

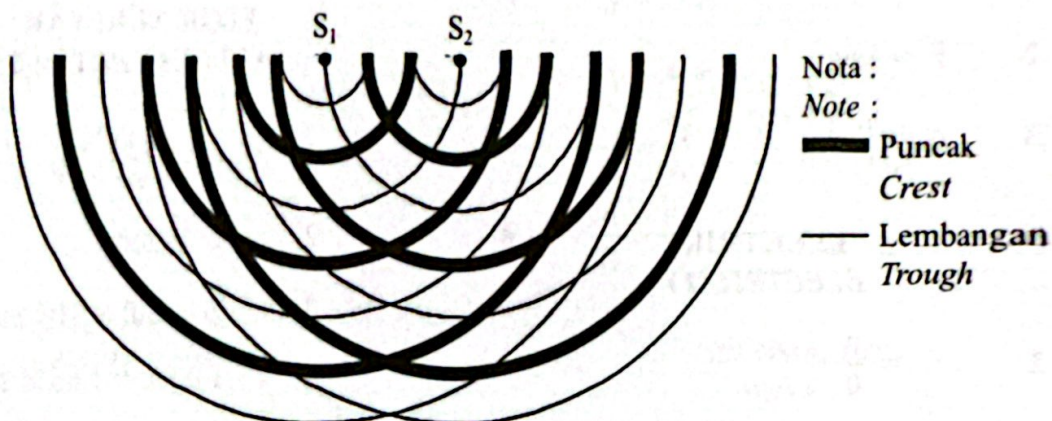
Bahagian A

[60 markah]

Jawab semua soalan.

- 1 Rajah 1 menunjukkan corak interferens gelombang air yang dihasilkan oleh dua sumber yang koheren S_1 dan S_2 dalam sebuah tangki riak.

Diagram 1 shows the interference pattern of water waves produced by two coherent sources S_1 and S_2 in a ripple tank.



Rajah 1
Diagram 1

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

1(a)

1

[1 markah]
[1 mark]

- (b) Nyatakan takrifan bagi sumber koheren.
State the definition of coherent source.

1(b)

1

[1 markah]
[1 mark]

- (c) Lukis dan labelkan satu garis antinod dan satu garis nod dalam Rajah 1.
Draw and label an antinode line and a nodal line in Diagram 1.

1(c)

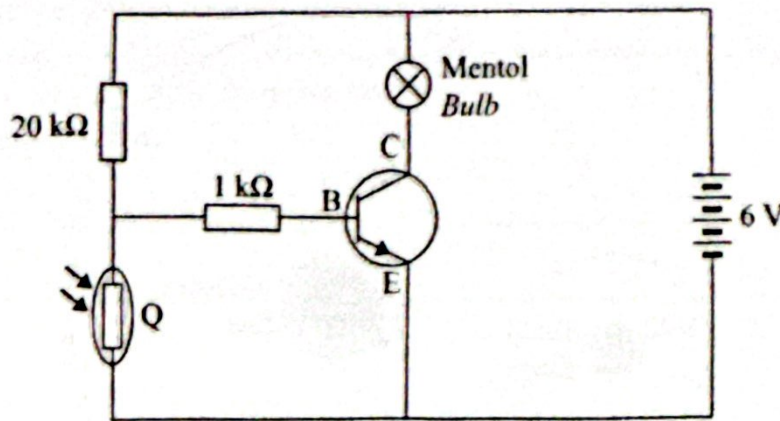
2

[2 markah]
[2 marks]

Total
A1

4

- 2 Rajah 2 menunjukkan satu litar transistor.
Diagram 2 shows a transistor circuit.



Rajah 2
Diagram 2

- (a) Namakan komponen Q.
Name the component Q.

[1 markah]
[1 mark]

2(a)

1

- (b) Apakah yang berlaku kepada voltan tapak, V_B apabila persekitaran semakin gelap?
What happens to the base voltage, V_B when the environment gets darker?

[1 markah]
[1 mark]

2(b)

1

- (c) Mentol akan menyala apabila voltan tapak, V_B adalah 4.0 V.
Berdasarkan Rajah 2, hitung rintangan Q apabila mentol menyala.
The bulb will light up when the base voltage, V_B is 4.0 V.
Based on Diagram 2, calculate the resistance of Q when the bulb lights up.

[3 markah]
[3 marks]

2(c)

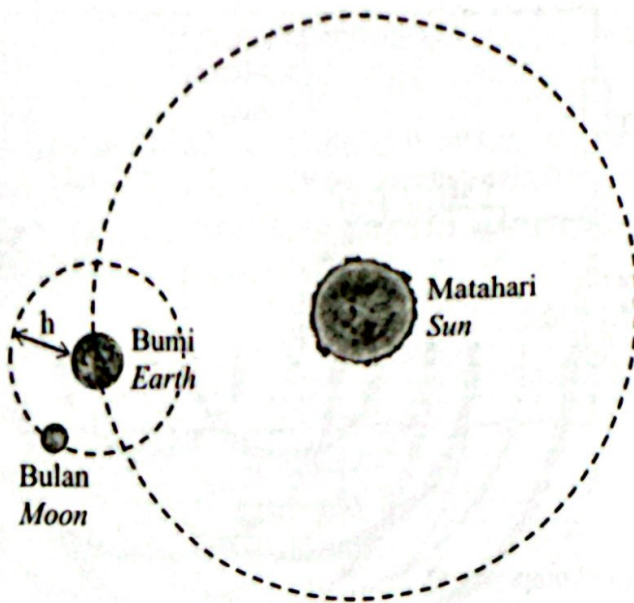
3

Total
A2

5

3

Rajah 3 menunjukkan Bulan mengorbit Bumi, manakala Bumi mengorbit Matahari.
Diagram 3 shows the Moon orbiting the Earth, while the Earth orbits the Sun.



Rajah 3
Diagram 3

Daya graviti antara Matahari, Bumi dan Bulan dapat ditentukan menggunakan Hukum Kegravitian Semesta Newton.

The gravitational force between the Sun, Earth and Moon can be determined using Newton's Universal Law of Gravitation.

- (a) Apakah Hukum Kegravitian Semesta Newton?
What is Newton's Universal Law of Gravitation?

.....

.....

.....

[1 markah]
[1 mark]

3(a)

1

- (b) Berdasarkan Rajah 3, bandingkan daya graviti antara Bumi dan Bulan, dengan Bumi dan Matahari.

Berikan sebab.

Based on Diagram 3, compare the gravitational force between the Earth and the Moon, with the Earth and the Sun.

Give a reason.

3(b)

2

[2 markah]

[2 marks]

- (c) Diberi; Jisim Bulan = 7.35×10^{22} kg
 Jisim Bumi = 5.97×10^{24} kg
 Jejari Bumi = 6.37×10^6 m
 Daya graviti antara Bumi dan Bulan = 2.00×10^{20} N
 Pemalar kegravitian semesta, $G = 6.67 \times 10^{-11} \text{ N m}^2 \text{ kg}^{-2}$

Hitung ketinggian Bulan dari permukaan Bumi, h.

- Given; Mass of Moon = 7.35×10^{22} kg
 Mass of the Earth = 5.97×10^{24} kg
 Radius of the Earth = 6.37×10^6 m
 Gravitational force between the Earth and the Moon = 2.00×10^{20} N
 Universal gravitational constant, $G = 6.67 \times 10^{-11} \text{ N m}^2 \text{ kg}^{-2}$

Calculate the height of the Moon from the Earth's surface, h.

3(c)

3

Total
A3

[3 markah]

[3 marks]

6

[Lihat halaman sebelah]

4

Rajah 4 menunjukkan sebahagian siri reputan uranium-238.
Diagram 4 shows part of the uranium-238 decay series.



Rajah 4
Diagram 4

- (a) Apakah yang dimaksudkan dengan reputan radioaktif?
What is meant by radioactive decay?

4(a)

1

.....

.....

[1 markah]
[1 mark]

- (b) Berdasarkan Rajah 4, tentukan bilangan zarah alfa dan zarah beta yang dipancarkan apabila ${}_{92}^{238}\text{U}$ mereput menjadi ${}_{88}^{226}\text{Ra}$.

Based on Diagram 4, determine the number of alpha particles and beta particles emitted when ${}_{92}^{238}\text{U}$ decays into ${}_{88}^{226}\text{Ra}$.

Bilangan zarah alfa :
Number of alpha particle

Bilangan zarah beta :
Number of beta particle

[2 markah]
[2 marks]

4(b)

2

- (c) Apakah yang berlaku kepada bilangan zarah alfa yang dipancarkan dalam 4(b) jika suhu persekitaran berkurang menghampiri takat beku?

What happens to the number of alpha particles emitted in 4(b) if the surrounding temperature is reduces to near freezing?

4(c)

1

.....

[1 markah]
[1 mark]

- (d) ${}^{226}_{88}\text{Ra}$ mereput menjadi ${}^{222}_{86}\text{Rn}$ dengan memancarkan satu zarah alfa.

Diberi; Jisim ${}^{226}_{88}\text{Ra} = 226.54 \text{ u.j.a.}$
 Jisim ${}^{222}_{86}\text{Rn} = 222.018 \text{ u.j.a.}$
 Jisim zarah alfa = 4.003 u.j.a.

${}^{226}_{88}\text{Ra}$ decays to ${}^{222}_{86}\text{Rn}$ by emitting an alpha particle.

Given; Mass of ${}^{226}_{88}\text{Ra} = 226.54 \text{ a.m.u}$
 Mass of ${}^{222}_{86}\text{Rn} = 222.018 \text{ a.m.u}$
 Mass of alpha particle = 4.003 a.m.u

- (i) Hitung cacat jisim dalam u.j.a.
 Calculate the mass defect in a.m.u.

4(d)(i)

	1
--	---

[1 markah]

[1 mark]

- (ii) Hitung tenaga yang dibebaskan.
 Calculate the energy released.

4(d)(ii)

	3
--	---

[3 markah]

[3 marks]

- (iii) Jika cacat jisim dalam 4(d)(i) berkurang, apakah yang berlaku pada tenaga yang terhasil dalam tindak balas tersebut?

If the mass defect in 4(d)(i) decreases, what happens to the energy produced in the reaction?

4(d)(iii)

	1
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[1 markah]

[1 mark]

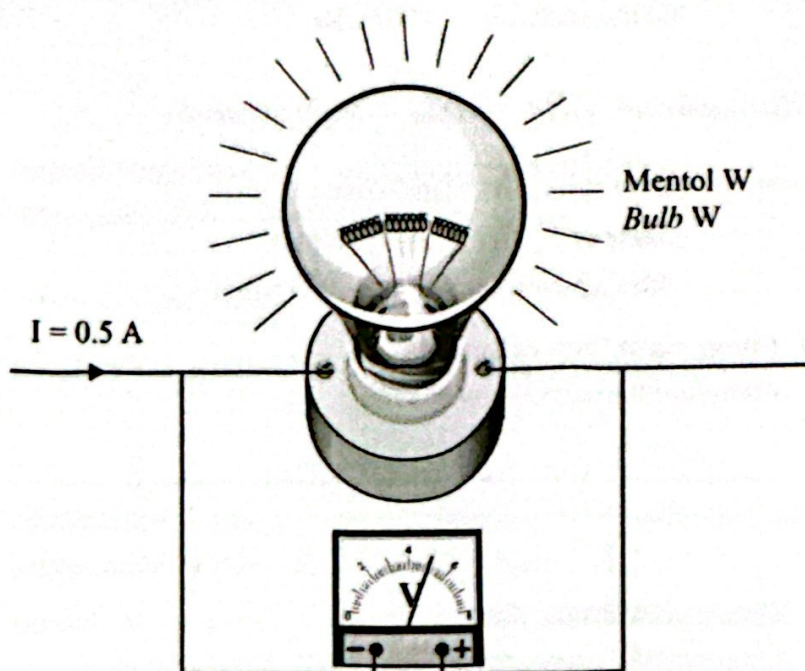
Total
A4

	9
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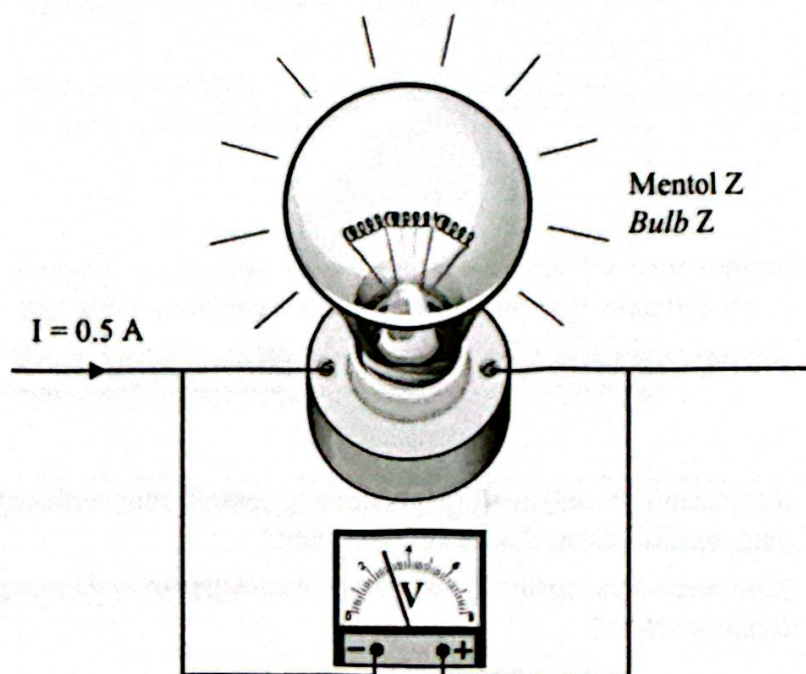
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Rajah 5.1 dan Rajah 5.2 menunjukkan kecerahan mentol W dan mentol Z apabila arus, I mengalir di dalamnya.

Diagram 5.1 and Diagram 5.2 show the brightness of bulb W and bulb Z when current, I flows in them.



Rajah 5.1
Diagram 5.1

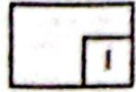


Rajah 5.2
Diagram 5.2

- (a) Apakah maksud arus?
What is meant by current?

[1 markah]
[1 mark]

S(a)

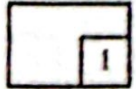


- (b) Berdasarkan Rajah 5.1 dan Rajah 5.2, bandingkan:
Based on Diagram 5.1 and Diagram 5.2, compare:

- (i) voltan merentasi mentol
the voltage across the bulb

[1 markah]
[1 mark]

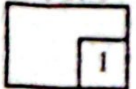
S(b)(i)



- (ii) bilangan lilitan gegelung dawai filamen
the number of turns of coil of filament wire

[1 markah]
[1 mark]

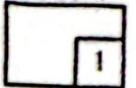
S(b)(ii)



- (iii) rintangan dawai filamen
the resistance of filament wire

[1 markah]
[1 mark]

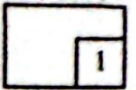
S(b)(iii)



- (iv) nyalaan mentol
the brightness of bulb

[1 markah]
[1 mark]

S(b)(iv)



- (c) Berdasarkan jawapan dalam 5(b), hubung kaitkan
Based on the answer in 5(b), relate

5(c)(i)

	1
--	---

- (i) bilangan lilitan gegelung dawai filamen dengan rintangan dawai filamen
the number of turns of coil of filament wire to the resistance of filament wire

[1 markah]

[1 mark]

5(c)(ii)

	1
--	---

- (ii) rintangan dawai filamen dengan nyalaan mentol
the resistance of filament wire to the brightness of bulb

[1 markah]

[1 mark]

- (d) Diberi; Panjang dawai filamen mentol $W = 2.0 \text{ m}$
Diameter dawai filamen mentol $W = 3 \times 10^{-4} \text{ m}$
Kerintangan dawai filamen mentol $W = 5.6 \times 10^{-8} \Omega \text{ m}$

Hitung rintangan dawai filamen mentol W.

Given; The length of filament wire of bulb $W = 2.0 \text{ m}$
The diameter of filament wire of bulb $W = 3 \times 10^{-4} \text{ m}$
The resistivity of filament wire of bulb $W = 5.6 \times 10^{-8} \Omega \text{ m}$

Calculate the resistance of filament wire of bulb W.

5(d)

	2
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Total
A5

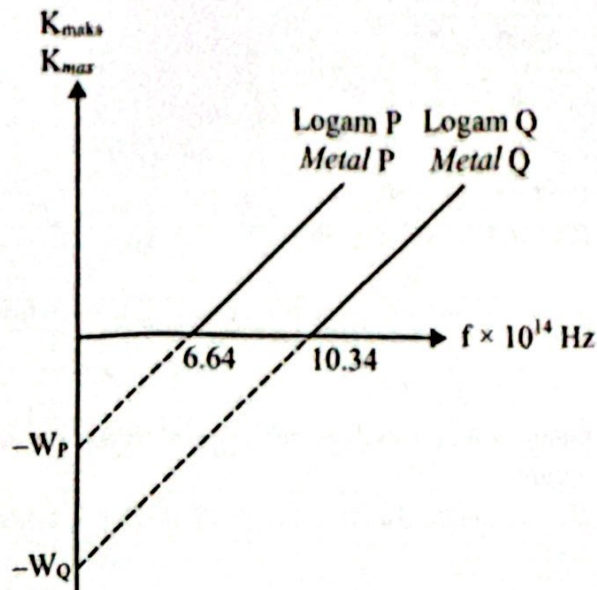
	9
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[2 markah]

[2 marks]

- 6 Rajah 6 menunjukkan sebuah graf tenaga kinetik maksimum, K_{maks} melawan frekuensi, f bagi logam P dan logam Q.

Diagram 6 shows a graph of maximum kinetic energy, K_{max} against frequency, f for metal P and metal Q.



Rajah 6
Diagram 6

Frekuensi ambang, f_0 dan fungsi kerja, W bagi setiap logam masing-masing boleh ditentukan daripada pintasan-x dan pintasan-y bagi graf K_{maks} melawan f .

The threshold frequency, f_0 and the work function, W for each metal can be determined from the x-intercept and y-intercept of the graph of K_{max} against f respectively.

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

6(a)

	1
--	---

[1 markah]

[1 mark]

- (b) Diberi bahawa pemalar Planck, $h = 6.63 \times 10^{-34}$ J s.
Berdasarkan Rajah 6, hitung fungsi kerja bagi logam Q.
Given that the Planck's constant, $h = 6.63 \times 10^{-34}$ J s.
Based on Diagram 6, calculate the work function for metal Q.

6(b)

	2
--	---

[2 markah]

[2 marks]

[Lihat halaman sebelah]

6(c)(i)

1

- (c) Berdasarkan Rajah 6, bandingkan:
Based on Diagram 6, compare:

(i) frekuensi ambang logam
the threshold frequency of metal

[1 markah]
[1 mark]

6(c)(ii)

1

(ii) fungsi kerja logam
the work function of metal

[1 markah]
[1 mark]

6(c)(iii)

1

(iii) tenaga kinetik maksimum fotoelektron yang terpancar dari permukaan logam
the maximum kinetic energy of photoelectrons emitted from the metal surface

[1 markah]
[1 mark]

- (d) Berdasarkan jawapan dalam 6(c), hubung kaitkan
Based on the answer in 6(c), relate

6(d)(i)

1

(i) frekuensi ambang dengan fungsi kerja
the threshold frequency to the work function

[1 markah]
[1 mark]

6(d)(ii)

1

(ii) fungsi kerja dengan tenaga kinetik maksimum fotoelektron
the work function to the maximum kinetic energy of photoelectrons

[1 markah]
[1 mark]

6(e)

1

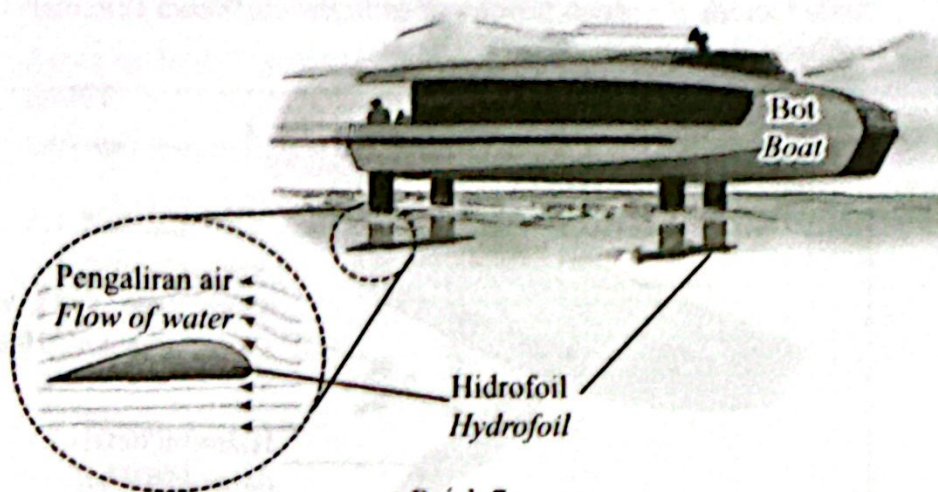
- (e) Apakah yang berlaku kepada elektron pada permukaan logam P jika alur cahaya berfrekuensi 6.64×10^{14} Hz ditujukan ke permukaan logam P?
What happens to the electrons on the surface of metal P if a beam of light that has a frequency of 6.64×10^{14} Hz is directed to the surface of metal P?

[1 markah]
[1 mark]

Total
A6

9

- 7 Rajah 7 menunjukkan hidrofoil yang dipasang pada bahagian bawah sebuah bot.
Diagram 7 shows hydrofoils attached to the bottom of a boat.



Rajah 7
Diagram 7

Penghasilan daya angkat oleh hidrofoil adalah berdasarkan prinsip Bernoulli.
The production of lift force by the hydrofoil is based on Bernoulli's principle.

- (a) Nyatakan prinsip Bernoulli.
State Bernoulli's principle.

7(a)

	1
--	---

[1 markah]
[1 mark]

- (b) Luas permukaan bahagian bawah hidrofoil dalam Rajah 7 adalah 0.5 m^2 dan perbezaan tekanan yang wujud antara permukaan atas dan bawah hidrofoil adalah 50 kPa.

Hitung daya angkat yang dihasilkan oleh hidrofoil itu dalam unit Newton.

The surface area of the lower part of the hydrofoil in Diagram 7 is 0.5 m^2 and the pressure difference that exists between the upper and lower surfaces of the hydrofoil is 50 kPa.

Calculate the lift force produced by the hydrofoil in the unit of Newton.

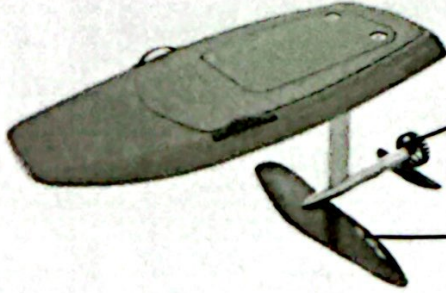
7(b)

	3
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[3 markah]
[3 marks]

- (c) Jadual 7 menunjukkan ciri-ciri papan luncur hidrofoil S, T dan U yang digunakan dalam satu pertandingan papan luncur.

Table 7 shows the characteristics of hydrofoil surfboards S, T and U used in a surfboard competition.

Papan luncur S <i>Surfboard S</i>  Kuasa motor : 10 kW <i>Power of motor : 10 kW</i> Hidrofoil besar <i>Large hydrofoil</i>
Papan luncur T <i>Surfboard T</i>  Kuasa motor : 12 kW <i>Power of motor : 12 kW</i> Hidrofoil kecil <i>Small hydrofoil</i>
Papan luncur U <i>Surfboard U</i>  Kuasa motor : 12 kW <i>Power of motor : 12 kW</i> Hidrofoil besar <i>Large hydrofoil</i>

Jadual 7
Table 7

Berdasarkan Jadual 7, nyatakan ciri-ciri papan luncur yang boleh bergerak paling laju.

Beri satu sebab untuk kesesuaian setiap ciri-ciri.

Based on Table 7, state the characteristics of the surfboard that can move the fastest.

Give one reason for the suitability of each characteristics.

(i) Saiz hidrofoil

Size of hydrofoil

.....

Sebab

Reason

.....

[2 markah]

[2 marks]

7(c)(i)

2

(ii) Kuasa motor

Power of motor

.....

Sebab

Reason

.....

[2 markah]

[2 marks]

7(c)(ii)

2

(d) Berdasarkan jawapan di 7(c), tentukan papan luncur yang boleh bergerak paling laju.

Based on the answer in 7(c), determine the surfboard that can move the fastest.

.....

[1 markah]

[1 mark]

7(d)

1

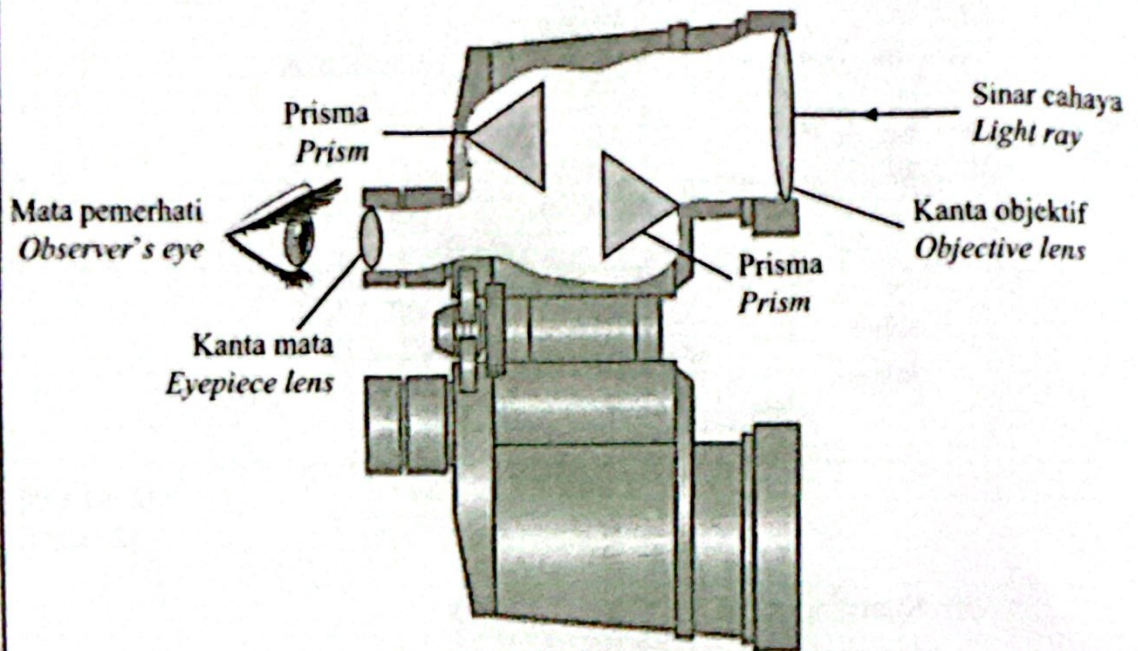
Total
A7

9



8

Seorang lelaki melihat seekor burung di atas pokok yang tinggi menggunakan binokular. Rajah 8 menunjukkan struktur dalam sebahagian binokular tersebut.
A man sees a bird on a tall tree using binoculars. Diagram 8 shows the structure in part of the binoculars.



Rajah 8
Diagram 8

- (a) Nyatakan satu ciri imej burung yang dapat dilihat menggunakan binokular.
State one characteristic of the image of the bird that can be seen using binoculars.

8(a)

	1
--	---

[1 markah]
[1 mark]

- (b) Pada Rajah 8, lengkapkan lintasan sinar cahaya yang masuk ke dalam binokular hingga ke mata pemerhati.
In Diagram 8, complete the path of light rays entering the binoculars to the observer's eye.

8(b)

	2
--	---

[2 markah]
[2 marks]

- (c) Anda dikehendaki mencadangkan pengubahsuaian yang boleh dilakukan kepada binokular supaya imej yang dilihat adalah lebih jelas serta mudah dibawa ketika melihat burung yang jauh di atas pokok.

Nyatakan dan terangkan pengubahsuaian anda berdasarkan aspek-aspek berikut:

You are required to suggest modifications that can be made to the binoculars so that the image seen is clearer and easier to carry when looking at birds that are far away on the trees.

State and explain your modification based on the following aspects:

- (i) Panjang fokus kanta objek

The focal length of objective lens

Sebab

Reason

[2 markah]

[2 marks]

8(c)(i)

	2
--	---

- (ii) Diameter kanta

The diameter of the lens

Sebab

Reason

[2 markah]

[2 marks]

8(c)(ii)

	2
--	---

- (iii) Ciri-ciri bahan yang digunakan untuk badan binokular

The characteristics of material used for the body of the binocular

Sebab

Reason

[2 markah]

[2 marks]

8(c)(iii)

	2
--	---

Total
A8

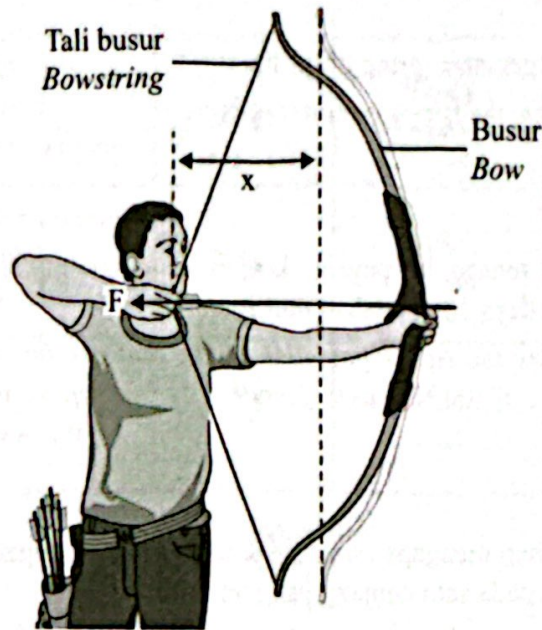
	9
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Bahagian B

[20 markah]

Bahagian ini mengandungi dua soalan. Jawab satu soalan.

- 9 Rajah 9 menunjukkan seorang pemanah menarik tali busur dengan daya, F menghasilkan regangan sebanyak x cm.
Diagram 9 shows an archer pulls the bowstring with a force, F resulting in extension of x cm.



Rajah 9
Diagram 9

Apabila anak panah dilepaskan, ia akan bergerak dengan suatu kelajuan disebabkan kekenyalan busur.

When the arrow is released, it will travel at a speed due to the elasticity of the bow.

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

[1 markah]

[1 mark]

- (b) Dengan menggunakan konsep kekenyalan dan prinsip keabadian tenaga, terangkan bagaimanakah pemanah itu dapat menghasilkan jarak panahan yang jauh.

Using the concept of elasticity and the principle of conservation of energy, explain how archers can produce a far shooting distance.

[3 markah]

[3 marks]

- (c) Daya yang dikenakan oleh pemanah itu adalah 100 N dan pemanjangan, x busur adalah 50.0 cm.

The force applied by the archer is 100 N and the extension, x of the bow is 50.0 cm.

- (i) Hitung pemalar spring busur itu.

Calculate the spring constant of bow.

[2 markah]

[2 marks]

- (ii) Hitung tenaga keupayaan kenyal yang tersimpan semasa busur tersebut ditarik dengan daya 100 N dalam unit Joule.

Calculate the elastic potential energy that can be stored when the bow is pulled by the force of 100 N in unit of Joule.

[3 markah]

[3 marks]

- (d) Beri satu sebab mengapa busur tidak akan kembali kepada keadaannya yang asal apabila diregangkan pada satu panjang yang tertentu.

Give one reason why a bow will not return to its original condition when extended to a certain length.

[1 markah]

[1 mark]

- (e) Jadual 9 menunjukkan busur P, Q, R dan S yang digunakan dalam sukan memanah.
 Table 9 shows the bows P, Q, R and S which is used in archery sports.

Busur Bow	Bahan tali busur Material of bow string	Jisim busur Mass of bow	Bulu pelepah anak panah Arrow flechas feathers	Bahan anak panah Material of arrow
P	Keras dan kenyal Stiff and elastic	5 kg	Tiada None	Aluminium karbon Carbon aluminium
Q	Lembut dan kurang kenyal Soft and less elastic	2 kg	Tiada None	Plastik PVC PVC plastic
R	Lembut dan kurang kenyal Soft and less elastic	5 kg	Ada Has	Plastik PVC PVC plastic
S	Keras dan kenyal Stiff and elastic	2 kg	Ada Has	Aluminium karbon Carbon aluminium

Jadual 9
Table 9

Kaji setiap busur tersebut dan terangkan kesesuaian setiap ciri.

Tentukan busur yang paling sesuai untuk menghasilkan jarak panahan yang paling jauh dan mudah dibawa.

Beri sebab untuk pilihan anda.

Study each of these bows and explain the suitability of each feature.

Determine the most suitable bow to produce the longest shooting distance and easy to carry.

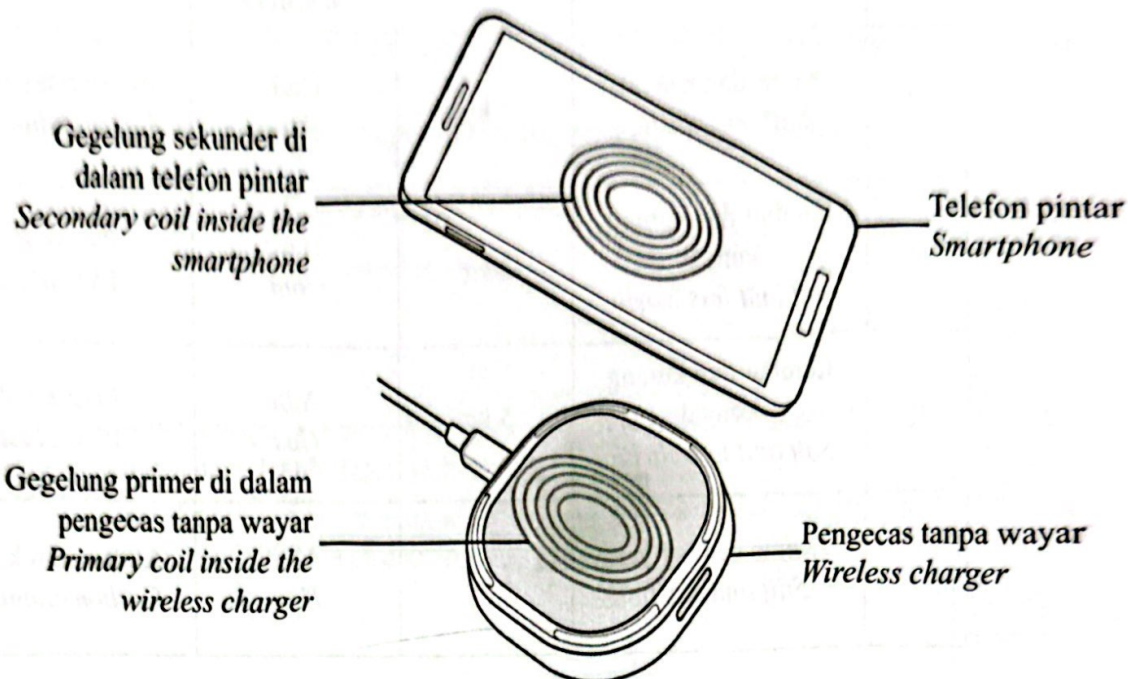
Give reasons for your choice.

[10 markah]

[10 marks]

- 10 Rajah 10.1 menunjukkan sebuah telefon pintar yang boleh dicas menggunakan pengecas tanpa wayar. Terdapat gegelung di dalam pengecas tanpa wayar dan telefon pintar yang membolehkan proses pengecasan tanpa wayar ini berlaku berdasarkan aruhan elektromagnet.

Diagram 10.1 shows a smartphone being charged using the wireless charger. There are coils inside wireless charger and smartphone that allow this wireless charging process to occur based on electromagnetic induction.



Rajah 10.1
Diagram 10.1

- (a) Telefon pintar dapat dicas secara tanpa wayar apabila bahagian belakang telefon bimbit diletakkan di atas pengecas tanpa wayar.

Smartphone can be charge by wirelessly when the back of the smartphone is placed on the wireless charger.

- (i) Apakah yang dimaksudkan dengan aruhan electromagnet?

What is meant by electromagnetic induction?

[1 markah]

[1 mark]

- (ii) Terangkan bagaimana gegelung di dalam pengecas tanpa wayar dapat mengecas telefon pintar.

Explain how the coil in the wireless charger can charge smartphone.

[4 markah]

[4 marks]

- (b) Jadual 10 menunjukkan pilihan komponen yang boleh digunakan untuk membina prototaip pengecas tanpa wayar.

Table 10 shows the choice of components that can be used to build the prototype of wireless charger.

Prototaip <i>Prototype</i>	Bilangan lilitan gegelung primer <i>Number of turns of primary coil</i>	Jenis dawai gegelung <i>Type of wire of coil</i>	Ketebalan pegecas tanpa wayar <i>The thickness of the wireless charger</i>	Jenis bekalan kuasa <i>Type of power supply</i>
P	20	Nikrom <i>Nichrome</i>	Tebal <i>Thick</i>	Arus terus <i>Direct current</i>
Q	15	Kuprum <i>Copper</i>	Tebal <i>Thick</i>	Arus ulang-alik <i>Alternating current</i>
R	15	Nikrom <i>Nichrome</i>	Nipis <i>Thin</i>	Arus terus <i>Direct current</i>
S	20	Kuprum <i>Copper</i>	Nipis <i>Thin</i>	Arus ulang-alik <i>Alternating current</i>

Jadual 10

Table 10

Berdasarkan Jadual 10, kenal pasti dan jelaskan kesesuaian setiap komponen bagi menghasilkan prototaip pengecas tanpa wayar yang mempunyai kecekapan yang tinggi dan seterusnya tentukan prototaip mana yang paling sesuai digunakan.

Beri sebab untuk pilihan anda.

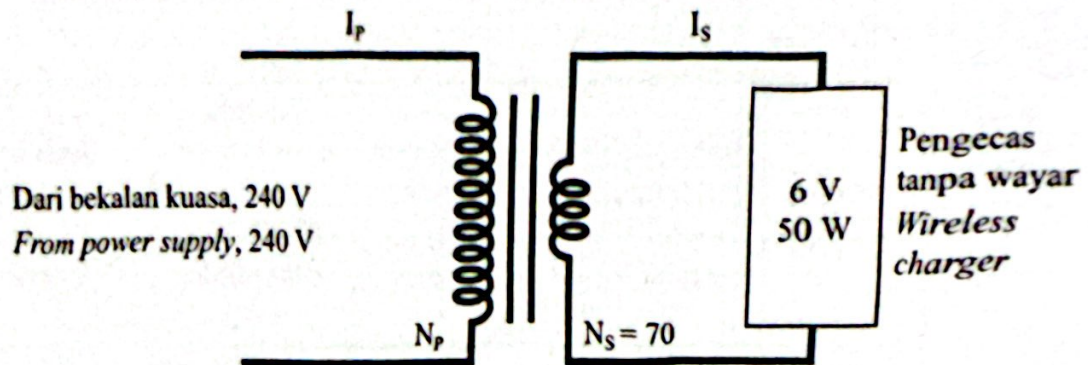
Based on Table 10, identify and explain the suitability of each component to produce a wireless charger prototype that has high efficiency and then determine which prototype is most suitable to use.

Give reasons for your choice.

[10 markah]

[10 marks]

- (c) Rajah 10.2 menunjukkan sebuah transformer di dalam plag pengecas tanpa wayar.
 Diagram 10.2 shows a transformer inside the wireless charger plug.



Rajah 10.2
 Diagram 10.2

Dengan menganggap bahawa transformer itu unggul, hitung
 Assuming that the transformer is ideal, calculate

- (i) bilangan lilitan gegelung primer, N_p .
 the number of turns of the primary coil, N_p .

[2 markah]
 [2 marks]

- (ii) arus dalam litar primer.
 current in primary circuit.

[3 markah]
 [3 marks]

Bahagian C

[20 markah]

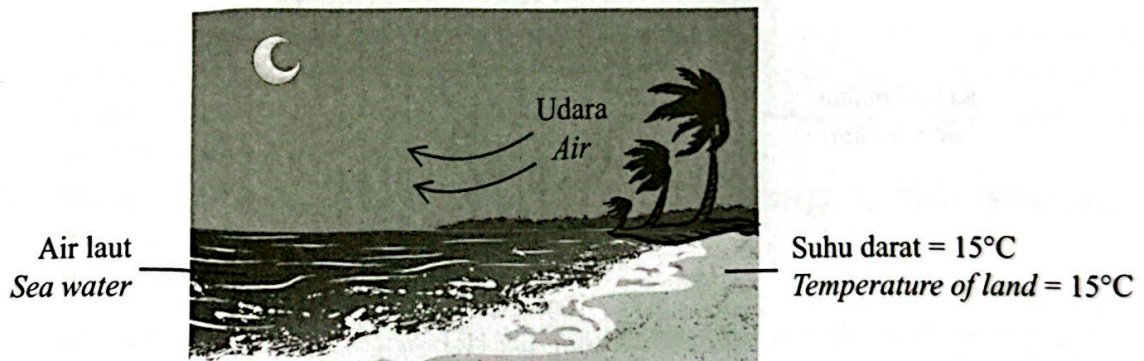
Soalan ini mesti dijawab.

- 11 Rajah 11.1 dan Rajah 11.2 menunjukkan fenomena bayu laut dan bayu darat yang terjadi kerana perbezaan muatan haba tentu air laut dan darat.

Diagram 11.1 and Diagram 11.2 show the phenomenon of sea breeze and land breeze that occur due to the difference in the specific heat capacity of sea water and land.



Rajah 11.1
Diagram 11.1



Rajah 11.2
Diagram 11.2

Diberi bahawa muatan haba tentu darat dan air laut masing-masing adalah $3\,900\text{ J kg}^{-1}\text{ }^{\circ}\text{C}^{-1}$ dan $1\,632\text{ J kg}^{-1}\text{ }^{\circ}\text{C}^{-1}$.

Given that the specific heat capacity of land and sea water are $3\,900\text{ J kg}^{-1}\text{ }^{\circ}\text{C}^{-1}$ and $1\,632\text{ J kg}^{-1}\text{ }^{\circ}\text{C}^{-1}$ respectively.

- (a) Apakah yang dimaksudkan dengan muatan haba tentu?

What is meant by specific heat capacity?

[1 markah]

[1 mark]

- (b) Berdasarkan Rajah 11.1 dan Rajah 11.2, bandingkan muatan haba tentu bagi darat dan air laut, suhu udara di atas darat, ketumpatan udara di atas darat dan arah pengaliran udara yang berlaku.

Seterusnya, hubung kaitkan muatan haba tentu dengan suhu udara.

Maka, deduksikan hubungan antara suhu udara di atas darat dengan arah pengaliran udara yang berlaku.

Based on Diagram 11.1 and Diagram 11.2, compare the specific heat capacity of land and sea water, the temperature of air above land, the density of air above land and the direction of air flow.

Then, relate the specific heat capacity to the temperature of air.

Therefore, deduce the relationship between the temperature of air above land and the direction of air flow.

[6 markah]

[6 marks]

- (c) Rajah 11.3 menunjukkan kerusi-kerusi pantai yang diletakkan di tepi pantai pada hari siang.

Diagram 11.3 shows beach chairs placed on a beach during day time.

Kerusi pantai
Beach chair



Rajah 11.3
Diagram 11.3

Kerusi pantai tersebut dirasakan panas ketika mula duduk di atasnya.

Selepas beberapa ketika, kerusi tersebut didapati tidak panas seperti sebelumnya.

Jelaskan.

The beach chair feels hot when you start sitting on it.

After a while, the chair was found not to be as hot as before.

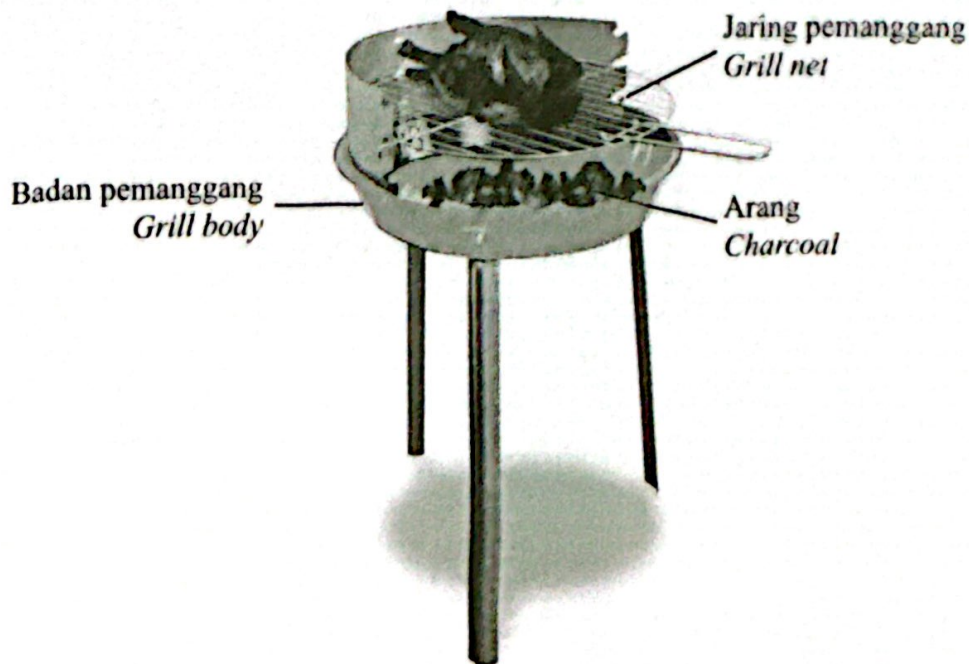
Explain.

[3 markah]

[3 marks]

- (d) Rajah 11.4 menunjukkan sebuah pemanggang yang menggunakan arang untuk memanggang makanan di tepi pantai.

Diagram 11.4 shows a grill that uses charcoal to grill food by the beach.



Rajah 11.4
Diagram 11.4

Anda dikehendaki mencadangkan beberapa pengubahsuaian yang boleh dilakukan kepada pemanggang dalam Rajah 11.4 supaya pemanggang boleh dipegang dengan selamat dan mudah alih, serta mampu memanggang makanan yang banyak dengan cepat tanpa gangguan angin dari pantai.

Nyatakan cadangan anda berdasarkan ciri-ciri jaring pemanggang, badan pemanggang, saiz pemanggang dan alat tambahan pada pemanggang.

Beri sebab bagi jawapan anda.

You are required to suggest some modifications that can be made to the grill in Diagram 11.4 so that the grill can be held securely and is portable, and able to grill large amounts of food quickly without the disturbance of the wind from the shore.

State your recommendations based on the features of the grill net, grill body, grill size and additional tool on the grill.

Give reasons for your answer.

[10 markah]

[10 marks]

KERTAS PEPERIKSAAN TAMAT

Maklumat berikut mungkin berfaedah. Simbol-simbol mempunyai makna yang biasa.

The following information may be useful. The symbols have their usual meaning.

**DAYA DAN GERAKAN I
FORCE AND MOTION I**

**HABA
HEAT**

- 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 $p = mv$
- 6 $F = ma$

- 1 $Q = mc\Delta\theta$
- 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**

**GELOMBANG
WAVES**

- 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 $T^2 = \frac{4\pi^2 r^3}{GM}$
- 7 $\frac{T_1^2}{r_1^3} = \frac{T_2^2}{r_2^3}$
- 8 $v = \sqrt{\frac{GM}{r}}$
- 9 $v = \sqrt{\frac{2GM}{r}}$
- 10 $g = 9.81 \text{ m s}^{-2}$
- 11 $G = 6.67 \times 10^{-11} \text{ N m}^2 \text{ kg}^{-2}$

**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 $m = \frac{h_1}{h_0} = \frac{v}{u}$

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 $P = \frac{F}{A}$
- 2 $P = h\rho g$
- 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 $\eta = \frac{P_o}{P_i} \times 100 \%$

ELEKTRONIK
ELECTRONICS

- 1 $E = eV$
- 2 $E_K = \frac{1}{2}mv^2$
- 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 $c = 3.0 \times 10^8 \text{ ms}^{-1}$
- 4 $1 \text{ u.j.a.} = 1.66 \times 10^{-27} \text{ kg}$

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 $h = 6.63 \times 10^{-34} \text{ Js}$