

4531/1  
Physics  
Paper 1  
August  
 $1\frac{1}{4}$  hours



PANITIA FIZIK DAERAH  
PEPERIKSAAN PERCUBAAN SPM 2010  
DAERAH MANJUNG

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PHYSICS

Paper 1

One hour and fifteen minutes

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DO NOT OPEN THE QUESTION PAPER  
UNTIL YOU ARE TOLD TO DO SO

INFORMATION FOR CANDIDATES

1. *This question paper consists of 50 questions.*
2. *Answer **all** questions.*
3. *Blacken only one space for each question.*
4. *If you wish to change your answer, erase the blackened mark that you have made. Then blacken the space for the new answer.*
5. *The diagrams in the questions provided are not drawn to scale unless stated*
6. *You may use a non-programmable scientific calculator.*

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This question paper contains 21 printed pages

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

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

2.  $v^2 = u^2 + 2as$

3.  $s = ut + \frac{1}{2}at^2$

4. Momentum =  $mv$

5.  $F = ma$

6. Kinetic energy =  $\frac{1}{2}mv^2$

7. Potential energy =  $mgh$

8. Elastic potential energy =  $\frac{1}{2}Fx$

9.  $\rho = \frac{m}{V}$

10. Pressure,  $p = h\rho g$

11. Pressure,  $p = \frac{F}{A}$

12. Heat,  $Q = mc\theta$

13. Heat,  $Q = ml$

14.  $\frac{pV}{T} = \text{constant}$

15.  $E = mc^2$

16.  $v = f\lambda$

17. Power,  $P = \frac{\text{energy}}{\text{time}}$

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

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

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

21.  $n = \frac{\text{real depth}}{\text{apparent depth}}$

22.  $Q = It$

23.  $V = IR$

24. Power,  $P = IV$

25.  $\frac{N_s}{N_p} = \frac{V_s}{V_p}$

26. Efficiency =  $\frac{I_s V_s}{I_p V_p} \times 100\%$

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

Each question is followed by either **three or four** options. Choose the best option for each question then blacken the correct space on the answer sheet.

Setiap soalan diikuti oleh salah satu **tiga atau empat** pilihan. Pilih jawapan yang terbaik untuk setiap soalan kemudian hitamkan ruangan yang betul pada lembaran jawapan

1. Which of the derived quantities below is a combination of three base quantities?

Di antara kuantiti terbitan berikut yang manakah adalah gabungan daripada tiga kuantiti asas?

- A. Power / kuasa  
B. Speed / laju  
C. Density / ketumpatan  
D. Volume / isipadu

2. Which of the following shows a group of vector quantities?

Manakah diantara berikut menunjukkan kumpulan kuantiti vektor?

- A. Acceleration, speed, length  
Pecutan, laju, panjang  
B. Acceleration, area, volume  
Pecutan, sesaran, halaju  
C. Acceleration, temperature, momentum  
Pecutan, suhu, momentum  
D. Acceleration, displacement, velocity  
Pecutan, sesaran, halaju

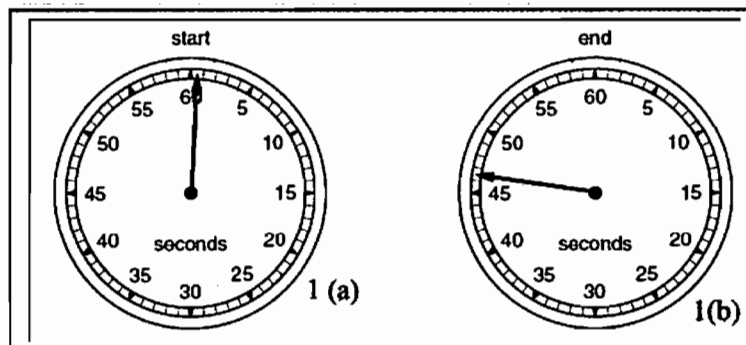
3. 50 millimetres is equivalent to

50 milimeter bersamaan dengan

- A  $5.0 \times 10^{-3}$  m  
B  $5.0 \times 10^{-5}$  m  
C  $5.0 \times 10^{-2}$  m  
D  $5.0 \times 10^{-4}$  m

4. Ali competed in a 400 m race. The diagram 1(a) below shows the reading at the start of the race. Diagram 1(b) shows the result at the end of the race.

Ali bertanding dalam acara lari 400 m. Gambarajah 1(a) di bawah menunjukkan bacaan pada permulaan pertandingan. Gambarajah 1(b) menunjukkan bacaan apabila acara tamat.



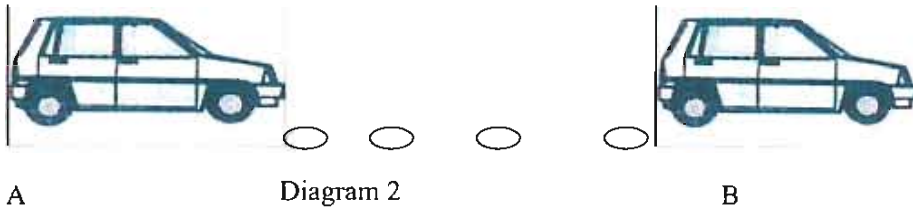
How long did he take to complete the race?

Berapakah lama masa yang diambilnya untuk acara tersebut?

- A 45.7 s  
B 46.0 s  
C 46.5 s  
D 47.0 s

5. The cylinder oil tank of En. Ali's car is leaking. Lubricant spots are seen along the road from A to B as shown in Diagram 2.

*Tangki silinder minyak kereta En Ali telah bocor. Kesan tompokan kelihatan disepanjang jalan dari A ke B seperti yang ditunjukkan dalam rajah 2.*



It can be concluded that En Ali's car is moving with ...  
*It boleh disimpulkan sebagai kereta En Ali bergerak dengan...*

- |                                      |   |
|--------------------------------------|---|
| A acceleration<br><i>Pecutan</i>     | C zero acceleration<br><i>Pecutan sifar</i>   |
| B deceleration<br><i>Nyahpecutan</i> | D acceleration that is decreasing constantly<br><i>Pengurangan pecutan secara seragam</i> |

6. Diagram 3 shows the velocity- time graph of a moving object .  
*Rajah 3 menunjukkan graf halaju-masa bagi objek yang sedang bergerak.*

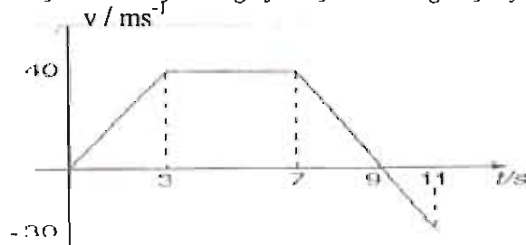


Diagram 3

Calculate the average velocity of its motion.  
*Kirakan halaju purata bagi gerakan tersebut.*

- |                         |                         |
|-------------------------|-------------------------|
| A 20.0 ms <sup>-1</sup> | C 23.6 ms <sup>-1</sup> |
| B 20.9 ms <sup>-1</sup> | D 26.4 ms <sup>-1</sup> |

7. A man of mass 50 kg stands on a stationary boat of mass 25 kg. Diagram 4 shows him jumping out of the boat on to a jetty at a velocity 4 ms<sup>-1</sup>. Calculate the velocity of the boat as the man jumps.

*Seorang lelaki berjisim 50kg berdiri diatas sebuah bot pegun berjisim 25 kg. Rajah 4 menunjukkan dia melompat dari bot ke jeti pada halaju 4ms<sup>-1</sup>. Kirakan halaju bot bila lelaki itu melompat.*

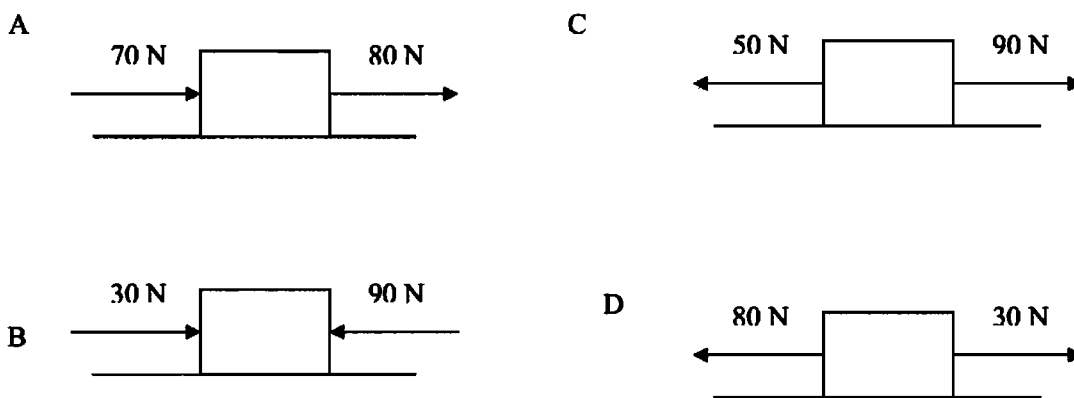


Diagram 4

- |                      |                      |
|----------------------|----------------------|
| A 2 ms <sup>-1</sup> | C 6 ms <sup>-1</sup> |
| B 4 ms <sup>-1</sup> | D 8 ms <sup>-1</sup> |

8. Diagrams below show the same blocks of wood on a smooth table. Four different pairs of forces are acting on the block. Which pair of the forces will give the greatest acceleration towards the block ?

*Rajah di bawah menunjukkan blok kayu yang sama berada di atas permukaan meja yang licin. Berikut adalah empat pasangan daya masing-masing yang bertindak ke atas blok kayu. Manakah di antara pasangan daya tersebut memberi pecutan paling besar bagi blok kayu tersebut*



9. Diagram 5 shows a wooden block of 2.0 kg mass being pulled up a frictionless inclined plane at an angle of  $30^\circ$  by the application of a constant force,  $F$ .

*Rajah 5 menunjukkan blok kayu yang berjisim 2.0 kg sedang ditarik ke atas pada satah condong yang licin pada sudut  $30^\circ$  dengan daya yang tetap,  $F$ .*

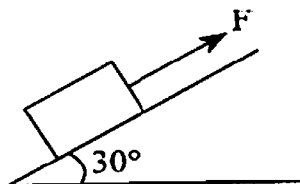


Diagram 5

If the block moves up with a constant speed, what is the value of  $F$ ?

*Jika blok kayu itu bergerak keatas dengan kelajuan tetap, apakah nilai bagi  $F$ ?*

- A 19 N                      C 12 N
- B 17 N                      D 10 N

10.



The front and back parts of a car are designed to crumple easily during a crash so that

*Bahagian hadapan dan belakang kereta di reka agar mudah kemek semasa perlanggaran supaya*

- A the collision time will be longer  
*Masa perlanggaran menjadi panjang*
- B the impulsive force will increase  
*Daya impuls bertambah*
- C prevent the passengers from being thrown forwards  
*Mencegah penumpang dari terhumban kehadapan.*

11. A durian falls from a tree and hits the ground in 1.0 s. What is the speed of the durian when it hits the ground? [ take  $g = 10\text{ms}^{-2}$  ]

*Sebiji durian gugur dari pokok dan menghentam tanah dalam masa 1.0 s . Apakah laju buah durian itu bila ia menghentam tanah? [ ambil  $g = 10\text{ms}^{-2}$  ]*

- A  $4\text{ms}^{-1}$                       C  $8\text{ms}^{-1}$   
 B  $6\text{ms}^{-1}$                       D  $10\text{ms}^{-1}$

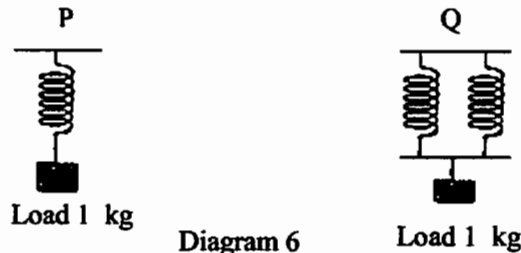
12. A boy of mass 50 kg stands in a lift. His weight reaches 500 N when .....  
 (given  $g = 10\text{N kg}^{-1}$ )

*Seorang budak lelaki berjisim 50 kg berdiri didalam sebuah lif. Beratnya akan mencecah 500N bila..... (diberi  $g = 10\text{N kg}^{-1}$ )*

- A the lift moves upwards with a constant velocity.  
*Lif bergerak keatas dengan halaju tetap.*
- B the lift moves downwards with a constant acceleration.  
*Lif bergerak kebawah dengan pecutan tetap.*
- C the lift fall freely.  
*Lif jatuh bebas*

13. Diagram 6 shows the relationship between the force applied and the corresponding extensions of spring P and spring Q. Which of the following statements about spring P and Q is true?

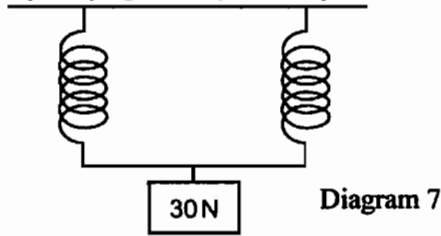
*Rajah 6 menunjukkan hubungan antara daya dan pemanjangan spring P dan spring Q. Manakah kenyataan berikut tentang P dan Q adalah benar*



- A Spring P is more difficult to extend  
*Spring P lebih sukar untuk memanjang/menokok*
- B For the same extension, spring P needs a lower force  
*Untuk pemanjangan yang sama, spring P memerlukan daya yang lebih rendah*
- C More energy has to be used for spring Q in order to produce the same amount of force  
*Lebih tenaga diperlukan untuk spring Q bagi menghasilkan jumlah daya yang sama*

14. A spring extends by 6 cm when a load of 30 N is suspended from it.

*Satu spring mengalami pemanjangan sebanyak 6 cm apabila beban 30 N digantungkan padanya.*



Two identical springs are connected as shown in Diagram 7 to carry a 30 N load. What is the extension of the spring system?

*Dua spring yang serupa dihubungkan seperti dalam rajah 7 untuk menanggung beban 30N. Apakah pemanjangan sistem spring itu?*

- A 3 cm                      C 6 cm  
B 5 cm                      D 12 cm
15. Which situation shows that no work is being done?

*Yang manakah keadaan berikut menunjukkan kerja tidak dilakukan.*

- A. A worker pulling a wooden block horizontally on a rough floor.  
*Seorang pekerja menarik bongkah kayu secara mengufuk diatas lantai yang kasar.*
- B. A student running up a staircase.  
*Seorang pelajar berlari menaiki tangga*
- C. A worker unloading goods from a lorry  
*Seorang pekerja memunggah muatan dari lori*
- D. A teacher pushing a wall to explain about Newton's Third Law of Motion.  
*Seorang guru menolak dinding untuk menerangkan tentang Hukum Gerakan Newton Ketiga.*

16.

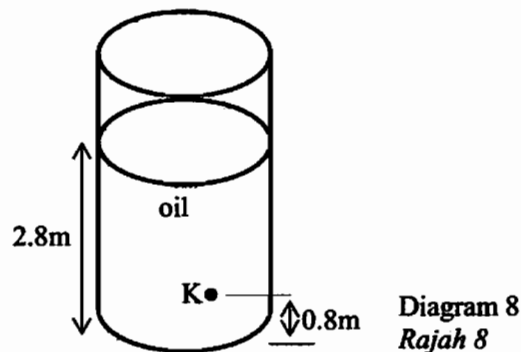


Diagram 8 above shows a drum containing oil. Density of oil is  $800 \text{ kg m}^{-3}$ . The pressure exerted by the oil at K is

*Rajah 8 di atas menunjukkan satu dram yang mengandungi minyak. Ketumpatan minyak ialah  $800 \text{ kg m}^{-3}$ . Tekanan yang dikenakan oleh minyak pada K ialah*

- A. 640 Pa                      C 6 400 Pa  
B. 800 Pa                      D 28 800 Pa

17.

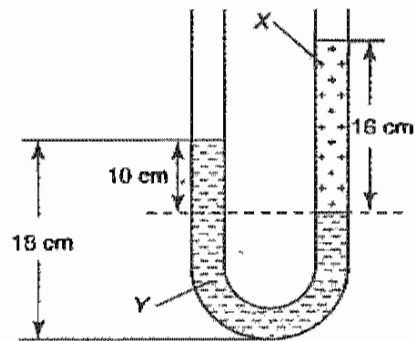


Diagram 9  
Rajah 9

Diagram 9 above shows a U-tube filled with two immiscible types of liquids,  $X$  and  $Y$ . The height of liquid  $Y$  above the table surface is 18 cm. If the density of liquid  $Y$  is  $1\,200\text{ kg m}^{-3}$ , the density of liquid  $X$  in  $\text{kg m}^{-3}$  is

Rajah 9 di atas menunjukkan suatu tiub berbentuk-U diisikan dengan dua jenis cecair yang tidak boleh bercampur,  $X$  dan  $Y$ . Tinggi cecair  $Y$  dari permukaan meja ialah 18 cm. Jika ketumpatan cecair  $Y$  ialah  $1\,200\text{ kg m}^{-3}$ , ketumpatan cecair  $X$  dalam  $\text{kg m}^{-3}$  ialah

- A. 500                      C 1 070  
B. 750                      D 1 920

18.

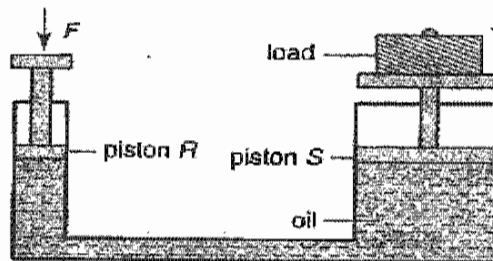


Diagram 10  
Rajah 10

Diagram 10 above shows a hydraulic jack. Which comparison is true about the pressure and the force?

Rajah 10 di atas menunjukkan sebuah jek hidraulik. Manakah perbandingan yang betul tentang tekanan dan daya?

- A. The pressure on piston  $R$  is smaller than the pressure on  $S$   
*Tekanan pada omboh  $R$  adalah lebih kecil daripada tekanan pada  $S$*
- B. The pressure on piston  $R$  is greater than the pressure on piston  $S$   
*Tekanan omboh  $R$  lebih besar daripada tekanan pada  $S$*
- C. The force on piston  $R$  is smaller than the weight of the load  
*Daya omboh  $R$  lebih kecil daripada berat beban*
- D. The force on piston  $R$  is greater than the weight of the load  
*Daya omboh  $R$  lebih besar daripada berat beban*



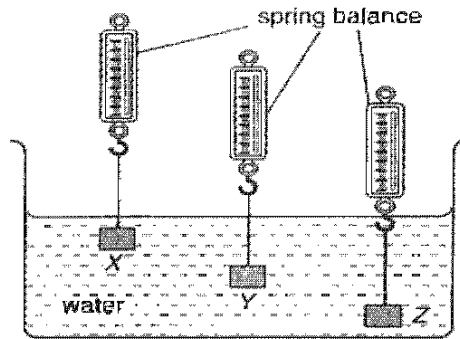


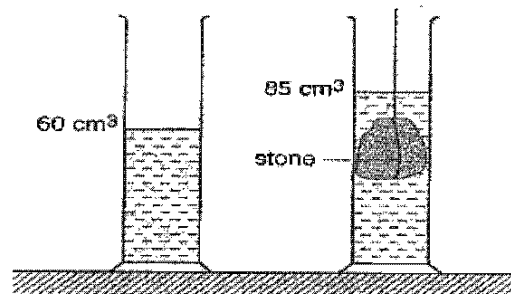
Diagram 11

Rajah 11

19. An object suspended from a spring balance is immersed in water as shown in the diagram 11 above. As the object changes position from X to Y and then to Z, the reading on the spring balance

*Satu objek yang digantung dari satu neraca spring direndam dalam air seperti yang ditunjukkan pada rajah 11 di atas. Apabila objek itu berubah kedudukan dari X ke Y dan seterusnya ke Z, bacaan neraca spring*

- A. remains constant  
*tidak berubah*
- B. increases  
*bertambah*
- C. decreases  
*berkurang*



20. A measuring cylinder contains  $60 \text{ cm}^3$  of water. When a stone suspended from a string is lowered into the water until it is completely below the surface, the reading goes up to  $85 \text{ cm}^3$ . The mass of the object is  $90 \text{ g}$ . What is the density of the stone in  $\text{g cm}^{-3}$ ?

*Satu silinder penyukat mengandungi  $60 \text{ cm}^3$  air. Apabila seketul batu yang digantung dengan seutas tali direndahkan ke dalam air sehingga keseluruhannya di bawah permukaan air, bacaan meningkat ke  $85 \text{ cm}^3$ . Jisim batu ialah  $90 \text{ g}$ . Apakah ketumpatan batu, dalam  $\text{g cm}^{-3}$ ?*

- A 0.62                      C 1.50
- B 1.06                      D 3.60

21.

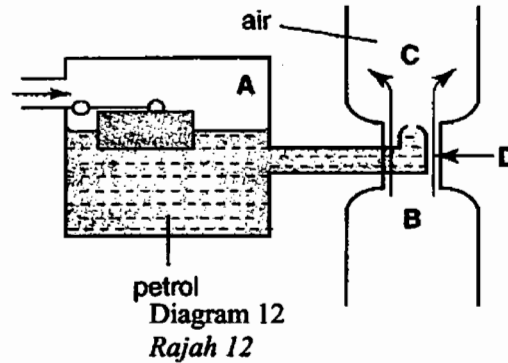
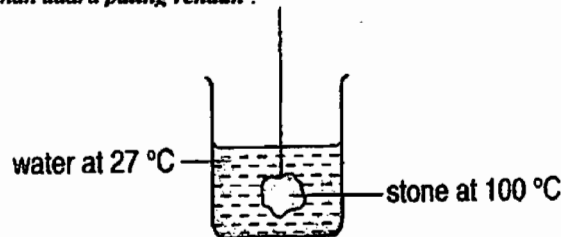


Diagram 12 shows a carburetor used for producing petrol vapour in a car engine. At which point is the air pressure the lowest ?

Rajah 12 menunjukkan sebuah karburetor yang menghasilkan wap petrol dalam enjin kereta. Kawasan manakah tekanan udara paling rendah ?



22. A piece of stone is heated to 100°C in boiling water. The hot stone is then transferred to a beaker containing water at 27°C as shown in Diagram 13 above. Thermal equilibrium is achieved when

Sebiji batu dipanaskan pada suhu 100°C di dalam air yang mendidih. Batu yang panas itu dialihkan ke dalam bikar yang mengandungi air pada suhu 27°C seperti dalam rajah 13 di atas. Keseimbangan terma dicapai apabila

- A. the stone is totally immersed in the water  
*Keseluruhan batu direndam di dalam air*
- B. the temperature of the water begins to rise  
*Suhu air mula meningkat*
- C. the temperature of the stone begins to drop  
*Suhu batu mula menurun*
- D. the temperature of the stone is equal to that of the water  
*Suhu batu sama dengan suhu air*

23.

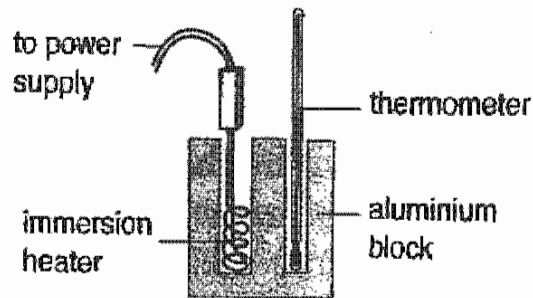


Diagram 14 / Rajah 14

The apparatus set up to determine the specific heat capacity of aluminium is shown in Diagram 14 above. Which of the following will enable a more accurate value of the specific heat capacity of aluminium to be obtained?

Susunan radas untuk mendapatkan muatan haba tentu aluminium ditunjukkan dalam rajah 14 di atas. Manakah antara berikut yang akan membolehkan nilai muatan haba tentu aluminium diperolehi dengan lebih jitu?

- A. Wrapping the aluminium block with some cotton wool  
*Membalut bongkah aluminium dengan kapas*
- B. Connecting the immersion heater to a 12 V supply  
*Menyambungkan pemanas rendam pada bekalan kuasa 12V*
- C. Placing the thermometer in the side hole of the aluminium block  
*Meletakkan termometer dalam lubang yang bersebelahan pada bongkah aluminium*
- D. Placing the aluminium block on a copper plate  
*Meletakkan bongkah aluminium di atas kepingan kuprum*
24. Table 1 below shows the specific heat capacity of aluminium, iron, copper and lead. Equal amount of heat energy are given off by 1.0 kg samples of aluminium, iron, copper and lead, all initially at 100°C. Which sample has the greatest decrease in temperature? *Jadual 1 di bawah menunjukkan muatan haba tentu aluminium, besi, kuprum dan plumbum. Jumlah tenaga haba yang sama dibebaskan oleh 1.0 kg sampel bagi aluminium, besi, kuprum dan plumbum pada suhu awal 100°C. Sampel manakah akan mengalami penurunan suhu yang paling tinggi?*

Metal / Logam	Specific heat capacity / muatan haba tentu ( $\text{Jkg}^{-1} \text{ } ^\circ\text{C}^{-1}$ )
Aluminium / aluminium	900
Iron / besi	480
Copper / kuprum	380
Lead / plumbum	130

Table 1  
Jadual 1

- A. Aluminium / aluminium
- B. Iron / besi
- C. Copper / kuprum
- D. Lead / plumbum

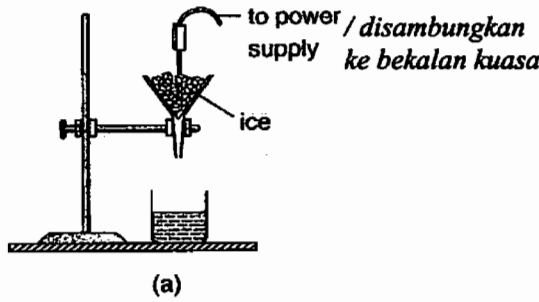


Diagram 15(a)  
Rajah 15(a)

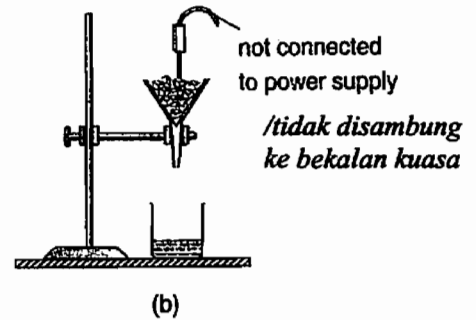


Diagram 15(b)  
Rajah 15(b)

25. The specific latent heat of fusion of ice can be determined by using the apparatus set-up as shown in Diagram 15 (a). The set-up for the control experiment is shown in Diagram 15 (b). What is the function of setting up a control experiment ?

*Haba pendam tentu pelakuran ais dapat ditentukan dengan menggunakan susunan radas yang ditunjukkan pada rajah 15(a). Susunan radas untuk set kawalan ditunjukkan pada rajah 15(b). Apakah tujuan menyediakan set kawalan dalam eksperimen ini ?*

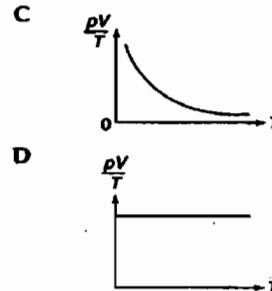
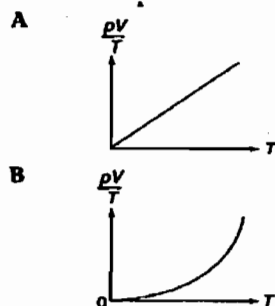
- A. To show that ice melts at room temperature  
*Untuk menunjukkan bahawa ais melebur pada suhu bilik*
- B. To control the rate at which ice melts  
*Untuk mengawal kadar peleburan ais*
- C. To determine the amount of ice melted at room temperature  
*Untuk menentukan jumlah ais yang melebur pada suhu bilik*
- D. To determine the amount of ice melted by the heater  
*Untuk menentukan jumlah ais yang dilebur oleh pemanas*

26. A fixed mass of gas occupies a volume of 2 000 cm<sup>3</sup> at pressure, p and absolute temperature, T. What will its volume be when the pressure is 2p and the absolute temperature is 2T ?  
*Suatu gas yang berjisim tetap memenuhi suatu isipadu sebanyak 2 000 cm<sup>3</sup> pada tekanan, p dan suhu mutlak, T. Apakah yang akan terjadi pada isipadu itu jika tekanannya adalah 2p dan suhu mutlak adalah 2T ?*

- A. 1 500 cm<sup>3</sup>      C 1 500 cm<sup>3</sup>
- B. 1 000 cm<sup>3</sup>      D 2 000 cm<sup>3</sup>

27. Which of the following graphs represent the relationship of  $\frac{PV}{T}$  of an ideal gas with its temperature T if its mass remains constant ?

*Antara graf-graf berikut, yang manakah mewakili hubungan  $\frac{PV}{T}$  bagi suatu gas unggul dengan suhunya T jika jisimnya adalah tetap ?*



28. Diagram 16 shows Ahmad standing in front of a plane mirror at a distance of 5m.  
Rajah 16 menunjukkan Ahmad sedang berdiri di hadapan sebuah cermin satah pada jarak 5m.

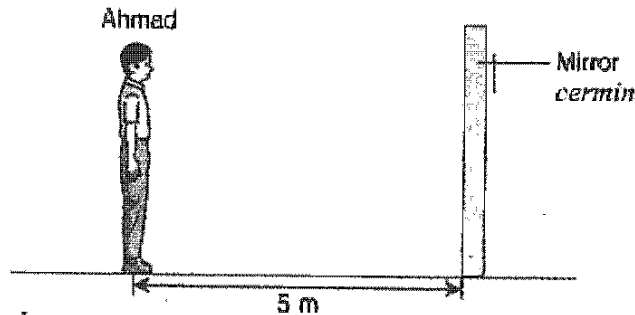


Diagram 16 / Rajah 16

What is the distance between the initial image and the final image if Ahmad moves backwards another 5 m?  
Berapakah jarak di antara imej awal dan imej akhir sekiranya Ahmad bergerak 5 m lagi ke belakang?

- A 5 m                      C 15 m  
B 10 m                     D 20 m

29. An object placed at principal axis 10 cm from converging lens with focal length 5.0 cm. What is linear magnification?  
Satu objek diletakkan di paksi utama 10 cm daripada kanta penumpu yang mempunyai panjang fokus 5.0 cm. Berapakah pembesaran linear?

A 0.5                      C 1.5  
B 1.0                     D 2.0

30. Image forms by concave lens is  
Imej yang dihasilkan oleh kanta pencapah ialah

- A upright, virtual and image size diminished than object  
tegak, maya dan saiz imej lebih kecil daripada objek  
B Upright, virtual and image size bigger than object  
Tegak, maya dan saiz imej lebih besar daripada objek  
C Inverted, real and size of image diminished than object.  
Songsang, sahik dan saiz imej lebih kecil daripada objek.  
D Inverted, real and size of image bigger than object.  
Songsang, sahik dan saiz imej lebih besar daripada objek.

31 Diagram 17 shows a light ray, *X*, directed into a glass block. The critical angle of the glass is  $42^\circ$ . In which direction does the light move from point *Y*?

Rajah 17 menunjukkan sinar cahaya, *X* ditujukan ke dalam blok kaca. Sudut genting kaca ialah  $42^\circ$ . Arah yang mana satukah cahaya bergerak dari titik *Y*?

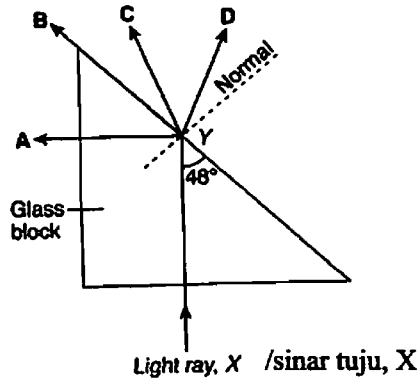


Diagram 17

32 Diagram 18 shows a Barton's pendulums. It is observed that when the pendulum *Q* is being oscillated, pendulum *S* will oscillate with the biggest amplitude.

Rajah 18 menunjukkan Bandul Barton. Diperhatikan apabila bandul *Q* berayun, bandul *S* akan berayun dengan amplitud maksimum.

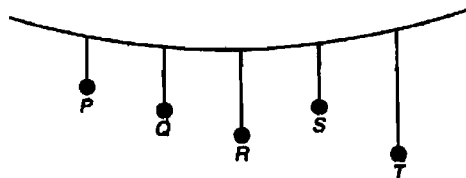


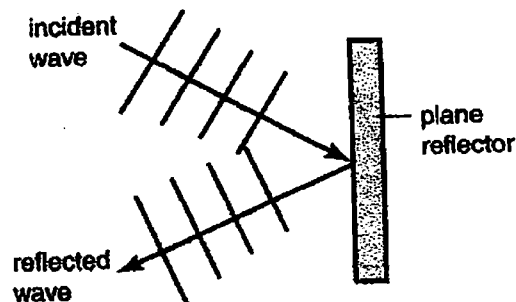
Diagram 18  
Rajah 18

The phenomenon is known as  
Fenomena ini dikenali sebagai

- A damping  
pelembapan
- B Reflection  
pantulan
- C Interference  
interferens
- D Resonance  
resonans

33 Diagram 19 shows a water wave directed to a plane reflector and then reflected.

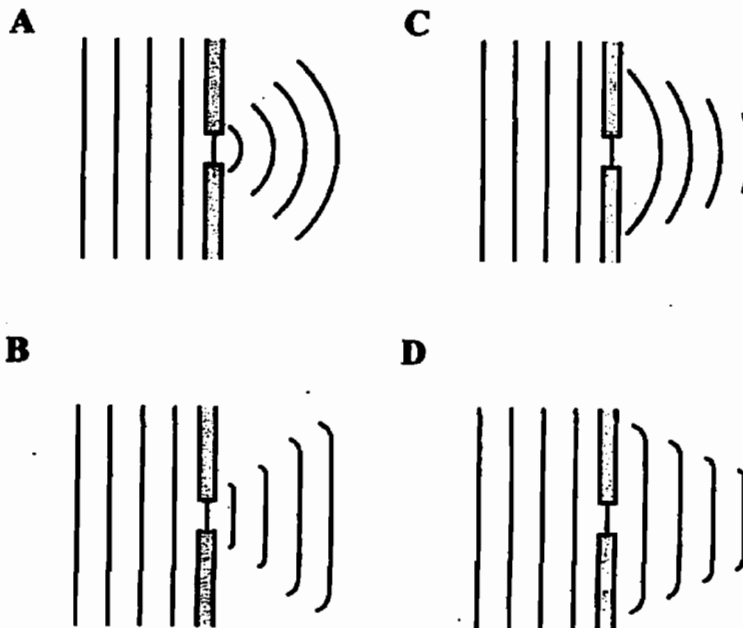
Rajah 19 menunjukkan gelombang air ditujukan kepada pemantul satah dan kemudiannya dipantulkan.



Which comparison is **correct** about the reflected wave and the incident wave?  
 Perbandingan yang manakah **benar** tentang gelombang pantulan dan gelombang tuju?

- A The reflected wave has a shorter wavelength.  
*Gelombang pantulan mempunyai panjang gelombang yang lebih pendek*
- B The reflected wave has a smaller amplitude.  
*Gelombang pantulan mempunyai amplitud yang lebih kecil.*
- C The reflected wave has the same speed.  
*Gelombang pantulan mempunyai laju yang sama.*
- D The reflected wave has a lower frequency.  
*Gelombang pantulan mempunyai frekuensi yang lebih rendah.*

34 Which of the following wavefronts is **true** about water waves passing through a narrow gap?  
 Yang manakah antara muka gelombang berikut betul apabila gelombang air melalui celah yang sempit?



- 35 Diagram 20 shows the interference patterns for waves from two coherent sources  $S_1$  and  $S_2$ .  
Rajah 20 menunjukkan corak interferens gelombang dari dua sumber koheren  $S_1$  dan  $S_2$ .

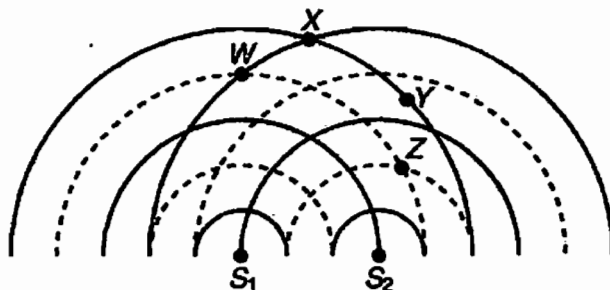


Diagram 20  
Rajah 20

Destructive interference occurs at  
Interferens membinasa berlaku di

- A  $W$  only  
 $W$  sahaja
- B  $X$  only  
 $X$  sahaja
- C  $X$  and  $Y$  only  
 $X$  dan  $Y$  sahaja
- D  $W, X$  and  $Z$  only  
 $W, X$  dan  $Z$  sahaja
- 36 Diagram 21 shows part of the electromagnetic waves spectrum.  
Rajah 21 menunjukkan bahagian spectrum gelombang electromagnet.

$\gamma$ - rays Sinar $\gamma$	Ultraviolet rays Sinar ultraungu	Infrared rays Sinar infra merah	Radio waves Gelombang radio
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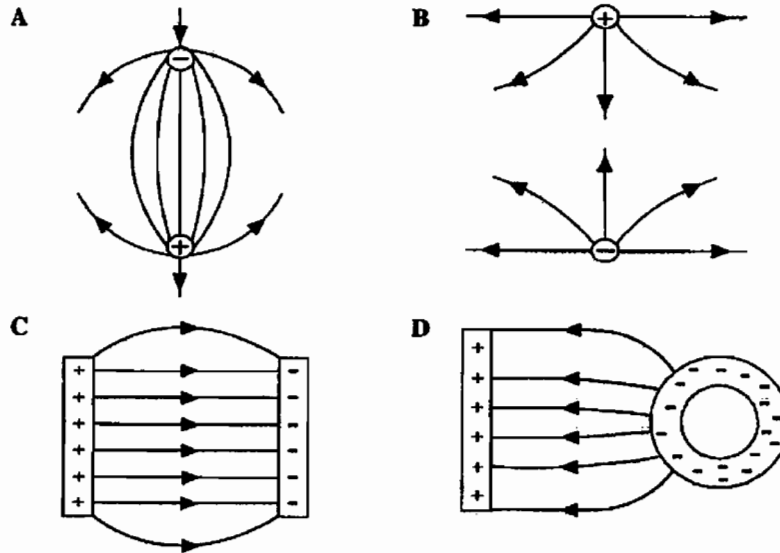
Diagram 21  
Rajah 21

The position of visible light is  
Kedudukan cahaya nampak ialah di

- A between  $\gamma$ - rays and ultraviolet rays  
antara sinar  $\gamma$  dan sinar ultraungu
- B between ultraviolet rays and infrared rays  
antara sinar ultraungu dan sinar infra merah
- C between infrared rays and radio waves  
antara sinar infra merah dan gelombang radio
- D after radio waves  
selepas gelombang radio



- 37 Which of the following diagrams shows the correct electric field pattern?  
 Antara corak medan elektrik yang berikut, yang manakah betul?



- 38 Diagram 22 shows an electric circuit used to measure potential difference,  $V$ , and current,  $I$ .  
 Rajah 22 menunjukkan litar elektrik yang digunakan untuk mengukur beza keupayaan,  $V$  dan arus,  $I$ .

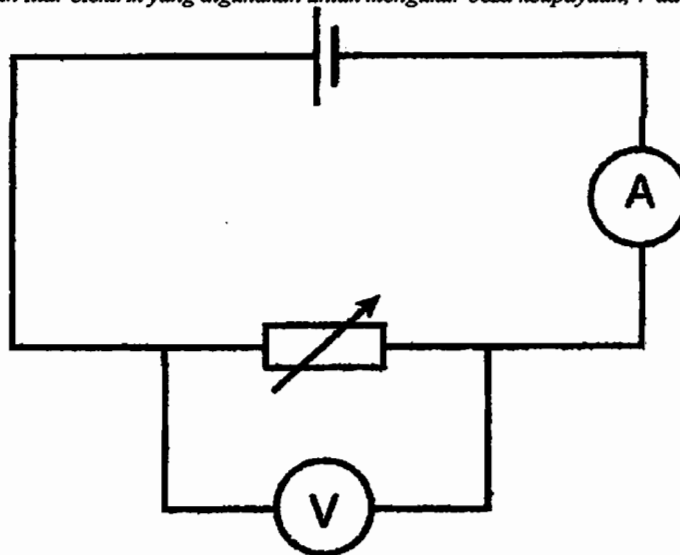
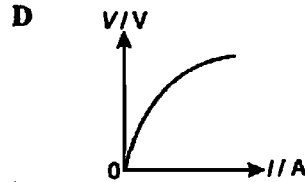
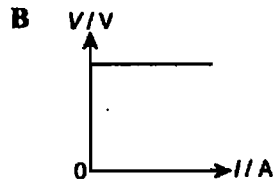
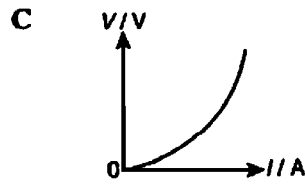
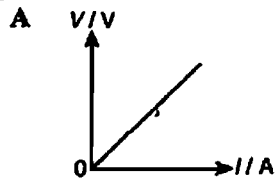
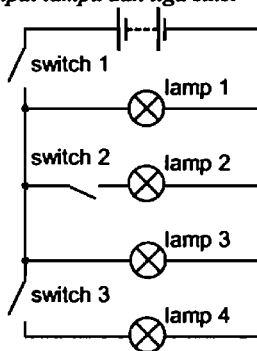


Diagram 22 / Rajah 22

- Which of the following graphs shows the relationship between  $V$  and  $I$ ?  
 Graf yang manakah menunjukkan hubungan antara  $V$  dan  $I$ ?



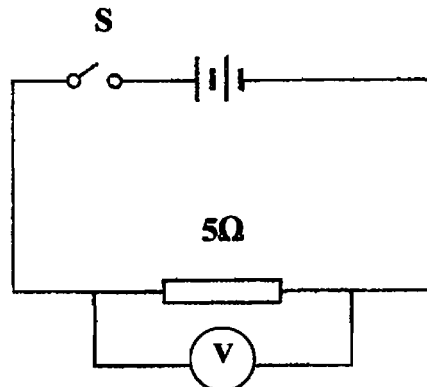
**39** The circuit shown contains four lamps and three switches.  
*Litar dibawah mengandungi empat lampu dan tiga suis.*



Which switches must be closed to light up only lamps 1 and 3?  
*Suis yang manakah harus dihidupkan untuk menyalakan lampu 1 dan 3 sahaja?*

- |          |   |          |   |
|----------|---|----------|---|
| <b>A</b> | Switch 1 only<br><i>Suis 1 sahaja</i>                         | <b>C</b> | Switch 1 and switch 3 only<br><i>Suis 1 dan suis 3 sahaja</i> |
| <b>B</b> | Switch 1 and switch 2 only<br><i>Suis 1 dan suis 2 sahaja</i> | <b>D</b> | Switch 2 and switch 3 only<br><i>Suis 2 dan suis 3 sahaja</i> |

**40** A  $5\ \Omega$  resistor is connected in series to two dry cells as shown in the circuit below.  
*Sebuah perintang  $5\ \Omega$  disambungkan secara bersiri kepada dua sel kering seperti yang ditunjukkan dalam litar di bawah ini.*



What is the reading of the voltmeter when the switch S is closed if the electromotive force and internal resistance of each of the dry cells is 1.5 V and 0.5 Ω respectively?  
 Berapakah bacaan voltmeter apabila suis S ditutup jika daya gerak elektrik dan rintangan dalam setiap sel kering masing-masing adalah 1.5 V dan 0.5 Ω?

- A 0.5 V                      C 2.0 V
- B 1.0 V                      D 2.5 V

41. A 2.0 kW air conditioner is switched on for 8 hours a day. Calculate the cost in RM of using the air conditioner for the month of December. The electricity tariff is as shown in the Table 2 below.

Penyaman udara 2.0 kW dihidupkan selama 8 jam satu hari. Hitungkan kos penggunaan penyaman udara itu bagi sepanjang bulan Disember dalam RM. Tariff elektrik ditunjukkan dalam Jadual 2 di bawah ini.

Unit of electricity <i>Unit elektrik</i>	Cost per unit <i>Kos per unit</i>
First 200 units <i>200 unit yang pertama</i>	RM 0.22
Every subsequent unit <i>Setiap unit yang berikutnya</i>	RM 0.26

Table 2 / *Jadual 2*

- A 3.52                      C 109.12
- B 13.64                    D 120.96

42. Diagram 23 shows a bare copper wire PQ in a magnetic field.

Rajah 23 menunjukkan satu wayar kuprum PQ yang tidak bertebat di dalam medan magnet

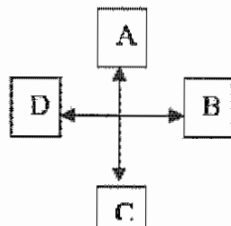
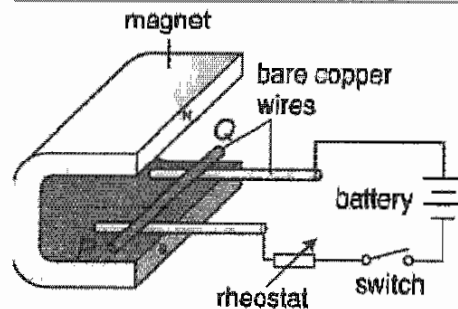


Diagram 23  
Rajah 23

Which direction of A, B, C or D is the direction of motion of PQ when the switch is on?  
 Yang manakah antara berikut A, B, C atau D adalah arah gerakan bagi PQ apabila suis dihidupkan.

43. Diagram 24 shows an electric bell.

Rajah 24 menunjukkan satu loceng elektrik.

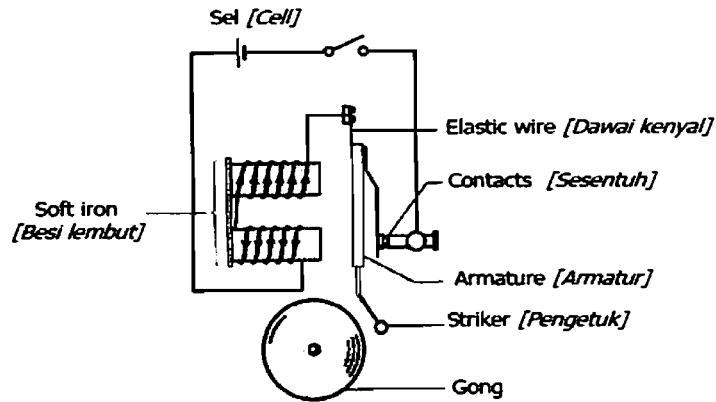


Diagram 24  
[Rajah 24]

Which of the following steps can be taken to increase the loudness of the sound produced by the electric bell?

Antara langkah berikut, yang manakah boleh diambil untuk meningkatkan kekuatan bunyi yang dihasilkan oleh loceng elektrik tersebut?

- A Increase the current of the circuit.  
*Meningkatkan arus dalam litar.*
- B Reverse the polarity of the dry cell.  
*Songsangkan kekutuban sel kering.*
- C Reduce the number of turns in the coil.  
*Mengurangkan bilangan tilitan dalam gegelung.*
- D Replace the soft iron core with steel core.  
*Menggantikan teras besi lembut kepada teras keluli.*

44. Diagram 25 shows the arrangement of a solenoid and a magnet.

Rajah 25 menunjukkan susunan suatu solenoid dan magnet.

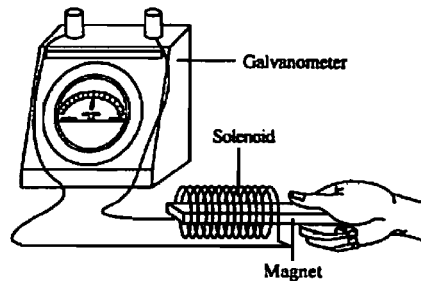


Diagram 25 /Rajah 25

Which of the following methods produce zero reading in galvanometer?

Antara cara berikut, yang manakah menghasilkan bacaan sifar pada galvanometer?

- A The magnet is pulled out of the solenoid.  
*Magnet ditarik keluar dari solenoid.*
- B The solenoid is moved towards the magnet.  
*Solenoid digerakkan menghala ke magnet.*

- C The magnet and the solenoid are moved at the same velocity.  
*Magnet dan solenoid digerakkan pada halaju yang sama.*
- D The magnet and the solenoid are moved at the same speed but in opposite direction.  
*Magnet dan solenoid digerakkan pada laju yang sama tetapi pada arah yang berlawanan.*
45. Diagram 26 shows a transformer that is used to light up a bulb.  
*Rajah 26 menunjukkan sebuah transformer yang digunakan untuk menghidupkan sebiji mentol.*

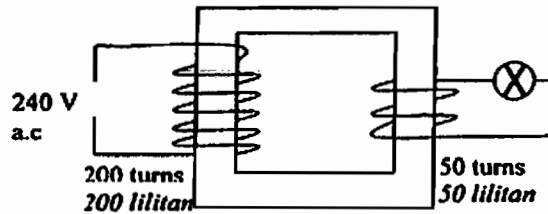


Diagram 26  
*Rajah 26*

Which of the following statements is true about the transformer?  
*Antara pernyataan-pernyataan yang berikut, yang manakah benar tentang transformer itu?*

Type of transformer <i>Jenis transformer</i>	Voltage across the bulb <i>Voltan merentasi mentol</i>
A Step-up <i>Injak naik</i>	480 V
B Step-up <i>Injak naik</i>	960 V
C Step-down <i>Injak turun</i>	50 V
D Step-down <i>Injak turun</i>	60 V

46.

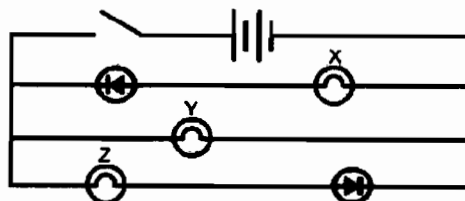


Diagram 27 / *Rajah 27*

Diagram 27 shows a circuit containing bulbs X, Y and Z. Which bulb in the circuit will light up when switch is on?

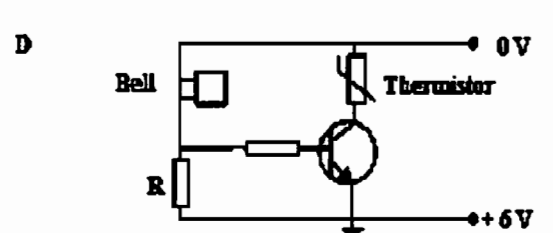
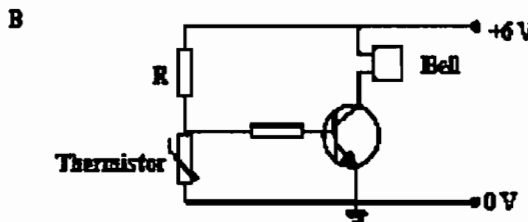
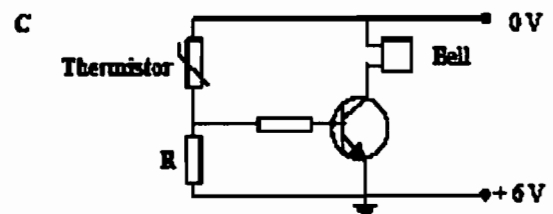
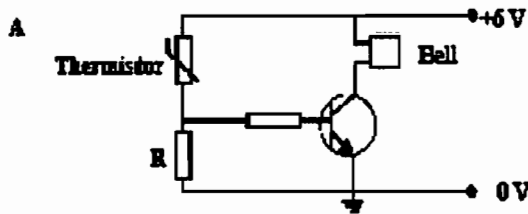
*Rajah 27 menunjukkan satu litar mengandungi mentol-mentol X, Y dan Z. Mentol yang manakah akan menyala apabila suis dihidupkan.*

- A. Z only / *Z sahaja*
- B. X, Y and Z / *X, Y dan Z sahaja*
- C. Y and Z only / *Y dan Z sahaja*
- D. X and Y only / *X dan Y sahaja*

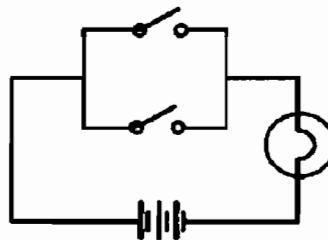
47. A thermistor and a transistor are connected in a fire alarm circuit. The resistance of the thermistor decreases as the temperature rises.

*Suatu termistor dan transistor disambungkan kepada suatu litar penggera kebakaran. Rintangan termistor berkurang apabila suhu meningkat.*

Which of the following circuits will cause the bell to ring when there is fire?  
*Litar yang manakah akan berbunyi apabila berlaku kebakaran?*



48.



Which one of the following logic gates has the same effect as the circuit in the figure above?  
*Get logik yang mana satukah akan menghasilkan kesan yang sama seperti litar dalam rajah di atas.*

- A. OR gate / get *ATAU*
- B. NOR gate / get *TAKATAU*
- C. AND gate / get *DAN*
- D. NAND gate / get *TAKDAN*

49. . A radioactive nucleus decays by emitting an  $\alpha$ -particle. What changes occur in the atomic number and nucleon number?

*Suatu nukleus radioaktif mereput dengan membebaskan zarah  $\alpha$ . Apakah perubahan-perubahan yang berlaku kepada nombor atom dan nombor nucleon*

**Atomic Number**

*Nombor atom*

**Nucleon Number**

*Nombor nucleon*

A Decreases by 2

*Berkurang sebanyak 2*

Decreases by 2

*Berkurang sebanyak 2*

B Decreases by 2

*Berkurang sebanyak 2*

Decreases by 4

*Berkurang sebanyak 4*

C Increases by 2

*Bertambah sebanyak 2*

Increases by 4

*Bertambah sebanyak 4*

D Decreases by 1

*Berkurang sebanyak 1*

No change

*Tiada perubahan*

50. A radioisotope can be used as a tracer to determine the position of blood clots by injecting the radioisotope into the patient's blood vessel.

*Satu radioisotope boleh digunakan sebagai penyurih untuk menentukan kedudukan darah beku dengan menyuntik radioisotope tersebut dalam salur darah pesakit.*

Which radioisotope should be used?

*Radioisotop yang manakah patut digunakan?*

**Type of radiation emitted**

*Jenis radiasi yang dibebaskan*

**Half life**

*Separuh hayat*

A  $\beta$  and  $\gamma$

3 hours / 3 jam

B  $\beta$  and  $\gamma$

8 days / 8 hari

C  $\gamma$

6 hours / 6 jam

D  $\beta$

15 days / 15 hari

**- END OF QUESTION PAPER-**

4531/3  
Physics  
Paper 3  
August  
1 ½ hours

Nama: \_\_\_\_\_

No Kad Pengenalan :

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Angka giliran :

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PANITIA FIZIK DAERAH

PEPERIKSAAN PERCUBAAN SPM 2010

DAERAH MANJUNG

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PHYSICS

Paper 3

One hour and thirty minutes

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**DO NOT OPEN THE QUESTION PAPER UNTIL YOU ARE TOLD TO DO SO**

**INFORMATION FOR CANDIDATES**

1. This question paper consists of **two** sections:  
**Section A** and **Section B**.
2. Answer **all** question from **Section A** and **one** question from **Section B**. Answer questions in Section A and Section B in detail. You may use equations, diagrams, tables, graphs and other suitable methods to explain your answer.
3. The time suggested to answer **Section A** is 60 minutes, **Section B** is 30 minutes.

Section	Question	Full marks	Marks obtain
A	1	16	
	2	12	
B	3	12	
	4	12	
Total			

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This question paper consist of 11 pages.

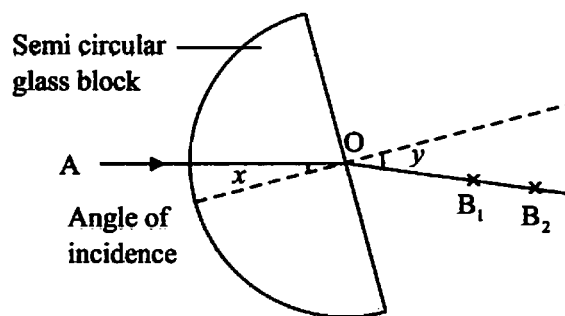


**Section A**  
**Bahagian A**  
[28 marks]  
[28 markah]

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

1. An experiment is conducted to investigate the relationship between the angle of incidence and angle of refraction when light travels through a semi-circular glass block. A light ray AO is directed towards the centre of the glass block, O with an angle of  $x=15^\circ$  from the normal axis. The ray emerging from the glass block is marked with two pins, at point  $B_1$  and  $B_2$  respectively.

Satu eksperimen dijalankan untuk menyiasat hubungan antara sudut tuju dengan sudut biasan apabila cahaya melalui blok kaca separuh bulatan. Sinar cahaya AO ditujukan terus ke pusat blok kaca, O dengan sudut  $x = 15^\circ$  daripada garis normal. Sinar yang menembusi blok kaca ditandakan dengan dua pin, iaitu pada titik  $B_1$  dan  $B_2$ .



**Figure 1.1**  
**Rajah 1.1**

The experiment is conducted with angle  $x = 20^\circ, 25^\circ, 30^\circ$  and  $35^\circ$ . The light rays which emerged from the glass block are marked with points  $C_1$  and  $C_2, D_1$  and  $D_2, E_1$  and  $E_2, F_1$  and  $F_2$  respectively. In Figure 1.2 show the results for the points marked from the experiments. All the figures are drawn according to scale.

Eksperimen dijalankan dengan sudut  $x = 20^\circ, 25^\circ, 30^\circ$  dan  $35^\circ$ . Sinar cahaya yang keluar daripada blok kaca ditandakan dengan titik  $C_1$  dan  $C_2, D_1$  dan  $D_2, E_1$  dan  $E_2, F_1$  dan  $F_2$ . Rajah 1.2 menunjukkan titik-titik yang ditandakan daripada eksperimen. Semua Rajah adalah dilukis mengikut skala.

- (b) On Figure 1.2, draw a straight line to join the couple of points  $C_1$  and  $C_2$ ,  $D_1$  and  $D_2$ ,  $E_1$  and  $E_2$ ,  $F_1$  and  $F_2$  which emerged from the semi-circular glass block. [3 marks]

*Pada Rajah 1.2, lukiskan satu garis lurus yang menyambungkan pasangan titik-titik  $C_1$  dan  $C_2$ ,  $D_1$  dan  $D_2$ ,  $E_1$  dan  $E_2$ ,  $F_1$  dan  $F_2$  yang menembusi blok kaca separuh bulatan.*

- (c) Based on the ray path that you have drawn for each angle of  $x$  and  $y$  and also the Figure 1.1, determine the values of  $x$  and  $y$  in each case. Tabulate your answer including  $x$ ,  $y$ ,  $\sin x$  and  $\sin y$ .

*Berpandukan kepada sinar yang telah anda lukis bagi setiap sudut  $x$  dan  $y$  serta Rajah 1.1, tentukan nilai  $x$  dan  $y$  bagi setiap kes. Jadualkan jawapan anda bagi  $x$ ,  $y$ ,  $\sin x$  dan  $\sin y$ . [4 marks]*

- (d) (i) On the graph paper provided, plot a graph of  $\sin y$  against  $\sin x$ .  
*Plotkan graf  $\sin y$  melawan  $\sin x$  pada kertas graf.*

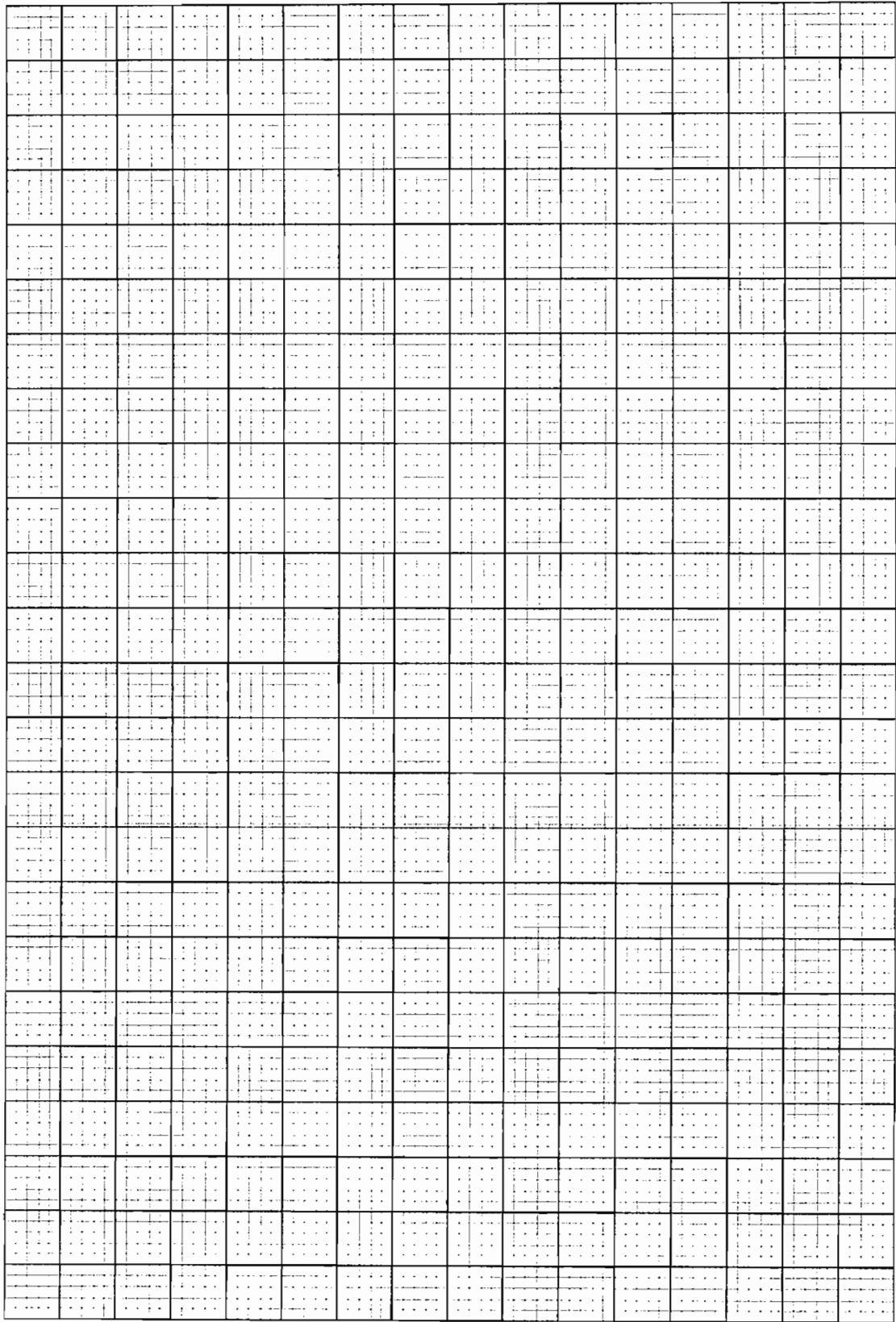
[5 marks]

- (ii) Hence, state the relationship between  $\sin x$  and  $\sin y$ .  
*Seterusnya, nyatakan hubungan antara  $\sin x$  dan  $\sin y$ .*

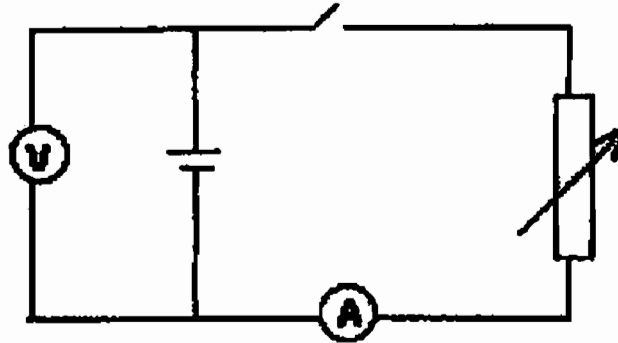
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[1 mark]

**Graph of sin y against sin x**  
**Graf sin y melawan sin x**



2. A student carries out an experiment to investigate the relationship between the potential difference across a battery,  $V$  and the current flows it,  $I$ . He used ammeter, rheostat, and voltmeter which connected as shown in the Figure 2.1.  
*Seorang pelajar menjalankan eksperimen untuk meniasat hubungan antara beza keupayaan yang merentasi bateri  $V$  dengan arus yang mengalir,  $I$ . Pelajar itu menggunakan ammeter, reostat dan voltmeter yang disambungkan seperti dalam Rajah 2.1.*



**Figure 2.1**  
**Rajah 2.1**

The results of the experiment is shown in graph of  $V$  against  $I$  as shown in Diagram 2.2  
*Keputusan eksperimen ditunjukkan dalam graf  $V$  lawan  $I$  seperti ditunjukkan dalam Rajah 2.2*

- (a) Based on the graph in Diagram 2.2, determine the value of  $V$  when  $I = 0.54$  A, show on the graph, how you determine the value of  $V$ .  
*Berdasarkan graf dalam Rajah 2.2, tentukan nilai  $V$  bila  $I = 0.54$  A. Tunjukkan di atas graf bagaimana anda menentukan nilai  $V$ .*

[ 3 marks]

- (b) What will happen to the value of  $V$ , if the current flows increase?  
*Apakah yang akan berlaku terhadap nilai  $V$ , jika arus yang mengalir bertambah.*

[1 mark]

- (c) The gradient of the graph represent the internal resistance of the battery,  $r$ . State how the resistance varies with current.  
*Kecerunan graf itu mewakili rintangan dalam sel itu,  $r$ . Nyatakan bagaimana rintangan berubah dengan arus.*

[1 mark ]

Voltage,  
 $V$  (V)

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

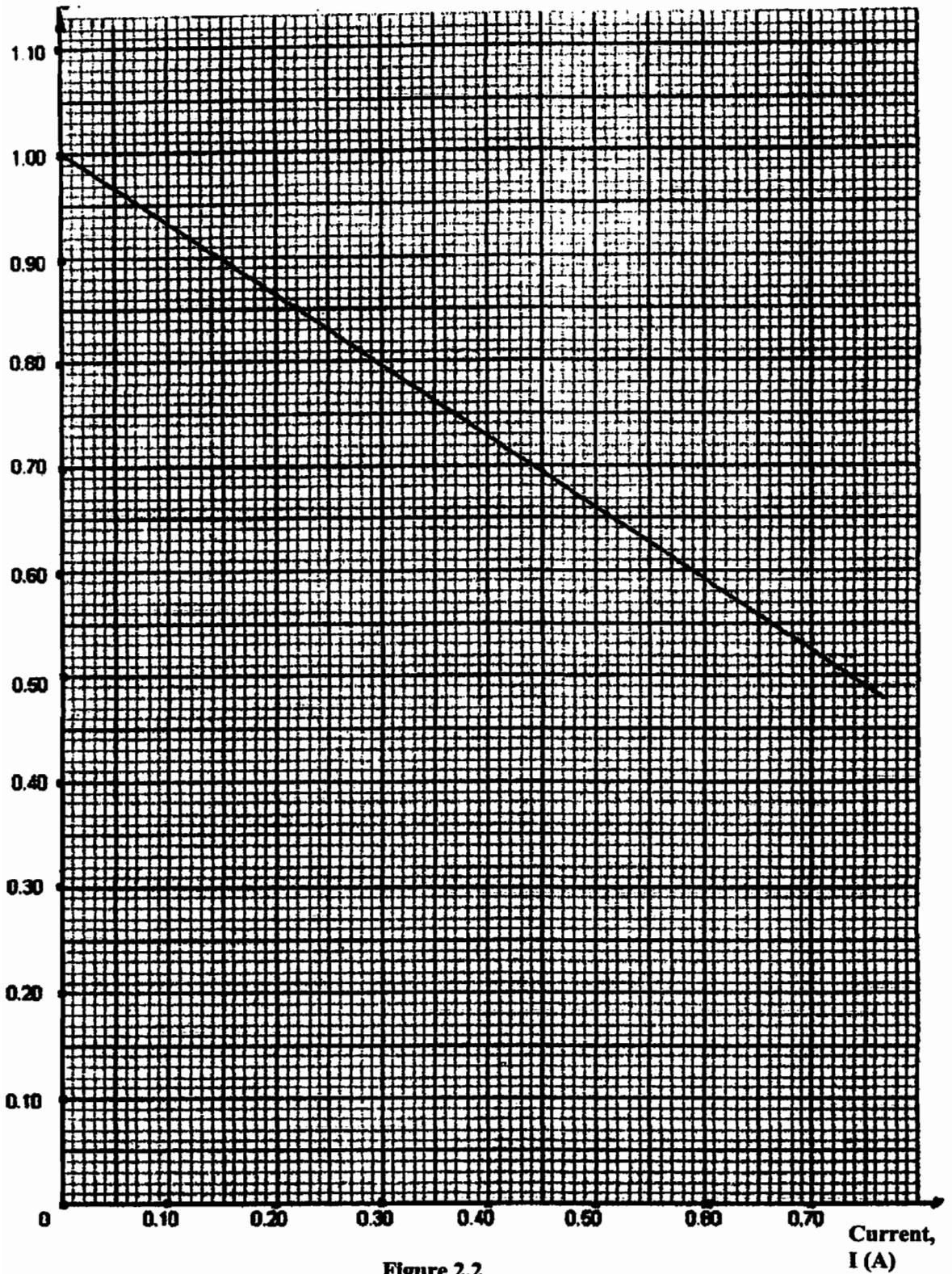
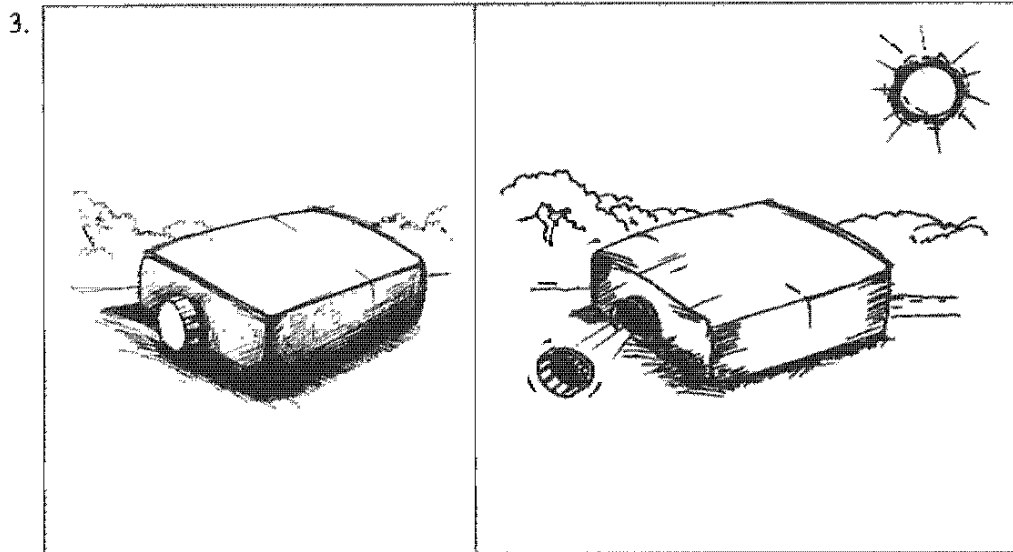


Figure 2.2  
Rajah 2.2

**Section B**  
**Bahagian B**  
**(12 marks)**  
**(12 markah)**



**Figure 3.1**  
*Rajah 3.1*

**Figure 3.2**  
*Rajah 3.2*

Figure 3.1 shows the condition of a plastic container early in the morning where located at open place whereas Figure 3.2 shows the cap of the same plastic container burst out at 12.00 noon on a hot day.

*Rajah 3.1 menunjukkan keadaan sebuah bekas plastik yang diletakkan di kawasan lapang pada waktu pagi manakala Rajah 3.2 menunjukkan penutup bekas tercabut keluar daripada bekas plastik yang sama pada jam 12.00 tengahari pada hari yang panas.*

Based on the information and observation:

*Berdasarkan maklumat dan pemerhatian tersebut:*

- (a) State one suitable inference. [1 mark]  
*Nyatakan satu inferens yang sesuai.*
- (b) State one suitable hypothesis. [1 mark]  
*Nyatakan satu hipotesis yang sesuai.*
- (c) With the use of apparatus such as round bottom flask, Bourdon gauge and other apparatus, describe one experiment to investigate the hypothesis states in 3 (b).  
*Dengan menggunakan radas seperti kelalang dasar bulat, tolok Bourdon dan radas lain, terangkan satu eksperimen untuk menyiasat hipotesis yang dinyatakan di 3 (b).*

In your description, state clearly the following:

*Dalam penerangan anda, nyatakan dengan jelas perkara berikut:*

- (i) 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 controlling the responding variable.  
*Prosedur eksperimen yang mesti termasuk satu kaedah mengawal pembolehubah dimanipulasi dan satu kaedah mengukur pembolehubah bergerak balas.*
- (vi) The way you would tabulate the data.  
*Cara anda menjadualkan data.*
- (vii) The way you would analyse the data.  
*Cara anda menganalisis data.*

[10 marks]

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

(10 marks)

**-END OF QUESTION PAPER-**