

4531/1
Physics
Paper 1
September
2011
1 ¼ hours



MAKTAB RENDAH SAINS MARA

SIJIL PELAJARAN MALAYSIA TRIAL EXAMINATION 2011

PHYSICS

Paper 1

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5
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1
-
1

One hour and fifteen minutes

DO NOT OPEN THIS QUESTION BOOKLET UNTIL TOLD TO DO SO

1. This paper is written in English and bahasa Melayu
Kertas soalan ini adalah dalam dwibahasa.
2. The question in English is written on top while the bahasa Melayu version is below.
Soalan di atas adalah dalam bahasa Inggeris dan soalan dalam bahasa Melayu terdapat di bawahnya.
3. Candidates are required to read the information at the back of the booklet.
Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.

This question booklet consists of 47 printed pages and 1 blank page

The following information maybe useful. The symbols have their usual meaning.

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

1. $a = \frac{v-u}{t}$
2. $v^2 = u^2 + 2as$
3. $s = ut + \frac{1}{2}at^2$
4. Momentum = mv
5. $F = ma$
6. Kinetic energy / Tenaga kinetik = $\frac{1}{2}mv^2$
7. Gravitational potential energy / Tenaga keupayaan graviti = mgh
8. Elastic potential energy / Tenaga keupayaan kenyal = $\frac{1}{2}Fx$
9. $= \frac{m}{V}$
10. Pressure / Tekanan, $p = h g$
11. Pressure / Tekanan, $p = \frac{F}{A}$
12. Heat / Haba, $Q = mc$
13. Heat / Heat, $Q = ml$
14. $\frac{pV}{T} = \text{constant} / \text{pemalar}$
15. $E = mc^2$
16. $v = f$
17. Power, $P = \frac{\text{energy}}{\text{time}}$
 $Kuasa, P = \frac{\text{tenaga}}{\text{masa}}$
18. $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$

$$19. \quad = \frac{ax}{D}$$

$$20. \quad n = \frac{\sin i}{\sin r}$$

$$21. \quad n = \frac{\text{realdepth}}{\text{apparentdepth}}$$

$$n = \frac{\text{dalam nyata}}{\text{dalamketara}}$$

$$22. \quad Q = It$$

$$23. \quad V = \frac{E}{Q}$$

$$24. \quad V = IR$$

$$25. \quad \text{Power / Kuasa, } P = IV$$

$$26. \quad \frac{N_s}{N_p} = \frac{V_s}{V_p}$$

$$27. \quad \text{Efficiency / Kecekapan} = \frac{I_s V_s}{I_p V_p} \times 100\%$$

$$28. \quad g = 10 \text{ m s}^{-2}$$

$$29. \quad c = 3.0 \times 10^8 \text{ m s}^{-1}$$

- 1 Mm, nm, m, km and dm are distance units.

Which of the following is their correct order from the smallest to the largest ?

Mm, nm, m, km, dm adalah unit untuk jarak.

Antara yang berikut, yang manakah adalah urutan yang betul dari yang paling kecil kepada yang paling besar ?

- A Mm, nm, m, km, dm
 - B Mm, km, m, dm, nm
 - C dm, km, m, nm, Mm
 - D nm, dm, m, km, Mm
- 2 Which of the following is a vector quantity?
Manakah di antara berikut merupakan kuantiti vektor?
- A Diameter of earth
Diameter bumi
 - B Density of sea water
Ketumpatan air laut
 - C Energy to climb the stairs
Tenaga untuk menaiki tangga
 - D Momentum of a moving bullet
Momentum peluru yang sedang bergerak..

- 3 Diagram 1 shows a ticker tape obtained from a moving trolley.

Rajah 1 menunjukkan pita detik yang diperolehi dari sebuah troli yang bergerak..

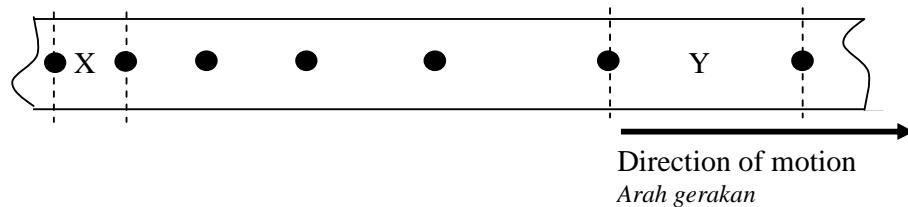


Diagram 1
Rajah 1

Which of the following statements is true?

Manakah antara pernyataan berikut adalah benar?

- A The time interval at Y is longer than at X
Sela masa pada Y lebih panjang dari sela masa X
- B The acceleration at X is greater than at Y
Pecutan pada X lebih besar dari pecutan pada Y
- C The frequency at X is greater than at Y
Frekuensi pada X lebih besar dari frekuensi pada Y
- D The velocity at Y is greater than at X
Halaju pada Y lebih besar dari halaju pada X

- 4 Diagram 2 shows a graph of velocity against time of a moving car.
Rajah 2 menunjukkan graf halaju melawan masa bagi gerakan sebuah kereta.

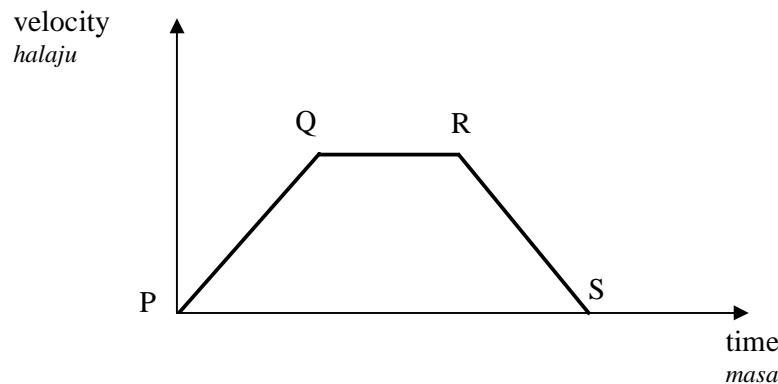


Diagram 2
Rajah 2

Which of the following explains the motion correctly?
Manakah di antara berikut menerangkan gerakan dengan betul?

- A Acceleration increases at a constant rate at PQ
Pecutan bertambah pada kadar seragam pada PQ
- B Deceleration is constant at RS
Nyahpecutan adalah seragam pada RS
- C Velocity increases at a constant rate at RS
Halaju bertambah pada kadar seragam pada RS
- D Velocity remains zero at QR
Halaju kekal sifar pada QR

5. Diagram 3 shows a carpenter knocking a hammer onto a hard surface to secure the hammer head.

Rajah 3 menunjukkan seorang tukang kayu sedang menghentak penukul di atas permukaan keras untuk mengetatkan kepala penukul.

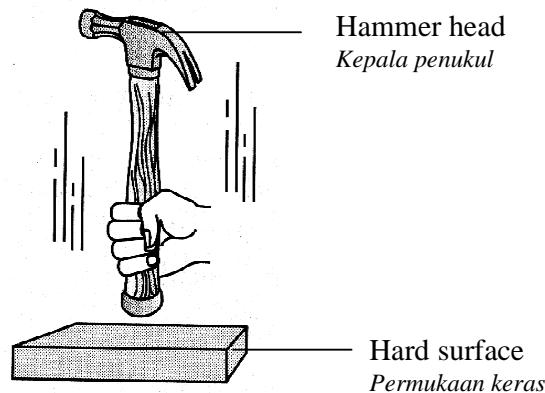


Diagram 3
Rajah 3

Which of following concepts explains the situation above?

Konsep yang manakah menerangkan situasi di atas?

- A Principle of Conservation of Momentum
Prinsip Keabadian Momentum
- B Principle of Conservation of Energy
Prinsip Keabadian Tenaga
- C Equilibrium of Forces
Keseimbangan Daya
- D Inertia
Inersia

- 6 Diagram 4 shows two plasticine balls, P and Q which have the same mass. P is released at an angle, θ and collides with Q which is stationary. After collision, P and Q move together.

Rajah 4 menunjukkan dua bebola plastisin, P dan Q yang mempunyai jisim yang sama. P dilepaskan pada sudut, θ dan berlanggar dengan Q yang pegun. Selepas perlanggaran, P dan Q bergerak bersama-sama.

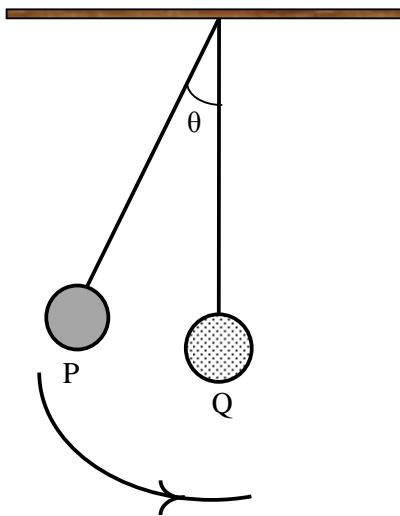


Diagram 4
Rajah 4

Which physical quantity is conserved?
Kuantiti fizik yang manakah diabadikan?

- A Gravitational potential energy
Tenaga keupayaan graviti
- B Kinetic energy
Tenaga kinetik
- C Momentum
Momentum
- D Inertia
Inersia

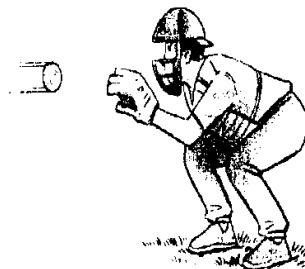
7 Which of the following situations produces the largest impulsive force?

Situasi yang manakah menghasilkan daya impuls yang terbesar?

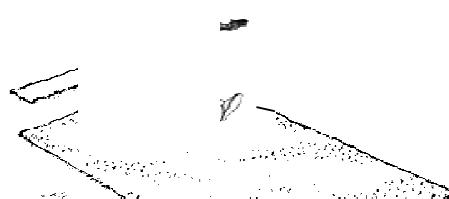
A



B



C



D



- 8 Diagram 5 shows a tennis player making a service by throwing the ball vertically upwards.

Rajah 5 menunjukkan seorang pemain tenis membuat servis dengan melontar bola tenis tegak ke atas.

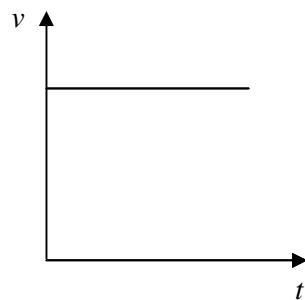


Diagram 5
Rajah 5

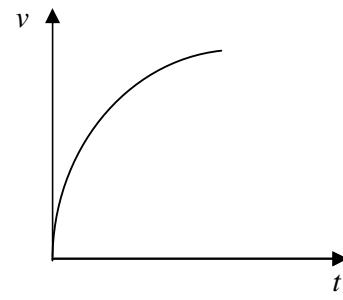
Which graph shows the correct relationship between the velocity, v , of the ball and the time after the serve, t ?

Graf yang manakah menunjukkan hubungan di antara halaju bola, v , dengan masa selepas ia dipukul t ?

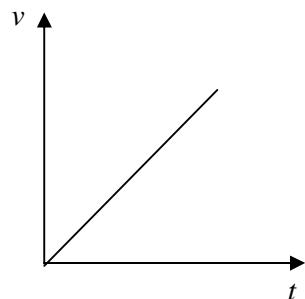
A



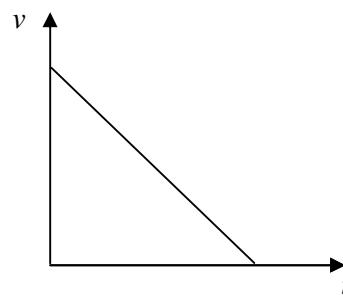
B



C



D



9. Diagram 6 shows a framed picture hung on the wall using two strings.

Rajah 6 menunjukkan gambar berbingkai digantung pada dinding menggunakan dua tali.

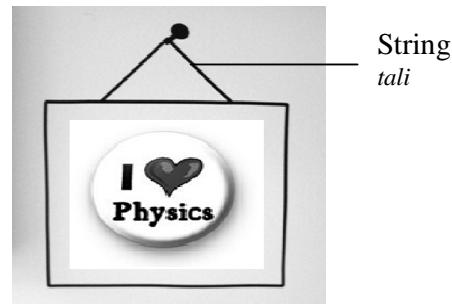
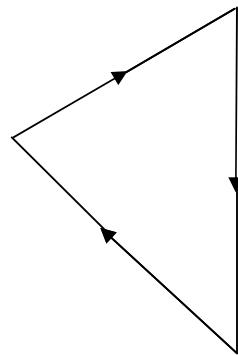


Diagram 6
Rajah 6

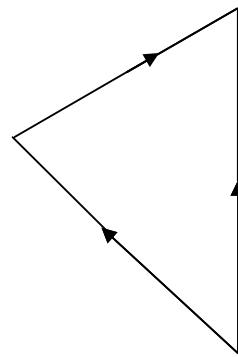
Which of the following vector diagrams shows the forces which are acting on the picture?

Rajah vektor yang manakah menunjukkan daya-daya yang bertindak ke atas gambar itu?

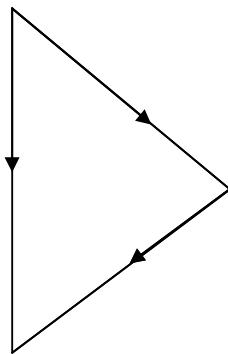
A



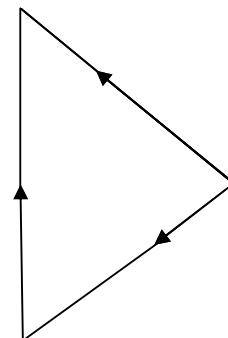
B



C



D



- 10 Diagram 7 shows a gymnast swinging on a high bar.

Rajah 7 menunjukkan seorang ahli gimnastik sedang berayun pada palang tinggi.

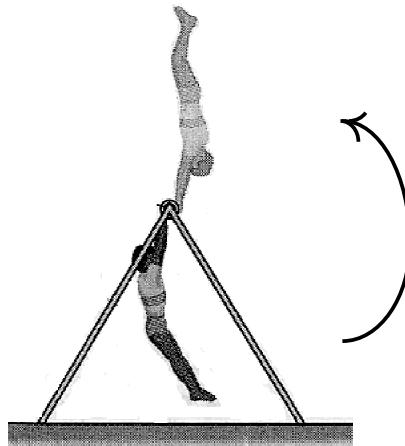


Diagram 7
Rajah 7

What are the changes in kinetic energy and gravitational potential energy of the gymnast as he moves to the top of the swing?

Apakah perubahan dalam tenaga kinetik dan tenaga keupayaan graviti ahli gimnastik tersebut semasa bergerak ke puncak ayunan?

- A Gravitational potential energy increases, kinetic energy decreases
Tenaga keupayaan graviti bertambah, tenaga kinetik berkurang.
- B Gravitational potential energy constant, kinetic energy decreases
Tenaga keupayaan graviti malar, tenaga kinetik berkurang
- C Gravitational potential energy increases, kinetic energy is constant
Tenaga keupayaan graviti bertambah, tenaga kinetik malar
- D Gravitational potential energy and kinetic energy are constants
Tenaga keupayaan graviti dan tenaga kinetik adalah malar

- 11 Diagram 8 shows two springs, P and Q which are made of the same material. When objects M and N of similar mass are placed on the springs, the compressions of P and Q are X_P and X_Q respectively.

Rajah 8 menunjukkan dua spring P dan Q yang diperbuat dari bahan yang sama. Bila objek-objek M dan N yang sama jisim diletakkan di atas P dan Q, mampatan spring P dan Q masing-masing ialah X_P dan X_Q .

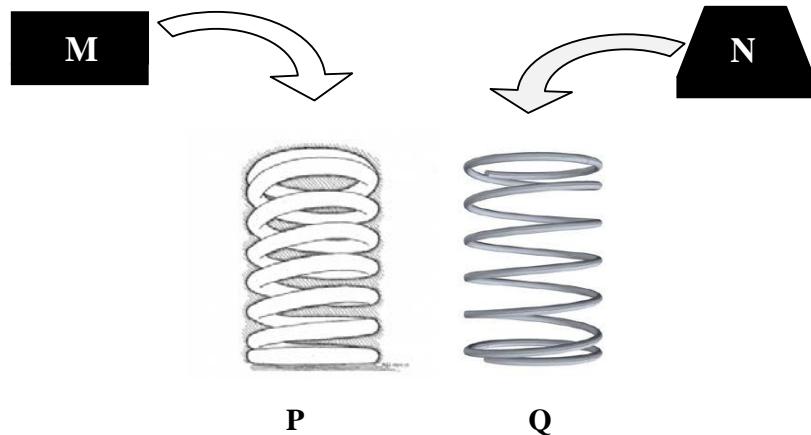


Diagram 8
Rajah 8

Which comparison is correct about X_P and X_Q ?

Perbandingan yang manakah betul tentang X_P dan X_Q ?

- A $X_P < X_Q$
- B $X_P = X_Q$
- C $X_P > X_Q$

12 Diagram 9 shows a racing car.

Rajah 9 menunjukkan sebuah kereta lumba.



Diagram 9
Rajah 9

Why are the tyres of the racing car made wide?

Mengapa tayar kereta lumba dibuat lebar?

- A To lower the centre of gravity
Untuk merendahkan pusat tarikan graviti
- B To reduce the pressure produced
Untuk mengurangkan tekanan yang terhasil
- C To increase the acceleration of the car
Untuk meningkatkan pecutan kereta
- D To increase the stability of the car
Untuk meningkatkan kestabilan kereta

- 13 Diagram 10 shows an aquarium with two outlet tubes.

Rajah 10 menunjukkan satu akuarium dengan dua tiub saliran keluar.

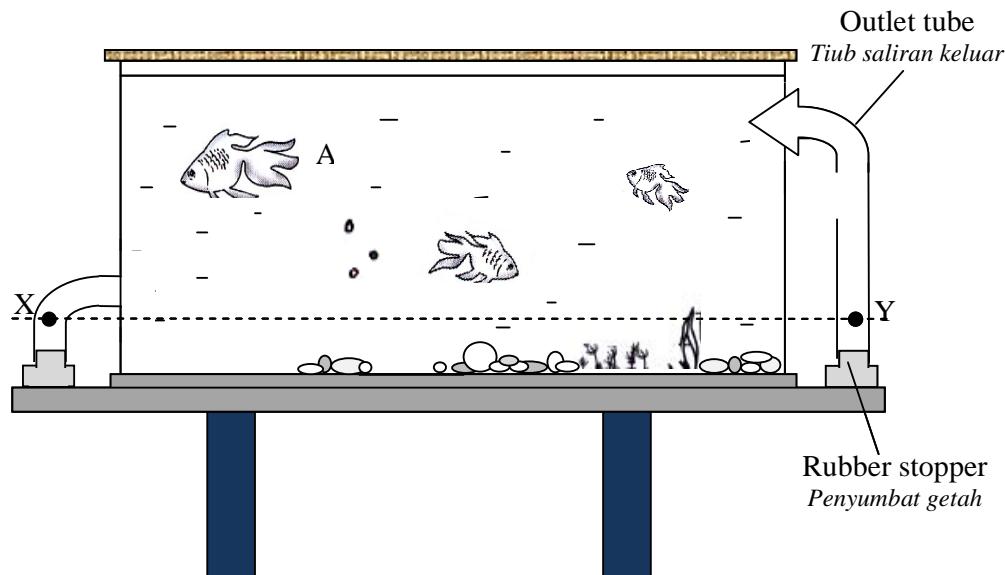


Diagram 10
Rajah 10

Compare the water pressure at X and Y.

Bandingkan tekanan di X dan Y.

- A Pressure at X > Pressure at Y
Tekanan di X > Tekanan di Y
- B Pressure at X = Pressure at Y
Tekanan di X = Tekanan di Y
- C Pressure at X < Pressure at Y
Tekanan di X < Tekanan di Y

- 14 Diagram 11 shows a mercury filled manometer connected to a gas cylinder.

Rajah 11 menunjukkan manometer berisi merkuri disambungkan pada satu selinder gas.

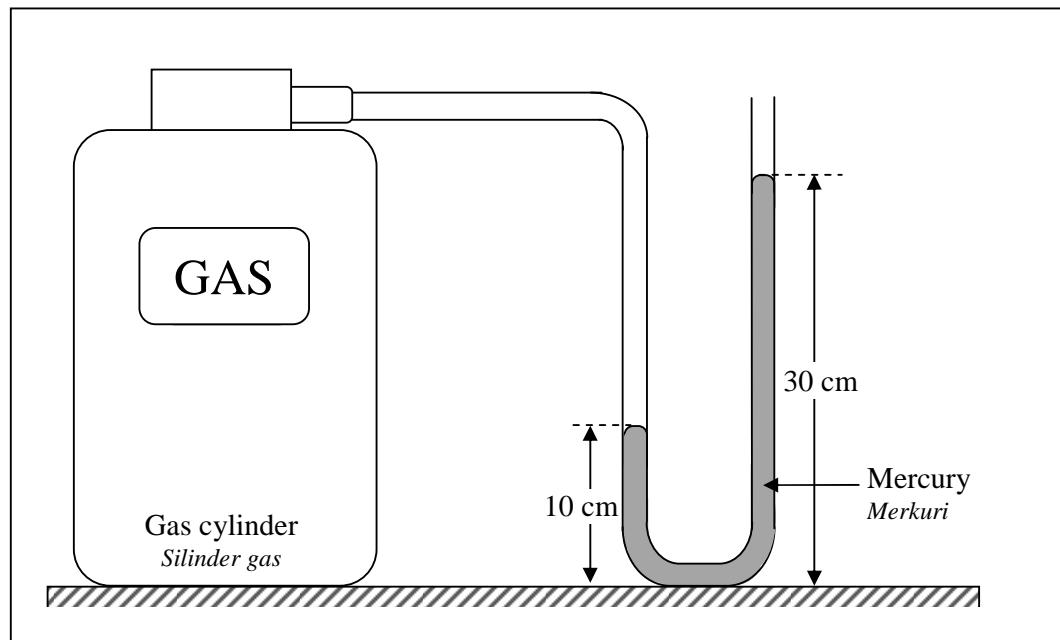


Diagram 11

Rajah 11

Determine the gas pressure in the manometer.

Tentukan tekanan dalam manometer.

[Atmospheric Pressure = 75 cm Hg]

[Tekanan Atmosfera = 75 cm Hg]

- A 65 cm Hg
- B 85 cm Hg
- C 95 cm Hg
- D 105 cm Hg

- 15** Diagram 12.1 shows a simple hydraulic system where P and Q are pistons each with areas 10 cm^2 and 100 cm^2 respectively. Diagram 12.2 shows that when a force, F is applied to P, Q rises by h_o .

Rajah 12 menunjukkan satu sistem hidraulik ringkas. Luas piston P dan Q masing-masing ialah 10 cm^2 dan 100 cm^2 . Apabila satu daya, F dikenakan ke atas P, Q bergerak ke atas sebanyak h_o .

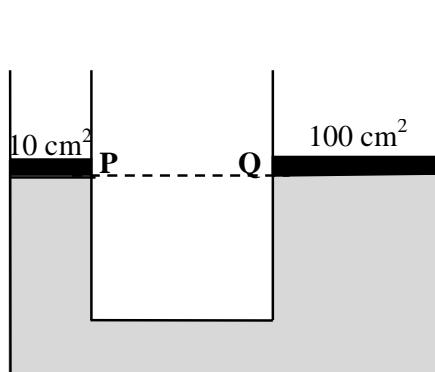


Diagram 12.1
Rajah 12.1

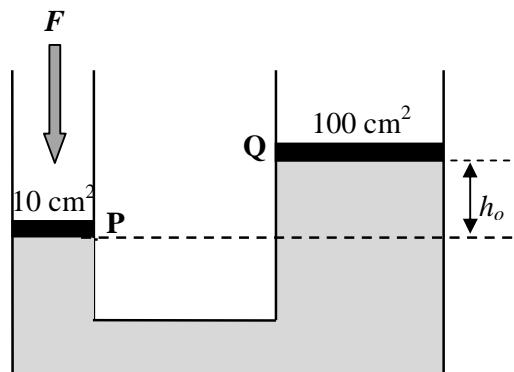


Diagram 12.2
Rajah 12.2

If the area of Q is increased to 200 cm^2 and the same force, F is applied to P, what is the new position of Q?

Jika luas Q ditambah menjadi 200 cm^2 dan daya yang sama F dikenakan pada P, apakah kedudukan baru Q?

- A** Raised by $\frac{1}{2} h$
Naik sebanyak $\frac{1}{2} h$
- B** Raised by $2h$
Naik sebanyak $2h$
- C** Lowered by $\frac{1}{2} h$
Turun sebanyak $\frac{1}{2} h$
- D** Lowered by $2h$
Turun sebanyak $2h$

- 16** Diagrams 13.1 and 13.2 show two identical drums floating in sea water and river water.

Rajah 13.1 dan 13.2 menunjukkan dua tong dram yang serupa terapung dalam air laut dan air sungai.

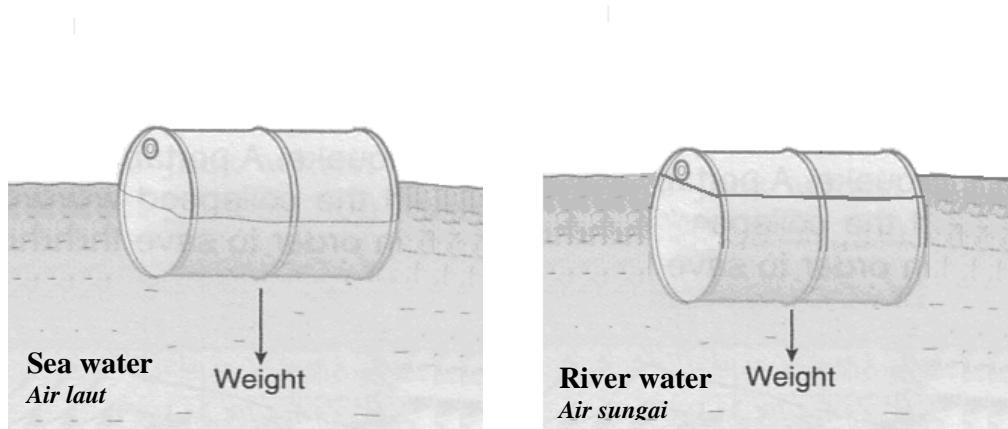


Diagram 13(a)

Rajah 13(a)

Diagram 13 (b)

Rajah 13(b)

Which statement is correct?

Pernyataan manakah yang betul?

	Bouyant force of sea water compared to river water <i>Daya apungan oleh air laut berbanding air sungai</i>	Density of sea water <i>Ketumpatan air laut</i>	Volume of river water displaced <i>Isipadu air sungai yang tersesar</i>
A	Big Besar	Low Rendah	High Tinggi
B	Big Besar	High Tinggi	High Tinggi
C	Same Sama	Low Rendah	Low Rendah
D	Same Sama	High Tinggi	High Tinggi

- 17** Diagram 14 shows water flowing through a Bernoulli tube.

Rajah 14 menunjukkan air mengalir melalui tiub Bernoulli.

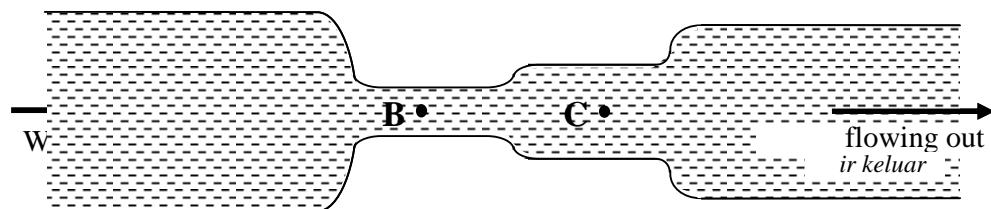


Diagram 14

Rajah 14

At which point is the water pressure the lowest?

Pada titik manakah tekanan air yang paling rendah terhasil ?

- 18** Diagram 15 shows 20 g of milk at temperature 10°C being poured into a glass containing 50 g of milk at temperature 60°C.

Rajah 15 menunjukkan 20 g susu pada suhu 10°C dicampurkan dengan 50 g susu pada suhu 30°C.



Diagram 15

Rajah 15

What is the final temperature of the mixture?

Apakah suhu akhir campuran itu?

- A** Between 20°C and 25°C
Antara 20°C dan 25°C
- B** Between 25°C and 30°C
Antara 25°C dan 30°C
- C** Between 30°C and 40°C
Antara 30°C dan 40°C
- D** Between 40°C and 50°C
Antara 40°C and 50°C

[Turn over

CONFIDENTIAL

19. Diagram 16 shows an immersion heater of power 500W used to heat up 2 kg of water.

Rajah 16 menunjukkan sebuah pemanas rendam berkuasa 500 W digunakan untuk memanaskan 2 kg air.

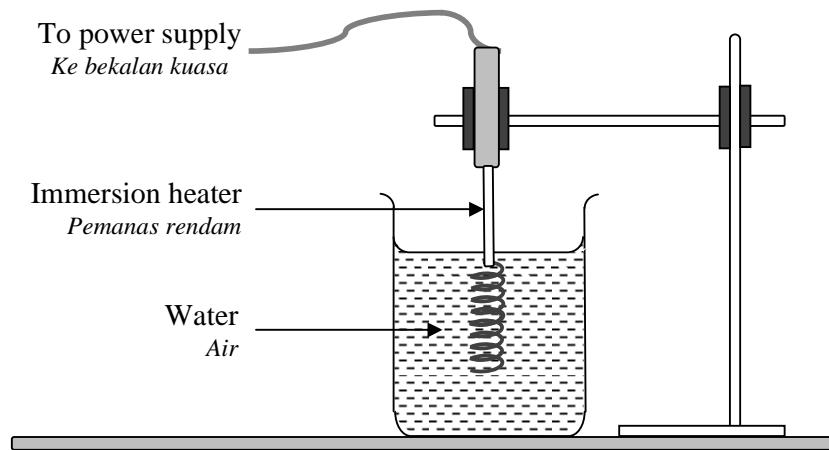


Diagram 16
Rajah 16

Determine the time taken to heat up the water from 30°C to 55°C?

Tentukan masa yang diperlukan untuk memanaskan air dari 30°C to 55°C?

[Specific heat capacity of water = $4\ 200\ \text{J kg}^{-1}\ \text{°C}^{-1}$]
[Muatan haba tentu bagi air = $4\ 200\ \text{J kg}^{-1}\ \text{°C}^{-1}$]

- A $2.10 \times 10^2\ \text{s}$
- B $4.20 \times 10^2\ \text{s}$
- C $2.10 \times 10^5\ \text{s}$
- D $4.20 \times 10^5\ \text{s}$

20 Diagram 17 shows the cooling curve of water.

Rajah 17 menunjukkan lengkung penyejukan bagi air.

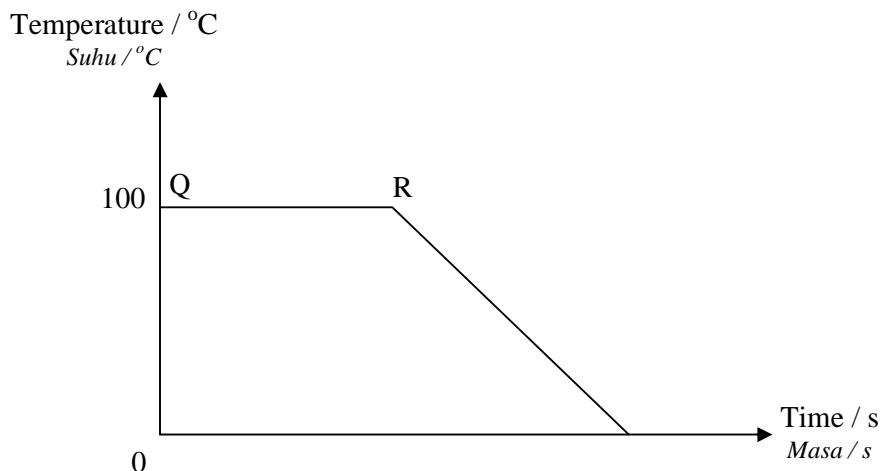


Diagram 17
Rajah 17

Which of the following statements is true about QR?

Pernyataan yang manakah benar mengenai QR?

- A Specific latent heat of fusion is released
Haba pendam tentu pelakuran dibebaskan
- B Specific heat capacity is released to cool down.
Muatan haba tentu dibebaskan untuk penyejukan
- C Specific latent heat of vaporization is released
Haba pendam tentu pengewapan dibebaskan
- D Specific heat capacity is released to change state of matter
Muatan haba tentu dibebaskan untuk menukar keadaan bahan

21. Diagram 18 shows a balloon which has been filled with air at room temperature, being immersed in hot water.

Rajah 18 menunjukkan belon yang telah diisi dengan udara pada suhu bilik, direndam ke dalam air panas.

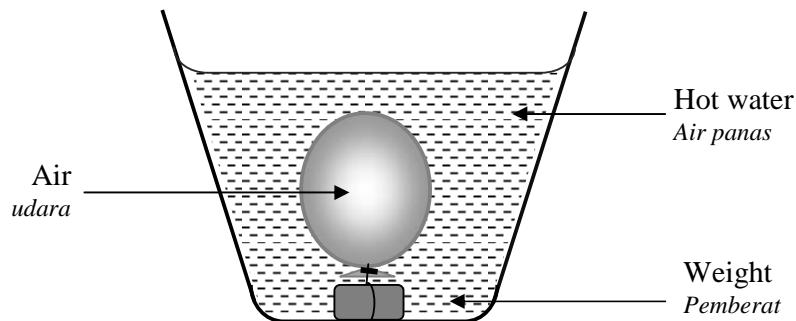


Diagram 18
Rajah 18

After 10 minutes, what happens to the air temperature and the volume of the balloon?
Selepas 10 minit, apakah yang berlaku pada suhu udara dan isipadu belon?

(Assume air pressure in the balloon is constant)
(Andaikan tekanan udara dalam belon adalah malar)

	Temperature of air in the balloon <i>Suhu udara dalam belon</i>	Volume of the balloon <i>Isipadu belon</i>
A	Decreases <i>Berkurang</i>	Increases <i>Bertambah</i>
B	Decreases <i>Berkurang</i>	Decreases <i>Berkurang</i>
C	Increases <i>Bertambah</i>	Increases <i>Bertambah</i>
D	Increases <i>Bertambah</i>	Decreases <i>Berkurang</i>

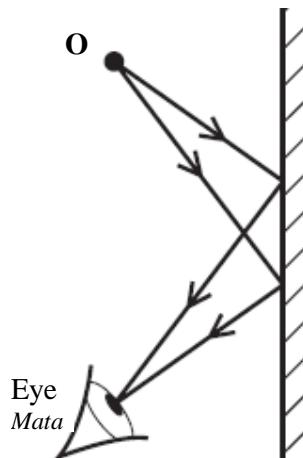
22. An eye views an object O by its reflection in a plane mirror.

Objek O dilihat melalui pantulan cahaya oleh cermin satah

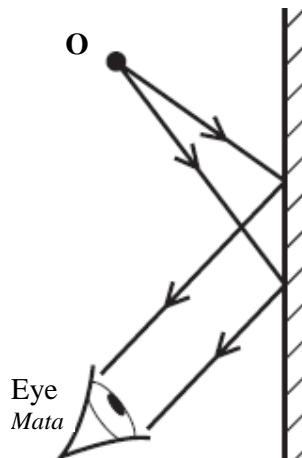
Which of the following is the correct ray diagram?

Yang manakah adalah rajah sinar yang betul?

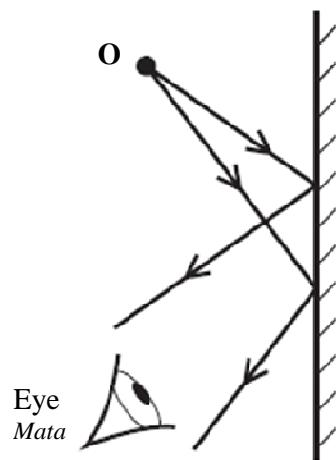
A



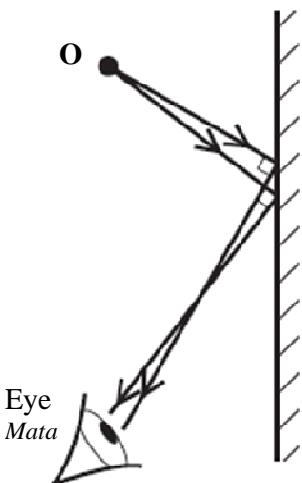
B



C



D



23. Diagram 20 shows a graph of $\sin r$ against $\sin i$ for three different materials, A, B and C.

Rajah 20 menunjukkan satu graf $\sin r$ melawan $\sin i$ untuk tiga bahan berbeza, A, B dan C.

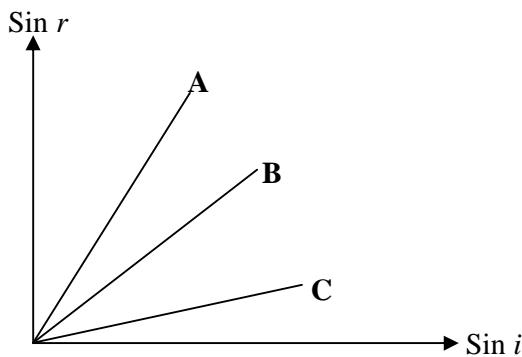


Diagram 20
Rajah 20

Which material has the highest refractive index?

Bahan manakah yang mempunyai indeks pembiasan yang paling tinggi?

24. Diagram 21 shows light rays traveling from water to air.

Rajah 21 menunjukkan sinar cahaya merambat dari air ke udara.

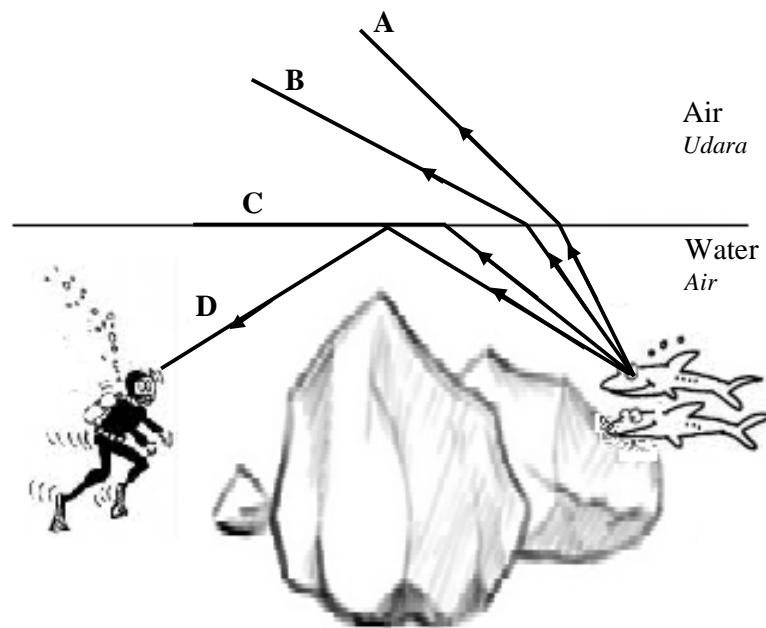


Diagram 21
Rajah 21

Which ray shows the phenomenon of total internal reflection?

Sinar yang manakah menunjukkan fenomena pantulan dalam penuh?

- 25 Diagram 22 shows an object placed 6.0 cm in front of a convex lens. The magnification of the image produced is 2.

Rajah 22 menunjukkan satu objek diletakkan 6.0 cm di hadapan sebuah kanta cembung. Pembesaran imej yang terhasil ialah 2.

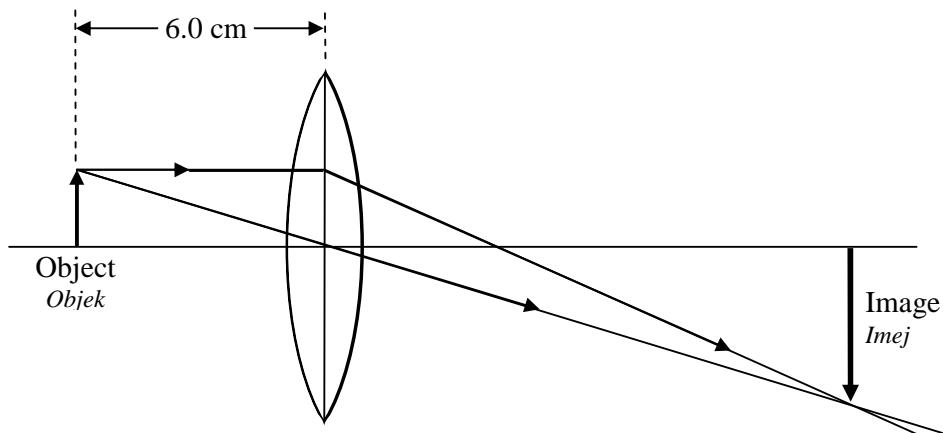


Diagram 22
Rajah 22

Calculate the focal length of the lens.

Kira panjang fokus kanta tersebut.

- A** 2.0 cm
- B** 3.0 cm
- C** 4.0 cm
- D** 6.0 cm

- 26** Diagram 23 shows the displacement-time graphs for the oscillations of two different spring set-ups, X and Y. All the springs used are identical.

Rajah 23 menunjukkan graf sesaran-masa untuk ayunan dua susunan spring yang berbeza, X dan Y. Semua spring yang digunakan adalah serupa.

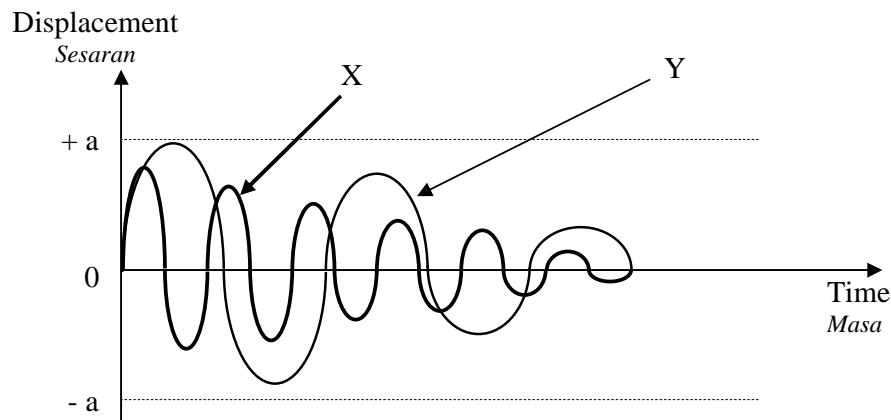


Diagram 23
Rajah 23

Which of the following spring set up is used to obtain these graphs?

Susunan spring manakah yang menghasilkan graf-graf tersebut?

	Arrangement for X <i>Susunan untuk X</i>	Arrangement for Y <i>Susunan untuk Y</i>	Arrangement for X <i>Susunan untuk X</i>	Arrangement for Y <i>Susunan untuk Y</i>
A				
C				

- 27** What happens to the frequency, amplitude and wavelength of sound waves when it is reflected?

Apakah yang berlaku kepada frekuensi, amplitud dan panjang gelombang bagi suatu gelombang bunyi apabila dipantulkan?

	Frequency Frekuensi	Amplitude Amplitud	Wavelength Panjang gelombang
A	Increases <i>Bertambah</i>	Decreases <i>Berkurang</i>	Decreases <i>Berkurang</i>
B	Increases <i>Bertambah</i>	Unchanged <i>Tidak berubah</i>	Unchanged <i>Tidak berubah</i>
C	Unchanged <i>Tidak berubah</i>	Increases <i>Bertambah</i>	Decreases <i>Berkurang</i>
D	Unchanged <i>Tidak berubah</i>	Decreases <i>Berkurang</i>	Unchanged <i>Tidak berubah</i>

- 28** Diagram 24 shows water waves propagating from region P to region Q.

Rajah 24 menunjukkan gelombang air merambat dari kawasan P ke kawasan Q.

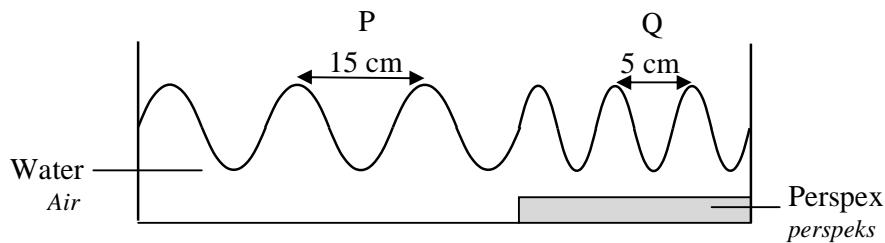


Diagram 27
Rajah 27

What is the wave speed in region Q if the wave speed in region P is 9 m s^{-1} ?

Berapakah laju gelombang dalam kawasan Q jika laju gelombang dalam kawasan P ialah 9 m s^{-1} ?

- A** 3.0 m s^{-1}
- B** 6.0 m s^{-1}
- C** 27.0 m s^{-1}
- D** 45.0 m s^{-1}

[Turn over

29 Diagram 25 shows water waves passing round a small island.

Rajah 25 menunjukkan gelombang air melalui sebuah pulau kecil.

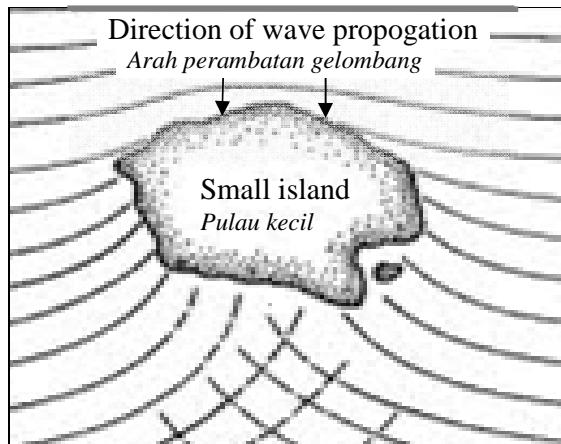


Diagram 25
Rajah 25

Which quantity will change after the waves pass round the small island?

Kuantiti yang manakah akan berubah setelah gelombang melalui pulau tersebut?

- A Speed
Laju
- B Energy
Tenaga
- C Frequency
Frekuensi
- D Wavelength
Panjang gelombang

- 30** Diagram 26 shows an interference pattern of sound waves produced by vibrations of a thin string.

Rajah 26 menunjukkan suatu corak interferensi gelombang bunyi yang dihasilkan melalui getaran seutas tali halus.

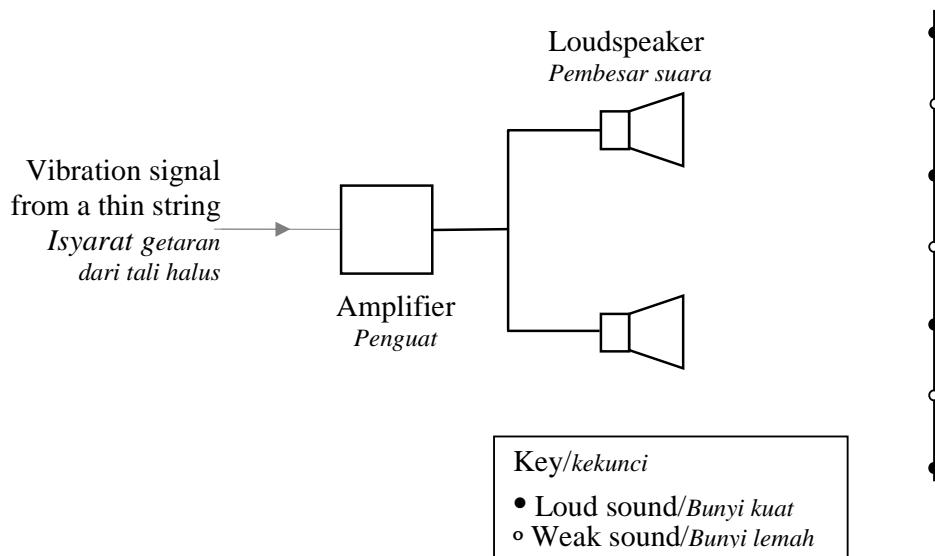


Diagram 26

Rajah 26

What happens to the distance between two adjacent loud sounds if a thicker string is used ?

Apakah yang berlaku kepada jarak antara dua bunyi kuat yang berturutan jika tali yang lebih tebal digunakan ?

- A** Decreases
Berkurang
- B** Increases
Bertambah
- C** No change
Tiada perubahan

- 31 Diagram 27 shows a technology used by fishermen to catch more fish.

Rajah 27 menunjukkan teknologi yang digunakan oleh para nelayan untuk menangkap lebih banyak ikan.

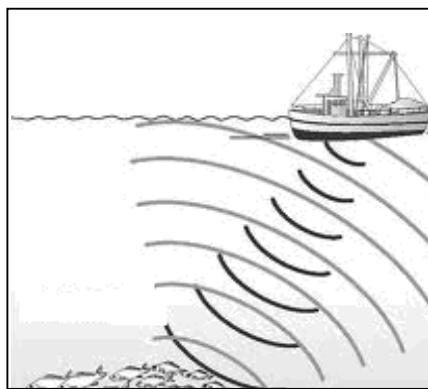


Diagram 27
Rajah 27

What is the wave used?

Apakah gelombang yang digunakan?

- A Water wave
Gelombang air
- B Engine's sound wave
Gelombang bunyi enjin
- C Ultrasonic wave
Gelombang ultrasonik
- D Infrasonic wave
Gelombang infrasonik

- 32 The Global Positioning System (GPS) is used to provide reliable location.

Sistem Penentu Kedudukan Global(GPS) digunakan untuk mengesan lokasi dengan lebih jitu.

Microwaves is suitable to be used in GPS compared to radio waves because microwaves
Gelombang mikro sesuai digunakan dalam GPS berbanding gelombang radio kerana gelombang mikro

- A has longer wavelength
mempunyai panjang gelombang yang lebih panjang
- B can travel through vacuum more easily
boleh merambat melalui vakum dengan lebih mudah
- C can penetrate the atmosphere more easily
boleh menembusi ruang atmosfera dengan lebih mudah
- D gives more energy to the water molecules in air
memberi lebih banyak tenaga kepada molekul air dalam udara

- 33 Diagram 28 shows a lightning carrying 5 C of charge striking a tree. The potential difference between the cloud and the tree is 20 kV.

Rajah 28 menunjukkan kilat yang membawa 5 C cas memanah sebatang pokok. Beza keupayaan antara awan dan pokok itu ialah 20 kV.



Diagram 28
Rajah 28

What is the energy released ?

Berapakah tenaga yang dibebaskan ?

- A** 4 J
- B** 100 J
- C** 4 000 J
- D** 100 000 J

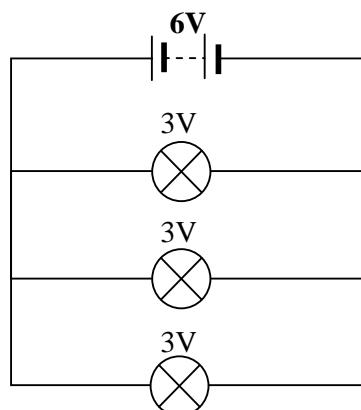
- 34 Which conductor obeys Ohm's Law and allows the biggest current to flow through it?
Konduktor yang manakah mematuhi Hukum Ohm dan membenarkan arus paling besar mengalir melaluinya?

	Conductor material <i>Bahan konduktor</i>	Diameter of conductor <i>Diameter konduktor</i>
A	Constantan <i>Konstantan</i>	Large <i>Besar</i>
B	Constantan <i>Konstantan</i>	Small <i>Kecil</i>
C	Tungsten <i>Tungsten</i>	Small <i>Kecil</i>
D	Tungsten <i>Tungsten</i>	Large <i>Besar</i>

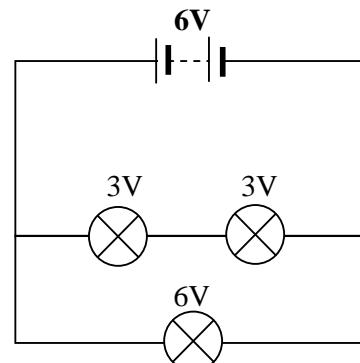
35 Which circuit has all lamps lighted up with normal brightness?

Litar manakah mempunyai semua mentol menyala dengan kecerahan normal?

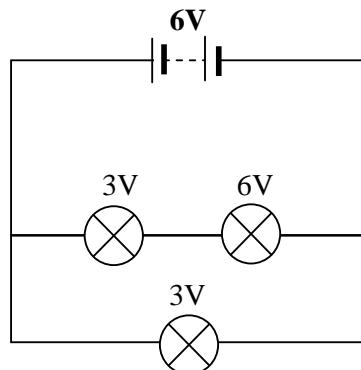
A



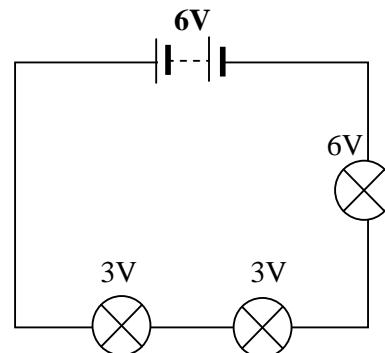
B



C



D



- 36** Diagram 29 shows an electric circuit which consists of resistor R and a dry cell with internal resistance, r .

Rajah 29 menunjukkan satu litar elektrik yang mengandungi perintang R dan satu sel kering dengan rintangan dalam, r .

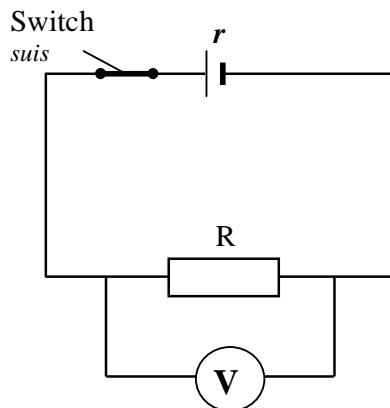


Diagram 29

Rajah 29

What happens to the voltmeter reading if another resistor R' is connected in series with R ?

Apakah yang berlaku pada bacaan voltmeter jika satu lagi perintang R' disambung bersiri dengan R ?

- A** Increases
Bertambah
- B** Decreases
Berkurang
- C** No change
Tiada perubahan

- 37** What is the electrical energy used by a '12V, 0.5A' lamp in every second?

Berapakah tenaga elektrik yang digunakan oleh mentol '12V, 0.5A' dalam setiap saat?

- A** 6 J
- B** 12 J
- C** 24 J
- D** 60 J

38 Diagram 30 shows an electric bell without a solenoid.

Rajah 30 menunjukkan sebuah loceng elektrik tanpa solenoid.

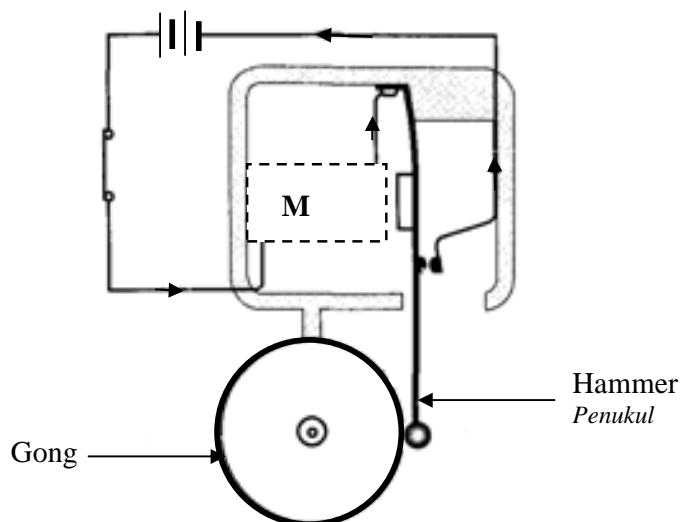
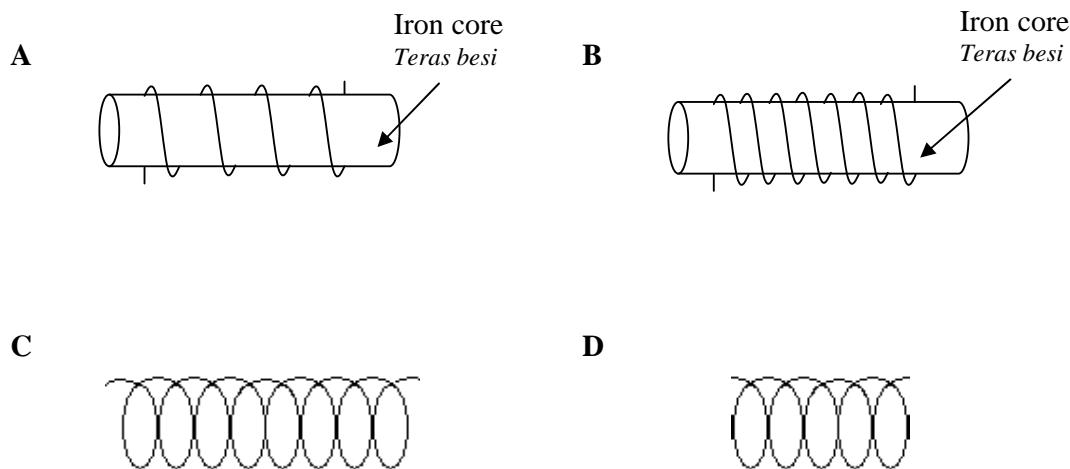


Diagram 30
Rajah 30

Which solenoid is suitable to be placed at **M** in order to produce the loudest sound?

Solenoid manakah yang sesuai diletakkan pada **M** untuk menghasilkan bunyi yang paling kuat?



- 39 Diagram 31 shows a coil placed between two opposite magnetic poles. An electric current flows through the coil producing a pair of turning force, F.

Rajah 31 menunjukkan satu gegelung diletakkan di antara dua kutub magnet yang berlawanan. Arus elektrik mengalir melalui gegelung tersebut lalu menghasilkan sepasang daya putaran, F.

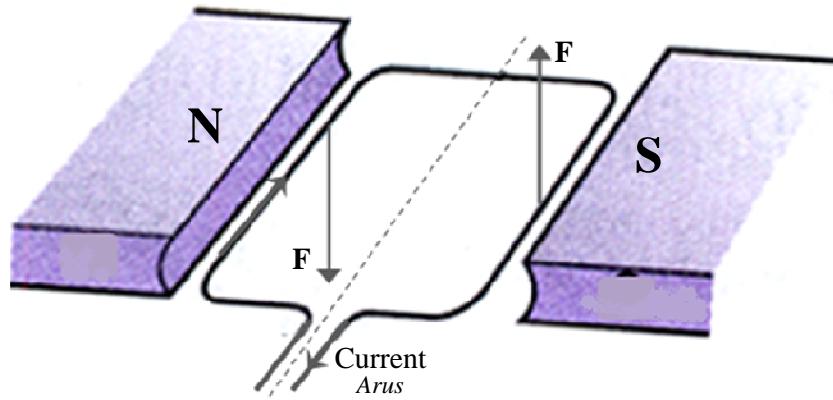
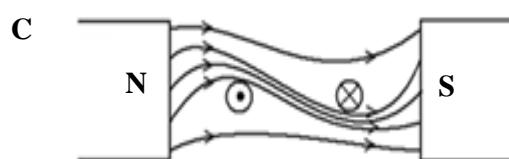
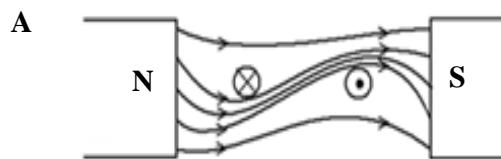


Diagram 31

Rajah 31

Which diagram shows the correct catapult field?

Rajah manakah menunjukkan corak medan lastik yang betul?



40 Diagram 32 shows a bar magnet and a solenoid.

Rajah 32 menunjukkan magnet bar dan solenoid.

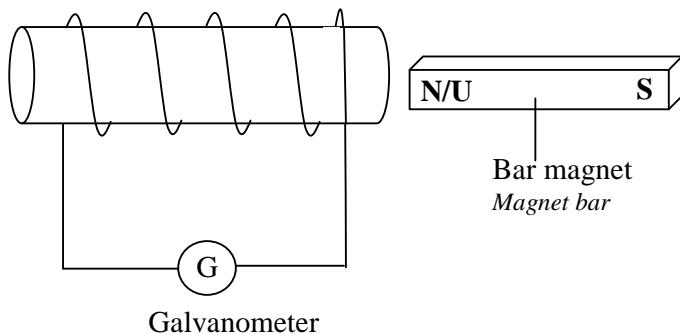
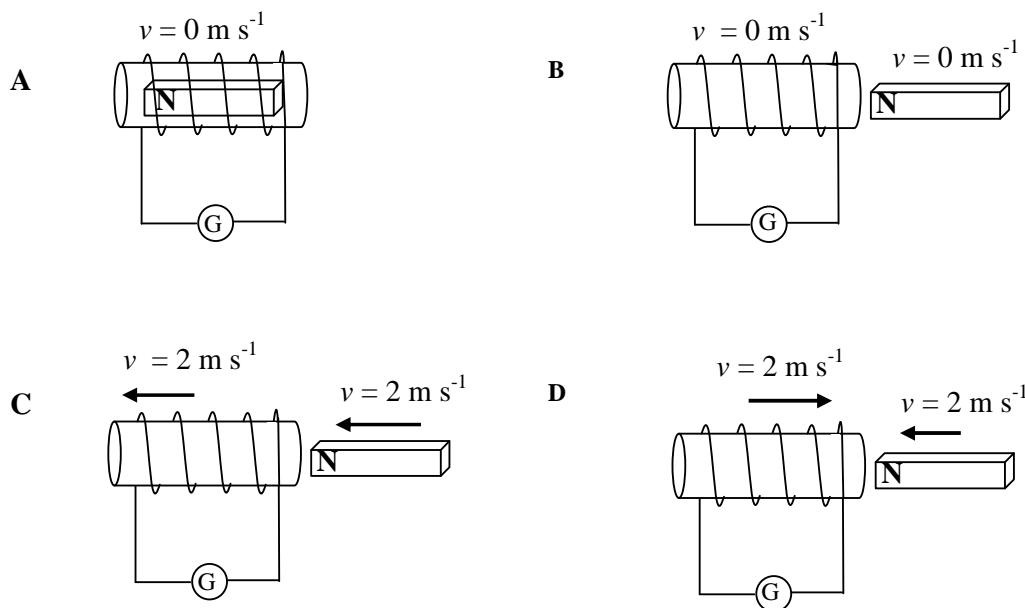


Diagram 32
Rajah 32

Which of these actions will produce an induced current?

Tindakan manakah yang akan menghasilkan arus aruhan?



[Turn over

41 Diagram 33 shows a multi-tap transformer.

Rajah 33 menunjukkan sebuah transformer pelbagai terminal.

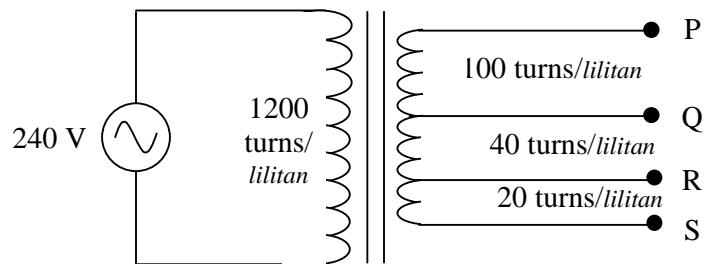


Diagram 33

Rajah 33

Where should a 12 V lamp be connected so that it lights up with normal brightness?

Di manakah mentol 12 V harus disambung supaya mentol itu menyala dengan kecerahan normal?

- A Across terminals P and Q
Merentasi terminal P dan Q
- B Across terminals Q and R
Merentasi terminal Q dan R
- C Across terminals R and S
Merentasi terminal R dan S
- D Across terminals Q and S
Merentasi terminal Q dan S

42 Diagram 34 shows an electricity transmission system.

Rajah 34 menunjukkan sistem penghantaran elektrik.

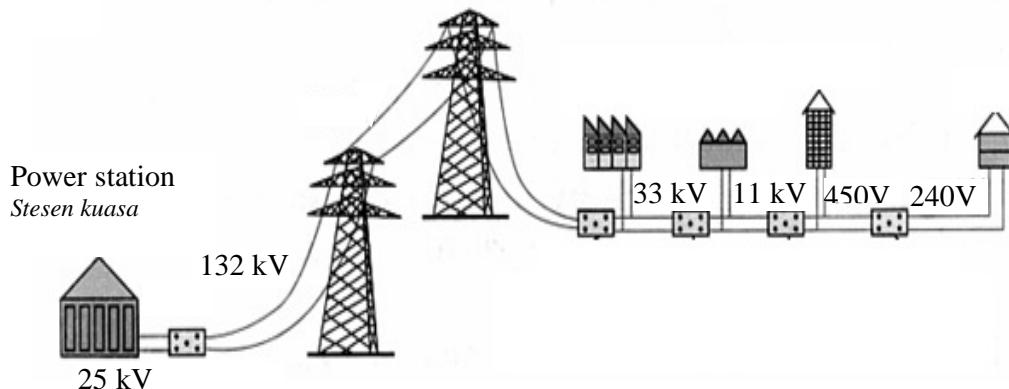


Diagram 34

Rajah 34

The output voltage of the power station is increased from 25 kV to 132 kV to reduce

Voltan keluaran stesen kuasa mesti dinaikkan dari 25 kV menjadi 132 kV untuk mengurangkan

- A the frequency of the electric current
frekuensi arus elektrik
- B the resistance of the transmission cable
rintangan kabel penghantaran
- C the electric current in the cable
arus elektrik yang mengalir dalam kabel
- D the power output of the power station
kuasa keluaran stesen kuasa

43 Diagram 35 shows a bar magnet and a Maltese-Cross Tube.

Rajah 35 menunjukkan satu bar magnet dan Tiub Palang Maltese.

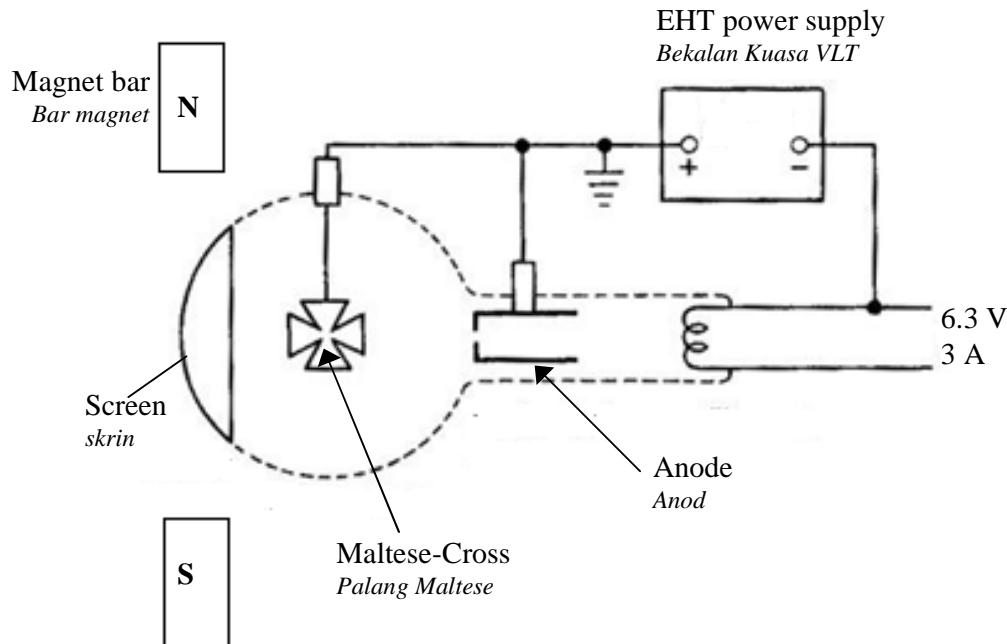


Diagram 38

Rajah 38

The shadow formed on the screen is deflected because cathode rays

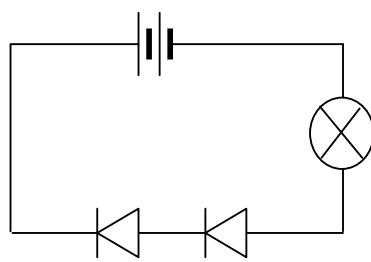
Bayang-bayang yang pada skrin terpesong keranasin ar katod

- A** can travel through vacuum
boleh bergerak melalui vakum
- B** is deflected by the electric field
dipesongkan oleh medan elektrik
- C** travels in a straight line
bergerak dalam garis lurus
- D** is deflected by the magnetic field
dipesongkan oleh medan magnet

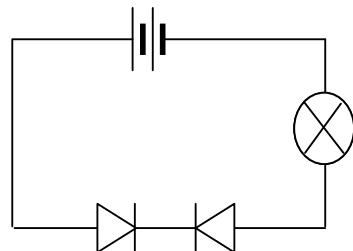
44 Which circuit will light up the lamp ?

Litar yang manakah akan menyalakan mentol ?

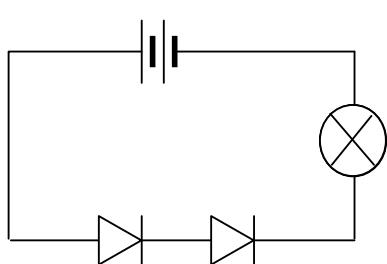
A



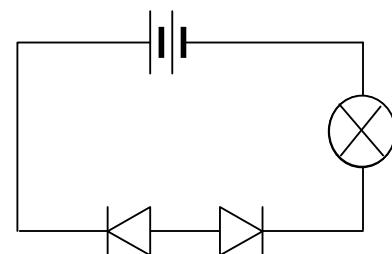
B



C



D



45 Diagram 36 shows a transistor circuit.

Rajah 36 menunjukkan satu litar bertransistor.

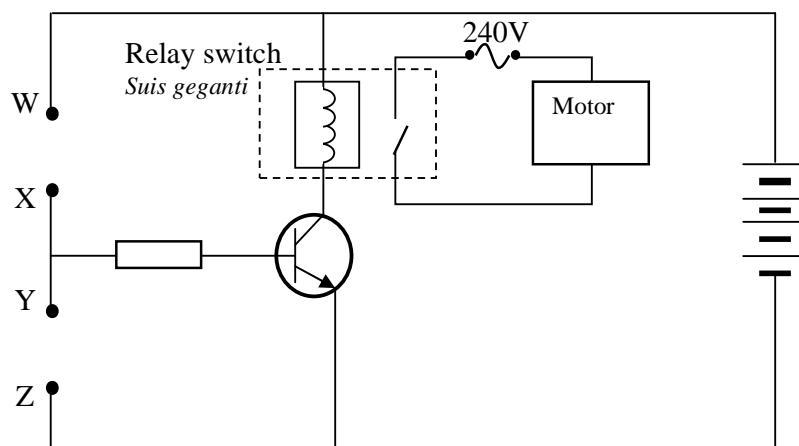


Diagram 36
Rajah 36

What components should be connected at terminals WX and YZ to switch on the motor when the surrounding is hot?

Komponen apakah yang perlu disambung pada terminal WX dan YZ untuk menyalaikan mentol L akan apabila keadaan persekitaran menjadi panas?

	Terminals WX	Terminals YZ
A	Light dependent resistor <i>Perintang peka cahaya</i>	Thermistor <i>Termistor</i>
B	Resistor <i>Perintang</i>	Light dependent resistor <i>Perintang peka cahaya</i>
C	Thermistor <i>Termistor</i>	Resistor <i>Perintang</i>
D	Capacitor <i>Kapasitor</i>	Resistor <i>Perintang</i>

46 Diagram 37 shows a logic gate circuit with input signals P and Q.

Rajah 37 menunjukkan litar get logik dengan isyarat input P dan Q.

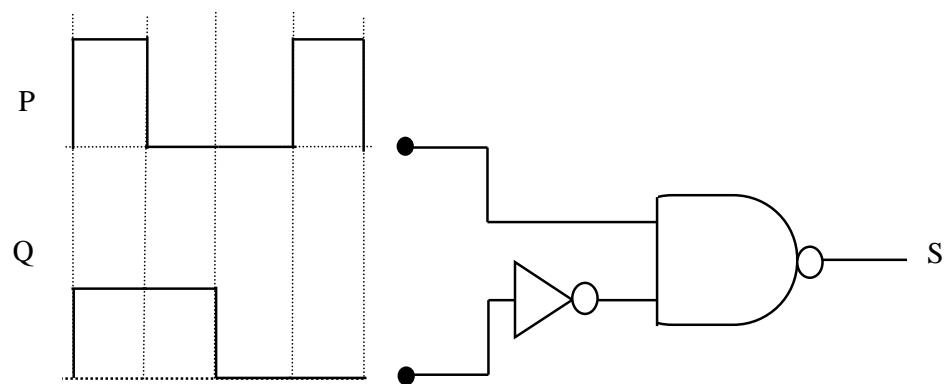


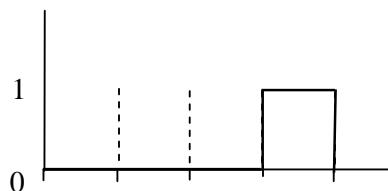
Diagram 37

Rajah 37

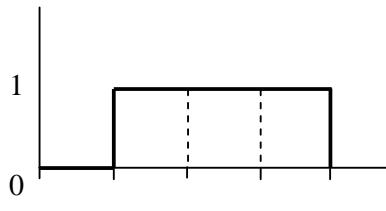
Which diagram shows the correct output signal, S?

Rajah manakah yang menunjukkan isyarat output S yang betul?

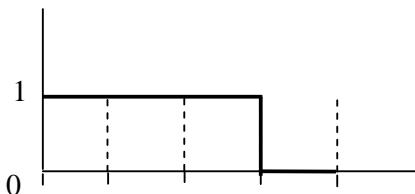
A



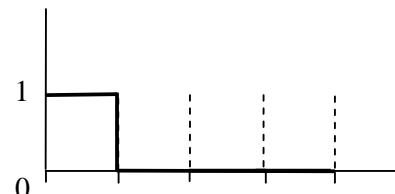
B



C



D



- 47** $^{23}_{11}Na$ and $^{24}_{11}Na$ are two isotopes of sodium.

Compared to a sodium-23 atom, how many protons, neutrons and electrons does a sodium-24 atom have?

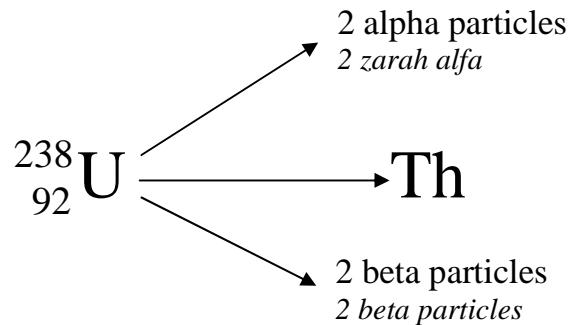
$^{23}_{11}Na$ dan $^{24}_{11}Na$ adalah dua isotop natrium.

Berapa banyak bilangan proton, neutron dan elektron yang dippunyai oleh atom natrium-24 jika dibandingkan dengan atom natrium-23?

	Number of Protons Bilangan Proton	Number of Neutrons Bilangan Neutron	Number of Electrons Bilangan Elektron
A	Same <i>Sama</i>	More <i>Lebih banyak</i>	More <i>Lebih banyak</i>
B	Same <i>Sama</i>	More <i>Lebih banyak</i>	Same <i>Sama</i>
C	More <i>Lebih banyak</i>	Same <i>Sama</i>	More <i>Lebih banyak</i>
D	More <i>Lebih banyak</i>	Same <i>Sama</i>	Same <i>Sama</i>

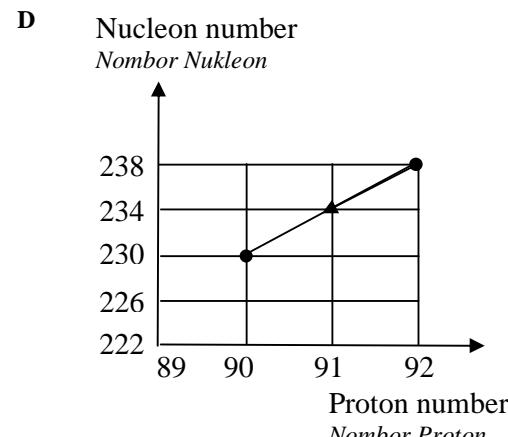
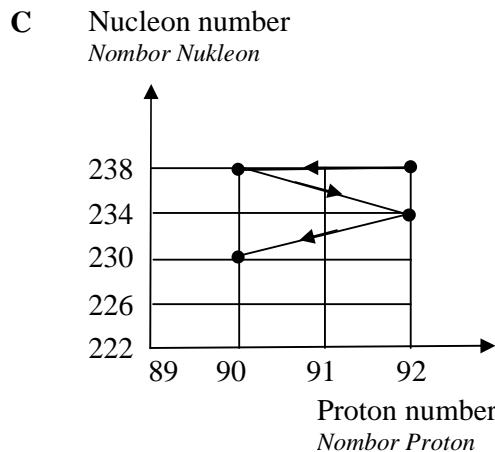
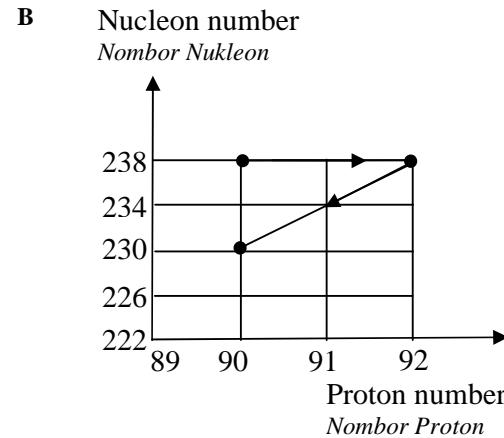
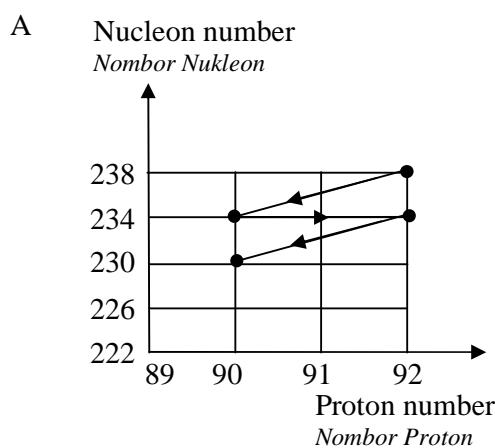
- 48** When a uranium-238 nucleus decays it becomes thorium, and two alpha and two beta particles are emitted, as shown diagram 38.

Bila uranium-238 mereput ia menjadi torium dan dua zarah alfa serta dua zarah beta dibebaskan, seperti ditunjukkan pada rajah 38.



Which graph represents this decay?

Graf yang manakah mewakili reputan ini?



49 Iodine-131 is suitable to detect thyroid disorder because
Iodine-131sesuai untuk mengesan kelainan kelenjar tirod kerana

- A** it emits only beta rays
ia mengeluarkan hanya sinaran beta
- B** it has a half life of eight days
ia mempunyai separuh hayat lapan hari
- C** it can be used to treat the disorder
ia boleh digunakan untuk merawat kelainan kelenjar tiroid
- D** it can be detected by the spark counter
ia boleh dikesan menggunakan pembilang bunga api

50 In a nuclear fission reaction, the mass defect is 0.02u.
What is the energy released?

*Dalam satu tindakbalas pembelahan nuklear, cacat jisim yang terhasil ialah 0.02u.
Berapakah tenaga yang dibebaskan?*

[speed of light = $3 \times 10^8 \text{ m s}^{-1}$, $1\text{u} = 1.66 \times 10^{-27}\text{kg}$]
[halaju cahaya = $3 \times 10^8 \text{ m s}^{-1}$, $1\text{u} = 1.66 \times 10^{-27}\text{kg}$]

- A** $1.80 \times 10^{17} \text{ J}$
- B** $6.00 \times 10^6 \text{ J}$
- C** $2.99 \times 10^{-12} \text{ J}$
- D** $9.96 \times 10^{-21} \text{ J}$

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

<http://edu.joshuatly.com/>

INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON

1. This question paper consists of **50** questions.
*Kertas soalan ini mengandungi **50** soalan.*
2. Answer **all** questions.
*Jawab **semua** soalan.*
3. Each question is followed by either **three** or **four** options. Choose the best option for each question and blacken the correct space on the answer sheet.
*Tiap-tiap soalan diikuti oleh sama ada **tiga** atau **empat** pilihan jawapan. Pilih satu jawapan yang terbaik bagi setiap soalan dan hitamkan ruangan yang betul pada kertas jawapan anda.*
4. Blacken only one space for each question.
*Hitamkan **satu** ruangan sahaja bagi setiap soalan.*
5. If you wish to change your answer, erase the blackened mark that you have made. Then blacken the space for the new answer.
Sekiranya anda hendak menukar jawapan, padamkan tanda yang telah dibuat. Kemudian hitamkan jawapan yang baru.
6. The diagrams in the questions provided are not drawn to scale unless stated.
Gambar rajah yang mengiringi soalan tidak dilukiskan mengikut skala kecuali dinyatakan.
7. You may use a non-programmable scientific calculator.
Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.
8. A list of formulae is provided on page 2 and 3.
Satu senarai formula disediakan di halaman 2 dan 3.

CONFIDENTIAL

4531/2

4531/2

PHYSICS

Index Number :

Paper 2

September

2011

2 ½ hours

Name :

Class :



MAKTAB RENDAH SAINS MARA

**SIJIL PELAJARAN MALAYSIA
TRIAL EXAMINATION 2011**

4
5
3
1
2

PHYSICS

Paper 2

Two hours and thirty minutes

**DO NOT OPEN THIS BOOKLET
UNTIL TOLD TO DO SO**

1. Write down your name and class in the space provided.
2. The questions are written in English and *bahasa Melayu*.
3. Candidates are required to read the information at the back of the booklet

<i>For Examiner's Use</i>			
Section	Question	Total Marks	Score Obtained
A	1	4	
	2	5	
	3	6	
	4	7	
	5	8	
	6	8	
	7	10	
	8	12	
B	9	20	
	10	20	
C	11	20	
	12	20	
Total			

This booklet consists of 34 printed pages and 2 blank pages

The following information may be useful. The symbols have their usual meaning.
(Maklumat berikut mungkin berfaedah. Simbol-simbol mempunyai makna yang biasa.)

- | | | | |
|----|--|----|---|
| 1 | $v = \frac{s}{t}$ | 18 | Wavelength/Panjang gelombang, $= \frac{ax}{D}$ |
| 2 | $a = \frac{v-u}{t}$ | 19 | Power/Kuasa, $P = \frac{\text{energy / tenaga}}{\text{time / masa}}$ |
| 3 | $v^2 = u^2 + 2as$ | 20 | $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$ |
| 4 | $s = ut + \frac{1}{2}at^2$ | 21 | Linear magnification/Pembesaran linear,
$M = \frac{v}{u}$ |
| 5 | Momentum $= mv$ | 22 | Refractive index/Indeks biasan, $= \frac{\sin i}{\sin r}$ |
| 6 | $F = ma$ | 23 | Refractive index/Indeks biasan,
$= \frac{\text{real depth/dalam nyata}}{\text{apparent depth/dalam ketara}}$ |
| 7 | Kinetic energy/Tenaga kinetik
$= \frac{1}{2}mv^2$ | 24 | $Q = It$ |
| 8 | Gravitational potential energy/
$Tenaga keupayaan gravity = mgh$ | 25 | $V = IR$ |
| 9 | Elastic potential energy/
$Tenaga keupayaan kenyal = \frac{1}{2}Fx$ | 26 | $E = VQ$ |
| 10 | Density /Ketumpatan, $= \frac{m}{V}$ | 27 | Power/Kuasa, $P = IV$ |
| 11 | Pressure/Tekanan, $P = \frac{F}{A}$ | 28 | $\frac{N_s}{N_p} = \frac{V_s}{V_p}$ |
| 12 | Pressure/Tekanan, $P = h\rho g$ | 29 | $E = mc^2$ |
| 13 | Heat/Haba, $Q = mc\theta$ | 30 | Efficiency/Kecekapan $= \frac{I_s V_s}{I_p V_p} \times 100\%$ |
| 14 | Heat/Haba, $Q = ml$ | 31 | $g = 10 \text{ m s}^{-2}$ |
| 15 | $\frac{PV}{T} = \text{constant/pemalar)$ | 32 | $c = 3.0 \times 10^8 \text{ m s}^{-1}$ |
| 16 | Atmospheric pressure at sea level/
$Tekanan atmosfera pada aras laut$
$= 1 \times 10^5 \text{ Pa}$ | | |
| 17 | $v = f$ | | |

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For
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Section A
Bahagian A

[60 marks]
[60 markah]

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

- 1** Diagram 1 shows a micrometer screw gauge.
Rajah 1 menunjukkan sebuah tolok skru mikrometer.

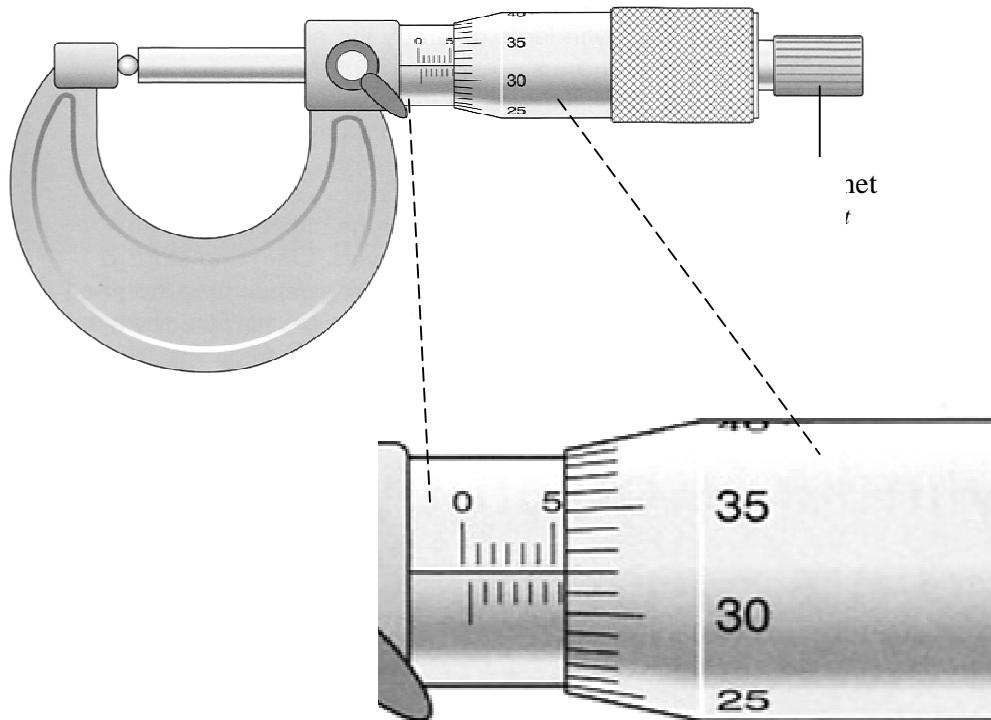


Diagram 1
Rajah 1

1(a)

- (a) On Diagram 1, mark the vernier scale with the letter 'V'
Pada Rajah 1, tandakan skala vernier dengan huruf 'V'

[1 mark]
[1 markah]

1

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- (b) Complete the sentence below by ticking (✓) the correct box.
Lengkapkan ayat berikut dengan menanda (✓) pada kotak yang betul.

A micrometer screw gauge can be used to measure the
Tolok skru mikrometer boleh digunakan untuk mengukur

Internal diameter of a drinking straw
Diameter dalam penyedut minuman

Thickness of a wool blanket
Ketebalan sehelai selimut bulu

Diameter of a pencil
Diameter sebatang pensel

[1 mark]
[1 markah]

1(b)

	1
--	---

- (c) What is the reading shown on Diagram 1?
Apakah bacaan yang ditunjukkan pada Rajah 1?

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

[1 mark]
[1 markah]

1(c)

	1
--	---

- (d) Why does the rotation of the ratchet needs to be stopped when the first 'click' sound is heard?

Mengapa putaran racet perlu dihentikan bila bunyi 'klik' yang pertama kedengaran?

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

[1 mark]
[1 markah]

1(d)

	1
--	---

Total
A1

	4
--	---

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- 2 Diagram 2 shows a mother pushing a baby stroller of mass 8 kg with a constant force 20 N.

Rajah 2 menunjukkan seorang ibu menolak kereta sorong bayi berjisim 8 kg dengan daya 20 N.

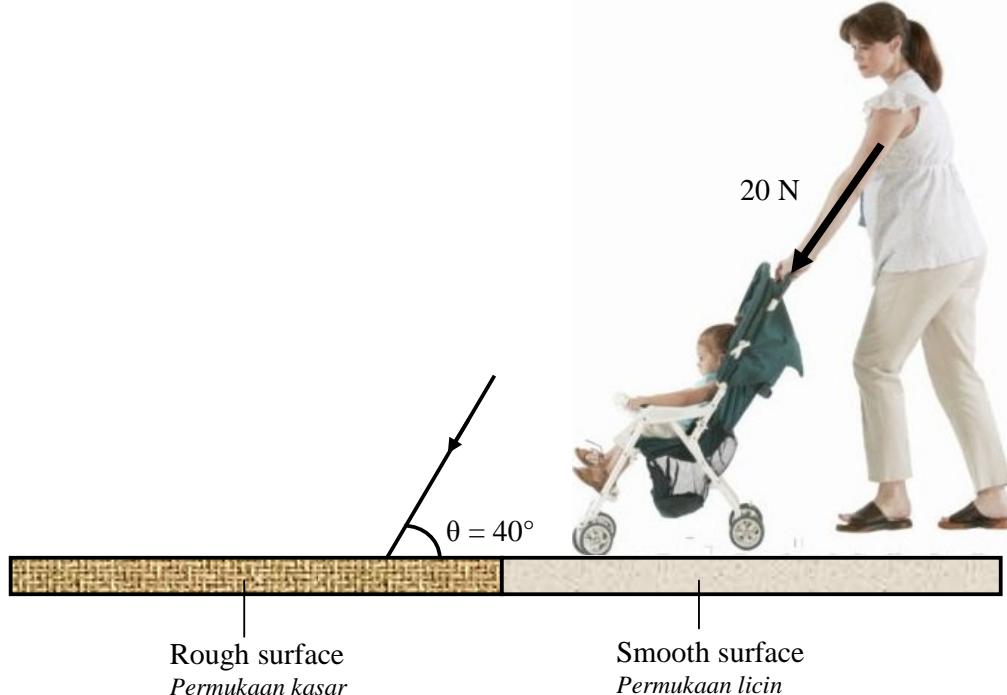


Diagram 2
Rajah 2

2(a)

- (a) What is meant by force?

Apakah maksud daya?

1

[1 mark]
[1 markah]

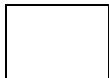
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- (b) Based on Diagram 2,
Berdasarkan Rajah 2,

- (i) Tick (\checkmark) the direction of the component force F , that causes the baby stroller to move forward.

Tandakan (\checkmark) terhadap arah komponen daya F , yang menyebabkan kereta sorong bayi tersebut bergerak ke hadapan.

Direction of force
Arah daya



2(b)(i)

[1 mark]
[1 markah]

	1
--	---

- (ii) The force acting on the stroller is 40° from the horizontal surface.

Daya yang bertindak ke atas kereta sorong bayi adalah 40° dari permukaan mendatar

Calculate the value of the force, F in (b) (i)
Kira nilai daya F di (b) (i)

2(b)(i)

[2 marks]
[2 markah]

	2
--	---

- (c) Complete the following sentence by **underlining** the correct word.

Lengkapkan ayat berikut dengan menggariskan perkataan yang betul.

When the object moves on the rough surface, the net force acting on the object will be (**increased, decreased, unchanged**)

*Apabila objek bergerak pada permukaan kasar, daya paduan yang bertindak ke atas objek akan (**meningkat, berkurang, tidak berubah**)*

[1 mark]
[1 markah]

2(c)

	1
--	---

**Total
A2**

	5
--	---

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- 3 Diagram 3 shows a hair dryer with specification “240V, 1000W”.

Rajah 3 menunjukkan pengering rambut dengan spesifikasi “240V, 1000W”

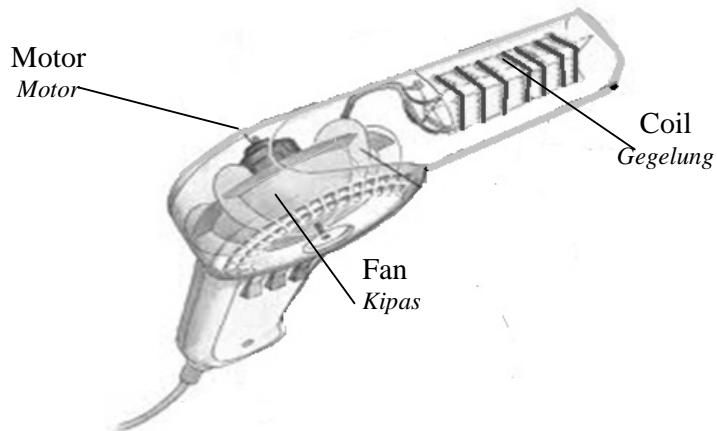


Diagram 3

Rajah 3

- (a) What is meant by “240V, 1000W” ?

Apakah yang dimaksudkan dengan “240V, 1000W” ?

3(a)

1

[1 mark]

[1 markah]

- (b) Calculate the current flowing in the hair dryer.

Hitungkan arus yang mengalir dalam pengering rambut tersebut

3(b)

2

[2 marks]

[2 markah]

For
Examiner's
Use

- (c) (i) Give **one** reason why the efficiency of the hair dryer decreases after it has been used over one hour.

Beri satu sebab mengapa kecekapan pengering rambut berkurang selepas digunakan selama satu jam.

.....

[1 mark]
[1 markah]

3(c)(i)

1

- (ii) State **one** method to overcome the problem in c(i)

Nyatakan satu cara untuk masalah di c(i)

.....

[1 mark]
[1 markah]

3(c)(ii)

1

- (d) The hairdryer is switched on for one hour. What happens to the power output of the hair dryer in Diagram 3 when the current supplied is increased?

Apakah yang terjadi kepada kuasa output pengering rambut dalam Rajah 3 apabila arus yang dibekalkan meningkat?

.....

[1 mark]
[1 markah]

3(c)

1

Total
A3

6

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For
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- 4 Diagram 4 shows the water wave moving with velocity of 4 m s^{-1} from deep to shallow area.

Rajah 4 menunjukkan gelombang air yang merambat dengan halaju 4 m s^{-1} dari kawasan dalam ke kawasan ceteak

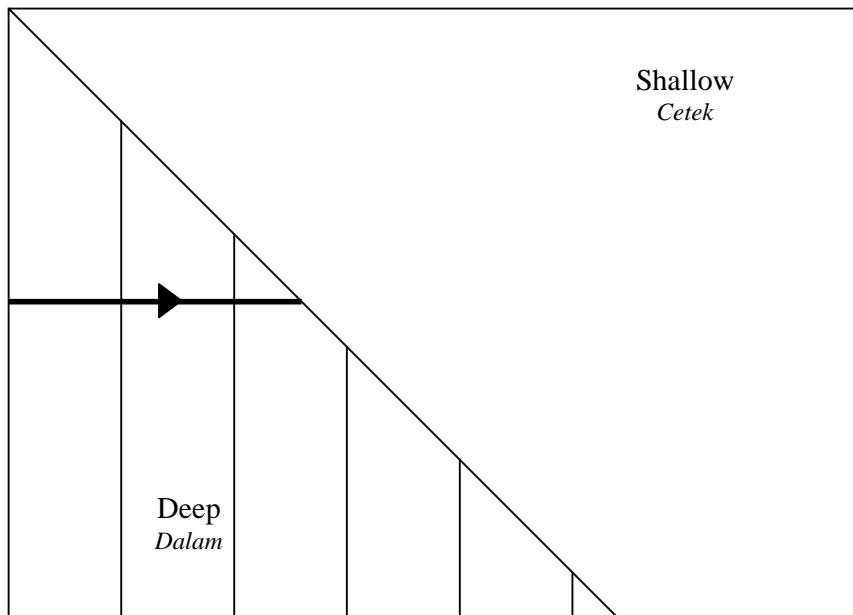


Diagram 4
Rajah 4

- (a) Name the wave phenomenon.

Namakan fenomena gelombang tersebut

4(a)

1

[1 mark]
[1 markah]

- (b) Calculate the wavelength of the water waves at the deep area if the frequency is 5 Hz.

Kira panjang gelombang air di kawasan air dalam jika frekuensi gelombang air adalah 5 Hz.

4(b)

2

[2 marks]
[2 markah]

- (c) In Diagram 4, draw the pattern of water wave in the shallow area.

Pada Rajah 4, lukis corak gelombang air di kawasan ceteak.

[2 marks]
[2 markah]

4(c)

2

- (d) (i) State the frequency of the water wave at the shallow area.
Nyatakan frekuensi gelombang air di kawasan cetek.

.....
.....

[1 mark]
[1 markah]

For
Examiner's
use

4(d)(i)

1

- (ii) Give **one** reason for the answer in 4(d)(i).
Berikan satu sebab kepada jawapan di 4(d)(i).

.....
.....

[1 mark]
[1 markah]

4(d)(ii)

1

Total
A4

7

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For
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use

- 5 Diagram 5.1 and Diagram 5.2 show the light rays passing through two identical concave lenses. u is the object distance and v is the image distance.

Rajah 5.1 dan Rajah 5.2 menunjukkan sinar cahaya melalui dua kanta cekung yang serupa. u adalah jarak objek and v adalah jarak imej.

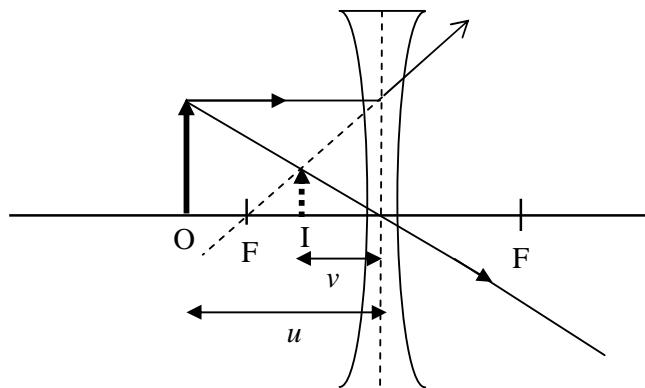


Diagram 5.1
Rajah 5.1

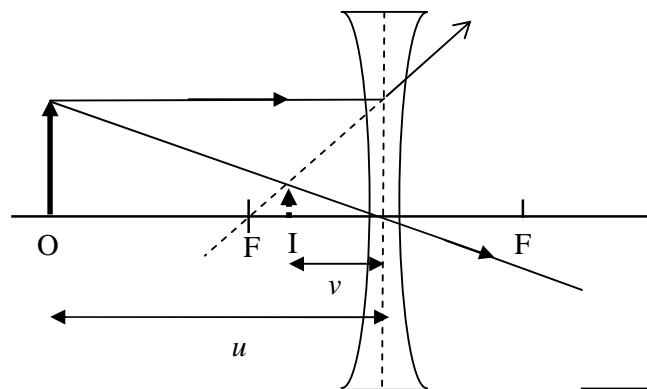


Diagram 5.2
Rajah 5.2

Key /kekunci:
O : Object/objek
I : Image/imej

- (a) What is meant by object distance?

Apakah yang dimaksudkan dengan jarak objek?

5(a)

1

.....

[1 mark]
[1 markah]

For
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Use

- (b) Based on Diagram 5.1 and 5.2, state **one** similar characteristic of the images formed.

*Berdasarkan Rajah 5.1 dan 5.2, nyatakan **satu** ciri sepunya bagi imej yang terbentuk.*

5(b)

.....	1
-------	---

[1 mark]
[1 markah]

- (c) Observe Diagram 5.1 and Diagram 5.2.

Perhatikan Rajah 5.1 dan Rajah 5.2.

5(c)(i)

.....	1
-------	---

[1 mark]
[1 markah]

- (i) Compare the object distance.

Bandingkan jarak objek

5(c)(ii)

.....	1
-------	---

[1 mark]
[1 markah]

- (ii) Compare the image distance.

Bandingkan jarak imej.

5 (c)(iii)

.....	1
-------	---

[1 mark]
[1 markah]

- (iii) Compare the size of image produced by the lenses.

Bandingkan saiz imej yang dihasilkan oleh kanta.

5(d)

.....	1
-------	---

[1 mark]
[1 markah]

- (d) Based on the answers in 5(c), state the relationship between the size of image and the object distance.

Berdasarkan jawapan di 5(c), nyatakan hubungan antara saiz imej dan jarak objek

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use

5(e)(i)

1

- 5 (e) (i) Based on Diagram 5.1, what happens to the size of image when a thicker lens is used?

Berdasarkan Rajah 5.1, apakah yang berlaku kepada saiz imej apabila kanta yang lebih tebal digunakan?

.....

[1 mark]
[1 markah]

5(e)(ii)

1

- (ii) Give **one** reason for the answer in 5 (e)(i)

Berikan **satu** sebab kepada jawapan di 5 (e)(i).

.....

[1 mark]
[1 markah]

Total
A5

8

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- 6** A transistor-based circuit is used as an automatic switch for a light bulb P. Diagram 6.1 shows the circuit at night while Diagram 6.2 shows the same circuit during day time.

Satu litar bertransistor berfungsi sebagai suis automatik untuk mentol P. Rajah 6.1 menunjukkan litar pada waktu malam dan Rajah 6.2 menunjukkan litar pada waktu siang.

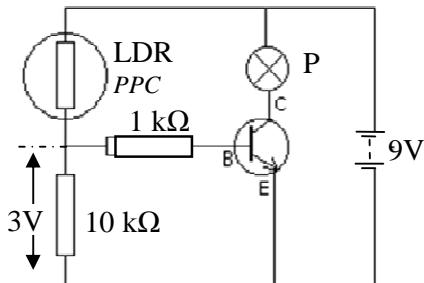


Diagram 6.1

Rajah 6.1

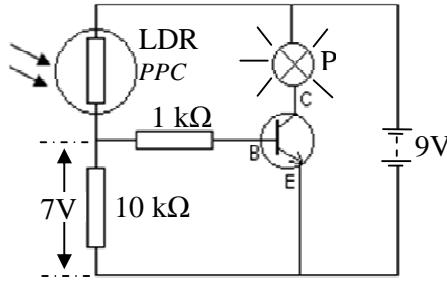


Diagram 6.2

Rajah 6.2

- (a) Name the type of transistor used in the circuit.
Namakan jenis transistor yang digunakan dalam litar.

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

6(a)

1

- (b) What is the effect of light (intensity) on the resistance of the LDR?
Apakah kesan (keamatan) cahaya terhadap rintangan PPC?

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

6(b)

1

- (c) Observe Diagram 6.1 and Diagram 6.2,
Perhatikan Rajah 6.1 dan Diagram 6.2,

- (i) Compare the resistance of the LDR
Bandingkan rintangan PPC.

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

6(c)(i)

1

- (ii) Compare the base potential difference, V_{BE} .
Bandingkan beza keupayaan tapak, V_{BE} .

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

6(c)(ii)

1

For
Examiner's
Use

6(c)(iii)

	1
--	---

- (iii) Compare the brightness of the bulb.

Bandingkan kecerahan mentol.

.....
.....

[1 mark]
[1 markah]

- (d) Based on the answers in 6 (c), relate the base potential V_{BE} with the brightness of the bulb.

Berdasarkan jawapan di 6 (c), hubungkaitkan beza keupayaan tapak V_{BE} dengan kecerahan mentol.

6(d)

	1
--	---

.....
.....

[1 mark]
[1 markah]

- (e) Diagram 6.3 shows the circuit which has been modified.

Rajah 6.3 menunjukkan litar yang telah diubahsuai.

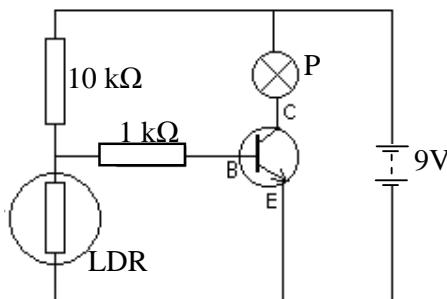


Diagram 6.3
Rajah 6.3

6(e)(i)

	1
--	---

- (i) State the surrounding condition in which the bulb will light up.

Nyatakan keadaan persekitaran di mana mentol itu akan menyala.

.....
.....

[1 mark]
[1 markah]

- (ii) Explain your answer.

Terangkan jawapan anda.

.....
.....

[1 mark]
[1 markah]

6(e)(ii)

	1
--	---

**Total
A6**

	8
--	---

- 7 Diagram 7.1 shows a Cartesian diver in a plastic bottle. X are holes to allow water to flow in and out of the Cartesian diver.

Rajah 7.1 menunjukkan penyelam Cartesian dalam sebuah botol plastik. X adalah lubang yang membenarkan air masuk dan keluar dari penyelam Cartesian.

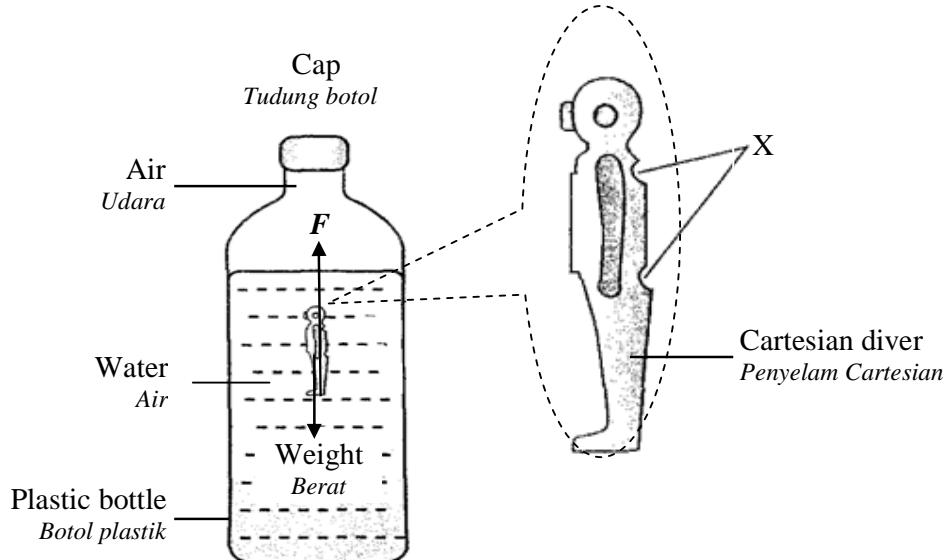


Diagram 7.1
Rajah 7.1

- (a) Diagram 7.1 shows the Cartesian diver floating in the water.

Rajah 7.1 menunjukkan penyelam Cartesian terapung di dalam air.

- (i) Name the force F acting upwards on the Cartesian diver.

Namakan daya F yang bertindak ke atas pada penyelam Cartesian.

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

7(a)(i)

	1
--	---

- (ii) State the relationship between the force F and weight.

Nyatakan hubungan antara daya F dan berat.

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

7(a)(ii)

	1
--	---

For
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use

- (b) The Cartesian diver sinks when the bottle is squeezed, as shown in Diagram 7.2.

Penyelam Cartesian tenggelam apabila botol dipicit, seperti ditunjukkan pada Rajah 7.2.

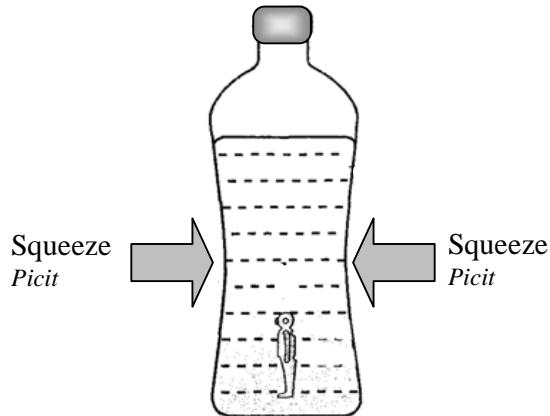


Diagram 7.2
Rajah 7.2

- 7(b)(i) (i) Explain why the Cartesian diver sinks.

Terangkan kenapa penyelam Cartesian itu tenggelam.

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

[2 marks]
[2 markah]

- 7(b)(ii) (ii) State one application that is similar to this situation.

Nyatakan satu aplikasi yang serupa dengan situasi ini.

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

[1 mark]
[1 markah]

- (c) Diagram 7.3 shows a hot air balloon used in sports and recreation. It ascends as the atmospheric air in the open **balloon envelope** is displaced by the hot air.

Hot air with the temperature which exceeds 100°C is produced by burners which are placed below the balloon envelope.

Rajah 7.3 menunjukkan belon udara panas yang digunakan untuk sukan dan rekreatif. Belon naik ke atas apabila udara atmosfera di dalam karung belon disesar oleh udara panas. Udara panas dengan suhu melebihi 100 °C dihasilkan oleh pembakar yang terletak di bawah karung belon.

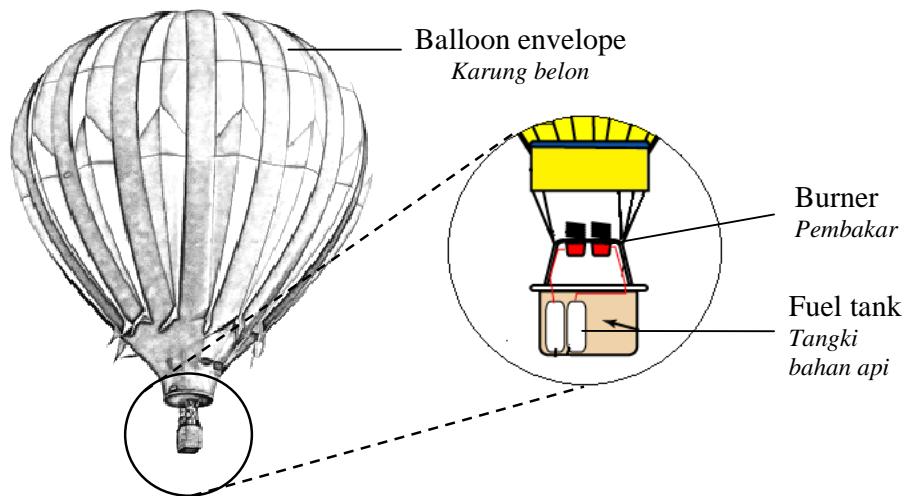


Diagram 7.3
Rajah 7.3

Suggest and explain the modifications which need to be done for each of the following :

Cadangkan dan terangkan pengubahsuaian yang perlu dilakukan untuk setiap yang berikut:

- (i) The balloon has to reach higher altitudes.

Belon perlu mendaki ke altitud yang lebih tinggi.

.....

.....

.....

[2 marks]
[2 markah]

7(c)(i)

	2
--	---

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7(c)(ii)

2

- (ii) The balloon has to support to the increased weight of when the number of passengers increases.

Belon perlu menampung pertambahan berat apabila bilangan penumpang bertambah.

.....
.....

[2 marks]
[2 markah]

- (d) When does the hot air balloon start moving at a constant altitude?

Bilakah belon udara panas akan mula bergerak pada alitud yang tetap?

.....
.....

[1 mark]
[1 markah]

7(d)

1

Total
A7

10

- 8 Diagram 8.1 shows an electrical transmission system from the power station to the consumers.

Rajah 8.1 menunjukkan sistem penghantaran elektrik dari stesen janakuasa kepada pengguna.

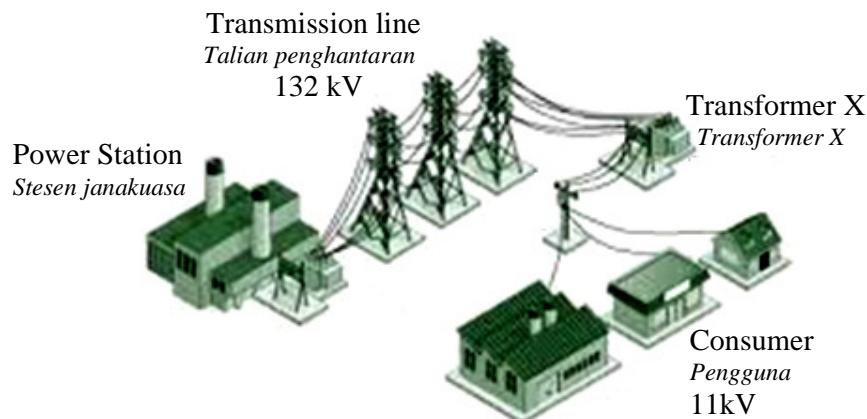


Diagram 8.1
Rajah 8.1

- (a) What is the function of a transformer?

Apakah kegunaan tranformer?

.....
.....

[1 mark]
[1 markah]

8(a)

1

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- 8 (b) Table 8 shows the information of the components in an electrical transmission system.

Jadual 8 menunjukkan maklumat tentang komponen suatu sistem penghantaran elektrik.

Electrical transmission system model <i>Model sistem penghantaran elektrik</i>	P	Q	R
Number of turns of the primary coil <i>Bilangan lilitan gegelung primer</i>	100	3600	1200
Number of turns of the secondary coil <i>Bilangan lilitan gegelung sekunder</i>	1200	1200	100
Type of transformer core <i>Jenis teras transformer</i>	Laminated soft iron <i>Besi lembut berlamina</i>	Soft iron <i>Besi lembut</i>	Laminated soft iron <i>Besi lembut berlamina</i>
Materials of transmission wire <i>Bahan bagi kabel penghantaran</i>	Constantan <i>Konstantan</i>	Aluminium <i>Aluminium</i>	Aluminium <i>Aluminium</i>

Table 8
Jadual 8

Based on Table 8, state the suitable characteristics for electric transmission system as shown in Diagram 8.

Berdasarkan pada Jadual 8, nyatakan ciri-ciri yang sesuai bagi sistem penghantaran elektrik seperti dalam Rajah 8.

- (i) Number of turns of primary and secondary coil for Transformer X
Bilangan lilitan bagi gegelung primer dan sekunder Transformer X.

.....
.....

Reason.

Sebab.

.....
.....

[2 marks]
[2 markah]

8(b)(i)

	2
--	---

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- (b) (ii) Type of core of the transformer.

Jenis teras transformer.

.....
.....

Reason.

Sebab.

.....
.....

[2 marks]
[2 markah]

8(b)(ii)

2

- (iii) Material of transmission wire

Bahan bagi kabel penghantaran.

.....
.....

Reason.

Sebab.

.....
.....

[2 marks]
[2 markah]

8(b)(iii)

2

- (iv) Based on your answers in (b)(i),(b)(ii) and (b)(iii), determine the most electric transmission model.

Berdasarkan jawapan anda dalam (b)(i), (b)(ii) dan (b)(iii), tentukan model penghantaran elektrik yang paling sesuai.

.....

[1 mark]
[1 markah]

8(b)(iv)

1

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- 8 (c)** Diagram 8.2 shows a transformer which changes the mains supply from 240 V to 9 V.

Rajah 8.2 menunjukkan sebuah transformer yang mengubah bekalan tenaga elektrik 240 V kepada 9 V.

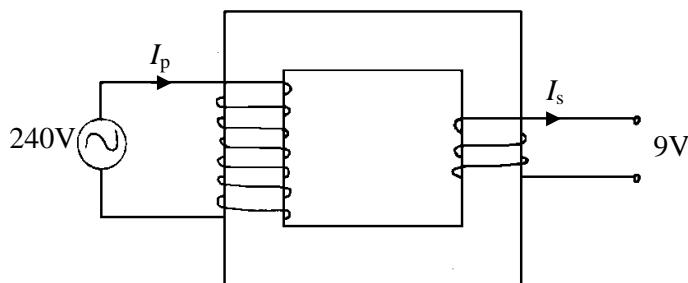


Diagram 8.2
Rajah 8.2

The electric current in the primary coil, I_p , and the secondary coil, I_s , is 0.1 A and 2.0 A respectively.

Arus elektrik yang mengalir dalam gegelung primer, I_p dan gegelung sekunder, I_s masing-masing adalah 0.1 A dan 2.0 A

- (i) Calculate the efficiency of the transformer.

Kirakan kecekapan transformer tersebut.

8(c)(i)

2

[2 marks]
[2 markah]

- (ii) What is the power loss in the transformer?

Berapakah kehilangan kuasa transformer tersebut?

8(c)(ii)

2

**Total
A8**

12

[2 marks]
[2 markah]

Section B*Bahagian B*

[20 marks]
 [20 markah]

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

- 9** Diagram 9.1 and Diagram 9.2 show the heating curves for a fixed mass of ice and naphthalene respectively. Both materials are heated by using identical heaters.

Rajah 9.1 dan Rajah 9.2 masing-masing menunjukkan lengkung pemanasan bagi suatu jisim tetap untuk ais dan naftalena. Kedua-dua bahan dipanaskan dengan menggunakan pemanas yang serupa.

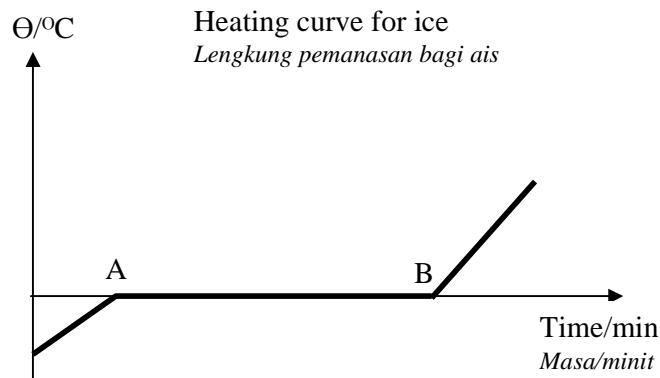


Diagram 9.1
Rajah 9.1

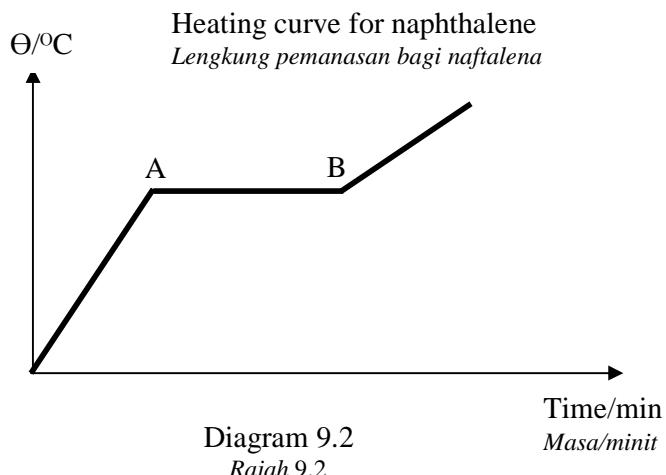


Diagram 9.2
Rajah 9.2

[Turn page over
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- (a) What is meant by specific latent heat of fusion?

Apakah yang dimaksudkan dengan haba pendam spesifik pelakuran?

[1 mark]
[1 markah]

- (b) (i) By using Diagram 9.1 and 9.2, compare the rate of heat supply, the temperature change and the physical state of matter at AB

Dengan menggunakan Rajah 9.1 dan 9.2, bandingkan kadar haba yang dibekalkan, perubahan suhu dan keadaan fizikal bahan pada AB.

[3 marks]
[3 markah]

- (ii) Relate

- (a) the rate of heat supply and the temperature change
(b) the temperature change and the change in the physical state of matter.

Kaitkan

- (a) *Kadar haba yang dibekalkan dan perubahan suhu*
(b) *Perubahan suhu dan perubahan keadaan fizikal bahan di AB.*

[2 marks]
[2 markah]

- (c) Using the kinetic theory of matter, explain the changes which occur in ice when it is heated until it melts.

Dengan menggunakan teori kinetik jirim, terangkan perubahan yang berlaku kepada ais apabila ia dipanaskan sehingga ia melebur.

[4 marks]
[4 markah]

- (d) Diagram 9.3 shows a refrigerator to make ice in a small quantity.

Rajah 9.3 menunjukkan sebuah peti sejuk untuk membuat ais dalam kuantiti yang kecil.

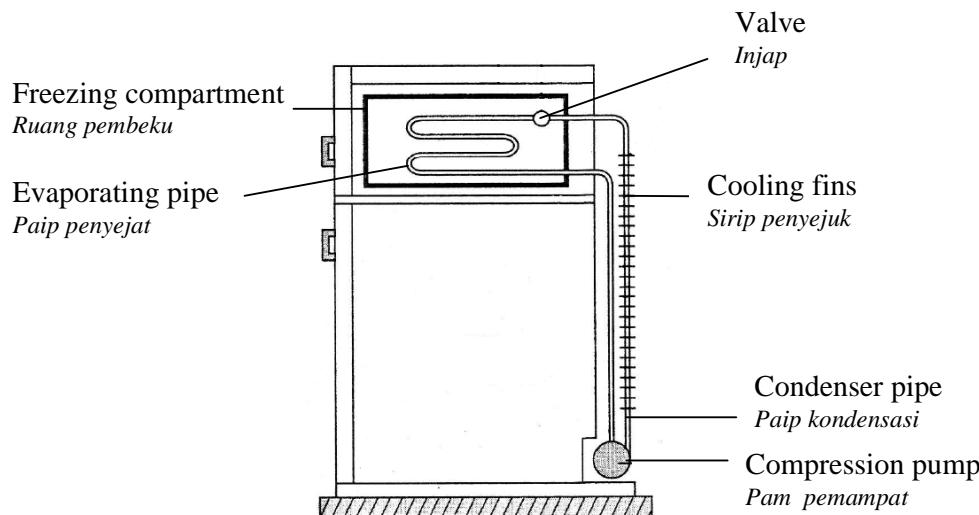


Diagram 9.3
Rajah 9.3

Using appropriate physics concepts, suggest and explain suitable modifications so that water can cool faster and in large quantity based on the following aspects:

Dengan menggunakan konsep fizik yang sesuai, cadang dan jelaskan pengubahsuai yang boleh dilakukan supaya air dapat disejukkan dengan lebih cepat dan dalam kuantiti yang besar berdasarkan aspek-aspek berikut:

- (i) Size of freezing compartment
Saiz ruang pembeku
- (ii) Design for evaporating pipe
Rekabentuk untuk paip penyejat
- (iii) Ability of the compression pump
Kemampuan pam pemmpat
- (iv) Characteristic of metal used for cooling fins
Ciri logam yang digunakan sebagai sirip penyejuk
- (v) Characteristic of liquid used for cooling
Ciri cecair yang digunakan sebagai penyejuk

[10 marks]
[10 markah]

- 10** Diagram 10.1 and 10.2 shows two different structures of semiconductor.

Rajah 10.1 dan 10.2 menunjukkan dua struktur atom semikonduktor yang berbeza.

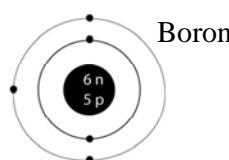


Diagram 10.1
Rajah 10.1

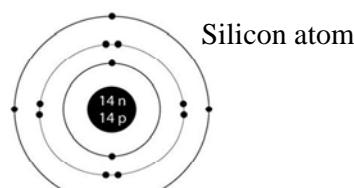


Diagram 10.2
Rajah 10.2

- (a) What is the meaning of semiconductor?

Apakah maksud semikonduktor?

[1 mark]/[1 markah]

- (b) State the number of valence electrons in Diagram 10.1 and 10.2

Nyatakan bilangan elektron valensi dalam Rajah 10.1 dan 10.2

When the Boron atom in Diagram 10.1 is added to Silicon atom in Diagram 10.2, majority charge carrier is formed. Name the majority charge carrier.

Bila atom Boron dalam Rajah 10.1 ditambah kepada atom Silikon dalam Rajah 10.2, pembawa cas majoriti terbentuk. Namakan pembawa cas majority tersebut

Relate the majority charge carrier with the type of semiconductor produced.

Name the physics process to create this type of semiconductors.

Hubungkan pembawa cas majority dengan jenis semikonduktor yang terhasil.
Namakan proses fizik yang menghasilkan jenis semikonduktor ini.

[5 marks]/[5 markah]

- (c) Based on Diagram 10.3, explain how a shadow is formed on the screen of a Maltese Cross Tube when the Extra High Tension(E.H.T) power supply is switched on.

Berdasarkan Rajah 10.3, terangkan bagaimana bayang boleh terbentuk di atas skrin Tiub Palang Maltese bila bekalan kuasa Voltan Lampau Tinggi (V.L.T.) dihidupkan.

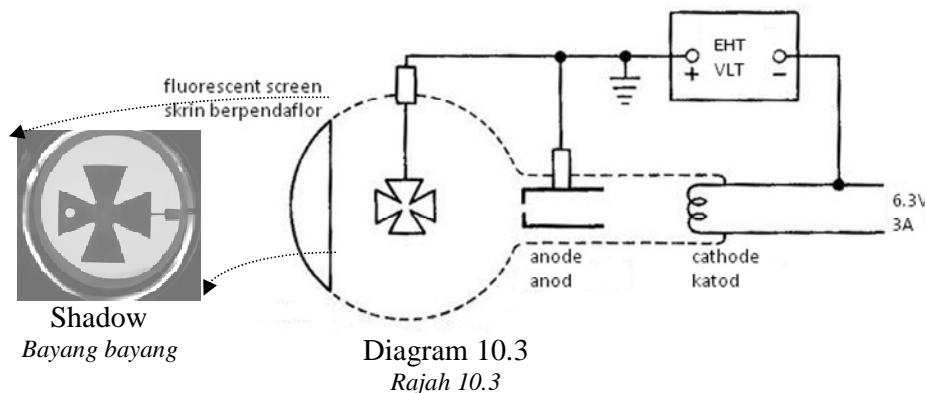


Diagram 10.3
Rajah 10.3

[4 marks]/4 markah

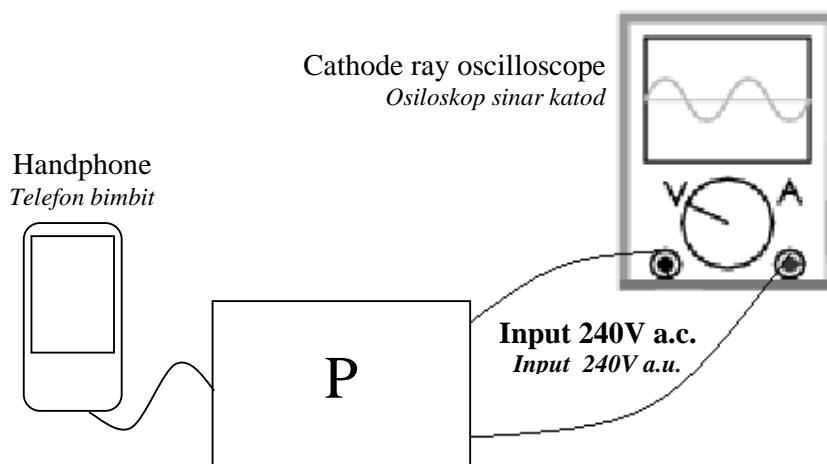


Diagram 10.4
Rajah 10.4

Diagram 10.4 shows the screen of a cathode ray tube (CRO) with an **alternating input voltage of 240V**. The CRO is connected to box P which in turn is connected to a handphone. Suggest and explain the suitable circuit for box P so it charge the handphone. Include in your answer :

Rajah 10.4 menunjuk skrin suatu osiloskop sinar katod (OSK) dengan input voltan ulang-alik 240V. OSK disambungkan kepada kotak P yang seterusnya disambungkan ke satu telefon bimbit. Cadangkan dan beri penerangan tentang litar yang sesuai untuk kotak P supaya P boleh mengcas telefon bimbit. Sertakan dalam jawapan anda:

- (i) the device used to charge the 9V handphone.
alat yang digunakan untuk mengecas telefon bimbit 9V.
- (ii) the component used to convert alternating current to direct current.
(draw the complete circuit with input and output).
*komponen yang digunakan untuk menukar arus terus au to arus terus.
(Lukiskan litar yang lengkap dengan input dan output).*
- (iii) the component used to smoothen the output voltage and how it is connected in the circuit.
komponen yang digunakan untuk melicinkan voltan output dan bagaimana ia disambungkan dalam litar tersebut.
- (iv) draw the final wave form obtained.
lukiskan bentuk gelombang yang terhasil.

[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 water container. When the tap is opened, water will come out from the container.

Rajah 11.1 menunjukkan air di dalam sebuah bekas air. Apabila pili dibuka, air akan mengalir keluar daripada bekas tersebut.



Diagram 11.1

Rajah 11.1

- (a) What is the meaning of liquid pressure ?

Apakah maksud tekanan cecair ?

[1 mark]
[1 markah]

- (b) (i) When the container is tilted forward, the water comes out faster from the tap. Explain why.

Apabila bekas air tersebut di condongkan ke depan, air dari bekas keluar lebih laju. Jelaskan mengapa.

[3 marks]
[3 markah]

- (ii) What happens to the pressure in (b)(i) if the same amount of water is placed in a bigger container?

Apakah yang berlaku terhadap tekanan air di (b)(i) yang mengalir keluar dari pili tersebut jika amaun air yang sama diletakkan di dalam bekas yang lebih besar?

[1 mark]
[1 markah]

- (c) Diagram 11.2 shows a hydraulic jack lifting a car.

Rajah 11.2 menunjukkan jek hidraulik mengangkat sebuah kereta.



Diagram 11.2

Rajah 11.2

Table 11 shows the characteristics of four different hydraulic liquids P, Q, R and S to be used in the hydraulic jack.

Jadual 11 menunjukkan ciri-ciri bagi empat cecair hidraulik berlainan P, Q, R dan S yang akan digunakan di dalam jek hidraulik

Hydraulic liquid <i>Cecair hidraulik</i>	Density <i>Ketumpatan</i>	Boiling Point <i>Takat Didih</i>	Compressibility <i>Kebolehmampatan</i>	Rate of vapourization <i>Kadar pengewapan</i>
P	13600 kg m^{-3}	357°C	High <i>Tinggi</i>	Low <i>Rendah</i>
Q	800 kg m^{-3}	130°C	Low <i>Rendah</i>	Low <i>Rendah</i>
R	1000 kg m^{-3}	100°C	High <i>Tinggi</i>	High <i>Tinggi</i>
S	790 kg m^{-3}	55°C	Low <i>Rendah</i>	High <i>Tinggi</i>

Table 11

Jadual 11

Explain the suitability of each characteristic of the hydraulic liquids and determine the most suitable hydraulic liquid to be used in the hydraulic jack to lift the car effectively. Give reasons for your choice.

Terangkan kesesuaian setiap ciri cecair hidraulik dan tentukan cecair hidraulik yang paling sesuai untuk digunakan di dalam jek hidraulik untuk mengangkat kereta dengan berkesan. Nyatakan sebab bagi pilihan anda.

[10 marks]
[10 markah]

[Turn page over
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- (d) Diagram 11.3 shows a hydraulic lift in a car service centre.

Rajah 11.3 menunjukkan sebuah pengangkat hidraulik di pusat servis kereta.

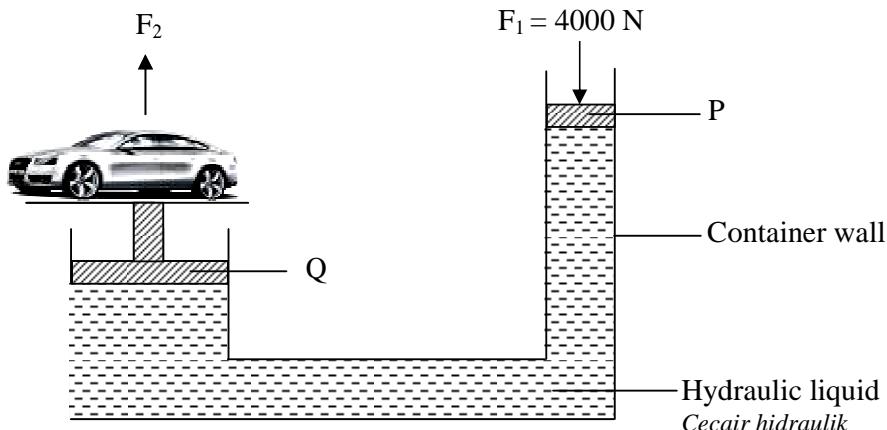


Diagram 11.3
Rajah 11.3

The cross-sectional areas of piston P and piston Q are 50 cm^2 and 200 cm^2 respectively. When a force, F_1 of 4000 N is applied to piston P, the car moves upward.

Luas keratan rentas bagi omboh P dan omboh Q masing-masing ialah 50 cm^2 dan 200 cm^2 . Apabila daya 4000 N dikenakan pada omboh P, kereta bergerak ke atas.

- (i) Ignoring the weights of of pistons P and Q and the container wall, calculate the value of F_2 .

Dengan mengabaikan berat omboh P dan Q, hitungkan daya F_2 .

[2 marks]
[2 markah]

- (ii) The weights of piston P and Q are 500 N and 5000 N respectively.

Berat omboh P dan Q ialah 500 N dan 5000 N .

Calculate the maximum car weight that may be lifted by piston Q.

Hitungkan berat maksimum yang boleh diangkat oleh omboh Q.

[3 marks]
[3 markah]

- 12** Diagram 12 shows a patient who is given an injection of radioisotope Iodine-131 to trace thyroid cancer. A detector is used to detect the activity of the radioactive emission after the injection.

Rajah 12 menunjukkan seorang pesakit yang akan disuntik dengan radioisotop Iodine-131 bagi mengesan kanser tiroid. Satu alat pengesan digunakan untuk mengesan aktiviti sinar radioaktif selepas suntikan diberikan

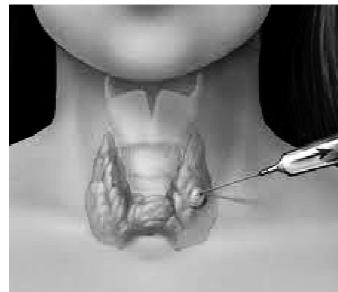


Diagram 12
Rajah 12

- (a) What is meant by radioisotope?

Apakah yang dimaksudkan dengan radioisotop?

[1 mark]
[1 mark]

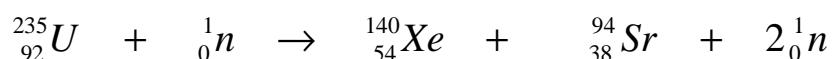
- (b) Explain how Iodine-131 is used in hospital to detect the location of the cancer cell.

Terangkan bagaimana lodin- 131 digunakan untuk mengesan lokasi sel kanser.

[4 marks]
[4 markah]

- (c) The following equation shows the decay of a radioactive substance.

Persamaan di bawah menunjukkan bahan radioaktif mereput.



[Mass of neutron = 1.008665 u

Jisim neutron = 1.008665 u

Atomic mass of U-235 = 235.043925 u

Jisim atom U-235 = 235.043925 u

Atomic mass of Xe -140 = 139.921620 u

Jisim atom Xe -140 = 139.921620 u

Atomic mass of Sr-94 = 93.915367 u

Jisim atom Sr-94 = 93. 915367 u

$$\begin{aligned} [1 \text{ u} &= 1.66 \times 10^{-27} \text{ kg} \\ c &= 3.00 \times 10^8 \text{ m s}^{-1}] \end{aligned}$$

[Turn page over
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- (i) What is the mass defect for the radioactive decay?
Apakah nilai cacat jisim bagi reputan rapdioaktif di atas?
[3 marks]
[3 markah]
- (ii) Determine the energy produced in joule.
Tentukan tenaga yang dihasilkan dalam unit joule.
[2 marks]
[2 markah]

As a scientist, you are asked to investigate the characteristics of radioisotopes J, K, L and N that could be used to detect the thickness of paper in a paper factory.

Sebagai seorang saintis, anda diminta untuk menyiasat ciri-ciri radioisotope J, K, L dan N yang boleh digunakan untuk mengesan ketebalan kertas di sebuah kilang kertas.

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

Radioisotopes <i>Radioisotop</i>	State of matter <i>Keadaan jirim</i>	Type of ray <i>Jenis sinar</i>	Half-life <i>Separuh hayat</i>	Penetrating power <i>Kuasa penembusan</i>
J	Liquid <i>Cecair</i>	Beta <i>Beta</i>	12 years <i>12 tahun</i>	Medium <i>Sederhana</i>
K	Solid <i>Pepejal</i>	Gamma <i>Gama</i>	5 years <i>5 tahun</i>	High <i>Tinggi</i>
L	Solid <i>Pepejal</i>	Alpha <i>Alfa</i>	19 days <i>19 hari</i>	Low <i>Rendah</i>
N	Gas <i>Gas</i>	Beta <i>Beta</i>	5 years <i>5 tahun</i>	High <i>Tinggi</i>

Table 12
Jadual 12

Using Table 12, describe the characteristics of radioisotope that is suitable to be used in the paper thickness detection system.

Determine the most suitable radioisotope to be used to detect the paper thickness and give your reasons.

Menggunakan Jadual 12,uraikan ciri-ciri radioisotop yang sesuai digunakan dalam sistem pengesanan ketebalan kertas.
Tentukan radioisotop paling sesuai digunakan untuk mengesan ketebalan kertas dan berikan sebab-sebab anda.

[10 marks]
[10 markah]

END OF QUESTION PAPER

KERTAS SOALAN TAMAT

INFORMATION TO CANDIDATES
MAKLUMAT UNTUK CALON

1. This question paper consists of **three** sections: **Section A**, **Section B** and **Section C**.
Kertas soalan ini mengandungi tiga bahagian: Bahagian A, Bahagian B dan Bahagian C.
2. Answer **all** questions in **Section A**. Write your answers for **Section A** in the spaces provided in the question paper.
Jawab semua soalan daripada Bahagian A. Jawapan kepada Bahagian A hendaklah ditulis dalam ruang yang disediakan dalam kertas soalan.
3. Answer **one** question from **Section B** and **one** question from **Section C**. Write your answers for **Section B** and **Section C** on the paper provided by the invigilators. Answer questions in **Section B** and **Section C** in detail. Answers should be clear and logical. Equations, diagrams, tables, graphs and other suitable methods can be used to explain your answer.
4. *Jawab satu soalan daripada Bahagian B dan satu soalan daripada Bahagian C. Jawapan kepada Bahagian B dan Bahagian C hendaklah ditulis dalam kertas yang disediakan oleh pengawas peperiksaan. Anda diminta menjawab dengan lebih terperinci untuk Bahagian B dan Bahagian C. Jawapan mestilah jelas dan logik. Persamaan, gambar rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda boleh digunakan.*
5. Show your working, it may help you to get marks.
Tunjukkan kerja mengira, ini membantu anda mendapatkan markah.
6. The diagrams in the questions provided are not drawn to scale unless stated.
Rajah yang mengiringi soalan tidak dilukiskan mengikut skala kecuali dinyatakan.
7. The marks allocated for each question or sub-section of a question are shown in brackets.
Markah yang diperuntukkan bagi setiap soalan atau ceraian soalan ditunjukkan dalam kurungan.
8. If you wish to cancel any answer, neatly cross out the answer. Then write down the new answer.
Jika anda anda hendak menukar sesuatu jawapan,,batalkan jawapan yang telah dibuat . Kemudian tulis jawapan yang baru.
9. A list of formulae is provided on page 2.
Satu senarai rumus disediakan di halaman 2.
10. You may use non-programmable scientific calculator. However, steps in calculation must be shown.
Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram. Walau bagaimanapun, langkah mengira perlu ditunjukkan.)
11. The time suggested to complete **Section A** is 90 minutes, **Section B** is 30 minutes and **Section C** is 30 minutes.
Masa yang dicadangkan untuk menjawab Bahagian A ialah 90 minit, Bahagian B ialah 30 minit dan Bahagian C ialah 30 minit.
12. Attach all your answers together and hand them in at the end of the examination.
Lekatkan semua kertas jawapan dan serahkan di akhir peperiksaan.

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**MAKTAB RENDAH SAINS MARA**

**SIJIL PELAJARAN MALAYSIA
TRIAL EXAMINATION 2011**

PHYSICS**Paper 3**

One hour and thirty minutes

4
5
3
1
3

DO NOT OPEN THIS QUESTION BOOKLET UNTIL TOLD TO DO SO

1. Write down your name, college no. and your class in the space provided.
Tulis nama, no. maktab dan kelas anda pada ruang yang disediakan.
2. The questions are written in English and *bahasa Melayu*.
Kertas soalan ini adalah dalam dwibahasa.
3. Candidates are required to read the information at the back of the booklet.
Calon dikehendaki membaca maklumat di halaman belakang buku soalan ini.

Examiner's Code			
Section	Question	Marks	Score
A	1	16	
	2	12	
B	1	12	
	2	12	
Total			

This booklet consists of 15 printed pages and 1 blank page

Section A
Bahagian A

[28 marks]
[28 markah]

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

- 1 A student carries out an experiment to investigate the relationship between time, t and temperature, T of a copper block.

Seorang pelajar menjalankan satu eksperimen untuk menyiasat hubungan antara masa, t dan suhu, T bagi suatu bongkah kuprum.

The arrangement of the apparatus for this experiment is shown in Diagram 1.1

Susunan radas bagi eksperimen ini ditunjukkan pada Rajah 1.1.

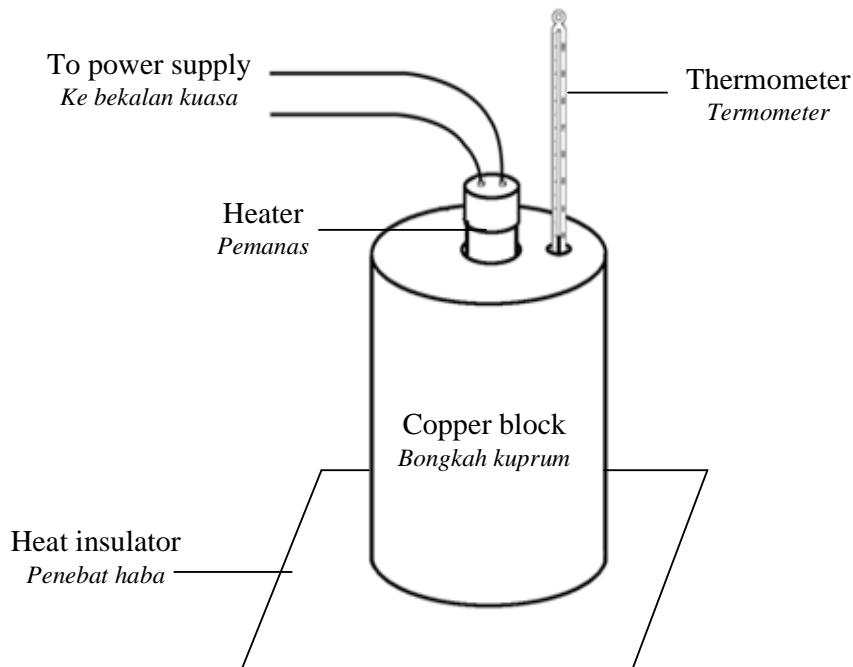
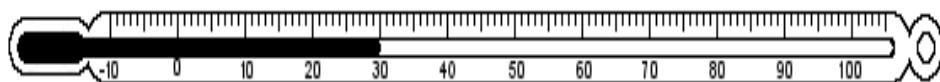


Diagram 1.1
Rajah 1.1

Diagram 1.2 shows the reading of the initial temperature, o before the heater is switched on.

Rajah 1.2 menunjukkan bacaan suhu awal, o sebelum pemanas dihidupkan.



vitched on.
idupkan.

^oC

Diagram 1.2

Rajah 1.2

Diagram 1.3 shows the temperature, i when the heater is switched on for 1 minute. Record the reading of i and calculate the temperature change, Δi by using the formula $i - o$.

Rajah 1.3 menunjukkan suhu, i apabila pemanas dihidupkan selama 1 minit. Rekod bacaan i dan hitungkan perubahan suhu, Δi dengan menggunakan formula $i - o$.

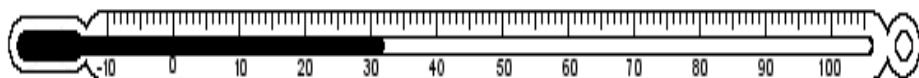


Diagram 1.3
Rajah 1.3

^oC

. ^oC

The procedure is repeated with times, $t = 2$ minutes, 3 minutes, 4 minutes and 5 minutes. The corresponding temperature readings are shown in Diagrams 1.4, 1.5, 1.6 and 1.7 on page 3 and 4.

Prosedur ini diulang dengan masa, $t = 2$ minit, 3 minit, 4 minit dan 5 minit. Bacaan suhu yang sepadan ditunjukkan pada Rajah 1.4, 1.5, 1.6 dan 1.7 di halaman 3 dan 4.

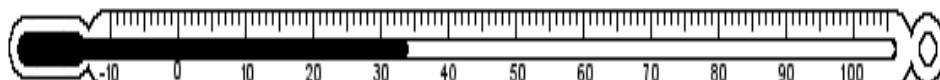


Diagram 1.4
Rajah 1.

^oC

. ^oC

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Diagram 1.5
Rajah 1.5

°C
.°C

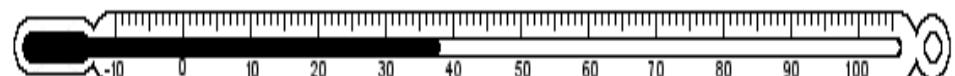


Diagram 1.6
Rajah 1.6

°C
.°C



Diagram 1.7
Rajah 1.7

°C
.°C

For
Examiner's
Use.

- (a) For the experiment described on pages 2 and 3, identify:
Bagi eksperimen yang diterangkan di halaman 2 dan 3, kenal pasti:

- (i) The manipulated variable
Pembolehubah dimanipulasikan

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

1(a)(i)

	1
--	---

- (ii) The responding variable
Pembolehubah bergerak balas

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

1(a)(ii)

	1
--	---

- (iii) The constant variable
Pembolehubah dimalarkan

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

1(a)(iii)

	1
--	---

- (b) For this part of the question, write your answers in the spaces provided in the corresponding diagrams.

Untuk bahagian soalan ini, tulis jawapan anda dalam ruang yang disediakan dalam rajah-rajab yang sepadan.

- (i) Based on Diagram 1.2 on page 2, record the reading of _o .
Berdasarkan Rajah 1.2 di halaman 2, catat bacaan _o .

[1 mark]
 [1 markah]

1(b)(i)

	1
--	---

- (ii) Based on Diagrams 1.3, 1.4, 1.5, 1.6 and 1.7 on pages 3 and 4, record the readings of _i .

Berdasarkan Rajah 1.3, 1.4, 1.5, 1.6 dan 1.7 di halaman 3 dan 4, catat bacaan _i .

[2 marks]
 [2 markah]

1(b)(ii)

	2
--	---

- (ii) Calculate Δ for each value of _i in 1(b)(ii), and record the value of Δ .

Hitungkan Δ bagi setiap nilai _i di 1(b)(ii), dan rekodkan nilai Δ _i

[2 marks]
 [2 markah]

1(b)(ii)

	2
--	---

For
Examiner's
Use.

- (c) Tabulate your results for all values of t , Δ_i and Δ in the space below.

Jadualkan keputusan anda bagi semua nilai t , Δ_i dan Δ dalam ruang di bawah.

1(c)

2

[2 marks]
[2 markah]

1(d)

5

- (d) On the graph paper on page 7, plot a graph of Δ against t .

Pada kertas graf di halaman 7, lukis graf Δ melawan t .

[5 marks]
[5 markah]

- (e) Based on your graph in 1(d), state the relationship between Δ and t .

Berdasarkan graf anda di 1(d), nyatakan hubungan antara Δ dan t .

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

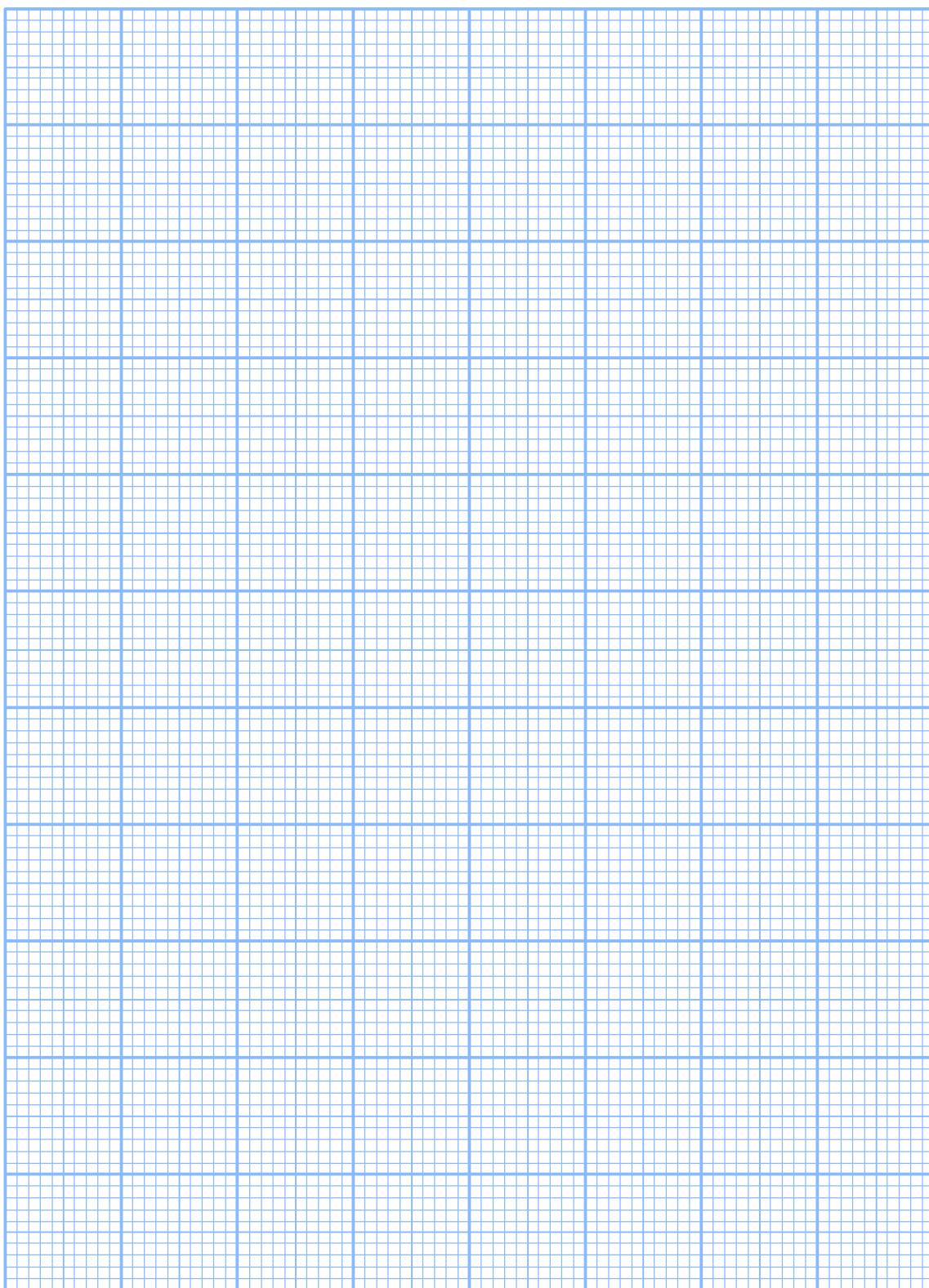
1(e)

1

Total
A1

16

Graph of Δ against t .
Graf Δ melawan t .



- 2** A student carries out an experiment to investigate the relationship between pressure, P and cross-sectional area of an aluminium block, A .

The results of this experiment are shown in graph P against $\frac{1}{A}$ in Diagram 2.1 on page 9.

Seorang pelajar menjalankan satu eksperimen untuk mengkaji hubungan antara tekanan, P dan luas keratan rentas satu bongkah aluminium, A .

Hasil eksperimen ini ditunjukkan oleh graf P melawan $\frac{1}{A}$ pada Rajah 2.1 di halaman 9.

- (a) Based on the graph in Diagram 2.1 :
Berdasarkan graf pada Rajah 2.1:

- (i) State the relationship between P and A .
Nyatakan hubungan antara P dan A .

.....

[1 mark]
[1 markah]

- (ii) Determine the pressure, P , when the area of aluminium block is 0.25 m^2 .

Show on the graph how you determine the value.

*Tentukan tekanan, P , jika luas permukaan bongkah aluminium, A ialah 0.25 m^2 .
Tunjukkan pada graf bagaimana anda menentukan nilai ini.*

2(a)(i)

1

2(a)(ii)

3

$$P = \dots \text{ N m}^{-2}$$

[3 marks]
[3 markah]

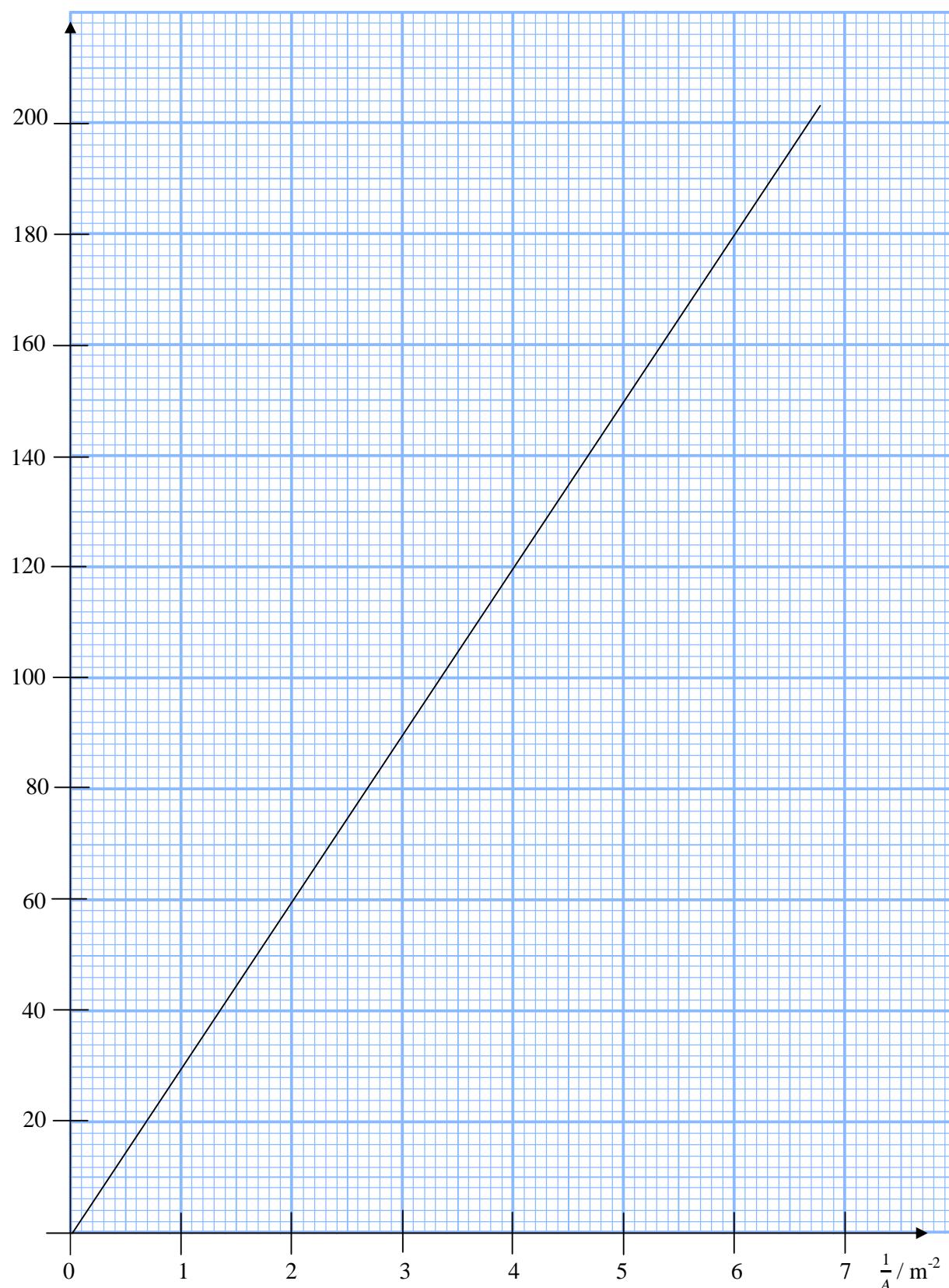
- (b) (i) Calculate the gradient of the graph, k .
Show on the graph how you determine, k .

*Hitungkan kecerunan graf, k .
Tunjukkan pada graf bagaimana anda menentukan nilai k .*

2(b)(i)

3

[3 marks]
[3 markah]

Pressure, $P / \text{N m}^{-2}$ Tekanan, $P / \text{N m}^{-2}$ Diagram 2.1
Rajah 2.1

For
Examiner's
Use

- (ii) The mass of the aluminium block, m is given by the formula

$$m = \frac{k}{g}, \text{ where } g = 10 \text{ m s}^{-2}.$$

Jisim blok aluminium, m diberikan oleh formula

$$m = \frac{k}{g}, \text{ dimana } g = 10 \text{ ms}^{-2}.$$

Calculate the mass of the aluminium block, m .

Hitungkan jisim bongkah aluminium, m .itu.

2(b)(ii)

2

[2 marks]

[2 markah]

- (iii) What happens to the gradient of the graph, k if the experiment is repeated by using an iron block with the same size?

Give your reason.

Apa akan terjadi kepada kecerunan graf, k , jika eksperimen diulangi dengan menggunakan bongkah besi yang sama saiz.

Berikan sebab anda.

2(b)(iii)

2

[2 marks]

[2 markah]

- (c)** State **one** precaution that can be taken to increase the accuracy of the measurements.

Nyatakan **satu** langkah berjaga-jaga yang boleh diambil untuk meningkatkan kejituuan pengukuran.

2(c)

1

[1 mark]

[1 markah]

Total
A2

12

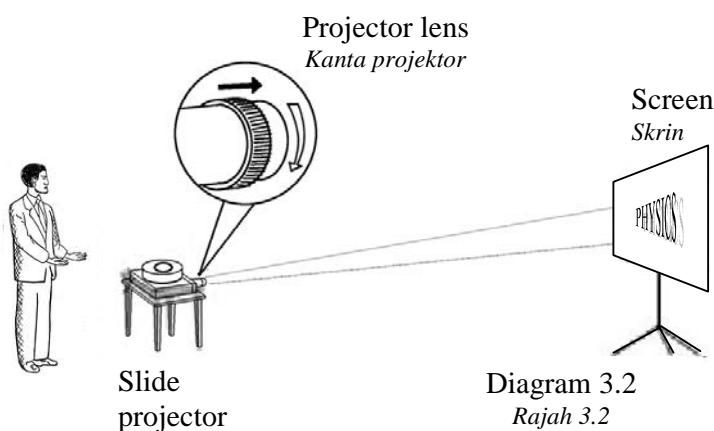
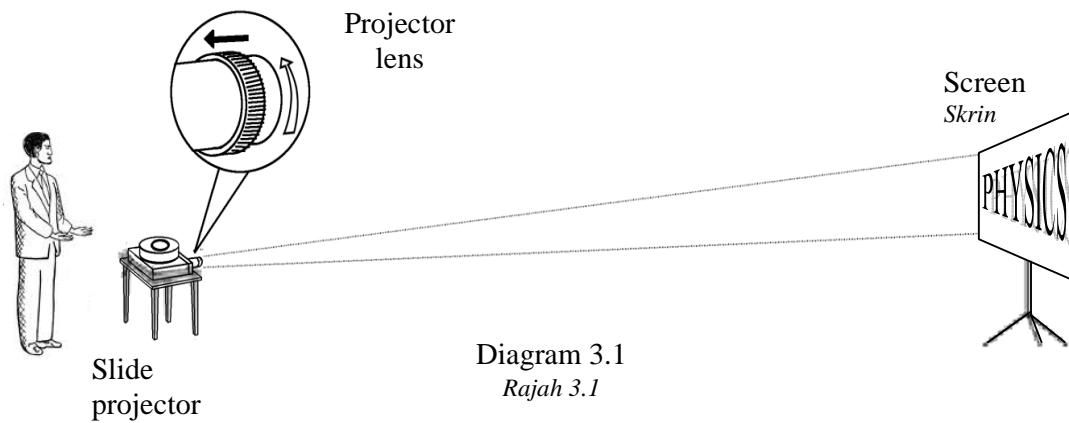
Section B
Bahagian B

[12 marks]
[12 markah]

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

- 3 Diagram 3.1 and Diagram 3.2 show a teacher is using a slide projector. Diagram 3.1 shows the position of the screen displaying a sharp image when the lens of projector is turn in direction anticlockwise, moving it away from the slide. Diagram 3.2 shows the position of the screen which displays a sharp image when the lens of projector turn in clockwise, moving it towards the slide.

Rajah 3.1 dan Rajah 3.2 menunjukkan seorang guru sedang menggunakan satu projektor slaid. Rajah 3.1 menunjukkan kedudukan skrin yang menayangkan imej yang tajam apabila kanta projektor dilaraskan mengikut arah lawan jam yang menggerakkannya menjauhi slaid. Rajah 3.2 menunjukkan kedudukan skrin yang menayangkan imej yang tajam bila kanta projektor dilaraskan dalam arah ikut jam yang menggerakkannya mendekati slaid.



Based on the information and observation :

Berdasarkan maklumat dan pemerhatian tersebut :

- (a) State **one** suitable inference. [1 mark]
Nyatakan satu inferensi yang sesuai. [1 markah]
- (b) State **one** suitable hypothesis. [1 mark]
Nyatakan satu hipotesis yang sesuai. [1 markah]
- (c) With the use of apparatus such as a convex lens and other apparatus, describe **one** experiment to investigate the hypothesis stated in 3(b).

Dengan menggunakan radas seperti kanta cembung dan lain-lain radas, terangkan satu eksperimen untuk menyiasat hipotesis yang dinyatakan di 3(b).

In your description, state clearly the following:

Dalam penerangan anda, nyatakan dengan jelas perkara berikut:

- (i) The aim of the experiment.
Tujuan eksperimen.
- (ii) The variables in the experiment.
Pembolehubah dalam eksperimen.
- (iii) The list of apparatus and materials.
Senarai radas dan bahan.
- (iv) The arrangement of the apparatus.
Susunan radas.
- (v) The procedure used in the experiment.

Describe how to control the manipulated variable and how to measure the responding variable.

Prosedur yang digunakan dalam eksperimen.

Terangkan bagaimana mengawal pembolehubah dimanipulasikan dan bagaimana mengukur pembolehubah bergerak balas.

- (vi) The way to tabulate the data.
Cara untuk menjadualkan data.
- (vii) The way to analyse the data.
Cara menganalisis data.

[10 marks]
[10 markah]

[Turn over
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- 4 Diagram 4.1 shows a wiring system in a kitchen. Each appliance is connected to the main fuse box with suitable fuse and different thicknesses of wire to prevent overload current occur. The lengths of the wires are the same.

Rajah 4.1 menunjukkan sistem pendawaian di sebuah ruang dapur. Setiap alatan elektrik disambungkan kepada kotak fusi utama dengan menggunakan fusi yang sesuai dan dawai-dawai yang berbeza ketebalannya untuk mengelakkan arus berlebihan berlaku. Panjang dawai adalah sama.

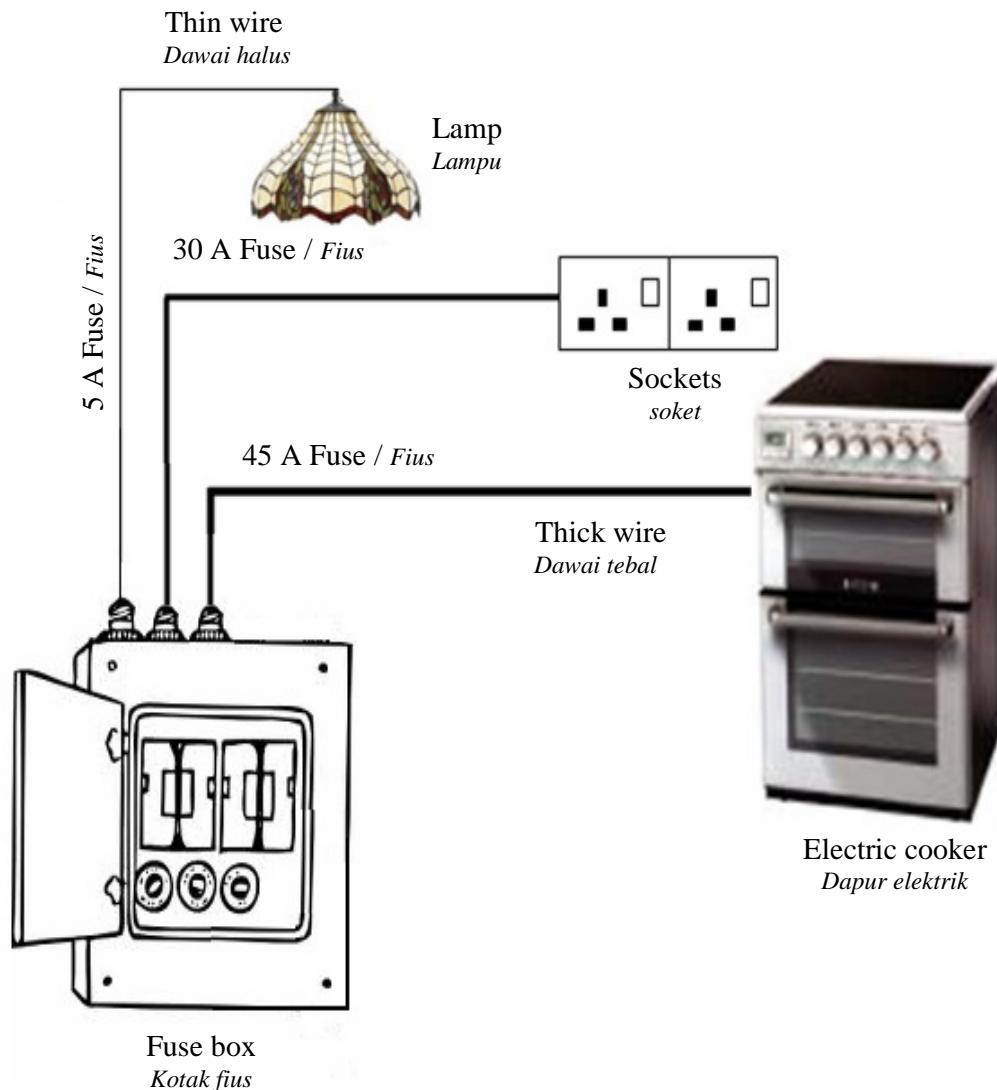


Diagram 4.1
Rajah 4.1

Based on the observation:

Berdasarkan pemerhatian tersebut :

- (a) State **one** suitable inference. [1 mark]
Nyatakan satu inferensi yang sesuai. [1 markah]

- (b) State **one** suitable hypothesis. [1 mark]
Nyatakan satu hipotesis yang sesuai. [1 markah]

- (c) With the use of apparatus such as constantan wire, voltmeter and other apparatus, describe an experiment to investigate the hypothesis stated in 4(b).

Dengan menggunakan radas seperti dawai constantan, voltmeter dan lain-lain radas, terangkan satu eksperimen untuk menyiasat hipotesis yang dinyatakan di 4(b).

In your description, state clearly the following:

Dalam penerangan anda, nyatakan dengan jelas perkara berikut :

- (i) The aim of the experiment.
Tujuan eksperimen.
- (ii) The variables in the experiment.
Pembolehubah dalam eksperimen.
- (iii) The list of apparatus and materials.
Senarai radas dan bahan.
- (iv) The arrangement of the apparatus.
Susunan radas.
- (v) The procedure used in the experiment.
Describe how to control the manipulated variable and how to measure the responding variable.

*Prosedur eksperimen yang digunakan dalam eksperimen.
Terangkan bagaimana mengawal pembolehubah dimanipulasikan dan bagaimana mengukur pembolehubah bergerak balas.*
- (vi) The way to tabulate the data.
Cara untuk menjadualkan data.
- (vii) The way to analyse the data. [10 marks]
Cara untuk menganalisis data. [10 markah]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON

1. This question paper consists of two sections: **Section A** and **Section B**.
Kertas soalan ini mengandungi dua bahagian: Bahagian A dan Bahagian B.
2. Answer **all** questions in **Section A**. Write your answers for **Section A** in the spaces provided in the question paper.
Jawab semua soalan dalam Bahagian A. Jawapan anda bagi Bahagian A hendaklah ditulis pada ruang yang disediakan dalam kertas soalan ini.
3. Answer **one** question from **Section B**. Write your answers for **Section B** on the paper provided by the invigilators. Answer questions in **Section B** in detail. Answer should be clear and logical. Equations, figures, tables, graphs and other suitable methods to explain your answers.
Jawab satu soalan daripada Bahagian B. Jawapan bagi Bahagian B hendaklah ditulis pada helaians tambahan yang dibekalkan oleh pengawas peperiksaan. Anda diminta menjawab dengan lebih terperinci. Jawapan mestilah jelas dan logik. Persamaan, gambar rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda boleh digunakan.
4. Show your working, it may help you to get marks.
Tunjukkan kerja mengira, ini membantu anda mendapatkan markah.
5. The diagram in the question are not drawn to scale unless stated.
Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.
6. The marks allocated for each question or part question are shown in brackets.
Markah yang diperuntukkan bagi setiap soalan atau ceraian soalan ditunjukkan dalam kurungan.
7. If you wish to change your answer, cross out the answer that you have done. Then write down the new answer.
Jika anda hendak menukar jawapan, batalkan jawapan yang telah dibuat. Kemudian tulis jawapan yang baru.
8. You may use a non-programmable scientific calculator.
Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.
9. You are advised to spend 60 minutes to answer questions in **Section A** and 30 minutes for **Section B**.
Anda dinasihatkan supaya mengambil masa 60 minit untuk menjawab soalan dalam Bahagian A dan 30 minit untuk Bahagian B.
10. Hand in your answer at the end of the examination.
Serahkan kertas jawapan anda di akhir peperiksaan.