

# BAHAN KECEMERLANGAN 9

## Fizik Kertas 1

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

$$1. \quad a = \frac{v - u}{t}$$

$$2. \quad \text{Momentum} = mv$$

$$3. \quad F = ma$$

$$4. \quad \text{Gravitational potential energy} = mgh$$

$$5. \quad \rho = \frac{m}{v}$$

$$6. \quad \text{Pressure, } p = \frac{F}{A}$$

$$7. \quad \text{Pressure, } p = h\rho g$$

$$8. \quad \text{Heat, } Q = mc\theta$$

$$9. \quad \frac{pV}{T} = \text{constant}$$

$$10. \quad E = mc^2$$

$$11. \quad v = f\lambda$$

$$12. \quad \lambda = \frac{ax}{d}$$

$$13. \quad \frac{1}{f} = \frac{1}{u} + \frac{1}{v}$$

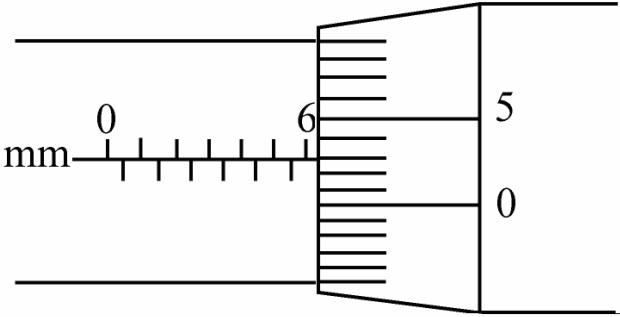
$$14. \quad n = \frac{\sin i}{\sin r}$$

$$15. \quad V = IR$$

$$16. \quad g = 10 \text{ m s}^{-2}$$

$$17. \quad Q = It$$

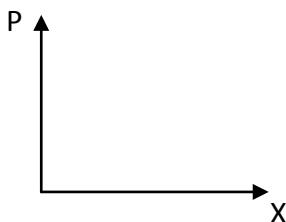
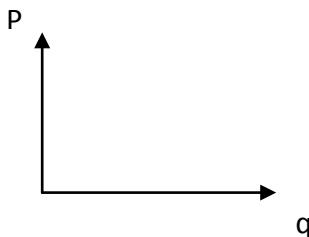
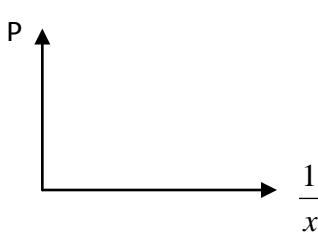
$$18. \quad c = 3.0 \times 10^8 \text{ ms}^{-1}$$

- 1** Temperature and energy can be classified as  
*Suhu dan tenaga boleh dikelaskan sebagai*
- A** base quantities  
*kuantiti asas*
  - B** derived quantities  
*kuantiti terbitan*
  - C** scalar quantities  
*kuantiti skalar*
  - D** vector quantities  
*kuantiti vektor*
- 2** A wavelength of blue light is 475 nm. What is the wavelength of blue light in m ?  
*Panjang gelombang bagi cahaya biru ialah 475 nm. Berapakah panjang gelombang itu dalam m?*
- A**  $4.75 \times 10^9$  m
  - B**  $4.75 \times 10^{-7}$  m
  - C**  $4.75 \times 10^{-6}$  m
  - D**  $4.75 \times 10^{-4}$  m
- 3** Diagram shows the scale of a micrometer screw gauge.  
*Rajah menunjukkan skala sebuah tolok skru mikrometer.*
- 

What is the reading of the micrometer screw gauge ?  
*Berapakah bacaan tolok skru micrometer itu?*

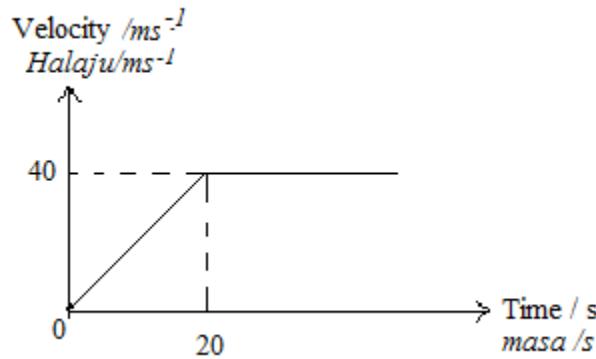
- 4 You are given an equation of  $P = \frac{a}{X} + q$ . Which of the following quantities need to be plotted in order to determine the value of a?

*Anda diberi dengan persamaan  $P = \frac{a}{X} + q$ . Manakah antara kuantiti yang berikut perlu di plot untuk mendapatkan nilai a?*

**A****B****C**

- 5 Diagram shows a velocity-time graph of a car that accelerates from rest.

*Rajah menunjukkan graf halaju-masa bagi sebuah kereta yang bermula dari keadaan pegun*

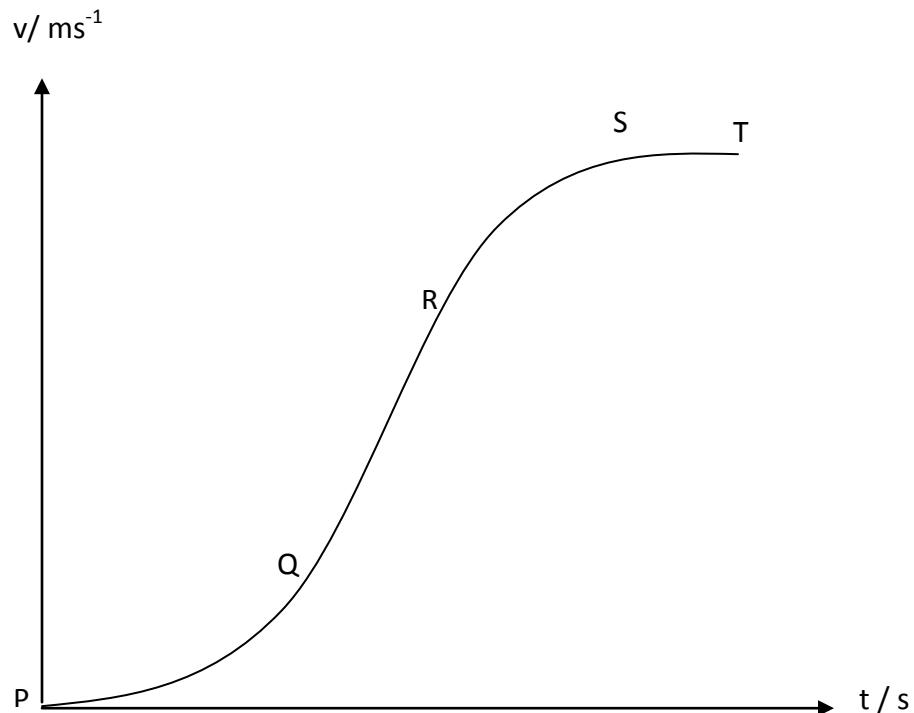


How far does the car travel before it reaches a constant velocity?

*Berapa jauhkan kereta itu bergerak sebelum ia mencapai halaju seragam?*

- A 200 m
- B 400 m
- C 600 m
- D 800 m

- 6 Diagram shows a velocity – time graph of a car.  
Rajah menunjukkan graf halaju – masa bagi sebuah kereta.

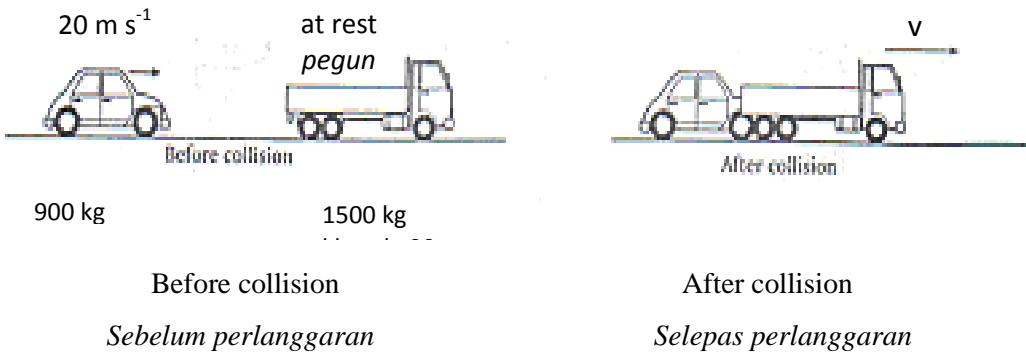


Which part shows the acceleration of the car is zero ?  
Pada bahagian manakah menunjukkan pecutan kereta itu adalah sifar ?

- A PQ
- B PR
- C QS
- D ST

- 7 Diagram shows an inelastic collision.

Rajah menunjukkan suatu perlanggaran tak kenyal.



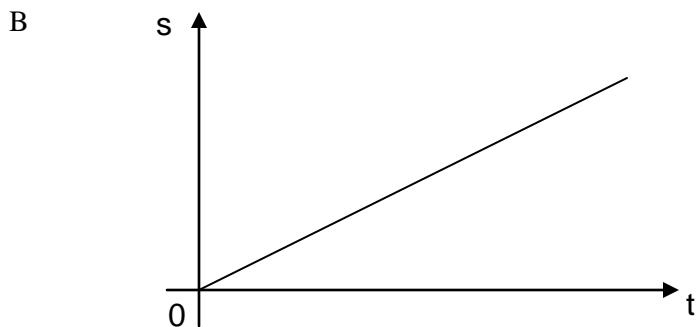
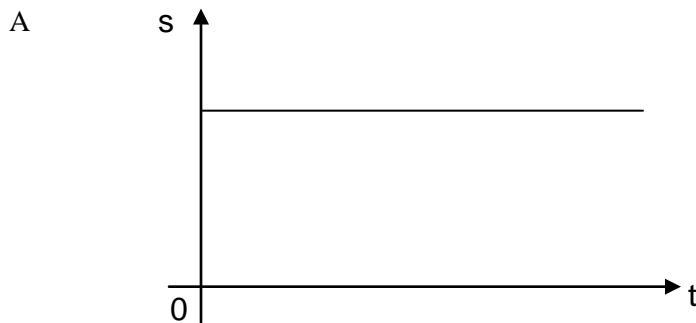
What is the velocity of both vehicles after collision?

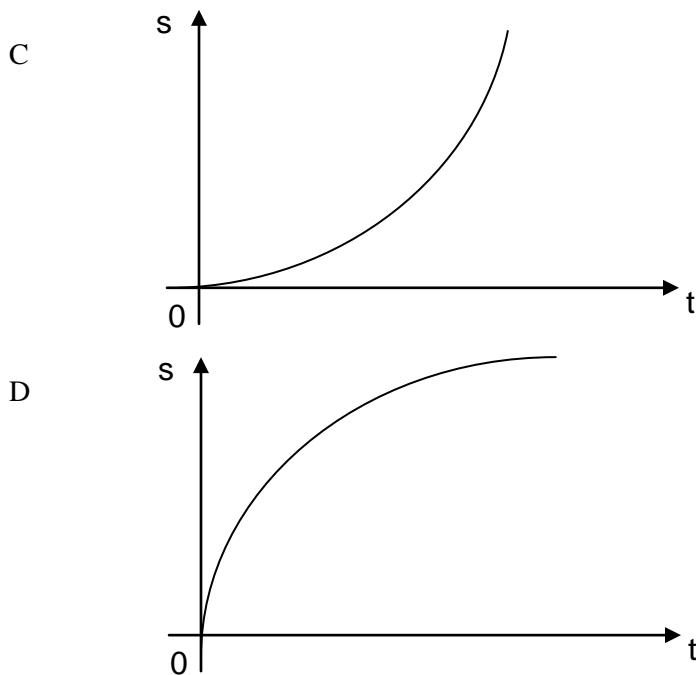
Berapakah halaju kedua-dua kenderaan selepas perlanggaran?

- A  $1.3 \text{ ms}^{-1}$
- B  $2.5 \text{ ms}^{-1}$
- C  $7.5 \text{ ms}^{-1}$
- D  $10.0 \text{ ms}^{-1}$

- 8 Which of the following displacement against time graphs represents the motion of an object moving at constant acceleration?

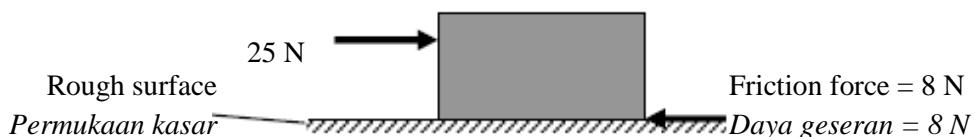
Manakah antara graf-graf sesaran melawan masa yang berikut mewakili pergerakan suatu objek yang sedang bergerak dengan pecutan seragam?





- 9** Diagram shows a constant force of 25 N is exerted on a block.

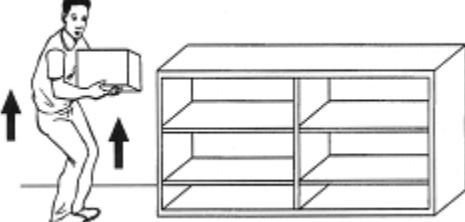
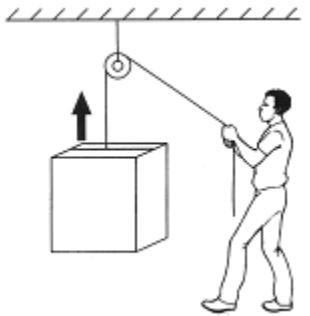
Rajah menunjukkan suatu daya seragam 25 N dikenakan ke atas sebuah bongkah.



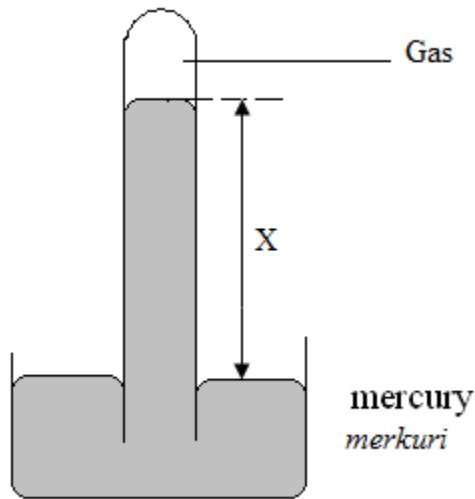
The block will move with  
Blok itu akan bergerak dengan

- A** constant velocity  
*halaju seragam*
- B** constant acceleration  
*pecutan seragam*
- C** increasing acceleration  
*pecutan bertambah*
- D** decreasing acceleration  
*pecutan berkurang*

- 10** Which of the following situations shows that no work being done?  
*Manakah antara situasi-situasi berikut menunjukkan kerja tidak dilakukan?*

- A  Pushing a trolley  
*Menolak sebuah troli*
- B  Pushing a wall  
*Menolak dinding*
- C  Lifting a load  
*Mengangkat suatu beban*
- D  Lifting a box using pulley  
*Mengangkat sebuah kotak menggunakan takal*

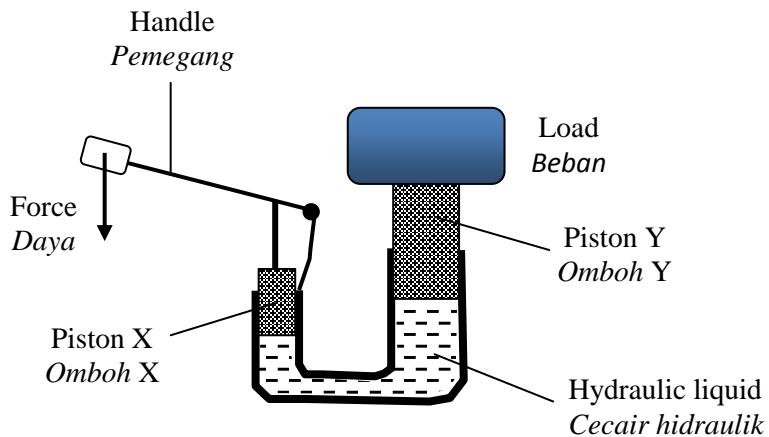
- 11 Diagram shows the gas pressure in the tube is 10 cm Hg.  
*Rajah menunjukkan tekanan gas dalam tiub adalah 10 cm Hg.*



- If the atmospheric pressure is 76 cm Hg, what is the height of mercury, x?  
*Jika tekanan atmosfera ialah 76 cm Hg, berapakah tinggi mercuri, x dalam tiub?*
- A 10 cm  
B 66 cm  
C 76 cm  
D 86 cm
- 12 Gas pressure in a closed container is due to the gas molecules  
*Tekanan gas di dalam sebuah bekas bertutup adalah disebabkan oleh molekul gas*
- A moving randomly  
*bergerak secara rawak*  
B moving with equal speed  
*bergerak dengan halaju yang sama*  
C colliding with one another  
*berlanggar sesama sendiri*  
D colliding with the walls of the container  
*berlanggar dengan dinding bekas*

- 13** Diagram shows a simple hydraulic jack.

Rajah menunjukkan satu jek hidraulik ringkas.



The jack can lift a heavier load using the same force by

Jek tersebut dapat mengangkat beban yang lebih berat dengan menggunakan daya yang sama dengan

- A** shortening the length of the handle.  
memendekkan panjang pemegang.
- B** increasing the vertical length of piston X.  
menambahkan panjang menegak omboh X.
- C** increasing the cross-sectional area of piston Y.  
menambahkan luas keratan rentas omboh Y.
- D** using a hydraulic liquid of higher density.  
menggunakan cecair hidraulik yang berkemampuan lebih tinggi.

- 14** Diagram shows a boy in a raft.

Rajah menunjukkan seorang budak di atas rakit.



If the weight of the boy and the raft is 1200 N, what is the volume of the raft which is submerged?

*Jika berat budak dan rakitnya ialah 1200 N, apakah isipadu bahagian rakit yang tenggelam?*

[ Density of water =  $1000 \text{ kg m}^{-3}$  ]

[ Ketumpatan air =  $1000 \text{ kg m}^{-3}$  ]

A  $0.12 \text{ m}^3$

B  $0.83 \text{ m}^3$

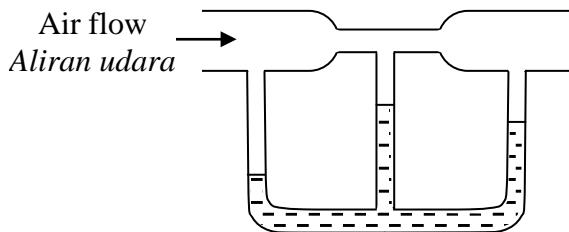
C  $1.20 \text{ m}^3$

D  $8.33 \text{ m}^3$

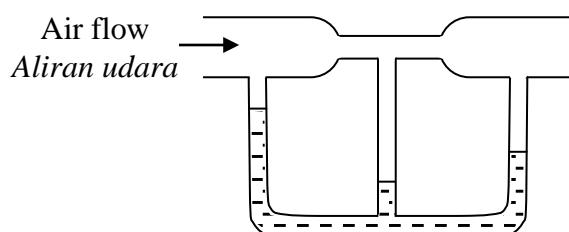
- 15 Which diagram shows the correct liquid level in the U-tube?

*Rajah manakah menunjukkan aras cecair yang betul di dalam tiub-U?*

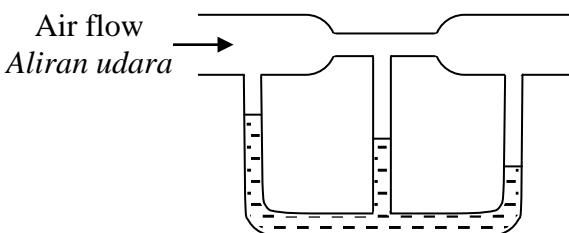
A



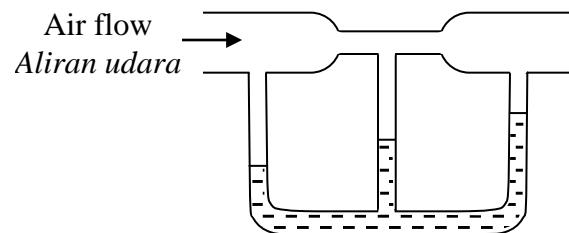
B



C



D



- 16 Diagram shows cold milk being poured into hot coffee.

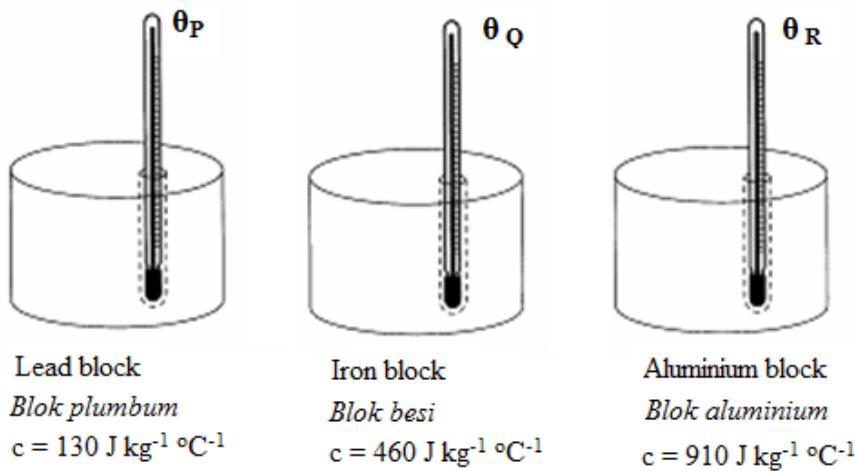
*Rajah menunjukkan susu sejuk dituangkan ke dalam kopi panas.*



Which statement is correct when the mixture is at the thermal equilibrium?

*Pernyataan manakah yang betul apabila campuran itu berada dalam keadaan keseimbangan terma?*

- A** Temperature of mixture is lower than cold milk  
*Suhu campuran itu lebih rendah daripada suhu susu sejuk*
- B** Temperature of mixture is higher than hot coffee  
*Suhu campuran itu lebih tinggi daripada suhu kopi panas*
- C** Net rate of heat transfer of the cold milk is lower than the hot coffee  
*Kadar pemindahan haba susu sejuk adalah lebih rendah daripada kopi panas*
- D** Net rate of heat transfer between the cold milk and the hot coffee is zero  
*Kadar pemindahan haba bersih antara susu sejuk dan kopi panas adalah sifar*
- 17** Diagram shows a lead block, an iron block and aluminium block. All the blocks has the same mass and same initial temperature and let to be cold. All the blocks have different specific heat capacity,  $c$ . After 15 minutes the temperature of the blocks are recorded.  
*Rajah menunjukkan satu blok plumbum, satu blok besi dan satu blok aluminium. Semua blok itu mempunyai jisim dan suhu awal yang sama dan dibiarkan menyekuk. Ketiga-tiga logam itu mempunyai muatan haba tentu,  $c$  yang berbeza. Selepas 15 minit suhu ketiga-tiga logam itu direkodkan.*



Which comparison is correct about the temperature of lead block,  $\theta_P$ , iron block,  $\theta_Q$ , and aluminium block,  $\theta_R$  is correct?

*Perbandingan yang manakah betul tentang suhu bagi blok plumbum,  $\theta_P$ , blok besi,  $\theta_Q$ , dan blok aluminium,  $\theta_R$  ?*

- A**  $\theta_P > \theta_Q > \theta_R$
- B**  $\theta_Q > \theta_P > \theta_R$
- C**  $\theta_R > \theta_P > \theta_Q$
- D**  $\theta_R > \theta_Q > \theta_P$

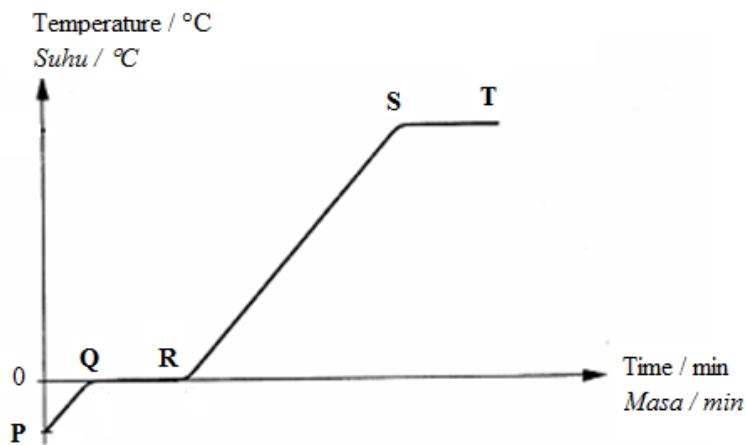
- 18** 5400 J of heat is used to increase the temperature of 0.8 kg metal block. The specific heat capacity of the metal block is  $450 \text{ J kg}^{-1}\text{C}^{-1}$ . What is the rise in temperature of the metal block ?

*5400 J haba digunakan untuk meningkatkan suhu sebuah blok logam berjisim 0.8 kg. Muatan haba tentu blok logam itu ialah  $450 \text{ J kg}^{-1}\text{C}^{-1}$ . Berapakah peningkatan suhu blok logam itu?*

- A**  $9.6^\circ\text{C}$
- B**  $12.0^\circ\text{C}$
- C**  $15.0^\circ\text{C}$
- D**  $360.0^\circ\text{C}$

- 19** Diagram shows the heating curve of a substance.

*Rajah menunjukkan lengkung pemanasan suatu bahan.*



Which statement is correct about the heat absorbed by the substance?

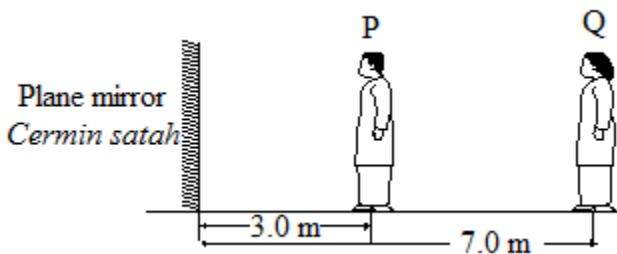
*Pernyataan manakah betul tentang haba yang diserap oleh bahan itu?*

	<b>Stages Peringkat</b>	<b>Statement Pernyataan</b>
<b>A</b>	<b>PQ</b>	It strengthens the bonds between the substance molecules <i>Menguatkan ikatan antara molekul bahan</i>
<b>B</b>	<b>QR</b>	It breaks the bonds between the substance molecules <i>Memutuskan ikatan antara molekul bahan</i>
<b>C</b>	<b>RS</b>	It decreases the kinetic energy of the substance molecules <i>Menurunkan tenaga kinetik molekul bahan</i>
<b>D</b>	<b>ST</b>	It weakens the forces between the substance molecules <i>Melemahkan daya antara molekul bahan</i>

- 20** After a long journey the air pressure in a car tyre is increased. This can be explain by  
*Selepas satu perjalanan yang jauh, tekanan udara di dalam kereta akan bertambah. Ini dapat diterangkan oleh*

- A** Boyle's law.  
*Hukum Boyle.*
- B** Charles' law.  
*Hukum Charles.*
- C** Pressure's law.  
*Hukum Tekanan.*

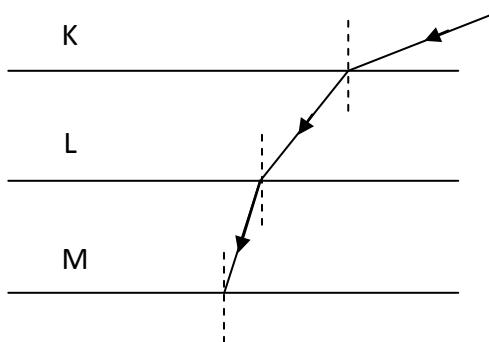
- 21** Diagram shows student P and student Q standing in front of a plane mirror at a distance of 3.0 m and 7.0 m respectively.  
*Rajah menunjukkan pelajar P dan pelajar Q berdiri di hadapan sebuah cermin satah pada jarak 3.0 m dan 7.0 m masing-masing.*



What is the distance between student Q and the image student P?  
*Apakah jarak antara pelajar Q dengan imej pelajar P?*

- A** 4.0 m
- B** 10.0 m
- C** 13.0 m
- D** 14.0 m

- 22** Diagram shows a light ray passing through three different media, K, L and M.  
*Rajah menunjukkan satu sinar cahaya merambat melalui tiga medium yang berlainan, K, L dan M.*



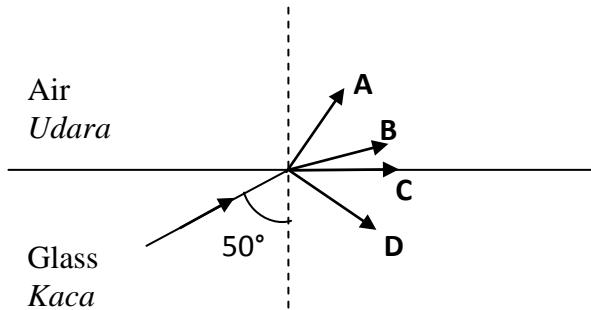
Which of the following shows the correct comparison of the refractive indices  $n_K$ ,  $n_L$ , and  $n_M$  of the three media?

*Antara yang berikut, yang manakah menunjukkan perbandingan yang betul bagi indeks biasan,  $n_K$ ,  $n_L$ , dan  $n_M$  bagi tiga medium itu?*

- A  $n_L > n_K > n_M$
- B  $n_M > n_L > n_K$
- C  $n_L > n_M > n_K$
- D  $n_M < n_K < n_L$

- 23 Diagram shows a light ray travelling from glass to air. The critical angle of glass is  $44^\circ$ .

*Rajah menunjukkan satu sinar cahaya bergerak dari kaca menuju ke udara. Sudut genting kaca ialah  $44^\circ$ .*

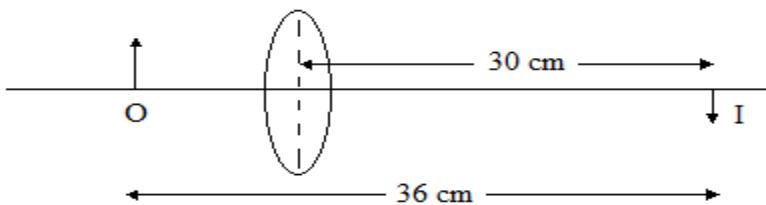


Which of the following paths, **A**, **B**, **C** or **D**, shows the correct path of the light ray?

*Antara lintasan **A**, **B**, **C** dan **D**, yang manakah menunjukkan lintasan sinar cahaya yang betul?*

- 24 Diagram shows the formation of the image of an object by a convex lens.

*Rajah menunjukkan pembentukan imej satu objek oleh satu kanta cembung.*



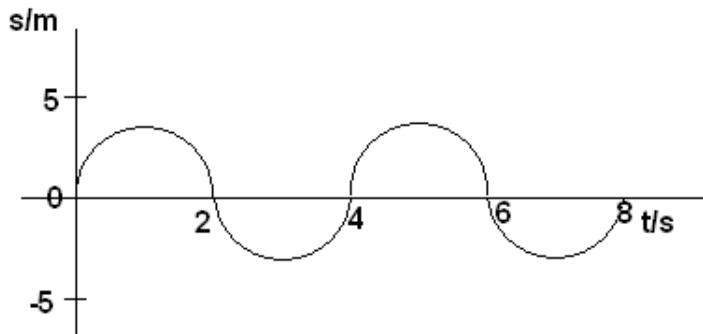
What is focal length of the lens?

*Berapakah jarak fokus bagi kanta?*

- A 0.2 cm
- B 1.2 cm
- C 5.0 cm
- D 6.0 cm

- 25** Which pair of lenses can be used to construct a telescope?  
*Pasangan kanta yang manakah boleh digunakan untuk membina sebuah teleskop?*
- A** Two concave lenses with focal lengths of 6 cm and 9 cm  
*Dua kanta cekung dengan jarak fokus 6 cm dan 9 cm*
- B** Two convex lenses with focal lengths of 10 cm and 80 cm  
*Dua kanta cembung dengan jarak fokus 10 cm dan 80 cm*
- C** Two concave lenses with focal lengths of 10 cm and 80 cm  
*Dua kanta cekung dengan jarak fokus 10 cm dan 80 cm*
- D** A convex lens with focal lengths of 6 cm and a concave with focal length 9 cm  
*Kanta cembung dengan jarak fokus 6 cm dan kanta cekung dengan jarak fokus 9 cm*

- 26** Diagram shows the displacement-time graph of a wave.  
*Rajah menunjukkan graf sesaran -masa bagi satu gelombang.*

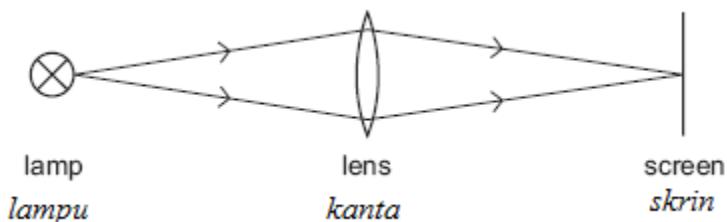


What is the frequency of the wave ?  
*Berapakah frekuensi gelombang ?*

- A** 8.0 Hz.  
**B** 4.0 Hz.  
**C** 0.25 Hz  
**D** 0.125 Hz

- 27** Which diagram shows an example of a longitudinal wave ?  
*Rajah yang manakah menunjukkan contoh gelombang membujur ?*

- A** Light traveling from a lamp to a screen.  
*Cahaya merambat dari sebuah lampu ke skrin*



- B** A water ripple caused by a dipper moving up and down  
*Riak gelombang air dihasilkan oleh pencelup bergetar atas dan bawah.*



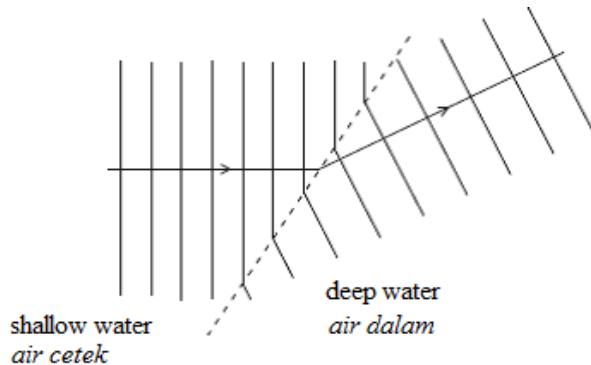
- C** A spring pushed backwards and forwards  
*Spring digerakkan ke depan dan ke belakang*



- D** A spring pushed up and down  
*Spring digerakkan ke atas dan ke bawah*



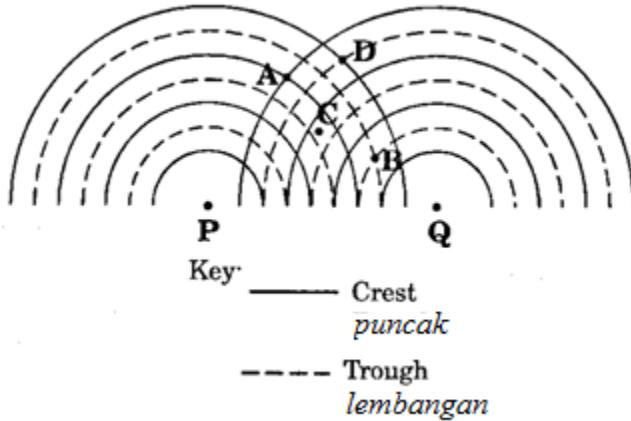
- 28** Diagram shows water waves change direction when they move from shallow water to deep water.  
*Rajah menunjukkan arah gelombang air berubah apabila merambat dari kawasan air cetek ke kawasan air dalam.*



What is the name of this phenomena ?  
*Apakah nama fenomena ini ?*

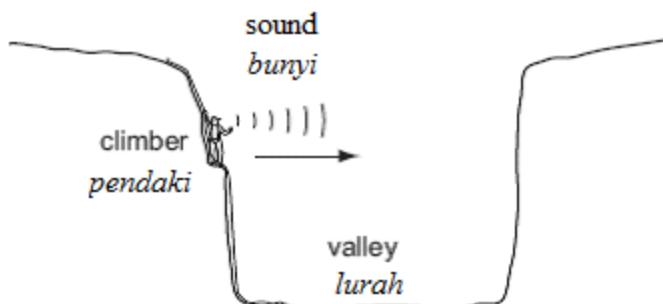
- A** refraction  
*pembiasan*
- B** reflection  
*pantulan*
- C** diffraction  
*belauan*
- D** interference  
*interferensi*

- 29** Diagram shows an interference pattern of water waves from two coherent sources P and Q.  
*Rajah menunjukkan corak interferensi gelombang air dari dua sumber koheren P dan Q.*  
 Which point is the node ?  
*Titik yang manakah adalah nod ?*



- 30** Diagram shows a climber starts a stopwatch as he shouts. He heard an echo from the opposite side of the valley after 1.0 s.

Rajah menunjukkan seorang pendaki menghidupkan jam randik sambil menjerit. Dia mendengar gema dari hujung lurah selepas 1.0 s.



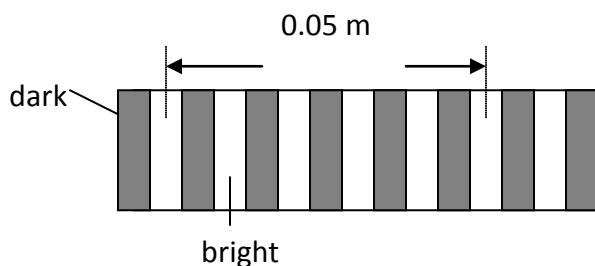
The sound travels at  $340 \text{ m s}^{-1}$ . What is the width of the valley. ?

Halaju gelombang bunyi ialah  $340 \text{ m s}^{-1}$ . Berapakah lebar lurah tersebut ?

- A**  $85 \text{ m}$
- B**  $170 \text{ m}$
- C**  $340 \text{ m}$
- D**  $680 \text{ m}$

- 31** Diagram shows a fringe pattern formed on a screen in the Young's double-slit experiment

Rajah menunjukkan corak pinggir yang dihasilkan di atas skrin dalam eksperimen dwicelah Young.



The distance between double slit and screen is 1 m and the wavelength of light is given by  $5 \times 10^{-7} \text{ m}$ . What is the distance between two slits?

Jarak diantara dwicelah dan skrin ialah 1 m dan panjang gelombang cahaya yang digunakan ialah  $5 \times 10^{-7} \text{ m}$ . Berapakah jarak di antara dua celah ?

- A**  $5.0 \times 10^{-5} \text{ m}$
- B**  $1.0 \times 10^{-4} \text{ m}$
- C**  $1.3 \times 10^{-3} \text{ m}$
- D**  $1.0 \times 10^{-3} \text{ m}$

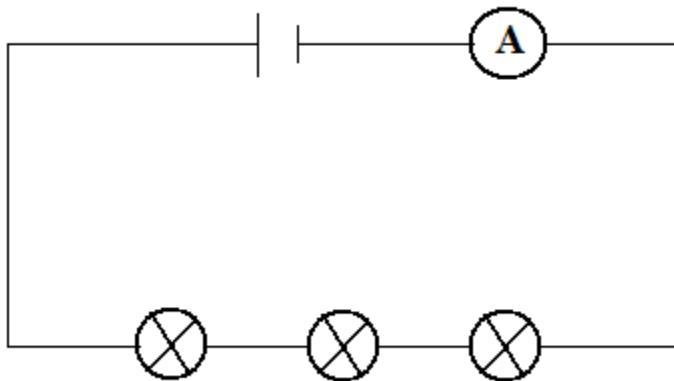
**32** Which of the following statements is true about electromagnetic waves?

*Manakah pernyataan berikut yang benar mengenai gelombang elektromagnet?*

- A** They are longitudinal waves  
*Gelombang membujur*
- B** They are waves that require a medium to travel  
*Gelombang yang memerlukan medium untuk merambat*
- C** The velocity of the waves is influenced by the wavelength  
*Halaju gelombang dipengaruhi oleh panjang gelombang*
- D** They consist of both magnetic fields and electric fields  
*Terdiri daripada kedua-dua medan magnet dan medan elektrik*

**33** Diagram shows three similar bulbs connected in the series to a battery and an ammeter.

*Rajah menunjukkan tiga mentol yang sama disambung secara sesiri dengan bateri dan ammeter.*



What will happen to the ammeter reading and the brightness of the bulbs when another similar bulb is added in series to the circuit ?

*Apakah yang akan berlaku kepada bacaan ammeter dan kecerahan mentol apabila ditambah satu lagi mentol secara siri dalam litar tersebut ?*

<b>Ammeter reading</b> <i>Bacaan ammeter</i>	<b>Brightness of the bulbs</b> <i>Kecerahan mentol</i>
<b>A</b> Increase <i>Bertambah</i>	Increase <i>bertambah</i>
<b>B</b> Increase <i>Bertambah</i>	Decrease <i>Berkurang</i>
<b>C</b> Decrease <i>Berkurang</i>	Increase <i>Bertambah</i>
<b>D</b> Decrease <i>Berkurang</i>	Decrease <i>Berkurang</i>

- 34** Diagram shows a tungsten filament bulb, P and an energy saver bulb, Q. Both of them are rated 40W 240 V. However, bulb Q is brighter than bulb P when they are operated normally.  
*Rajah menunjukkan mentol filament tungsten, P dan mentol penjimat tenaga, Q. Keduanya berlabel 40W 240 V. Walaubagaimana pun, mentol Q lebih cerah berbanding mentol P apabila keduanya digunakan secara normal.*



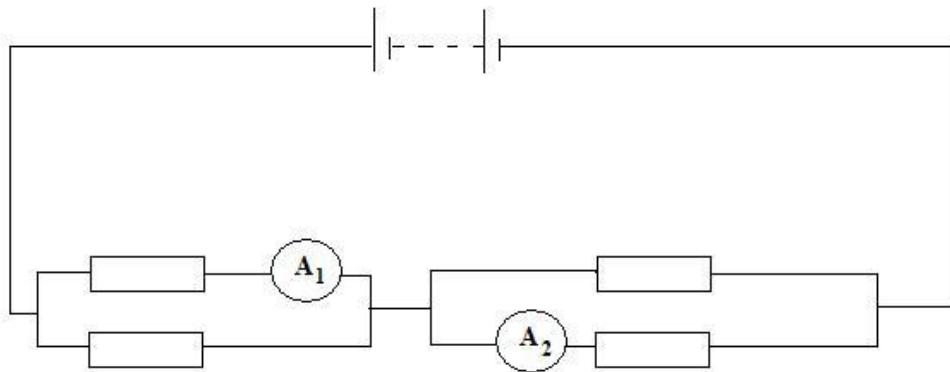
What conclusion can be drawn from this situation?  
*Apakah kesimpulan yang boleh dibuat dari keadaan ini?*

- A** Bulb P has more resistance than bulb Q  
*Mentol P mempunyai rintangan lebih tinggi berbanding mentol Q*
- B** The current in bulb P is less than that in bulb Q  
*Arus dalam mentol P rendah berbanding dalam mentol Q*
- C** Bulb Q is more energy efficient than bulb P  
*Kecekapan tenaga mentol Q lebih tinggi berbanding mentol P*
- D** Bulb Q is hotter than bulb P  
*Mentol Q lebih panas berbanding mentol P*

- 35** When the switch is ON, the current that flows in an electronic advertisement board is  $3.0 \times 10^{-5}$  A. What is the number of electrons flowing when it is switched on for 2 hours ?  
*Apabila suis dihidupkan, arus yang mengalir dalam litar sebuah papan iklan elektronik ialah  $3.0 \times 10^{-5}$  A. Berapakah bilangan elektron yang mengalir dalam litar itu semasa suis dihidupkan selama 2 jam?*  
[ Charge of an electron / cas setiap elektron =  $1.6 \times 10^{-19}$  C ]

- A**  $3.84 \times 10^{11}$
- B**  $1.67 \times 10^{14}$
- C**  $1.35 \times 10^{18}$
- D**  $4.17 \times 10^{23}$

- 36** Diagram shows four identical resistors and two ammeter  $A_1$  and  $A_2$  are connected to a power supply in a circuit.  
*Rajah menunjukkan empat perintang yang sama jenis dan dua ammeter  $A_1$  dan  $A_2$  disambungkan kepada satu bekalan kuasa dalam satu litar.*

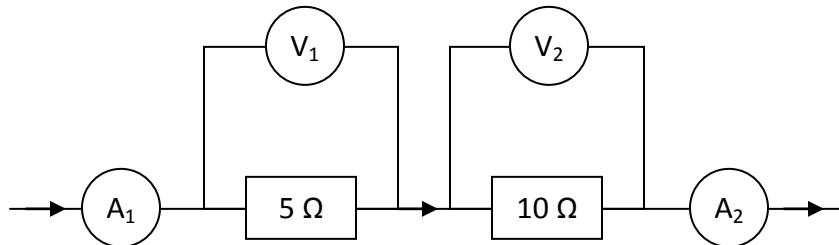


If the reading of ammeter  $A_1$  is 1.2 A, what is the reading of ammeter  $A_2$ ?  
*Jika bacaan ammeter  $A_1$  ialah 1.2 A, berapakah bacaan ammeter  $A_2$ ?*

- A** 0.4 A
- B** 0.7 A
- C** 0.8 A
- D** 1.2 A

- 37** Diagram shows current flowing through two resistors in series.  $A_1$  and  $A_2$  are ammeters while  $V_1$  and  $V_2$  are voltmeters.

*Rajah menunjukkan arus mengalir melalui dua perintang yang disambung sesiri.  $A_1$  dan  $A_2$  adalah ammeter manakala  $V_1$  dan  $V_2$  adalah voltmeter.*

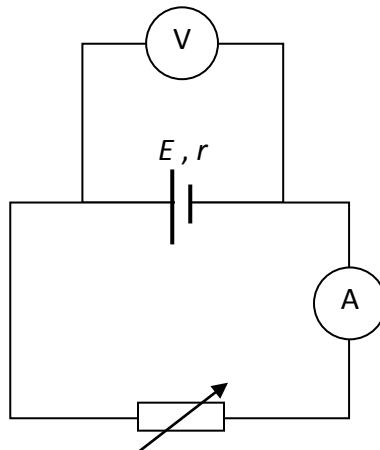


Which is the correct comparison of the ammeter and voltmeter readings?  
*Perbandingan yang manakah benar tentang bacaan ammeter dan voltmeter?*

	Ammeter reading / Bacaan ammeter	Voltmeter reading / Bacaan voltmeter
<b>A</b>	$A_1 < A_2$	$V_1 < V_2$
<b>B</b>	$A_1 > A_2$	$V_1 > V_2$
<b>C</b>	$A_1 = A_2$	$V_1 = V_2$
<b>D</b>	$A_1 = A_2$	$V_1 < V_2$

- 38** Diagram shows a circuit in which the cell has internal resistance.

Rajah menunjukkan suatu litar di mana sel itu mempunyai rintangan dalam.



What are the changes in the reading of the ammeter and voltmeter when the resistance of the rheostat is decreased?

Apakah perubahan bacaan ammeter dan voltmeter apabila rintangan rheostat dikurangkan?

	Ammeter reading / Bacaan ammeter	Voltmeter reading / Bacaan voltmeter
<b>A</b>	Increases / Bertambah	Increases / Bertambah
<b>B</b>	Increases / Bertambah	Decreases / Berkurang
<b>C</b>	Decreases / Berkurang	Increases / Bertambah
<b>D</b>	Decreases / Berkurang	Decreases / Berkurang

- 39** Diagram shows an electrical circuit to investigate the magnetic field produced by a current.

Rajah menunjukkan suatu litar elektrik untuk menyiasat medan magnet yang dihasilkan oleh arus elektrik.

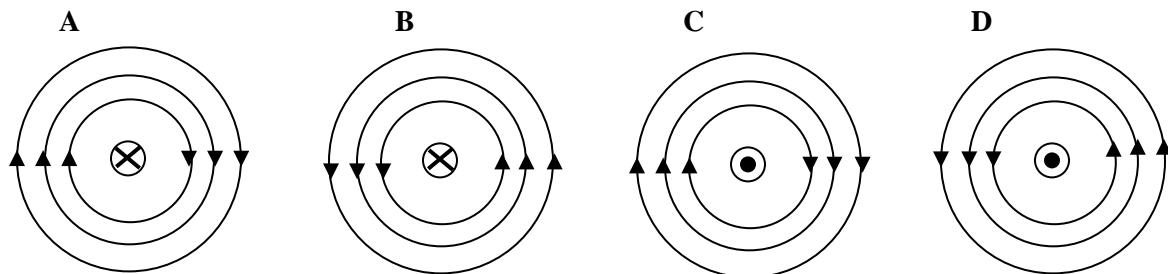
The diagram shows a setup for investigating the magnetic field of a current. On the left, a rectangular box represents a DC power supply with '+' and '-' terminals. Two wires extend from the power supply to a vertical copper wire loop. The loop is suspended in the air by two vertical lines. Below the loop, a horizontal piece of cardboard is positioned to observe any deflection or effect caused by the magnetic field of the current in the loop.

BK9

23

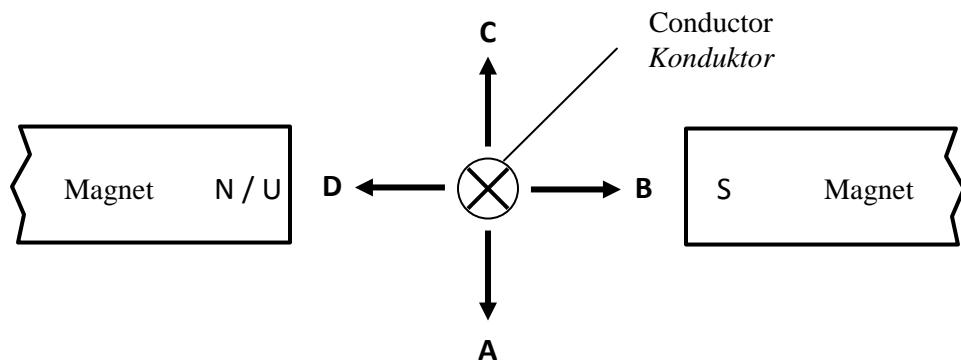
<http://www.chngtuition.blogspot.com>

What is the pattern of the magnetic field when iron filings are sprinkled on the cardboard?  
*Apakah corak medan magnet apabila serbuk besi ditaburkan di atas kadbod?*



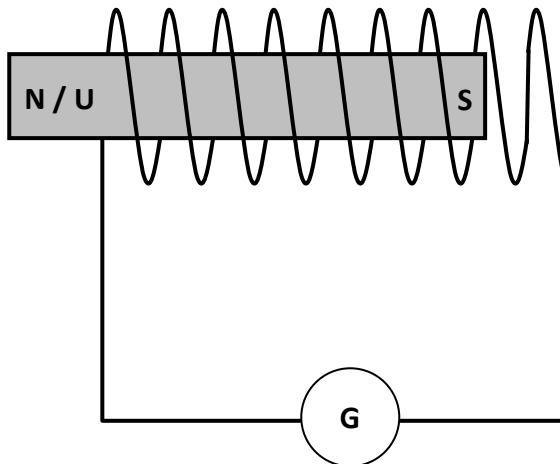
- 40** Diagram shows a current carrying conductor placed between two permanent magnets. In which direction, **A**, **B**, **C** or **D** will the conductor move when the current flows into the paper?

*Rajah menunjukkan suatu konduktor yang mengalirkan arus elektrik diletakkan diantara dua magnet kekal. Pada arah manakah, **A**, **B**, **C**, atau **D** konduktor itu akan bergerak apabila arus mengalir masuk ke dalam kertas?*



- 41** Diagram shows a solenoid connected to a galvanometer and a bar magnet placed inside the solenoid.

*Rajah menunjukkan solenoid disambung kepada sebuah galvanometer dan satu magnet bar berada di dalam solenoid itu.*



Which action will cause **no deflection** of the galvanometer pointer?

*Tindakan yang manakah akan menyebabkan tiada pesongan pada penunjuk galvanometer?*

- A Push the magnet slowly into the solenoid  
*Menolak magnet dengan perlahan ke dalam solenoid*

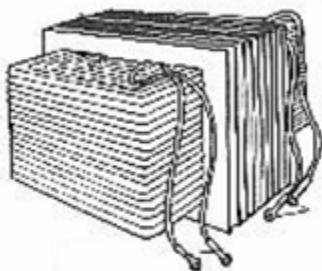
- B Pull the magnet away from the solenoid  
*Tarik magnet menjauhi solenoid*

- C Move the magnet and the solenoid in the opposite direction  
*Menggerakkan magnet dan solenoid dalam arah yang berlawanan*

- D Move the magnet and the solenoid in the same direction at the same speed  
*Menggerakkan magnet dan solenoid dalam arah yang sama pada laju yang sama*

42 Diagram shows a transformer.

*Rajah menunjukkan sebuah transformer.*



Transformer

Which of the following method is used to increase the efficiency of the transformer above?

*Manakah antara langkah berikut digunakan untuk meningkat lagi kecekapan transformer di atas?*

- A Use a thinner wire  
*Menggunakan wayar lebih nipis*

- B Use solid iron core  
*Menggunakan teras besi pejal*

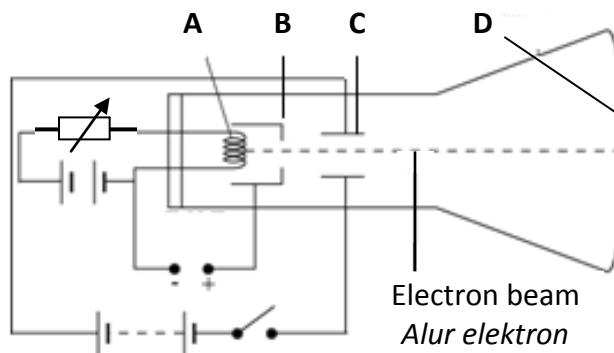
- C Use steel iron core  
*Menggunakan teras besi keluli*

- D Use laminated iron core  
*Menggunakan teras besi berlamina*

**43** Alternating current supply is used in the transmission of electricity because  
*Arus ulang alik digunakan dalam penghantaran tenaga elektrik kerana*

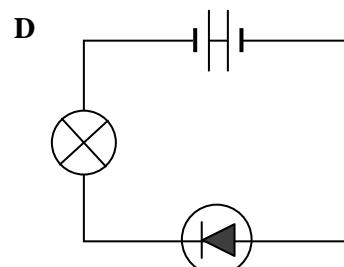
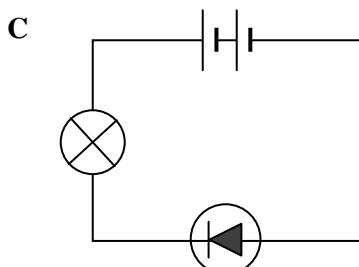
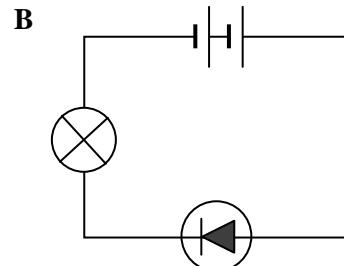
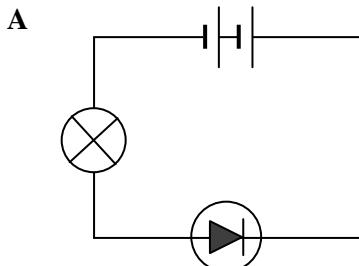
- A** alternating current is easier to generate  
*arus ulang alik lebih mudah dijana*
- B** the voltage of the alternating current can be changed easily  
*voltan arus ulang alik boleh diubah dengan mudah*
- C** the frequency of the alternating current can be changed easily  
*frekuensi arus ulang alik boleh diubah dengan mudah*
- D** the power of the supply can be maintained at a constant value  
*kuasa bekalan boleh dikekalkan pada satu nilai yang tetap*

**44** Diagram shows the structure of a cathode ray oscilloscope.  
*Rajah menunjukkan struktur sebuah osiloskop sinar katod.*

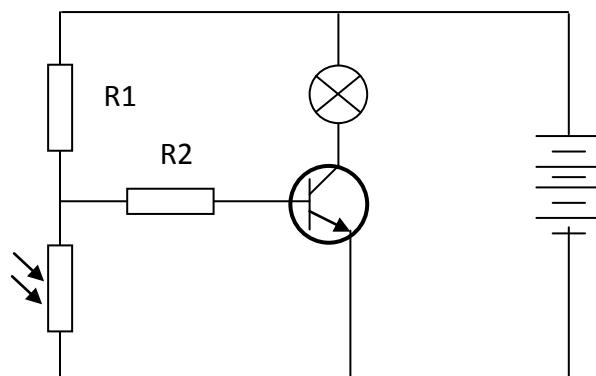


Which of the part **A**, **B**, **C** or **D** changes the kinetic energy of electron beam into light energy?  
*Antara bahagian **A**, **B**, **C** dan **D**, yang manakah menukarkan tenaga kinetik alur elektron kepada tenaga cahaya?*

- 45** Which of the following circuits shows the forward-biased arrangement of a diode?  
*Antara litar yang berikut, yang manakah menunjukkan susunan diod pincang ke depan?*



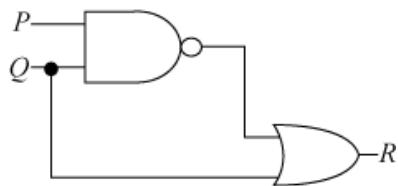
- 46** Diagram shows a transistor switching circuit with a light dependent resistor.
- Rajah menunjukkan litar pensuisan transistor dengan sebuah perintang peka cahaya.*



The bulb will light up when  
*Mentol akan menyala apabila*

- A** the resistor R1 is disconnected  
*perintang R1 ditanggalkan*
- B** the terminals of the battery are reversed  
*apabila terminal bateri disongsangkan*
- C** the surrounding is bright  
*persekitaran adalah terang*
- D** the surrounding is dark  
*persekitaran adalah gelap*

- 47** Diagram shows a NAND logic gate combined with an OR logic gate  
*Rajah menunjukkan get logik TAKDAN digabungkan dengan get logik ATAU.*



Which is the correct truth table for the circuit?  
*Jadual kebenaran yang manakah betul bagi litar tersebut?*

**A**

Input		Output
P	Q	R
0	1	0
0	0	0
1	1	0
1	0	0

**B**

Input		Output
P	Q	R
1	1	0
1	0	1
0	1	0
0	0	1

**C**

Input		Output
P	Q	R
0	1	1
0	0	0
1	1	1
1	0	1

**D**

Input		Output
P	Q	R
1	1	1
1	0	1
0	1	1
0	0	1

- 48.** A nuclide X is represented by  $^{230}_{91}Z$ . It emits one alpha,  $\alpha$  particle and then one beta,  $\beta$  particle.  
*Satu nukleus X dihasilkan oleh  $^{230}_{91}Z$ . Nukleus Z mengeluarkan satu zarah alfa,  $\alpha$  dan kemudian satu zarah beta,  $\beta$ .*

What is the Nuclide X?

*Apakah nuklid X?*

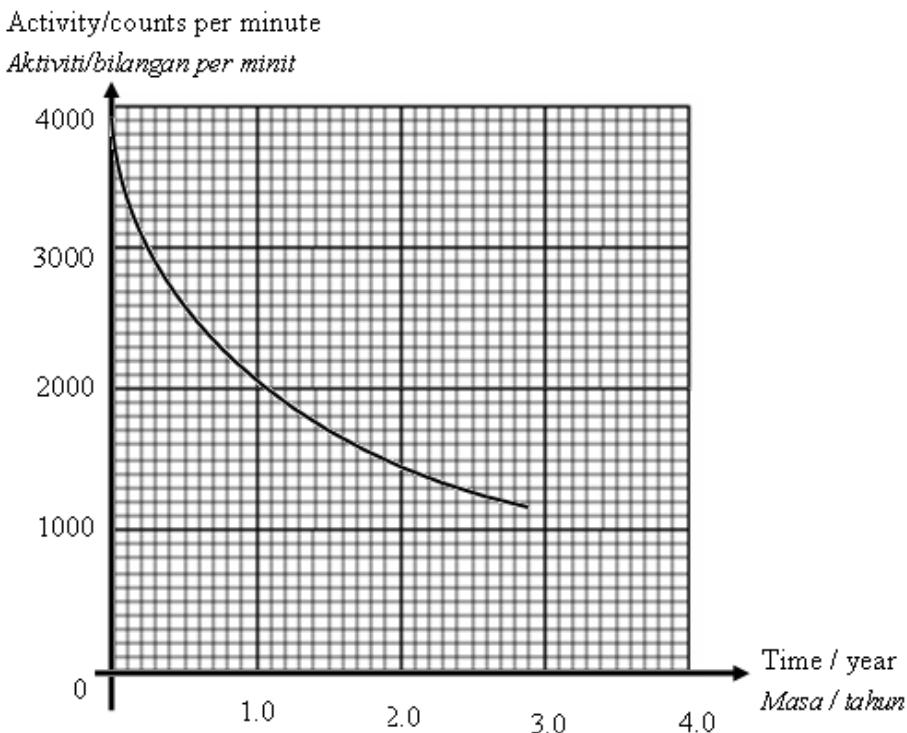
**A**  $^{226}_{88}X$

**B**  $^{226}_{89}X$

**C**  $^{226}_{90}X$

**D**  $^{230}_{89}X$

- 49** Diagram shows the decay curve of a radioactive sample.  
*Rajah menunjukkan lengkung reputan bagi satu sampel radioaktif.*



What is the half life of the radioactive sample?  
*Berapakah separuh hayat bagi sampel radioaktif tersebut?*

- A 0.2 years  
*0.2 tahun*
- B 0.4 years  
*0.4 tahun*
- C 1.0 years  
*1.0 tahun*
- D 1.2 years  
*1.2 tahun*

- 50** When a sample of Radium -226 decays, the energy released is  $7.81 \times 10^{-13}$  J.  
 What is the mass defect?  
*Apabila satu sampel Radium-226 mereput, tenaga yang dibebaskan ialah  $7.81 \times 10^{-13}$  J.*  
*Berapakah cacat jisim?*

- A  $8.68 \times 10^{-30}$  kg
- B  $2.60 \times 10^{-21}$  kg
- C  $3.84 \times 10^{20}$  kg
- D  $1.15 \times 10^{29}$  kg

## SKEMA KERTAS 1 FIZIK BK9 2014

1	C	26	C
2	B	27	C
3	B	28	A
4	C	29	D
5	B	30	B
6	D	31	A
7	C	32	D
8	C	33	D
9	B	34	C
10	B	35	C
11	B	36	D
12	D	37	D
13	C	38	B
14	C	39	A
15	A	40	A
16	D	41	D
17	A	42	D
18	C	43	B
19	B	44	D
20	C	45	B
21	B	46	D
22	B	47	D
23	D	48	C
24	C	49	C
25	B	50	A

# BAHAN KECEMERLANGAN 9

## Fizik Kertas 2

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

1.  $a = \frac{v - u}{t}$
2.  $s = ut + \frac{1}{2}at^2$
3.  $v^2 = u^2 + 2as$
4. Momentum =  $mv$
5.  $F = ma$
6.  $F = kx$
7. Gravitational potential energy =  $mgh$
8. Kinetic energy =  $\frac{1}{2}mv^2$
9. Elastic potential energy =  $\frac{1}{2}Fx = \frac{1}{2}kx^2$
10.  $g = 10 \text{ m s}^{-2}$
11.  $\rho = \frac{m}{v}$
12. Pressure,  $P = \frac{F}{A}$
13. Heat,  $Q = mc\Theta$
14.  $\frac{pV}{T} = \text{constant}$
15.  $E = mc^2$
16.  $v = f\lambda$
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.  $\lambda = \frac{ax}{D}$
20.  $n = \frac{\sin i}{\sin r}$ ,  $n = \frac{1}{\sin c}$
21.  $n = \frac{\text{real depth}}{\text{apparent depth}}$
22.  $Q = It$
23.  $V = IR$
24. Power / Kuasa,  $P = IV$   
*Power / Kuasa, P =  $\frac{V^2}{R}$*
25.  $\frac{N_s}{N_p} = \frac{V_s}{V_p}$
26. Efficiency / Kecekapan  
 $= \frac{I_s V_s}{I_p V_p} \times 100\%$
27.  $c = 3.0 \times 10^8 \text{ m s}^{-1}$
28.  $g = 10 \text{ m s}^{-2}$

**Section A**  
**Bahagian A**  
[60 marks]

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

- 1 Diagram 1 shows scale of an ammeter.  
*Rajah 1 menunjukkan skala sebuah ammeter.*

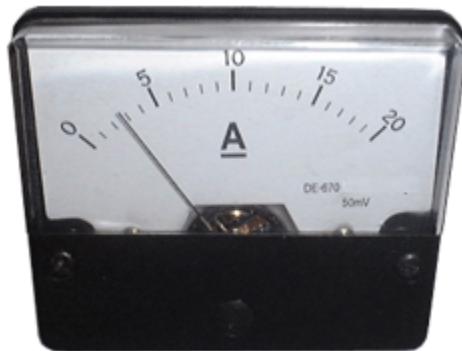


Diagram 1  
*Rajah 1*

- (a) What is the physical quantity measured by the ammeter?  
*Apakah kuantiti fizik yang diukur oleh ammeter tersebut?*

..... [1 mark]

- (b) State the value of the smallest division on the scale?  
*Nyatakan nilai senggatan terkecil pada skala tersebut.*

..... [1 mark]

- (c) Complete the following sentence by ticking (✓) the correct box.  
*Lengkapkan ayat berikut dengan menandakan (✓) dalam kotak yang betul.*

In an electric circuit the ammeter is connected.  
*Dalam suatu litar elektrik ammeter itu disambungkan secara.*

Series  
*sesiri*

Parallel  
*Selari*

[1 mark]

- (d) What is the reading shows by the ammeter.  
*Berapakah bacaan yang ditunjukkan oleh ammeter itu.*

..... [1 mark]

- 2** Diagram 2 shows a gardener push a lawnmower of mass 15 kg to cut grass. The force to move the lawnmower forwards is 320 N and frictional force between the grass and the wheel of the lawnmower is 8 N.

*Rajah 2 menunjukkan sorang tukang kebun menolak sebuah mesin rumput untuk memotong rumput.*

*Daya yang menyebabkan mesin rumput bergerak ke hadapan ialah 320 N dan geseran antara rumput dengan tayar mesin rumput ialah 8 N.*



Diagram 2  
*Rajah 2*

- (a) Complete the following sentence by ticking (✓) the correct box.

*Lengkapkan ayat berikut dengan menandakan (✓) dalam kotak yang betul.*

1 N is equivalent to

*1 N adalah setara dengan*

$1 \text{ kg ms}^{-1}$

$1 \text{ kg ms}^{-2}$

[1 mark]

- (b) Calculate the work done by the gardener when he pushed the lawnmower at a distance of 40 m.

*Hitungkan kerja yang dilakukan oleh tukang kebun apabila beliau menolak mesin rumput itu sejauh 40 m.*

[3 marks]

- (c) Why it is more efficient to cut the grass by pushing the lawnmower compare pulling it?

*Mengapakah adalah lebih cekap untuk memotong rumput dengan menolak mesin rumput berbanding dengan menariknya?*

.....  
[1 mark]

- 3 Diagram 3 shows an electrical circuit. The bulbs P, Q, R and S are identical and the filaments of each bulb has resistance  $2\ \Omega$ .

*Rajah 3 menunjukkan suatu litar elektrik. Mentol-mentol P, Q, R dan S adalah serupa dan filamen setiap mentol itu mempunyai rintangan  $2\ \Omega$ .*

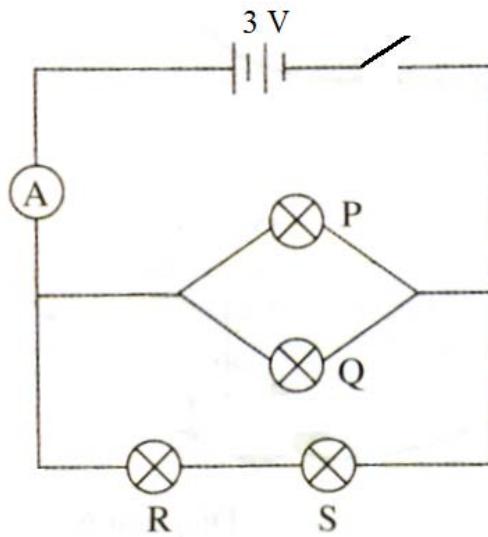


Diagram 3  
*Rajah 3*

- (a) What is the meaning of resistance?

*Apakah yang dimaksudkan dengan rintangan?*

.....  
[1 mark]

- (b) When the switch is on,

*Bila suis dihidupkan,*

- (i) Which two bulbs light up brighter?

*Dua mentol manakah yang menyala dengan lebih cerah?*

.....  
[1 mark]

- (ii) Give **one** reason for the answer in (b)(i).

*Beri satu sebab bagi jawapan (b)(i).*

.....  
[1 mark]

(iii) Calculate the reading of the ammeter.

*Hitungkan bacaan ammeter tersebut.*

[3 marks]

- 4 Diagram 4 shows a transistor circuit used as a fire alarm circuit.

*Rajah 4 menunjukkan sebuah litar bertransistor yang digunakan sebagai litar amaran kebakaran*

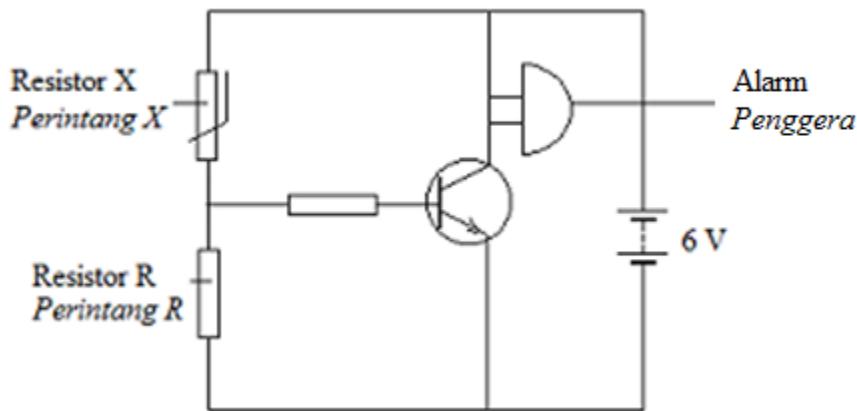


Diagram 4  
Rajah 4

Table 4 shows the variations of the resistance of resistor X with temperature.

*Jadual 4 menunjukkan perubahan rintangan bagi perintang X dengan suhu.*

Temperature / °C Suhu / °C	Resistance of resistor X / Ω Rintangan perintang X / Ω
200	1750
100	3500
70	5000
40	6000

Table 4  
Jadual 4

- (a) Name the resistor X.

*Namakan perintang X.*

[1 mark]

- (b) The alarm is triggered when the potential difference across resistor R is at least 1.2 V.  
*Loceng itu akan berbunyi apabila beza keupayaan merentasi perintang R adalah sekurang-kurangnya 1.2 V.*

Calculate,

*Hitung,*

- (i) the resistance of resistor R when the alarm is triggered at  $100^{\circ}\text{C}$ .  
*rintangan perintang R apabila penggera itu berbunyi pada suhu  $100^{\circ}\text{C}$ .*

[2 marks]

- (ii) the temperature is required to trigger alarm, when the resistance of resistor R is  $1250\ \Omega$ .  
*suhu yang diperlukan untuk penggera itu berbunyi apabila rintangan perintang R ialah  $1250\ \Omega$ .*

[2 marks]

- (c) The resistor X and the alarm are removed and replaced by a microphone, a capacitor and a loudspeaker to modify the circuit in Diagram 4 to become an amplifier circuit.  
In the space below, draw a circuit diagram to show the new circuit.  
*Perintang X dan penggera itu dialihkan dan diganti dengan sebuah mikrofon, sebuah kapasitor dan sebuah pembesar suara untuk mengubahsuai litar dalam Rajah 4 menjadi sebuah litar penguat.*  
*Pada ruangan di bawah lukis satu gambarajah litar untuk menunjukkan litar baru.*

[2 marks]

- 5 Diagram 5.1 and Diagram 5.2 show two identical boat floating in the sea water.

*Rajah 5.1 dan Rajah 5.2 menunjukkan bot yang serupa sedang terapung di dalam air laut.*

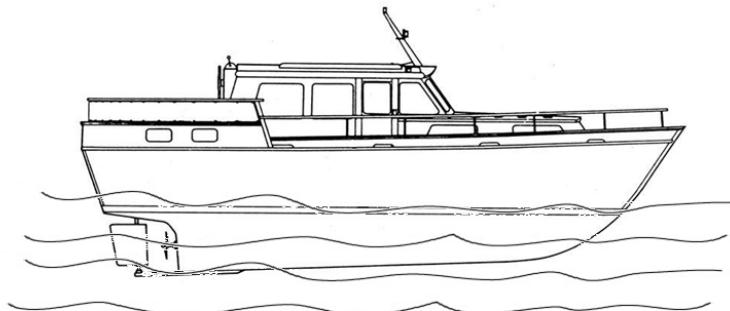


Diagram 5.1  
*Rajah 5.1*

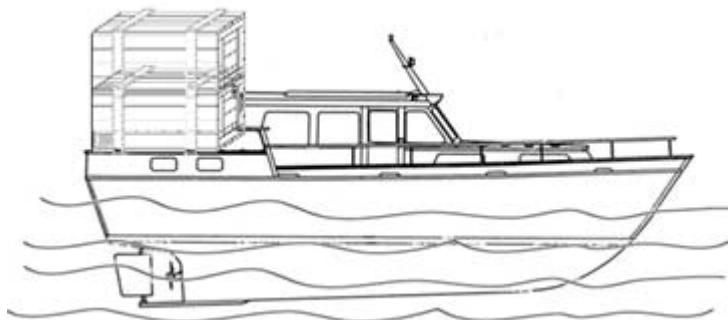


Diagram 5.2  
*Rajah 5.2*

- (a) Name the physics principle involved when the boat floats in the sea water.  
*Namakan prinsip fizik yang terlibat apabila bot terapung di dalam air laut.*

.....  
[1 mark]

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

- (i) Compare the level of sinking of the boat.  
*Bandingkan paras tenggelam bot itu.*

.....  
[1 mark]

- (ii) Compare the weight of the boat.  
*Bandingkan berat bot itu.*

.....  
[1 mark]

- (iii) Compare the buoyant force acted on the boat.  
*Bandingkan daya keapungan yang bertindak pada bot itu.*

.....  
[1 mark]

- (iv) State the relationship between the weight of the boat and the sinking level of the boat.

*Nyatakan hubungan antara berat kapal dan paras tenggelam bot itu.*

.....

[1 mark]

- (v) State the relationship between the weight of the boat and the buoyant force.

*Nyatakan hubungan antara berat kapal dan daya keapungan.*

.....

[1 mark]

- (c) The boat in Diagram 5.1 then floats in the river.

Explain the difference level of sinking of the boat.

*Bot dalam Rajah 5.1 kemudiannya terapung didalam sungai.*

*Jelaskan perubahan pada paras tenggelam bot itu.*

.....

.....

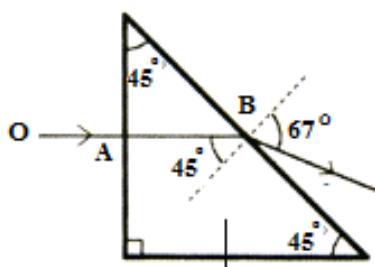
.....

[2 marks]

- 6 Diagram 6.1 and Diagram 6.2 show a light ray passing through prism P and prism Q respectively. Prism P made from plastic and prism Q made from glass.

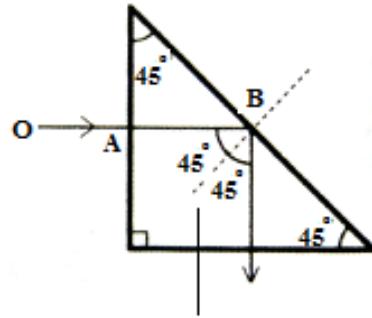
*Rajah 6.1 dan Rajah 6.2 masing-masing menunjukkan satu sinar cahaya melalui prisma P dan prisma Q masing-masing.*

*Prisma P diperbuat daripada plastik dan prisma Q diperbuat daripada kaca.*



Prism P made from  
plastic has critical  
angle  $47^\circ$

*Prisma P diperbuat daripada  
plastik mempunyai  
sudut genting  $47^\circ$*



Prism Q made from  
plastic has critical  
angle  $44^\circ$

*Prisma P diperbuat daripada  
kaca mempunyai  
sudut genting  $44^\circ$*

Diagram 6.1  
Rajah 6.1

Diagram 6.2  
Rajah 6.2

- (a) What is meant by critical angle? **Tick (✓)** the correct answer in the box provided.  
*Apakah yang dimaksudkan dengan sudut genting? Tanda (✓) jawapan yang betul dalam petak yang disediakan.*

The angle of incidence when the angle of refraction is  $90^\circ$ .  
*Sudut tuju apabila sudut biasan ialah  $90^\circ$ .*

The angle of incidence when the incident ray is totally reflected.  
*Sudut tuju apabila sinar tuju dipantulkan sepenuhnya.*

[1 mark]

- (b) Explain why the light ray does not bend when it enters both prisms at point A.  
*Jelaskan mengapa sinar cahaya tidak bengkok semasa memasuki kedua-dua prisma di titik A.*

.....  
[1 mark]

- (c) Based on Diagram 6.1 and Diagram 6.2, compare  
*Berdasarkan Rajah 6.1 dan Rajah 6.2, bandingkan*

- (i) the angle of incidence at point B in Prism P and Q.  
*sudut tuju di titik B dalam prisma P dan Q.*

.....  
[1 mark]

- (ii) the critical angle of Prism P and Q.  
*sudut genting prisma P dan Q*

.....  
[1 mark]

- (d) Relate your answer in (c)(i) and (c)(ii) and hence name the light phenomenon involved in  
*Hubungkaitkan jawapan anda di (c) (i) dan (c) (ii) dan seterusnya namakan fenomena cahaya terlibat dalam*

- (i) Prism P  
*Prism P*

.....

[1 mark]

- (ii) Prism Q  
*Prism Q*

.....

[1 mark]

- (e) Diagram 6.3 shows a cat's eye reflector fixed into a road to help drivers when it is dark or foggy.

*Rajah 6.3 menunjukkan sebuah pemantul cahaya yang diletakkan pada jalan raya untuk membantu seorang pemandu apabila keadaan gelap atau berkabus.*

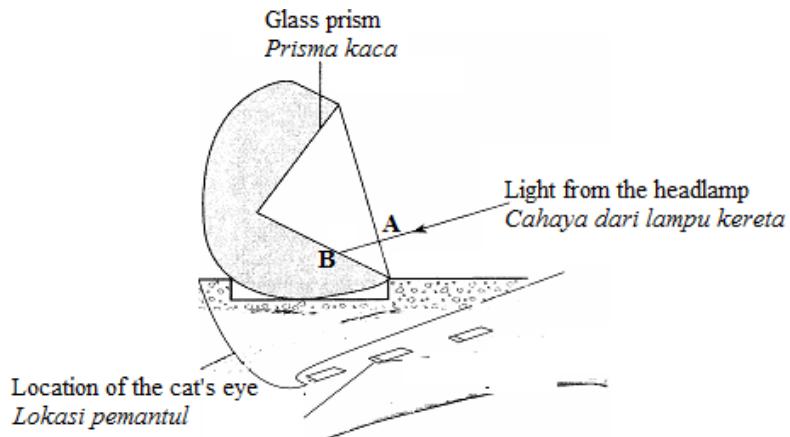


Diagram 6.3  
Rajah 6.3

Based on Diagram 6.3,

*Berdasarkan Rajah 6.3,*

- (i) how does the cat's eye reflector help the driver?  
*bagaimanakah pemantul cahaya itu dapat membantu pemandu?*

..... [1 mark]

- (ii) complete the path of the ray of light in Diagram 6.3.  
*lengkapkan lintasan cahaya dalam Rajah 6.3.*

..... [1 mark]

- 7 Diagram 7 shows a huge banner hung up to a building side using a light rope. The weight of the banner is 800 N.

*Rajah 7 menunjukkan sebidang kain rentang yang besar digantung pada sisi bangunan dengan menggunakan tali yang ringan. Berat kain rentang itu adalah 800 N*

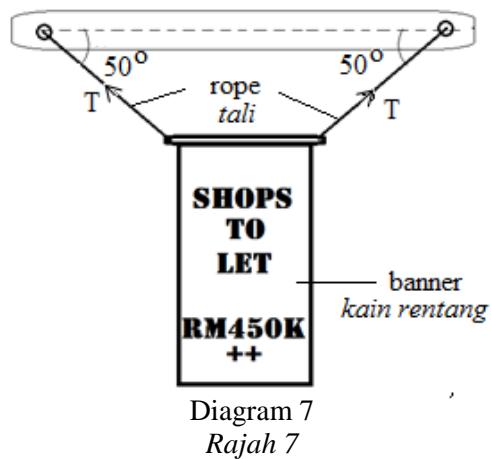


Diagram 7  
Rajah 7

- (a) What is the meaning of weight?

*Apakah yang dimaksudkan dengan berat?*

.....

[1 mark]

- (b) On Diagram 7 draw and label a **force** acting on the banner.

*Pada Rajah 7 lukis dan labelkan satu **daya** yang bertindak pada kain rentang.*

[1 mark]

- (c) The banner is in equilibrium state.

*Kain rentang adalah dalam keadaan keseimbangan.*

- (i) In the space below, draw a diagram of a triangle of forces based on the Diagram 7 to show that all the forces are in equilibrium. Label the forces involved.

*Pada ruang di bawah, lukiskan segi tiga daya berdasarkan Rajah 7 untuk menunjukkan semua daya adalah dalam keseimbangan. Labelkan daya-daya yang terlibat itu.*

.....

[2 marks]

- (ii) Calculate the tension on the rope T

*Hitungkan ketegangan pada tali T.*

.....

[2 marks]

- (d) The rope used to hang the banner is not strong enough to withstand extra force.

Suggest some modification to the banner and the method to hang it and give reasons.

*Tali yang digunakan untuk menggantung kain rentang tidak cukup kuat untuk menampung lebihan daya.*

*Cadangkan pengubahsuaian pada kain rentang dan kaedah menggantungnya serta berikan alasan.*

- (i) Banner

*Kain rentang*

Reason

*Sebab*

.....

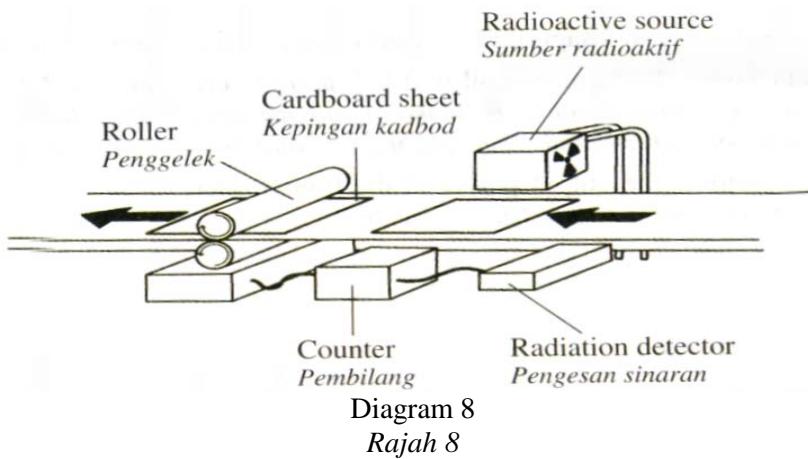
[2 marks]

- (i) Angle of hanging.  
*Sudut gantungan.*

.....  
 Reason  
*Sebab*  
 .....

[2 marks]

- 8 Diagram 8 shows a system used in a factory to ensure the thickness of a cardboard sheet is uniform.  
*Rajah 8 menunjukkan satu sistem yang digunakan di sebuah kilang untuk memastikan ketebalan kepingan kadbd adalah seragam.*



The radioactive source, radiation detector and counter are used to detect the thickness of the cardboard sheet. The radioactive source contains a radioisotope. The roller is used to compress the cardboard sheet.

*Sumber radioisotop, pengesan sinaran dan pembilang digunakan untuk mengesan ketebalan kepingan kadbd. Sumber radioaktif itu mengandungi radioisotop. Penggelek digunakan untuk memampatkan kepingan kadbd.*

Table 8 shows four radioisotopes with their respective properties.  
*Jadual 8 menunjukkan empat radioisotop dengan sifat masing-masing.*

Radioisotopes <i>Radioisotop</i>	Half-life <i>Separuh hayat</i>	Type of radiation <i>Jenis sinaran</i>	Physical state <i>Keadaan fizikal</i>
Sodium-24 (Na) <i>Natrium-24 (Na)</i>	15 hours <i>15 jam</i>	Gamma <i>Gama</i>	Liquid <i>Cecair</i>
Phosphorus-32 (P) <i>Fosforus-32 (P)</i>	14.3 days <i>14.3 hari</i>	Beta <i>Beta</i>	Liquid <i>Cecair</i>
Cobalt-60 (Co) <i>Kobalt-60 (Co)</i>	5.27 years <i>5.27 tahun</i>	Gamma <i>Gama</i>	Solid <i>Pepejal</i>
Strontium-90 (Sr) <i>Strontium-90 (Sr)</i>	28.5 years <i>28.5 tahun</i>	Beta <i>Beta</i>	Solid <i>Pepejal</i>

Table 8  
*Jadual 8*

- (a) What is the meaning of radioisotope?

*Apakah yang dimaksudkan dengan radioisotop?*

.....

[1 mark]

- (b) Based on Table 8, state the suitable properties of the radioisotope to detect the thickness of the cardboard sheet.

Give reason for the suitability of the properties.

*Berdasarkan Jadual 8, nyatakan sifat-sifat radioisotop yang sesuai untuk mengesan ketebalan kepingan kadbad.*

*Beri sebab mengapa sifat-sifat itu sesuai.*

- (i) Half-life

*Separuh hayat*

Reason

*Sebab*

.....

[2 marks]

- (ii) Type of radiation

*Jenis sinaran*

Reason

*Sebab*

.....

[2 marks]

- (iii) Physical state

*Keadaan fizikal*

Reason

*Sebab*

.....

[2 marks]

- (c) Based on answers in 8(b), determine the most suitable radioisotope in Table 8 used to detect the thickness of the cardboard sheet.

*Berdasarkan jawapan di 8(b), tentukan radioisotop dalam Jadual 8 yang paling sesuai digunakan untuk mengesan ketebalan kepingan kadbad.*

.....

[1 mark]

- (d) The radioisotope in 8(c) is used to detect the thickness of the cardboard sheet.  
*Radioisotop dalam 8(c) untuk mengesan ketebalan kepingan kad bod.*

- (i) State the change in the reading of the counter when a thicker cardboard is used.  
*Nyatakan perubahan bacaan pembilang apabila kad bod yang lebih tebal digunakan.*

.....  
[1 mark]

- (ii) How is the thickness of the cardboard sheet reduced?  
*Bagaimakah ketebalan kepingan kad bod itu dikurangkan?*

.....  
[1 mark]

- (e) The half-life of Cobalt-60 is 5.27 years.  
*Separuh hayat Kobalt-60 ialah 5.27 tahun.*

Calculate the time taken for the activity of Cobalt-60 to reduce to 6.25% of its ini value.  
*Hitung masa yang diambil untuk keaktifan Kobalt-60 berkurang menjadi 6.25% daripada nilai asalnya.*

[2 marks]

**Section B**  
**Bahagian B**  
[20 marks]

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

- 9** Diagram 9.1 shows a cross sectional structure of a hydraulic jack used to raise a load. A pushing force of 100 N is exerted on the piston R and able to raise a load of weight 500 N on piston S
- Rajah 9.1 menunjukkan keratan rentas sebuah jek hidraulik yang digunakan untuk menaikkan suatu beban. Satu daya tolakan 100 N dikenakan ke atas piston R dan berupaya untuk mengangkat satu beban 500 N di atas piston S.*

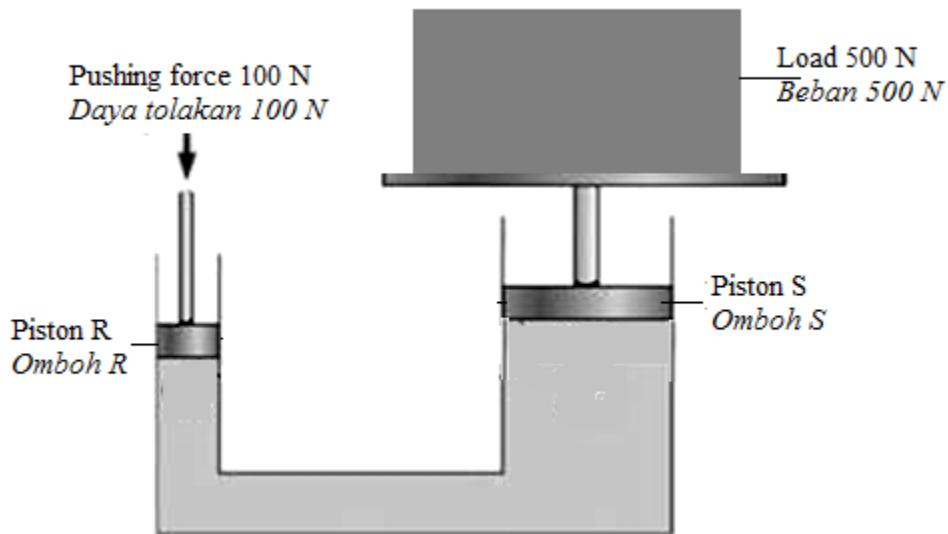


Diagram 9.1  
Rajah 9.1

- (a) What is the meaning of pressure?  
*Apakah yang dimaksudkan dengan tekanan?* [1 mark]
- (b) Based on Diagram 9.1, compare the surface area of piston R and piston S, the pushing force and the weight of load and the pressure exerted on the pistons R and S.  
*Berdasarkan Rajah 9.1, bandingkan luas keratan rentas piston R dan piston S, daya tolakan dan beban dan tekanan yang bertindak pada omboh R dan S.*
- Relate the surface area and the force acted on the pistons and name the physics principle involved  
*Hubungkait luas keratan rentas dan daya yang bertindak pada omboh dan namakan prinsip fizik yang terlibat* [5 marks]

- (c) Explain how the hydraulic jack in Diagram 9.1 can raise the load of 500 N when the pushing force of 100 N is applied on the piston R.

*Terangkan bagaimana jek hidraulik dalam Rajah 9.1 boleh mengangkat sebuah beban 500 N apabila daya tolakan 100 N dikenakan pada omboh R.*

[4 marks]

- (d) A car needs an efficient hydraulic brake system for safety purposes.

Diagram 9.2 shows a hydraulic brake system in a car.

*Sebuah kereta memerlukan satu sistem brek hidraulik yang cekap untuk tujuan keselemanan.*

*Rajah 9.2 menunjukkan suatu sistem brek hidraulik dalam sebuah kereta.*

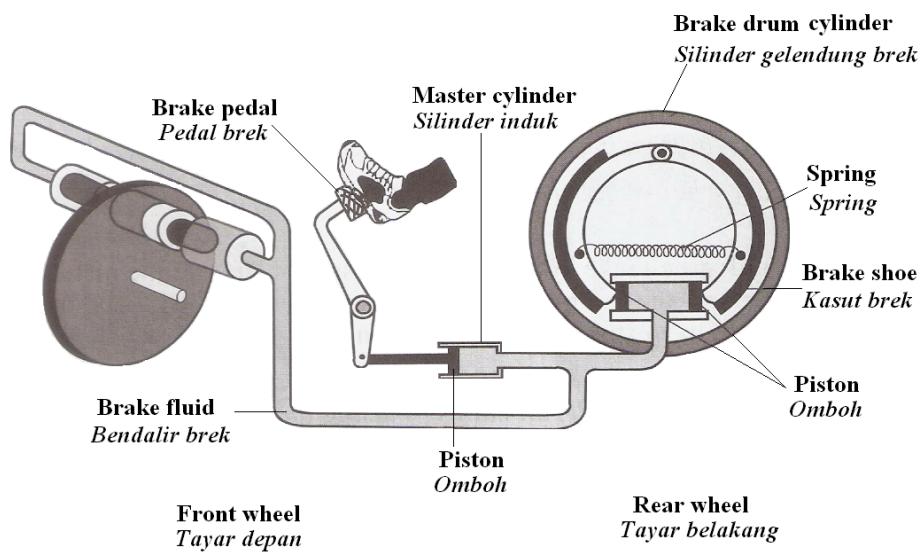


Diagram 9.2  
Rajah 9.2

Suggest and explain the modification should be done on the hydraulic brake system so that it can function effectively based on the following aspect :

*Cadang dan terangkan pengubahsuaian yang perlu dibuat kepada sistem ini supaya ia dapat berfungsi dengan lebih berkesan berdasarkan aspek-aspek berikut:*

- (i) The type of material of brake fluid.  
*Jenis bahan bendalir brek.*
- (ii) The boiling point of brake fluid.  
*Takat didih bendalir brek.*
- (iii) The size of master piston.  
*Saiz omboh utama.*
- (iv) The melting point of brake shoe.  
*Takat lebur kasut brek.*
- (v) Spring constant of the spring.  
*Pemalar spring bagi spring.*

[10 marks]

- 10** Diagram 10.1 shows the red fringes formed in a Young's double slit experiment.

Rajah 10.1 menunjukkan pinggir-pinggir merah yang terbentuk dalam eksperimen dwicelah Young.

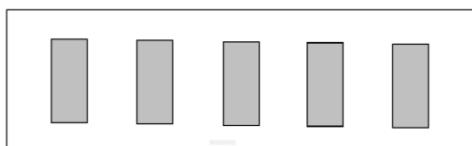


Diagram 10.1  
Rajah 10.1

Diagram 10.2 shows the green fringes formed when the red light of wavelength  $7.0 \times 10^{-7}$  m is replaced by the green light of wavelength  $5.0 \times 10^{-7}$  m.

Rajah 10.2 menunjukkan pinggir-pinggir yang terbentuk apabila cahaya merah yang mempunyai panjang gelombang  $7.0 \times 10^{-7}$  m diganti dengan cahaya hijau yang mempunyai panjang gelombang  $5.0 \times 10^{-7}$  m.

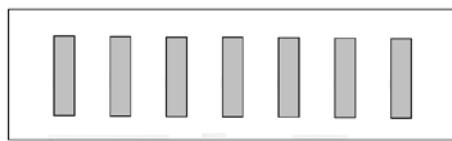


Diagram 10.2  
Rajah 10.2

- (a) (i) What is the meaning of wavelength?

Apakah yang dimaksudkan dengan panjang gelombang?

[1 mark]

- (ii) Based on Diagram 10.1 and Diagram 10.2, compare the wavelength of the light source used, the distance between two consecutive fringes formed by the respective light and the distance between two consecutive fringes of red light and green light.

Relate the wavelength of the light with the distance between two consecutive fringes. Name the wave phenomenon involved.

[5 marks]

Berdasarkan Rajah 10.1 dan Rajah 10.2, bandingkan panjang gelombang bagi sumber cahaya yang digunakan, jarak antara dua pinggir berturutan yang terbentuk oleh cahaya-cahaya itu dan jarak antara dua pinggir berturutan bagi cahaya merah dan cahaya hijau. Namakan fenomena gelombang yang terlibat.

[5 markah]

- (b) Diagram 10.3 shows a train in a tunnel. The sound waves from the train can be heard loudly and clearly at night.

Rajah 10.3 menunjukkan sebuah keretapi di dalam terowong. Gelombang bunyi dari keretapi itu boleh didengar dengan kuat dan jelas pada waktu malam.

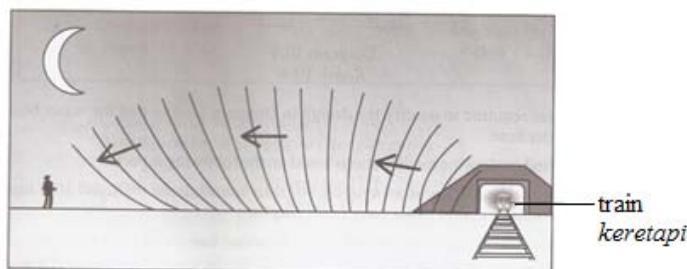


Diagram 10.3  
Rajah 10.3

The distance of the sound waves are further apart at the top than at the ground level.  
Explain why this situation occurs, and state how this leads to the sound being loud and clear.

[4 marks]

*Jarak gelombang bunyi adalah lebih besar di atas berbanding di permukaan bumi.  
Terangkan bagaimana situasi ini terjadi dan nyatakan bagaimana ini boleh menyebabkan bunyi kedengaran lebih kuat dan jelas.*

[4 markah]

- (c) Diagram 10.4 shows the design of a dish made by a student to boil water in a kettle using solar energy.

*Rajah 10.4 menunjukkan reka bentuk sebuah piring yang dibuat oleh seorang murid untuk mendidihkan air di dalam cerek menggunakan tenaga suria.*

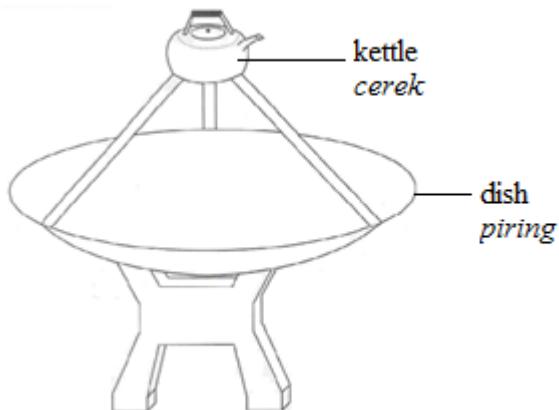


Diagram 10.4  
*Rajah 10.4*

You are required to modify the design in Diagram 10.4 so that the water boils in a shorter time. State and explain the modifications based on the following aspects:

*Anda dikehendaki untuk mengubahsuai reka bentuk di dalam Rajah 10.4 supaya air mendidih dalam masa yang lebih singkat.*

*Nyata dan terangkan pengubahsuaian berdasarkan aspek-aspek berikut:*

- (i) Shape of the dish.  
*Bentuk piring*
- (ii) The type of surface of the dish.  
*Jenis permukaan piring.*
- (iii) Size of the dish.  
*Saiz piring.*
- (iv) Position of the kettle.  
*Kedudukan cerek.*
- (v) The orientation of the dish.  
*Orientasi piring.*

[10 markah]

**Section C**  
**Bahagian C**  
[20 marks]

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

- 11 Diagram 11.1 shows a clinical thermometer is used by a doctor to check the temperature of a patient's body during medical treatment.  
*Rajah 11.1 menunjukkan satu termometer klinik digunakan oleh seorang doktor bagi memeriksa suhu badan seorang pesakit semasa membuat rawatan.*



Diagram 11.1  
Rajah 11.1

- (a) What is meant by temperature?  
*Apakah yang dimaksudkan dengan suhu?* [1 mark]
- (b) Referring to the principle of thermal equilibrium and the working principle of a thermometer, explain how a doctor can check his patient's temperature during the medical treatment.  
*Merujuk kepada prinsip keseimbangan terma dan prinsip kerja termometer, terangkan bagaimana seorang doktor dapat memeriksa suhu badan pesakit semasa membuat rawatan kesihatan.* [4 marks]

Diagram 11.2 shows a thermometer which is not calibrated has a mercury column of length,  $L_0$  is 5.0 cm when the temperature is 0 °C and  $L_{100}$  is 25.0 cm when the temperature is 100 °C.

The mercury column,  $L_\theta$  is 12.0 cm when put into liquid X.  
*Rajah 11.2 menunjukkan sebuah termometer yang belum ditentukurkan mempunyai panjang turus  $L_0$  ialah 5.0 cm apabila suhu adalah 0 °C dan  $L_{100}$  ialah 25.0 cm apabila suhu adalah 100 °C. Panjang turus merkuri,  $L_\theta$  ialah 12 cm apabila diletakkan ke dalam cecair X.*

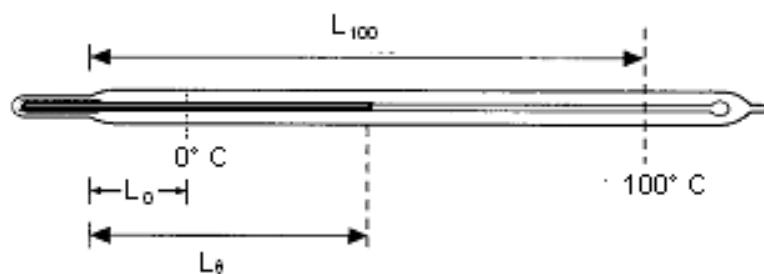


Diagram 11.2  
Rajah 11.2

- (c) Determine the temperature of liquid X.

*Tentukan suhu cecair X itu.*

[2 marks]

- (d) Determine the value of the temperature in 11(c)(i) in Kelvin.

*Tentukan nilai suhu dalam 11(c)(i) dalam unit Kelvin.*

[1 mark]

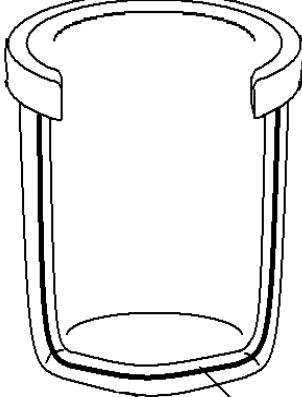
- (e) What is the length of the mercury column from the bulb at temperatures  $30^{\circ}\text{C}$ ?

*Berapakah panjang turus merkuri itu dari bebuli pada suhu  $30^{\circ}\text{C}$ ?*

[2 marks]

- (f) Diagram 11.3 shows cross sectional shape and the characteristic of the material of the four rice keepers J, K, L and M which are used to maintain the temperature of the hot rice.

*Rajah 11.3 menunjukkan empat keratan rentas dan ciri-ciri bahan bagi empat tabung nasi J, K, L dan M yang digunakan untuk mengekalkan suhu nasi yang panas.*

Rice keeper <i>Tabung nasi</i> <b>J</b>	 Polystyrene foil <i>Kepingan polisterena</i>	<b>Characteristic of the material:</b> <b>Ciri-ciri bahan</b>  Melting point: <b>68 °C</b> <i>Takat lebur:</i>  Specific heat capacity: <b>800 J kg⁻¹ °C⁻¹</b> <i>Muatan haba tentu:</i>  Density : <b>800 kg m⁻³</b> <i>Ketumpatan:</i>
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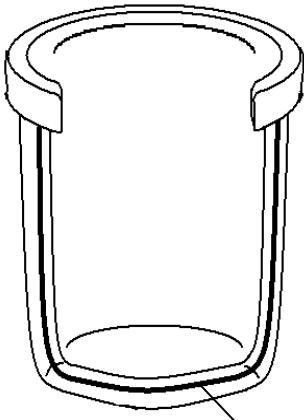
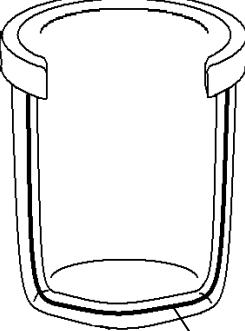
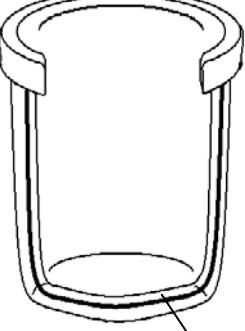
Rice keeper <i>Tabung nasi</i> <b>K</b>	 <p>Copper foil  <i>Kepingan kuprum</i></p>	<b>Characteristic of the material:</b> <i>Ciri-ciri bahan</i>  Melting point: <b>240 °C</b> <i>Takat lebur:</i>  Specific heat capacity: <b>1 900 J kg⁻¹ °C⁻¹</b> <i>Muatan haba tentu:</i>  Density : <b>670 kg m⁻³</b> <i>Ketumpatan:</i>
Rice keeper <i>Tabung nasi</i> <b>L</b>	 <p>Polystyrene foil  <i>Kepingan polisterena</i></p>	<b>Characteristic of the material:</b> <i>Ciri-ciri bahan</i>  Melting point: <b>240 °C</b> <i>Takat lebur:</i>  Specific heat capacity: <b>1900 J kg⁻¹ °C⁻¹</b> <i>Muatan haba tentu;</i>  Density : <b>670 kg m⁻³</b> <i>Ketumpatan:</i>
Rice keeper <i>Tabung nasi</i> <b>M</b>	 <p>Copper foil  <i>Kepingan kuprum</i></p>	<b>Characteristic of the material:</b> <i>Ciri-ciri bahan</i>  Melting point: <b>68°C</b> <i>Takat lebur:</i>  Specific heat capacity: <b>900 J kg⁻¹ °C⁻¹</b> <i>Muatan haba tentu:</i>  Density : <b>800 kg m⁻³</b> <i>Ketumpatan:</i>

Diagram 11.3  
*Rajah 11.3*

You are required to determine the most suitable rice keeper which is able to maintain the temperature of the hot rice for a long time and can be moved from one place to another.

Study the characteristics of the four rice keepers from the following aspects:

*Anda dikehendaki menentukan tabung nasi yang paling sesuai untuk mengekalkan suhu nasi panas dalam masa yang panjang dan boleh dibawa dari satu tempat ke tempat yang lain..*

*Kaji ciri-ciri bagi keempat-empat tabung nasi itu dari aspek berikut:*

- melting point  
*takat lebur*
- specific heat capacity  
*muatan haba tentu*
- density  
*ketumpatan*
- material between the inner wall and outer wall  
*bahan diantara dinding dalam dengan dinding luar*

Explain the suitability of the aspects.

Justify your choice.

*Jelaskan kesesuaian aspek-aspek itu.*

*Beri sebab bagi pilihan anda.*

[10 marks]

- 12 (a) Most of our electrical energy comes from hydroelectric power stations and thermal power stations. These power stations are connected by cables to transmit electricity to users in industries, offices, schools and houses. This system is called the national grid network.  
*Sebahagian besar tenaga elektrik yang digunakan datang daripada stesen janakuasa elektrik hidro dan stesen janakuasa termal. Stesen janakuasa ini disambung antara satu sama lain menggunakan kabel untuk menyalurkan tenaga elektrik kepada industri, pejabat, sekolah dan rumah kediaman. Sistem ini dikenali sebagai rangkaian grid nasional.*

- (i) What is the meaning of power

*Apakah yang dimaksudkan dengan kuasa?*

[1 mark]

- (ii) Explain based on the transformations of energy and other physics concept how a hydroelectric power station generates electric energy.

*Terangkan berdasarkan perubahan tenaga dan lain-lain konsep fizik bagaimanakah sebuah stesen janakuasa elektrik hidro menjana tenaga elektrik.*

[4 marks]

- (b) Diagram 12 shows how a model of an electric transmission system can be set up in a laboratory. The model consists of a power station that generates 12 V of alternating current (a.c) that transmits the electrical energy to the users using transmission wires and transformers P, Q and R.

*Rajah 12 menunjukkan satu model sistem penghantaran tenaga elektrik yang boleh dibina di dalam makmal. Model ini mengandungi satu stesen janakuasa yang menjana 12 V arus ulang alik (a.u) yang menghantar tenaga elektrik kepada pengguna menggunakan dawai penghantar dan transformer P, Q dan R*

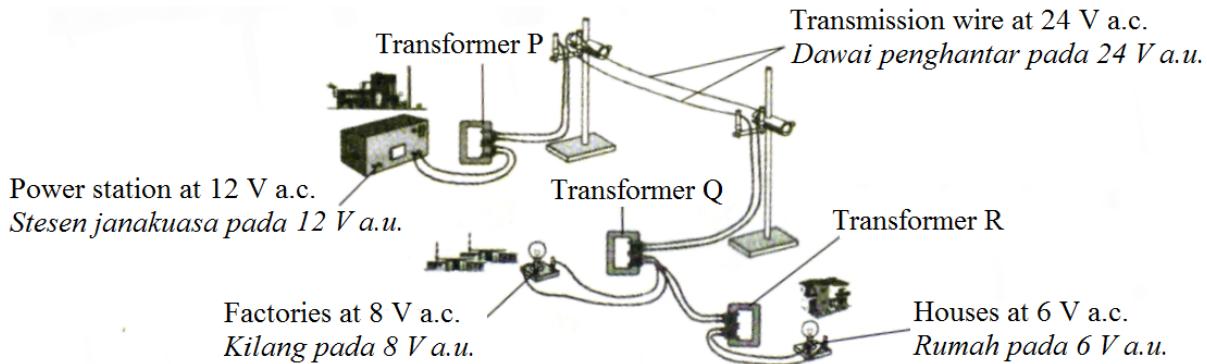


Diagram 12  
Rajah 12

You are required to set up a model as in Diagram 12 using the information in Table 12.  
*Anda dikehendaki untuk menyediakan model seperti dalam Rajah 12 dengan menggunakan maklumat dalam Jadual 12.*

Number of turns of the coil <i>bilangan lilitan gegelung</i>	Type of transformer core <i>Jenis teras transformer</i>	Materials of transmission wire <i>Bahan dawai penghantar</i>
1200	Solid copper core <i>Teras kuprum pepejal</i>	Constantan <i>Konstantan</i>
1000	Laminated copper core <i>Teras kuprum berlamina</i>	Copper <i>Kuprum</i>
500	Solid soft iron core <i>Teras besi lembut</i>	Aluminium <i>Aluminium</i>
400	Laminated soft iron core <i>Teras besi lembut berlamina</i>	Nichrome <i>Nikrom</i>
160		
120		

Table 12  
Jadual 12

Using the information in Diagram 12 and Table 12, determine:  
*Menggunakan maklumat dalam Rajah 12 dan Jadual 12, tentukan:*

- the number of turns in the primary coil and the secondary coil of transformers P, Q and R and show your working.  
*bilangan lilitan dalam gegelung primer dan bilangan lilitan dalam gegelung sekunder bagi transformer P, Q dan R dan tunjukkan kerja hitungan yang anda lakukan.*
- the type of core you will use in all transformers and justify your choice.  
*jenis teras yang anda akan gunakan bagi semua transformer itu dan jelaskan pilihan anda.*

- (iii) the material you will use for the transmission wire and justify your choice.  
*bahan yang anda akan gunakan untuk membina dawai penghantar dan jelaskan pilihan anda.*

[10 marks]

- (c) If the resistance of the transmission wires between transformers P and Q in the model at Diagram 12 is  $30\ \Omega$ , calculate:  
*Jika rintangan dawai penghantar antara transformer P dan transformer Q dalam model pada Rajah 12 ialah  $30\ \Omega$ , hitungkan:*

- (i) the current that flows in the transmission wire,  
*arus yang mengalir dalam dawai penghantar itu.*
- (ii) the power loss due to the heating effect of the current in the transmission wire.  
*kuasa yang hilang disebabkan oleh kesan pemanasan arus dalam wayar penghantar itu.*

[5 marks]

**END OF QUESTION PAPER**  
***KERTAS SOALAN TAMAT***

**INFORMATION FOR 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 dalam Bahagian A. Tulis jawapan bagi Bahagian A 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 lined pages at the end of this question paper. Answer questions in **Section B** and **Section C** in detail. You may use equations, diagrams, tables, graphs and other suitable methods to explain your answer.  
*Jawab satu soalan daripada Bahagian B dan satu soalan daripada Bahagian C. Tuliskan jawapan bagi Bahagian B dan Bahagian C pada halaman bergaris di bahagian akhir kertas soalan ini. Jawab Bahagian B dan Bahagian C dengan terperinci. Anda boleh menggunakan persamaan, gambar rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda.*
4. Show your working, it may help you to get marks.  
*Tunjukkan kerja mengira, ini membantu anda mendapatkan markah.*
5. If you wish to cancel any answer, neatly cross out the answer.  
*Sekiranya anda hendak membatalkan sesuatu jawapan, buat garisan di atas jawapan itu*
6. The diagram in the question provided are not drawn to scale unless stated.  
*Gambarajah yang mengiringi soalan tidak dilukiskan mengikut skala kecuali dinyatakan.*
7. A list of formulae is provided on page 3.  
*Satu senarai rumus disediakan di halaman 3.*
8. 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.*
9. The time suggested to answer **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.*
10. You may use a non-programmable scientific calculator.  
*Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram. Walau bagaimanapun, langkah mengira perlu ditunjukkan.*
11. Hand in this question paper at the end of the examination.  
*Serahkan kertas soalan ini di akhir peperiks*



Section A  
**Bahagian A**

[28 marks]  
[28 markah]

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

Time suggestion in this section is 60 minutes  
*Masa yang dicadangkan untuk menjawab bahagian ini ialah 60 minit.*

- 1 A student carries out an experiment to investigate the relationship between the length of trapped air,  $l$ , and the temperature,  $T$ , of air at constant mass and atmospheric pressure. Diagram 1.1 shows the arrangement of the apparatus for the experiment. The trapped air in the capillary is always totally immersed in the water. At the beginning of the experiment the water in the beaker is cooled with ice until the temperature  $\theta_1 = 0^\circ\text{C}$ . The length,  $l$  of trapped air and the temperature are recorded. Then the water is heated and continuously stirred. The procedure is repeated with different temperature,  $\theta_2 = 27^\circ\text{C}$ ,  $\theta_3 = 77^\circ\text{C}$ ,  $\theta_4 = 127^\circ\text{C}$  and  $\theta_5 = 177^\circ\text{C}$ . Diagrams 1.2, 1.3, 1.4, 1.5 and 1.6 shows the trapped air at different temperature.

*Seorang murid menjalankan satu eksperimen untuk mengkaji hubungan antara panjang udara terperangkap,  $l$  dan suhu,  $T$ , bagi udara pada jisim dan tekanan atmosfera yang tetap. Rajah 1.1 menunjukkan susunan radas untuk eksperimen tersebut. Eksperimen dimulakan dengan mencampurkan air batu ke dalam air di dalam bikar sehingga suhunya mencapai  $\theta_1 = 0^\circ\text{C}$ . Panjang,  $l$  udara terperangkap, dan suhu dicatatkan. Kemudian air dipanaskan dan dikacau.*

*Eksperimen diulang dengan menggunakan suhu-suhu yang berlainan,  $\theta_2 = 27^\circ\text{C}$ ,  $\theta_3 = 77^\circ\text{C}$ ,  $\theta_4 = 127^\circ\text{C}$  dan  $\theta_5 = 177^\circ\text{C}$ . Rajah-rajah 1.2, 1.3, 1.4, 1.5 dan 1.6 menunjukkan udara terperangkap pada suhu yang berlainan.*

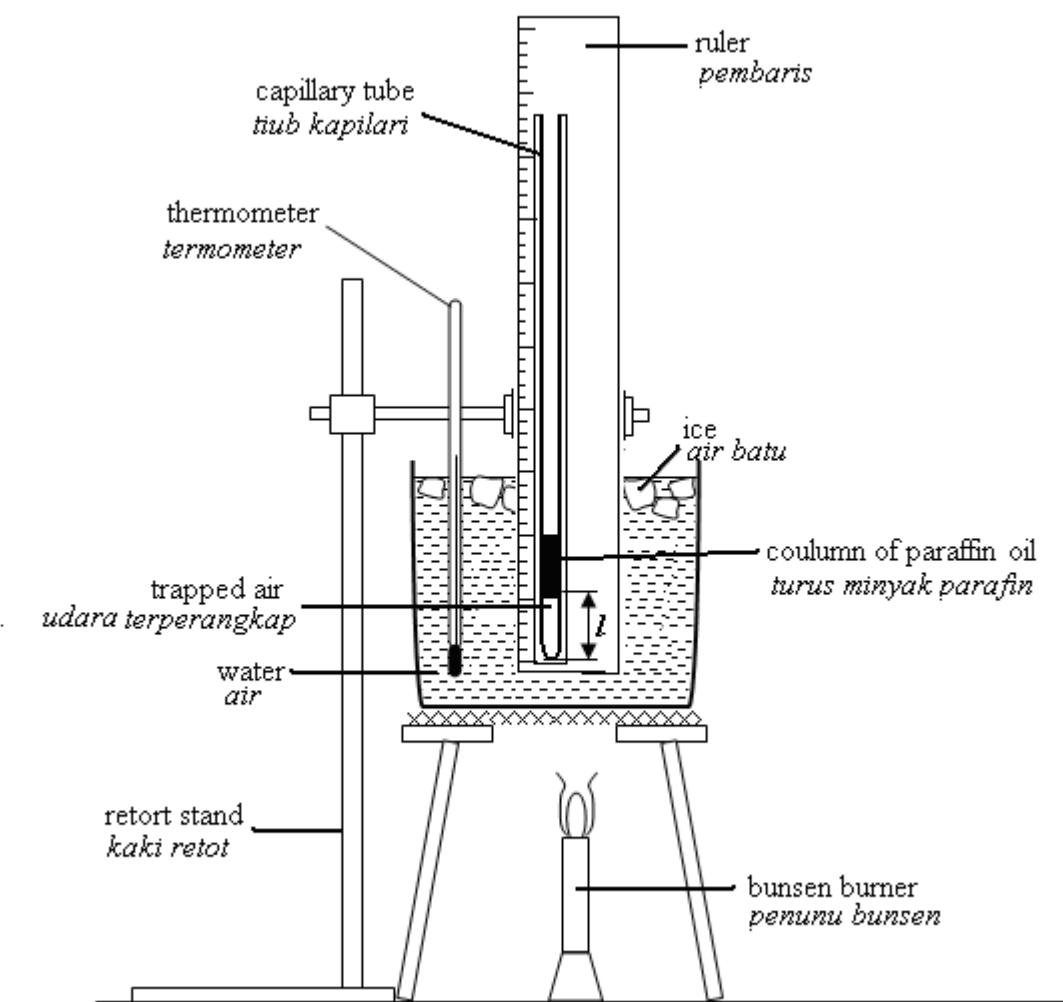


Diagram 1.1  
Rajah 1.1

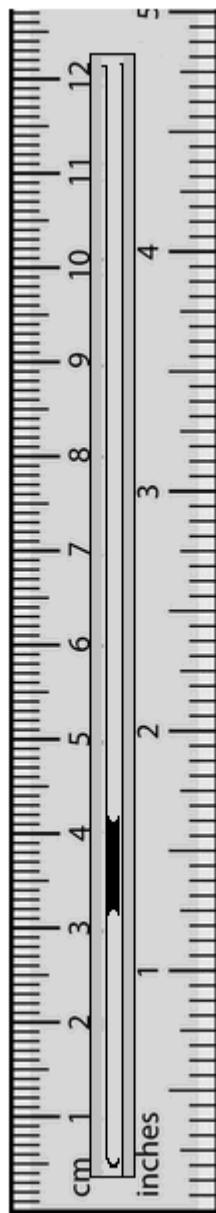


Diagram 1.2  
*Rajah 1.2*  
 $\theta_1 = 0^\circ\text{C}$

$$l_1 = \dots\dots\dots$$

$$T_1 = \dots\dots\dots$$

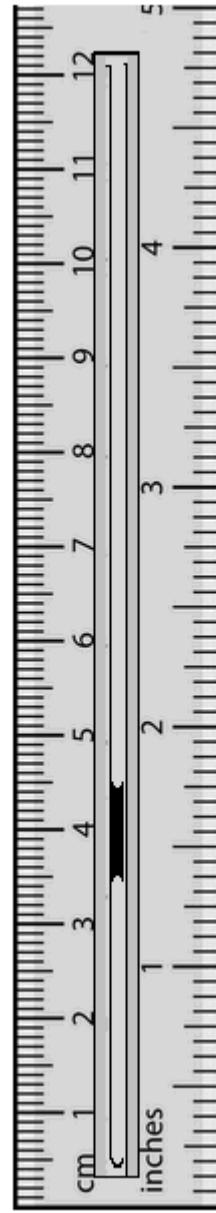


Diagram 1.3  
*Rajah 1.3*  
 $\theta_2 = 27^\circ\text{C}$

$$l_2 = \dots\dots\dots$$

$$T_2 = \dots\dots\dots$$

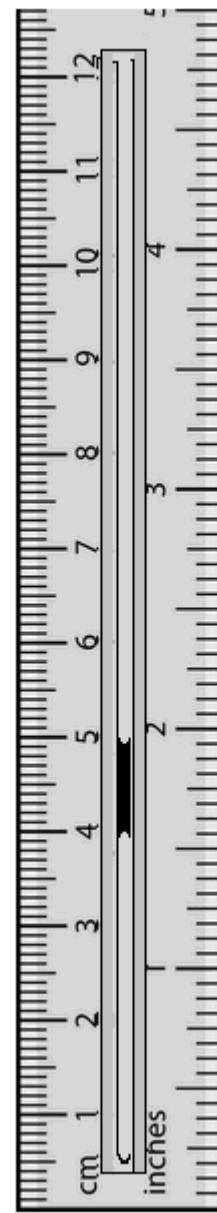


Diagram 1.4  
*Rajah 1.4*  
 $\theta_3 = 77^\circ\text{C}$

$$l_3 = \dots\dots\dots$$

$$T_3 = \dots\dots\dots$$

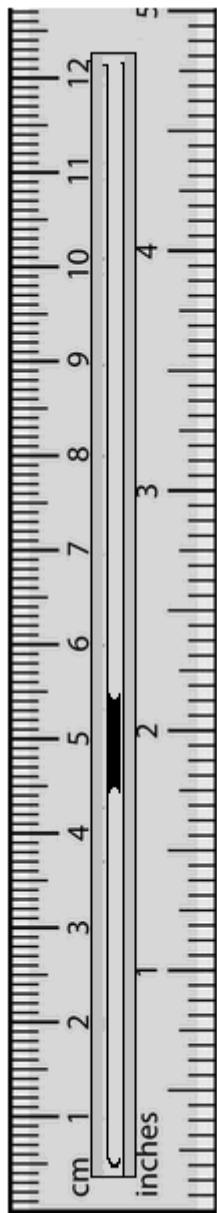


Diagram 1.5

*Rajah 1.5*

$$\theta_4 = 127^{\circ}\text{C}$$

$$l_4 = \dots\dots\dots$$

$$T_4 = \dots\dots\dots$$

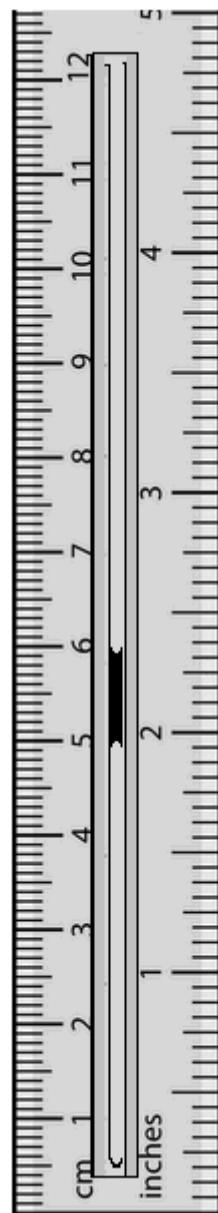


Diagram 1.6

*Rajah 1.6*

$$\theta_5 = 177^{\circ}\text{C}$$

$$l_5 = \dots\dots\dots$$

$$T_5 = \dots\dots\dots$$

- (a) For the experiment described on page 2, identify:  
*Bagi eksperimen yang diterangkan di halaman 2, kenal pasti:*

- (i) The manipulated variable  
*Pembolehubah dimanipulasikan*

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

- (ii) The responding variable  
*Pembolehubah bergerak balas*

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

- (iii) The constant variable  
*Pembolehubah dimalarkan*

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

- (b) Based on Diagrams 1.2, 1.3, 1.4, 1.5 and 1.6 on page 4 and 5:  
*Berdasarkan Rajah 1.2, 1.3, 1.4, 1.5 dan 1.6 di halaman 4 dan 5:*

Record the reading of  $l_1, l_2, l_3, l_4$  and  $l_5$ .  
*Catatkan bacaan  $l_1, l_2, l_3, l_4$  dan  $l_5$ .*

[2 mark]  
[2 markah]

Convert the unit of  $\theta_1, \theta_2, \theta_3, \theta_4$  and  $\theta_5$  to Kelvin unit,  $T_1, T_2, T_3, T_4$  and  $T_5$  by using equation :

*Tukarkan unit  $\theta_1, \theta_2, \theta_3, \theta_4$  and  $\theta_5$  ke unit Kelvin,  $T_1, T_2, T_3, T_4$  dan  $T_5$  dengan menggunakan persamaan:*

$$T = \theta + 273 \text{ K}$$

[1 mark]  
[1 markah]

Tabulate your results for of  $\theta$ ,  $T$  and  $l$  in the space below.

Jadualkan keputusan anda bagi  $\theta$ ,  $T$  dan  $l$  pada ruang di bawah.

[2 marks]  
[2 markah]

- (c) On the graph paper on page 7, plot a graph of  $l$  against  $T$ .

Pada kertas graf di halaman 7, lukis graf  $l$  melawan  $T$ .

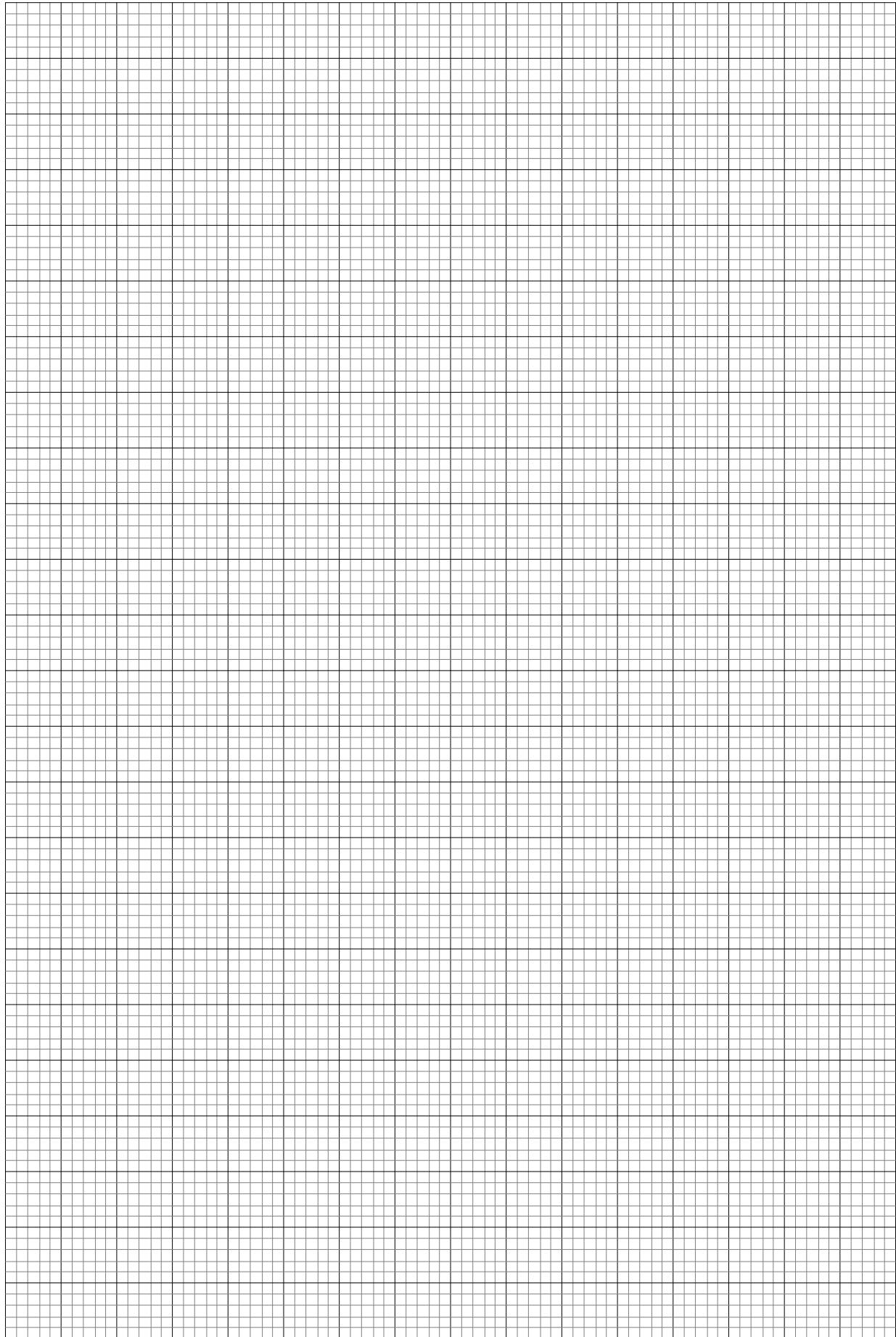
[5 marks]  
[5 markah]

- (d) Based on your graph in 1(c), state the relationship between  $l$  against  $T$ . . .

Berdasarkan graf anda di 1(c), nyatakan hubungan antara  $l$  melawan  $T$ .

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

Graph  $l$  against T  
*Graf  $l$  melawan T*



- 2 A student carries out an experiment to determine the internal resistance,  $r$ , and electromotive force (e.m.f),  $E$ , of a dry cell. The results of this experiment is shown in the graph of potential difference,  $V$ , against current,  $I$ , in Diagram 2.1.

*Seorang murid menjalankan satu eksperimen untuk menentukan rintangan dalam,  $r$ , dan daya gerak elektrik (d.g.e),  $E$ , sebuah sel kering. Keputusan eksperimen ini ditunjukkan oleh graf  $V$  melawan  $I$  pada Rajah 2.1.*

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

- (i) What happens to  $V$  as  $I$  increase ?  
*Apakah yang berlaku pada  $V$  apabila  $I$  bertambah?*

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

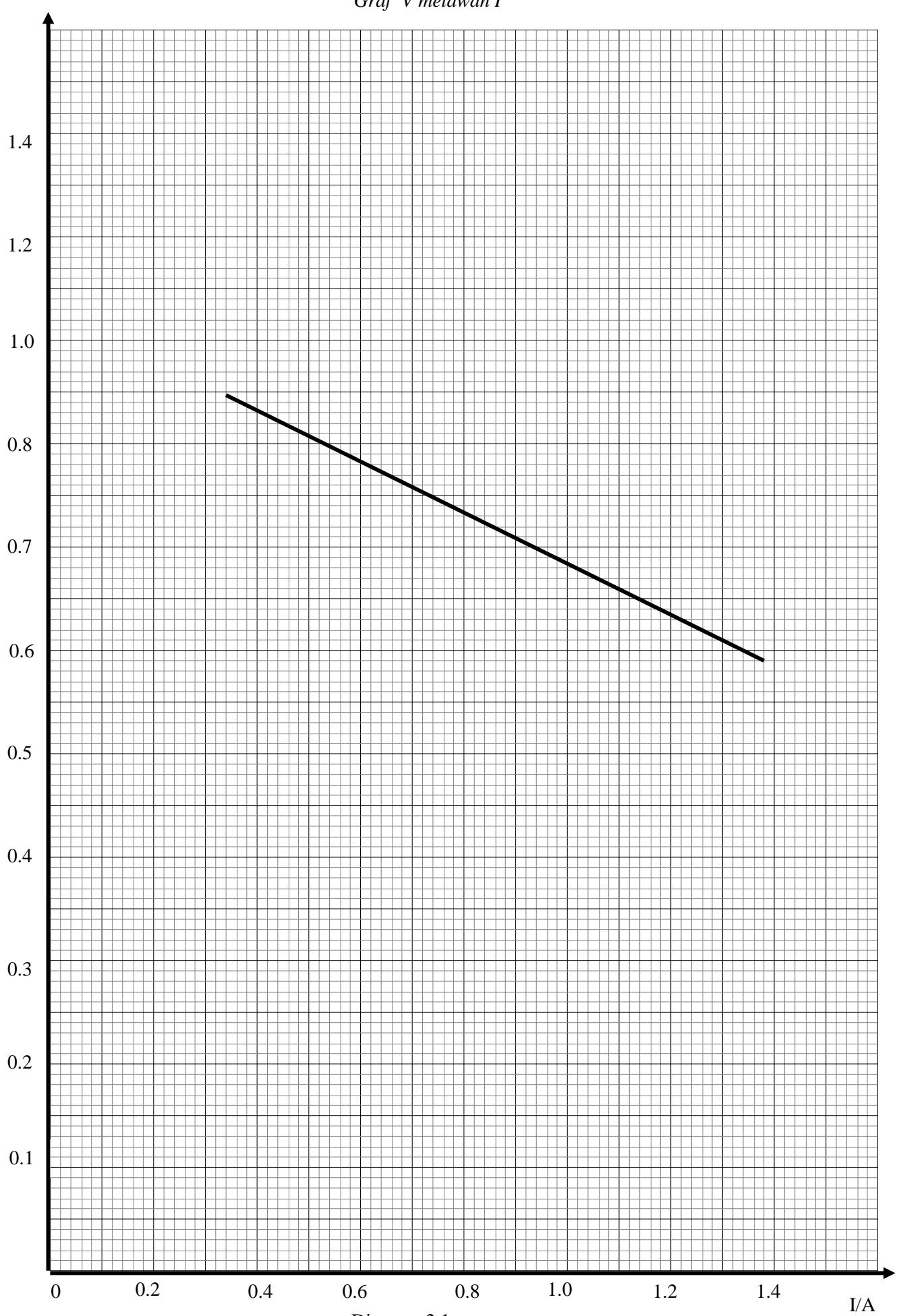
- (ii) Determine the value of  $V$  when  $I = 0.6$  A.  
Show on the graph, how you determine the value of  $V$ .

*Tentukan nilai  $V$  apabila  $I = 0.6$ A.  
Tunjukkan pada graf itu bagaimana anda menentukan nilai  $V$ .*

$$V = \dots\dots\dots\dots\dots V$$

[2 marks]  
[2 markah]

Graph of  $V$  against  $I$   
Graf  $V$  melawan  $I$



- (b) Calculate the gradient , m, of the graph. Show on the graph how you determine m.  
*Hitung kecerunan, m, bagi graf itu. Tunjukkan pada graf itu bagaimana anda menentukan m.*

m= .....

[3 marks]

[3 markah]

- (c) The internal resistance,  $r$ , of the dry cell is given by the formula  $r = -m$ ,  
where  $m$  is the gradient of the graph.  
*Rintangan dalam sel kering, r, diberi oleh formula  $r = -m$ ,  
di mana m ialah kecerunan graf*

Calculate the internal resistance,  $r$ , of the dry cell  
*Hitungkan rintangan dalam, r, bagi sel kering itu*

[2 marks]

[2 markah]

- (d) Electromotive force (e.m.f), of dry cell is the value of intercept on the V axis of the graph V against I  
 Based on the graph in diagram 2.1 , determine the electromotive force of the dry cell

*Daya gerak elektrik (d.g.e), sel kering adalah nilai pintasan pada paksi V bagi graf V melawan I.*

*Berdasarkan graf dalam Rajah 2.1 , tentukan daya gerak elektrik sel kering itu*

[ 2 marks]  
 [ 2 markah ]

- (e) State two precautions that can be taken to improve the accuracy of the reading in this experiment.

*Nyatakan dua langkah berjaga-jaga yang boleh diambil untuk memperbaiki ketepatan bacaan dalam eksperimen ini.*

1.....

.....

2.....

.....

[2 marks]  
 [2 markah]

Section B  
**Bahagian B**

[12 marks]  
*[12 markah]*

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

The time suggested to answer this section is 30 minutes.  
*Masa yang dicadangkan untuk menjawab bahagian ini ialah 30 minit.*



Sumber gambar: Google image

sea water / *air laut*

Diagram 3.1 / *Rajah 3.1*



freshwater / *air tawar*

Diagram 3.2/ *Rajah 3.2*

- 3 Diagram 3.1 shows the view of an marine aquarium.  
 Diagram 3.2 shows the view that has been seen if sea water replaced with freshwater.

*Rajah 3.1 menunjukkan pemandangan sebuah akuarium hidupan laut.*

*Rajah 3.2 menunjukkan pemandangan yang akan dilihat sekiranya air laut digantikan dengan air tawar.*

Based on the information and observation above and your knowledge about the real depth and apparent depth:

*Berdasarkan maklumat dan pemerhatian di atas dan pengetahuan anda mengenai dalam nyata dan dalam ketara:*

- (a) State one suitable inference.  
*Nyatakan **satu** inferensi yang sesuai.*

[1mark]  
*[1 markah]*

- (b) State one suitable hypothesis.  
*Nyatakan **satu** hipotesis yang sesuai.*

[1 mark]  
*[1 markah]*

- (c) With the use of apparatus as a beaker, pin, retort stand and other apparatus, describe an experiment framework to investigate the hypothesis stated in 4(b)

*Dengan menggunakan radas seperti bikar, pin, kaki retort dan lain-lain radas, terangkan satu rangka kerja eksperimen untuk menyiasat hipotesis yang anda nyatakan dalam 4(b)*

In your description, state clearly the following :  
*Dalam penerangan anda jelaskan perkara berikut :*

- i) Aim of the experiment.  
*Tujuan eksperimen.*
- ii) Variables in the experiment.  
*Pembolehubah yang terlibat.*
- iii) List of apparatus and materials.  
*Senarai radas dan bahan*
- iv) Arrangement of the apparatus.  
*Susunan radas.*
- v) The procedure of the experiment which include the method of controlling the manipulated variable and the method of measuring the responding variable.  
*Prosedur eksperimen termasuk kaedah mengawal pembolehubah dimanipulasikan dan kaedah mengukur pembolehubah bergerak balas.*
- vi) The way you would tabulate the data.  
*Penjadualan data.*
- vii) The way you would analyse the data.  
*Cara menganalisis data.*

[10 marks]  
[10 markah]

- 4 Diagram 4.1 shows a model of a.c generator. When the wind blow, cause the blade rotate and the bulb light up.

Rajah 4.1 menunjukkan satu model penjana a.u. Apabila angin bertiup menyebabkan bilah berputar dan mentol menyala.

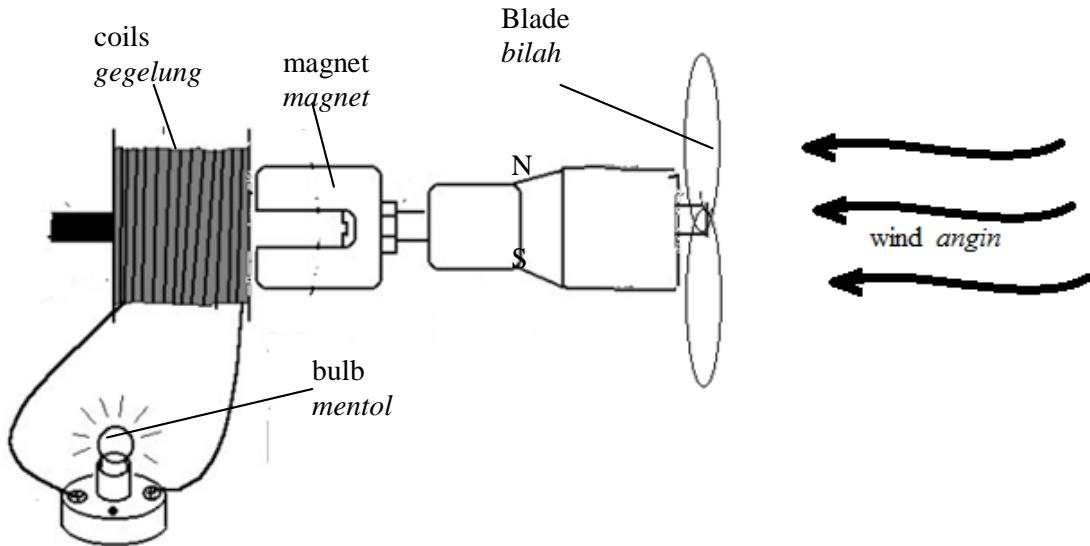


Diagram 4.1  
Rajah 4.1

The brightness of the bulb increase as the speed of blade rotation increase.  
Kecerahan mentol bertambah apabila kelajuan putaran bilah bertambah

Based on the information and observation above ;  
Berdasarkan maklumat dan perhatian di atas;

- (a) State one suitable inference.

*Nyatakan satu inferensi yang sesuai.*

[1 mark]

[1 markah]

- (b) State one suitable hypothesis.

*Nyatakan satu hipotesis yang sesuai.*

[1 mark]

[1 markah]

- (c) With the use of apparatus such as bar magnet, coils and others describe an experiment framework to investigate the hypothesis stated in 4(b)

*Dengan menggunakan radas seperti magnet bar, gelugur dan lain-lain, terangkan satu rangka kerja eksperimen untuk menyiasat hipotesis yang anda nyatakan dalam 4(b)*

In your description, state clearly the following

*Dalam penerangan anda jelaskan perkara berikut :*

- i) Aim of the experiment.

*Tujuan eksperimen.*

- ii) Variables in the experiment.

*Pembolehubah dalam eksperimen.*

- iii) List of apparatus and materials.  
*Senarai radas dan bahan*
- iv) Arrangement of the apparatus.  
*Susunan radas.*
- v) The procedure of the experiment which include one method of controlling the manipulated variable and one method of measuring the responding variable.  
*Prosedur eksperimen termasuk **satu** kaedah mengawal pembolehubah dimanipulasikan dan **satu** kaedah mengukur pembolehubah bergerak balas.*
- vi) The way you would tabulate the data.  
*Penjadualan data.*
- vii) The way you would analyse the data.  
*Cara menganalisis data.*

[10 marks]  
[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 question in Section A. Write your answers in the spaces provided in the question paper.  
*Jawab semua soalan dalam Bahagian A. Jawapan kepada Bahagian A hendaklah ditulis dalam ruang yang disediakan dalam kertas soalan.*
- 3 Answer one question from Section B and detail. Your answer must be clear and logical. You can use equations, diagrams, tables, graphs and other suitable methods to explain your answer.  
*Jawab satu soalan daripada Bahagian B dan terperinci. Jawapan mestilah jelas dan logik. Anda boleh menggunakan persamaan, gambar rajah, jadual graf dan cara lain yang sesuai untuk menjelaskan jawapan anda.*
- 4 If you wish to cancel any answer, neatly cross out the answer.  
*Sekiranya anda hendak membatalkan sesuatu jawapan, buatkan garisan di atas jawapan itu.*
- 5 The diagram in the question provided are not drawn to scale unless stated.  
*Rajah yang mengiringi soalan tidak dilukiskan 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. You may use a non-programmable scientific calculator.  
*Anda dibenarkan menggunakan kalkulator saintifik yang tidak diprogramkan. Walau bagaimanapun, langkah mengira perlu ditunjukkan.*
- 8 The time suggested to answer Section A is 60 minutes, Section B is 30 minutes.  
*Masa yang dicadangkan untuk menjawab Bahagian A ialah 60 minit, Bahagian B ialah 30 minit..*

**SKEMA FIZIK  
BAHAN KECEMERLANGAN 9  
(PERCUBAAN SPM 2014)**

**KERTAS 1, 2 DAN 3**

## SKEMA JAWAPAN PERCUBAAN 2014 BK9

## SKEMA KERTAS 1 FIZIK BK9 2014

1	C	26	C
2	B	27	C
3	B	28	A
4	C	29	D
5	B	30	B
6	D	31	A
7	C	32	D
8	C	33	D
9	B	34	C
10	B	35	C
11	B	36	D
12	D	37	D
13	C	38	B
14	C	39	A
15	A	40	A
16	D	41	D
17	A	42	D
18	C	43	B
19	B	44	D
20	C	45	B
21	B	46	D
22	B	47	D
23	D	48	C
24	C	49	C
25	B	50	A

**KERTAS 2****Question 1**

Section		Answer	Note
(a)	1	Current	
(b)	1	1 A // 1	
(c)	1	Series	
(d)	1	3 A	Reject : 2.5 A
Total	<b>4</b>		

**Question 2**

Section		Answer	Note
(a)	1	$1 \text{ kg ms}^{-2}$	
(b)	1	$F = 320 - 8 // 312$	
	1	$W = 312 \times 40$	e.c.f for F
	1	$= 12480 \text{ J}$	
(c)	1	The resultant downward force increase // the lawnmower not lift up // stable	
Total	<b>5</b>		

**Question 3**

Section		Answer	Note
(a)	1	Resistance is the opposition that a substance offers to the flow of electric <u>current</u> // $\frac{\text{voltage}}{\text{current}}$ // formula	
(b)(i)	1	P and Q	
(b)(ii)	1	Voltage across P and Q is high// Current flows through P and Q is high // Total resistance P and Q is low	
(b)(iii)	1	$R = \left( \frac{1}{2} + \frac{1}{2} \right)^{-1} + 2 + 2 // 5 \Omega$	ecf for R
	1	$I = \frac{3}{5}$	
	1	0.6 // 0.6 A	
<b>Total</b>	<b>6</b>		

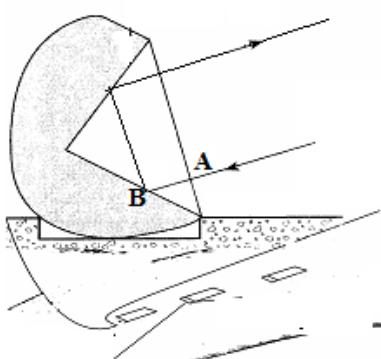
**Question 4**

Section		Answer	Note
(a)	1	Thermistor // resistor sensitive to temperature	
(b)(i)	1	$\left(\frac{1.2}{4.8}\right) \times 3500$	
	1	$875 \Omega$	
(b)(ii)	1	$\left(\frac{4.8}{1.2}\right) \times 1250 // 5000$	
	1	$70^\circ\text{C}$	
(c)	1	<p>Resistor R Perintang R</p>	<p>1<sup>st</sup> : The correct position between resistor R and microphone</p> <p>2<sup>nd</sup> : Capacitor and microphone in base circuit and loudspeaker in collector circuit</p>
<b>Total</b>	<b>7</b>		

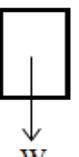
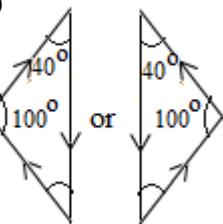
**Question 5**

Section		Answer	Note
(a)	1	Archimedes' principle	
(b)(i)	1	Sinking level Diagram 5.2 > Diagram 5.1	
(b)(ii)	1	Weight of the boat in Diagram 5.2 > Diagram 5.1	
(b)(iii)	1	Buoyant force in Diagram 5.2 > Diagram 5.1	
(b)(iv)	1	When the weight of the boat increases, the sinking level increases // directly proportional	
(b)(v)	1	When the weight increases, buoyant force increases	
(c)	1	Sinking level increased Density is lower	
<b>Total : 8</b>			

**Question 6**

<b>Section</b>	<b>Mark</b>	<b>Answer</b>	<b>Note</b>
(a)	<b>1</b>	The angle of incidence when the angle of refraction is $90^\circ$ .	
(b)	<b>1</b>	<i>Ray of light parallel to normal // angle of incidence =<math>0^\circ</math> // angle of refraction =<math>0^\circ</math></i>	
(c)(i)	<b>1</b>	Same // $45^\circ$	
(c)(ii)	<b>1</b>	$P > Q$ // $P > 45^\circ$ and $Q < 45^\circ$	
(d)(i)	<b>1</b>	Angle of incidence < critical angle – refraction away from normal	
(d)(ii)	<b>1</b>	Angle of incidence >critical angle – total internal reflection	
(e)(i)	<b>1</b>	By reflecting light from headlamp to the driver's eye	
(e)(ii)	<b>1</b>	 <p>A diagram illustrating the optical path of light from a headlight. A circular headlight housing is shown at the top left. A light ray originates from the headlight and passes through a lens, labeled 'A'. The ray then strikes a curved reflective surface, labeled 'B', which reflects the light downwards. The light then passes through another lens and is directed onto a road surface.</p>	Total internal reflection two times
<b>Total</b>	<b>8</b>		

**Question 7**

Section		Answer	Note
(a)	1	Gravitational force	
(b)	1	(i) 	Label mesti pada kain rentang
(c)(i)	1 1	(i) 	(i) bentuk dan arah betul 1 mrk Mana-mana sudut betul 1 mrk
(c)(ii)	1 1	$\frac{400}{\sin 50}$ or $\frac{400}{\cos 40}$ $= 522 // 522 \text{ N}$	
(d)	1 1 1 1	Increase angle Reduce tension on string Low density material Reduce mass / light	
<b>Total</b>	<b>10</b>		

**Question 8**

Part	Mrk	Answer	Note
(a)	1	Unstable isotope tend to decay.	
(b)(i)	1 2	Longer half-life. No need to change/replace frequently.	
(b)(ii)	1 2	Gamma radiation. High penetration power.	
(b)(iii)	1 2	Solid state. Easily to handle.	
(c)	1	Cobalt–60 // Co	
(d)(i) (d)(ii)	1 1	Decreases Adjust the roller until the reading of counter increase and uniform.	
(d)	1 2	$T_{\frac{1}{2}} \quad T_{\frac{1}{2}} \quad T_{\frac{1}{2}} \quad T_{\frac{1}{2}}$ $100\% \rightarrow 50\% \rightarrow 25\% \rightarrow 12.5\% \rightarrow 6.25\%$ Time taken, $t = 4T_{\frac{1}{2}} // 4(5.27 \text{ years}) // 21.08 \text{ years.}$	
<b>Tot/Jum : 12</b>			

**Question 9**

Q 9 / S 9		Answer	Note												
(a)	1	Force per area													
(b)	1	Surface area of piston R < piston S													
	2	Pushing force < weight of load													
	3	Pressure is equal													
	4	Surface area decreased, force decreased // directly proportional													
	5	Pascal													
(c)	1	The force applied to the small piston produce pressure													
	2	Pressure transmitted equally throughout the liquid / $P_1 = P_2$													
	3	Force is produced when pressure acts on piston S / $F = PA$													
	4	Force is higher // Surface area of piston S > R / Ratio S : R is greater than 1													
(c)	1, 2	<table border="1"> <thead> <tr> <th>Suggestion /Design/Way</th> <th>Explanation / Reason</th> </tr> </thead> <tbody> <tr> <td>Oil</td> <td>Incompressible</td> </tr> <tr> <td>High melting point</td> <td>Difficult to evaporate</td> </tr> <tr> <td>Small size of master piston</td> <td>High pressure</td> </tr> <tr> <td>High melting point of brake shoe</td> <td>Difficult to melt</td> </tr> <tr> <td>High spring constant</td> <td>Withstand force / return quickly</td> </tr> </tbody> </table>	Suggestion /Design/Way	Explanation / Reason	Oil	Incompressible	High melting point	Difficult to evaporate	Small size of master piston	High pressure	High melting point of brake shoe	Difficult to melt	High spring constant	Withstand force / return quickly	
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High spring constant	Withstand force / return quickly														
	3, 4														
	5, 6														
	7, 8														
	9, 10														
<b>Total : 20</b>															

**Question 10**

<b>Q 10 / S 10</b>			<b>Note</b>												
(a)(i)	1	Distance between two consecutive points inphase / crests / troughs // Diagram.													
(a)(ii)	1 2 3 4 5	The wavelength of red is longer / vice versa The distance is equally spaced / uniform The distance between the two consecutive fringes of red is longer than green. The fringes separation increases with the wavelength. Interference													
(b)	1 2 3 4	At night ground cools quickly / ground has low specific heat capacity / air layer near the ground colder / low temperature. Cold air denser than warm air // Diagram. Sound faster in warm air // sound slower in cold air Sound bends towards observer / ground // Refraction occurs.													
(c)	1, 2 3, 4 5, 6 7, 8 9, 10	<table border="1"> <thead> <tr> <th><b>Modification/ Suggestion /Design/Way</b></th> <th><b>Explanation / Reason</b></th> </tr> </thead> <tbody> <tr> <td>Parabolic / concave</td><td>Heat converged // Heat collected at focus</td></tr> <tr> <td>Shining // Smooth</td><td>Reflection effective // Reflect more // Good reflector</td></tr> <tr> <td>Larger diameter</td><td>More heat collected // More heat trap</td></tr> <tr> <td>At focal point</td><td>Heat converge to kettle // Heat reflect to kettle // More light converged to kettle</td></tr> <tr> <td>Facing the sun</td><td>Collect more energy // Reflect more energy //</td></tr> </tbody> </table>	<b>Modification/ Suggestion /Design/Way</b>	<b>Explanation / Reason</b>	Parabolic / concave	Heat converged // Heat collected at focus	Shining // Smooth	Reflection effective // Reflect more // Good reflector	Larger diameter	More heat collected // More heat trap	At focal point	Heat converge to kettle // Heat reflect to kettle // More light converged to kettle	Facing the sun	Collect more energy // Reflect more energy //	
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Facing the sun	Collect more energy // Reflect more energy //														
<b>Tot/Jum : 20</b>															

**Question 11**

Q 11		Answer	Note														
(a)	1	Degree of hotness															
(b)	1 1 1 1	Thermometer is place under the tongue // inside the mouth Heat from body flows to the thermometer // net heat flow is to the thermometer. Thermal equilibrium achieved Temperature of the body = temperature of the thermometer															
(c)	1 1	$\frac{12 - 5}{25 - 5} \times 100$ $= 35 // 35^\circ\text{C}$	- substitution - answer														
(d)	1	273 + 35 // 308 // 308 K	ecf from (c)														
(e)	1 1	$30 = \frac{X - 5}{25 - 5} \times 100$ $X = 11 // 11 \text{ cm}$	- substitution - answer														
(c)	1, 2 3, 4 5, 6 7, 8 9, 10	<table border="1"> <thead> <tr> <th>Characteristics</th> <th>Explanation / Reason</th> </tr> </thead> <tbody> <tr> <td>High melting point</td> <td>Can withstand high temperature</td> </tr> <tr> <td>High specific heat capacity</td> <td>Temperature does not change easily // hot longer</td> </tr> <tr> <td>Polystyrene foil in between wall</td> <td>Good heat insulator</td> </tr> <tr> <td>Low density</td> <td>Low mass / light</td> </tr> <tr> <td>L because (state all four characteristics)</td> <td>L because (state all four reasons)</td> </tr> <tr> <td>L because (combination of characteristics and reasons)</td> <td></td> </tr> </tbody> </table>	Characteristics	Explanation / Reason	High melting point	Can withstand high temperature	High specific heat capacity	Temperature does not change easily // hot longer	Polystyrene foil in between wall	Good heat insulator	Low density	Low mass / light	L because (state all four characteristics)	L because (state all four reasons)	L because (combination of characteristics and reasons)		
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<b>Total : 20</b>																	

**Question 12**

<b>Section</b>	<b>Mark</b>	<b>Answer</b>	<b>Note</b>
(a)(i)	1	$\frac{\text{Energy}}{\text{time}} // \frac{\text{Work}}{\text{time}} // \text{rate of energy} // \text{rate of work}$	
(a)(ii)	1	When water fall flow gravitational energy convert to kinetic energy	
	1	The kinetic energy converted to mechanical energy when fall to turbine // dynamo	
	1	Electromagnetic induction produce current	
	1	Mechanical energy convert to electrical energy	
(b)(i)	1	Transformer P: $\frac{N_P}{N_Q} = \frac{12}{24}$ , $N_P = 500, N_S = 1000$	
	1	Transformer Q: $\frac{N_P}{N_Q} = \frac{24}{8}$ , $N_P = 1200, N_S = 400$	
	1	Transformer R: $\frac{N_P}{N_Q} = \frac{8}{6}$ , $N_P = 160, N_S = 120$	
(b)(ii)	1	Laminated soft iron core	
	1	Easily magnetised / demagnetised // Reduced hysteresis loss	
(b)(iii)	1	Copper // aluminium	
	1	Small resistance // less loss of power in cable	
(c)(i)	1	Current = $\frac{30}{24}$	
	1	= 0.8 A	
(c)(ii)	1	$P = I^2 R$	First mark : correct formula
	1	= $(0.8)^2(30)$	
	1	= 19.2 W	
<b>Total</b>	<b>20</b>		

## SKEMA JAWAPAN BK9 2014 KERTAS 3

## Question 1

NO	mark	MARKING CRITERIA	MARK																			
				TOTAL																		
1(a) (i)		Able to state the manipulated variable																				
	1	temperature//T		1																		
(ii)		Able to state the responding variable																				
	1	volume //V// length//l		1																		
(iii)		Able to state a constant variable																				
	1	mass of air trapped /pressure		1																		
(b) (i)		Able to read the value of <i>l</i>																				
	2	All 5 readings of <i>l</i> correct: 27mm(2.7cm), 30(3.0), 35(3.5), 40(4.0), 45(4.5)																				
	1	3 or 4 correct																				
	1	Consistency to 1 decimal places for cm unit and no decimal place for mm unit		3																		
(ii)		Able to calculate the value of <i>T</i>																				
	1	all 5 reading correct: 273, 300, 350, 400, 450																				
	1	3 or 4 correct		2																		
(c)	2	Able to tabulate $\theta$ , <i>T</i> and <i>l</i> Tick ( $\checkmark$ ) based on the following aspects: A      •      Quantities $\theta$ , <i>T</i> and <i>l</i> shown in heading B      •      Units $^{\circ}\text{C}$ , K and mm//cm shown in heading		2																		
		<table border="1"> <thead> <tr> <th><math>\theta/ ^{\circ}\text{C}</math></th> <th><i>T</i> / K</th> <th><i>l</i> / mm//cm</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>273</td> <td>27//2.7</td> </tr> <tr> <td>27</td> <td>300</td> <td>30//3.0</td> </tr> <tr> <td>77</td> <td>350</td> <td>35//3.5</td> </tr> <tr> <td>127</td> <td>400</td> <td>40//4.0</td> </tr> <tr> <td>177</td> <td>450</td> <td>45//4.5</td> </tr> </tbody> </table>	$\theta/ ^{\circ}\text{C}$	<i>T</i> / K	<i>l</i> / mm//cm	0	273	27//2.7	27	300	30//3.0	77	350	35//3.5	127	400	40//4.0	177	450	45//4.5		
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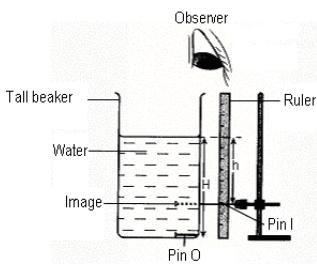
(d)	5	<p>Able to draw a complete graph of <math>l</math> against T.</p> <p>Tick ✓ based on the following aspects:</p> <ul style="list-style-type: none"> <li>A     •     Show <math>l</math> on Y-axis and <math>T</math> on the X-axis</li> <li>B     •     State the units (<math>l/\text{mm}/\text{cm}</math>) and (<math>T/\text{K}</math>) of the variables correctly</li> <li>C     •     Both axes are marked with uniform scale</li> <li>D     •     All five points are plotted correctly</li> </ul> <p>[Note : 3 to 4 points plotted correctly : ✓]</p> <ul style="list-style-type: none"> <li>E     •     Best straight line is drawn</li> <li>F     •     Show the minimum size of graph at least <math>5 \times 4</math> ( <math>2 \text{ cm} \times 2 \text{ cm}</math> ) square (counted from the origin until furthest point)</li> </ul> <p><u>Score :</u></p> <table border="0"> <thead> <tr> <th>Number of ✓</th> <th>Score</th> </tr> </thead> <tbody> <tr> <td>7 ✓</td> <td>5</td> </tr> <tr> <td>5-6 ✓</td> <td>4</td> </tr> <tr> <td>3-4 ✓</td> <td>3</td> </tr> <tr> <td>2 ✓</td> <td>2</td> </tr> <tr> <td>1 ✓</td> <td>1</td> </tr> </tbody> </table>	Number of ✓	Score	7 ✓	5	5-6 ✓	4	3-4 ✓	3	2 ✓	2	1 ✓	1	5
Number of ✓	Score														
7 ✓	5														
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3-4 ✓	3														
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1 ✓	1														
(e)		Able to state the correct relationship between $l$ against T.													
	1	$l$ is directly proportional to $T$	1												
			16												

**Question 2**

No. 2	Mark	Marking scheme
2(a) (i) (ii)	1 1 1	V increase <i>Draw a straight line from I = 0.6 A</i> $V = 0.78$
(b)	1 1 1	Draw a sufficient large triangle (7 cm vertical) * Correct substitution(follow candidate's triangle) <u>- 0.33</u> 1.44  * State the value /answer -0.2292 V/A(with unit)

(c)	1 1	Correct substitution $r = -(-0.2292)$ coreccct answer (with unit) $0.2292 \Omega$
(d)	1 1	Extrapolated the line Answer with unit $1.3 \text{ V}$
(e)	1 1	- eye position must be perpendicular to scale/repeat the experiment and find the average . The all connection of the circuit must be tied
total	12	

## Question 3

No.	Mark	Answer
3 (a)	1	Inference The density of liquid affects the apparent depth // The apparent depth depends on density of liquid
(b)	1	Hypothesis The apparent depth increases as the density real depth decreases.
(c)(i)	1	Aim: To investigate the relationship density of liquid and apparent depth
(ii)	1	Variables : Manipulated : density Responding : apparent depth
	1	Constant Variable : real depth
(iii)	1	List of apparatus : Pin,ruler,water,retort stand ,tall beaker
(iv)	1	Arrangement of apparatus: 

(v)	1	Control of manipulated variable: The beaker is filled with different liquid / density										
	1	Measurement of responding variable: By using a ruler ,the real depth of the pin is measured = H The pin O is seen vertically above the surface of the water. The position of pin I is adjusted until parallax error between the pin O and the pin I is non- existent. By using the ruler again ,the position of pin I is measured as the apparent depth = h										
	1	Repeat the experiment 4 times with the different density of liquid .										
(vi)	1	Tabulation of data <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th><math>\rho / \text{kgm}^{-3}</math></th> <th><math>h/\text{mm}/\text//\text{cm}</math></th> </tr> </thead> <tbody> <tr> <td>1.0</td> <td></td> </tr> <tr> <td>1.5</td> <td></td> </tr> <tr> <td>2.0</td> <td></td> </tr> <tr> <td>2.5</td> <td></td> </tr> </tbody> </table>	$\rho / \text{kgm}^{-3}$	$h/\text{mm}/\text//\text{cm}$	1.0		1.5		2.0		2.5	
$\rho / \text{kgm}^{-3}$	$h/\text{mm}/\text//\text{cm}$											
1.0												
1.5												
2.0												
2.5												
(vii)	1	Analysis of data. Plot the graph of apparent depth, h against density, $\rho$										
	12											

**Question 4**

No.	Mark	Answer
4 (a)	1	Inference : The brightness of the bulb depend on the speed of blade rotation// The brightness of the bulb depend on the speed of magnet
(b)	1	Hypothesis : If the speed increases ( magnet) , the current increase//if the height of magnet increase, the current increase.
(c)(i)		Aim: To investigate the relationship between height and current
(ii)	1 <i>(kedua-dua betul)</i>	Variables: Manipulated : height Responding : current
	1	Constant Variable : number of turn/strength of magnet/
(iii)	1	List of apparatus : ammeter, , meter ruler, connection wire ( bar maget), and (coils/solenoid)

(iv)	1	<p>Arrangement of apparatus:</p>												
(v)	1	<p>Control of manipulated variable: Set up the apparatus as shown in the diagram Measure the height of magnet, example <math>x_1</math> cm</p>												
	1	<p>Measurement of responding variable: Released the bar magnet into solenoid . Record the reading of galvanometer</p>												
	1	Repeat the experiment 4 times with the difference height of magnet.												
(vi)		<p>Tabulation of data <i>(Terima jika tak tulis unit)</i></p> <table border="1"> <thead> <tr> <th>Height (of magnet) /cm</th> <th>Current / mA</th> </tr> </thead> <tbody> <tr> <td><math>x_1</math></td> <td></td> </tr> <tr> <td><math>x_2</math></td> <td></td> </tr> <tr> <td><math>x_3</math></td> <td></td> </tr> <tr> <td><math>x_4</math></td> <td></td> </tr> <tr> <td><math>x_5</math></td> <td></td> </tr> </tbody> </table>	Height (of magnet) /cm	Current / mA	$x_1$		$x_2$		$x_3$		$x_4$		$x_5$	
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$x_3$														
$x_4$														
$x_5$														
(vii)	1	<p>Analysis of data. Plot the graph of current against height</p>												
	12													

