri-ciri bateri.

Suggest modifications that can be made to the homopolar motor in Diagram 11.4, so that the conductor can spin faster.

State and explain the modifications based on the type of material and characteristics of the magnet, type of material and characteristics of the conductor and the characteristics of the battery.

[10 markah]
[10 marks]

KERTAS PEPERIKSAAN TAMAT
END OF QUESTION PAPER