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mind. PROVE IT!!*

PHYSICS Workshop 2023



Kertas 2 (Paper 2)

1. A professional baseball team trains their players by allowing them to go through hitting the ball drills that are ejected from a spring system in two initial state of compression as shown in Diagram 9.1 and Diagram 9.2. Both two springs have the same initial length. *Kumpulan bola lisut profesional telah melatih pemainnya dengan membenarkan mereka menghentam bola yang dilepaskan dari sistem spring dalam dua keadaan mampatan awal seperti yang ditunjukkan dalam Rajah 9.1 dan Rajah 9.2. Kedua-dua spring mempunyai panjang awal yang sama.*

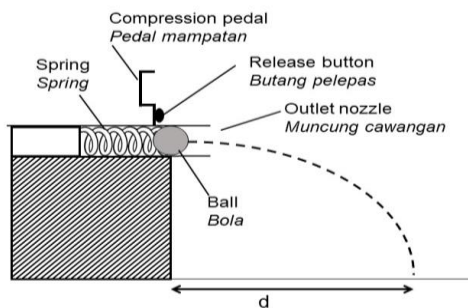


Diagram 9.1/ Rajah 9.1

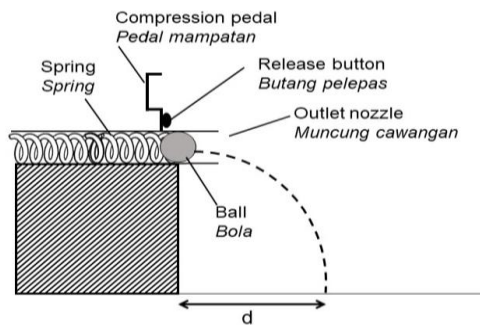


Diagram 9.2/ Rajah 9.2

A compression pedal are used to compress the spring. The target ball is then placed beside the compression spring. The release button will releases the compressed spring and the ball is ejected with a high speed for the base players to hit. *Pedal mampatan digunakan untuk memampatkan spring. Bola sasaran diletakkan bersebelahan dengan spring termampat. Butang pelepas akan melepaskan spring termampat dan bola dilepaskan dengan halaju tinggi supaya pemain boleh menghentam bola tersebut*

b) Based on Diagram 9.1 and Diagram 9.2, *Berdasarkan Rajah 9.1 dan Rajah 9.2,* i) compare the elastic potential energy in the spring, the speed of the ball after being ejected and the distance travelled, d by the ball after ejection.

bandingkan tenaga keupayaan kenyal dalam spring, halaju bola apabila dilepaskan dan jarak yang dilalui, d oleh bola apabila dilepaskan.

ii) relate the elastic potential energy in the spring with the speed of the ball after being ejected to make a deduction regarding the relationship between the distance travelled, d by the ball after ejection and the speed of the ball after being ejected.

hubungkaitkan tenaga keupayaan kenyal dalam spring dengan halaju bola apabila dilepaskan untuk membuat satu kesimpulan berkaitan hubungan antara jarak yang dilalui, d oleh bola selepas dilepaskan dengan halaju bola apabila dilepaskan.

[5 marks/ 5 markah]

(c) State two modifications that can be done to the spring in order to generate a higher speed for the ball. Give reasons for your answers.

Nyatakan dua perubahan yang boleh dilakukan kepada spring supaya bola boleh dilepaskan dengan halaju yang tinggi, sebab untuk jawapan anda.

[4 marks/ 4 markah]

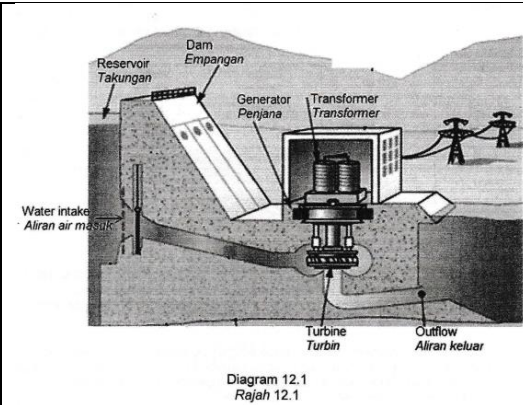


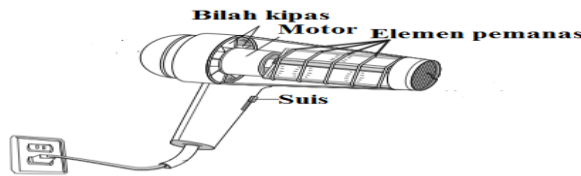
Diagram 12.1 shows the building structure of construction of a hydro power generating plant. Rajah 12.1 menunjukkan struktur binaan sebuah loji penjana kuasa hidro.

Based on the Diagram 12.1, explain how the efficiency can be increased in the long distance transmission of electricity by using alternating-current. Berdasarkan Rajah 12.1, terangkan bagaimana kecekapan dapat ditingkatkan dalam penghantaran tenaga elektrik jarak jauh dengan menggunakan arus ulangalik.

[4 marks]

Rajah 10.4 menunjukkan struktur sebuah alat pengering rambut yang bertanda 240V, 1100 W. Alat ini tidak berfungsi dengan cekap.

Diagram 10. 4 shows a structure of hair dryer with sign 240 V, 1100 W. The gadget not function effectively.



Rajah 10.4

Anda dikehendaki untuk mengubahsuai alat pengering rambut di atas untuk menjadi lebih cekap lagi. Dalam penerangan anda berikan penekanan kepada aspek-aspek berikut:

You are ask to modify the hair dryer to be more efficient. In your discussion, the aspect to be highlights (i) Bahan elemen pemanas/ heating element

(ii) Ketebalan dawai elemen pemanas/ the thickness of heating element

(iii) Kuasa kipas yang digunakan/ power of fan

(iv) Kadar fuis yang digunakan/ rate of fuse uses

(v) Bilangan kipas / number of fans

[10 markah]

1.

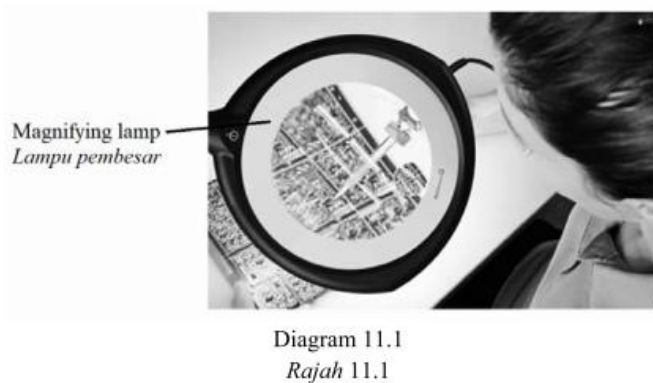






Diagram 11.1 shows a technician using a magnifying lamp to help him repairing a circuit board. The magnifying lamp uses a lens to magnify the image of the circuit.

Rajah 11.1 menunjukkan seorang juru teknik menggunakan lampu pembesar untuk membantunya membaiki sebuah papan litar. Lampu pembesar itu menggunakan sebuah kanta untuk memperbesarkan imej litar itu.

By using a diagram, explain how the image is formed. In your explanation, state the characteristics of the image.

Dengan menggunakan rajah, terangkan bagaimana imej terbentuk. Dalam

Characteristics of Track Helmet <i>Ciri-ciri Topi Keledar Trek</i>	
K	<p>Material for interior shell: Rubber <i>Bahan bahagian dalam: Getah</i></p>  <p>Narrow strap <i>Tali halus</i></p> <p>Air hole: Absent <i>Lubang udara: Tiada</i></p> <p>Front end: Short & round <i>Bahagian hadapan: Pendek & bulat</i></p>
L	<p>Material for interior shell: Rubber <i>Bahan bahagian dalam: Getah</i></p>  <p>Narrow strap <i>Tali halus</i></p> <p>Air hole: Present <i>Lubang udara: Ada</i></p> <p>Front end: Long & pointed <i>Bahagian hadapan: Panjang & tirus</i></p>
M	<p>Material for interior shell: Polystyrene <i>Bahan untuk bahagian dalam: Polisterina</i></p>  <p>Wide strap <i>Tali lebar</i></p> <p>Air hole: Absent <i>Lubang udara: Tiada</i></p> <p>Front end: Long & pointed <i>Bahagian hadapan: Panjang & tirus</i></p>
N	<p>Material for interior shell: Polystyrene <i>Bahan untuk bahagian dalam: Polisterin</i></p>  <p>Wide strap <i>Tali lebar</i></p> <p>Air hole: Present <i>Lubang udara: Ada</i></p> <p>Front end: Short & round <i>Bahagian hadapan: Bulat</i></p>

penerangan anda, nyatakan ciri-ciri imej itu.
[4 marks]

(c) Table 11.1 shows the characteristics of four different track helmets used for a track cycling competition in a velodrome.

You are required to determine the most suitable helmet.

Jadual 11.1 menunjukkan ciri-ciri bagi empat topi keledar trek berlainan yang digunakan dalam pertandingan trek berbasikal di dalam velodrom.

Anda dikehendaki menentukan topi keledar trek yang paling sesuai.

Study the specifications of all the four helmets based on the following aspects:

Kaji spesifikasi keempat-empat topi keledar trek berdasarkan aspek aspek berikut:

- (i) Front end of helmet
Bahagian hadapan helmet
- (ii) Material for inner shell
Bahan untuk bahagian dalam
- (iii) Width of strap
Kelebaran tali
- (iv) Presence of air hole
Kehadiran lubang udara

Explain the suitability of each characteristic of the track helmets and determine the most suitable track helmet to be used for the indoor cycling competition.

Give reasons for your choice.

11. Diagram 11.1 shows an air ventilation system used in a house.

Rajah 11.1 menunjukkan satu sistem pengudaraan yang digunakan di sebuah rumah.



Diagram 11.1

Rajah 11.1

(ii) Explain in terms of heat transfer, how the air ventilation system worked to cool down house.

Terangkan dalam konteks pengaliran haba, bagaimana sistem pengudaraan bekerja untuk menyejukkan rumah.

[4 marks]

[4 markah]

(c) Diagram 9.3 shows Farhan is cutting the grass using a lawnmower by pushing it forward.
Rajah 9.3 menunjukkan Farhan sedang memotong rumput menggunakan mesin pemotong rumput dengan menolak mesin itu ke hadapan.



Diagram 9.3
Rajah 9.3

He found that it is less efficient cutting the grass by pulling the lawnmower backwards. Explain why the situation occurs.

Dia mendapati adalah kurang berkesan memotong rumput dengan menarik mesin pemotong ke belakang. Jelaskan mengapa situasi ini terjadi.

[4 marks]

4.

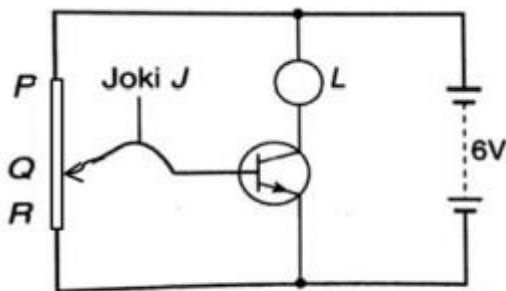


Diagram 10.2(a)/Rajah 10.2(a)

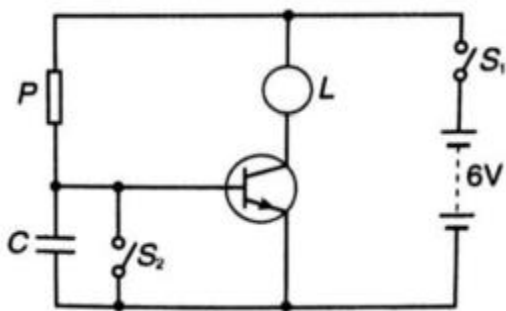


Diagram 10.2/Rajah 10.2(b)

Diagram 10.2(a) show a transistor circuit. PQR is a resistance wire, J is a jockey and L is a lamp with label 6V,6W. When the jockey J is touched at Q, the lamp, L light up with normal brightness.

Rajah 10.2(a) menunjukkan satu litar transistor. PQR ialah satu dawai perintang, J ialah sebatang joki dan L ialah sebuah lampu berlabel 6V,6W. Apabila joki J berada di Q, lampu L menyala dengan kecerahan normal.

(i) What happen to the bulb when jockey J is moved to position R? Give your reason.

Apa yang akan berlaku kepada mentol apabila joki J digerakkan ke kedudukan R? Berikan alasan anda. [2 Mark/2Markah]

(ii) Circuit in diagram 10.2(a) is changed to diagram 10.2(b), where C is an uncharged capacitor. Explain your observation when only switch S 1 is closed.

Litar pada rajah 10.2(a) diubah kepada rajah 10.2(b), di mana C ialah sebuah kapasitor yang belum dicaskan. Terangkan pemerhatian anda apabila hanya suis S 1 sahaja ditutup? [2 Marks/2Markah]

1.

Diagram 10.4 shows a moving coil microphone and its cross-section. Moving coil microphone converts the sound energy to electrical energy based on electromagnetic induction.

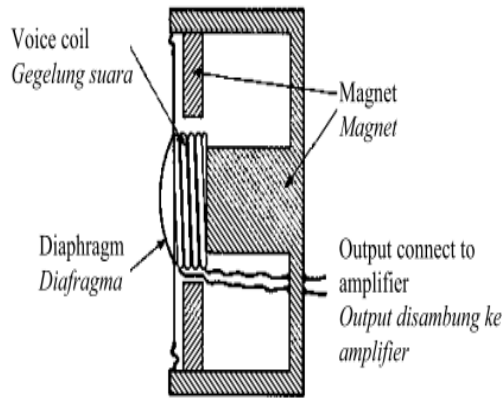


Diagram / Rajah 10.4

When a person speaks through the microphone, the diaphragm and voice coil vibrate. The coils move in and out from the magnet to produce a small alternating current at the frequency of the sound.

Rajah 10.4 menunjukkan satu mikrofon gegelung bergerak dan keratan rentasnya. Mikrofon gegelung bergerak menukarkan tenaga bunyi kepada tenaga elektrik berdasarkan aruhan elektromagnet.

Apabila seseorang bercakap melalui mikrofon, diafragma dan gegelung bergetar. Gegelung suara bergerak ke dalam dan ke luar magnet untuk menghasilkan satu arus elektrik ulang-alik yang kecil pada frekuensi bunyi.

Suggest and explain how to improve the moving coil microphone so that it can function effectively and generate a greater electric current based on the characteristics of the thickness and elasticity of diaphragm, the voice coil and the strength of magnet.

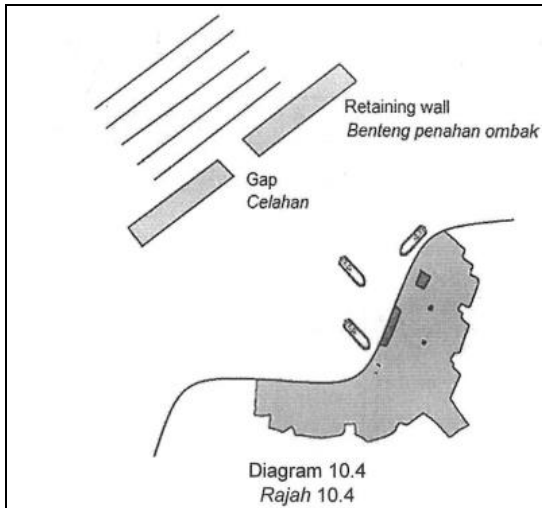
Cadang dan terangkan bagaimana untuk menambah baik mikrofon gegelung bergerak itu supaya ia dapat berfungsi dengan berkesan dan menghasilkan arus elektrik yang lebih besar berdasarkan ciri-ciri ketebalan dan kekenyalan diafragma, gegelung suara dan kekuatan magnet.

[10 marks]

Characteristics	Explanation
1.	
2.	
3.	
4.	
5.	

2.

Diagram 10.4 shows the water wave moves toward a retaining wall near the harbour.



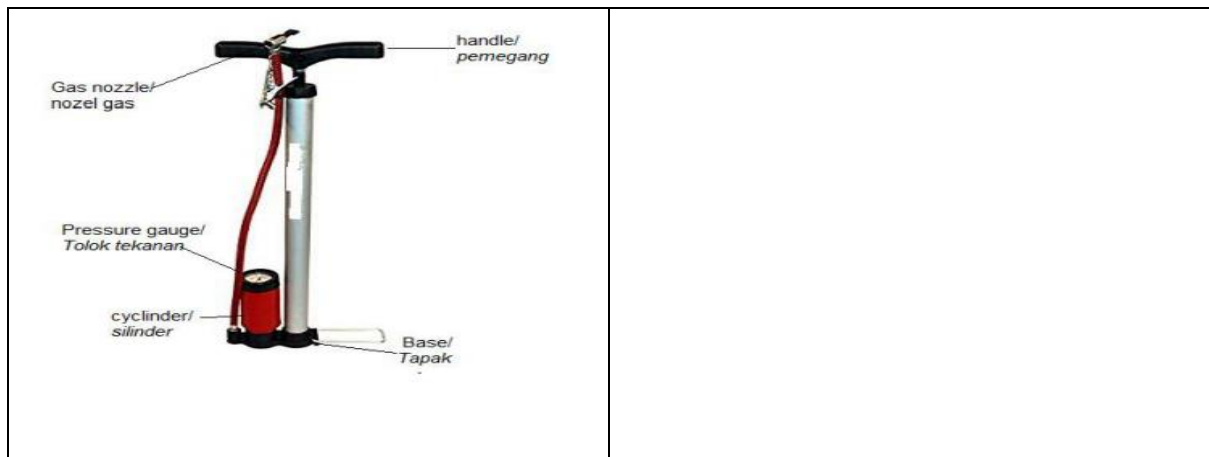
Rajah 10.4 menunjukkan gelombang air bergerak menuju ke benteng penahan ombak dekat dengan pelabuhan.

The design of the retaining wall in Diagram 10.4 is not suitable to protect the harbour from erosion due to high amplitude of water waves. Suggest and explain how to improve the retaining wall to reduce erosion on the surface of the wall, height of the wall, shape of the wall and size and number of the gap.

Rekabentuk dinding pemecah ombak pada Rajah 10.4 tidak sesuai untuk melindungi pelabuhan daripada hakisan disebabkan oleh amplitud ombak yang besar. Cadang dan terangkan bagaimana untuk meningkatkan dinding pemecah dalam mengurangkan hakisan melalui permukaan benteng, ketinggian benteng, bentuk banteng, saiz dan bilangan celah. [10 marks]

Characteristics	Explanation
1.	
2.	
3.	
4.	
5.	

3. Diagram shows a bicycle pump which takes longer time to inflate the bicycle tyres. <i>Rajah menunjukkan sebuah pam basikal yang mengambil masa yang lama untuk mengembungkan tayar basikal.</i>	Using appropriate physics concepts, explain the usage of suitable parts to design the most convenience safety pump that ready to pump whenever it is needed. <i>Guna konsep fizik yang sesuai, terangkan penggunaan bahagian yang sesuai untuk merekabentuk pam basikal yang paling memudahkan dan selamat untuk digunakan bila-bila diperlukan.</i> [10 marks]
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Essay Part C.

1. Table A shows the characteristic of four designs of the aeroplane wings.

Jadual A menunjukkan ciri-ciri bagi empat rekabentuk sayap kapal terbang.

Wing Sayap	Shape of cross section of wing <i>Bentuk keratan rentas sayap</i>	Area of wing <i>Keluasan sayap/ m²</i>	Density of wing material <i>Ketumpatan bahan sayap / kgm⁻³</i>	Difference in speed of air above and below the wing <i>Perbezaan laju udara di antara bahagian atas dan bawah sayap / ms⁻¹</i>
W		38.0	2400	10.0
X		39.7	2300	21.8
Y		60.5	2000	20.0
Z		40.5	2050	15.5

Table A/ *Jadual A*

Study the characteristics of all four design of aeroplane wings.

Explain the suitability of each characteristic and determine the most suitable wing to be mounted with the body of the aeroplane.

Give reasons for your choice.

Kaji ciri-ciri bagi keempat-empat rekabentuk sayap kapal terbang tersebut.

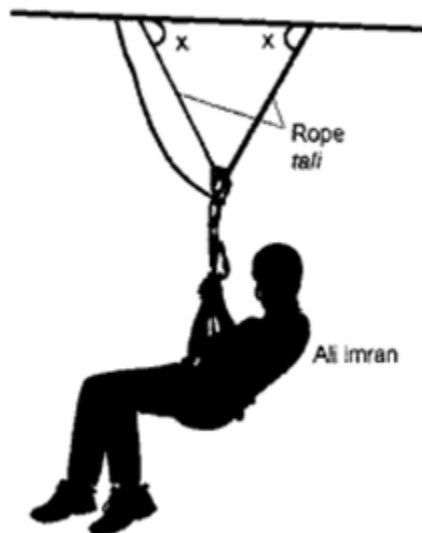
Terangkan kesesuaian setiap ciri dan tentukan sayap yang paling sesuai untuk dipasang bersama badan kapal terbang tersebut.

Beri sebab untuk pilihan anda.

[10 marks]
[10 markah]

Characteristics	Explanation
1.	
2.	
3.	
4.	
5.	

2. Diagram shows two ropes supporting Ali Imran during a flying fox activity.
Rajah menunjukkan dua utas tali yang menyokong Ali Imran semasa aktiviti 'flying fox'.



You are required to investigate the characteristics of the rope as shown in Table B below.
 Anda dikehendaki menyiasat ciri-ciri tali seperti ditunjukkan dalam Jadual B di bawah.





Rope Tali	Maximum tension of the rope/ N Tegangan maksimum tali / N	Material of the rope Bahan tali	Angle X Sudut X	Rate of the heat expansion of the rope Kadar pengembangan haba dalam tali
R	300	 Nylon Nilon	Low Rendah	2400
S	500	 Nylon Nilon	High Tinggi	2300
T	500	 Coconut husk fibre Sabut kelapa	Low Rendah	2000
U	300	 Coconut husk fibre Sabut kelapa	High Tinggi	2050

Table B / Jadual B

Study the characteristics of all four characteristic of the rope.

Determine the most suitable rope which can support a heavy man for a longer time.
Give reasons for your choice.

Kaji ciri-ciri bagi keempat-empat rekabentuk ciri pada tali.

Tentukan tali yang paling sesuai untuk menyokong seorang lelaki yang berat dalam masa yang lama. Beri sebab untuk pilihan anda. [10 marks]

Characteristics	Explanation
1.	
2.	
3.	
4.	
5.	

Paper 2 Part C

1. Definition – don't state the formula of the define word
- Write the definition in statement from the formula
2. Comparison questions – must use back the same diagram to compare in physics term comparison. Quote back the Diagram number, and compare with statement according to the marks provision.
3. Explanation on aspects given.
Must quote back the aspect given, don't divert the statement by explaining other statement of your ways.
Explain the characteristics of the statement given follow (1 marks) with explanation of the benefit and advantages of the characteristics stated. (1 marks)
More explanation are better, usually TWO are more than enough.

Part B

1. Usually calculation, and definition.
Please state formula, working and final results with minimum 2 decimal places and correct units.
2. Explanation of physics concepts, usually test your understanding of physics formula relationships.
3. Study specification on the aspects given and evaluate the pictures given to extract the answer from the information given. Quote the information of point of answer and elaborate the statement of characteristics with physics concept explanation.
4. Try to give TWO explanation of each characteristics in a statement. (4 points with 4 explanation) – 8 marks
5. Final 2 marks is the explanation of the BEST suitability and CHOOSE the BEST of the 4 or 5 given examples.
6. This characteristics and explanation can states in a table form. (THE BEST EVER ESSAY for 10 marks)
7. Choose the best essay than you can get the MOST marks.
8. Essay in Part B is usually ONE form 4 and ONE form 5. So DON'T SPOT QUESTION. Study all the physics concept.

10 Diagram 10.1 and Diagram 10.2 show two similar loudspeakers connected to an audio signal generator at different frequencies.

Rajah 10.1 dan Rajah 10.2 menunjukkan dua pembesar suara yang serupa disambung pada suatu penjana isyarat audio yang berbeza frekuensi.

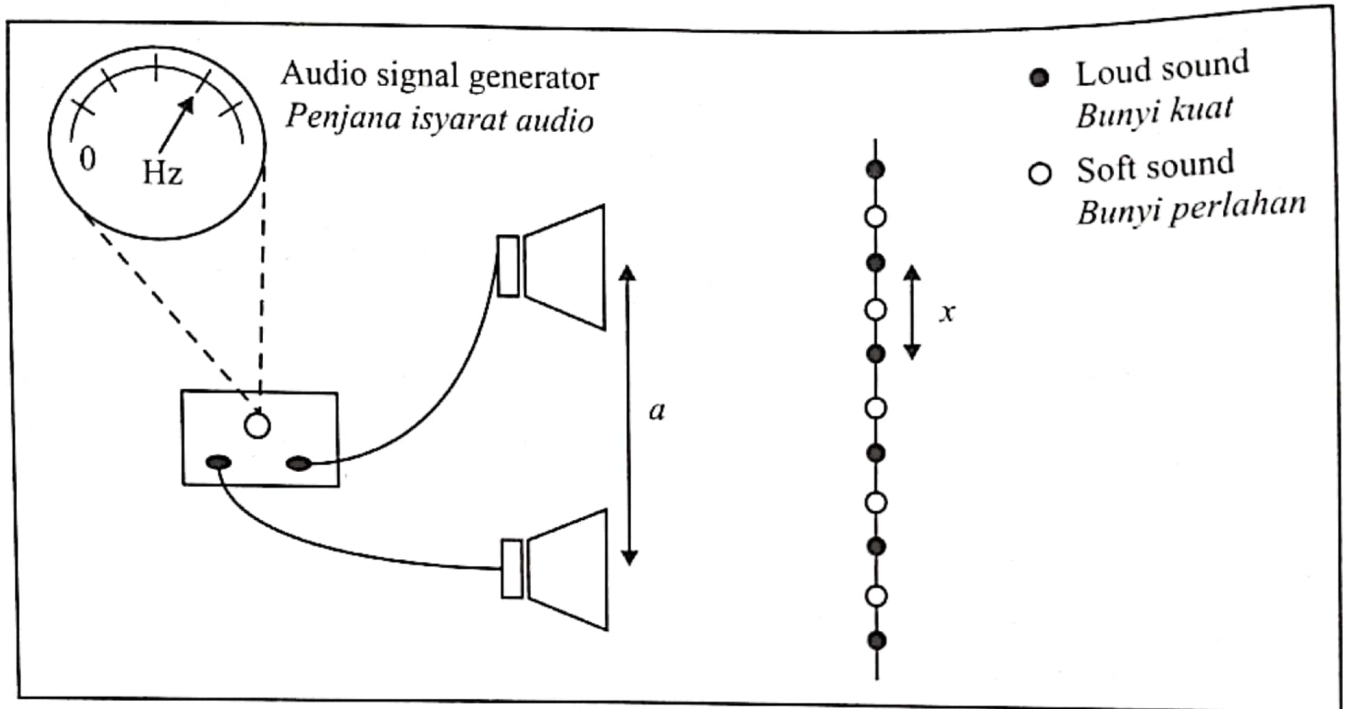


Diagram 10.1

Rajah 10.1

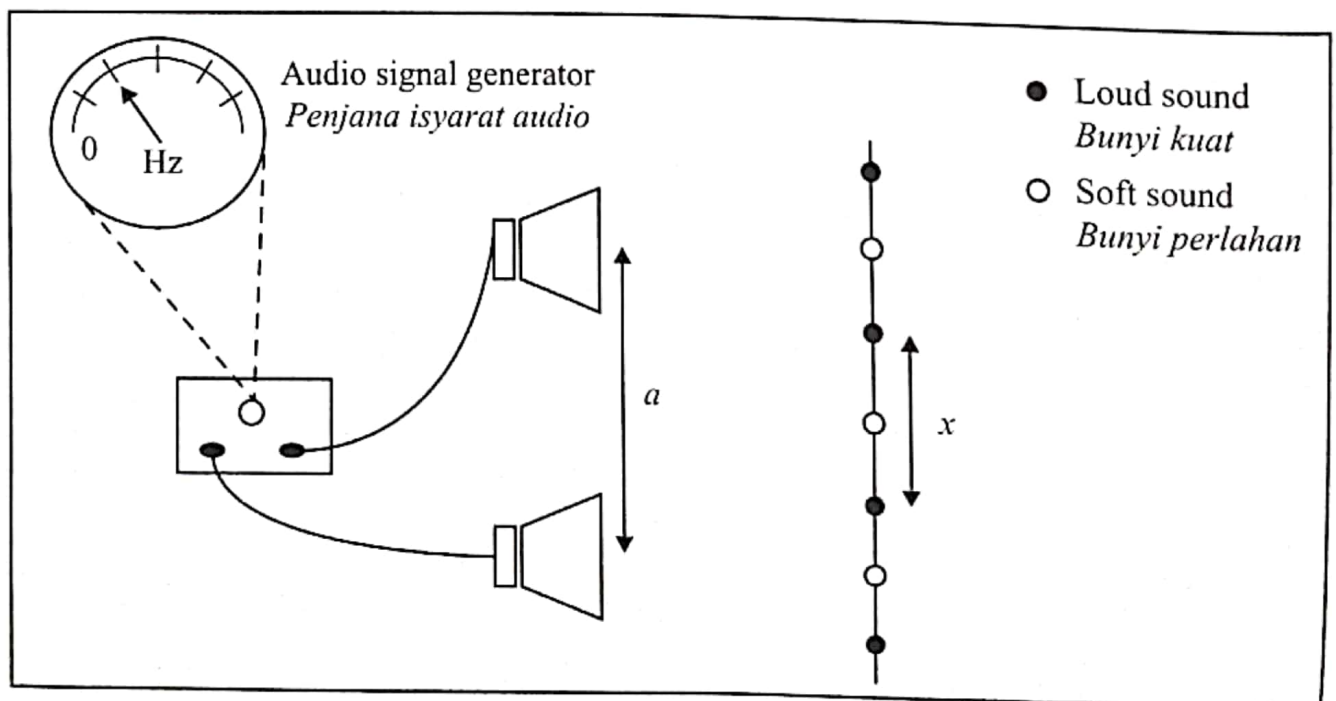


Diagram 10.2

Rajah 10.2

(a) What is the meaning of frequency?

[1 mark]

Apakah maksud frekuensi?

[1 markah]

(b) Based on Diagram 10.1 and Diagram 10.2,

Berdasarkan Rajah 10.1 dan Rajah 10.2,

(i) compare the frequency of the sound waves, the distance between the two loud speakers, a , and the distance between two consecutive loud sounds, x .

bandingkan frekuensi gelombang bunyi, jarak antara dua pembesar suara, a , dan jarak antara dua bunyi kuat yang berturutan, x .

(ii) relate the frequency of the sound waves and the distance between two consecutive loud sounds.

Name the wave phenomenon involved.

hubungkaitkan frekuensi gelombang bunyi dengan jarak antara dua bunyi kuat yang berturutan.

Namakan fenomena gelombang yang terlibat.

[5 marks]

[5 markah]

- (c) Diagram 10.3 shows the pattern of sea waves when approaching the beach.
Rajah 10.3 menunjukkan corak gelombang laut semasa menghampiri pantai.

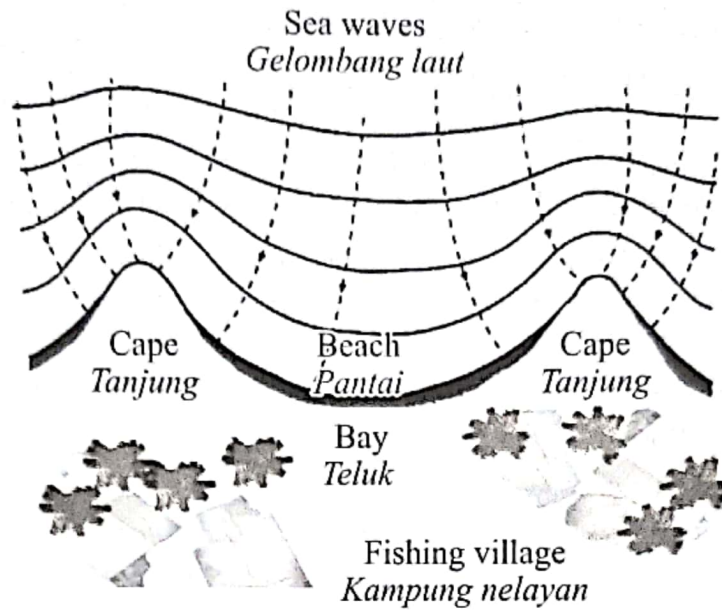


Diagram 10.3
Rajah 10.3

Explain in terms of the wave phenomena, why the water waves follow the shape of the beach as it approaches the shore.

Terangkan dalam konteks fenomena gelombang, mengapa gelombang air mengikut bentuk pantai apabila menghampiri tepi pantai.

[4 marks]

[4 markah]

- (d) There is a fishing village in the area shown in Diagram 10.3.
 You are assigned to suggest a location where the fishermen can anchor their fishing boats, the characteristics and design of a retaining wall based of the following aspects:

Terdapat sebuah kampung nelayan di kawasan yang ditunjukkan dalam Rajah 10.3.

Anda dikehendaki untuk mencadangkan lokasi yang sesuai untuk melabuhkan bot-bot ikan, ciri-ciri dan reka bentuk benteng penghalang ombak berdasarkan aspek-aspek berikut:

- (i) The location to keep the boat
Lokasi untuk melabuhkan bot
- (ii) Material used for the retaining wall
Bahan yang digunakan untuk membina benteng
- (iii) The designs of the retaining wall
Reka bentuk benteng

[10 marks]

[10 markah]

Section C
Bahagian C

[20 marks]

[20 markah]

Answer any **one** question from this section.

Jawab mana-mana satu soalan daripada bahagian ini.

- 11 Diagram 11.1 shows a plate of fried noodles and Diagram 11.2 shows a bowl of curry noodles.
Rajah 11.1 menunjukkan sepinggan mi goreng dan Rajah 11.2 menunjukkan semangkuk mi kari.



Diagram 11.1
Rajah 11.1

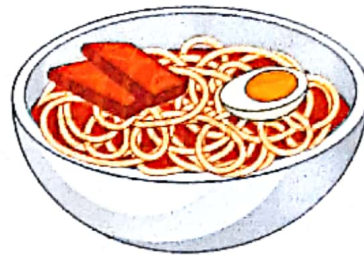


Diagram 11.2
Rajah 11.2

Both dishes contain the same amount of noodles but the curry noodles has a lot more water in it.
Kedua-dua hidangan ini mengandungi jumlah mi yang sama tetapi mi kari mengandungi lebih banyak air di dalamnya.

- (a) (i) The specific heat capacity of water is $4\,200\text{ J kg}^{-1}\text{ }^{\circ}\text{C}^{-1}$.
What is the meaning of specific heat capacity? [1 mark]
Muatan haba tentu air adalah $4\,200\text{ J kg}^{-1}\text{ }^{\circ}\text{C}^{-1}$.
Apakah yang dimaksudkan dengan muatan haba tentu? [1 markah]
- (ii) Explain why the bowl of curry noodles remains hot longer than the plate of fried noodles, even though they both contain the same amount of noodles.
Use your knowledge of specific heat capacity of water in your explanation.
Terangkan mengapa semangkuk mi kari kekal panas lebih lama daripada sepinggan mi goreng, walaupun kedua-duanya mengandungi jumlah mi yang sama.
Gunakan pengetahuan anda mengenai muatan haba tentu air dalam penjelasan anda.
[4 marks]
[4 markah]

- (b) Diagram 11.3 shows the cross-section of a roof of a tropical house with a roof turbine ventilator to provide cooling. The turbine ventilator will spin when wind passes over the roof. This will cause an airflow through the eaves vent and through the roof.

Eaves are the part of the roof that extends beyond side of the building. Its main function is to ensure that rain water from the roof is not exposed to the exterior walls.

Rajah 11.3 menunjukkan keratan rentas bumbung rumah tropika dengan ventilator turbin bumbung untuk menghasilkan penyejukan. Ventilator turbin akan berputar apabila angin bertiup melalui bumbung. Ini menyebabkan aliran udara mengalir melalui bukaan ambang dan seterusnya melalui bumbung.

Ambang adalah bahagian bumbung yang melepasi tepi bangunan. Fungsi utamanya adalah memastikan bahawa air hujan dari bumbung tidak terkena pada dinding luar.

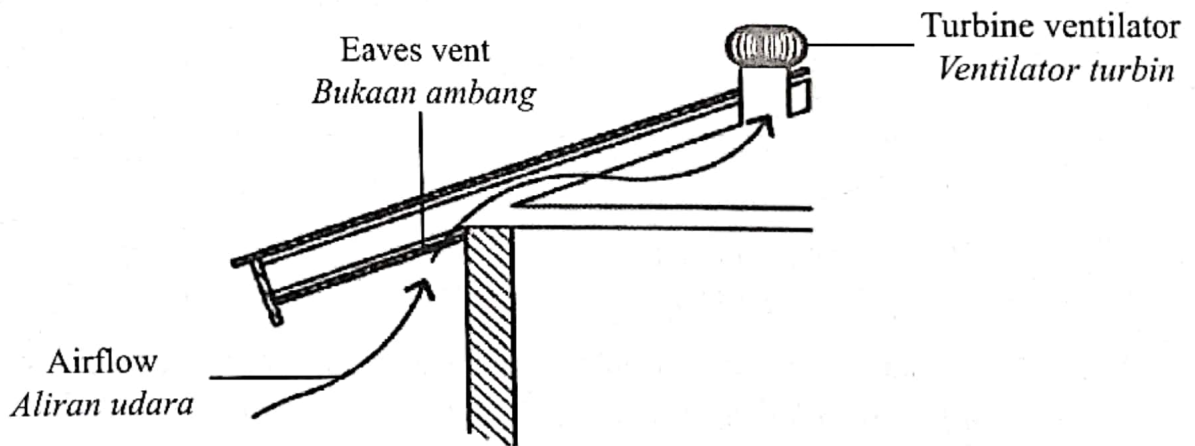


Diagram 11.3

Rajah 11.3

Table 2 shows the characteristics of four different tropical roofing systems.

Jadual 2 menunjukkan ciri-ciri empat buah sistem bumbung tropika yang berbeza.

Characteristics <i>Ciri-ciri</i>	P	Q	R	S
Specific heat capacity of roof tile <i>Muatan haba tentu jubin bumbung</i>	High <i>Tinggi</i>	High <i>Tinggi</i>	Low <i>Rendah</i>	Low <i>Rendah</i>
Colour of roof tile <i>Warna jubin bumbung</i>	Dark <i>Gelap</i>	Light <i>Cerah</i>	Dark <i>Gelap</i>	Light <i>Cerah</i>
Length of roof eaves <i>Panjang ambang bumbung</i>	1.2 m	1.0 m	0.8 m	1.4 m
Turbine ventilator <i>Ventilator turbin</i>	Present <i>Ada</i>	Present <i>Ada</i>	None <i>Tiada</i>	None <i>Tiada</i>

Table 2
Jadual 2

Study the characteristics of all four given roofing systems.

Explain the suitability of each characteristic required for providing the best cooling effect, and then determine the most suitable roofing system for a tropical house.

Give reasons for your choice.

Kaji ciri-ciri keempat-empat sistem bumbung tersebut.

Jelaskan ciri-ciri kesesuaian yang diperlukan untuk menghasilkan kesan penyejukan yang terbaik, dan seterusnya tentukan sistem bumbung yang paling sesuai bagi sebuah rumah di kawasan tropika.

Berikan sebab untuk pilihan anda.

[10 marks]

[10 markah]

- (c) 200 g of ice from the freezer at -4°C is left to melt to room temperature at 30°C in a glass.
200 g ais dari peti ais pada suhu -4°C dibiarkan mencair sehingga mencapai suhu bilik 30°C dalam sebuah gelas.

- (i) Sketch the temperature-time graph for the process of the melting ice. [2 marks]
Lakarkan graf suhu-masa bagi proses ais yang mencair itu. [2 markah]

- (ii) Calculate the quantity of heat gained by the melting ice.
The latent heat of fusion of ice is $3.34 \times 10^5 \text{ J kg}^{-1}$, the specific heat capacity of water is $4200 \text{ J kg}^{-1} \text{ }^{\circ}\text{C}^{-1}$ and the specific heat capacity of ice is $2100 \text{ J kg}^{-1} \text{ }^{\circ}\text{C}^{-1}$.

Hitung kuantiti haba yang diserap oleh ais yang mencair.

Haba pendam tentu pelakuran ais ialah $3.34 \times 10^5 \text{ J kg}^{-1}$, muatan haba tentu air ialah $4200 \text{ J kg}^{-1} \text{ }^{\circ}\text{C}^{-1}$ dan muatan haba tentu ais ialah $2100 \text{ J kg}^{-1} \text{ }^{\circ}\text{C}^{-1}$.

[3 marks]

[3 markah]

[Lihat halaman sebelah

12 Diagram 12.1 shows a transformer. The efficiency of the transformer is 80 %.

Rajah 12.1 menunjukkan sebuah transformer. Kecekapan transformer ini adalah 80 %.

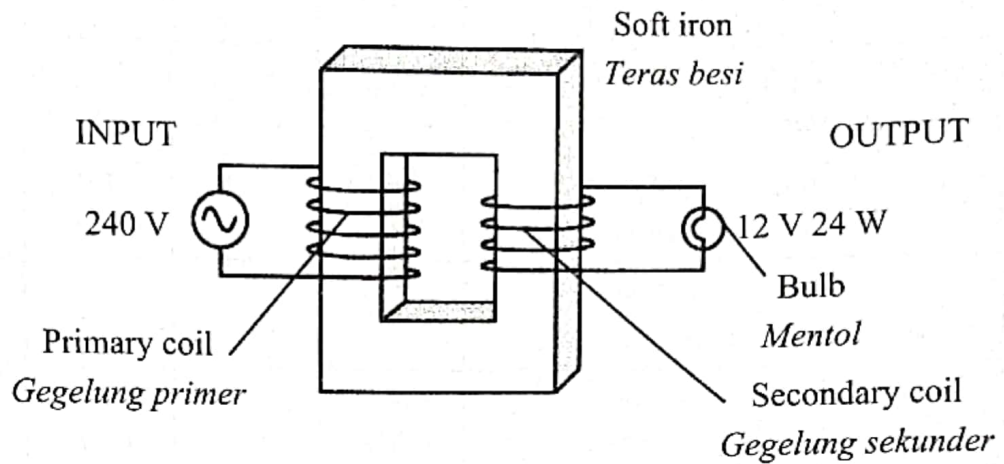


Diagram 12.1

Rajah 12.1

- (a) Name the type of transformer. [1 mark]
 Namakan jenis transformer. [1 markah]
- (b) Explain the working principle of a transformer. [4 marks]
 Terangkan prinsip kerja sebuah transformer. [4 markah]
- (c) Calculate
 Hitung
- the ratio of number of secondary coil, N_s to the number of primary coil, N_p .
 nisbah bilangan lilitan gegelang sekunder, N_s kepada bilangan gegelang primer, N_p .
 - current flowing through the bulb.
 arus yang mengalir melalui mentol.
 - input current.
 arus input.

[5 marks]
 [5 markah]

(d) Diagram 12.2 shows a direct current electrical motor.

Rajah 12.2 menunjukkan sebuah motor elektrik arus terus.

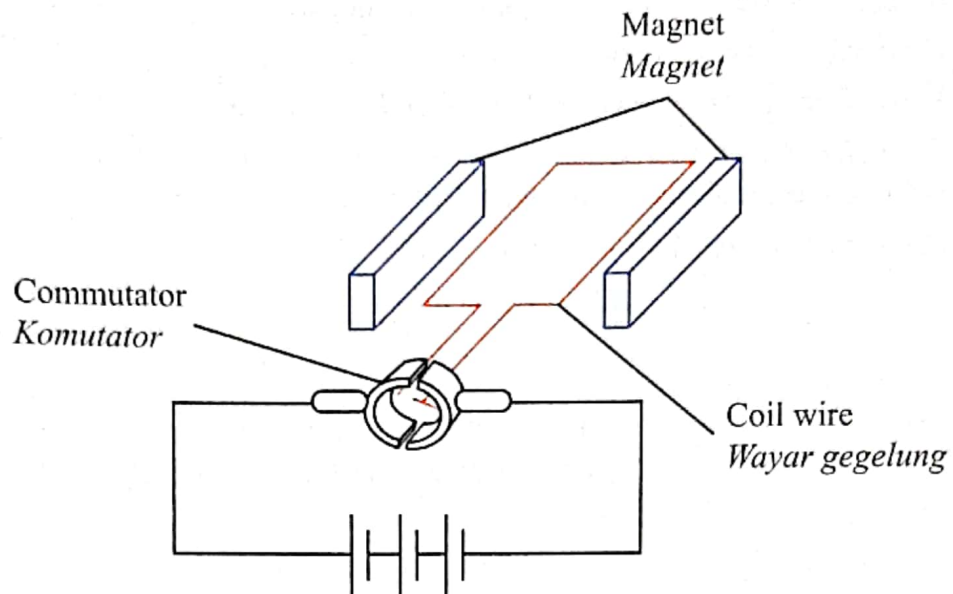


Diagram 12.2
Rajah 12.2

Table 3 shows four types of direct current electrical motors J, K, L and M with different specifications.

Jadual 3 menunjukkan empat jenis motor elektrik arus terus J, K, L dan M dengan spesifikasi yang berbeza.

Types <i>Jenis</i>	Shape of magnet <i>Bentuk magnet</i>	Type of coil wire <i>Jenis wayar gegelung</i>	Thickness of coil wire <i>Ketebalan wayar gegelung</i>	Size of magnet <i>Saiz magnet</i>
J	Curved <i>Melengkung</i>	Constantan <i>Konstantan</i>	Thin <i>Nipis</i>	1 cm
K	Rectangular <i>Empat segi</i>	Constantan <i>Konstantan</i>	Thick <i>Tebal</i>	2 cm
L	Curved <i>Melengkung</i>	Copper <i>Kuprum</i>	Thick <i>Tebal</i>	2 cm
M	Rectangular <i>Empat segi</i>	Copper <i>Kuprum</i>	Thin <i>Nipis</i>	1 cm

Table 3
Jadual 3

Study the specifications of all the four electrical motors.

Explain the suitability of each specification of the electrical motor and determine the most suitable electrical motor which has high efficiency.

Give reasons for your choice.

Kaji spesifikasi kesemua empat motor elektrik tersebut.

Terangkan kesesuaian setiap spesifikasi bagi motor elektrik dan tentukan motor elektrik yang paling sesuai dan mempunyai kecekapan yang tinggi.

Berikan sebab untuk pilihan anda.

[10 marks]

[10 markah]

END OF QUESTION PAPER
KERTAS PEPERIKSAAN TAMAT

SULIT

- 10 Diagram 10.1 and Diagram 10.2 show two circuits connection. In both diagrams, the bulbs, dry cell and connecting wires used are identical.

Rajah 10.1 dan Rajah 10.2 menunjukkan dua penyambungan litar. Dalam kedua-dua rajah, mentol-mentol, sel kering dan dawai penyambung yang digunakan adalah sama.

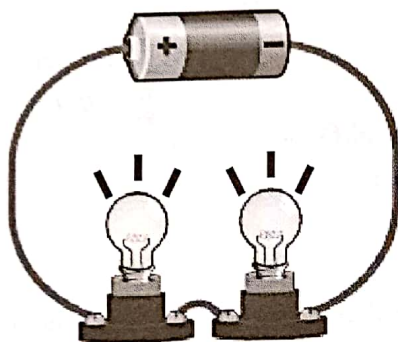


Diagram 10.1
Rajah 10.1

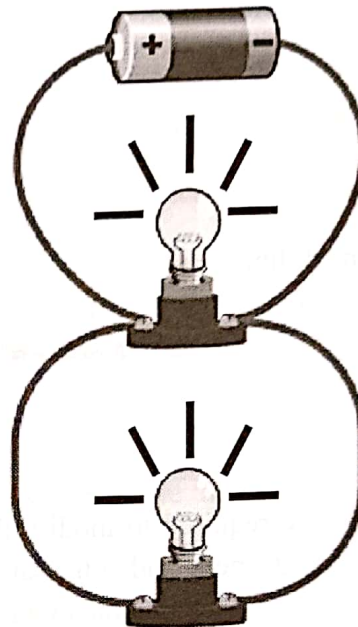


Diagram 10.2
Rajah 10.2

- (a) State Ohm's Law
Nyatakan Hukum Ohm.

[1 mark]
[1 markah]

- (b) (i) Based on Diagram 10.1 and Diagram 10.2, compare the arrangement of bulbs in the circuit, the brightness of the bulbs and the potential difference across each bulb.

Berdasarkan Rajah 10.1 dan Rajah 10.2, bandingkan susunan mentol-mentol dalam litar, kecerahan mentol-mentol dan beza keupayaan merentasi setiap mentol.

- (ii) Relate the arrangement of bulbs with the brightness of bulbs to make a deduction regarding the relationship between the arrangement of bulbs in the circuit with the potential difference across each bulb.

Hubungkan susunan mentol-mentol dengan kecerahan mentol untuk membuat deduksi tentang hubungan antara susunan mentol-mentol di dalam litar dengan beza keupayaan merentasi setiap mentol.

[5 marks]
[5 markah]

- (c) Table 10 shows voltage and power rating for three types of bulb.
Jadual 10 menunjukkan voltan dan kadar kuasa bagi tiga jenis mentol.

Type of bulb <i>Jenis mentol</i>	Voltage and Power rating <i>Voltan dan Kadar kuasa</i>
Bulb A <i>Mentol A</i>	120 V, 60 W
Bulb B <i>Mentol B</i>	120 V, 60 W
Bulb C <i>Mentol C</i>	240 V, 120 W

Table 10
Jadual 10

By using the information given in Table 10, draw and label an electrical circuit connecting all the three bulbs. All the bulbs should light up with normal brightness when connected to a 240 V a.c. power supply.

Dengan menggunakan maklumat yang diberikan dalam Jadual 10, lukis dan label satu litar elektrik yang menyambungkan ketiga-tiga mentol. Semua mentol harus menyala dengan kecerahan normal apabila disambungkan kepada bekalan kuasa a.u. 240 V.

[4 marks]
 [4 markah]

- (d) Diagram 10.3 shows a torch light available in the market.
 Diagram 10.4 shows cross sectional of the torch light.

*Rajah 10.3 menunjukkan sebuah lampu suluh yang ada di pasaran.
 Rajah 10.4 menunjukkan keratan rentas lampu suluh tersebut.*

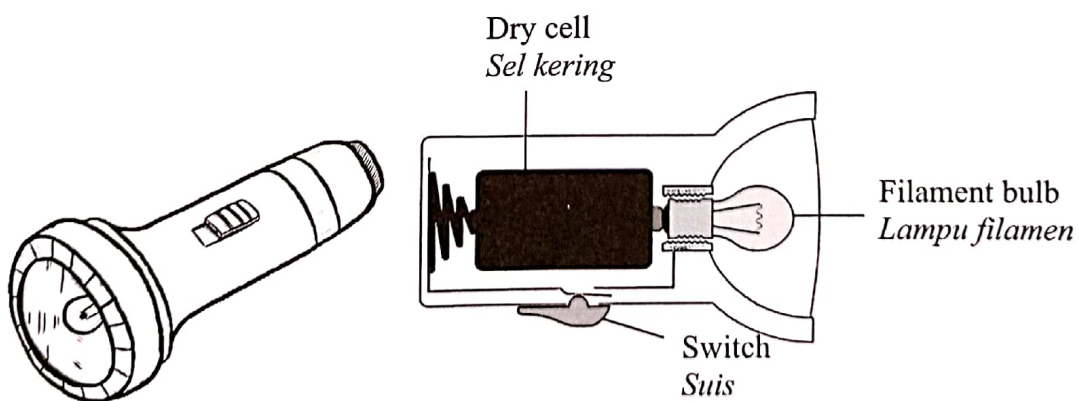


Diagram 10.3
Rajah 10.3

Diagram 10.4
Rajah 10.4

[Lihat halaman sebelah
 SULIT]

A torch light is an essential item during camping. You are required to modify the torch light in Diagram 10.3 so that it can produce brighter light, maintain its power for a longer period and work more efficiently. Suggest and explain the modifications based on the following aspects:

Lampu suluh adalah satu keperluan semasa perkhemahan. Anda dikehendaki untuk mengubah suai lampu suluh dalam Rajah 10.3 supaya ia boleh menghasilkan cahaya yang lebih terang, mengekalkan kuasanya pada tempoh yang lama dan bekerja dengan lebih cekap.

Cadang dan terangkan pengubahsuaian berdasarkan aspek-aspek berikut:

- (i) the number of the dry cell
bilangan sel kering
- (ii) the arrangement of dry cells in the circuit
cara susunan sel kering dalam litar
- (iii) the type of energy converter device to convert electrical to light energy
jenis peranti pengubah tenaga untuk mengubah tenaga elektrik kepada cahaya
- (iv) the way the energy converter device is connected
cara peranti pengubah tenaga itu disambungkan

[10 marks]

[10 markah]

Section C
Bahagian C

[20 marks]
[20 markah]

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

- 11 Diagram 11.1 shows a stainless-steel spoon in a cup of hot coffee.
Rajah 11.1 menunjukkan satu sudu keluli nirkarat di dalam secawan kopi panas.



Diagram 11.1
Rajah 11.1

- (a) What is meaning of thermal equilibrium?
Apakah yang dimaksudkan dengan keseimbangan terma?

[1 mark]
[1 markah]

- (b) Based on the concept of thermal equilibrium, explain how the stainless-steel spoon becomes as hot as the coffee in the cup?

Berpandukan kepada konsep keseimbangan terma, terangkan bagaimana sudu keluli nirkarat itu menjadi panas sama seperti kopi di dalam cawan tersebut?

[4 marks]
[4 markah]

- (b) Radioisotope is used in a factory to ensure uniform thickness of paper.
Radioisotop digunakan di sebuah kilang bagi memastikan ketebalan kertas yang seragam.

Table 12 shows the characteristics of five radioisotopes
Jadual 12 menunjukkan ciri-ciri bagi lima radioisotop.

Radioisotopes <i>Radioisotop</i>	Half-life <i>Setengah hayat</i>	Type of radiation <i>Jenis Sinaran</i>	Physical state <i>Keadaan fizikal</i>	Type of detector <i>Jenis pengesan</i>
Sodium-24 <i>Natrium-24</i>	15 hours <i>15 jam</i>	Gamma <i>Gama</i>	Liquid <i>Cecair</i>	GM-tube <i>Tiub GM</i>
Phosphorus-32 <i>Fosforus-32</i>	14 days <i>14 hari</i>	Beta <i>Beta</i>	Liquid <i>Cecair</i>	GM-tube <i>Tiub GM</i>
Polonium-210 <i>Polonium-210</i>	140 days <i>140 hari</i>	Alpha <i>Alfa</i>	Solid <i>Pepejal</i>	Spark counter <i>Pembilang bunga api</i>
Cobalt-60 <i>Kobalt-60</i>	5 years <i>5 tahun</i>	Gamma <i>Gama</i>	Solid <i>Pepejal</i>	Spark counter <i>Pembilang bunga api</i>
Strontium-90 <i>Strontium-90</i>	28 years <i>28 tahun</i>	Beta <i>Beta</i>	Solid <i>Pepejal</i>	GM-tube <i>Tiub GM</i>

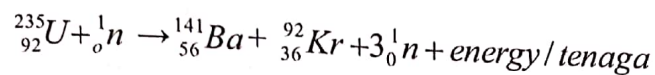
Table 12
Jadual 12

You are assigned to study the characteristics of the radioisotopes in Table 12 and determine the most suitable isotope to be used for the mentioned purpose. Justify your answer.

Anda ditugaskan untuk mengkaji ciri-ciri radioisotop dalam Jadual 12 dan tentukan radioisotop yang paling sesuai digunakan bagi tujuan yang dinyatakan. Jelaskan jawapan anda.

[10 marks]
 [10 markah]

- (c) A nuclear reaction is represented by the following equation :
Satu tindak balas nuklear diwakili oleh persamaan berikut :



Mass of:

Jisim bagi:

$${}_{92}^{235}\text{U} = 235.0439299u$$

$${}_0^1\text{n} = 1.00867u$$

$${}_{56}^{141}\text{Ba} = 140.9144u$$

$${}_{36}^{92}\text{Kr} = 91.926156u$$

$$1u = 1.66 \times 10^{-27} \text{ kg}$$

Speed of light / *Kelajuan cahaya*, $c = 3.0 \times 10^8 \text{ ms}^{-1}$

Based on the equation, calculate:

Berdasarkan persamaan itu, hitung:

- (i) the mass defect in unit kg
kecacatan jisim dalam unit kg
- (ii) the energy released
tenaga yang dibebaskan

[5 marks]

[5 markah]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT