

SULIT



PROGRAM PENINGKATAN PRESTASI AKADEMIK SPM

TAHUN 2012

FIZIK

Kertas 1

Satu jam lima belas minit

JANGAN BUKA KERTAS SOALANINI SEHINGGA DIBERITAHU

1. Kertas soalan ini adalah dalam dwibahasa
2. Soalan dalam bahasa Inggeris mendahului soalan yang sepadan dalam bahasa Melayu.
3. Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.

Kertas soalan ini mengandungi 34 halaman bercetak

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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. $v^2 = u^2 + 2as$
3. $s = ut + \frac{1}{2}at^2$
4. Momentum = mv
5. $F = ma$
6. Kinetic energy / Tenaga kinetik = $\frac{1}{2}mv^2$
7. Gravitational potential energy /
Tenaga keupayaan graviti = mgh
8. Elastic potential energy /
Tenaga keupayaan kenyal = $\frac{1}{2}Fx$
9. Power, $P = \frac{\text{energy}}{\text{time}}$
Kuasa, $P = \frac{\text{tenaga}}{\text{masa}}$
10. Density / Ketumpatan, $\rho = \frac{m}{V}$
11. Pressure / Tekanan, $p = h\rho g$
12. Pressure / Tekanan, $p = \frac{F}{A}$
13. Heat / Haba, $Q = mc\theta$
14. Heat / Haba, $Q = ml$
15. $\frac{pV}{T} = \text{constant} / \text{pemalar}$
16. $n = \frac{\sin i}{\sin r}$
 $n = \frac{1}{\sin c}$
17. $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$
18. Magnifying power /
Kuasa pembesaran = $\frac{f_o}{f_e}$
19. $v = f\lambda$
20. $\lambda = \frac{ax}{D}$
21. $Q = It$
22. $E = VQ$
23. $V = IR$
24. Power / Kuasa, $P = IV$
Power / Kuasa, $P = I^2R$
Power / Kuasa, $P = \frac{V^2}{R}$
25. $\frac{V_s}{V_p} = \frac{N_s}{N_p}$
26. Efficiency /
 $Kecekapan = \frac{I_s V_s}{I_p V_p} \times 100 \%$
27. $E = mc^2$
28. $g = 10 \text{ m s}^{-2}$
29. $c = 3.0 \times 10^8 \text{ m s}^{-1}$

- 1 The speed of sound in cold air is 330 m s^{-1} . What is this speed in km h^{-1} ?
Laju bunyi dalam udara sejuk ialah 330 m s^{-1} . Berapakah laju ini dalam km j^{-1} ?

- A 19.8
- B 91.7
- C 1188
- D 5500

- 2 Diagram 1 shows a micrometer screw gauge with its jaws closed.
Rajah 1 menunjukkan sebuah tolok skru mikrometer dengan rahang-rahangnya tertutup.

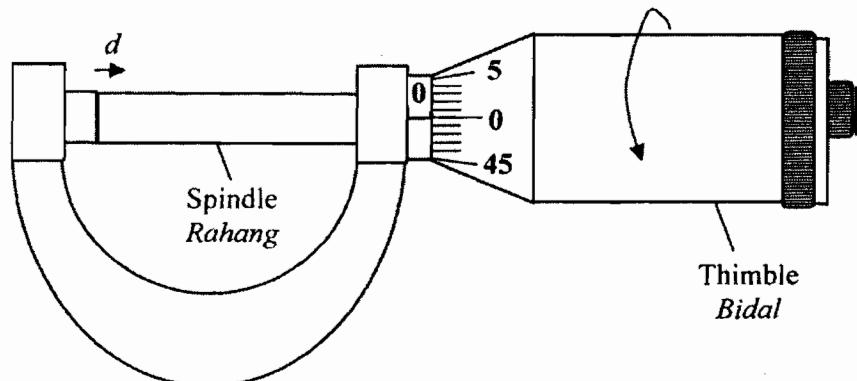


Diagram 1 / Rajah 1

What is the distance moved, d , by the spindle when the thimble is rotated through three complete rotations?

Berapakah jarak yang dilalui, d , oleh rahang apabila bidal diputar melalui tiga putaran lengkap?

- A 0.03 mm
- B 0.15 mm
- C 0.50 mm
- D 1.50 mm

- 3 Diagram 2 shows the arrangement of apparatus to investigate the relationship between the wavelength of sound and the distance between adjacent loud sounds.

Rajah 2 menunjukkan susunan radas untuk menyiasat hubungan antara panjang gelombang bunyi dan jarak antara bunyi kuat yang bersebelahan.

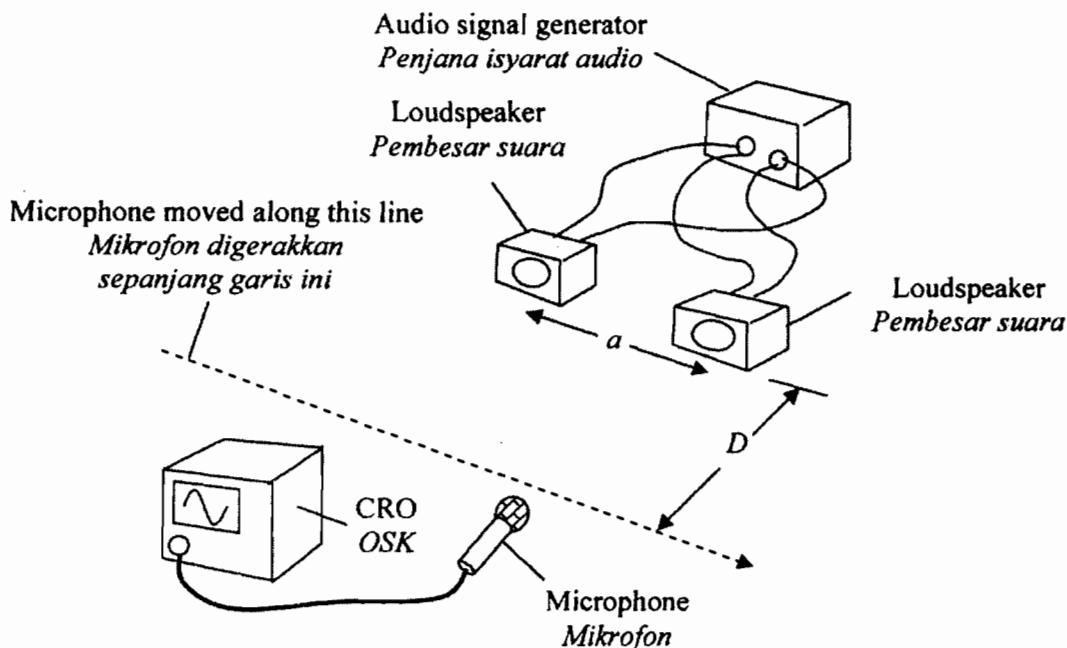


Diagram 2 / Rajah 2

What are the constant variables in this experiment?
Apakah pembolehubah dimalarkan dalam eksperimen ini?

- A a only / a sahaja
- B D only / D sahaja
- C a and D / a dan D

- 4 Which physical quantity is equal to $\frac{\text{change of velocity}}{\text{time taken}}$?

Kuantiti fizik manakah yang sama dengan $\frac{\text{perubahan halaju}}{\text{masa yang diambil}}$?

- A Momentum / Momentum
- B Impulse / Impuls
- C Displacement / Sesaran
- D Acceleration / Pecutan

- 5 Diagram 3 shows a marble about to be released in a bowl.

Rajah 3 menunjukkan sebiji guli yang akan dilepaskan di dalam sebuah mangkuk

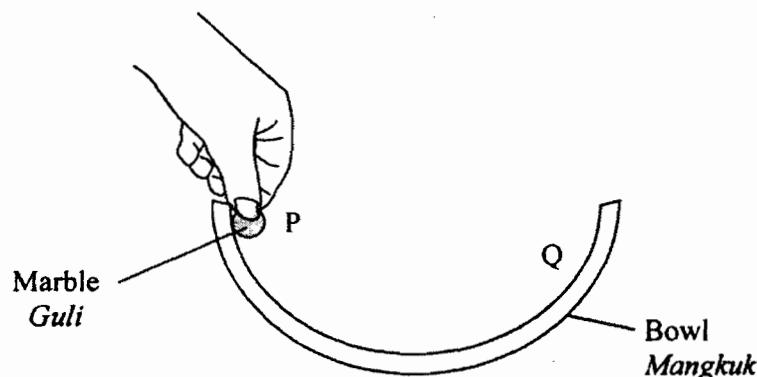
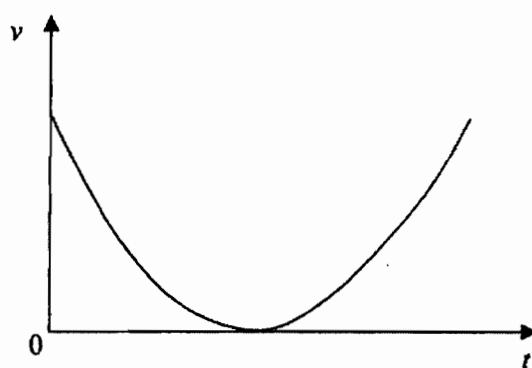


Diagram 3 / Rajah 3

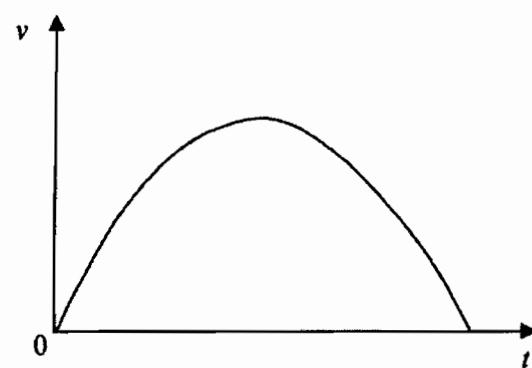
Which graph shows the correct relationship between the speed, v , of the marble and the time, t , of the motion of the marble from P to Q?

Graf yang manakah menunjukkan hubungan yang betul antara laju, v , bagi guli itu dan masa, t , bagi gerakan guli itu dari P ke Q?

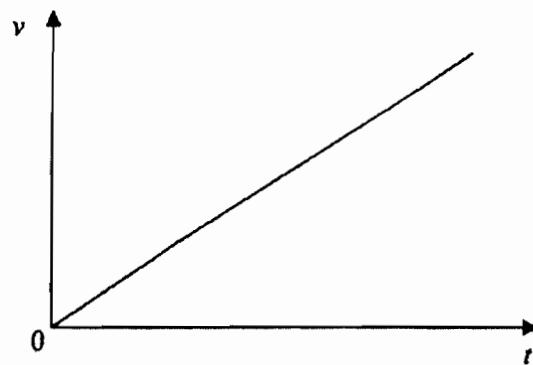
A



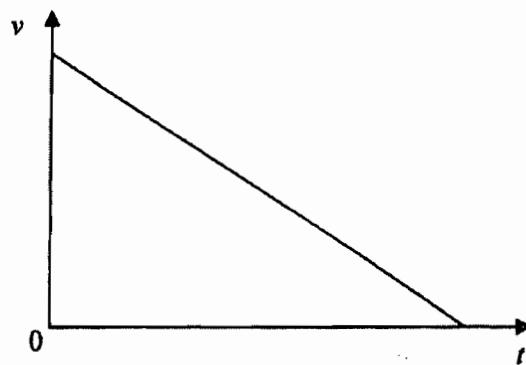
B



C



D



- 6 Diagram 4 shows two identical trolleys, P and Q, moving along a straight line. The velocity of P is bigger than the velocity of Q.
Rajah 4 menunjukkan dua buah troli yang serupa P dan Q, bergerak sepanjang satu garis lurus. Halaju bagi P lebih besar daripada halaju Q.

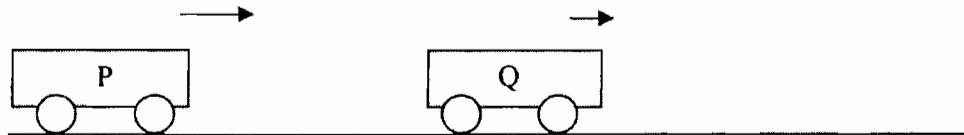


Diagram 4 / Rajah 4

What is the change in the velocities of P and Q when P collides with Q?
Apakah perubahan dalam halaju P dan Q apabila P berlanggar dengan Q?

- | Velocity of P / Halaju P | Velocity of Q / Halaju Q |
|--------------------------|--------------------------|
| A Increase / Bertambah | Increase / Bertambah |
| B Increase / Bertambah | Decrease / Berkurang |
| C Decrease / Berkurang | Increase / Bertambah |
| D Decrease / Berkurang | Decrease / Berkurang |

- 7 Diagram 5 shows the forces acting on an aeroplane that is flying with an acceleration along a horizontal line.
Rajah 5 menunjukkan daya-daya yang bertindak ke atas sebuah kapal terbang yang sedang terbang dengan suatu pecutan sepanjang satu garis lurus mengufuk.

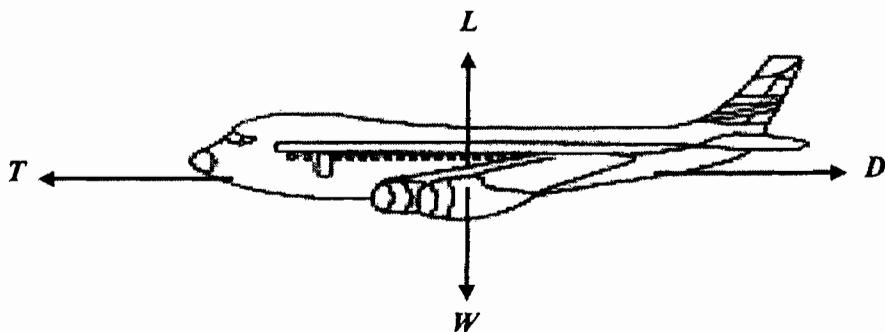


Diagram 5 / Rajah 5

Which is the correct relationship between the forces?
Apakah hubungan yang betul antara daya-daya itu?

- A $T > D ; L = W$
- B $T > D ; L > W$
- C $T < D ; L = W$
- D $T = D ; L < W$

- 8 A coconut falls from a height of 12.8 m to the ground.
 · What is the velocity of the coconut just before it hits the ground?
Sebji kelapa jatuh dari ketinggian 12.8 m ke tanah.
Berapakah halaju kelapa itu sejurus sebelum menghentam tanah?
- A 6.4 m s^{-1}
 B 16.0 m s^{-1}
 C 57.2 m s^{-1}
 D 128.0 m s^{-1}
- 9 Diagram 6 shows the forces acting on a piece of stone that has just been dropped into water.
Rajah 6 menunjukkan daya-daya yang bertindak ke atas seketul batu yang baru jatuh ke dalam air.

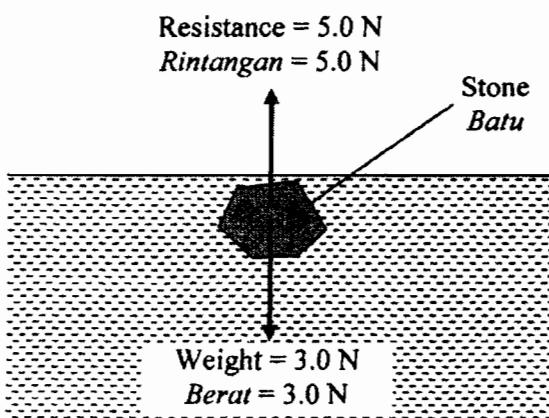


Diagram 6 / Rajah 6

The mass of the stone is 0.3 kg. What is the deceleration of the stone?
Jisim batu itu ialah 0.3 kg. Berapakah nyahpecutan batu itu?

- A 6.67 m s^{-2}
 B 10.00 m s^{-2}
 C 16.67 m s^{-2}
 D 26.67 m s^{-2}

- 10 Diagram 7 shows a set of high jump apparatus.
Rajah 7 menunjukkan set peralatan untuk lompat tinggi.

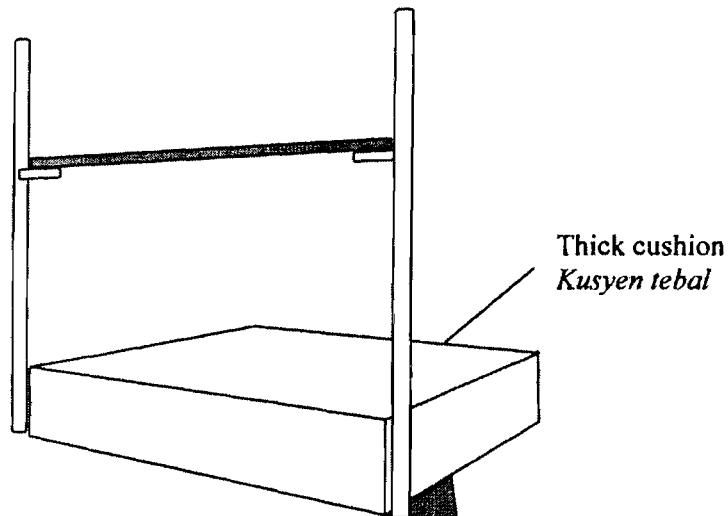


Diagram 7 / Rajah 7

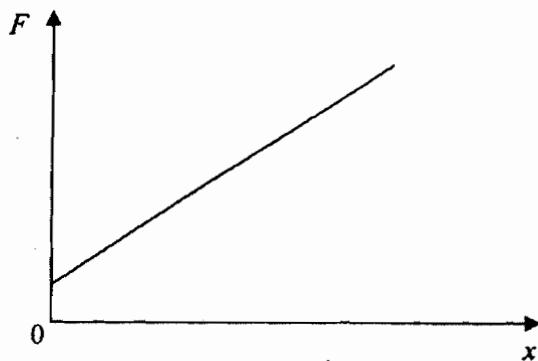
The thick cushion is used to reduce the
Kusyen tebal digunakan untuk mengurangkan

- A impulse on the body of the athlete
impuls ke atas badan atlet
- B impulsive force on the body of the athlete
daya impuls ke atas badan atlet
- C velocity just before landing
halaju sejurus sebelum mendarat
- D time of impact between the athlete and the cushion
masa hentaman antara atlet dan kusyen

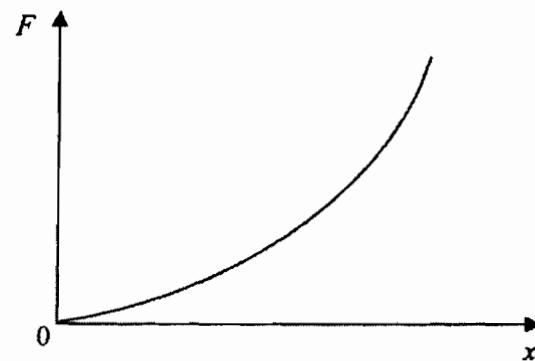
- 11 Which graph shows the correct relationship between the force, F , and the extension, x , of a spring that obeys Hooke's law?

Graf manakah yang menunjukkan hubungan yang betul antara daya, F , dengan pemanjangan, x , bagi satu spring yang mematuhi hukum Hooke?

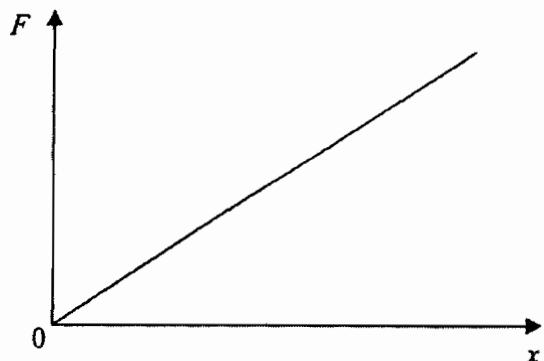
A



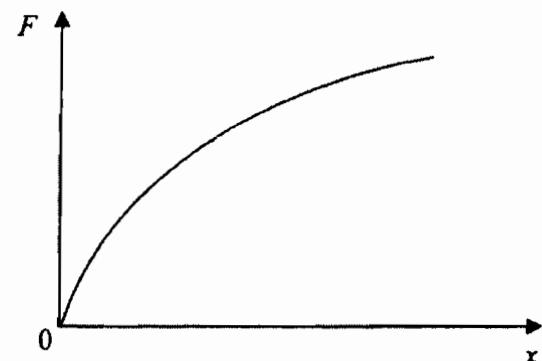
B



C



D



- 12 Diagram 8 shows a nail being held between the thumb and forefinger.

Rajah 8 menunjukkan sebatang paku dipegang di antara ibu jari dan jari telunjuk.

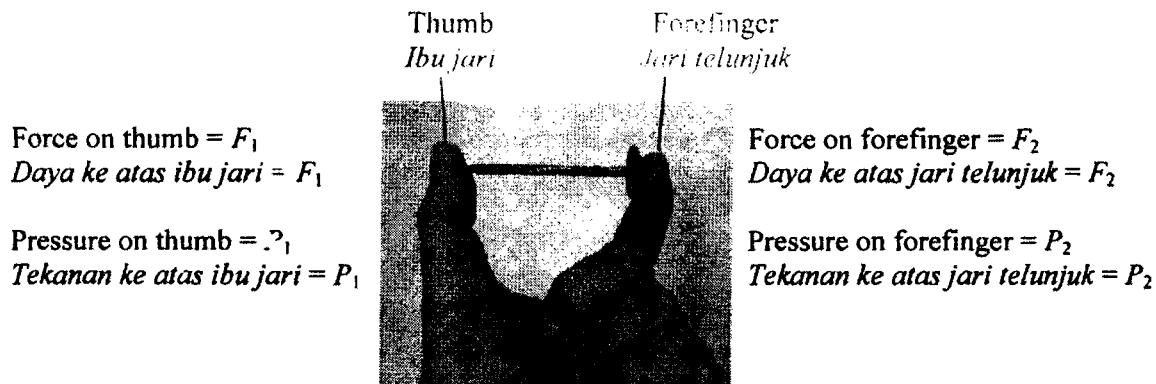


Diagram 8 / Rajah 8

Which is correct comparison for the force and pressure on the thumb and forefinger?

Apakah perbandingan yang betul bagi daya dan tekanan ke atas ibu jari dan jari telunjuk?

Force / Daya	Pressure / Tekanan
A $F_1 = F_2$	$P_1 = P_2$
B $F_1 = F_2$	$P_1 > P_2$
C $F_1 > F_2$	$P_1 = P_2$
D $F_1 > F_2$	$P_1 > P_2$

- 13 Diagram 9 shows four identical containers filled with four different types of liquids.
Rajah 9 menunjukkan empat buah bekas serupa yang diisi dengan empat jenis cecair yang berlainan.

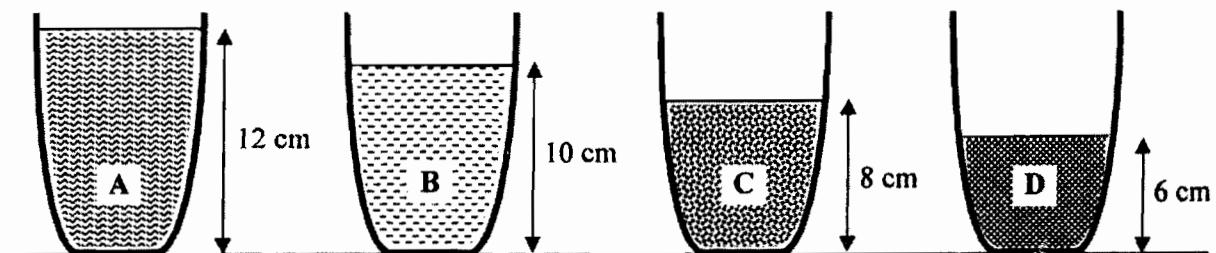


Diagram 9 / Rajah 9

Table 1 shows the densities of the liquids.
Jadual 1 menunjukkan ketumpatan bagi cecair-cecair itu.

Liquid Cecair	Density / kg m ⁻³ Ketumpatan / kg m ⁻³
A	700
B	900
C	1000
D	1200

Table 1 / Jadual 1

Which liquid exerts the highest pressure on the base of the container?
Cecair yang manakah mengenakan tekanan yang paling tinggi ke atas dasar bekas?

- 14 Diagram 10 shows a metal block L being weighed in air and in water.
Rajah 10 menunjukkan sebuah blok logam L ditimbang di dalam udara dan di dalam air.

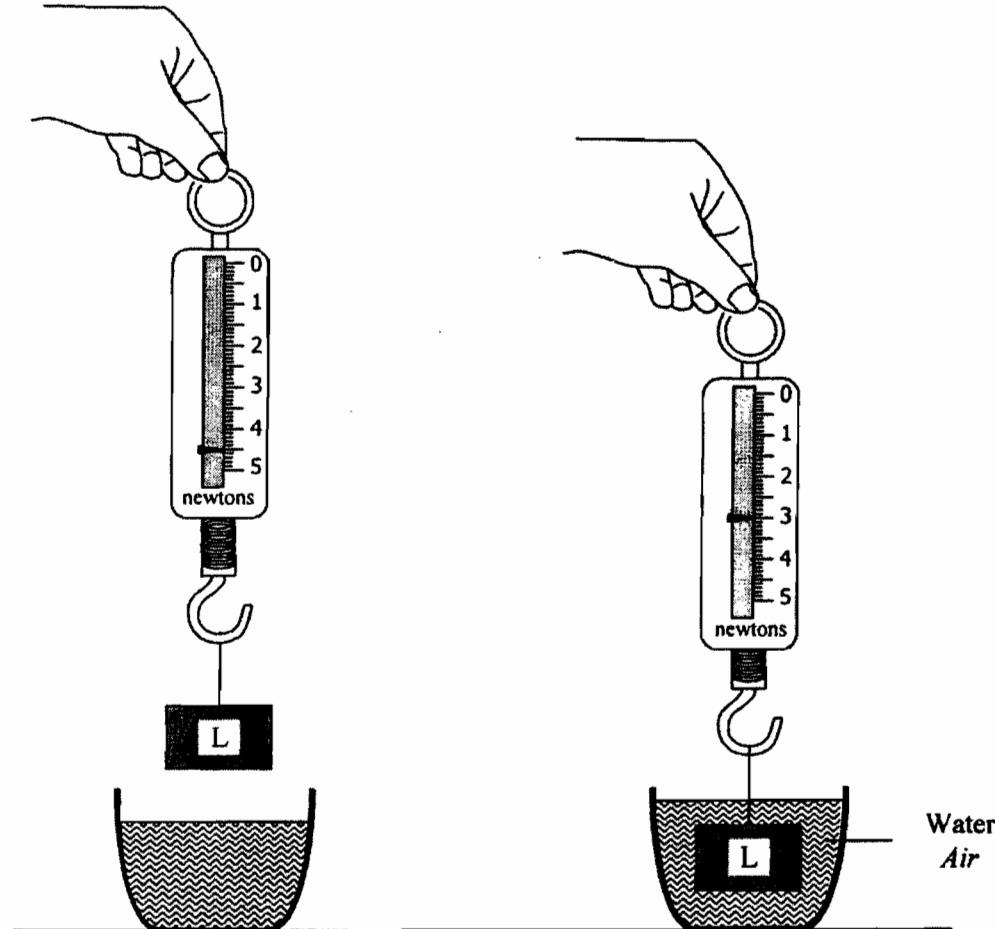


Diagram 10 / Rajah 10

What principle explains the difference in the readings of the two spring balances?
Apakah prinsip yang menerangkan perbezaan antara bacaan dua buah neraca spring itu?

- A Pascal's principle / Prinsip Pascal
- B Bernoulli's principle / Prinsip Bernoulli
- C Archimedes' principle / Prinsip Archimedes
- D Principle of flotation / Prinsip keapungan

- 15 Diagram 11 shows a mercury barometer and a mercury manometer.
Rajah 11 menunjukkan sebuah barometer merkuri dan sebuah manometer merkuri.

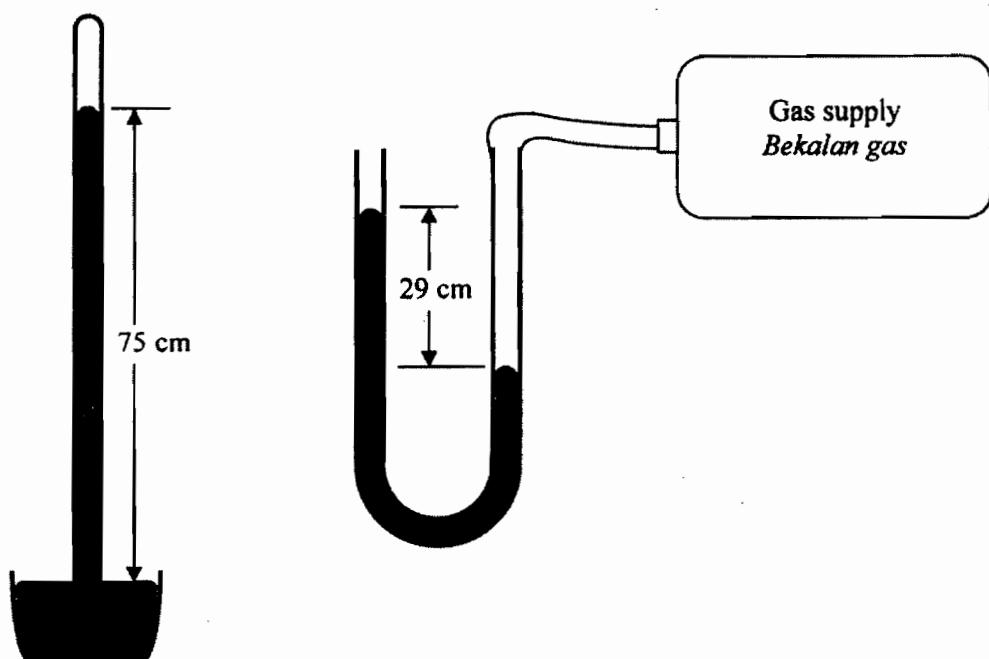


Diagram 11 / Rajah 11

What is the pressure of the gas supply?
Berapakah tekanan bekalan gas itu?

- A 29 cm Hg
- B 46 cm Hg
- C 75 cm Hg
- D 104 cm Hg

- 16** Diagram 12 shows part of the hydraulic brake system of a car.
Rajah 12 menunjukkan sebahagian daripada sistem brek hidraulik sebuah kereta.

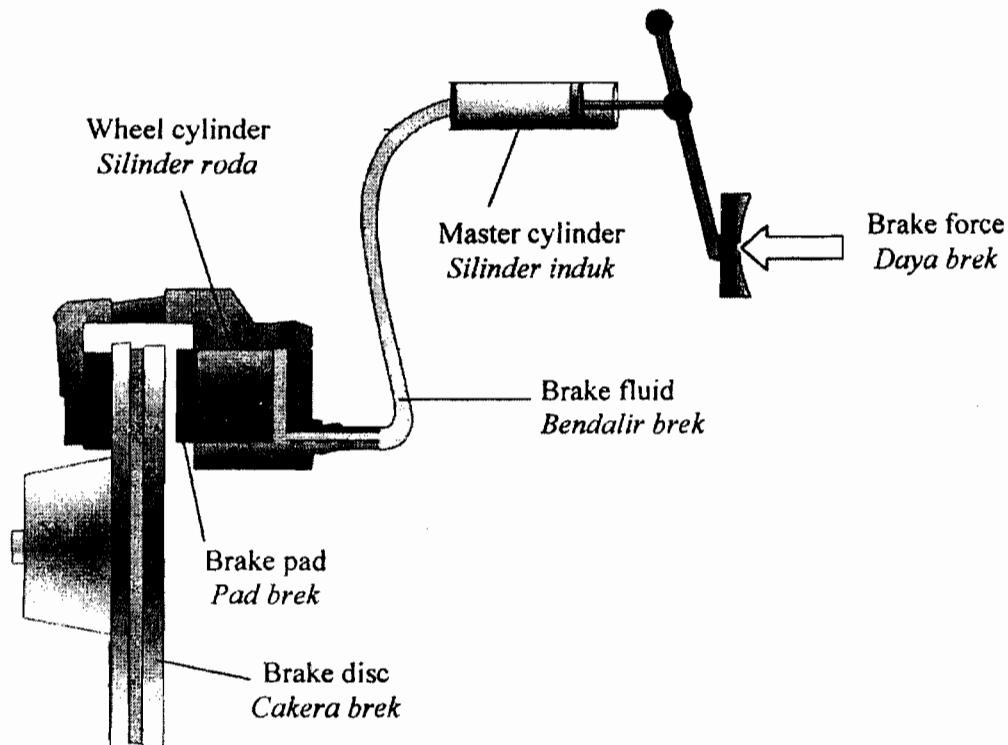


Diagram 12 / Rajah 12

Which of the following is **not** a characteristic of the brake fluid?
Antara yang berikut, yang manakah bukan ciri bagi bendarir brek?

- | | | |
|---|-------------------------|----------------------------------|
| A | Low density | / Ketumpatan yang rendah |
| B | Low rate of evaporation | / Kadar penyejatan yang rendah |
| C | Low boiling point | / Takat didih yang rendah |
| D | Low rate of expansion | / Kadar pengembangan yang rendah |

- 17 Diagram 13 shows a folded piece of paper resting on the table.
Rajah 13 menunjukkan sekeping kertas lipat yang berada di atas meja.

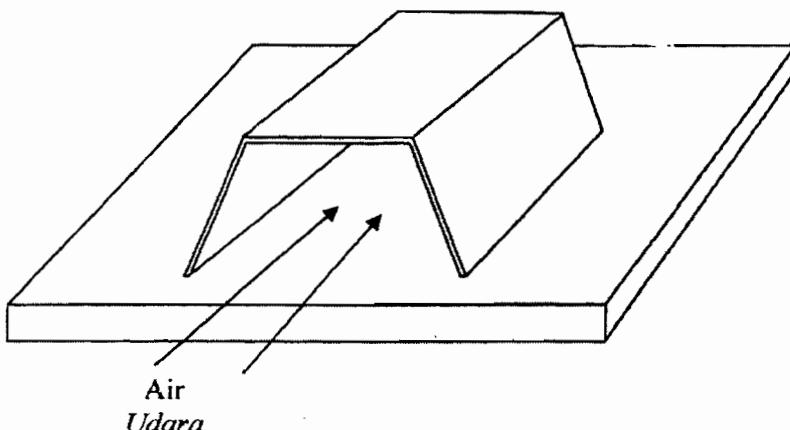


Diagram 13 / Rajah 13

Air is blown at high speed under the paper. What will happen to the paper?
Udara ditiup pada laju tinggi di bawah kertas itu. Apakah yang akan berlaku pada kertas itu?

- A The paper will lift up
Kertas itu akan terangkat naik
- B The paper will press down on to the table
Kertas itu akan tertekan pada meja
- C The paper will remain as it is
Kertas itu akan berada seperti asal

- 18 Diagram 14 shows four people rowing a boat.
Rajah 14 menunjukkan empat orang mendayung sebuah bot.



Diagram 14 / Rajah 14

When one of them jumps into the water, the buoyant force on the boat will
Apabila salah seorang melompat ke dalam air, daya keapungan ke atas bot itu akan

- A decrease / berkurang
- B increase / bertambah
- C remains the same / kekal malar

- 19 Two objects that are at thermal equilibrium have
Dua objek yang berada dalam keseimbangan terma mempunyai
- A the same mass / *jisim yang sama*
 - B the same amount of heat energy / *kuantiti tenaga haba yang sama*
 - C the same heat capacity / *muatan haba yang sama*
 - D the same temperature / *suhu yang sama*
- 20 24 000 J of heat is used to increase the temperature of 0.8 kg metal block from 25°C to 55°C.
 What is the specific heat capacity of the metal block?
24 000 J haba digunakan untuk meningkatkan suhu sebuah blok logam 0.8 kg daripada 25°C kepada 55°C.
Berapakah muatan haba tentu blok logam itu?
- A $375 \text{ J kg}^{-1}\text{°C}^{-1}$
 - B $545 \text{ J kg}^{-1}\text{°C}^{-1}$
 - C $1\ 000 \text{ J kg}^{-1}\text{°C}^{-1}$
 - D $1\ 200 \text{ J kg}^{-1}\text{°C}^{-1}$
- 21 Diagram 15 shows the cooling curve for a substance that was initially in the liquid state.
Rajah 15 menunjukkan lengkung penyejukan bagi suatu bahan yang pada awalnya berada dalam keadaan cecair.

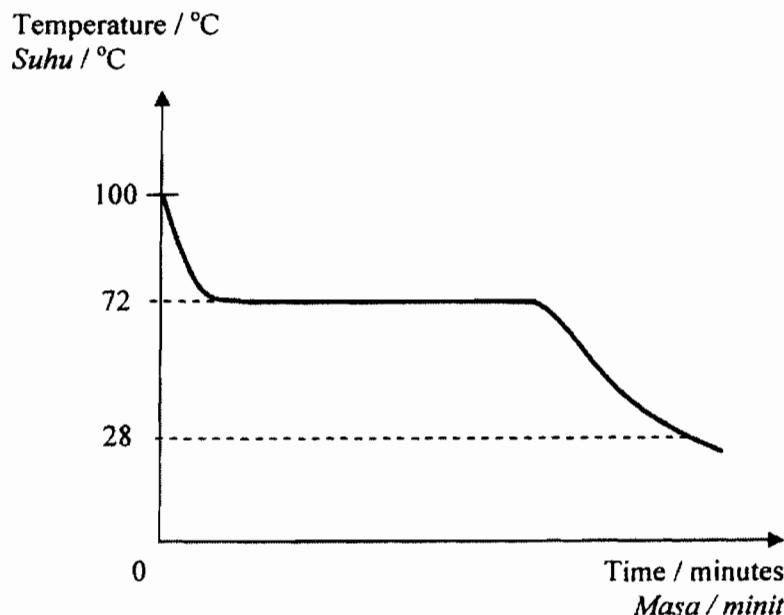


Diagram 15 / Rajah 15

Which of the following gives the correct information about the freezing point of the substance and the room temperature?

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Antara yang berikut, yang manakah memberikan maklumat yang betul tentang takat beku bahan itu dan suhu bilik?

- | | Freezing point / Takat beku | Room temperature / Suhu bilik |
|---|-----------------------------|---|
| A | 72°C | 28°C |
| B | 72°C | Less than 28°C / Kurang daripada 28°C |
| C | 28°C | Less than 28°C / Kurang daripada 28°C |
| D | 100°C | 72°C |
- 22 The body temperature of a boy increases from 37°C to 38°C . What is this increase in temperature in kelvin?
Suhu badan seorang budak bertambah dari 37°C ke 38°C . Berapakah peningkatan suhu ini dalam kelvin?
- A 1 K
B 273 K
C 310 K
D 311 K
- 23 Diagram 16 shows the pressure-volume graph for a fixed mass of gas.
Rajah 16 menunjukkan graf tekanan-isipadu bagi suatu gas berjisim tetap.

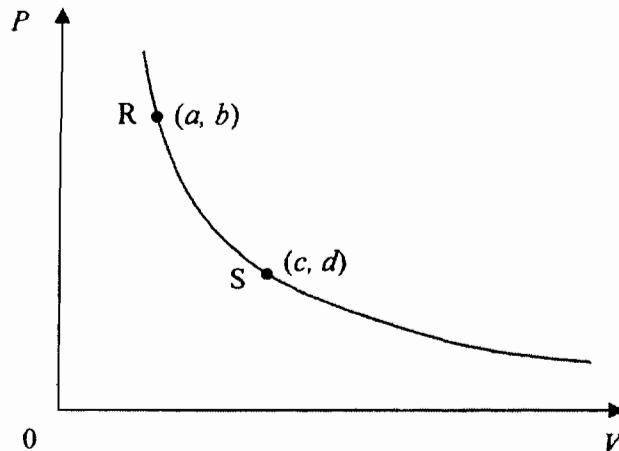


Diagram 16 / Rajah 16

Which of the following relationships is correct?
Hubungan yang manakah betul?

- A $ab = cd$
B $ac = bd$
C $\frac{a}{b} = \frac{c}{d}$
D $a - b = c - d$

- 24 Diagram 17 shows four objects P, Q, R and S in front of a plane mirror.
Rajah 17 menunjukkan empat objek P, Q, R dan S di hadapan sebuah cermin satah.

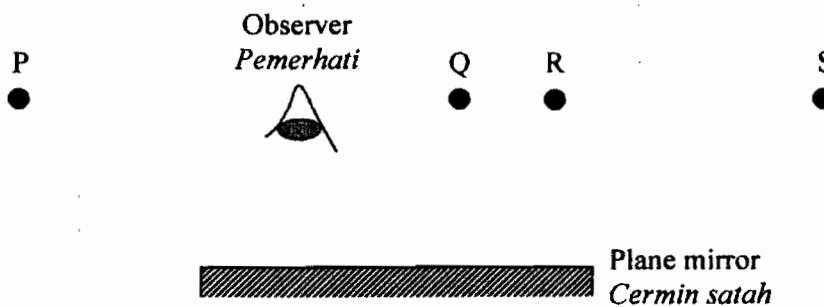


Diagram 17 / Rajah 17

Which image cannot be seen by the observer?
Imej yang manakah tidak dapat dilihat oleh pemerhati itu?

- A The image of P / Imej bagi P
 - B The image of Q / Imej bagi Q
 - C The image of R / Imej bagi R
 - D The image of S / Imej bagi S
- 25 Diagram 18 shows a light ray moving in water towards a layer of oil.
Rajah 18 menunjukkan satu sinar cahaya bergerak dalam air ke arah satu lapisan minyak.

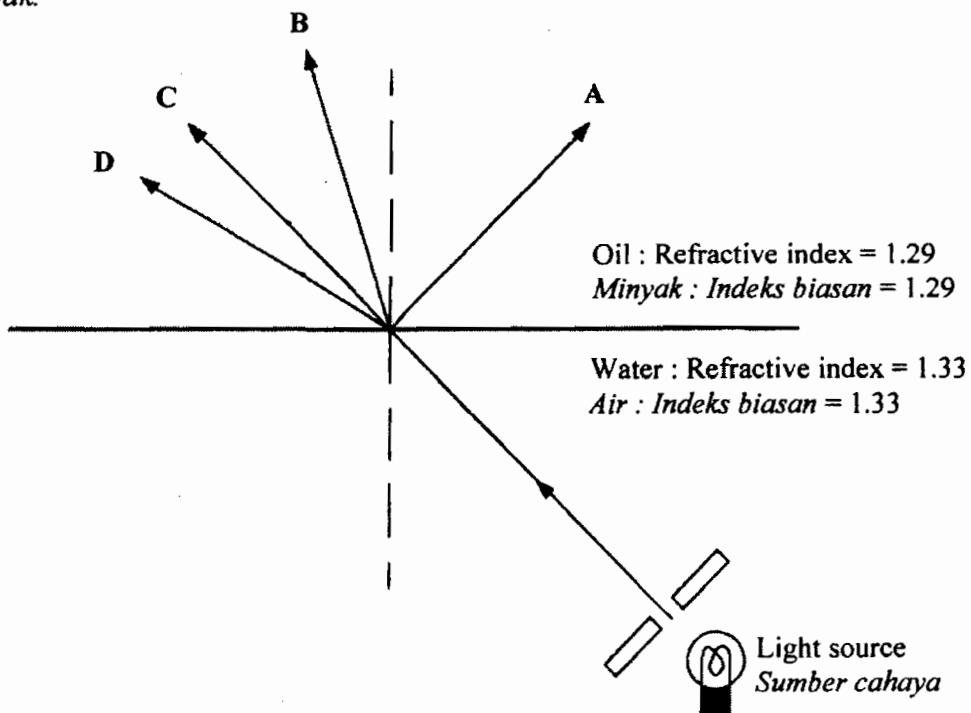


Diagram 18 / Rajah 18

Which ray is the refracted ray in the layer of oil?
Sinar manakah ialah sinar biasan dalam lapisan minyak?

- 26 The critical angle of a type of glass is 40° .
 What are the conditions for total internal reflection to occur?
Sudut genting bagi suatu jenis kaca ialah 40° .
Apakah syarat untuk pantulan dalam penuh berlaku?

- A Light moving from air towards glass; angle of incidence $> 40^\circ$
Cahaya bergerak dari udara ke arah kaca; sudut tuju $> 40^\circ$
- B Light moving from air towards glass; angle of incidence $< 40^\circ$
Cahaya bergerak dari udara ke arah kaca; sudut tuju $< 40^\circ$
- C Light moving from glass towards air; angle of incidence $> 40^\circ$
Cahaya bergerak dari kaca ke arah udara; sudut tuju $> 40^\circ$
- D Light moving from glass towards air; angle of incidence $< 40^\circ$
Cahaya bergerak dari kaca ke arah udara; sudut tuju $< 40^\circ$

- 27 Diagram 19 shows an object placed in front of a convex lens.
Rajah 19 menunjukkan suatu objek diletakkan di hadapan satu kanta cembung.

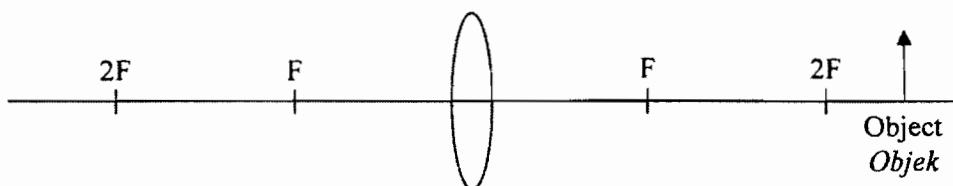


Diagram 19 / Rajah 19

- What are the characteristics of the image formed?
Apakah ciri-ciri imej yang terbentuk?

- A Real, inverted, magnified / Nyata, songsang, dibesarkan
 - B Virtual, upright, magnified / Maya, tegak, dibesarkan
 - C Real, inverted, same size / Nyata, songsang, sama saiz
 - D Real, inverted, diminished / Nyata, songsang, dikecilkan
- 28 Two convex lenses of focal lengths 4 cm and 60 cm are used to construct an astronomical telescope at normal adjustment. What is the distance between the two lenses?
Dua kanta cembung dengan panjang fokus 4 cm dan 60 cm digunaan untuk membina sebuah teleskop astronomi pada pelarasian normal. Berapakah jarak antara dua kanta itu?
- A 15 cm
 - B 56 cm
 - C 64 cm
 - D 240 cm

- 29 Diagram 20 shows an oscillating system.
Rajah 20 menunjukkan satu sistem ayunan

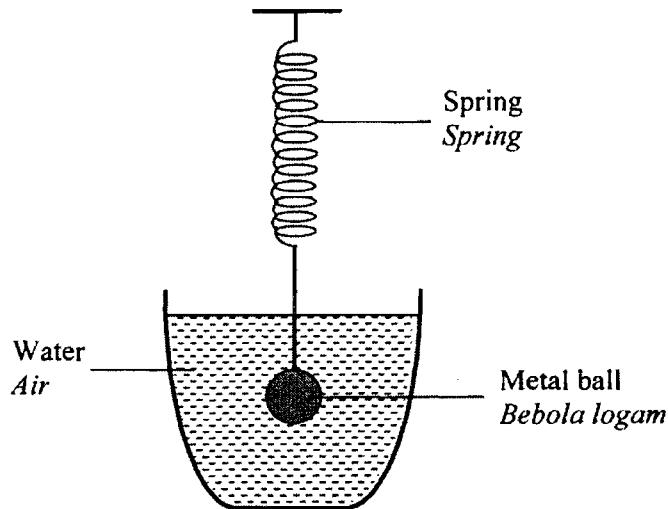
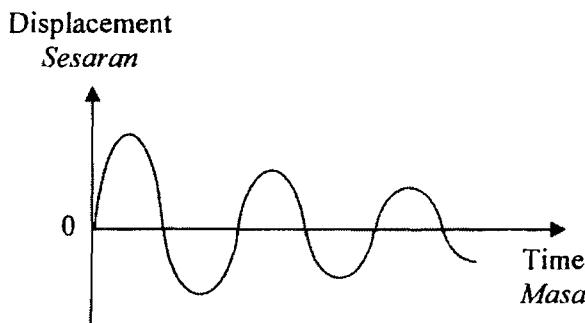


Diagram 20 / Rajah 20

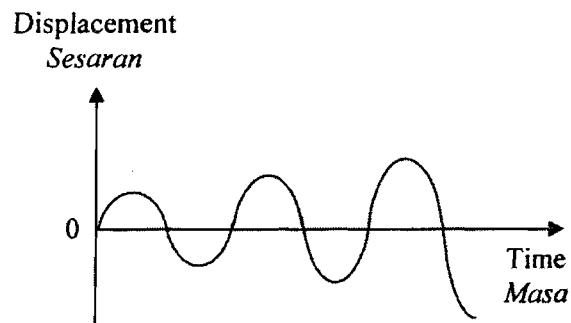
Which graph shows the correct relationship between displacement and time for the oscillating system?

Graf manakah yang menunjukkan hubungan yang betul antara sesaran dan masa bagi sistem ayunan itu?

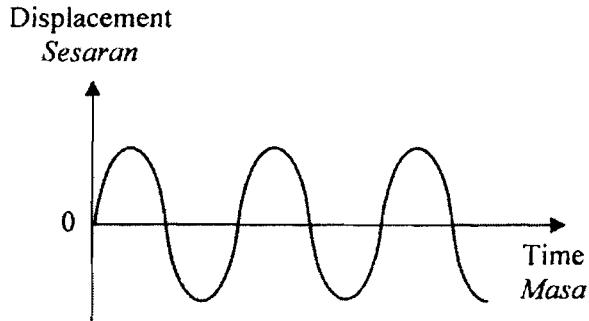
A



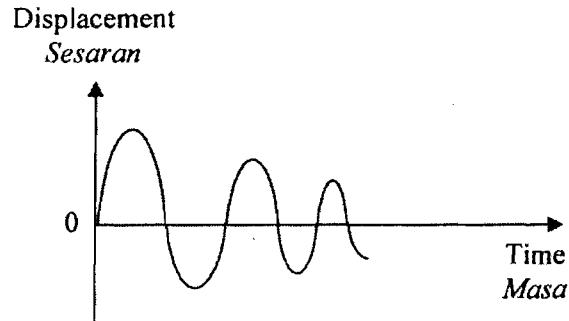
B



C



D



- 30 Diagram 21 shows the layers of air when waves are produced by a vibrating tuning fork.
Rajah 21 menunjukkan lapisan-lapisan udara apabila gelombang dihasilkan oleh sebuah tala bunyi.

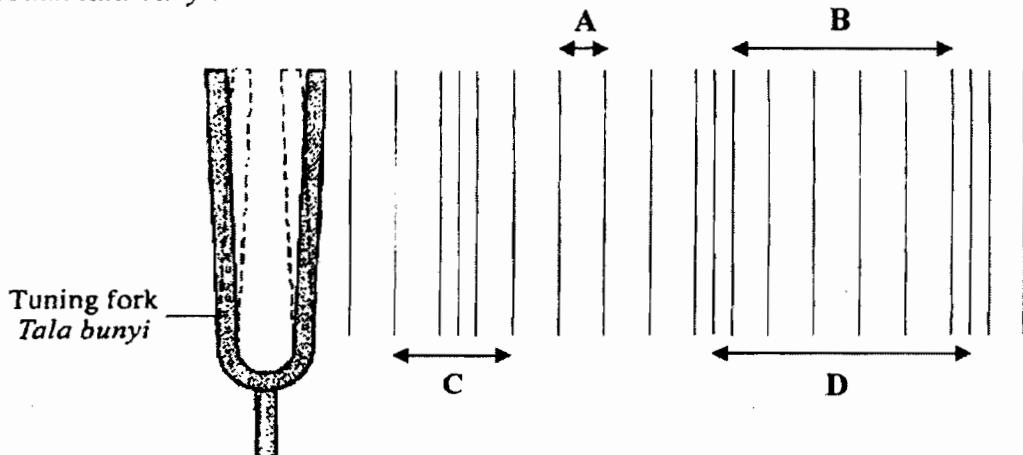


Diagram 21 / Rajah 21

Which distance represents one wavelength?

Jarak yang manakah mewakili satu panjang gelombang?

- 31 Which of the following electromagnetic waves has the lowest frequency?
Antara yang berikut, gelombang elektromagnet yang manakah mempunyai frekuensi yang paling rendah?
- | | |
|---------------------|--------------------|
| A Microwaves | / Gelombang mikro |
| B Ultra violet rays | / Sinar ultra ungu |
| C Blue light | / Cahaya biru |
| D X-rays | / Sinar-X |

- 32 Diagram 22 shows the apparatus used to produce plane waves on the surface of water.
Rajah 22 menunjukkan radas untuk menghasilkan gelombang satah pada permukaan air.

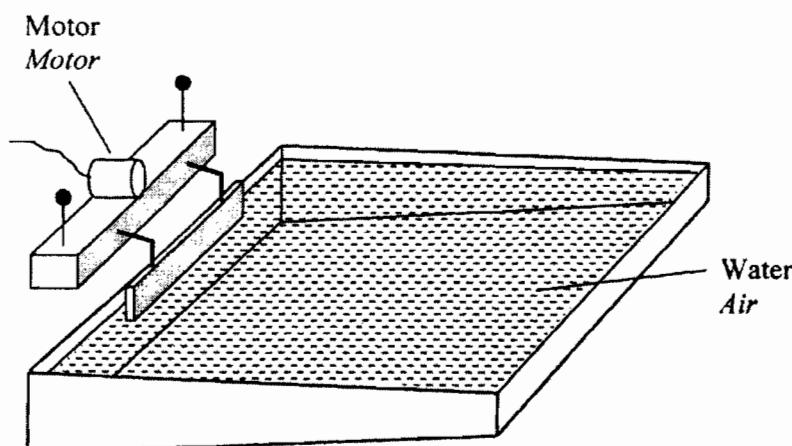
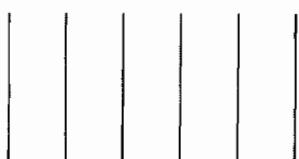


Diagram 22 / Rajah 22

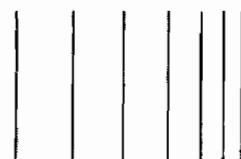
Which of the following diagrams shows the correct wavefronts when the motor is switched on?

Antara yang berikut, rajah yang manakah menunjukkan muka gelombang yang betul apabila motor dihidupkan?

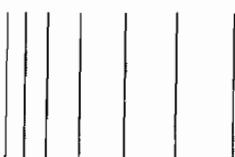
A



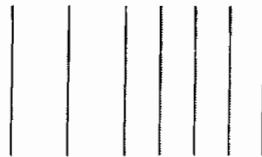
B



C



D



- 33 Diagram 23 shows plane wavefronts moving towards an obstacle.

Rajah 23 menunjukkan muka gelombang satah bergerak menuju suatu halangan.

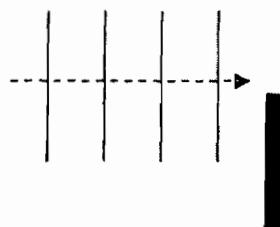
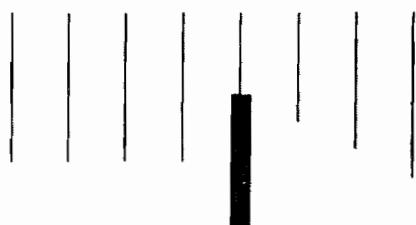


Diagram 23 / Rajah 23

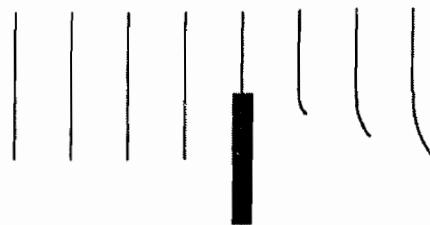
Which of the following diagrams show the correct wavefronts after passing the edge of the obstacle?

Antara yang berikut, rajah manakah menunjukkan muka gelombang yang betul selepas melalui tepi halangan itu?

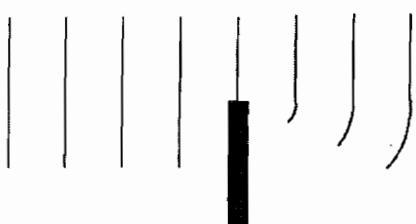
A



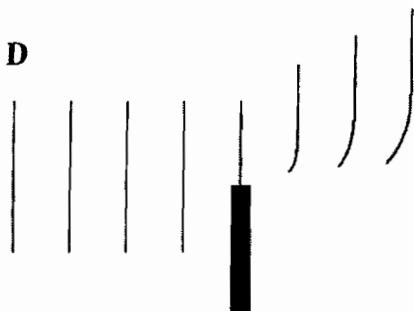
B



C



D



- 34 Diagram 24 shows the interference pattern of water waves produced by two coherent sources S_1 and S_2 .
Rajah 24 menunjukkan corak interferensi bagi gelombang air yang dihasilkan oleh dua sumber koheren S_1 dan S_2 .

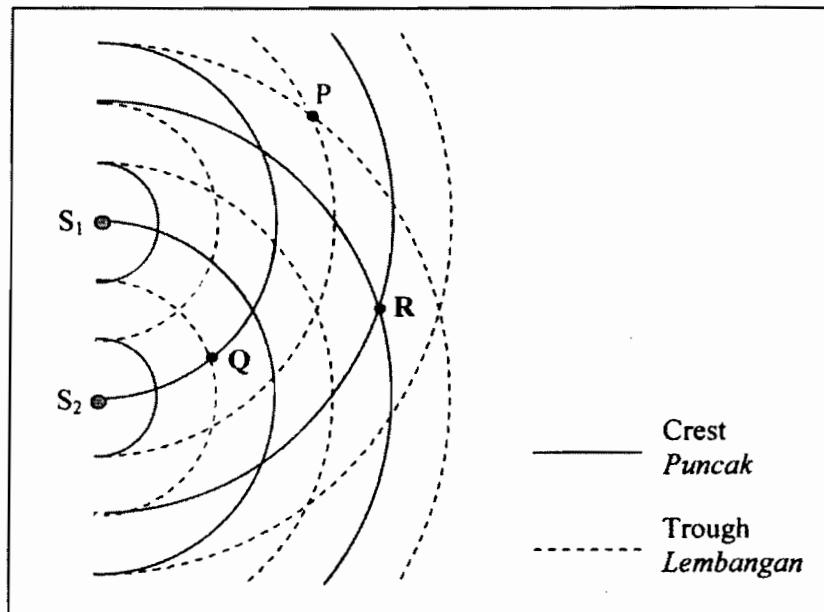


Diagram 24 / Rajah 24

At which points do constructive interference occur?
Pada titik-titik yang manakah interferensi membina berlaku?

- A P and Q / P dan Q
- B P and R / P dan R
- C Q and R / Q dan R
- D P, Q and R / P, Q dan R

- 35 A light bulb is labelled 240 V, 0.25 A.
 What is the quantity of charge that flows through the bulb when it lights up at normal brightness for 600 s?
Sebuah mentol lampu dilabel 240 V, 0.25 A.
Berapakah kuantiti cas yang mengalir melalui mentol itu apabila mentol itu menyala pada kecerahan normal selama 600 s?

- A 150 C
- B 360 C
- C 840 C
- D 2400 C

- 36 Diagram 25 shows two resistors connected in parallel.
Rajah 25 menunjukkan dua perintang disambung selari.

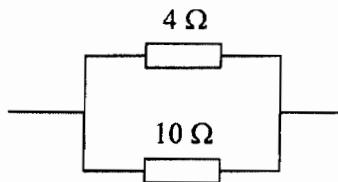


Diagram 25 / Rajah 25

The effective resistance is
Rintangan berkesan adalah

- A smaller than $4\ \Omega$ / lebih kecil daripada $4\ \Omega$
 - B between $4\ \Omega$ and $10\ \Omega$ / di antara $4\ \Omega$ dan $10\ \Omega$
 - C between $10\ \Omega$ and $14\ \Omega$ / di antara $10\ \Omega$ dan $14\ \Omega$
 - D bigger than $14\ \Omega$ / lebih besar daripada $14\ \Omega$
- 37 Diagram 26 shows a cell which has internal resistance connected to a light bulb.
Rajah 26 menunjukkan sebuah sel yang mempunyai rintangan dalam disambung kepada sebuah mentol.

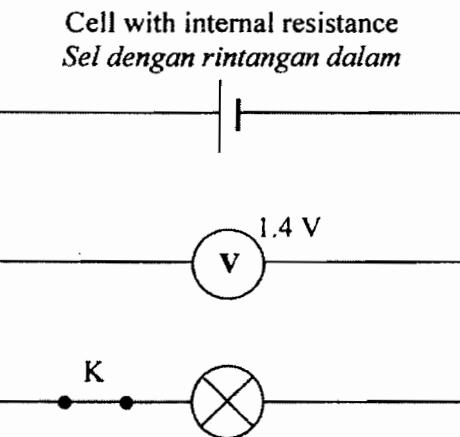


Diagram 26 / Rajah 26

What is the voltmeter reading when switch K is switched off?
Apakah bacaan voltmeter apabila suis K dipadamkan?

- A 0
- B 1.4 V
- C Less than 1.4 V / Lebih kecil daripada 1.4 V
- D More than 1.4 V / Lebih besar daripada 1.4 V

- 38** Diagram 27 shows an electric circuit.
Rajah 27 menunjukkan satu litar elektrik.

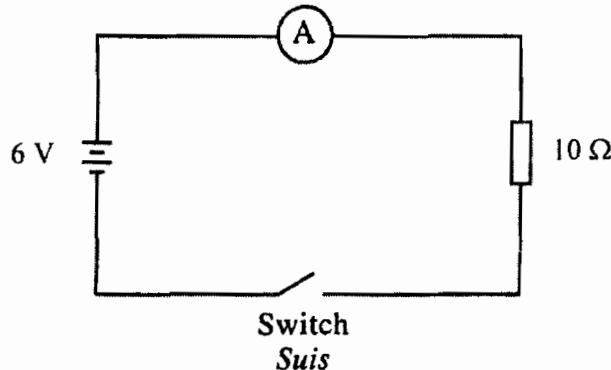


Diagram 27 / Rajah 27

What is the energy dissipated in the resistor when the switch is on for 1 minute?
Berapakah tenaga yang dilesapkan dalam perintang apabila suis dihidupkan selama 1 minit?

- A** 6 J
 - B** 60 J
 - C** 216 J
 - D** 3 600 J
- 39** Diagram 28 shows the arrangement of apparatus to investigate the magnetic field produced by the current in a circular coil.
Rajah 28 menunjukkan susunan radas untuk mengkaji medan magnet yang dihasilkan oleh arus dalam gegelung bulat.

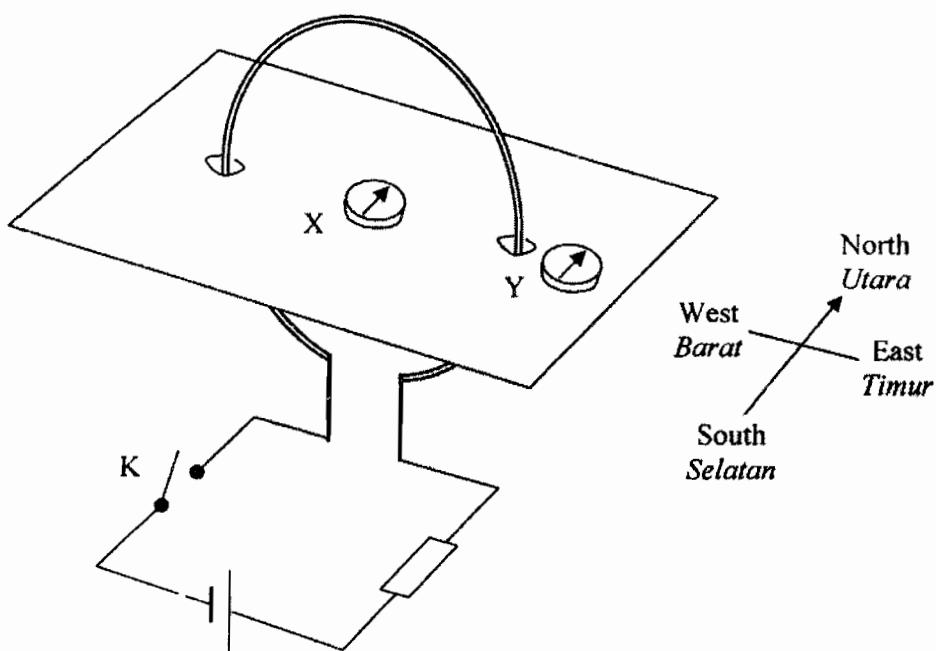


Diagram 28 / Rajah 28

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What are the directions shown by the pointers of compass X and compass Y when K is switched on?

Apakah arah yang akan ditunjuk oleh jarum kompas X dan Y apabila suis K dihidupkan?

Compass X / Kompas X

- A North / Utara
- B North / Utara
- C South / Selatan
- D South / Selatan

Compass Y / Kompas Y

- North / Utara
- South / Selatan
- North / Utara
- South / Selatan

- 40 Diagram 29 shows a coil WXYZ that is carrying a current.

Rajah 29 menunjukkan sebuah gegelung WXYZ yang membawa arus.

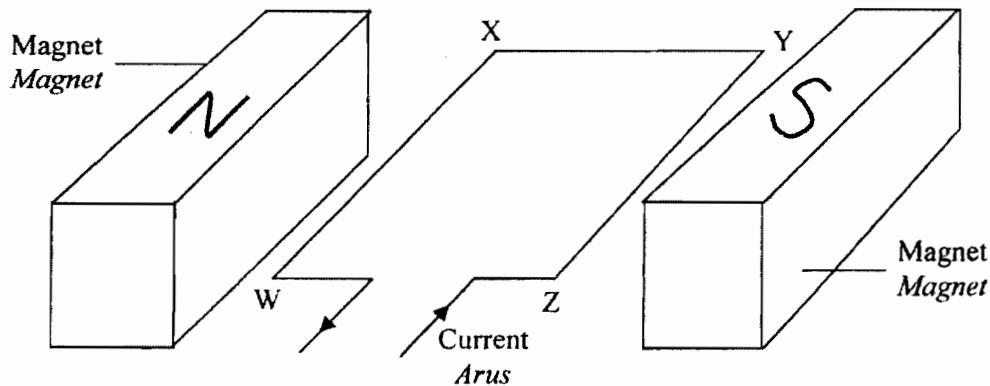


Diagram 29 / Rajah 29

What are the directions of the magnetic force acting on the sides WX and YZ of the coil?

Apakah arah daya magnet yang bertindak pada sisi WX dan YZ gegelung itu?

WX

- A Downwards / Ke bawah
- B Downwards / Ke bawah
- C Upwards / Ke atas
- D Upwards / Ke atas

YZ

- Upwards / Ke atas
- Downwards / Ke bawah
- Upwards / Ke atas
- Downwards / Ke bawah

- 41 Diagram 30 shows a copper rod being pulled across a magnetic field.

Rajah 30 menunjukkan sebatang rod kuprum ditarik merentasi medan magnet.

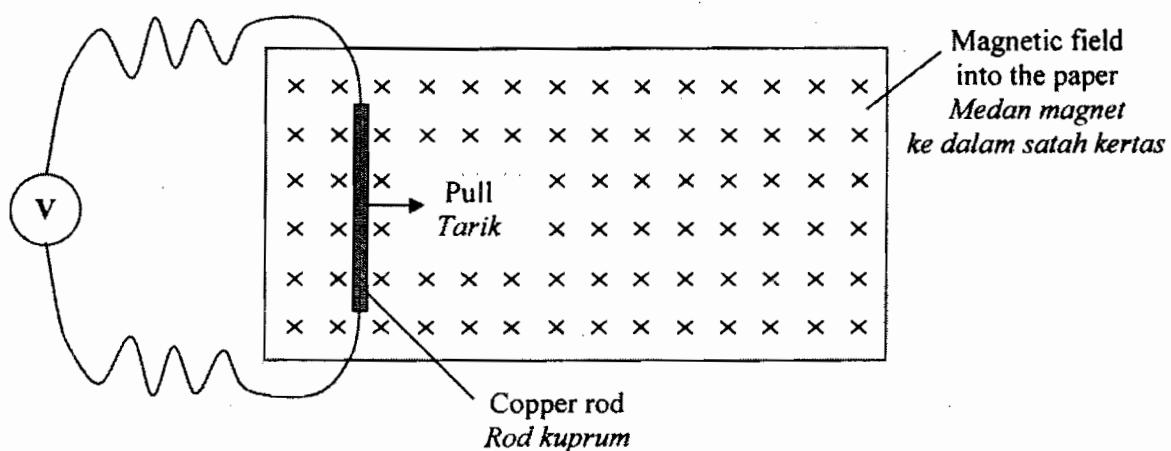


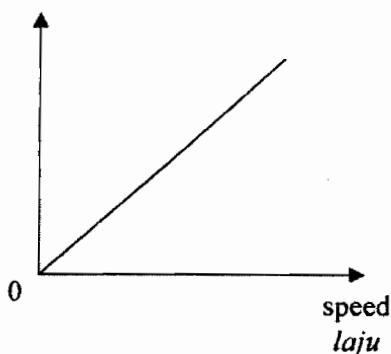
Diagram 30 / Rajah 30

Which graph shows the relationship between the induced e.m.f. across the copper rod and the speed of the copper rod?

Graf manakah menunjukkan hubungan antara d.g.e. aruhan merentasi rod kuprum dan laju gerakan rod kuprum?

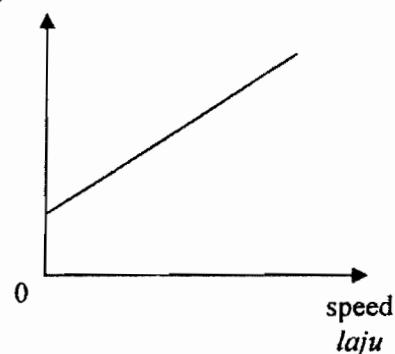
A

Induced e.m.f.
d.g.e. aruhan



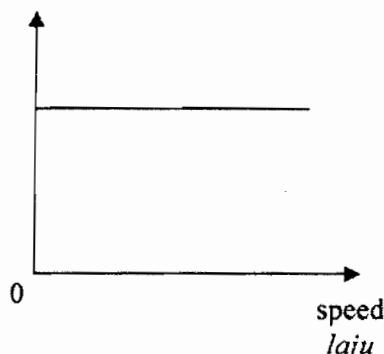
B

Induced e.m.f.
d.g.e. aruhan



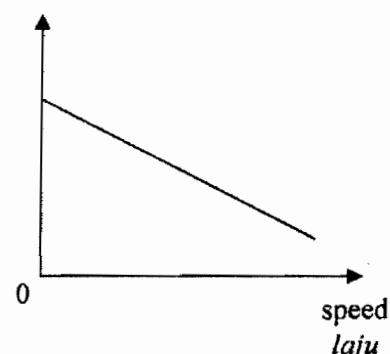
C

Induced e.m.f.
d.g.e. aruhan



D

Induced e.m.f.
d.g.e. aruhan



- 42 The primary voltage and secondary voltage of a transformer are 12 V and 360 V respectively.

What is the number of turns of the primary coil and secondary coil of the transformer?
Voltan primer dan voltan sekunder sebuah transformer ialah 12 V dan 360 V masing-masing.

Berapakah bilangan lilitan gegelung primer dan gegelung sekunder bagi transformer itu?

	Number of turns of primary coil <i>Bilangan lilitan gegelung primer</i>	Number of turns of secondary coil <i>Bilangan lilitan gegelung sekunder</i>
A	2400	30
B	1800	60
C	500	1500
D	40	1200

- 43 Which characteristics are the most suitable for transmission of electricity through the National Grid Network?

Ciri-ciri manakah paling sesuai untuk penghantaran elektrik melalui Rangkaian Grid Nasional?

	Type of current <i>Jenis arus</i>	Magnitude of voltage <i>Magnitud voltan</i>
A	Direct current <i>Arus terus</i>	Very high <i>Sangat tinggi</i>
B	Direct current <i>Arus terus</i>	Small <i>Kecil</i>
C	Alternating current <i>Arus ulangalik</i>	Small <i>Kecil</i>
D	Alternating current <i>Arus ulangalik</i>	Very high <i>Sangat tinggi</i>

- 44 Diagram 31 shows a shadow on the screen of a Maltese Cross Tube when the 6.3 V power supply is switched on but the EHT power supply is off.
Rajah 31 menunjukkan bayang di atas skrin Tiub Palang Maltese apabila bekalan kuasa 6.3 V dihidupkan tetapi bekalan kuasa VLT dimatikan.

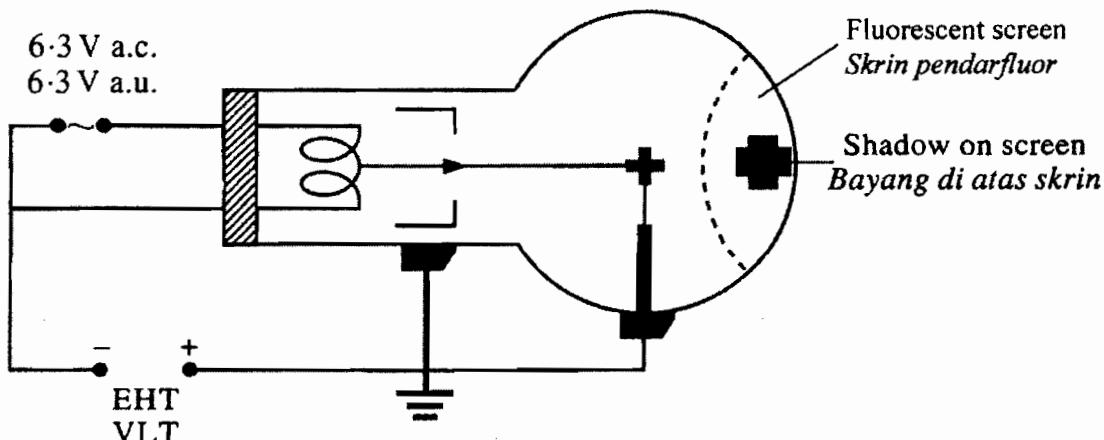


Diagram 31 / Rajah 31

When the EHT supply is switched on, the shadow remains but the fluorescent screen becomes green in colour.

Which statement cannot be inferred from this observation?

Apabila bekalan kuasa VLT dihidupkan, bayang itu kekal tetapi skrin pendarfluor menjadi berwarna hijau.

Pernyataan manakah tidak boleh diinferens daripada pemerhatian ini?

- A Cathode rays move in a straight line
Sinar katod bergerak dalam satu garis lurus
- B Cathode rays have kinetic energy
Sinar katod mempunyai tenaga kinetik
- C Cathode rays move at high speed
Sinar katod bergerak pada laju tinggi
- D Cathode rays are green in colour
Sinar katod berwarna hijau

- 45 Diagram 32 shows an electronic symbol representing an electronic component.
Rajah 32 menunjukkan satu simbol elektronik yang mewakili satu komponen elektronik.



Diagram 32 / Rajah 32

What is the electronic component?
Apakah komponen elektronik itu?

- | | | |
|---|------------|--------------|
| A | Diode | / Diod |
| B | Capacitor | / Kapasitor |
| C | Resistor | / Perintang |
| D | Transistor | / Transistor |
- 46 Diagram 33 shows a transistor circuit with a thermistor and a light bulb.
Rajah 33 menunjukkan suatu litar transistor dengan sebuah termistor dan mentol.

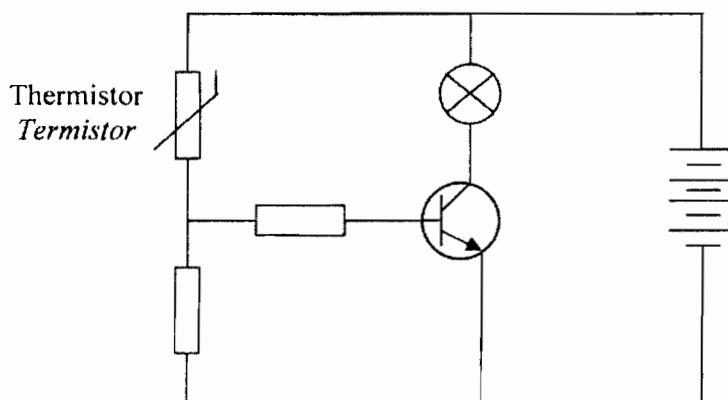


Diagram 33 / Rajah 33

What happens to the resistance of the thermistor and the light bulb when the temperature surrounding the thermistor increases?
Apakah yang berlaku kepada rintangan termistor dan mentol itu apabila suhu di sekeliling termistor itu bertambah?

- | | Resistance of thermistor
<i>Rintangan termistor</i> | Light bulb
<i>Mentol</i> |
|---|--|---|
| A | Decreases
<i>Berkurang</i> | Lights up
<i>Bernyala</i> |
| B | Decreases
<i>Berkurang</i> | Does not light up
<i>Tidak beryala</i> |
| C | Increases
<i>Bertambah</i> | Lights up
<i>Bernyala</i> |
| D | Increases
<i>Bertambah</i> | Does not light up
<i>Tidak beryala</i> |

- 47 Diagram 34 shows a combination of logic gates with input P, input Q, output S and output T.
Rajah 34 menunjukkan satu kombinasi get logik dengan input P, input Q, output S dan output T.

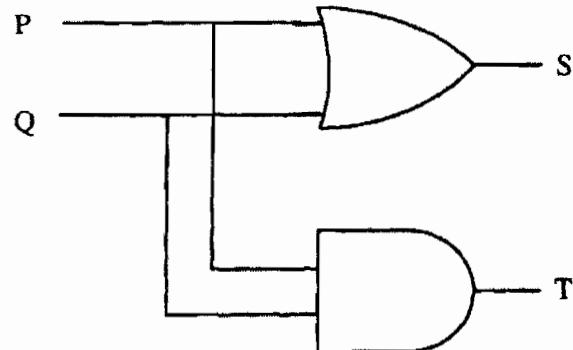


Diagram 34 / Rajah 34

Which pairs of input and output of the logic gate combination is correct?
Pasangan input dan output manakah yang betul bagi kombinasi get logik itu?

	P	Q	S	T
A	0	1	0	1
B	1	0	1	0
C	0	0	1	0
D	1	1	0	1

- 48 Diagram 35 shows a decay series.
Rajah 35 menunjukkan suatu siri pereputan.

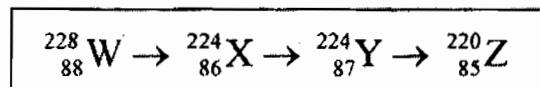


Diagram 35 / Rajah 35

The radiation given out consists of
Sinaran yang dikeluarkan terdiri daripada

- A two α -particles and gamma rays / dua zarah- α dan sinar gama
- B two β -particles and gamma rays / dua zarah- β dan sinar gama
- C two α -particles and one β -particle / dua zarah- α dan satu zarah- β
- D one α -particle and two β -particles / satu zarah- α dan dua zarah- β

- 49 Diagram 36 shows the decay curve for a radioactive sample.
Rajah 36 menunjukkan lengkung pereputan bagi suatu sampel radioaktif.

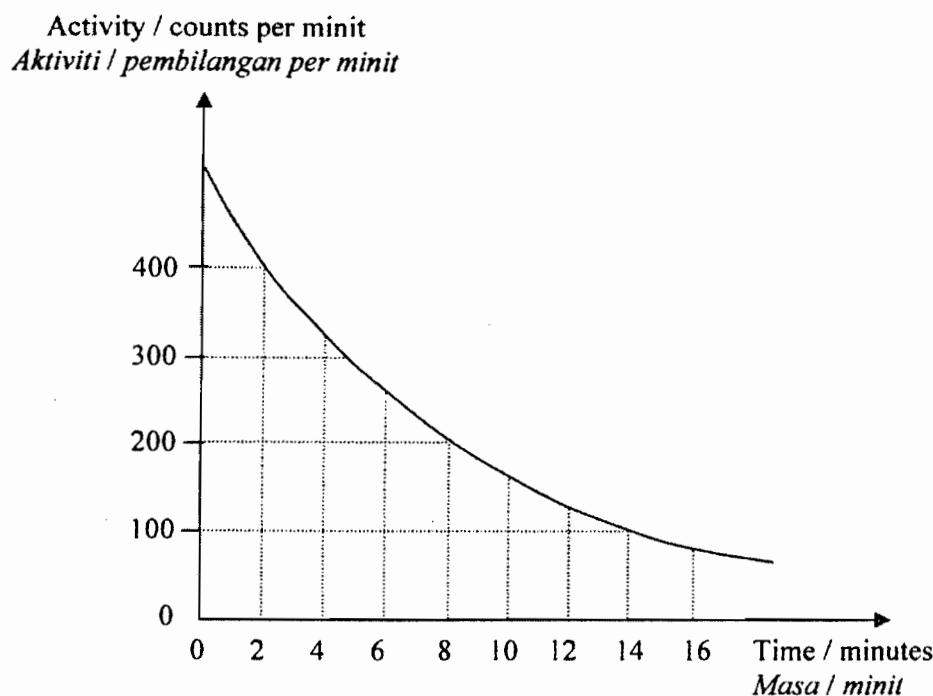


Diagram 36 / Rajah 36

What is the half-life of the radioactive sample?
Berapakah setengah hayat sampel radioaktif itu?

- A 4 minutes / 4 minit
 - B 6 minutes / 6 minit
 - C 8 minutes / 8 minit
 - D 10 minutes / 10 minit
- 50 The process of a heavier nucleus splitting to form two lighter nuclei is known as
Proses pembelahan satu nukleus yang lebih berat untuk membentuk dua nukleus yang lebih ringan dikenali sebagai
- A nuclear fusion / pelakuran nuklear
 - B nuclear fission / pembelahan nuklear
 - C chain reaction / tindak balas berantai

END OF QUESTION PAPER

KERTAS SOALAN TAMAT



**PROGRAM PENINGKATAN PRESTASI AKADEMIK SPM
TAHUN 2012**

FIZIK

Kertas 1

PERATURAN PEMARKAHAN

2012 PSPM Kedah Fizik 1

PHYSICS

PAPER		MARKS
Paper 1		50
Paper 2		100
Paper 3		40
	Total	190

Jumlah markah diskalakan kepada 100%

Paper 1

1	C
2	D
3	C
4	D
5	B
6	C
7	A
8	B
9	A
10	B
11	C
12	B
13	B
14	C
15	D
16	C
17	B
18	A
19	D
20	C
21	B
22	A
23	A
24	A
25	D

26	C
27	D
28	C
29	A
30	D
31	A
32	B
33	C
34	B
35	A
36	A
37	D
38	C
39	C
40	D
41	A
42	D
43	D
44	D
45	A
46	A
47	B
48	C
49	B
50	B

Nama :

Tingkatan :

**SULIT**

PROGRAM PENINGKATAN PRESTASI AKADEMIK SPM
TAHUN 2012

FIZIK
Kertas 2

Dua jam tiga puluh minit

JANGAN BUKA KERTAS SOALANINI SEHINGGA DIBERITAHU

1. *Kertas soalan ini adalah dalam dwibahasa.*
2. *Soalan dalam bahasa Inggeris mendahului soalan yang sepadan dalam bahasa Melayu.*
3. *Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam bahasa Inggeris atau bahasa Melayu.*
4. *Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.*

Untuk Kegunaan Pemeriksa			
Bahagian	Soalan	Markah Penuh	Markah Diperoleh
A	1	4	
	2	5	
	3	6	
	4	7	
	5	8	
	6	8	
	7	10	
	8	12	
B	9	20	
	10	20	
C	11	20	
	12	20	
Jumlah			

Kertas soalan ini mengandungi 26 halaman bercetak

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

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

$$17. \quad \frac{1}{f} = \frac{1}{u} + \frac{1}{v}$$

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

18. Magnifying power /

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

$$\text{Kuasa pembesaran} = \frac{f_o}{f_e}$$

4. Momentum = mv

$$19. \quad v = f\lambda$$

$$5. \quad F = ma$$

$$20. \quad \lambda = \frac{\alpha x}{D}$$

$$6. \quad \text{Kinetic energy / Tenaga kinetik} = \frac{1}{2}mv^2$$

$$21. \quad Q = It$$

$$7. \quad \text{Gravitational potential energy /} \\ \text{Tenaga keupayaan graviti} = mgh$$

$$22. \quad E = VQ$$

$$8. \quad \text{Elastic potential energy /} \\ \text{Tenaga keupayaan kenyal} = \frac{1}{2}Fx$$

$$24. \quad \text{Power / Kuasa, } P = IV$$

$$\text{Power / Kuasa, } P = I^2R$$

$$9. \quad \text{Power, } P = \frac{\text{energy}}{\text{time}}$$

$$\text{Power / Kuasa, } P = \frac{V^2}{R}$$

$$\text{Kuasa, } P = \frac{\text{tenaga}}{\text{masa}}$$

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

$$10. \quad \text{Density / Ketumpatan, } \rho = \frac{m}{V}$$

26. Efficiency /

$$11. \quad \text{Pressure / Tekanan, } p = h\rho g$$

$$\text{Kecekapan} = \frac{I_s V_s}{I_p V_p} \times 100 \%$$

$$12. \quad \text{Pressure / Tekanan, } p = \frac{F}{A}$$

$$27. \quad E = mc^2$$

$$13. \quad \text{Heat / Haba, } Q = mc\theta$$

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

$$14. \quad \text{Heat / Haba, } Q = ml$$

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

$$15. \quad \frac{pV}{T} = \text{constant / pemalar}$$

$$16. \quad n = \frac{\sin i}{\sin r}$$

$$n = \frac{1}{\sin c}$$

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Section A
Bahagian A
[60 marks]

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

- 1 Diagram 1 shows a wooden dipper oscillating on the surface of water to generate water waves.

Rajah 1 menunjukkan sebuah pencelup kayu bergetar pada permukaan air untuk menjana gelombang air.

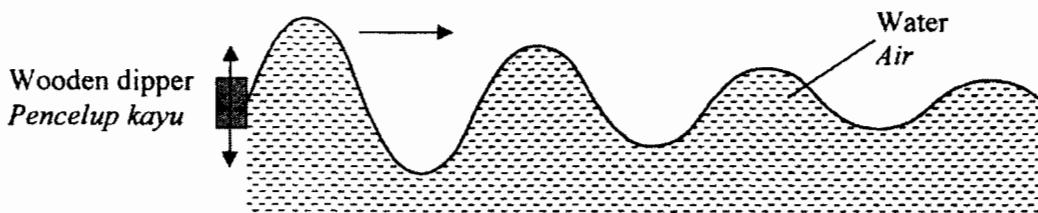


Diagram 1 / Rajah 1

- (a) Underline the correct answer in the brackets to complete the sentence below.

Water waves are (longitudinal, transverse) waves. [1 mark]

Garis jawapan yang betul dalam kurungan untuk melengkapkan ayat di bawah.

Gelombang air ialah gelombang (membujur, melintang). [1 markah]

- (b) The water waves generated travel with certain speed on the surface of the water.

State one factor which affects the speed of the water waves.

Gelombang air yang dijana bergerak dengan laju yang tertentu pada permukaan air. Nyatakan satu faktor yang mempengaruhi laju gelombang air.

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

- (c) (i) What happens to the energy of the water waves as it travels away from the wooden dipper?

Apakah yang berlaku kepada tenaga bagi gelombang apabila ia bergerak menjauhi pencelup kayu itu?

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

- (ii) Name the phenomenon in (c)(i).

Namakan fenomena di (c)(i).

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

- 2 Diagram 2.1 shows a stopwatch after it has been reset.
 Diagram 2.2 shows the reading of the stopwatch after it was used to measure the time taken for 20 oscillations of a simple pendulum.
Rajah 2.1 menunjukkan sebuah jam randik selepas jam randik itu diset semula.
Rajah 2.2 menunjukkan bacaan jam randik itu selepas jam randik itu digunakan untuk mengukur masa yang diambil untuk 20 ayunan sebuah bandul ringkas.

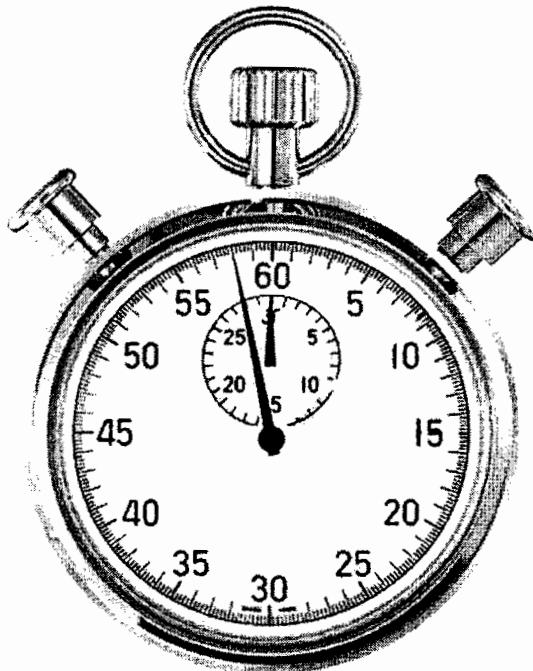


Diagram 2.1 / Rajah 2.1

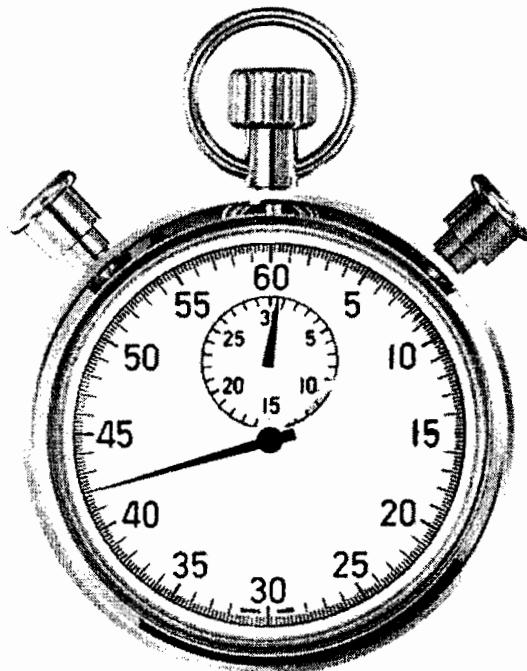


Diagram 2.2 / Rajah 2.2

- (a) Name the type of error found on the stopwatch in Diagram 2.1.
Namakan jenis ralat yang terdapat pada jam randik dalam Rajah 2.1.
 [1 mark] / [1 markah]
- (b) (i) What is the actual time taken for 20 oscillations of the simple pendulum?
Apakah masa yang sebenar untuk 20 ayunan bagi bandul ringkas itu?
 [1 mark] / [1 markah]
- (ii) Calculate the period of oscillation of the simple pendulum.
Hitungkan tempoh ayunan bandul ringkas itu.
 [2 marks] / [2 markah]
- (c) What will happen to the period of oscillation if the length of the simple pendulum is increased?
Apakah yang akan terjadi kepada tempoh ayunan jika panjang bandul ringkas itu ditambah?
 [1 mark] / [1 markah]
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- 3 Diagram 3 shows a man taking aim to spear a fish.

Rajah 3 menunjukkan seorang lelaki mensasarkan lembingnya dengan tujuan melembing seekor ikan.

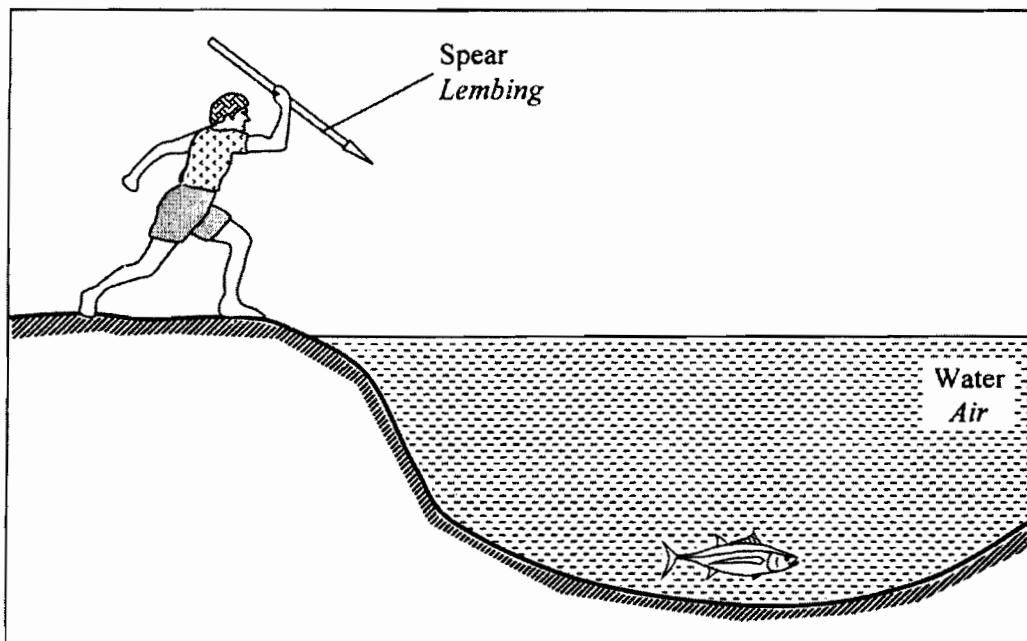


Diagram 3 / Rajah 3

- (a) The spear fails to hit the fish when it was thrown along the direction of his aim.
Lembing itu gagal mengena ikan itu apabila dibaling sepanjang arah yang disasarkan.
- (i) State **two** reasons, in terms of the propagation of light, why the spear did not hit the fish.
Nyatakan dua sebab, dalam sebutan perambatan cahaya, mengapa lembing itu tidak mengena ikan itu.

.....

[2 marks] / [2 markah]

- (ii) Draw light rays to show the position of the fish as seen by the man.
Lukiskan sinar cahaya untuk menunjukkan kedudukan ikan seperti dilihat oleh orang itu.

[2 marks] / [2 markah]

- (b) The fish is at a depth of 1.2 m from the surface of the water.
 What is the distance of the image of the fish below the surface of the water?
 [Refractive index of water = 1.33]
Ikan itu berada pada kedalaman 1.2 m dari permukaan air.
Berapakah jarak bagi imej ikan itu di bawah permukaan air?
 [Indeks biasan air = 1.33]

[2 marks] / [2 markah]

- 4 Diagram 4.1 shows four diodes connected to an alternating current supply. The output terminals X and Y across the resistor R are connected to a cathode ray oscilloscope (CRO). The time base of the CRO is set at 0.01 s/division.
 Diagram 4.2 shows the trace obtained on the screen of the CRO.

Rajah 4.1 menunjukkan empat diod disambung kepada bekalan arus ulangalik. Terminal-terminal output X dan Y merentasi perintang R disambung kepada sebuah osiloskop sinar katod (OSK). Dasar masa OSK itu dilaras kepada 0.01 s/bahagian.
Rajah 4.2 menunjukkan surihan yang diperoleh pada skrin OSK itu.

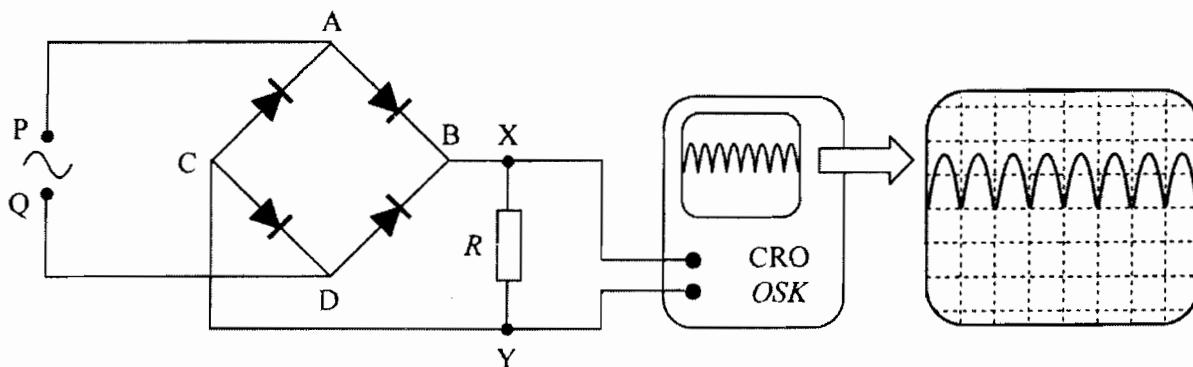


Diagram 4.1 / Rajah 4.1

Diagram 4.2 / Rajah 4.2

- (a) What is the function of a diode?
Apakah fungsi sebuah diod?

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

- (b) Based on Diagram 4.2:
Berdasarkan Rajah 4.2:
 (i) Determine the period of the alternating current supply.
Tentukan tempoh bagi bekalan arus ulangalik itu.

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

- (ii) Calculate the frequency of the alternating current supply.
Hitung frekuensi bagi bekalan arus ulangalik itu.

[2 marks] / [2 markah]

- (c) During the first half cycle, the current from P to Q follows the path
 $P \rightarrow A \rightarrow B \rightarrow X \rightarrow Y \rightarrow C \rightarrow D \rightarrow Q$.
 Write down the path of the current during the second half cycle from Q to P.

*Semasa separuh kitar pertama, arus dari P ke Q mengikuti lintasan
 $P \rightarrow A \rightarrow B \rightarrow X \rightarrow Y \rightarrow C \rightarrow D \rightarrow Q$.*

Tuliskan lintasan bagi arus semasa separuh kitar yang kedua dari Q ke P.

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

- (d) On Diagram 4.3, sketch the trace that will be obtained on the screen of the CRO when all the diodes in the circuit are reversed.
Pada Rajah 4.3, lakarkan surihan yang akan diperoleh pada skrin OSK itu apabila kesemua diod dalam litar tersebut disongsangkan.

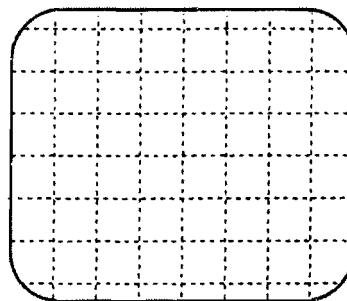


Diagram 4.3 / Rajah 4.3

[1 mark] / [1 markah]

- (e) Name the component that has to be connected to the circuit to smoothen the output voltage.
Namakan komponen yang perlu disambungkan ke dalam litar itu untuk meratakan voltan output.

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

- 5 Diagram 5.1 and Diagram 5.2 show identical metal blocks of mass 50 g hanging from a spring balance and immersed in water and cooking oil respectively.

Rajah 5.1 dan Rajah 5.2 menunjukkan blok logam yang serupa berjisim 50 g digantung daripada neraca spring dan direndam ke dalam air dan minyak masak masing-masing.

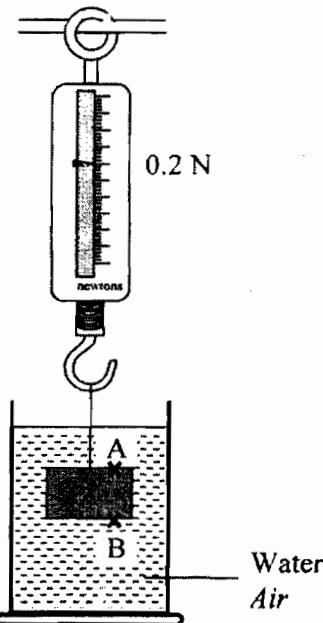


Diagram 5.1 / Rajah 5.1

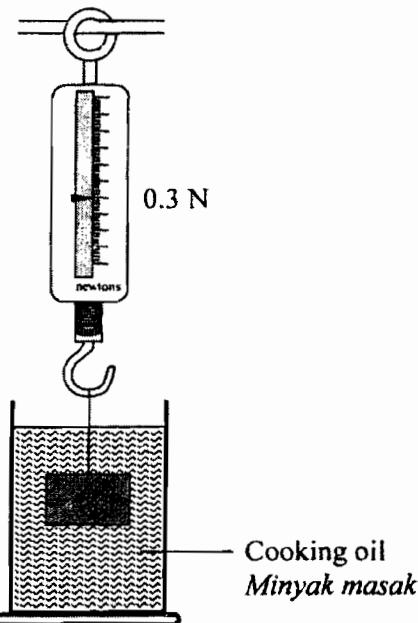


Diagram 5.2 / Rajah 5.2

- (a) State the physical quantity measured by a spring balance.
Nyatakan kuantiti fizik yang diukur oleh neraca spring itu.

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

- (b) (i) Compare the pressure at point A and point B in Diagram 5.1.
Explain your answer.
Bandingkan tekanan di titik A dan titik B dalam Rajah 5.1.
Jelaskan jawapan anda.

.....

.....

[2 marks] / [2 markah]

- (ii) Explain how the difference in pressure in 5(b)(ii) exerts an upthrust on the metal block.
Terangkan bagaimana perbezaan tekanan di 5(b)(ii) mengenakan satu daya tujah ke atas pada blok logam itu.

.....

.....

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- (c) Based on Diagram 5.1 and Diagram 5.2:
Berdasarkan Rajah 5.1 dan Rajah 5.2:

- (i) Compare the readings of the spring balances.
Bandingkan bacaan neraca-neraca spring itu.

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

- (ii) Relate the reading of the spring balance to the upthrust on the metal block.
Hubungkaitkan bacaan neraca spring kepada daya tujah ke atas pada blok logam itu.

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

- (iii) Compare the density of water to the density of cooking oil.
Bandingkan ketumpatan air dengan ketumpatan minyak masak.

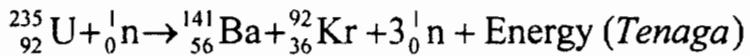
.....
.....
[1 mark] / [1 markah]

- (iv) State the relationship between the density of a liquid and the upthrust exerted by the liquid.
Nyatakan hubungan antara ketumpatan suatu cecair dengan daya tujah ke atas yang dikenakan oleh cecair itu.

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

- 6** Two nuclear reactions A and B are represented by the following equations:
Dua tindak balas nuklear A dan B diwakili oleh persamaan berikut:

Nuclear reaction A / *Tindak balas nuklear A*



Nuclear reaction B / *Tindak balas nuklear B*

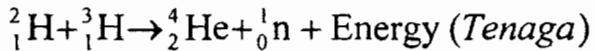


Table 6.1 shows the mass of the nuclides involved in the reactions.
Jadual 6.1 menunjukkan jisim bagi nuklid yang terlibat dalam tindak balas itu.

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Nuclide <i>Nuklid</i>	Mass / u <i>Jisim / u</i>
$^{235}_{92}\text{U}$	235.04392
$^{141}_{56}\text{Ba}$	140.91441
$^{92}_{36}\text{Kr}$	91.92611
^1_0n	1.00867

Nuclide <i>Nuklid</i>	Mass / u <i>Jisim / u</i>
^2_1H	2.014102
^3_1H	3.016049
^4_2He	4.002603

Table 6.1 / Jadual 6.1

- (a) What is the meaning of a nuclide?
Apakah maksud nuklid?

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

- (b) In Table 6.2, write down the total mass of the nuclides before and after each of the nuclear reaction.
Dalam Jadual 6.2, tuliskan jumlah jisim nuklid-nuklid tersebut sebelum dan selepas setiap tindak balas nuklear.

[3 marks] / [3 markah]

Nuclear reaction <i>Tindak balas nuklear</i>	Total mass before reaction <i>Jumlah jisim sebelum tindak balas</i>	Total mass after reaction <i>Jumlah jisim selepas tindak balas</i>
A		
B		

Table 6.2 / Jadual 6.2

- (c) (i) Compare the total mass of the nuclides before and after each nuclear reaction.
Bandingkan jumlah jisim nuklid sebelum dan selepas setiap tindak balas.

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

- (ii) From the results obtained in Table 6.2, deduce how energy is produced in a nuclear reaction.
Daripada keputusan yang diperoleh dalam Jadual 6.2, deduksikan bagaimana tenaga dihasilkan dalam satu tindak balas nuklear.

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

- (d) (i) Which nuclear reaction can cause a chain reaction?
Tindak balas nuklear manakah boleh menyebabkan tindak balas berantai?
..... [1 mark] / [1 markah]
- (ii) Name the rod that is used to control the reaction in a nuclear reactor.
Namakan rod yang digunakan untuk mengawal tindak balas tersebut dalam sebuah reaktor nuklear.
..... [1 mark] / [1 markah]

- 7 Diagram 7.1 shows an a.c. generator in which a coil is being turned in a magnetic field.
Rajah 7.1 menunjukkan sebuah penjana a.u. di mana satu gegelung diputar dalam medan magnet.

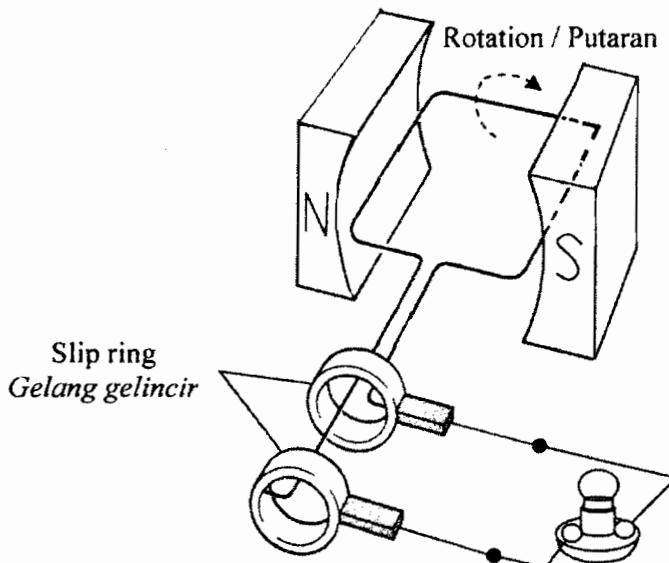


Diagram 7.1 / Rajah 7.1

- (a) (i) What is the meaning of magnetic field?
Apakah maksud medan magnet?
..... [1 mark] / [1 markah]
- (ii) Why does the bulb light up?
Mengapakah mentol itu menyala?
..... [1 mark] / [1 markah]
- (b) Some modifications need to be done to the a.c. generator in Diagram 7.1 to convert it into a d.c. motor.
Beberapa pengubahsuaian perlu dilakukan terhadap penjana a.u. dalam Rajah 7.1 untuk menjadikannya sebuah motor a.t.
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- (i) State the modification that has to be done to the slip rings.

Nyatakan pengubahsuaian yang perlu dilakukan terhadap gelang gelincir.

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

- (ii) What component should replace the light bulb?

Apakah komponen yang harus menggantikan mentol?

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

- (c) Diagram 7.2 shows the cross-sectional view of the coil and magnet of the d.c. motor.

Rajah 7.2 menunjukkan pandangan keratan rentas bagi gegelung dan magnet bagi motor a.t. itu.

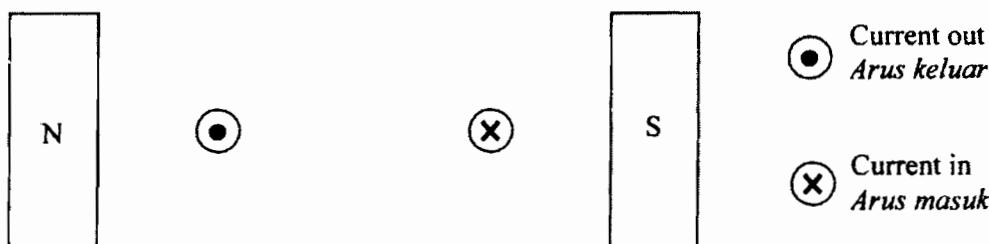


Diagram 7.2 / Rajah 7.2

In Diagram 7.2, draw the resultant magnetic field that causes the coil to rotate. Show the direction of the force, F , that acts on the coil.

Dalam Rajah 7.2, lukis medan magnet paduan yang menyebabkan gegelung itu berputar.

Tunjukkan arah daya, F , yang bertindak ke atas gegelung itu.

[2 marks] / [2 markah]

- (d) Further modifications need to be done to make the motor turn faster. State the modifications and give a reason for your answers.

Pengubahsuaian selanjutnya perlu dilakukan untuk membuat motor itu berputar dengan lebih laju. Nyatakan pengubahsuaian itu dan beri sebab bagi jawapan anda.

- (i) The coil / Gegelung :

.....

Reason / Sebab :

.....

[2 marks] / [2 markah]

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(ii) The magnet / Magnet :

.....

Reason / Sebab :

.....

[2 marks] / [2 markah]

- 8 A coach has to train and select participants for a competition. During the training session, trainees were asked to run up an inclined surface from point X to point Y as shown in Diagram 8.

Seorang jurulatih perlu melatih dan memilih peserta untuk satu pertandingan. Semasa sesi latihan pelatih-pelatih diminta berlari naik satu permukaan condong dari titik X ke titik Y seperti yang ditunjukkan dalam Rajah 8.

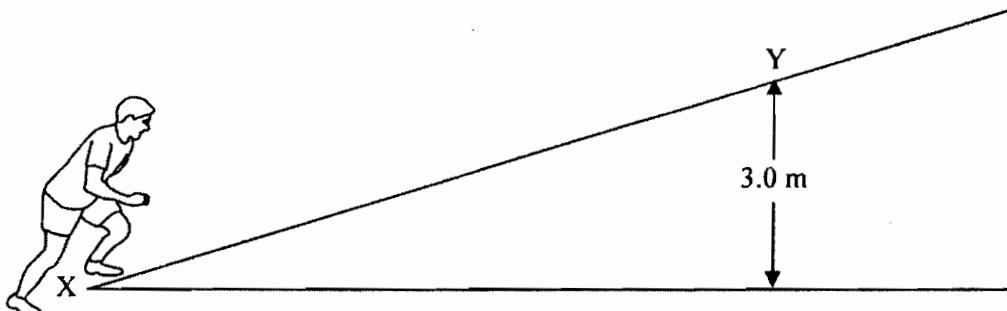


Diagram 8 / Rajah 8

Three trainees A, B and C run up the inclined surface 6 times and the times recorded are shown in Table 8.

Tiga orang pelatih A, B dan C berlari menaiki permukaan condong itu enam kali dan masa yang dicatatkan ditunjukkan dalam Jadual 8.

Trainee Pelatih	Mass / kg Jisim / kg	Time / s Masa / s						Average Purata
		1	2	3	4	5	6	
A	48	5.4	5.5	5.6	6.1	6.3	6.5	
B	52	5.8	6.0	6.5	6.9	7.7	8.5	
C	48	6.1	6.2	6.0	6.1	6.1	6.1	

Table 8 / Jadual 8

- (a) What is the meaning of energy?
Apakah maksud tenaga?
-

[1 mark] / [1 markah]

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- (b) Calculate the average time of each trainee and write the answers in Table 8.
Hitungkan masa purata bagi setiap pelatih dan tulis jawapannya dalam Jadual 8.
[2 marks] / [2 markah]
- (c) For trainee A, calculate:
Bagi pelatih A, hitungkan:
- (i) The potential energy gained when he runs from X to Y.
Tenaga keupayaan yang diperoleh apabila dia berlari dari X ke Y.
- [2 marks] / [2 markah]
- (ii) The average power generated.
Ignore the work done against friction.
Kuasa purata yang dijanakan.
Abaikan kerja yang dilakukan menentang geseran.

- [2 marks] / [2 markah]
- (d) Based on the results of the training, which trainee should the coach choose to compete in:
Berdasarkan keputusan latihan tersebut, pelatih manakah yang jurulatih itu perlu pilih untuk bertanding dalam:
- (i) a 100 m race / perlumbaan 100 m?
.....

Reason / Sebab :

[2 marks] / [2 markah]

- (ii) a 1 500 m race / perlumbaan 1 500 m?
.....

Reason / Sebab :

[2 marks] / [2 markah]

- (e) For the trainee who is not selected in either d(i) or d(ii), give a reason why the coach did not select him or her.
Bagi pelati? yang tidak dipilih sama ada dalam 8d(i) atau 8d(ii), beri satu sebab kenapa jurulatih tidak memilihnya.

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 the heating curves for liquid M and liquid N. Both liquids have mass 200 g and were heated with a 200 W heater for 5 minutes.
Rajah 9.1 menunjukkan lengkung-lengkung pemanasan bagi cecair M dan cecair N. Kedua-dua cecair mempunyai jisim 200 g dan dipanaskan oleh pemanas 200 W selama 5 minit.

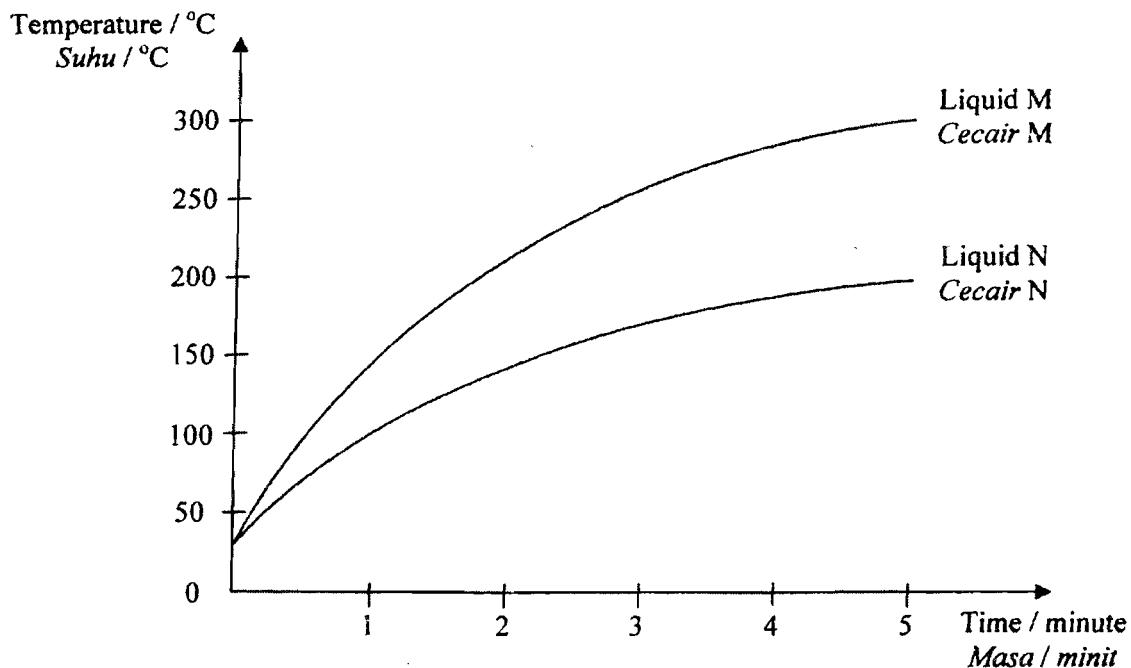


Diagram 9.1 / Rajah 9.1

Table 9 gives the values of the specific heat capacity of liquid M and liquid N.
Jadual 9 memberikan nilai-nilai muatan haba tentu bagi cecair M dan cecair N.

Liquid Cecair	Specific heat capacity / $\text{J kg}^{-1} \text{ }^{\circ}\text{C}^{-1}$ Muatan haba tentu / $\text{J kg}^{-1} \text{ }^{\circ}\text{C}^{-1}$
M	1200
N	1800

Table 9 / Jadual 9

- (a) What is the meaning of specific heat capacity?
Apakah maksud muatan haba tentu?

[1 mark] / [1 markah]

- (b) Based on the heating curves in Diagram 9.1:
Berdasarkan lengkung-lengkung pemanasan dalam Rajah 9.1:
- Compare the heat energy supplied to liquid M and liquid N.
Bandingkan tenaga haba yang dibekalkan kepada cecair M dan cecair N.
 - Compare the specific heat capacity of liquid M and liquid N.
Bandingkan muatan haba tentu bagi cecair M dan cecair N.
 - Compare the final temperature of liquid M and liquid N.
Bandingkan suhu akhir cecair M dan cecair N.
 - Compare the rate of increase of temperature of liquid M and liquid N.
Bandingkan kadar kenaikan suhu cecair M dan cecair N.
 - Relate the specific heat capacity of the liquid to its rate of increase in temperature.
Hubungkaitkan muatan haba tentu cecair kepada kadar kenaikan suhunya.
[5 marks] / [5 markah]
- (c) Explain why water is used as a cooling liquid in engines.
Terangkan mengapa air digunakan sebagai cecair penyejuk dalam enjin.
[4 marks] / [4 markah]
- (d) Diagram 9.2 shows an electric rice cooker.
Rajah 9.2 menunjukkan sebuah periuk nasi elektrik.

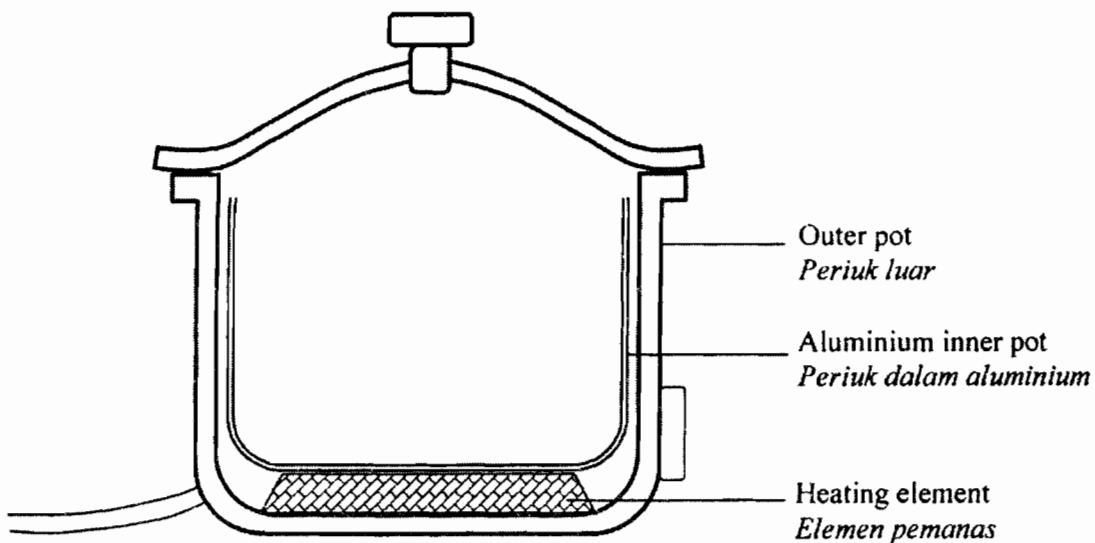


Diagram 9.2 / Rajah 9.2

You are required to give suggestions to modify the electric rice cooker to become a slow cooker that can cook food slowly with low heat to maintain the nutritional value and taste of the food.

Anda dikehendaki memberi cadangan untuk mengubahsuai periuk nasi elektrik itu untuk menjadi sebuah periuk perlakan yang boleh memasak makanan dengan perlakan menggunakan haba rendah untuk mengekalkan khasiat dan kelazatan makanan itu

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Explain your suggestions based on the following aspects:

Terangkan cadangan anda berdasarkan aspek-aspek berikut:

(i) the type of material of the outer pot
jenis bahan periuk luar

(ii) the type of material of the inner pot
jenis bahan periuk dalam

(iii) the space between the inner pot and outer pot
ruang antara periuk dalam dan periuk luar

(iv) the power of the heating element
kuasa element pemanas

(v) the cover of the outer pot
penutup periuk luar

[10 marks] / [10 markah]

- 10 (a) Diagram 10.1 shows the side view of two water tanks. When the motors on the wooden dippers are switched on, the wooden dippers oscillate on the surface of the water and produce water waves.

Rajah 10.1 menunjukkan pandangan sisi bagi dua buah tangki air. Apabila motor pada pencelup kayu dihidupkan, pencelup kayu itu bergetar pada permukaan air dan menghasilkan gelombang air.

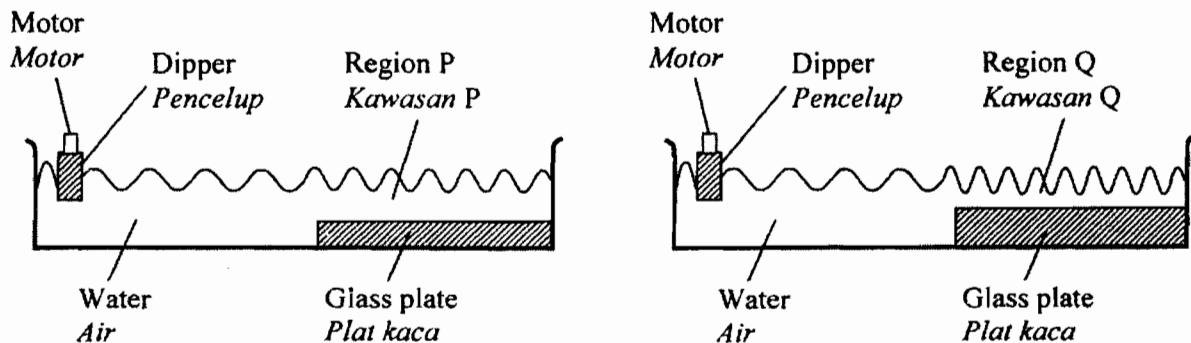


Diagram 10.1 / Rajah 10.1

Diagram 10.2 shows the aerial view of the propagation of the waves into region P and Q.

Rajah 10.2 menunjukkan pandangan atas bagi perambatan gelombang itu ke kawasan P dan Q.

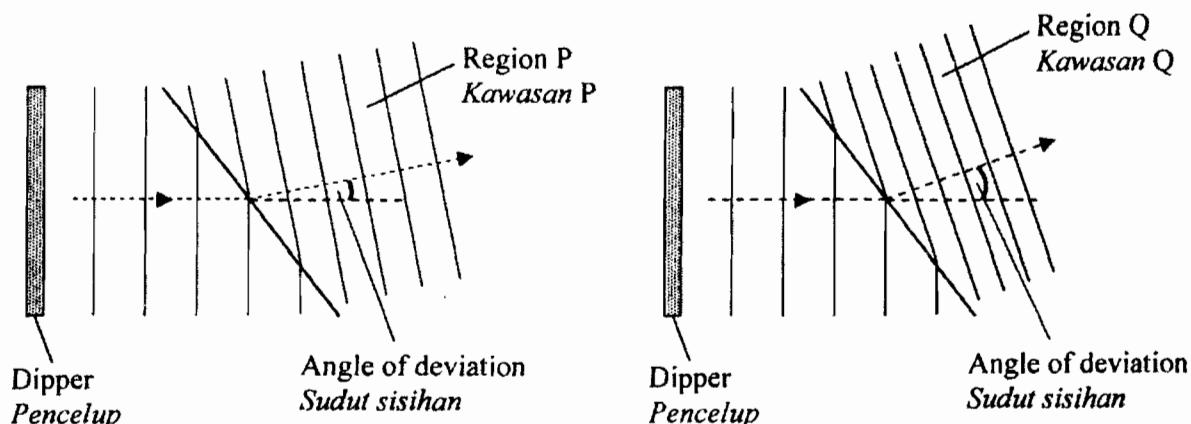


Diagram 10.2 / Rajah 10.2

- What is the meaning of wavelength?
Apakah maksud panjang gelombang? [1 mark] / [1 markah]
- Based on Diagram 10.1 and Diagram 10.2:
Berdasarkan Rajah 10.1 dan Rajah 10.2:
 - compare the wavelength of the waves in region P and region Q
bandingkan panjang gelombang bagi gelombang dalam kawasan P dan kawasan Q
 - compare the change of speed of the waves in region P and region Q
bandingkan perubahan laju gelombang dalam kawasan P dan kawasan Q

- compare the depth of water region P and region Q
bandingkan kedalaman air dalam kawasan P dan kawasan Q
- compare the angle of deviation when the waves move into region P and into region Q
bandingkan sudut sisihan apabila gelombang bergerak ke dalam kawasan P dan ke dalam kawasan Q

Relate the change of speed of wave to the angle of deviation.

Hubungkaitkan perubahan laju gelombang kepada sudut sisihan.

[5 marks] / [5 markah]

- (b) Sound is produced by a vibrating object in a medium and propagates as a longitudinal wave in the medium.

Bunyi dihasilkan oleh suatu objek yang bergetar di dalam suatu medium dan merambat sebagai gelombang memburu dalam medium itu.

- (i) Explain how a tuning fork produces sound waves in air.

Terangkan bagaimana sebuah tala bunyi menghasilkan gelombang bunyi dalam udara.

[2 marks] / [2 markah]

- (ii) Describe how you would show that sound waves are longitudinal waves.

Terangkan bagaimana anda akan menunjukkan bahawa gelombang bunyi adalah gelombang memburu.

[2 marks] / [2 markah]

- (c) Diagram 10.3 shows the use of a type of wave to obtain an image of a foetus. A transducer transmits the waves into the womb. The transducer is moved on a layer of gel applied on the skin of the mother. The rebounding echoes of the waves are detected to form a picture of the foetus on a computer monitor.

Rajah 10.3 menunjukkan penggunaan suatu jenis gelombang untuk memperoleh imej bagi fetus. Sebuah transduser memancarkan gelombang itu ke dalam rahim. Transduser itu digerakkan di atas satu lapisan gel yang disapu pada kulit ibu. Gema bagi gelombang yang melantun balik dikesan untuk membentuk gambar fetus itu pada paparan komputer.

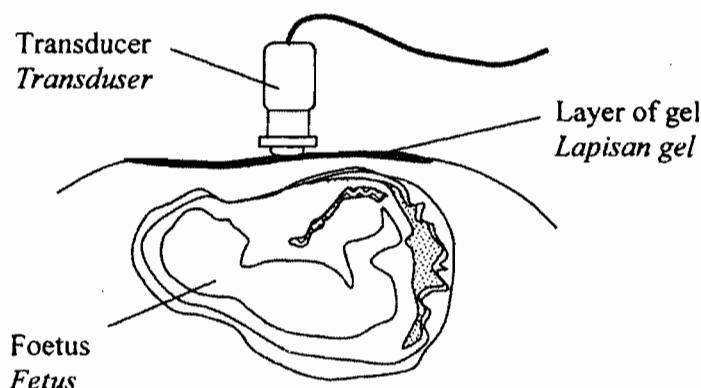


Diagram 10.3 / Rajah 10.3

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- (i) Using appropriate physics concepts, explain how a clearer image of the foetus can be obtained.

Your answer should include the following aspects:

- The type of wave
- The frequency of the wave
- The amplitude of the wave
- The use of the layer of gel

Dengan menggunakan konsep fizik yang sesuai, terangkan bagaimana satu imej yang lebih jelas bagi fetus itu dapat diperoleh.

Jawapan anda harus meliputi aspek berikut:

- *Jenis gelombang*
- *Frekuensi gelombang*
- *Amplitud gelombang*
- *Penggunaan lapisan gel*

[8 marks] / [8 markah]

- (ii) Name the phenomenon of wave being applied in 10(c)(i).

Namakan fenomena gelombang yang digunakan di 10(c)(i).

[1 mark] / [1 markah]

- (iii) State one other use of the wave.

Nyatakan satu lagi penggunaan bagi gelombang itu.

[1 mark] / [1 markah]

- 11 Diagram 11.1 shows a simple astronomical telescope at normal adjustment. The power of the objective lens is 5 D.

Rajah 11.1 menunjukkan sebuah teleskop astronomi ringkas pada pelarasan normal. Kuasa kanta objek ialah 5 D.

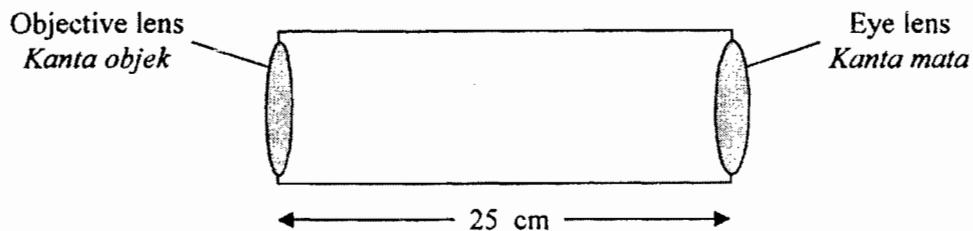


Diagram 11.1 / Rajah 11.1

- (a) (i) What is the meaning of the power of a lens?
Apakah maksud kuasa suatu kanta? [1 mark] / [1 markah]
- (ii) What is the focal length of the objective lens?
Berapakah panjang fokus bagi kanta objek? [2 marks] / [2 markah]
- (iii) Calculate the magnification of the astronomical telescope.
Hitungkan pembesaran teleskop astronomi itu. [2 marks] / [2 markah]
- (b) (i) What is the relationship between the thickness and power of a convex lens?
Apakah hubungan antara ketebalan dan kuasa sebuah kanta cembung?
[1 mark] / [1 markah]
- (ii) Describe a simple method to estimate the power of a convex lens.
Huraikan satu kaedah ringkas untuk menganggar kuasa sebuah kanta cembung. [4 marks] / [4 markah]
- (c) Diagram 11.2 shows a slide projector that is used to display an image of a picture slide on the screen.

Rajah 11.2 menunjukkan sebuah projektor slaid yang digunakan untuk menayangkan imej bagi sekeping slaid gambar pada skrin.

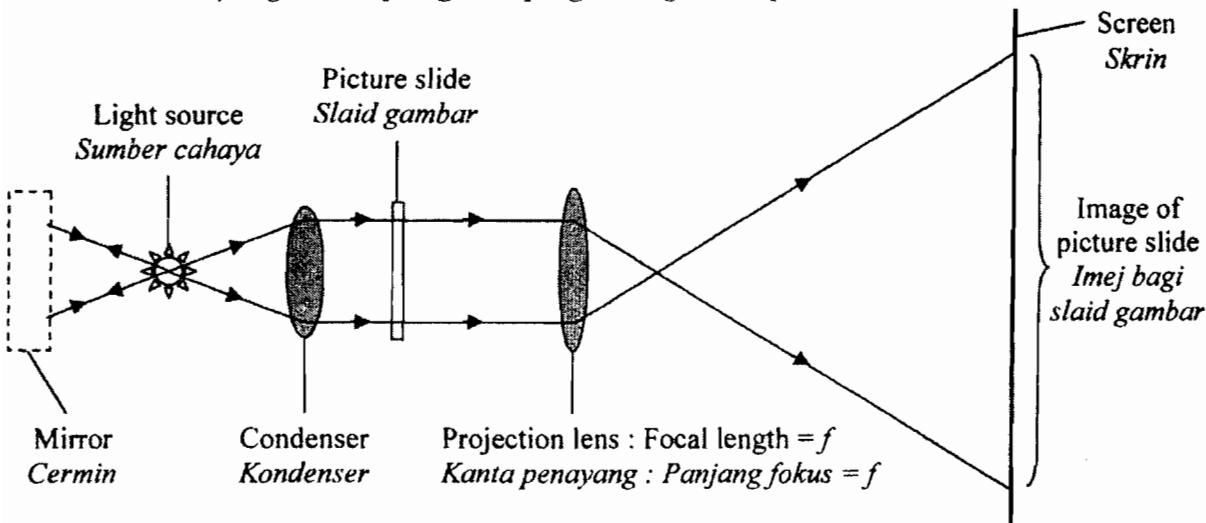


Table 11 gives the characteristics of the components of a slide projector.
Jadual 11 memberikan ciri-ciri bagi komponen-komponen sebuah projektor slaid.

Slide projector <i>Projektor slaid</i>	Type of mirror <i>Jenis cermin</i>	Distance, u , between picture slide and projection lens <i>Jarak, u, antara slaid gambar dan kanta penayang</i>	Orientation of picture slide <i>Orientasi slaid gambar</i>	Power of projection lens <i>Kuasa kanta penayang</i>
P	Concave <i>Cekung</i>	$f < u < 2f$	Inverted <i>Songsang</i>	High <i>Tinggi</i>
Q	Convex <i>Cembung</i>	$u = 2f$	Upright <i>Tegak</i>	High <i>Tinggi</i>
R	Concave <i>Cekung</i>	$u = 2f$	Inverted <i>Songsang</i>	Low <i>Rendah</i>
S	Convex <i>Cembung</i>	$f < u < 2f$	Inverted <i>Songsang</i>	High <i>Tinggi</i>
T	Concave <i>Cekung</i>	$u > 2f$	Upright <i>Tegak</i>	Low <i>Rendah</i>

Table 11 / Jadual 11

Explain the suitability of each characteristic of the components of the slide projector to display a sharp and large image.

Determine the most suitable slide projector and give reasons for your choice.

*Terangkan kesesuaian setiap ciri bagi komponen projektor slaid itu untuk menayangkan satu imej yang tajam dan besar pada skrin.
 Tentukan projektor slaid yang paling sesuai dan beri sebab-sebab bagi pilihan anda.*

[10 marks] / [10 markah]

- 12 (a) What is the meaning of electric current?
Apakah maksud arus elektrik?

[1 mark] / [1 markah]

- (b) Diagram 12.1 shows two light bulbs connected to four dry cells with internal resistance. When S_1 only is switched on, L_1 lights up brightly.
Rajah 12.1 menunjukkan dua buah mentol lampu disambung kepada empat buah sel kering yang mempunyai rintangan dalam. Apabila S_1 sahaja dihidupkan, L_1 bernyala dengan sangat cerah..

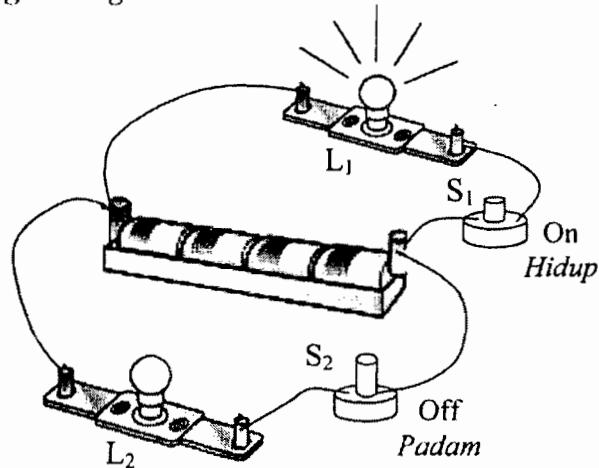


Diagram 12.1 / Rajah 12.1

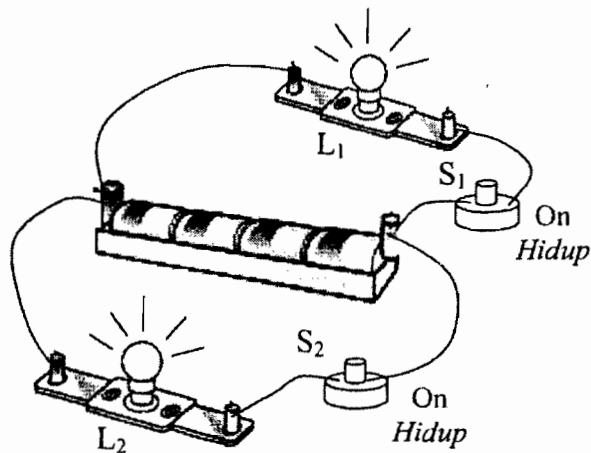


Diagram 12.2 / Rajah 12.2

Diagram 12.2 shows both L_1 and L_2 light up dimly when S_1 and S_2 are switched on.

Explain this observation.

Rajah 12.2 menunjukkan kedua-dua L_1 dan L_2 bernyala secara malap apabila S_1 dan S_2 dihidupkan.

Jelaskan pemerhatian ini.

[4 marks] / [4 markah]

- (c) The living room of a house is to be fitted with three identical lamps. Table 12 shows the characteristics of four types of lamps, P, Q, R and S and the type of connection of the lamps.

Bilik tamu di sebuah rumah perlu dilengkapi dengan tiga buah lampu yang serupa.

Jadual 12 menunjukkan ciri-ciri bagi empat jenis lampu, P, Q, R dan S serta jenis sambungan lampu-lampu itu.

Lamp Lampu	Type of bulb Jenis mentol	Input power / W Kuasa input / W	Efficiency Kecekapan	Type of connection Jenis sambungan
P	Fluorescent <i>Pendarfluor</i>	15	70%	Series <i>Siri</i>
Q	Filament <i>Filamen</i>	40	30%	Series <i>Siri</i>
R	Fluorescent <i>Pendarfluor</i>	18	70%	Parallel <i>Selari</i>
S	Filament <i>Filamen</i>	25	50%	Parallel <i>Selari</i>

Table 12 / Jadual 12

You are required to determine the most suitable lamp that can be used to light up the room brightly at low operating cost.

Anda dikehendaki menentukan lampu yang paling sesuai untuk mencahayakan bilik tersebut dengan cerahnya dengan kos operasi yang rendah.

Study the properties of all the lamps based on the following aspects:

Kaji ciri-ciri keempat-empat lampu itu berdasarkan aspek-aspek berikut:

- (i) Type of bulb / Jenis mentol
- (ii) Input power / Kuasa input
- (iii) Efficiency / Kecekapan
- (iv) Type of connection / Jenis sambungan

Explain the suitability of each characteristic and then determine the most suitable lamp.

Give the reasons for your choice.

Terangkan kesesuaian setiap ciri dan seterusnya tentukan lampu yang paling sesuai.

Beri sebab untuk pilihan anda.

[10 marks] / [10 markah]

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- (d) Diagram 12.3 shows an electrical circuit. The reading of voltmeter V_1 is 2 V.
 [Ignore the internal resistance of the cell]
*Rajah 12.3 menunjukkan suatu litar elektrik. Bacaan voltmeter V_1 ialah 2 V.
 [Abaikan rintangan dalam sel]*

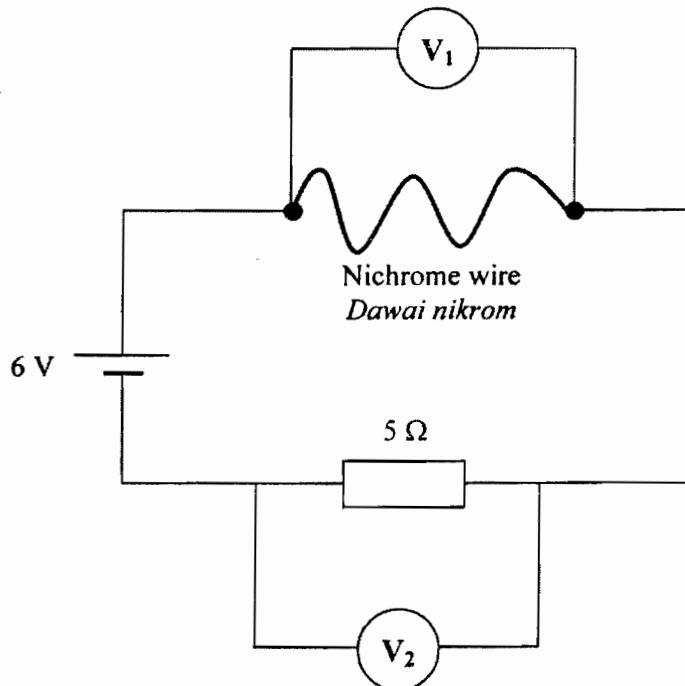


Diagram 12.3 / Rajah 12.3

- (i) State the reading of voltmeter V_2 .
Nyatakan bacaan voltmeter V_2 .
- (ii) Calculate the current in the circuit.
Hitungkan arus dalam litar itu.
- (iii) What is the resistance of the nichrome wire?
Berapakah rintangan bagi dawai nikrom itu?

[5 marks] / [5 markah]

END OF QUESTION PAPER

KERTAS SOALAN TAMAT

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**PROGRAM PENINGKATAN PRESTASI AKADEMIK SPM
TAHUN 2012**

FIZIK

Kertas 2

PERATURAN PEMARKAHAN

2012 PSPM KEDAH FIZIK 2

2

SECTION A

NO.	MARKING CRITERIA	MARK	
		SUB	TOTAL
1(a)	Underline the word correctly - transverse	1	
(b)	State the factor correctly - depth	1	
(c) (i)	State the change in the energy correctly - decrease	1	
(ii)	Name the phenomenon correctly - damping	1	4
2(a)	Name the type of error correctly - zero error/systematic error	1	
(b) (i)	Give the actual time taken with one decimal place correctly - 44.0 s	1	
(ii)	Correct expression - $\frac{44}{20}$	1	
	Correct answer and correct unit - 2.2 s	1	
(c)	State the change in period of oscillation correctly - increase	1	5
3(a) (i)	State the speed of light changes from water to air correctly - Speed of light increases when propagate from water to air	1	
	State the refraction of light ray correctly - Light ray is refracted away from the normal	1	
	State the location of the image of the fish correctly - Image of the fish is located nearer to the water surface	1	Any two
(ii)	Draw the one/two rays correctly Location of the image correctly	1 1	
(b)	Correct substitution $1.33 = \frac{1.2}{\text{apparent depth}}$ Correct answer and correct unit 0.90 m	1 1	6

NO.	MARKING CRITERIA	MARK	
		SUB	TOTAL
4(a)	Name the function correctly - as a rectifier/to rectify the current/to make the current flow in one direction/to convert a.c. to d.c.	1	
(b) (i)	Determine the period correctly 0.02 s	1	
(ii)	Correct expression - $\frac{1}{0.02}$ Correct answer and correct unit 50 Hz // 50 s^{-1}	1	
(c)	Path of the current correctly $Q \rightarrow D \rightarrow B \rightarrow X \rightarrow Y \rightarrow C \rightarrow A \rightarrow P$	1	
(d)	Draw the trace correctly Inverted from diagram 4.2	1	
(e)	State the component correctly - capacitor	1	7
5(a)	State the physical quantity correctly - weight	1	
(b) (i)	Compare the pressure correctly - Pressure acting at B is higher/vice versa Explain correctly - Pressure increase with depth	1	
(ii)	Explain the force correctly - Force acting on point B is higher/vice versa/Force \propto pressure	1	
(c) (i)	Compare the readings correctly - The reading in Diagram 5.1 is higher than in Diagram 5.2		
(ii)	Relate the reading of the spring balance and the upthrust correctly - The higher the reading of the spring balance, the lower the upthrust		
(iii)	Compare the density correctly - Density of water is higher/vice versa	1	
(iv)	State the relationship between density and upthrust correctly - The higher the density, the higher the buoyant force	1	

NO.	MARKING CRITERIA	MARK	
		SUB	TOTAL
6(a)	Explain the nuclide correctly - A nucleus having a specific number of protons and neutrons	1	
(b)	Write all the answers correctly with unit 3 marks Any two or three of the answers correct with unit 2 marks Any one of the answers correct 1 mark 236.05259 u, 235.86653 u, 5.030151 u, 5.011273 u	3	
(c) (i)	State the comparison correctly - decreases/less/smaller after the reaction	1	
(ii)	State the deduction correctly - mass defect (decrease in mass) is converted into energy // $E = mc^2$	1	
(d) (i)	State the nuclear reaction correctly - Nuclear reaction A	1	
(ii)	Name the rod correctly - boron/cadmium	1	8
7(a) (i)	State the meaning correctly - A region where a magnetic force is experienced	1	
(ii)	State the reason correctly - The cutting of magnetic flux produces a current in the circuit	1	
(b) (i)	State the modification correctly - replace the slip rings by a split ring // commutator	1	
(ii)	State the component correctly - dry cell(s)/battery	1	
(c)	Draw the correct resultant field	1	
	Label the direction of the force correctly	1	
(d) (i)	State the modification of the coil correctly with reason - more turns - To produce a bigger force	2	
(ii)	State the modification of the magnet correctly with reason - Stronger magnet - Produce a stronger magnetic field	2	
			10

NO.	MARKING CRITERIA	MARK	
		SUB	TOTAL
8(a) (i)	State the meaning correctly - The ability to do work	1	
(b)	Correct answer Write all the answers correctly Any one or two answers correct	2 marks 1 mark	2
(c) (i)	Correct substituition (48)(10)(3)	1	
	Correct answer and correct unit 1440 J	1	
(ii)	State substituition $\frac{1440}{5.9}$	1	
	Correct answer 244 W	1	
(d) (i)	State the choice correctly with reason - A - shortest time taken	2	
(ii)	State the correctly with reason - C - Time is consistent over a longer period	2	
(e)	State the reason correctly - Longest average time/time is not consistent/time increases with each run	1	
			12

SECTION B

NO	MARKING CRITERIA	MARK	
		SUB	TOTAL
9(a)	<p>State the meaning correctly</p> <ul style="list-style-type: none"> - The amount of energy requires to change the temperature of 1 kg of a substance by 1 °C. 	1	1
(b) (i)	<p>State the comparison correctly</p> <ul style="list-style-type: none"> - same 	1	
(ii)	<p>State the comparison correctly</p> <ul style="list-style-type: none"> - Liquid N is higher / vice versa 	1	
(iii)	<p>State the comparison correctly</p> <ul style="list-style-type: none"> - Liquid M is higher / vice versa 	1	
(iv)	<p>State the comparison correctly</p> <ul style="list-style-type: none"> - Liquid M is faster / higher /vice versa 	1	
(v)	<p>State the relationship correctly</p> <p>The bigger the specific heat capacity, the smaller the rate of increase in temperature</p>	1	5
(c)	<p>Give the four explanations correctly</p> <ul style="list-style-type: none"> - high specific heat capacity - high boiling point/not easily volatile / does not evaporate easily - easily available - non corrosive/do not react with metal 	1 1 1 1	4
(d)	<p>State the type of material of the outer pot and reason correctly</p> <ul style="list-style-type: none"> - Poor heat conductor - Less heat loss to the surrounding/cooler <p>State the type of material of the inner pot and reason correctly</p> <ul style="list-style-type: none"> - Poor heat conductor - Heat up slowly <p>State the space between the inner pot and outer pot correctly</p> <ul style="list-style-type: none"> - Big - Less heat loss <p>State the power of the heating element and reason correctly</p> <ul style="list-style-type: none"> - Low - Heat up the food slowly/take longer time to heat up the food <p>State the type of cover of the outer pot and reason correctly</p> <ul style="list-style-type: none"> - Air tight/transparent - Less heat loss/can observe the food inside the slow cooker 	2 2 2 2 2	10
			20

NO	MARKING CRITERIA	MARK	
		SUB	TOTAL
10(a) (i)	<p>State the meaning correctly</p> <ul style="list-style-type: none"> - Distance between two consecutive crests/trough <p>State the comparison correctly</p> <ul style="list-style-type: none"> - Region P longer/vice versa <p>State the comparison correctly</p> <ul style="list-style-type: none"> - Region P higher/vice versa <p>State the comparison correctly</p> <ul style="list-style-type: none"> - Region P is deeper/vice versa <p>State the comparison correctly</p> <ul style="list-style-type: none"> - Region P smaller/vice versa <p>Relate the change of speed with angle of deviation correctly</p> <ul style="list-style-type: none"> - The smaller the change in speed, the smaller the angle of deviation/vice versa 	1	1
(ii)	<p>Explain how a region of compression is produced When the prongs of the tuning fork move outward, it produce a region of compression</p> <p>Explain how a region of rarefaction is produced When the prongs of the tuning fork move inward, it produce a region of rarefaction</p>	1	5
(b) (i)	<p>Describe the set up correctly</p> <ul style="list-style-type: none"> - Candle flame in front of a loud speaker that emits sound wave <p>Describe the observation correctly</p> <ul style="list-style-type: none"> - Candle flame vibrates forward and backward 	1	2
(ii)	<p>State the type of wave and reason correctly</p> <ul style="list-style-type: none"> - Ultrasound - Safer/no side effect to the foetus// can differentiate between layers of different soft tissues <p>State the frequency of wave and reason correctly</p> <ul style="list-style-type: none"> - high frequency - can penetrate into mother's womb to scan the foetus / does not diffract easily <p>State the amplitude of wave and reason correctly</p> <ul style="list-style-type: none"> - small amplitude or high amplitude - does not harm the foetus or to produce clearer image <p>State the use of the layer of gel and reason correctly</p> <ul style="list-style-type: none"> - Allow the transducer to move easily on the skin// Helps the sound waves to transmit into the body - Reduce frictional force//produce better sound contact between the transducer and the skin 	2	8
(iii)	<p>Give the phenomenon of wave correctly</p> <ul style="list-style-type: none"> - reflection <p>State the usage correctly</p> <ul style="list-style-type: none"> - determine the depth of the sea - locate the position of a shoal of fish 	1	1
			20

SECTION C

NO	MARKING CRITERIA	MARK	
		SUB	TOTAL
11(a)	State the meaning correctly - Reciprocal of the focal length // $\frac{1}{f}$	1	1
	Correct substitution for power $\frac{1}{5} // \frac{100}{5}$	1	
	State the answer with unit correctly 0.2 m // 20 cm	1	2
	Correct substitution for the focal lengths $\frac{20}{5}$	1	
	State the answer correctly 4	1	2
	State the correct relationship - The thicker the lens, the higher the power	1	1
	Describe the method correctly - Place the lens to receive light from a distant object - Adjust the screen to obtain a sharp image - Measure the distance between the lens and the screen, d - Power = $\frac{1}{d}$	4	4
	State the choice and reason of type of mirror correctly 1 concave 2 to converge light to the focal point	1+1	
	State the choice and reason of distance between slide and projector lens correctly 3 $f < u < 2f$ 4 to produce real, inverted and magnified image	1+1	
	State the choice and reason of orientation of slide correctly 5 inverted 6 to produce final upright image on the screen	1 + 1	
	State the choice and reason of power of projector lens correctly 7 high 8 to produce bigger / magnified image	1 + 1	
	State most suitable slide projector and justification correctly 9 P 10 Concave mirror, $f < u < 2f$, inverted slide, high power projection lens	1+1	10
			20

NO.	MARKING CRITERIA	MARK	
		SUB	TOTAL
12(a)	State the meaning correctly - Rate of flow of charge	1	1
(b)	State the explanation correctly - dry cells have internal resistance - L_1 and L_2 are connected in parallel // effective resistance of the circuit decreases - current supplied by the battery increases // voltage lost in the battery increases - voltage applied across the bulbs decrease	1 1 1 1	4
(c)	State the suitable type of bulb and reason correctly 1 Fluorescent 2 Lasts longer // uses less energy // lower power // high efficiency State the suitable input power and reason correctly 3 Low 4 Less cost of electricity State the suitable efficiency and reason correctly 5 High 6 Less wastage of energy // Saves energy State the suitable type of connection and reason correctly 7 Parallel 8 Lamps can be switched on independently // If one lamp blows, the others can continue to be lighted up State most suitable choice of radioisotope and justification correctly 9 R 10 fluorescent bulb, low input power, high efficiency and parallel connection	1+1 1+1 1+1 1+1	10
(d) (i)	State the reading of the voltmeter correctly - 4 V	1	
(ii)	Correct substitution for V and R $\frac{4}{5}$ Correct answer with unit 0.8 A	1	
(iii)	Correct substitution for V and I $\frac{2}{0.8}$ Correct answer with unit 2.5 Ω	1 1	5
			20

Nama :

Tingkatan :

**SULIT**

PROGRAM PENINGKATAN PRESTASI AKADEMIK SPM
TAHUN 2012

FIZIK
Kertas 3

Satu jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Kertas soalan ini adalah dalam dwibahasa.*
2. *Soalan dalam bahasa Inggeris mendahului soalan yang sepadan dalam bahasa Melayu.*
3. *Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam bahasa Inggeris atau bahasa Melayu.*
4. *Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.*

Untuk Kegunaan Pemeriksa			
Bahagian	Soalan	Markah Penuh	Markah Diperoleh
A	1	16	
	2	12	
B	3	12	
	4	12	
Jumlah			

Kertas soalan ini mengandungi 14 halaman bercetak

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Section A**Bahagian A**

[28 marks]

Answer all questions in this section.

Jawab semua soalan dalam bahagian ini.

- 1 A student carries out an experiment to investigate the relationship between the increase in temperature, $\Delta\theta$, of water and the mass, m , of the water. The initial temperature, θ_0 , of a basin of water was measured with a thermometer as shown in Diagram 1.1.

Seorang pelajar menjalankan satu eksperimen untuk menyiasat hubungan antara kenaikan suhu, $\Delta\theta$ bagi air dengan jisim, m , air itu. Suhu awal, θ_0 , bagi sebuah besen air diukur oleh sebuah termometer seperti ditunjukkan dalam Rajah 1.1.

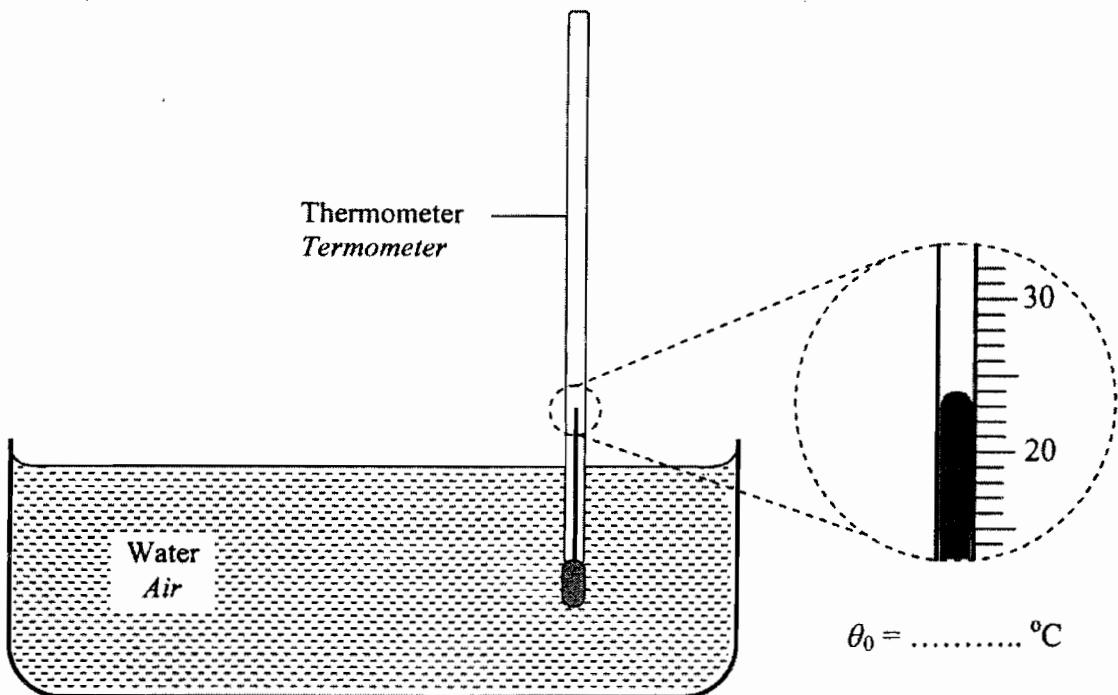


Diagram 1.1 / Rajah 1.1

A mass, $m = 0.20 \text{ kg}$ of the water taken from the basin was placed in a polystyrene cup and heated for 1 minute as shown in Diagram 1.2. The final temperature, θ , of the water is read on the thermometer. Diagram 1.3 shows the meniscus of the mercury column in the thermometer.

Suatu jisim, $m = 0.20 \text{ kg}$ bagi air daripada besen itu diletakkan di dalam sebuah cawan polisterina dan dipanaskan selama 1 minit seperti ditunjukkan dalam Rajah 1.2. Suhu akhir, θ , bagi air itu diukur oleh sebuah termometer. Rajah 1.3 menunjukkan meniskus bagi turus merkuri dalam termometer itu.

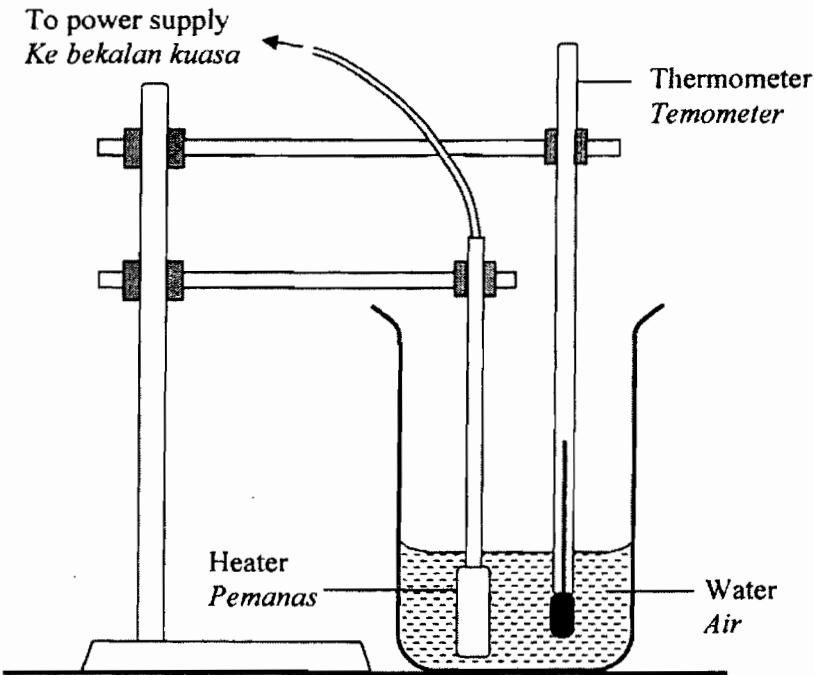
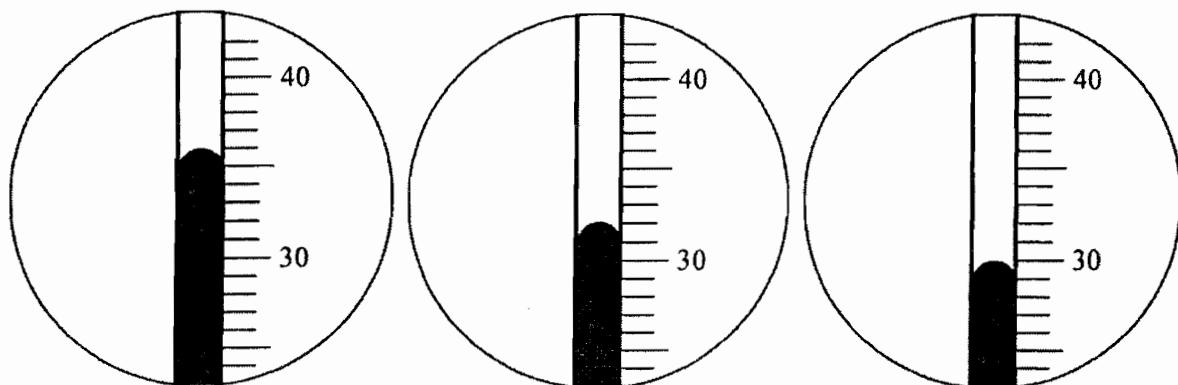


Diagram 1.2 / Rajah 1.2

The procedure is repeated with different masses of water, $m = 0.30 \text{ kg}$, 0.40 kg , 0.60 kg , and 0.80 kg taken from the basin. The final positions of the meniscus of the mercury column in the thermometer are shown in Diagrams 1.4, 1.5, 1.6 and 1.7.

Prosedur itu diulang bagi jisim air yang berlainan, $m = 0.30 \text{ kg}$, 0.40 kg , 0.60 kg , dan 0.80 kg yang diambil dari besen tersebut. Kedudukan-kedudukan akhir meniskus bagi turus merkuri dalam termometer adalah seperti ditunjukkan dalam Rajah 1.4, 1.5, 1.6 dan 1.7.

 $m = 0.20 \text{ kg}$ $m = 0.30 \text{ kg}$ $m = 0.40 \text{ kg}$

$$\frac{1}{m} = \dots \text{kg}^{-1}$$

$$\frac{1}{m} = \dots \text{kg}^{-1}$$

$$\frac{1}{m} = \dots \text{kg}^{-1}$$

$$\theta = \dots {}^\circ\text{C}$$

$$\theta = \dots {}^\circ\text{C}$$

$$\theta = \dots {}^\circ\text{C}$$

$$\Delta\theta = \dots {}^\circ\text{C}$$

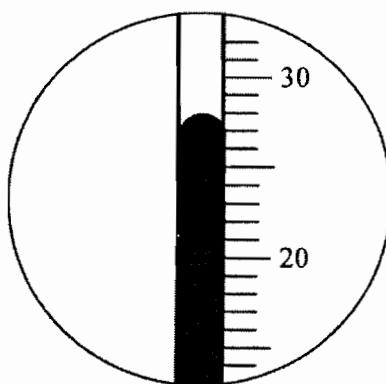
$$\Delta\theta = \dots {}^\circ\text{C}$$

$$\Delta\theta = \dots {}^\circ\text{C}$$

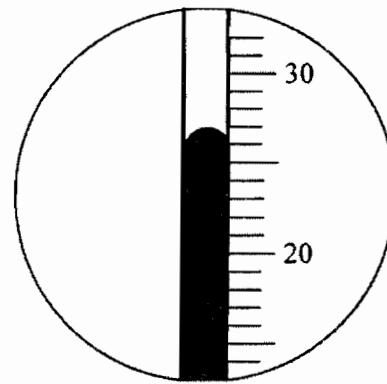
Diagram 1.3 / Rajah 1.3

Diagram 1.4 / Rajah 1.4

Diagram 1.5 / Rajah 1.5



$$m = 0.60 \text{ kg}$$



$$m = 0.80 \text{ kg}$$

$$\frac{1}{m} = \dots \text{kg}^{-1}$$

$$\frac{1}{m} = \dots \text{kg}^{-1}$$

$$\theta = \dots {}^{\circ}\text{C}$$

$$\theta = \dots {}^{\circ}\text{C}$$

$$\Delta\theta = \dots {}^{\circ}\text{C}$$

$$\Delta\theta = \dots {}^{\circ}\text{C}$$

Diagram 1.6 / Rajah 1.6

Diagram 1.7 / Rajah 1.7

- (a) For the experiment described on pages 2 and 3, identify:

Bagi eksperimen yang diterangkan pada halaman 2 dan 3, 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]

Write your answers for question 1(b) in the spaces provided in Diagrams 1.1, 1.3, 1.4, 1.5, 1.6 and 1.7 on pages 2, 3 and 4.

Tulis jawapan anda untuk soalan 1(b) dalam ruang yang disediakan dalam Rajah 1.1, 1.3, 1.4, 1.5, 1.6 dan 1.7 pada halaman 2, 3 dan 4.

- (b) Based on Diagrams 1.1, 1.3, 1.4, 1.5, 1.6 and 1.7 on pages 2, 3 and 4:
Berdasarkan Rajah 1.1, 1.3, 1.4, 1.5, 1.6 dan 1.7 pada halaman 2, 3 dan 4:
- (i) For each value of m in 1(b)(i), calculate the value of $\frac{1}{m}$.
 Your answers must be in two decimal places.
Bagi setiap nilai m di 1(b)(i), hitung nilai $\frac{1}{m}$.
Jawapan anda hendaklah dalam dua tempat perpuluhan.
 [1 mark] / [1 markah]
- (ii) Record the initial reading, θ_0 , and the readings, θ , of the thermometer.
Catat bacaan awal, θ_0 , dan bacaan-bacaan, θ , bagi termometer.
 [1 mark] / [1 markah]
- (iii) For each value of θ in 1(b)(ii), calculate the increase in temperature, $\Delta\theta$, by using the following equation:
Bagi setiap nilai θ di 1(b)(ii), hitung kenaikan suhu, $\Delta\theta$, dengan menggunakan persamaan berikut:

$$\Delta\theta = \theta - \theta_0$$

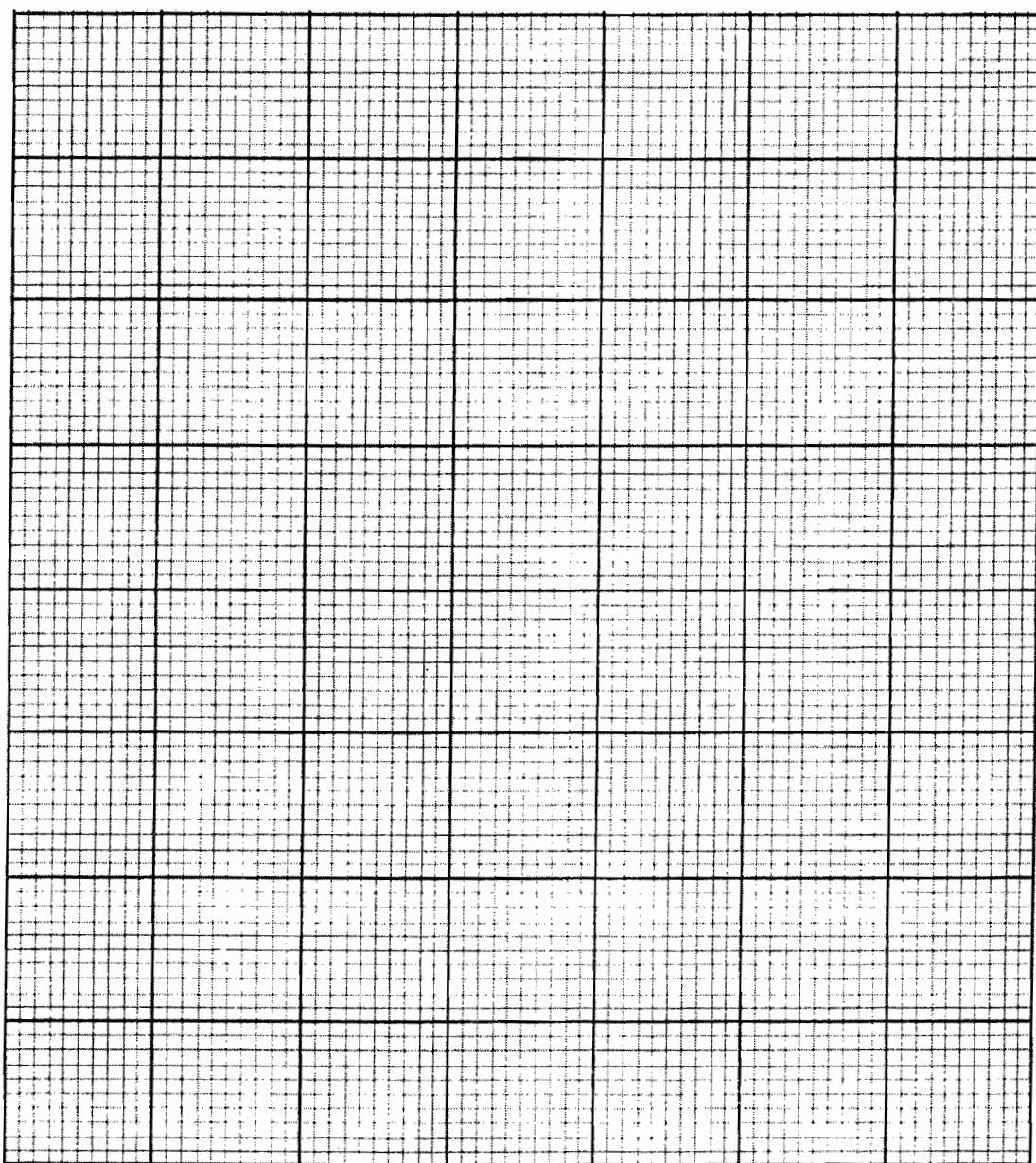
 Record the value of $\Delta\theta$.
Catat nilai $\Delta\theta$.
 [2 marks] / [2 markah]
- (c) Tabulate your results for all values of m , $\frac{1}{m}$, θ and $\Delta\theta$ in the space below.
Jadualkan keputusan anda bagi semua nilai m , $\frac{1}{m}$, θ dan $\Delta\theta$ dalam ruang di bawah.
 [3 marks] / [3 markah]
- (d) On the graph paper on page 6, draw a graph of $\Delta\theta$ against $\frac{1}{m}$.
Pada kertas graf di halaman 6, lukis graf $\Delta\theta$ melawan $\frac{1}{m}$.
 [5 marks] / [5 markah]

- (e) Based on the graph in 1(d), state the relationship between $\Delta\theta$ melawan $\frac{1}{m}$.

Berdasarkan graf di 1(d), nyatakan hubungan antara $\Delta\theta$ dengan $\frac{1}{m}$.

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

Graph of $\Delta\theta$ against $\frac{1}{m}$ / Graf $\Delta\theta$ melawan $\frac{1}{m}$.



- 2 A student carried out an experiment using the apparatus as shown in Diagram 2.1. The spring balance reading, T , the weight of the wooden block, W , and x is given by the equation

$$T = W - kx \quad \text{where } k \text{ is a constant.}$$

Seorang pelajar menjalankan satu eksperimen dengan menggunakan radas seperti yang ditunjukkan dalam Rajah 2.1. Bacaan neraca spring, T , berat bongkah kayu, W , dan x diberi oleh persamaan

$$T = W - kx \quad \text{yang mana } k \text{ adalah satu pemalar.}$$

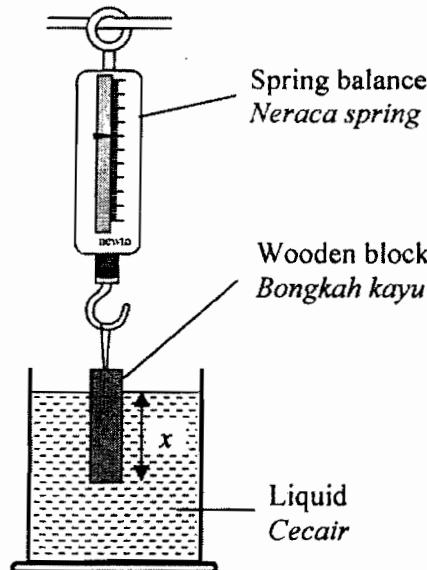


Diagram 2.1 / Rajah 2.1

The results of the experiment are shown in the graph T against x in Diagram 2.2.
Keputusan eksperimen ditunjukkan dalam graf T melawan x dalam Rajah 2.2.

- (a) Based on the graph in Diagram 2.2:

Berdasarkan graf dalam Rajah 2.2:

- (i) State the relationship between T and x .
Nyatakan hubungan antara T dan x .

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

- (ii) Determine the value of T when $x = 0$.
Tentukan nilai T apabila $x = 0$.

$T = \dots\dots\dots$ [2 marks] / [2 markah]

- (iii) What is the physical quantity that is represented by the value T in 2(a)(ii)?
Kuantiti fizik apakah yang diwakili oleh nilai T dalam 2(a)(ii)?

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

- (b) Determine the value of x when $T = 0.2$ N.
Tentukan nilai x apabila $T = 0.2$ N.

$x =$

[2 marks] / [2 markah]

- (c) Calculate the magnitude of the gradient, k , of the graph T against x .
Show on the graph how you determine the value of k .
Hitungkan magnitud kecerunan, k , graf T melawan x .
Tunjukkan pada graf bagaimana anda menghitung nilai k .

$$k = \dots \text{N cm}^{-1}$$

[3 marks] / [3 markah]

- (d) If $k = 7.2 \times 10^{-4} \rho$, calculate the density, ρ , of the liquid.
Jika $k = 7.2 \times 10^{-4} \rho$, *hitungkan ketumpatan*, ρ , *bagi cecair itu.*

$$\rho = \dots \text{ kg m}^{-3}$$

[2 marks] / [2 markah]

- (e) State one precaution that can be taken to improve the accuracy of the results of the experiment.

Nyatakan satu langkah berjaga-jaga yang boleh diambil untuk memperbaiki kejituhan keputusan eksperimen ini.

[1 mark] / [1 markah]

Graph of T against x
Graf T melawan x

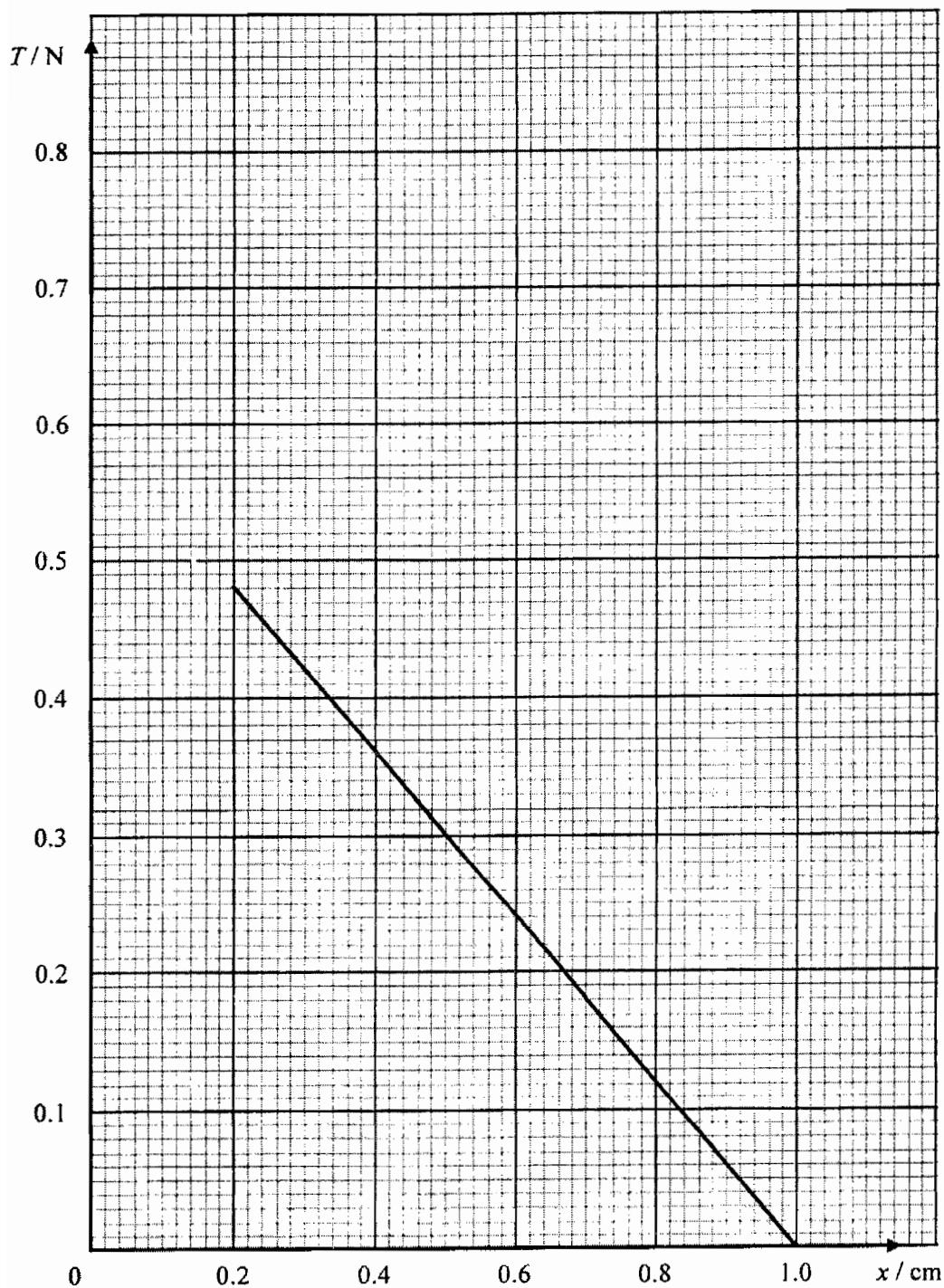


Diagram 2.2 / Rajah 2.2

Section B
Bahagian B
[12 marks]

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

Jawab mana-mana satu soalan daripada bahagian ini.

- 3 A student tries to push in the piston of a hand pump which is clipped tightly at the end. Diagram 3.1 shows that initially the student finds it is easy to push the piston. Diagram 3.2 shows that he finds it more difficult to continue pushing the piston.

Seorang pelajar cuba menolak omboh sebuah pam tangan yang diklip dengan ketat di hujungnya.

Rajah 3.1 menunjukkan pada awalnya pelajar itu mendapati mudah untuk menolak omboh itu.

Rajah 3.2 menunjukkan ia mendapati lebih sukar untuk terus menolak omboh itu.

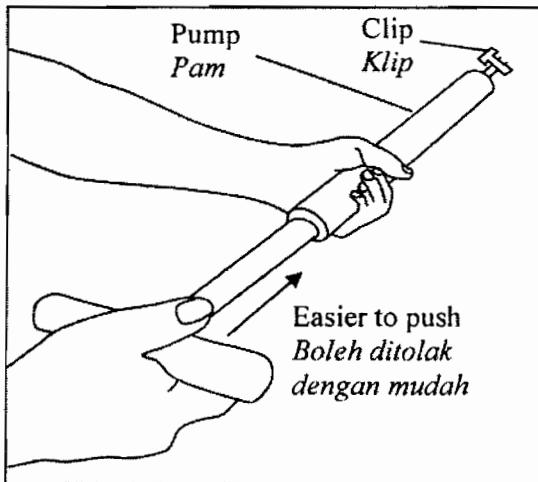


Diagram 3.1 / Rajah 3.1

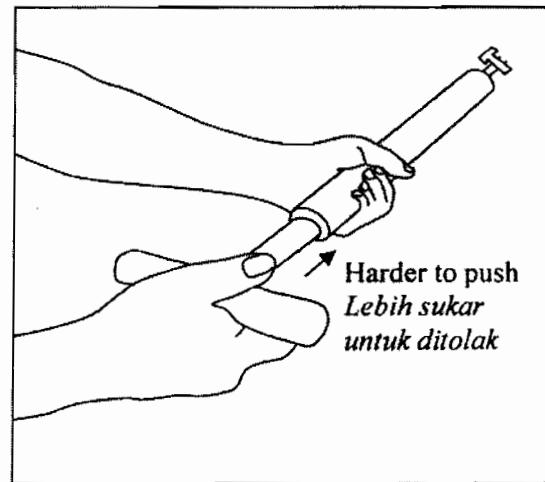


Diagram 3.2 / Rajah 3.2

Based on the information and observation:

Berdasarkan maklumat dan pemerhatian tersebut:

- (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 use of apparatus such as a syringe, rubber tube and other suitable apparatus, describe **one** experiment to investigate the hypothesis stated in 3(b).

Dengan menggunakan radas yang seperti sebuah picagari, tiub getah dan radas-radas lain yang sesuai, terangkan satu eksperimen untuk menyiasat hipotesis yang dinyatakan di 3(b).

In your description, state clearly the following:

Dalam penerangan anda, jelaskan perkara berikut:

- (i) The aim of the experiment.
Tujuan eksperimen.
- (ii) The variables in the experiment.
Pembolehubah eksperimen.
- (iii) The list of apparatus and materials.
Senarai radas dan bahan.
- (iv) The arrangement of the apparatus.
Susunan radas.
- (v) The procedure of the experiment which should include one method of controlling the manipulated variable and one method of measuring the responding variable.
Prosedur eksperimen yang mesti termasuk satu kaedah mengawal pembolehubah dimanipulasikan dan satu kaedah mengukur pembolehubah bergerak balas.
- (vi) The way to tabulate the data.
Cara untuk menjadual data.
- (vii) The way to analyse the data.
Cara untuk menganalisis data.

[10 marks] / [10 markah]

- 4 Diagram 4.1 shows a hawker stall being lighted up by a lamp connected to a battery using a thin connecting wire.

Diagram 4.2 shows a similar hawker stall being lighted up by an identical lamp connected to a battery using a thick connecting wire.

Rajah 4.1 menunjukkan sebuah gerai penjaja disinari oleh lampu yang disambung ke bateri oleh wayar penyambung nipis.

Rajah 4.2 menunjukkan sebuah gerai penjaja yang serupa disinari oleh lampu yang serupa yang disambung ke bateri oleh wayar penyambung tebal.

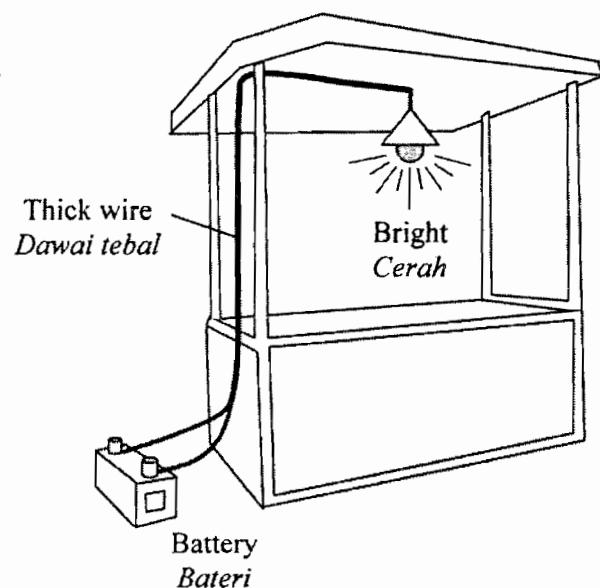
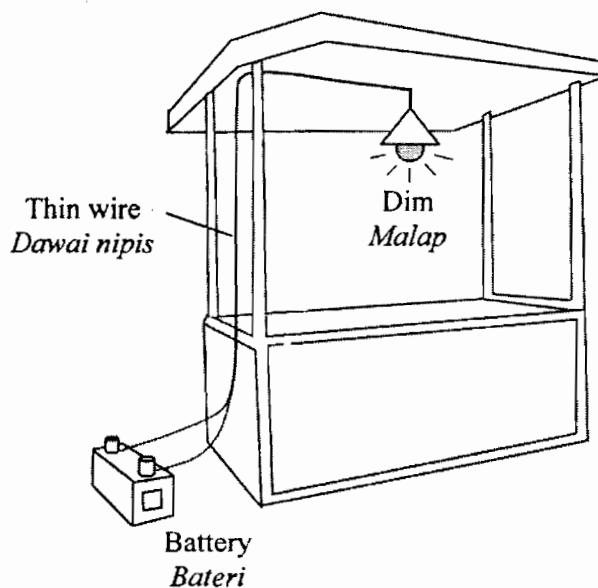


Diagram 4.1 / Rajah 4.1

Diagram 4.2 / Rajah 4.2

Based on the information and observation:

Berdasarkan maklumat dan pemerhatian tersebut:

- (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 constantan wires, ammeter, and other apparatus, describe **one** experiment to investigate the hypothesis stated in 4(b).

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

In your description, state clearly the following:

Dalam penerangan anda, nyatakan dengan jelas perkara berikut:

- (i) The aim of the experiment.

Tujuan eksperimen.

- (ii) The variables in the experiment.

Pembolehubah dalam eksperimen.

- (iii) The list of apparatus and materials.

Senarai radas dan bahan.

- (iv) The arrangement of the apparatus.

Susunan radas.

- (v) The procedure of the experiment which should include one method of controlling the manipulated variable and one method of measuring the responding variable.

Prosedur eksperimen yang mesti termasuk satu kaedah mengawal pembolehubah dimanipulasikan dan satu kaedah mengukur pembolehubah bergerak balas.

- (vi) The way to tabulate the data.

Cara untuk menjadualkan data.

- (vii) The way to analyse the data.

Cara untuk menganalisis data.

[10 marks] / [10 markah]

END OF QUESTION PAPER

KERTAS SOALAN TAMAT



PROGRAM PENINGKATAN PRESTASI AKADEMIK SPM
TAHUN 2012

FIZIK

Kertas 3

PERATURAN PEMARKAHAN

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

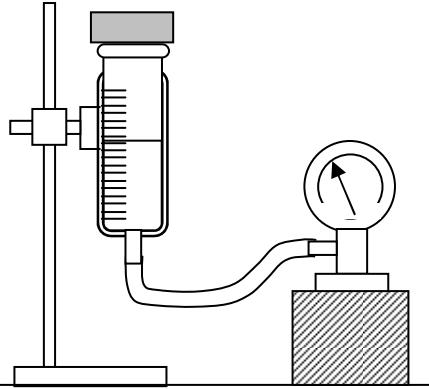
2
2012 PSM Kedah Fizik 3
SECTION A

NO	MARKING CRITERIA	MARK																									
		SUB	TOTAL																								
1(a) (i)	State the manipulated variable - mass / m	1	1																								
(ii)	State the responding variable - increase in temperature / $\Delta\theta$	1	1																								
(iii)	State a constant variable - Initial temperature / θ_0 // Heating time // Heat supplied // Specific heat capacity	1	1																								
(b) (i)	Record five values of $\frac{1}{m}$ Diagram 1.3 : 5.00 Diagram 1.4 : 3.33 Diagram 1.5 : 2.50 Diagram 1.6 : 1.67 Diagram 1.7 : 1.25	1	1																								
(ii)	Record six thermometer readings Diagram 1.1 : 24° Diagram 1.3 : 36° Diagram 1.4 : 32° Diagram 1.5 : 30° Diagram 1.6 : 28° Diagram 1.7 : 27°	1	1																								
(iii)	Record five values of $\Delta\theta$ Diagram 1.3 : 12° Diagram 1.4 : 8° Diagram 1.5 : 6° Diagram 1.6 : 4° Diagram 1.7 : 3° Note: Any three readings correct, award 1 mark Accept e.c.f. from (b)(ii)	2	2																								
(c)	Tabulate the results - Heading for m , $\frac{1}{m}$, θ and $\Delta\theta$ - State all the units of m , $\frac{1}{m}$, θ and $\Delta\theta$ correctly - The values of $\frac{1}{m}$ are consistent to two decimal places and θ , $\Delta\theta$ to whole number	1 1 1	3																								
	<table border="1"> <thead> <tr> <th>m / kg</th> <th>$\frac{1}{m}$ / kg⁻¹</th> <th>θ / °C</th> <th>$\Delta\theta$ / °C</th> </tr> </thead> <tbody> <tr> <td>0.20</td> <td>5.00</td> <td>36</td> <td>12</td> </tr> <tr> <td>0.30</td> <td>3.33</td> <td>32</td> <td>8</td> </tr> <tr> <td>0.40</td> <td>2.50</td> <td>30</td> <td>6</td> </tr> <tr> <td>0.60</td> <td>1.67</td> <td>28</td> <td>4</td> </tr> <tr> <td>0.68</td> <td>1.45</td> <td>27</td> <td>3</td> </tr> </tbody> </table> <p style="color: blue; font-size: 2em; margin-left: 100px;"> http://edu.joshuatly.com/ http://fb.me/edu.joshuatly </p>	m / kg	$\frac{1}{m}$ / kg ⁻¹	θ / °C	$\Delta\theta$ / °C	0.20	5.00	36	12	0.30	3.33	32	8	0.40	2.50	30	6	0.60	1.67	28	4	0.68	1.45	27	3		
m / kg	$\frac{1}{m}$ / kg ⁻¹	θ / °C	$\Delta\theta$ / °C																								
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0.40	2.50	30	6																								
0.60	1.67	28	4																								
0.68	1.45	27	3																								

(d)	<p>Draw a complete graph of $\Delta\theta$ against $\frac{1}{m}$</p> <p>Tick (\checkmark) based on the following aspects</p> <ul style="list-style-type: none"> A Show $\Delta\theta$ on vertical-axis and $\frac{1}{m}$ on the horizontal-axis \checkmark B State the units of the variables correctly \checkmark C Both axes are marked with uniform scale \checkmark D All five points are plotted correctly (Note: If only three points plotted correctly, award \checkmark) $\checkmark\checkmark$ E Best straight line is drawn \checkmark F Show the minimum size of graph at least 5×4 ($2 \text{ cm} \times 2 \text{ cm}$) square (counted from the origin until the furthest point) <p>Score :</p> <table border="1" data-bbox="357 576 874 788"> <thead> <tr> <th data-bbox="357 576 645 616">Number of \checkmark</th><th data-bbox="645 576 874 616">Score</th></tr> </thead> <tbody> <tr> <td data-bbox="357 616 645 656">7</td><td data-bbox="645 616 874 656">5</td></tr> <tr> <td data-bbox="357 656 645 695">5-6</td><td data-bbox="645 656 874 695">4</td></tr> <tr> <td data-bbox="357 695 645 735">3-4</td><td data-bbox="645 695 874 735">3</td></tr> <tr> <td data-bbox="357 735 645 774">2</td><td data-bbox="645 735 874 774">2</td></tr> <tr> <td data-bbox="357 774 645 814">1</td><td data-bbox="645 774 874 814">1</td></tr> </tbody> </table>	Number of \checkmark	Score	7	5	5-6	4	3-4	3	2	2	1	1	5	
Number of \checkmark	Score														
7	5														
5-6	4														
3-4	3														
2	2														
1	1														
(e)	<p>State the correct relationship between $\Delta\theta$ and $\frac{1}{m}$</p> <p>$\Delta\theta$ is directly proportional to $\frac{1}{m}$</p>	1													
			16												

NO	MARKING CRITERIA	MARK	
		SUB	TOTAL
2(a) (i)	State the relationship between T and x - T decreases linearly with x	1	
(ii)	State the value of T within the acceptable range - Show graphical extrapolation correctly - State the value within acceptable range $T = (0.59 - 0.61) \text{ N}$	1	
(iii)	State the physical quantity correctly - Weight /W	1	4
(b)	State the value of x within the acceptable range - Show graphical extrapolation correctly - State the value within acceptable range $x = (0.64 - 0.68) \text{ cm}$	1	2
(c)	Calculate the gradient of the graph, k and state the value of k within the acceptable range - Draw a sufficiently large triangle at least 3×3 ($2 \text{ cm} \times 2 \text{ cm}$) square - Correct substitution (follow candidate's triangle) Sample answer: $k = - \frac{0.6 - 0}{1.0 - 0}$ - State the correct value / answer with correct unit $(0.58 - 0.62) \text{ N cm}^{-1}$ Accept negative value for the answer	1	3
(d)	Calculate the value of ρ correctly using the given formula - Correct substitution $\rho = \frac{0.60}{7.2 \times 10^{-4}}$ Accept e.c.f. for k	1	
(e)	- State the correct answer / value $\rho = 833.3 \text{ kg m}^{-3}$ $\rho = (805.6 - 861.1) \text{ kg m}^{-3}$ State the correct precaution - The scale reading of the spring balance is taken when the wooden block stops oscillating - Place the eyes perpendicularly to the scale of spring balance and the metre rule - Repeat the readings and take the average value	1	2
			12

SECTION B

NO	MARKING CRITERIA	MARK	
		SUB	TOTAL
3 (a)	State a suitable inference - The pressure of the gas depends on its volume	1	1
(b)	State a relevant hypothesis - The smaller the volume, the higher the pressure	1	1
(c) (i)	Describe a complete suitable experimental framework <u>State the aim of experiment</u> To investigate the relationship between the volume of a gas and its pressure	1	
(ii)	<u>State the manipulated variable and the responding variable</u> Manipulated variable : Volume Responding variable : Pressure <u>State the constant variable</u> Constant variable : Mass of gas // Temperature	1	
(iii)	<u>List out the important apparatus and materials</u> Syringe, rubber tube, slotted weights, Bourdon gauge	1	
(iv)	<u>Draw a functional arrangement of apparatus</u>	1	
			
(v)	<u>State the method to control the manipulated variable</u> Slotted weights are placed on the piston of the syringe until the volume of air in the syringe is 40 cm^3	1	
	<u>State the method to measure the responding variable</u> The corresponding reading of the Bourdon gauge is measured	1	
	<u>Repeat the experiment at least four times</u> Repeat the previous steps for different volumes of 35 cm^3 , 30 cm^3 , 25 cm^3 and 20 cm^3	1	

(vi) State how the data is tabulated

Volume / cm ⁻³	Pressure
40	
35	
30	
25	
20	

1

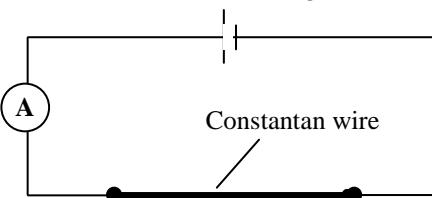
(vii) State how the data is analysed

Plot a graph of pressure against volume.

1

10

12

NO	MARKING CRITERIA	MARK													
		SUB	TOTAL												
4 (a)	Able to state a suitable inference <u>Sample answer</u> The diameter / thickness of a wire affects the current in the wire // The diameter / thickness of a wire affects the resistance of the wire // The diameter / thickness of the wire affects the brightness of the bulb	1	1												
(b)	Able to state a suitable hypothesis <u>Sample answer</u> The bigger the diameter of a wire, the bigger the current in the wire	1	1												
(c)	Able to describe a complete experimental framework <u>Sample answer</u> (i) <u>State the aim of experiment</u> To investigate the relationship between the diameter of a wire and the current in the wire (ii) <u>State the manipulated variable and the responding variable</u> Manipulated variable : diameter Responding variable : current <u>State the constant variable</u> Constant variable : length of wire // material of the wire (iii) <u>State the complete list of apparatus and materials</u> Constantan wires, metre rule, ammeter, battery, connecting wires (iv) <u>Draw a functional arrangement of the apparatus</u> 	1	1												
(v)	<u>State the method of controlling the manipulated variable</u> The circuit was set up with diameter, $d = 0.5$ mm of constantan wire <u>State the method of measuring the responding variable</u> The current, I , was measured with an ammeter. <u>Repeat the experiment at least four times</u> The procedure was repeated with diameter of, $d = 1.0$ mm, 1.5 mm, 2.0 mm and 2.5 mm (vii) <u>Tabulate the data</u> <table border="1" data-bbox="285 1541 737 1754"> <thead> <tr> <th>Diameter, d / mm</th> <th>Current, I / A</th> </tr> </thead> <tbody> <tr><td>0.5</td><td></td></tr> <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>	Diameter, d / mm	Current, I / A	0.5		1.0		1.5		2.0		2.5		1	1
Diameter, d / mm	Current, I / A														
0.5															
1.0															
1.5															
2.0															
2.5															
(vii)	<u>State how data is analysed</u> A graph of I against d is drawn <u>*Accept description of experiment for other relevant pairs of variables : diameter-resistance, diameter-brightness</u>	1	10												
			12												

Note : Diameter → Resistance → Current → Brightness