

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

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 $R = \frac{\rho l}{A}$
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 $h = 6.63 \times 10^{-34} \text{ J s}$

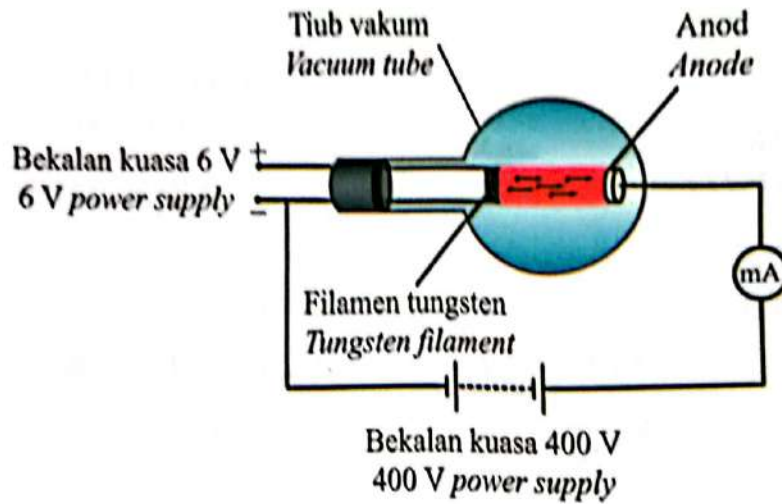
Bahagian A
Section A

[60 markah]
[60 marks]

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

- 1 Rajah 1 menunjukkan satu tiub vakum yang disambung kepada dua bekalan kuasa, 6 V dan 400 V.

Diagram 1 shows a vacuum tube connected to two power supplies, 6 V and 400 V.



Rajah 1
Diagram 1

- (a) Apakah yang dimaksudkan oleh pancaran termion?
What is meant by thermionic emission?

1(a)

1

.....

.....

[1 markah]
[1 mark]

(b) Bekalan kuasa yang manakah berfungsi menghasilkan pancaran termion dalam tiub vakum tersebut?

Tandakan (✓) pada jawapan anda.

Which power supply works to produce thermionic emission in the vacuum tube?

Tick (✓) for your answer.

6 V

400 V

[1 markah]
[1 mark]

1(b)

(c) Apakah yang akan berlaku kepada bacaan miliammeter apabila
What will happen to the milliammeter reading when

(i) bekalan kuasa 400 V ditingkatkan?
the 400 V power supply is increased?

[1 markah]
[1 mark]

1(c)(i)

(ii) terminal bekalan kuasa 400 V disongsangkan?
the terminals of the 400 V are reversed?

[1 markah]
[1 mark]

1(c)(ii)

Total
A1

Gerakan planet dalam Sistem Suria dijelaskan oleh hukum Kepler. Jadual di bawah mengandungi beberapa pernyataan berkaitan dengan hukum Kepler.

Planetary motion in the Solar System is explained by Kepler's laws. The tables below contain some statements regarding Kepler's laws.

Hukum Kepler Pertama <i>Kepler's First Law</i>	●
Planet bergerak lebih pantas apabila berhampiran dengan matahari <i>Planets move faster when closer to the sun</i>	●
Hukum Kepler Ketiga <i>Kepler's Third Law</i>	●

Jadual 2(a)
Table 2(a)

Membandingkan tempoh orbit bagi dua planet berlainan <i>Compares the orbital periods of two different planets</i>	●
Matahari berada di salah satu fokus orbit planet <i>The sun is on one of the foci of the planet's orbit</i>	●
Hukum Persamaan Luas <i>Law of Equal Areas</i>	●

Jadual 2(b)
Table 2(b)

- (a) Padankan pernyataan sesuai dalam Jadual 2(a) dengan pernyataan dalam Jadual 2(b), dengan melukis garis penghubung.

Match the appropriate statements in Table 2(a) with the statements in Table 2(b), by drawing a connecting line.

[2 markah]
[2 marks]

2(a)

	2
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- (b) Katakan sebuah planet kecil dijumpai berada 14 kali lebih jauh dari matahari berbanding dengan jarak Bumi daripada matahari. Gunakan hukum Kepler yang sesuai untuk meramalkan tempoh orbit planet tersebut dalam tahun. Ambil tempoh orbit Bumi sebagai, $T_B = 1$ tahun dan tunjukkan pengiraan anda.

Suppose a small planet is discovered 14 times further from the sun than Earth's distance from the sun. Use the appropriate Kepler's law to predict the orbital period of the planet in years.

Take Earth's orbital period to be, $T_E = 1$ year and show your working.

[3 markah]
[3 marks]

2(b)

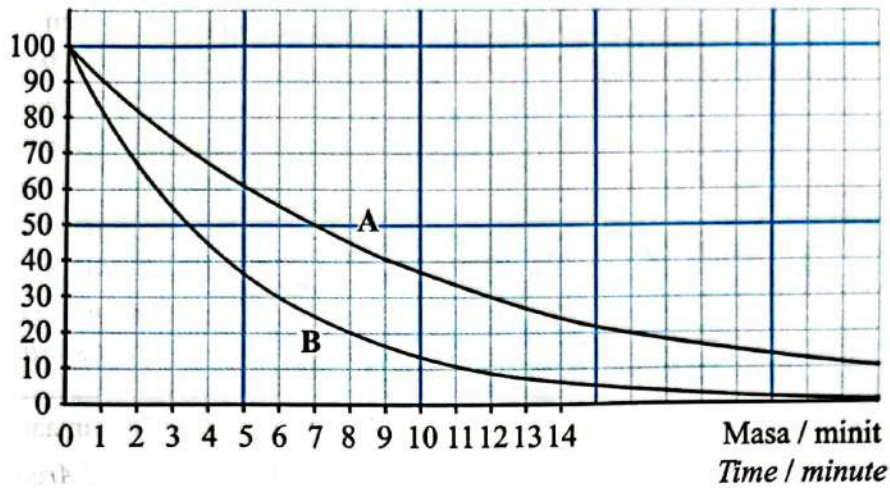
	3
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Total
A2

	5
--	---

- 3 Rajah 3 menunjukkan graf lengkung reputan dua unsur radioaktif, A dan B.
Diagram 3 shows the decay curve of two radioactive elements, A and B.

Bilangan per minit
Counts per minute



Rajah 3
Diagram 3

- (a) Apakah yang dimaksudkan dengan separuh hayat?
What is meant by half-life?

3(a)

	1
--	---

[1 markah]
[1 mark]

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

- (i) cari separuh hayat bagi unsur radioaktif A dan B.
Tunjukkan pada graf bagaimana separuh hayat itu ditentukan.
find the half-life of radioactive elements A and B.
Show on the graph how the half-life is determined.

3(b)(i)

--

[3 markah]
[3 marks]

- (ii) unsur radioaktif yang manakah mempunyai kadar reputan yang lebih rendah?
which radioactive element has lower decay rate?

3(b)(ii)

--

[1 markah]
[1 mark]

- (iii) berikan sebab bagi jawapan anda di 3(b)(ii).
give reason for your answer in 3(b)(ii).

3(b)(iii)

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[1 markah]
[1 mark]

Total
A3

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- 4 Rajah 4 menunjukkan seorang budak lelaki duduk di atas pelampung dan terapung di permukaan air sebuah tasik.

Diagram 4 shows a boy sitting on a rubber tube and floating on the water surface of a lake.



Rajah 4
Diagram 4

- (a) Pada Rajah 4, lukis dan labelkan daya-daya yang bertindak ke atas budak lelaki itu.

In Diagram 4, draw and label the forces acting on the boy.

[2 markah]
[2 marks]

4(a)

2

- (b) Berikan satu sebab mengapa budak lelaki itu terapung.
Give one reason why the boy floats.

[1 markah]
[1 mark]

4(b)

1

[Lihat halaman sebelah

- (c) (i) Jumlah jisim budak lelaki itu dan pelampung ialah 45 kg dan ketumpatan air tasik ialah $1\,000\text{ kg m}^{-3}$.

Hitung isi padu air yang disesarkan oleh budak lelaki itu.

The total mass of the boy and the rubber tube is 45 kg and the density of the lake water is $1\,000\text{ kg m}^{-3}$.

Calculate the volume of water displaced by the boy.

4(c)(i)

2

[2 markah]

[2 marks]

- (ii) Apakah yang akan berlaku kepada isi padu air yang disesarkan jika budak lelaki itu terapung di dalam laut?

What would happen to the volume of water displaced if the boy floated in the sea?

4(c)(ii)

1

[1 markah]

[1 mark]

- (iii) Terangkan jawapan anda di 4(c)(ii).

Explain your answer in 4(c)(ii).

4(c)(iii)

2

[2 markah]

[2 marks]

- (d) Namakan prinsip fizik yang terlibat dalam situasi ini.

Name the physics principle involved in this situation.

4(d)

1

[1 markah]

[1 mark]

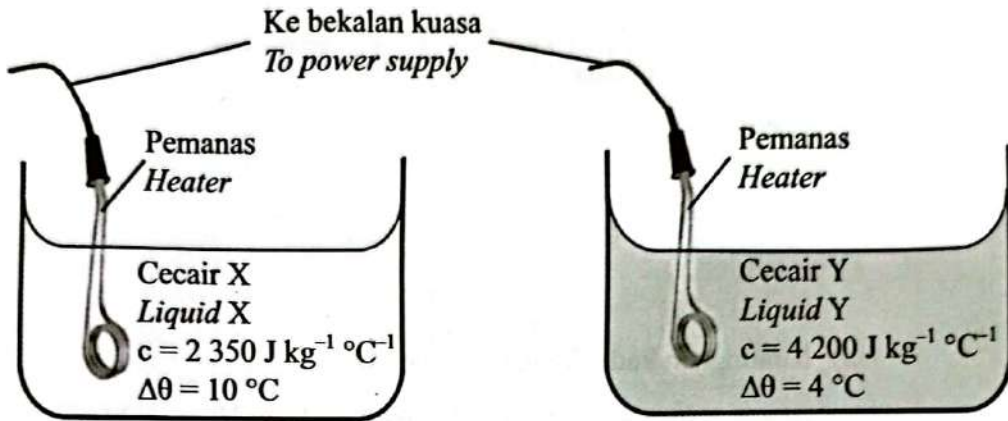
Total
A4

9

- 5 Rajah 5.1 dan Rajah 5.2 menunjukkan dua bikar mengandungi cecair X dan cecair Y yang mempunyai jisim yang sama tetapi muatan haba tentu yang berbeza. Cecair X dan cecair Y dipanaskan menggunakan pemanas rendam berlabel 240 V, 10 W selama 10 minit.

Diagram 5.1 and Diagram 5.2 show two beakers containing liquid X and liquid Y, which have the same mass but different specific heat capacities.

Liquid X and liquid Y are heated with an immersion heater labelled 240 V, 10 W for 10 minutes.



Rajah 5.1
Diagram 5.1

Rajah 5.2
Diagram 5.2

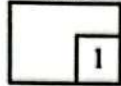
- (a) Apakah yang dimaksudkan dengan muatan haba tentu?
What is meant by specific heat capacity?

5(a)

	1
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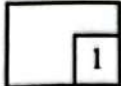
[1 markah]
[1 mark]

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

5(b)(i)


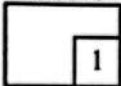
(i) bandingkan muatan haba tentu, c .
compare the specific heat capacity, c .

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

5(b)(ii)


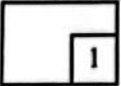
(ii) bandingkan tenaga yang dibekalkan.
compare the heat supplied.

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

5(b)(iii)


(iii) bandingkan kadar kenaikan suhu, $\Delta\theta$.
compare the rate of increase in temperature, $\Delta\theta$.

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

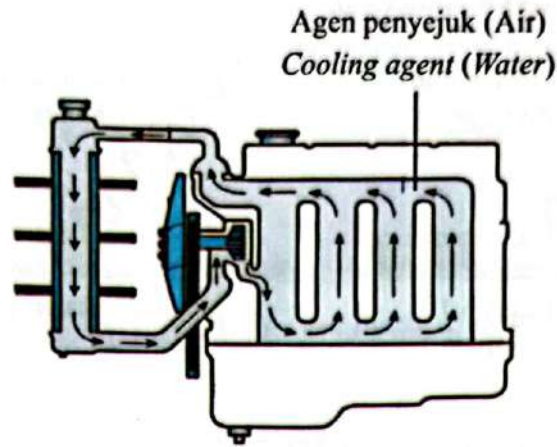
5(b)(iv)


(iv) nyatakan hubungan antara muatan haba tentu, c , cecair dengan kadar kenaikan suhu, $\Delta\theta$.
state the relationship between the specific heat capacity, c , of the liquid and the rate of increase in temperature, $\Delta\theta$.

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

- (c) Rajah 5.3 menunjukkan suatu sistem radiator kereta yang menggunakan air sebagai agen penyejuk.

Diagram 5.3 shows a car radiator system which uses water as a cooling agent.



Rajah 5.3
Diagram 5.3

- (i) Mengapakah air sesuai digunakan sebagai agen penyejuk?
Why water is suitable for use as a cooling agent?

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

5(c)(i)

	1
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- (ii) Terangkan bagaimana sistem penyejukan enjin ini berfungsi.
Explain how this engine cooling system works.

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

[3 markah]
[3 marks]

5(c)(ii)

	3
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Total
A5

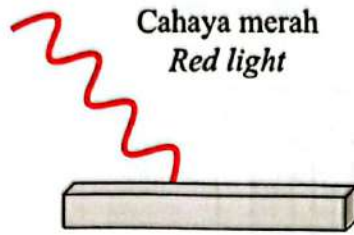
	9
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6

Rajah 6.1 dan Rajah 6.2 menunjukkan kesan elektron apabila cahaya merah dan cahaya ungu disinari pada logam yang sama.

Diagram 6.1 and Diagram 6.2 show the effect of electrons when red light and violet light are shone on the same metal.



Rajah 6.1
Diagram 6.1



Rajah 6.2
Diagram 6.2

(a) Apakah yang dimaksudkan kesan fotoelektrik?

What is meant by photoelectric effect?

6(a)

1

.....
[1 markah]

[1 mark]

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

(i) bandingkan panjang gelombang bagi cahaya merah dan cahaya ungu.
compare the wavelength of red light and violet light.

6(b)(i)

	1
--	---

[1 markah]

[1 mark]

(ii) bandingkan kesan elektron bagi cahaya merah dan cahaya ungu.
compare the electron effect for red light and violet light.

6(b)(ii)

	1
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[1 markah]

[1 mark]

(iii) bandingkan frekuensi cahaya merah dan cahaya ungu.
compare the frequency of red light and violet light.

6(b)(iii)

	1
--	---

[1 markah]

[1 mark]

(iv) hubung kaitkan kesan elektron dan frekuensi cahaya.
relate the electron effect to the frequency of light.

6(b)(iv)

	1
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[1 markah]

[1 mark]

- (c) (i) Diberi panjang gelombang cahaya kuning adalah 580 nm.
Hitung frekuensi untuk cahaya kuning.
*Given the wavelength of yellow light is 580 nm.
Calculate the frequency of the yellow light.*

6(c)(i)

2

[2 markah]
[2 marks]

- (ii) Frekuensi ambang untuk logam tersebut adalah 5.03×10^{14} Hz.
Ramalkan kesan elektron apabila cahaya kuning disinari ke atas logam tersebut.
Jelaskan jawapan anda.
*The threshold frequency for the metal is 5.03×10^{14} Hz.
Predict the effect of electrons when yellow light is shone on the metal.
Explain your answer.*

.....

.....

.....

[2 markah]
[2 marks]

6(c)(ii)

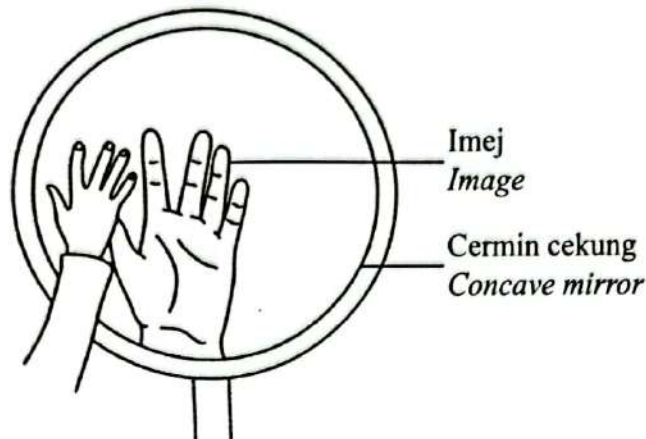
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Total
A6

9

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- 7 Rajah 7.1 menunjukkan imej tangan yang terbentuk oleh sebuah cermin cekung.
Diagram 7.1 shows the image of a hand formed by a concave mirror.



Rajah 7.1
Diagram 7.1

- (a) Nyatakan fenomena yang terlibat dalam pembentukan imej tersebut.
Name the phenomenon involved in the formation of the image.

7(a)

	1
--	---

[1 markah]

[1 mark]

- (b) Berdasarkan Rajah 7.1, nyatakan **satu** ciri imej yang telah dibentuk.
*Based on Diagram 7.1, state **one** characteristic of image formed.*

7(b)

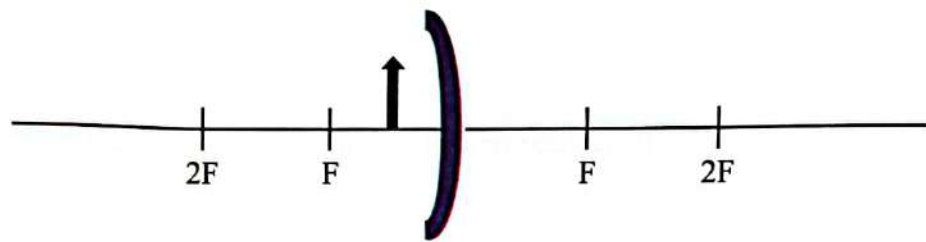
	1
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[1 markah]

[1 mark]

- (c) Lukiskan rajah sinar untuk menunjukkan pembentukan imej dalam cermin cekung bagi objek dalam Rajah 7.2.

Draw a ray diagram to show the formation of the image in the concave mirror of the object in Diagram 7.2.



Rajah 7.2
Diagram 7.2

[2 markah]
[2 marks]

- (d) Jadual 7 menunjukkan ciri cermin cegah kecurian dalam sebuah kedai.
Table 7 shows the characteristics of an anti-theft mirror in a shop.

Cermin melengkung <i>Curve mirror</i>	Jenis cermin melengkung <i>Type of curve mirror</i>	Diameter cermin melengkung <i>Diameter of curve mirror</i>
E	Cembung <i>Convex</i>	Kecil <i>Small</i>
F	Cekung <i>Concave</i>	Kecil <i>Small</i>
G	Cembung <i>Convex</i>	Besar <i>Big</i>
H	Cekung <i>Concave</i>	Besar <i>Big</i>

Jadual 7
Table 7

Berdasarkan spesifikasi dalam Jadual 7, nyatakan ciri-ciri cermin melengkung yang paling sesuai untuk digunakan supaya keseluruhan bahagian dalam kedai itu jelas kelihatan.

Beri sebab untuk kesesuaian ciri tersebut.

Based on the specifications in Table 7, state the most suitable characteristics of a curved mirror to be used so that the entire interior of the shop is clearly visible.

Give reason for the suitability for each of the characteristic.

(i) Jenis cermin melengkung.

Type of curve mirror.

.....

Sebab:

Reason:

.....

[2 markah]
[2 marks]

7(d)(i)
2

(ii) Diameter cermin melengkung.

Diameter of curved mirror.

.....

Sebab:

Reason:

.....

[2 markah]
[2 marks]

7(d)(ii)
2

(e) Berdasarkan jawapan dalam 7(d), cermin melengkung manakah yang paling sesuai untuk digunakan supaya keseluruhan bahagian dalam kedai itu jelas kelihatan?

Based on the answer in 7(d), which curved mirror is the most suitable to use so that the entire inside of the shop is clearly visible?

.....

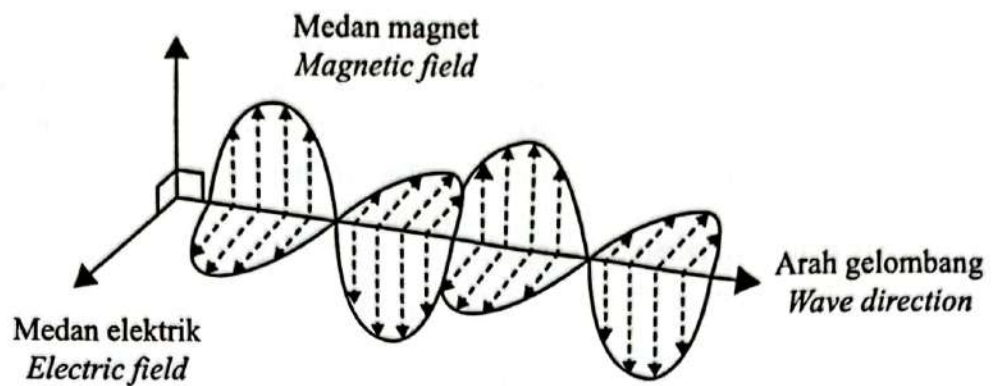
[1 markah]
[1 mark]

7(e)
1

Total
A7

9

Rajah 8.1 menunjukkan gelombang elektromagnet merambat melalui ruang udara.
Diagram 8.1 shows an electromagnetic wave propagating through air.



Rajah 8.1
Diagram 8.1

- (a) Apakah yang dimaksudkan dengan gelombang elektromagnet?
What is meant by electromagnetic wave?

8(a)

1

.....



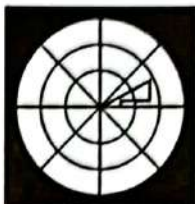
.....

[1 markah]

[1 mark]

- (b) Jadual 8 menunjukkan tiga jenis gelombang elektromagnet dan kegunaannya.

Table 8 shows three types of electromagnetic waves and their uses.

		
Alat kawalan jauh Remote control	Radio Radio	Sistem radar Radar system
Inframerah Infrared	Gelombang radio Radio wave	W

Jadual 8
Table 8

- (i) Apakah gelombang W?
What is wave W?

.....

[1 markah]
[1 mark]

8(b)(i)

	1
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- (ii) Berikan **satu** sebab bagi jawapan anda.
Give **one** reason for your answer.

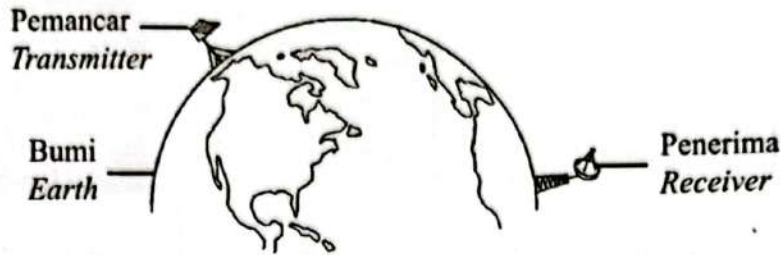
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[1 markah]
[1 mark]

8(b)(ii)

	1
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- (c) Rajah 8.2 menunjukkan satu sistem komunikasi yang terlibat dalam penghantaran maklumat antara dua lokasi yang jauh.
Diagram 8.2 shows a communication system involved in transmitting information between two distant locations.



Rajah 8.2
Diagram 8.2

- (i) Jenis gelombang yang dipancarkan.
Type of wave transmitted.

.....

Sebab:
Reason:

.....

[2 markah]
[2 marks]

- (ii) Diameter penerima.
Diameter of the receiver.

.....

Sebab:
Reason:

.....

[2 markah]
[2 marks]

- (iii) Lokasi pemancar dan penerima.
Location of the transmitter and receiver.

.....

Sebab:
Reason:

.....

[2 markah]
[2 marks]

8(c)(i)

2

8(c)(ii)

2

8(c)(iii)

2

Total
A8

9

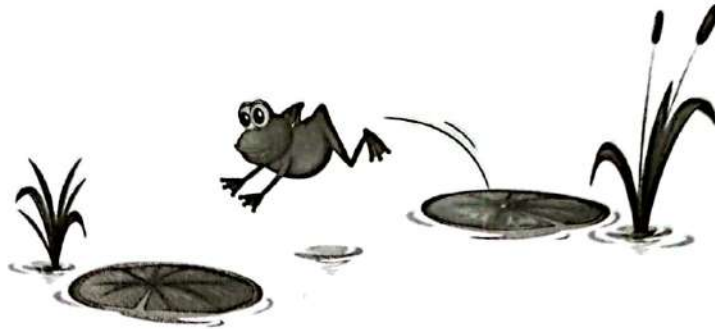
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Bahagian B
Section B

[20 markah]
[20 marks]

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

- 9 Rajah 9.1 menunjukkan seekor katak sedang melompat dari daun teratai yang terapung.
Diagram 9.1 shows a frog leaping from a floating lily pad.



Rajah 9.1
Diagram 9.1

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

[1 markah]
[1 mark]

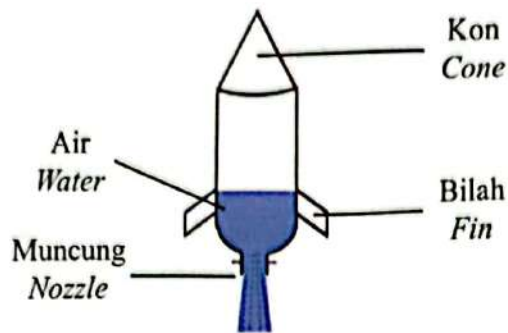
- (b) Berpandukan konsep momentum, terangkan bagaimana daun teratai itu bergerak ke arah belakang apabila katak melompat ke hadapan.

Based on the concept of momentum, explain how the lily pad moves backwards when the frog leaps forwards.

[4 markah]
[4 marks]

(c) Rajah 9.2 menunjukkan sebuah roket botol air.

Diagram 9.2 shows a water bottle rocket.



Rajah 9.2
Diagram 9.2

Jadual 9 menunjukkan spesifikasi empat jenis roket botol air, P, Q, R dan S dengan ciri-ciri berbeza.

Table 9 shows the specifications of four types of water bottle rocket P, Q, R and S with different characteristics.

Roket botol air Water bottle rocket	Jisim Mass	Bentuk Shape	Isi padu air Volume of water	Sudut pelancaran Angle of launching
P	Besar Large	Oval Oval	$\frac{1}{3}$ daripada isi padu botol $\frac{1}{3}$ of the volume of bottle	90°
Q	Besar Large	Aerodinamik Aerodynamic	$\frac{1}{5}$ daripada isi padu botol $\frac{1}{5}$ of the volume of bottle	45°
R	Kecil Small	Oval Oval	$\frac{1}{5}$ daripada isi padu botol $\frac{1}{5}$ of the volume of bottle	90°
S	Kecil Small	Aerodinamik Aerodynamic	$\frac{1}{3}$ daripada isi padu botol $\frac{1}{3}$ of the volume of bottle	45°

Jadual 9
Table 9

Anda ditugaskan memperoleh roket botol air yang dapat bergerak jauh.

Terangkan kesesuaian setiap spesifikasi dalam Jadual 9. Pilih roket botol air yang paling sesuai dan beri sebab untuk pilihan anda.

You are assigned to obtain a water bottle rocket that can travel far.

Explain the suitability of each specification in Table 9. Choose the most suitable water bottle rocket and give reasons for your choice.

[10 markah]
[10 marks]

- (d) Rajah 9.3 menunjukkan sebutir peluru berjisim, 50 g ditembak pada halaju 350 m s^{-1} dari selaras senapang yang berjisim 6 kg.

Diagram 9.3 shows a bullet of mass, 50 g is fired at velocity of 350 m s^{-1} from a rifle with a mass of 6 kg.

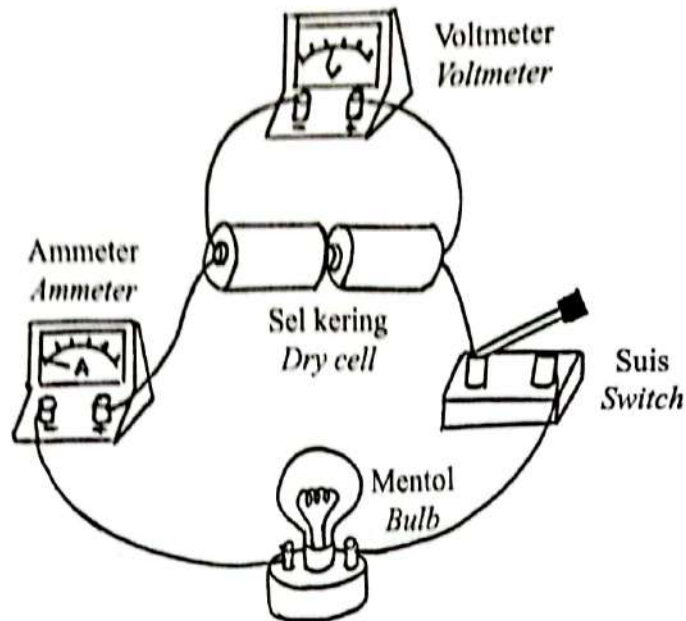


Rajah 9.3
Diagram 9.3

- (i) Lukis dengan anak panah pergerakan senapang selepas peluru ditembak keluar.
Draw with an arrow the movement of the rifle after the bullet is fired out. [1 markah]
[1 mark]
- (ii) Tentukan halaju senapang itu.
Determine the the velocity of the rifle. [3 markah]
[3 marks]
- (iii) Nyatakan prinsip yang diaplikasikan dalam situasi ini.
Name the principle applied in this situation. [1 markah]
[1 mark]

- 10 Rajah 10.1 menunjukkan susunan voltmeter, ammeter, sel kering, suis dan mentol dalam satu litar.

Diagram 10.1 shows the arrangement of a voltmeter, an ammeter, dry cell, a switch and a bulb in a circuit.



Rajah 10.1
Diagram 10.1

- (a) Namakan kuantiti fizik yang diukur oleh voltmeter dalam litar.

Name the physical quantity measured by the voltmeter in the circuit.

[1 markah]

[1 mark]

- (b) Apakah yang akan terjadi kepada bacaan voltmeter dan keadaan mentol apabila suis ditutup?

Jelaskan jawapan anda.

What will happen to the voltmeter reading and the condition of bulb when the switch is closed?

Explain your answer.

[4 markah]

[4 marks]

- (c) Rajah 10.2 menunjukkan sebuah bank kuasa USB yang lazimnya digunakan untuk mengecas semula telefon bimbit apabila baterinya lemah. Kapasiti bank kuasa diukur dalam unit mA j. Ia merujuk kepada bilangan cas yang dapat dipindahkan kepada telefon bimbit dalam masa 1 jam.

Diagram 10.2 shows a USB power bank which is normally used to recharge a handphone when its battery runs low. The capacity of a power bank is measured in the unit of mA h. It refers to the amount of charge transferred to the handphone in an hour.



Rajah 10.2
Diagram 10.2

Bank kuasa <i>Power bank</i>	Kapasiti/ mA j <i>Capacity/ mA h</i>	Ketumpatan/ g cm^{-3} <i>Density/ g cm^{-3}</i>	Rintangan dalam/ Ω <i>Internal resistance/ Ω</i>	Jenis permukaan <i>Type of surface</i>
W	10 000	1.28	Rendah <i>Low</i>	Bertekstur <i>Textured</i>
X	10 000	2.45	Tinggi <i>High</i>	Licin <i>Smooth</i>
Y	20 000	1.28	Rendah <i>Low</i>	Bertekstur <i>Textured</i>
Z	20 000	2.48	Tinggi <i>High</i>	Licin <i>Smooth</i>

Jadual 10
Table 10

Anda dikehendaki menentukan kesesuaian bank kuasa supaya pengecasan semula telefon bimbit dapat dibuat dengan lebih cekap dan ia mudah dibawa.

You are required to determine the most suitable power bank that can recharge handphones more efficiently and is easy to carry around.

[10 markah]
[10 marks]

(d) Terminal output bank kuasa dalam Rajah 10.2 berlabel '3.85 V, 77 W'.
The output terminals of the power bank in Diagram 10.2 is labelled '3.85 V, 77 W'.
Apabila ia disambungkan kepada sebuah telefon bimbit, hitung
When it is connected to a handphone, calculate

- (i) arus yang mengalir melalui bank kuasa itu,
the current that flows through the power bank,
- (ii) tenaga elektrik yang ia hilang dalam masa 1 jam.
the electrical energy it loses in 1 hour.

[5 markah]
[5 marks]

Bahagian C
Section C

[20 markah]

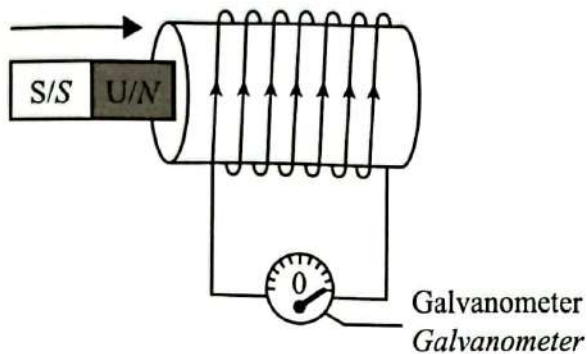
[20 marks]

Jawab semua soalan dalam bahagian ini.

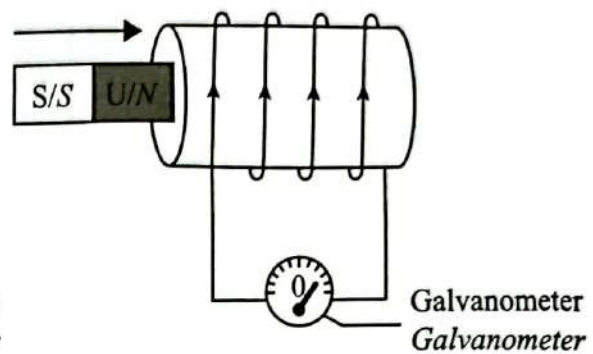
Answer all question in this section.

- 11 Rajah 11.1 dan Rajah 11.2 menunjukkan sebatang magnet bar ditolak ke dalam solenoid dengan laju yang sama.

Diagram 11.1 and Diagram 11.2 show a bar magnet is being pushed into a solenoid with the same speed.



Rajah 11.1
Diagram 11.1



Rajah 11.2
Diagram 11.2

- (a) Apakah yang dimaksudkan dengan aruhan elektromagnet?
What is meant by electromagnetic induction?

[1 markah]

[1 mark]

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

- (i) bandingkan bilangan lilitan solenoid, saiz pesongan penunjuk galvanometer dan kadar pemotongan fluks magnet.

compare the number of turns of the solenoid, the size of deflection of the galvanometer pointer and the rate of cutting of magnetic flux.

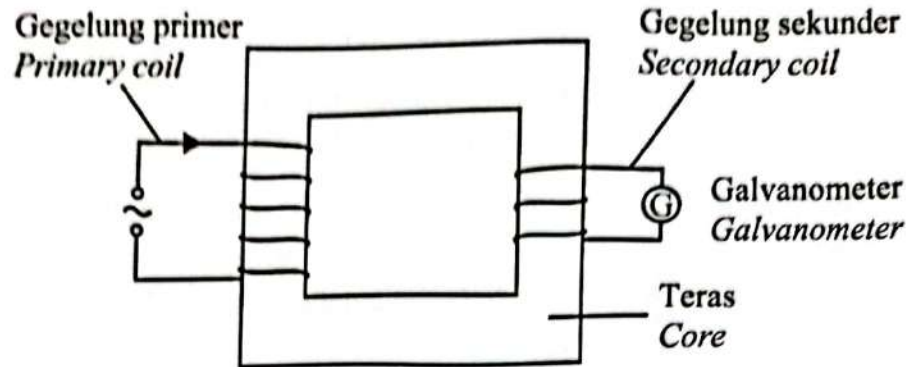
- (ii) nyatakan hubungan bilangan lilitan solenoid dengan kadar pemotongan fluks magnet untuk membuat deduksi tentang hubungan antara kadar pemotongan fluks magnet dan magnitud arus aruhan yang dihasilkan.

state the relationship between the number of turns of the solenoid with the rate of cutting of magnetic flux to make a deduction regarding the relationship between the rate of cutting of magnetic flux and magnitude of induced current produced.

[5 markah]

[5 marks]

- (c) Rajah 11.3 menunjukkan satu transformer unggul.
Diagram 11.3 shows an ideal transformer.



Rajah 11.3
Diagram 11.3

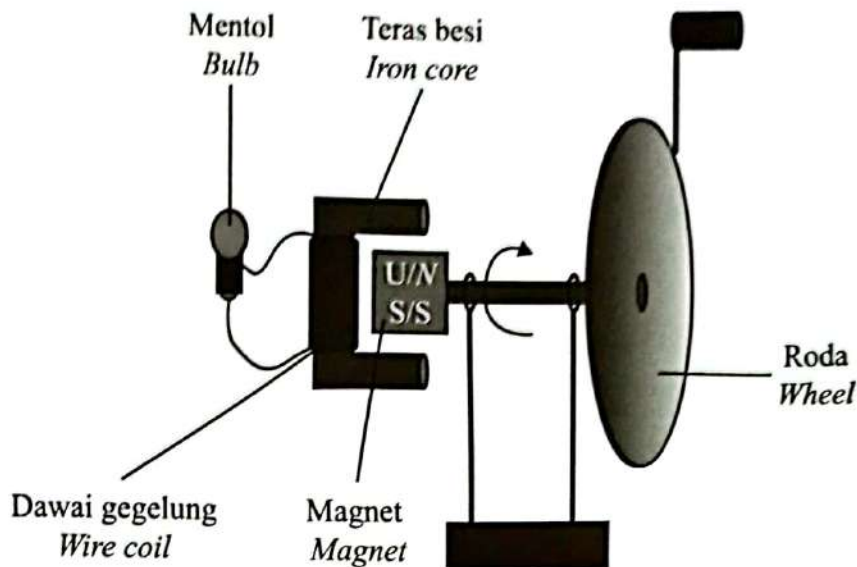
- (i) Namakan jenis transformer ini.
Name this type of transformer.
- (ii) Terangkan bagaimana arus diaruh di dalam gegelung sekunder.
Explain how current is induced in the secondary coil.

[1 markah]
[1 mark]

[3 markah]
[3 marks]

- (d) Rajah 11.4 menunjukkan struktur dinamo arus terus ringkas untuk menyalakan sebiji mentol.

Diagram 11.4 shows a structure of simple direct current dynamo to light up a bulb.



Rajah 11.4
Diagram 11.4

Cadangkan pengubahsuaian yang boleh dilakukan pada dinamo dalam Rajah 11.4 supaya mentol menyala lebih terang.

Nyatakan dan beri penerangan tentang pengubahsuaian itu berdasarkan ciri-ciri magnet, ciri-ciri teras besi, ciri-ciri dawai gegelung, kuasa mentol dan cara-cara untuk menghasilkan cahaya yang lebih terang.

Suggest modifications that can be made to the dynamo in Diagram 11.4, so that the bulb lights up brighter.

State and explain the modifications based on the characteristics of the magnet, characteristics of the iron core, characteristics of the wire coil, power of the bulb and ways to produce brighter light.

[10 markah]
[10 marks]

KERTAS PEPERIKSAAN TAMAT
END OF QUESTION PAPER