



JABATAN PELAJARAN NEGERI SELANGOR
MAJLIS PENGETUA SEKOLAH MALAYSIA NEGERI SELANGOR



PROGRAM PENINGKATAN PRESTASI AKADEMIK
PEPERIKSAAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA 2011

4531/1

PHYSICS

Kertas 1
September

1 $\frac{1}{4}$ jam

Satu jam lima belas 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 dikehendaki membaca maklumat di halaman belakang kertas soalan ini.*

Kertas soalan ini mengandungi 31 halaman bercetak dan 1 halaman tidak bercetak.

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 $\rho = \frac{m}{V}$
- 10 Pressure / Tekanan, $p = h\rho g$
- 11 Pressure / Tekanan, $p = \frac{F}{A}$
- 12 Heat / Haba, $Q = mc\theta$
- 13 Heat / Haba, $Q = ml$
- 14 $\frac{pV}{T} = \text{constant} / \text{pemalar}$
- 15 $E = mc^2$
- 16 $v = f\lambda$
- 17 Power, $P = \frac{\text{energy}}{\text{time}}$
 Kuasa, $P = \frac{\text{tenaga}}{\text{masa}}$
18. $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$

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

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

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

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

$$22 \quad Q = It$$

$$23 \quad V = IR$$

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

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

$$26 \quad \text{Efficiency / Kecekapan} = \frac{I_s V_s}{I_p V_p} \times 100\%$$

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

$$28 \quad c = 3.0 \times 10^8 \text{ m s}^{-1}$$

- 1 Which derived quantity has the same unit as momentum?

Kuantiti terbitan manakah yang mempunyai unit yang sama dengan momentum?

A $\frac{\text{Force}}{\text{Area}}$

$\frac{\text{Daya}}{\text{Luas}}$

B $\frac{\text{Mass}}{\text{Velocity}}$

$\frac{\text{Jisim}}{\text{Halaju}}$

C Force $\times$ Time

$\text{Daya} \times \text{Masa}$

D Mass $\times$ Acceleration

$\text{Jisim} \times \text{Pecutan}$

- 2 Which physical quantity is a vector quantity?

Kuantiti fizikal yang manakah adalah kuantiti vektor?

A Energy

Tenaga

B Impulse

Impuls

C Distance

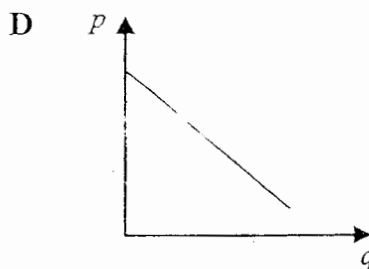
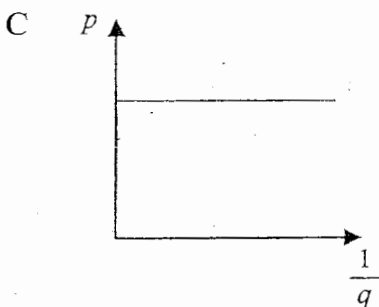
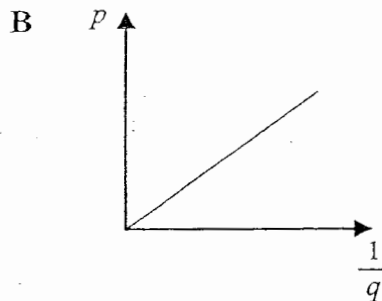
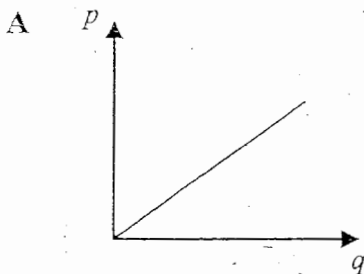
Jarak

D Density

Ketumpatan

- 3 Which graphs obeys the equation $pq = k$, where k is constant?

Graf manakah yang mematuhi persamaan $pq = k$, di mana k adalah pemalar?



- 4 Diagram 1 shows a velocity-time graph of an object.

Rajah 1 menunjukkan graf halaju-masa satu objek.

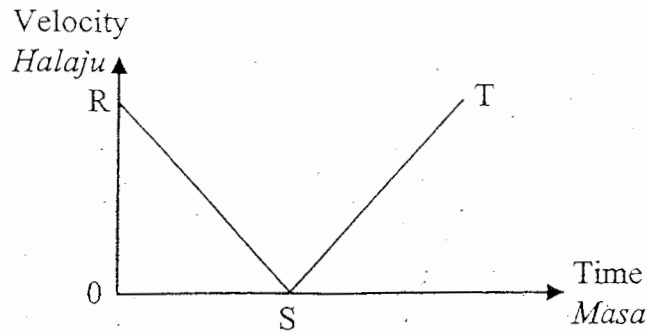


Diagram 1

Rajah 1

Which of the following describes the motion of the object?

Antara berikut, yang manakah menerangkan tentang gerakan objek?

	RS	ST
A	Deceleration <i>Nyahpecutan</i>	Acceleration <i>Pecutan</i>
B	Acceleration <i>Pecutan</i>	Deceleration <i>Nyahpecutan</i>
C	Increase velocity <i>Halaju bertambah</i>	Decrease velocity <i>Halaju berkurang</i>
D	Constant velocity <i>Halaju malar</i>	Constant velocity <i>Halaju malar</i>

- 5 Diagram 2 shows a wooden block, S, which is placed on the trolley.

Rajah 2 menunjukkan satu blok kayu, S, yang diletakkan di atas satu troli.

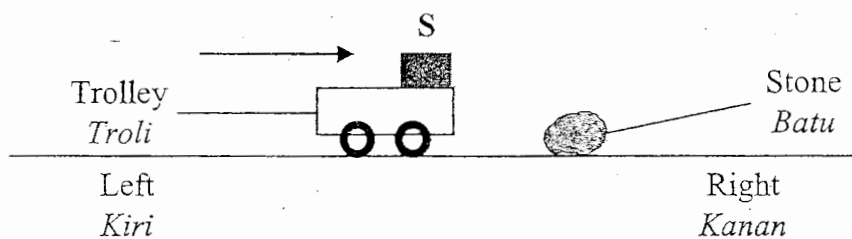


Diagram 2

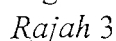
Rajah 2

What happens to the wooden block, S, when the trolley collides with the stone?

Apakah yang berlaku kepada blok kayu, S, apabila troli melanggar seketul batu?

- | | |
|--|--|
| A Pushed to the left
<i>Terhumban ke kiri</i> | B It remains on the trolley
<i>Ia tetap di atas troli</i> |
| C Pushed to the right
<i>Terhumban ke kanan</i> | |

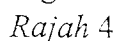
- Rajah 3 menunjukkan dua troli, P dan Q, yang masing-masing berjisim 1 kg dan 3 kg. Ia diletakkan di atas permukaan licin. Spring pada troli P dilepaskan oleh penukul. Kedua-dua troli bergerak dalam arah yang berbeza.



Jika troli P bergerak 2 m daripada kedudukan asal, berapa jauhkah troli Q akan bergerak dalam sela masa yang sama?

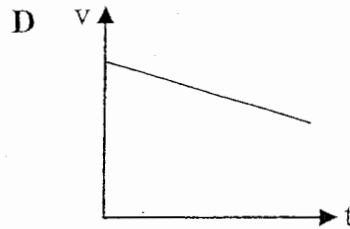
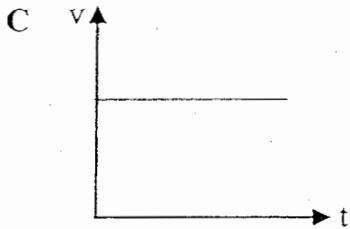
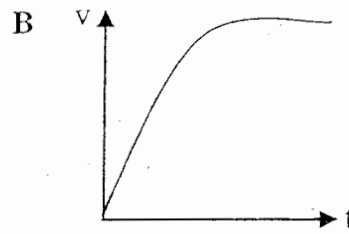
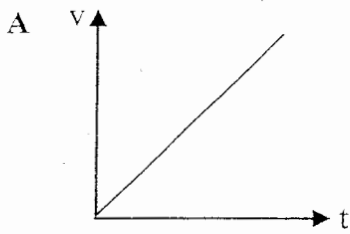
- A 0·67 m
- B 1·50 m
- C 5·00 m
- D 6·00 m

- Rajah 4 menunjukkan seorang atlet lompat bergalah yang berjisim 50 kg sedang jatuh di atas tilam getah dengan sela masa 2.0 s. Jika halajunya sejurus sebelum mendarat ialah 6.0 ms^{-1} , berapakah daya impuls yang dikenakan ke atasnya?

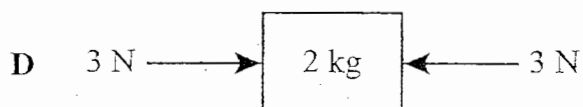
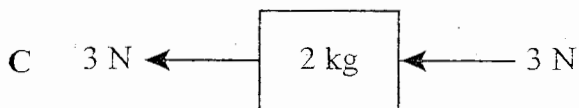
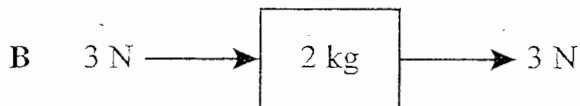
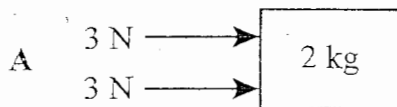


- | | | | |
|----------|-------|----------|-------|
| A | 100 N | B | 150 N |
| C | 300 N | D | 600 N |

- 8 Which velocity-time graph represents the motion of a free fall object?
 Graf halaju-masa manakah mewakili gerakan objek yang mengalami jatuh bebas?



- 9 Which diagram shows forces in equilibrium?
 Rajah manakah yang menunjukkan daya-daya berada dalam keseimbangan?



- 10 Diagram 5 shows a steel ball oscillating on a frictionless track.
Rajah 5 menunjukkan sebiji bola keluli sedang berayun di atas landasan tanpa geseran.

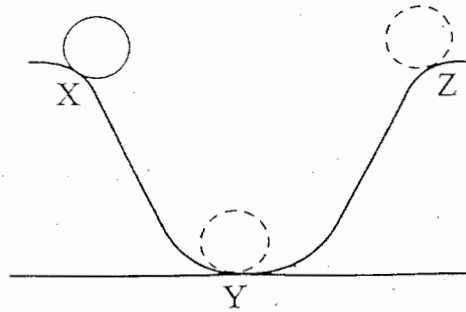


Diagram 5
Rajah 5

Which statement is true?

Pernyataan manakah yang benar?

- A The kinetic energy is maximum at X
Tenaga kinetik adalah maksimum di X
- B The principle of conservation of energy is not obeyed
Prinsip keabadian tenaga adalah tidak dipatuhi
- C The total energy of the steel ball at X is more than that at Y
Jumlah tenaga bola keluli di X adalah lebih daripada di Y
- D The total energy of the steel ball at Z is equal to that at Y
Jumlah tenaga bola keluli di Z adalah sama dengan di Y
- 11 Diagram 6 shows the force-extension graph of a spring.
Rajah 6 menunjukkan graf daya-pemanjangan satu spring.

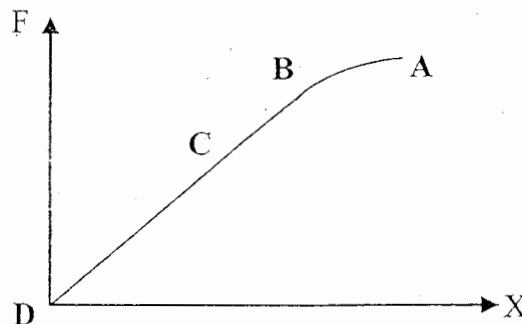
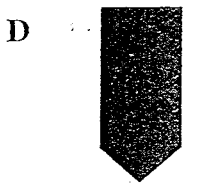
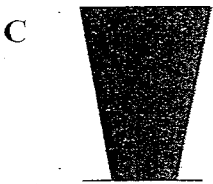
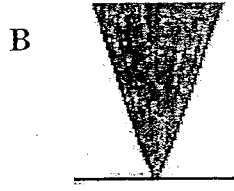
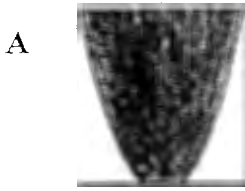


Diagram 6
Rajah 6

Which position, A, B, C or D, shows the elastic limit of the spring?

Antara kedudukan A, B, C dan D, manakah yang menunjukkan had elastik bagi spring?

- 12 Which diagram of knife blade slices the bread smoothly?
Rajah mata pisau manakah yang memotong kepingan roti dengan licin?



- 13 Diagram 7 shows a tank of water.
Rajah 7 menunjukkan sebuah tangki yang berisi air.

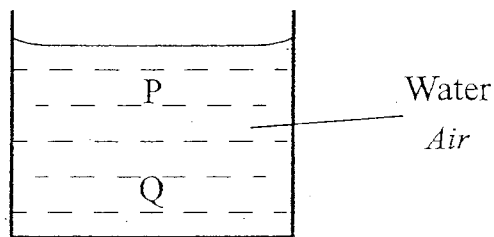


Diagram 7

Rajah 7

- Which is the correct comparison of the pressure at P and Q?
Perbandingan manakah yang betul mengenai tekanan di P dan Q?

- | | |
|--|--|
| A Pressure at P > pressure at Q
<i>Tekanan di P > tekanan di Q</i> | B Pressure at P < pressure at Q
<i>Tekanan di P < tekanan di Q</i> |
| C Pressure at P = pressure at Q
<i>Tekanan di P = tekanan di Q</i> | |

- 14 Diagram 8 shows a mercury barometer.
Rajah 8 menunjukkan barometer merkuri.

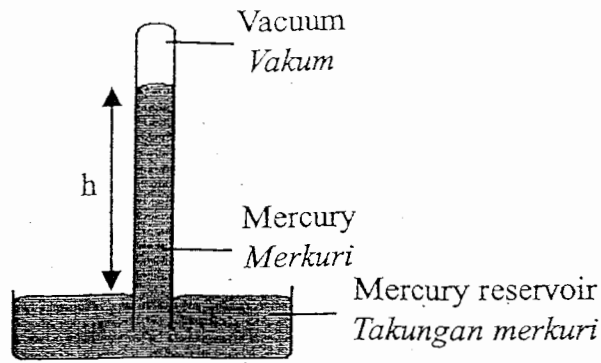


Diagram 8
Rajah 8

At which place will the height of mercury level, h , of the barometer be reduced?
Pada tempat manakah, ketinggian aras merkuri, h , bagi barometer akan berkurang?

- A At the sea side
Tepi pantai
- B Below sea level
Bawah aras laut
- C On the top of the mountain
Puncak gunung
- D In the deep mines which is below sea level
Lombong yang dalam di bawah aras laut

- 15 Diagram 9 shows the height of mercury level, $h = 5$ cm, in a manometer when connected to a gas supply.

Rajah 9 menunjukkan tinggi aras merkuri, $h = 5$ cm, di dalam manometer apabila disambungkan kepada bekalan gas.

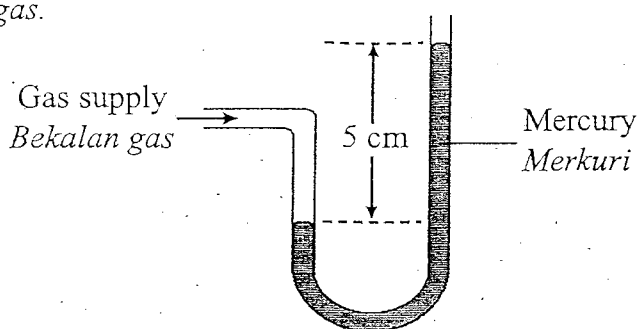


Diagram 9

Rajah 9

If water is used instead of mercury, what will be the height of water level, h , in the manometer?

Jika air diguna bagi menggantikan merkuri, apakah yang berlaku kepada tinggi aras air, h , di dalam manometer?

- | | |
|--|--------------------------------------|
| <p>A Increase
<i>Meningkat</i></p> <p>C No change
<i>Tiada perubahan</i></p> | <p>B Decrease
<i>Menurun</i></p> |
|--|--------------------------------------|

- 16 Which statement is true about Pascal's Principle?

Pernyataan manakah yang benar mengenai Prinsip Pascal?

- | |
|---|
| <p>A Force is applied to an enclosed fluid system, the pressure will be transmitted equally in all direction
<i>Daya dikenakan kepada sistem bendalir tertutup, tekanan akan dipindahkan secara seragam ke semua arah</i></p> <p>B Pressure is applied to an enclosed fluid system, the force will be transmitted equally in all direction
<i>Tekanan dikenakan kepada sistem bendalir tertutup, daya akan dipindahkan secara seragam ke semua arah</i></p> <p>C Pressure is applied to an enclosed fluid system, the pressure will be transmitted directly proportional to surface area
<i>Tekanan dikenakan kepada sistem bendalir tertutup, tekanan akan dipindahkan secara berkadar terus dengan luas permukaan</i></p> <p>D Force is applied to an enclosed fluid system, the pressure will be transmitted inversely proportional to a surface area
<i>Daya dikenakan kepada sistem bendalir tertutup, tekanan akan dipindahkan secara berkadar songsang dengan luas permukaan</i></p> |
|---|

- 17 In the Arctic region, a piece of ice is found floating in the sea.
Which statement about the ice is correct?

*Di kawasan Artik, seketul ais ditemui terapung di permukaan laut.
Pernyataan manakah yang betul tentang ais?*

- A The weight of the ice is less than the weight of water displaced
Berat ais adalah kurang daripada berat air yang disesarkan
- B The weight of the ice is equal to the weight of water displaced
Berat ais adalah sama dengan berat air yang disesarkan
- C The weight of ice is more than the weight of water displaced
Berat ais adalah melebihi berat air yang disesarkan
- D The weight of ice is equal to the volume of water displaced
Berat ais adalah sama dengan isi padu air yang disesarkan

- 18 Diagram 10 shows a hydraulic system. Given area A is 0.02 m^2 and area B is 0.01 m^2 .

Rajah 10 menunjukkan satu sistem hidraulik. Diberi luas A ialah 0.02 m^2 dan luas B ialah 0.01 m^2 .

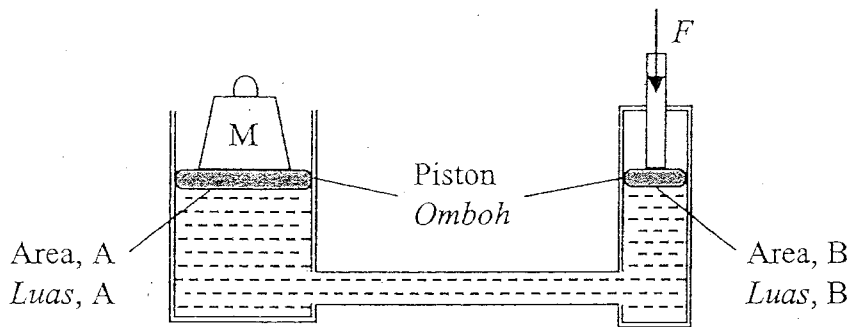


Diagram 10
Rajah 10

What is the maximum mass, M , that can be supported by the force, F , 20 N applied on a smaller piston?

Apakah jisim maksimum, M , yang boleh disokong oleh daya, F , 20 N yang dikenakan pada omboh kecil?

- A 2 kg
- B 4 kg
- C 20 kg
- D 40 kg

- 19 Diagram 11 shows the structure of a Bunsen burner.
Rajah 11 menunjukkan struktur sebuah penunu Bunsen.

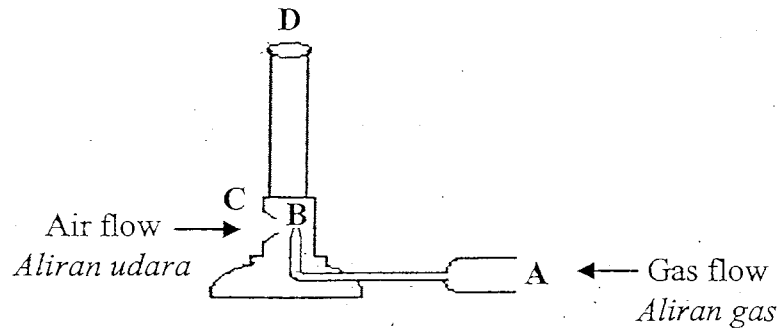


Diagram 11
Rajah 11

Which position, A, B, C, or D is the region of lowest pressure when the gas flows?
Antara kedudukan A, B, C, dan D, yang manakah kawasan tekanan paling rendah apabila gas mengalir?

- 20 Which of the following is closely associated with the temperature of an object?
Antara berikut, yang manakah berkait rapat dengan suhu suatu objek?

- | | |
|--|---|
| A The mass of the object
<i>Jisim objek</i> | B The volume of the object
<i>Isi padu objek</i> |
| C The density of the object
<i>Ketumpatan objek</i> | D The motion of its molecules
<i>Pergerakan molekulnya</i> |

- 21 If the same amount of heat is supplied to water and paraffin of the same mass, the temperature rise of paraffin is higher than water.
 This is due to

*Jika kuantiti haba yang sama dibekalkan kepada air dan parafin yang mempunyai jisim sama, kenaikan suhu parafin adalah lebih tinggi daripada air.
 Ini adalah disebabkan oleh*

- | |
|--|
| A the specific latent heat of water is higher than paraffin
<i>haba pendam tentu air adalah lebih tinggi daripada parafin</i> |
| B the specific latent heat of paraffin is higher than water
<i>haba pendam tentu parafin adalah lebih tinggi daripada air</i> |
| C the specific heat capacity of water is higher than paraffin
<i>muatan haba tentu air adalah lebih tinggi daripada parafin</i> |
| D the specific heat capacity of paraffin is higher than water
<i>muatan haba tentu parafin adalah lebih tinggi daripada air</i> |

- 22 Blisters on the skin caused by steam is much more severe than blisters caused by boiling water because steam has
Lecur pada kulit yang disebabkan oleh stim lebih teruk daripada lecur yang disebabkan oleh air mendidih kerana stim mempunyai

- A a higher temperature
suhu yang lebih tinggi
- B a higher specific heat capacity
muatan haba tentu yang lebih tinggi
- C a higher specific latent heat of vaporisation
haba pendam tentu pengewapan yang lebih tinggi

- 23 Diagram 12 shows air trapped in an empty container floating in the sea at noon. During night time the volume of trapped air reduced.

Rajah 12 menunjukkan udara terperangkap dalam sebuah bekas yang terapung di permukaan laut pada waktu tengah hari. Pada waktu malam isi padu udara yang terperangkap berkurang.

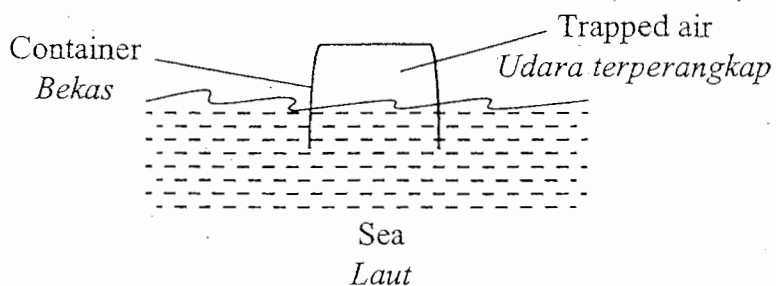


Diagram 12
Rajah 12

Which law explains this situation?

Hukum manakah yang menerangkan situasi ini?

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

- 24 Diagram 13 shows a ray of light, PO, reflected from a plane mirror.
Rajah 13 menunjukkan sinar cahaya, PO, dipantulkan dari cermin satah.

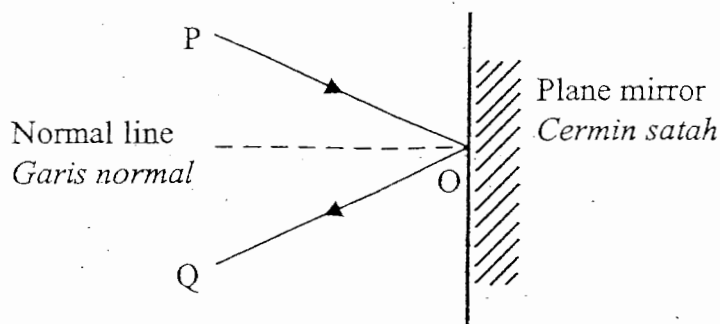


Diagram 13
Rajah 13

The angle between normal line and OQ is known as
Sudut antara garis normal dan OQ dikenali sebagai

- A angle of incidence
sudut tuju
- B angle of refraction
sudut biasan
- C angle of reflection
sudut pantulan

- 25 Which of the ray, A, B, C or D in Diagram 14 is most likely to represent refraction of ray from the surface of the glass?

Antara sinar A, B, C dan D, dalam Rajah 14, yang manakah paling tepat untuk mewakili sinar yang dibiaskan dari permukaan kaca tersebut?

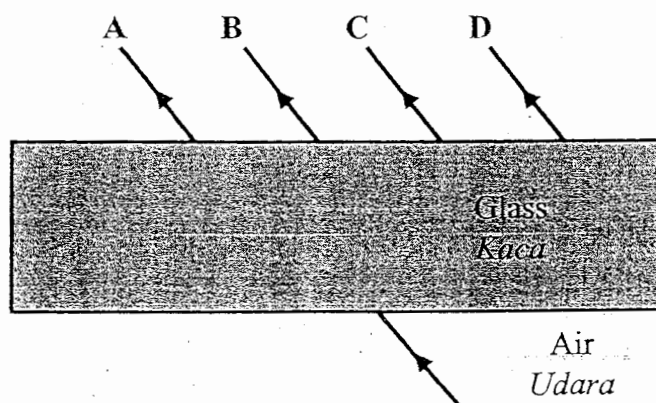


Diagram 14
Rajah 14

- 26 Which optical instrument is based on the application of total internal reflection?
Alat optik manakah yang berasaskan kepada aplikasi pantulan dalam penuh?
- A Telescope
Teleskop
- B Camera
Kamera
- C Endoscope
Endoskop
- D Microscope
Mikroskop
- 27 Diagram 15 shows an image formed by a convex lens.
Rajah 15 menunjukkan suatu imej yang terbentuk oleh sebuah kanta cembung.

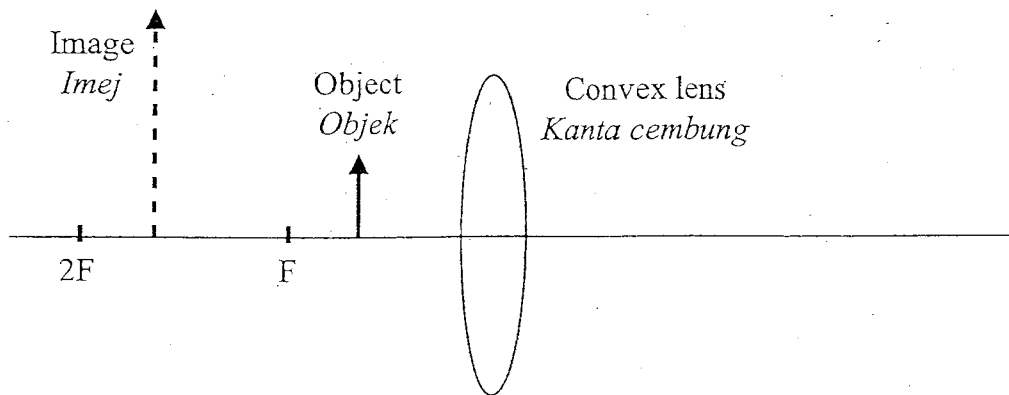


Diagram 15
 Rajah 15

What are the characteristics of the image formed when the object is placed at 2F?
Apakah ciri-ciri imej yang terbentuk apabila objek itu diletakkan di 2F?

- A Real, upright and magnified
Sahih, tegak dan lebih besar
- B Virtual, upright and diminished
Maya, tegak dan lebih kecil
- C Real, inverted and diminished
Sahih, songsang dan lebih kecil
- D Real, inverted and same size
Sahih, songsang dan sama saiz

- 28 Diagram 16 shows a displacement-time graph for an oscillating pendulum.
Rajah 16 menunjukkan graf sesaran-masa bagi suatu ayunan bandul.

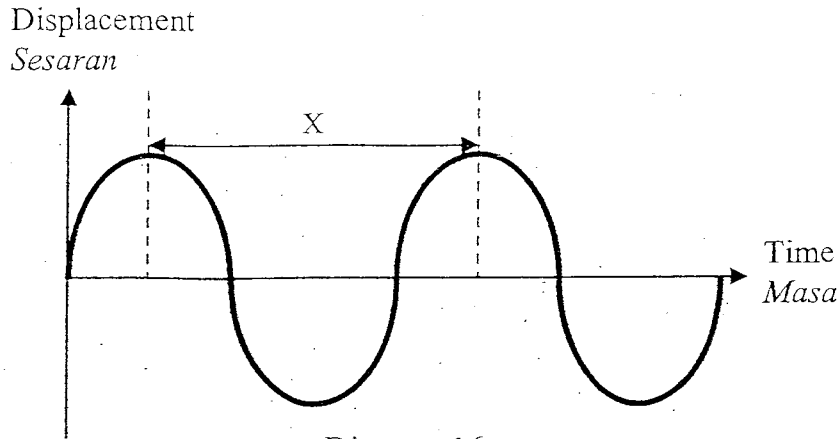


Diagram 16
Rajah 16

X represent
X mewakili

- | | |
|--------------------------------|--|
| A period
<i>tempoh</i> | B frequency
<i>frekuensi</i> |
| C amplitude
<i>amplitud</i> | D wavelength
<i>panjang gelombang</i> |

- 29 What happens to the frequency and loudness of sound waves when it is reflected?
Apakah yang berlaku kepada frekuensi dan kenyaringan bagi suatu gelombang bunyi apabila dipantulkan?

	Frequency <i>Frekuensi</i>	Loudness <i>Kenyaringan</i>
A	Unchanged <i>Tidak berubah</i>	Decreases <i>Berkurang</i>
B	Increases <i>Bertambah</i>	Decreases <i>Berkurang</i>
C	Unchanged <i>Tidak berubah</i>	Unchanged <i>Tidak berubah</i>
D	Increases <i>Bertambah</i>	Unchanged <i>Tidak berubah</i>

- 30 Diagram 17 shows a tilted water tank.
Rajah 17 menunjukkan sebuah tangki air yang dicondongkan.

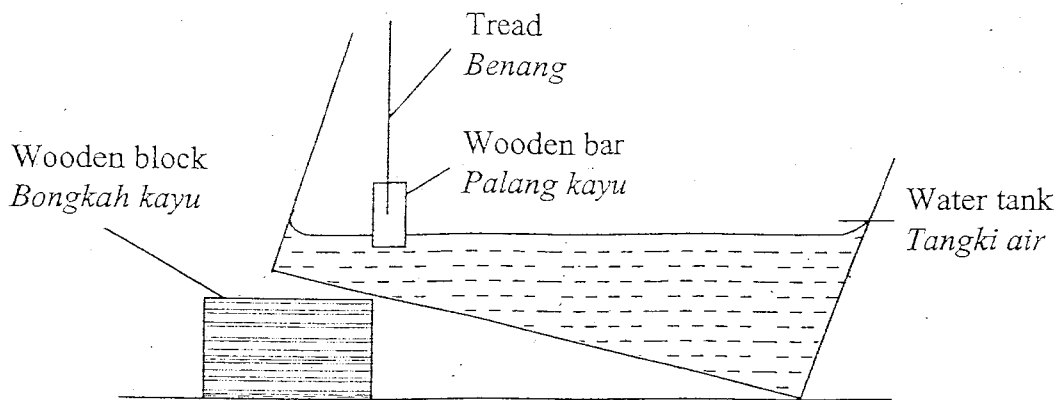
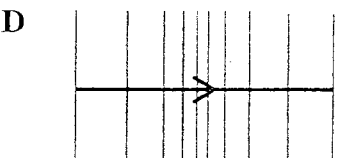
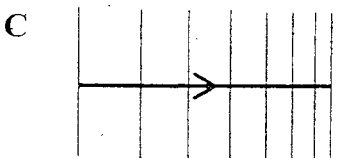
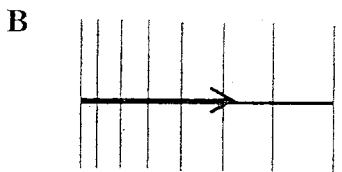
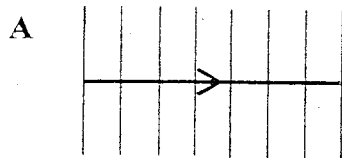


Diagram 17
Rajah 17

When the wooden bar vibrates, the wave pattern produced is
Apabila palang kayu bergetar, corak gelombang yang terhasil ialah



- 31 Diagram 18 shows plane water waves moving towards a slit.
Rajah 18 menunjukkan gelombang air satah merambat ke arah satu celah.

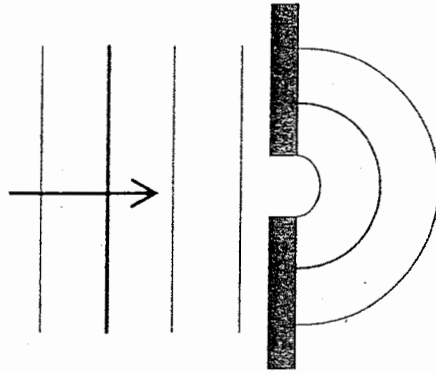


Diagram 18
Rajah 18

The motion of the waves through the slit will cause a change in the
Pergerakan gelombang melalui celah akan menyebabkan perubahan dalam

- A amplitude
amplitud
- B frequency
frekuensi
- C wave speed
laju gelombang
- D wavelength
panjang gelombang

- 32 Diagram 19 shows the superposition of two coherent water waves, X and Y.
Rajah 19 menunjukkan superposisi bagi dua gelombang air yang koheren, X dan Y.

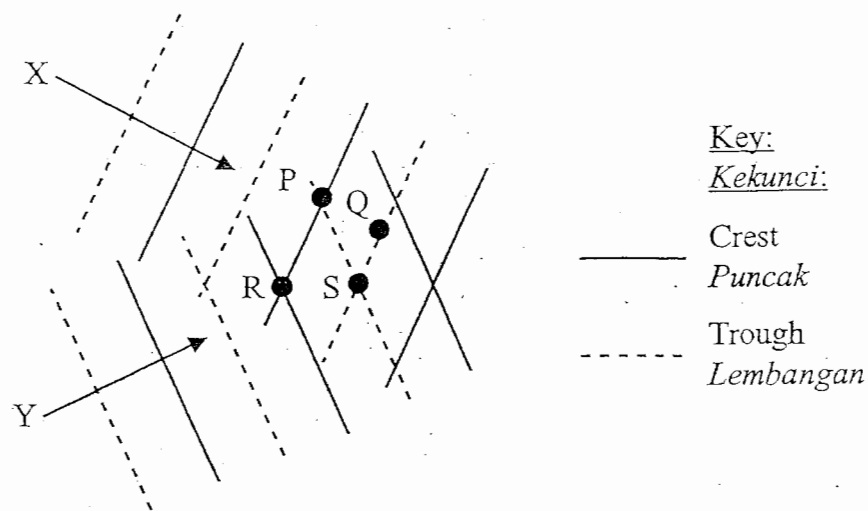


Diagram 19
Rajah 19

At which points do constructive interference occur?
Di titik-titik manakah interferens membina berlaku?

- A P and Q
 P dan Q
- B Q and R
 Q dan R
- C R and S
 R dan S
- D P and S
 P dan S

33 Diagram 20 shows a fringe pattern formed on a screen in Young's double-slit experiment.

Rajah 20 menunjukkan corak pinggir yang dihasilkan di atas skrin dalam eksperimen dwicelah Young.

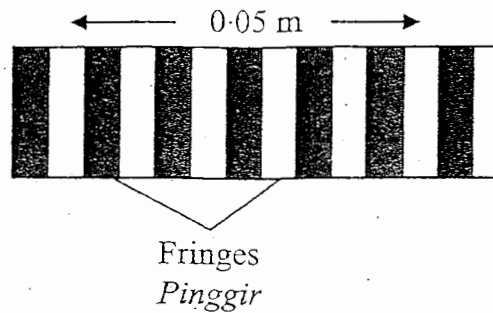


Diagram 20

Rajah 20

The distance between double slit and screen is 1 m and the wavelength of light is given as 5×10^{-7} m. What is the distance between two slits?

Jarak di antara dwicelah dan skrin ialah 1 m dan panjang gelombang cahaya yang diberi ialah 5×10^{-7} m. Berapakah jarak di antara dua celah?

- | | |
|--------------------------|--------------------------|
| A 5.0×10^{-5} m | B 1.0×10^{-5} m |
| C 5.0×10^{-3} m | D 1.0×10^{-3} m |

34 Diagram 21 shows a house at the busy road side, the noisy siren can be heard clearly by the residents of the house.

Rajah 21 menunjukkan sebuah rumah di sisi jalan yang sibuk, bising siren dapat didengar jelas oleh para penghuni rumah.

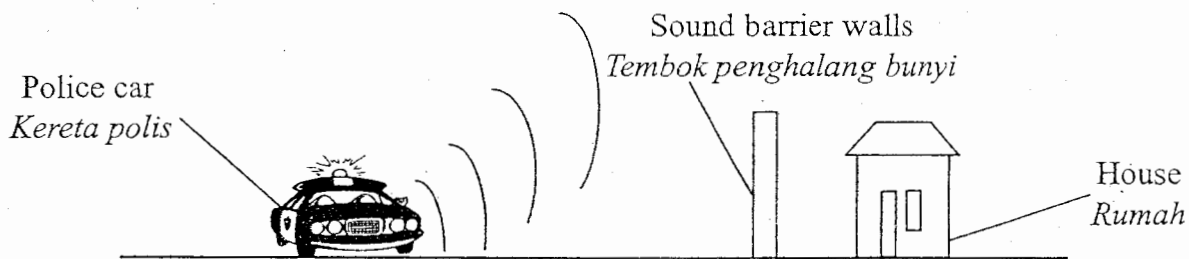


Diagram 21

Rajah 21

This happens because the sound wave is

Ini berlaku disebabkan oleh gelombang bunyi telah

- | | |
|-------------------------|------------------------|
| A diffracted
dibelau | B refracted
dibias |
| C reflected
dipantul | D dispersed
diserak |

- 35 Diagram 22 shows a series of wave-front produced by a ripple tank. The motor vibrates at 5 cycles per second.

Rajah 22 menunjukkan satu siri muka gelombang yang dihasilkan oleh sebuah tangki riak. Motor bergetar pada 5 kitaran per saat.

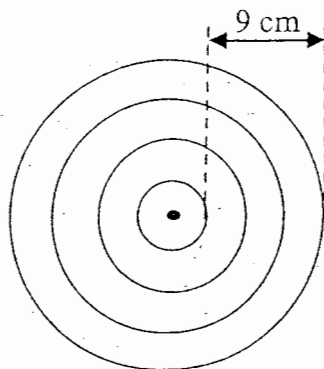


Diagram 22

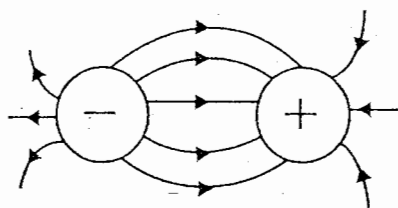
Rajah 22

What is the wave speed?

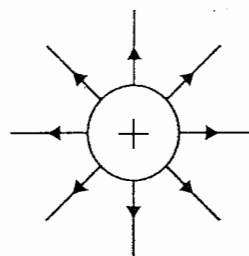
Berapakah kelajuan gelombang?

- A 0.6 cm s^{-1} B 1.8 cm s^{-1}
 C 15 cm s^{-1} D 45 cm s^{-1}
- 36 Which diagram shows the correct electric field pattern?
 Rajah manakah yang menunjukkan corak medan elektrik yang betul?

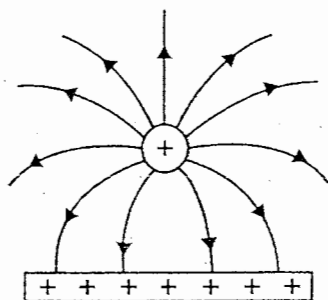
A



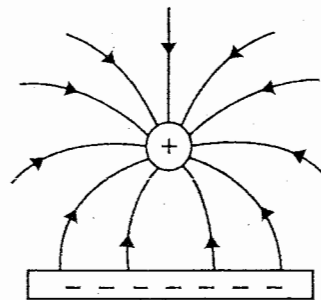
B



C

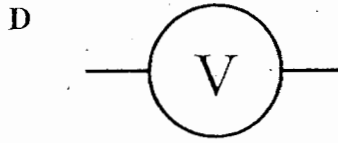
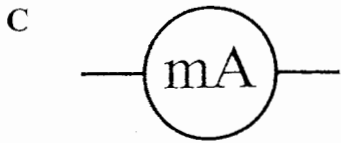
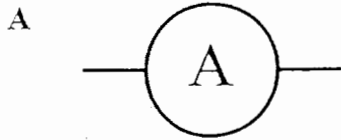


D



37 Which symbol represent an instrument to measure potential difference?

Simbol manakah yang mewakili alat untuk mengukur beza keupayaan?



38 Diagram 23 show two electrical circuits, series circuit O and parallel circuit P, with 3 identical light bulbs connected respectively.

Rajah 23 menunjukkan dua litar elektrik, litar sesiri O dan litar selari P, dengan 3 mentol serupa disambung masing-masing.

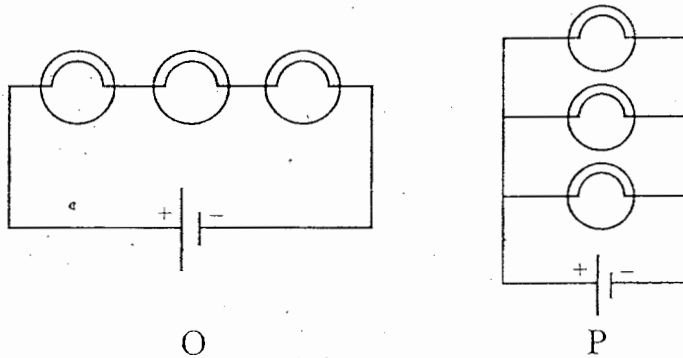


Diagram 23
Rajah 23

Which statements about both the circuits is correct if one of the light bulb blow-out?

Pernyataan yang manakah benar tentang kedua-dua litar itu jika salah satu mentol terbakar?

	O	P
A	The other bulbs do not lit up <i>Mentol yang lain tidak menyala</i>	The other bulbs lit up <i>Mentol yang lain menyala</i>
B	The other bulbs do not lit up <i>Mentol yang lain tidak menyala</i>	The other bulbs do not lit up <i>Mentol yang lain tidak menyala</i>
C	The other bulbs lit up <i>Mentol yang lain menyala</i>	The other bulbs lit up <i>Mentol yang lain menyala</i>
D	The other bulbs lit up <i>Mentol yang lain menyala</i>	The other bulbs do not lit up <i>Mentol yang lain tidak menyala</i>

39 Diagram 24 shows a voltage-current graph.

Rajah 24 menunjukkan graf voltan-arus.

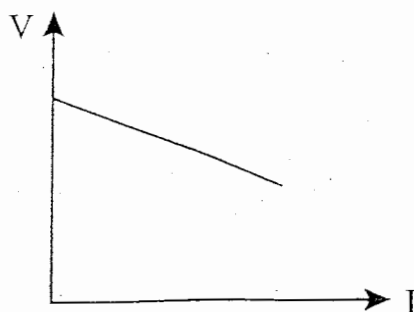
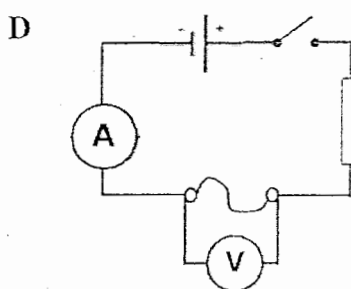
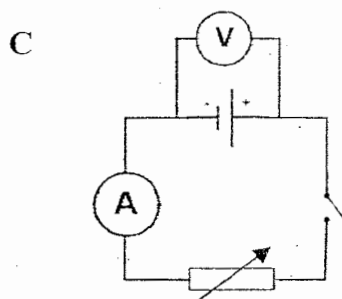
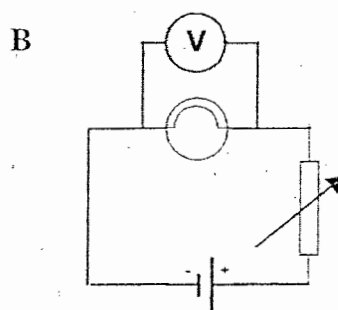
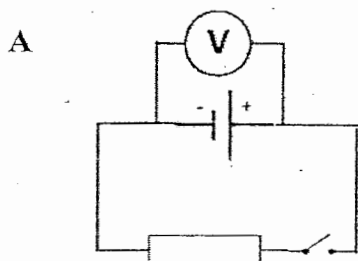


Diagram 24

Rajah 24

Which circuit is used to obtain this graph?

Litar manakah yang digunakan untuk memperolehi graf ini?



40 A label 240 V, 1500 W on electrical kettle means

Label 240 V, 1500 W pada cerek elektrik bermaksud

- A 1500 J of energy used every 1 second when connected to a 240 V supply
1500 J tenaga digunakan setiap 1 saat bila disambungkan kepada bekalan 240 V
- B 1500 W of power used every 1 second when connected to 240 V supply
1500 W kuasa digunakan setiap 1 saat bila disambungkan kepada bekalan 240 V
- C 1500 V of voltage used every 1 second when connected to 240 V supply
1500 V voltan digunakan setiap 1 saat bila disambungkan kepada bekalan 240 V
- D 1500 A of current used every 1 second when connected to 240 V supply
1500 A arus digunakan setiap 1 saat bila disambungkan kepada bekalan 240 V

- 41 Diagram 25 shows a compass that is placed above a wire.

Rajah 25 menunjukkan sebuah kompas diletakkan di atas satu wayar.

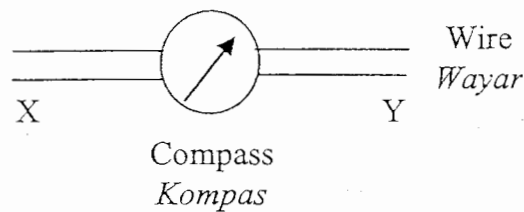
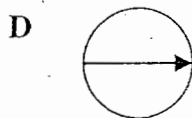
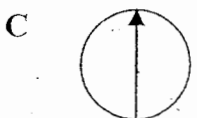
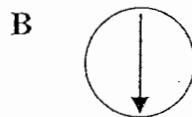
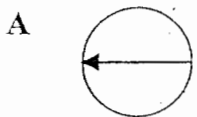


Diagram 25

Rajah 25

Which diagram shows the correct position of compass needle when the current flows from X to Y?

Rajah yang manakah menunjukkan kedudukan jarum kompas yang betul apabila arus mengalir dari X ke Y?



- 42 What is the function of split-ring commutator in a direct current motor?

Apakah fungsi komutator gelang terbelah dalam motor arus terus?

A Converge the magnetic field
Menumpukan medan magnet

B Reduce friction at the carbon brushes
Mengurangkan geseran berus karbon

C Increase the speed of rotation of the coil
Menambahkan kelajuan putaran gegelung

D Reverse the current direction in the coil every half turn
Menukar arah arus dalam gegelung dalam setiap separuh pusingan

- 43 Diagram 26 shows a magnet that is oscillating in a solenoid.
Rajah 26 menunjukkan satu magnet berayun dalam solenoid.

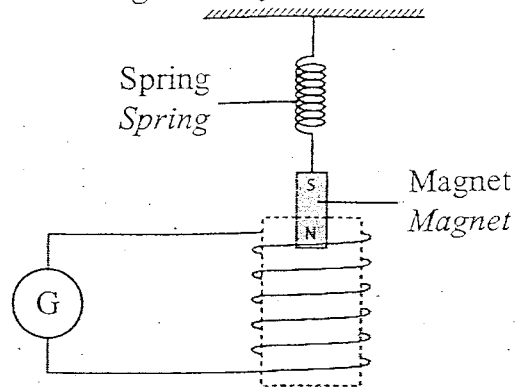


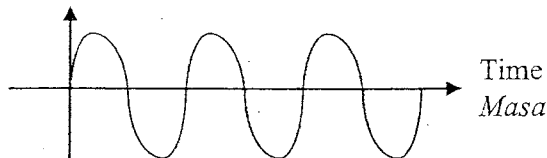
Diagram 26

Rajah 26

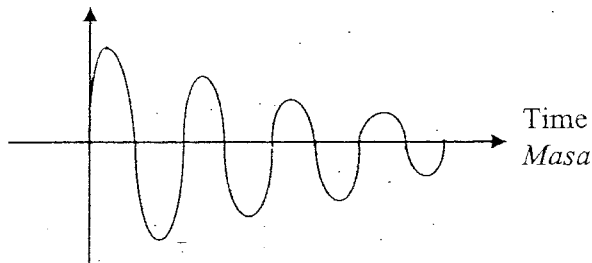
Which graph of induced current against time is correct?

Graf arus aruhan melawan masa manakah yang betul?

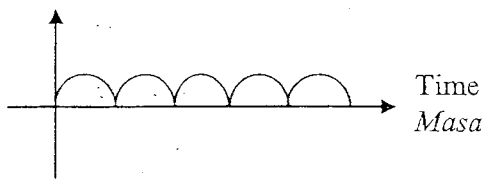
- A Induced current
Arus aruhan



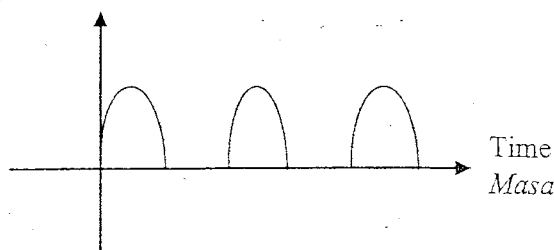
- B Induced current
Arus aruhan



- C Induced current
Arus aruhan



- D Induced current
Arus aruhan



44

Diagram 27 shows a circuit where the bulb lights up at normal brightness.

Rajah 27 menunjukkan litar di mana mentol menyala dengan kecerahan normal.

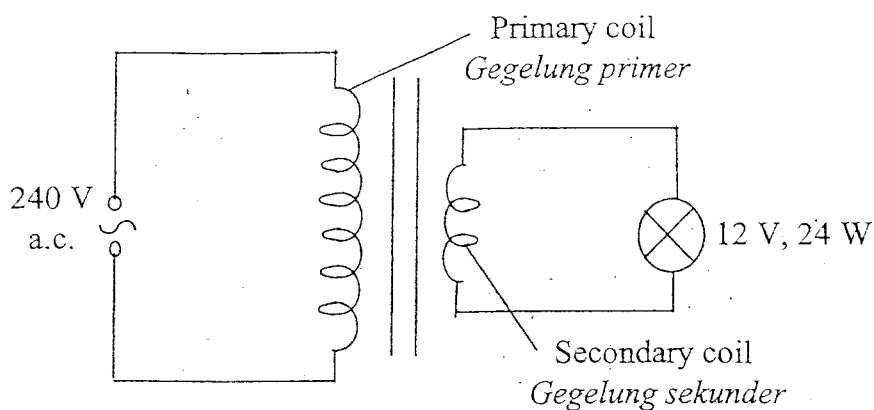


Diagram 27

Rajah 27

Which of the following is correct?

Antara berikut, yang manakah betul?

	Number of turns in the primary coil <i>Bilangan lilitan dalam gegelung primer</i>	Number of turns in the secondary coil <i>Bilangan lilitan dalam gegelung sekunder</i>
A	4800	1200
B	4000	200
C	3600	720
D	3000	750

- 45 Diagram 28 shows the trace displayed on the screen of a cathode ray oscilloscope.

Rajah 28 menunjukkan surihan pada skrin sebuah osiloskop sinar katod.



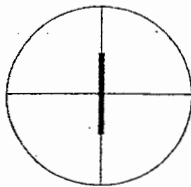
Diagram 28

Rajah 28

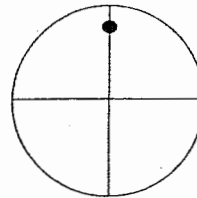
Which diagram shows the correct trace when the time-based switch is off?

Rajah manakah yang menunjukkan surihan betul apabila suis asas masa dimatikan?

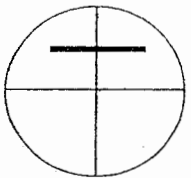
A



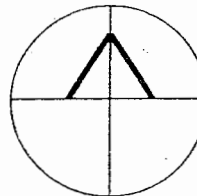
B



C



D



- 46 A student sets up a circuit as shown in Diagram 29. The bulb does not light up.
Seorang murid memasang litar seperti dalam Rajah 29. Mentol didapati tidak menyala.

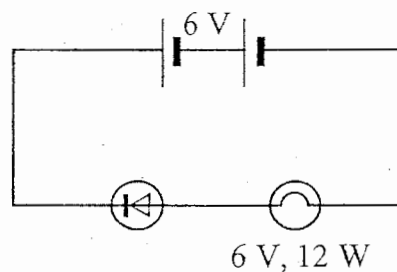


Diagram 29

Rajah 29

What should be done to light up the bulb?

Apakah yang perlu dilakukan untuk menyalakan mentol tersebut?

A Connecting a fuse in the circuit
Sambungkan fius dalam litar

B Reversing the connections of bulb
Songsangkan sambungan mentol

C Reversing the battery connection
Songsangkan sambungan bateri

D Changing the supply to a 12 V battery
Tukar bekalan kuasa kepada bateri 12 V

- 47 Diagram 30 shows a combination circuit of four logic gates used for controlling the operation of an electronic device.

Rajah 30 menunjukkan kombinasi empat get logik untuk mengawal operasi sebuah peranti elektronik.

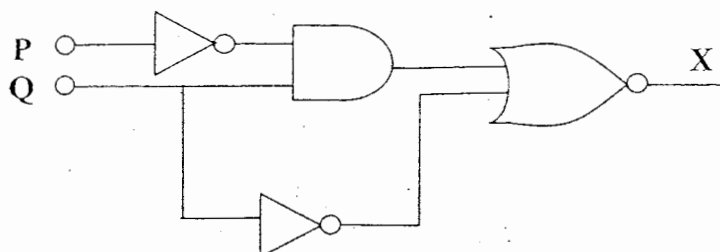


Diagram 30

Rajah 30

Which truth table is correct as output X?

Jadual kebenaran yang manakah betul sebagai output X?

A

P	Q	X
0	0	0
0	1	0
1	0	0
1	1	1

B

P	Q	X
0	0	1
0	1	0
1	0	1
1	1	0

C

P	Q	X
0	0	0
0	1	1
1	0	0
1	1	1

D

P	Q	X
0	0	1
0	1	0
1	0	0
1	1	1

- 48 $^{22}_{10}\text{Ne}$ represents an atom of neon.

How many neutrons does it have?

$^{22}_{10}\text{Ne}$ mewakili atom bagi neon.

Berapakah bilangan neutron di dalam atom neon?

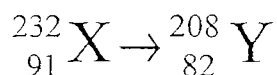
A 10

B 12

C 22

D 32

- 49 In the equation of nuclear reaction below, how many α particles and β particles are emitted?
Dalam persamaan tindak balas nuklear di bawah, berapakah bilangan zarah α dan zarah β yang dipancarkan?



	α	β
A	1	1
B	3	6
C	4	2
D	6	3

- 50 Diagram 31 shows a fireman detecting radiation through lead walls of the storeroom. The radiation was emitted by the radioactive material.

Rajah 31 menunjukkan seorang ahli bomba sedang mengesan sinaran melalui dinding plumbum bilik stor. Sinaran tersebut dihasilkan oleh bahan radioaktif.

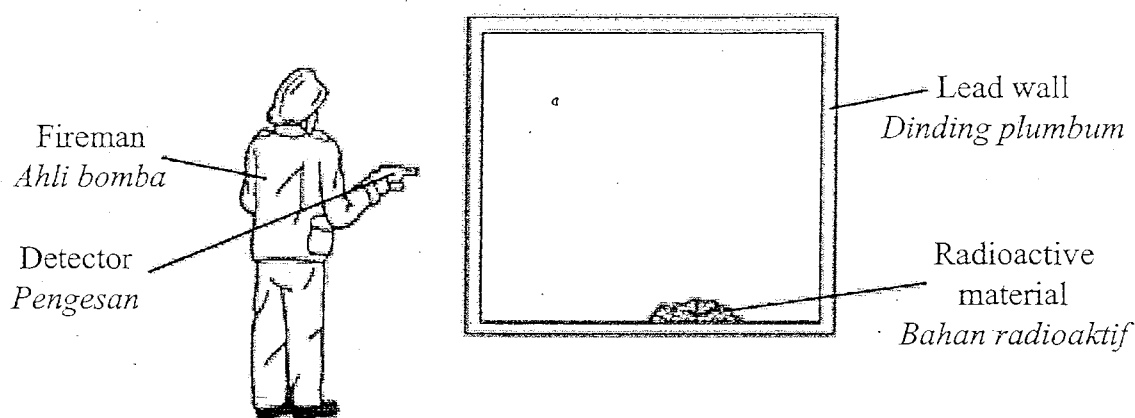


Diagram 31
Rajah 31

What type of radiation was being detected?

Apakah jenis sinaran yang dikesan?

- | | |
|---------------------------------------|-------------------------------------|
| A α particle
Zarah α | B β particle
Zarah β |
| C γ ray
Sinar γ | D X-ray
Sinar X |

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

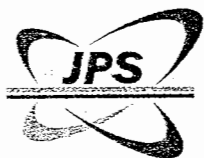
NO. KAD PENGENALAN

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ANGKA GILIRAN

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Nama Tingkatan



JABATAN PELAJARAN NEGERI SELANGOR
MAJLIS PENGETUA SEKOLAH MALAYSIA NEGERI SELANGOR



PROGRAM PENINGKATAN PRESTASI AKADEMIK
PEPERIKSAAN PERCUBAAN

SIJIL PELAJARAN MALAYSIA 2011

4531/2

PHYSICS

Kertas 2

September

$2\frac{1}{2}$ jam

Dua jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. Tulis nombor kad pengenalan, angka giliran, nama dan tingkatan anda pada ruangan yang disediakan.
2. Kertas soalan ini adalah dalam dwibahasa.
3. Soalan dalam bahasa Inggeris mendahului soalan yang sepadan dalam bahasa Melayu.
4. Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam bahasa Inggeris atau bahasa Melayu.
5. Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.

Untuk Kegunaan Pemeriksa			
Kod 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 31 halaman bercetak dan 1 halaman tidak bercetak.

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

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

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

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

$$4 \quad \text{Momentum} = mv$$

$$5 \quad F = ma$$

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

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

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

$$9 \quad \text{Power, } P = \frac{\text{energy}}{\text{time}} \\ \text{Kuasa, } P = \frac{\text{tenaga}}{\text{masa}}$$

$$10 \quad \rho = \frac{m}{V}$$

$$11 \quad \text{Heat / Haba, } Q = mc\theta$$

$$12 \quad \text{Heat / Haba, } Q = ml$$

$$13 \quad \frac{pV}{T} = \text{constant / pemalar}$$

$$14 \quad p_1V_1 = p_2V_2$$

$$15 \quad n = \frac{\sin i}{\sin r}$$

$$16 \quad n = \frac{\text{real depth}}{\text{apparent depth}}$$

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

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

$$18 \quad \text{Linear magnification /} \\ \text{Pembesaran linear, } m = \frac{v}{u}$$

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

$$20 \quad \lambda = \frac{ax}{D}$$

$$21 \quad Q = It$$

$$22 \quad E = VQ$$

$$23 \quad V = IR$$

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

$$25 \quad g = 10 \text{ m s}^{-2}$$

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

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

$$28 \quad E = mc^2$$

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

$$30 \quad \text{Pressure / Tekanan, } p = h\rho g$$

$$31 \quad \text{Pressure / Tekanan, } p = \frac{F}{A}$$

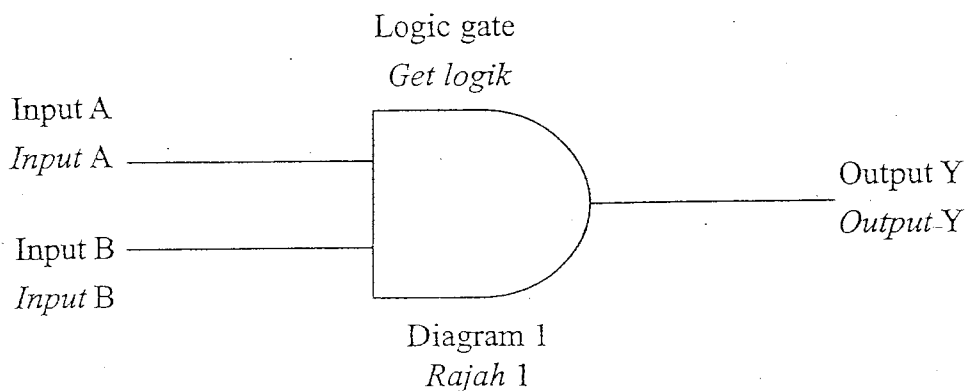
Section A
Bahagian A

[60 marks]

[60 markah]

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

- 1 Diagram 1 shows a logic gate.
Rajah 1 menunjukkan sebuah get logik.



- (a) Complete the sentence by ticking (✓) in the correct box.
Lengkapkan ayat berikut dengan menanda (✓) dalam petak betul.

Logic gates are ...

Get logik adalah ...

☐ rectifier circuit in computers and other electronic systems
litar pensearah di dalam komputer dan sistem elektronik lain

☐ switching circuit in computers and other electronic systems
litar penghidup suis di dalam komputer dan sistem elektronik lain

[1 mark]

[1 markah]

1(a)

	1
--	---

- (b) Based on Diagram 1,
Berdasarkan Rajah 1,

- (i) name the logic gate.
namakan get logik itu.

1(b)(i)

	1
--	---

[1 mark]

[1 markah]

- (ii) complete the truth table in Table 1.
lengkapkan jadual kebenaran dalam Jadual 1.

Input A <i>Input A</i>	Input B <i>Input B</i>	Output Y <i>Output Y</i>
1	0	
0	1	
1	1	
0	0	

Table 1
Jadual 1

[2 marks]
[2 markah]

1(b)(ii)

2

Total
A1

4

- 2 Diagram 2.1 shows a boy kicking an inflated ball until the ball stops at A. Diagram 2.2 shows the boy kicks a deflated ball with the same impulse and the ball stops at B.

Rajah 2.1 menunjukkan seorang budak lelaki sedang menendang bola hingga berhenti di A.

Rajah 2.2 pula menunjukkan budak lelaki tersebut menendang bola yang kempis dengan impuls yang sama dan bola itu berhenti di B.

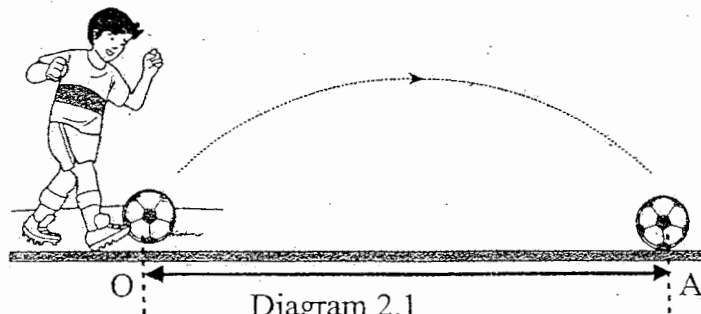


Diagram 2.1
Rajah 2.1

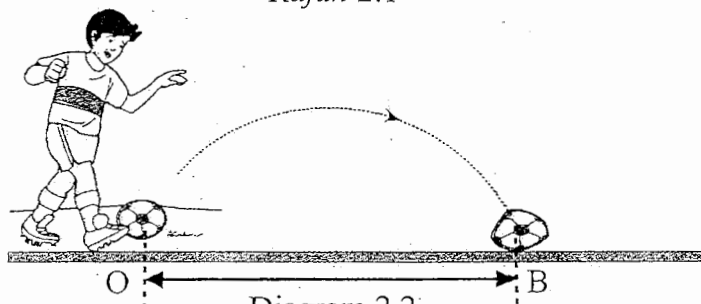


Diagram 2.2
Rajah 2.2

- (a) What is the meaning of impulse?

Apakah maksud impuls?

2(a)

	1
--	---

[1 mark]

[1 markah]

- (b) (i) Compare the distances travelled by the balls in Diagram 2.1 and Diagram 2.2.

Bandingkan jarak yang dilalui oleh bola pada Rajah 2.1 dan Rajah 2.2.

2(b)(i)

	1
--	---

[1 mark]

[1 markah]

For
Examiner's

Use

2(b)(ii)

1

(ii) State **one** reason for the observation in 2(b)(i).

Nyatakan satu sebab bagi pemerhatian pada 2(b)(i).

[1 mark]

[1 markah]

(c) State **one** suggestion to increase the distance, OB in Diagram 2.2.
Explain your answer.

*Nyatakan satu cadangan untuk menambah jarak, OB pada Rajah 2.2.
Terangkan jawapan anda.*

2(c)

2

[2 marks]

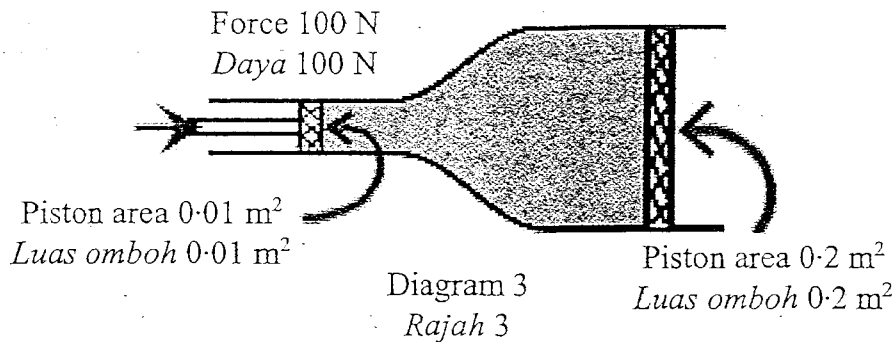
[2 markah]

Total
A2

5

- 3 Diagram 3 shows hydraulic oil trapped between two pistons of different areas. A force of 100 N is applied on the small piston.

Rajah 3 menunjukkan minyak hidraulik terperangkap antara dua omboh yang berlainan luas permukaan. Satu daya 100 N dikenakan kepada omboh kecil.



- (a) Name the physics principle involved.

Namakan prinsip fizik yang terlibat.

3(a)

1

[1 mark]

[1 markah]

- (b) Calculate the pressure produced by the small piston.

Kirakan tekanan yang dihasilkan pada omboh kecil.

3(b)

2

[2 marks]

[2 markah]

- (c) (i) The pressure is transmitted equally to the large piston, what is the change to the force produced on the large piston?

Tekanan dipindahkan secara seragam kepada omboh besar, apakah perubahan yang berlaku kepada daya yang terhasil pada omboh besar?

3(c)(i)

1

[1 mark]

[1 markah]

- (ii) Calculate the force produced on the large piston.

Kirakan daya yang dihasilkan pada omboh besar itu.

3(c)(ii)

2

Total

A3

[2 marks]

[2 markah]

6

4

Diagram 4.1(a) shows a circuit with one diode connected to a cathode-ray oscilloscope, C.R.O..

Diagram 4.1(b) shows the output signal displayed on the screen of the C.R.O..

Rajah 4.1(a) menunjukkan litar yang mengandungi satu diod yang disambungkan ke osiloskop sinar katod O.S.K..

Rajah 4.1(b) menunjukkan isyarat output yang dipaparkan pada skrin O.S.K..

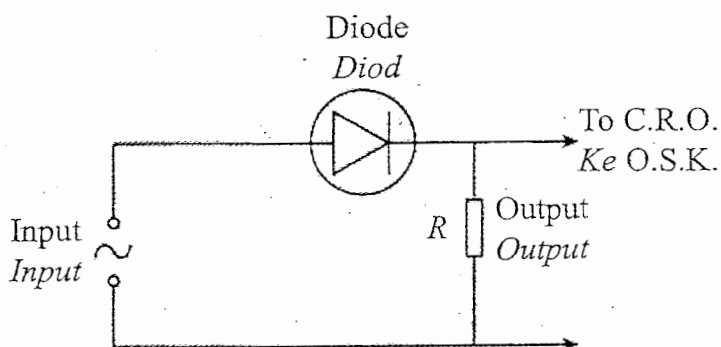


Diagram 4.1(a)

Rajah 4.1(a)

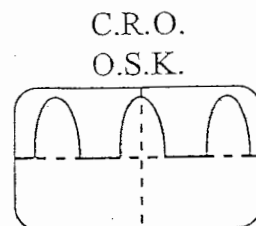


Diagram 4.1(b)

Rajah 4.1(b)

(a) Name the type of current that is

Namakan jenis arus yang

(i) supplied to the input.

dibekalkan kepada input.

[1 mark]

[1 markah]

(ii) produced at the output.

dihasilkan di output.

[1 mark]

[1 markah]

(b) Explain why the output signal is produced as shown in Diagram 4.1(b).

Terangkan mengapa isyarat output dihasilkan seperti yang ditunjukkan dalam Rajah 4.1(b).

[1 mark]

[1 markah]

(c) Name the process involved in Diagram 4.1(a).

Namakan proses yang terlibat dalam Rajah 4.1(a).

[1 mark]

[1 markah]

- (d) Diagram 4.2(a) shows a circuit diagram which uses four identical diodes, D_1 , D_2 , D_3 and D_4 .

Rajah 4.2(a) menunjukkan suatu litar yang menggunakan empat diod yang serupa, D_1 , D_2 , D_3 dan D_4 .

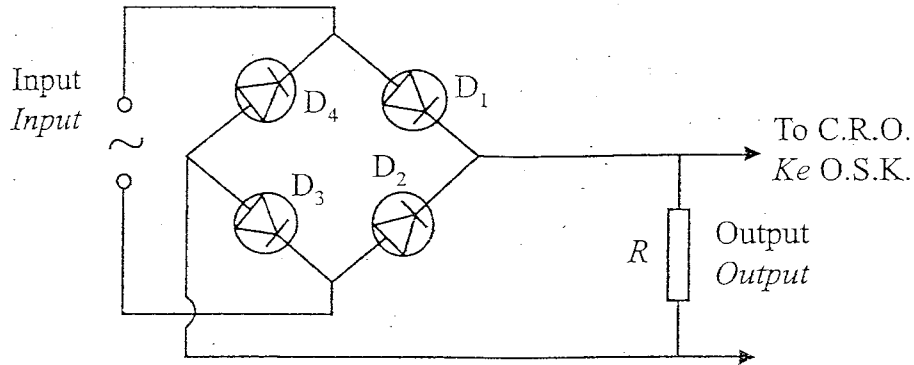


Diagram 4.2(a)

Rajah 4.2(a)

- (i) On Diagram 4.2(b), draw the output signal produced.

Pada Rajah 4.2(b), lukis isyarat output yang dihasilkan.

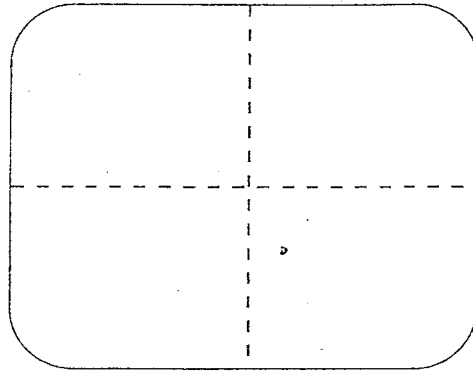


Diagram 4.2(b)

Rajah 4.2(b)

- (ii) Name **one** electronic component that needs to be added in Diagram 4.2(a) to smoothen the output current.

Namakan **satu** komponen elektronik yang perlu ditambah pada Rajah 4.2(a) untuk meratakan arus output.

- (e) Name **one** electrical appliance which uses the same principle as the circuit in Diagram 4.2(a).

Namakan **satu** alat elektrik yang menggunakan prinsip yang sama dengan litar pada Rajah 4.2(a).

4(d)(i)

1

[1 mark]

[1 markah]

4(d)(ii)

1

[1 mark]

[1 markah]

4(e)

1

Total
A4

[1 mark]

[1 markah]

7

5

Diagram 5.1 and Diagram 5.2 show the images formed by a convex lens and a concave lens using an identical object.

Rajah 5.1 dan Rajah 5.2 menunjukkan imej-imej yang dibentuk oleh sebuah kanta cembung dan sebuah kanta cekung dengan menggunakan objek yang serupa.

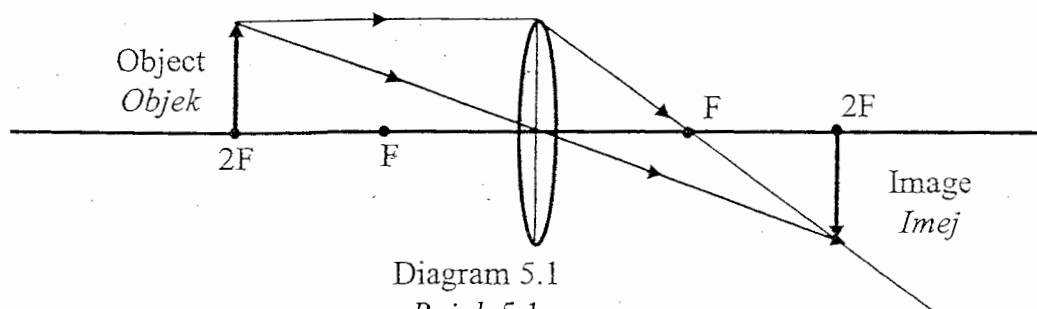


Diagram 5.1
Rajah 5.1

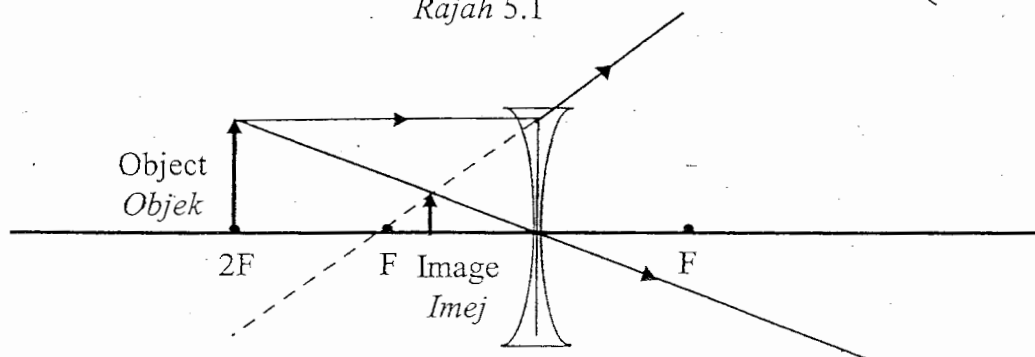


Diagram 5.2
Rajah 5.2

5(a)

1

- (a) What is the meaning of virtual image?
Apakah maksud imej maya?

[1 mark]
[1 markah]

- (b) Observe Diagram 5.1 and Diagram 5.2.
Perhatikan Rajah 5.1 dan Rajah 5.2.

5(b)(i)

1

- (i) Compare the distance between the object and the lenses.
Bandingkan jarak antara objek dengan kanta.

[1 mark]
[1 markah]

5(b)(ii)

1

- (ii) Compare the size of the image produced.
Bandingkan saiz imej yang terhasil.

[1 mark]
[1 markah]

- (iii) Tick (✓) the correct answer in the box provided.

Tanda (✓) jawapan yang betul dalam kotak yang disediakan.

☐ Diagram 5.1 image is inverted and Diagram 5.2 image is upright.
Dalam Rajah 5.1 imej adalah songsang dan Rajah 5.2 imej adalah tegak.

☐ Diagram 5.1 image is upright and Diagram 5.2 image is inverted.
Dalam Rajah 5.1 imej adalah tegak dan Rajah 5.2 imej adalah songsang.

[1 mark]

[1 markah]

- (c) (i) State the type of image formed in Diagram 5.1 and Diagram 5.2.

Nyatakan jenis imej yang terbentuk dalam Rajah 5.1 dan Rajah 5.2.

Diagram 5.1:

Rajah 5.1 :

Diagram 5.2:

Rajah 5.2 :

[2 marks]

[2 markah]

- (ii) Using Diagram 5.2, what happens to the size of the image formed by concave lens when the object distance is reduced?

Menggunakan Rajah 5.2, apakah yang berlaku kepada saiz imej yang terbentuk oleh kanta cekung apabila jarak objek dikurangkan?

.....

[1 mark]

[1 markah]

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

Berdasarkan jawapan di 5(c)(ii), nyatakan hubungan antara saiz imej dengan jarak objek bagi kanta cekung.

.....

[1 mark]

[1 markah]

5(b)(iii)

1

5(c)(i)

2

5(c)(ii)

1

5(d)

1

Total
A5

8

- 6 Diagram 6.1 and Diagram 6.2 show a bar magnet is pushed into a solenoid at a speed of 2 ms^{-1} .

Rajah 6.1 dan Rajah 6.2 menunjukkan sebatang magnet bar ditolak ke dalam solenoid dengan kelajuan 2 ms^{-1} .

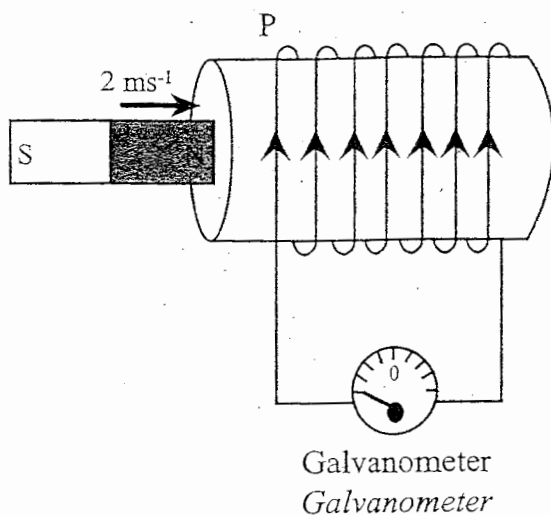


Diagram 6.1
Rajah 6.1

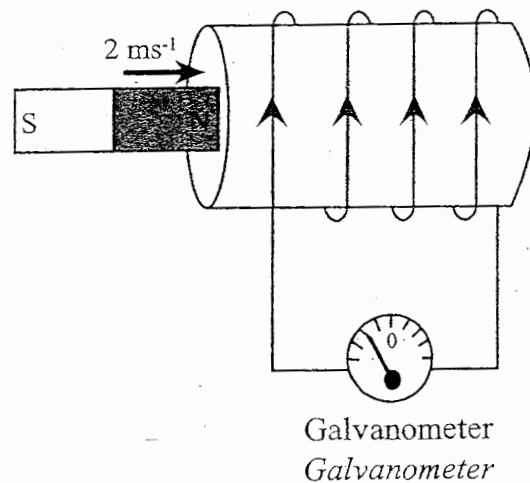


Diagram 6.2
Rajah 6.2

- (a) State the physical quantity that is represented by the deflection of the pointer of the galvanometer.

Nyatakan kuantiti fizik yang mewakili pesongan pada penunjuk galvanometer.

[1 mark]

[1 markah]

- (b) Based on Diagram 6.1 and Diagram 6.2:

Berdasarkan Rajah 6.1 dan Rajah 6.2:

- (i) Compare the number of turns of coil.

Bandingkan bilangan lilitan gegelung.

[1 mark]

[1 markah]

- (ii) Compare the deflection of the pointer of the galvanometer.

Bandingkan pesongan penunjuk galvanometer.

[1 mark]

[1 markah]

- (iii) State the relationship between the number of turns of coil and the deflection of the pointer of the galvanometer.

Nyatakan hubungan antara bilangan lilitan gegelung dan pesongan penunjuk galvanometer.

6(b)(iii)

	1
--	---

[1 mark]

[1 markah]

- (c) When the magnet move towards the solenoid, the direction of current is as shown in Diagram 6.1.

Apabila magnet digerakkan mendekati solenoid, arah arus adalah seperti ditunjukkan dalam Rajah 6.1.

- (i) Name the pole at P.

Namakan kutub pada P.

6(c)(i)

	1
--	---

[1 mark]

[1 markah]

- (ii) Explain your answer in 6(c)(i).

Terangkan jawapan anda dalam 6(c)(i).

6(c)(ii)

	2
--	---

[2 marks]

[2 markah]

- (iii) Name the law involved in 6(c)(ii).

Namakan hukum yang terlibat dalam 6(c)(ii).

6(c)(iii)

	1
--	---

[1 mark]

[1 markah]

Total
A6

	8
--	---

7

Diagram 7 shows the arrangement of apparatus used to investigate the relationship between the pressure and the temperature of a fixed mass of gas at constant volume.

Rajah 7 menunjukkan susunan radas yang digunakan untuk menyiasat hubungan antara tekanan dan suhu gas pada jisim dan isi padu tetap.

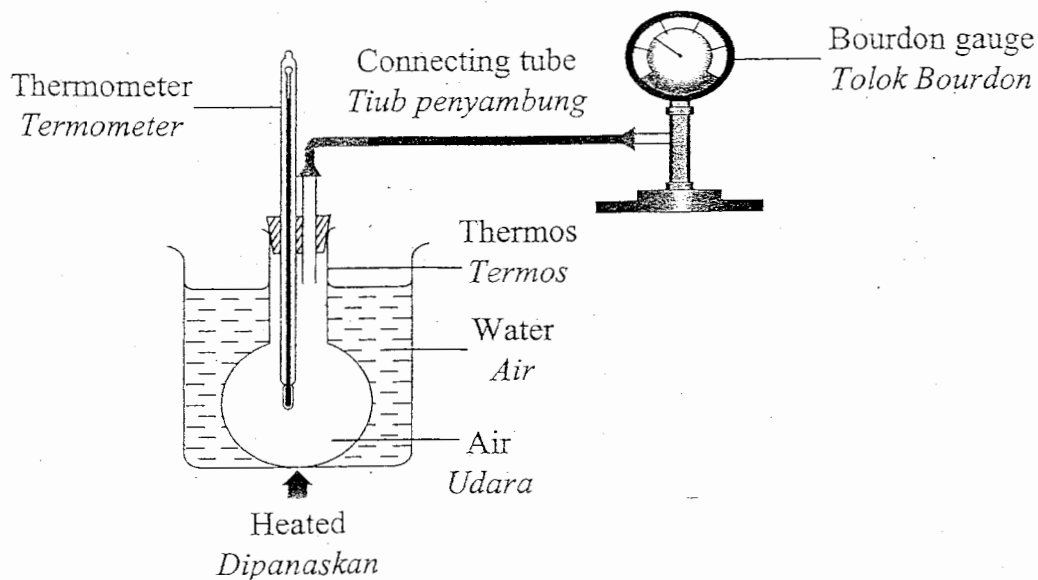


Diagram 7
Rajah 7

7(a)

1

(a). Name the gas law involved in this experiment.

Namakan hukum gas yang terlibat dalam eksperimen ini.

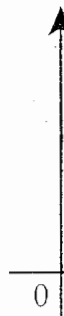
[1 mark]

[1 markah]

(b) (i) Based on the experiment in Diagram 7, sketch a graph of gas pressure, P , against temperature, T .

Berdasarkan eksperimen dalam Rajah 7, lakarkan graf tekanan gas, P , melawan suhu, T .

Pressure, P
Tekanan, P



Temperature, T/K
Suhu, T/K

[1 mark]

[1 markah]

7(b)(i)

1

- (ii) State the temperature of gas in Celsius when its pressure is zero.

Nyatakan suhu gas dalam Celsius bila tekanannya adalah sifar.

Use

7(b)(ii)

	1
--	---

[1 mark]

[1 markah]

- (c) The pressure of gas in a container of volume, V , is 3.2×10^5 Pa and its temperature is 2°C .

Calculate the pressure of the gas if the temperature is increased to 32°C .

Tekanan gas dalam satu bekas yang mempunyai isi padu, V , is 3.2×10^5 Pa dan suhunya adalah 2°C .

Hitung tekanan gas itu apabila suhunya bertambah kepada 32°C .

7(c)

	3
--	---

[3 marks]

[3 markah]

- (d) Diagram 7.1 shows a pot that can function as a pressure cooker.

Rajah 7.1 menunjukkan sebuah periuk yang boleh berfungsi sebagai periuk tekanan.

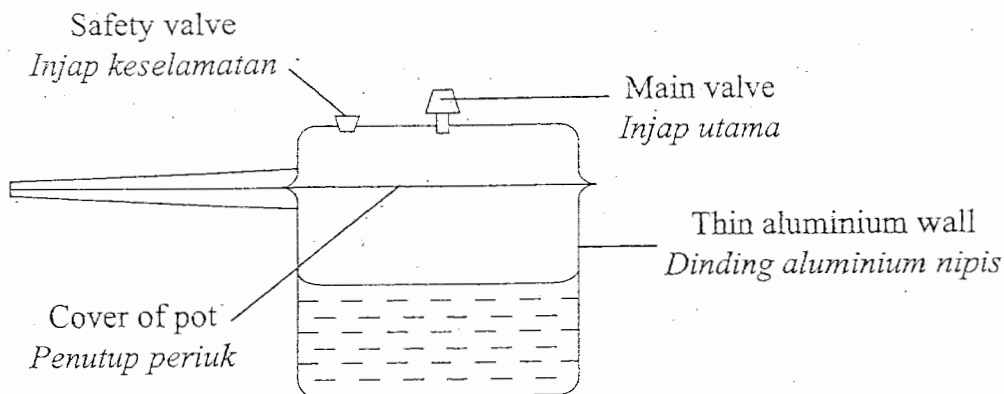


Diagram 7.1

Rajah 7.1

- (i) Using kinetic theory of gas, explain why the pressure of air in the cooker is increased when the temperature is increased.

Dengan menggunakan teori kinetik gas, terangkan mengapa tekanan udara dalam periuk bertambah apabila suhu bertambah.

7(d)(i)

	2
--	---

.....

.....

[2 marks]

[2 markah]

- (ii) Suggest **one** modification to the pot that enables it to function safely as a pressure cooker.

Cadangkan **satu** pengubahsuaian pada periuk itu untuk membolehkannya berfungsi sebagai periuk tekanan dengan selamat.

7(d)(ii)

	1
--	---

.....

[1 mark]

[1 markah]

- (iii) State **one** reason for the answer in 7(d)(ii).

Nyatakan **satu** sebab bagi jawapan di 7(d)(ii).

7(d)(iii)

	1
--	---

.....

[1 mark]

[1 markah]

Total
A7

	10
--	----

- 8 Diagram 8 shows a filament bulb labelled 240 V 40 W.
Rajah 8 menunjukkan sebuah mentol filamen berlabel 240 V 40 W.

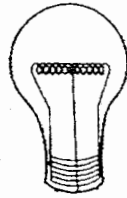


Diagram 8
Rajah 8

- (a) What is meant by 240 V 40 W?
Apakah yang dimaksudkan dengan 240 V 40 W?

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

8(a)
1

- (b) The bulb is connected to 240 V power supply.
Determine the current flow through the bulb.
Mentol disambungkan kepada bekalan kuasa 240 V.
Tentukan arus yang mengalir melalui mentol.

[2 marks]
[2 markah]

8(b)
2

- (c) If only 20 % of the electrical energy is converted to light energy, calculate:
Jika hanya 20 % tenaga elektrik ditukarkan kepada tenaga cahaya, kirakan:
(i) the light energy produced in one second.
tenaga cahaya yang dihasilkan dalam satu saat.

[2 marks]
[2 markah]

8(c)(i)
2

- (ii) the heat dissipated in one second.
haba yang dihilangkan dalam satu saat.

[2 marks]
[2 markah]

8(c)(ii)
2

Section B
Bahagian B

[20 marks]

[20 markah]

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

Jawab mana-mana **satu** soalan daripada bahagian ini.

- 9 Diagram 9.1 and Diagram 9.2 show two eggs released from the same height and dropped on to surface A and surface B respectively.

Rajah 9.1 dan Rajah 9.2 menunjukkan dua biji telur dilepaskan daripada ketinggian sama dan jatuh ke atas permukaan A dan permukaan B masing-masing.

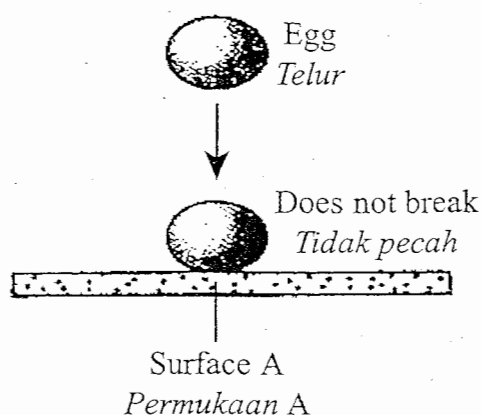


Diagram 9.1
Rajah 9.1

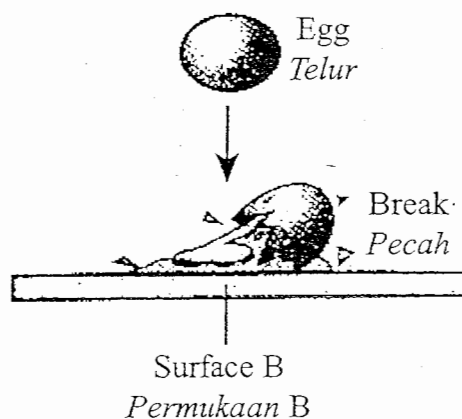


Diagram 9.2
Rajah 9.2

- (a) (i) What is the meaning of impulsive force? [1 mark]
Apakah yang dimaksudkan dengan daya impuls? [1 markah]

- (ii) Observe Diagram 9.1 and Diagram 9.2, compare the condition of the eggs before and after it hit the surfaces, the force exerted on the eggs that strike surface A and surface B and the time of impact of the eggs on surface A and surface B.

Relate the condition of the eggs on both surfaces to make a deduction regarding the relationship between forces produced in a collision and the time of impact on surfaces. [5 marks]

Perhatikan Rajah 9.1 dan Rajah 9.2, bandingkan keadaan telur sebelum dan selepas menghentam kedua-dua permukaan, daya yang dikenakan pada telur yang menghentam permukaan A dan permukaan B dan masa hentaman telur itu pada permukaan A dan permukaan B.

Hubungkan keadaan telur pada kedua-dua permukaan untuk membuat kesimpulan tentang hubungan antara daya yang dihasilkan dalam suatu perlanggaran dengan masa hentaman. [5 markah]

- 10 Diagram 10.1 and Diagram 10.2 show a continuous stream of plane waves of frequency 25 Hz and 50 Hz respectively produced in a ripple tank. A straight metal barrier with a gap at the centre is placed in the ripple tank.

Rajah 10.1 dan Rajah 10.2 menunjukkan gelombang lurus berfrekuensi 25 Hz dan 50 Hz masing-masing dihasilkan oleh tangki riak. Satu pengadang logam yang lurus mempunyai satu celah diletakkan di tengah-tengah tangki riak.

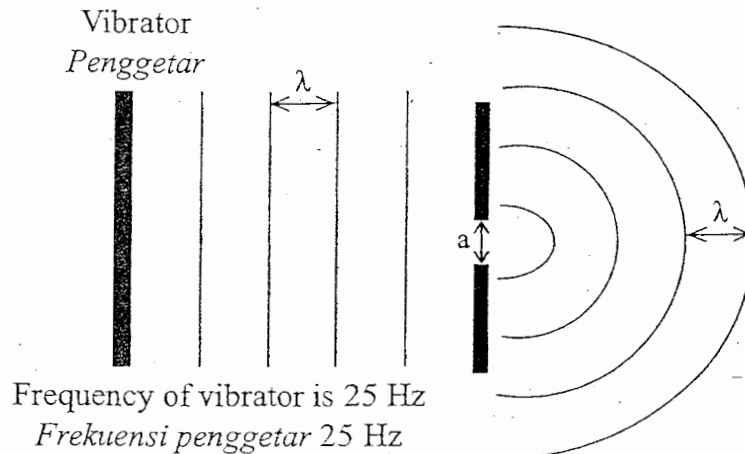


Diagram 10.1
Rajah 10.1

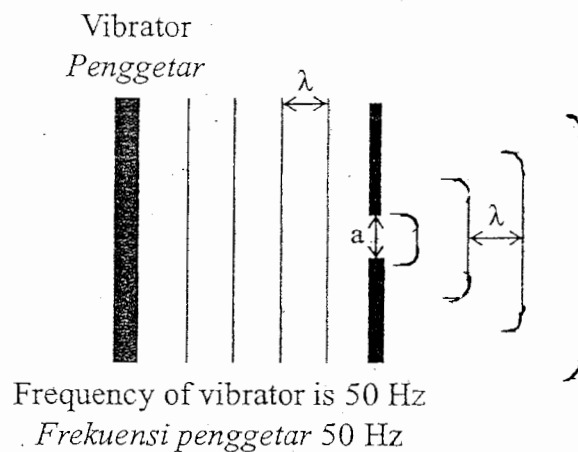


Diagram 10.2
Rajah 10.2

- (a) (i) Name the phenomenon involved. [1 mark]
 Namakan fenomena yang terlibat. [1 markah]
- (b) Based on Diagram 10.1 and Diagram 10.2,
 Berdasarkan Rajah 10.1 dan Rajah 10.2,
- (i) compare the wavelength, size of gap and the pattern of the wave after passing through the gap. [3 marks]
 bandingkan panjang gelombang, saiz celah dan bentuk gelombang selepas melalui celah. [3 markah]

- (b) Impulsive force can cause severe damage.

State and explain the material used for packaging eggs for safe delivery from the chicken farm to the market. [4 marks]

Daya impuls boleh menyebabkan kerosakan yang teruk.

Nyatakan dan jelaskan bahan yang digunakan untuk bekas pembungkusan telur supaya penghantaran dari ladang ternakan ayam ke pasar adalah selamat. [4 markah]

- (c) Diagram 9.3 shows a badminton player in a competition.

Rajah 9.3 menunjukkan seorang pemain badminton dalam suatu pertandingan.

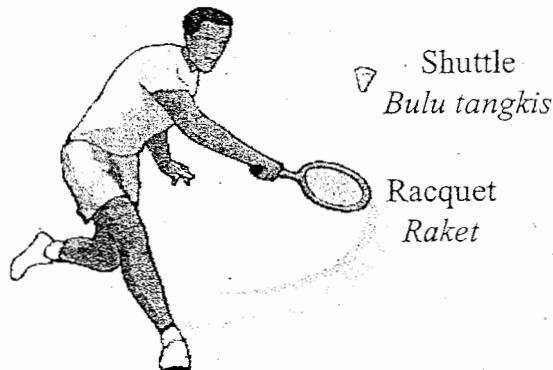


Diagram 9.3

Rajah 9.3

You are required to give some suggestions to design the shuttle and racquet used in the competition. Using your knowledge of motion, forces and properties of material, state and explain the suggestions based on the following aspects:

Anda dikehendaki memberikan cadangan untuk mereka bentuk bulu tangkis dan raket yang digunakan dalam pertandingan itu. Dengan menggunakan pengetahuan anda mengenai gerakan, daya-daya dan sifat bahan, nyatakan dan terangkan cadangan berdasarkan aspek-aspek berikut:

- | | |
|---|------------|
| (i) Shape of the shuttle. | [2 marks] |
| <i>Bentuk bulu tangkis.</i> | [2 markah] |
| (ii) Material used for shuttle. | [2 marks] |
| <i>Bahan yang digunakan untuk bulu tangkis.</i> | [2 markah] |
| (iii) Material used for the base of the shuttle. | [2 marks] |
| <i>Bahan yang digunakan untuk tapak bulu tangkis.</i> | [2 markah] |
| (iv) Material used for the string of the racquet. | [2 marks] |
| <i>Bahan yang digunakan untuk tali raket.</i> | [2 markah] |
| (v) Tension of the string of the racquet. | [2 marks] |
| <i>Ketegangan tali raket.</i> | [2 markah] |

- (ii) state the relationship between size of gap and wavelength, hence relate it to the pattern of the waves produced after passing the gap. [2 marks]

nyatakan hubungan antara saiz celah dan panjang gelombang, seterusnya nyatakan hubungannya dengan bentuk gelombang yang dihasilkan selepas melalui celah.

[2 markah]

- (c) In broadcasting, radio wave is used in communication for domestic area. Explain why radio waves is better than sound wave for telecommunication. [4 marks]

Dalam bidang penyiaran, gelombang radio digunakan dalam komunikasi untuk kawasan setempat.

Terangkan mengapa gelombang radio adalah lebih baik daripada gelombang bunyi untuk telekomunikasi. [4 markah]

- (d) Diagram 10.3, shows the location of housing area. The residents of housing area at P receive clearer television signal compare to the residents of housing area at Q where it is located behind the hill.

Rajah 10.3, menunjukkan kedudukan kawasan perumahan. Penduduk di kawasan perumahan P menerima isyarat televisyen lebih jelas berbanding dengan penduduk di kawasan perumahan Q di mana kedudukannya adalah di belakang bukit.

Broadcasting station

Stesyen penyiaran

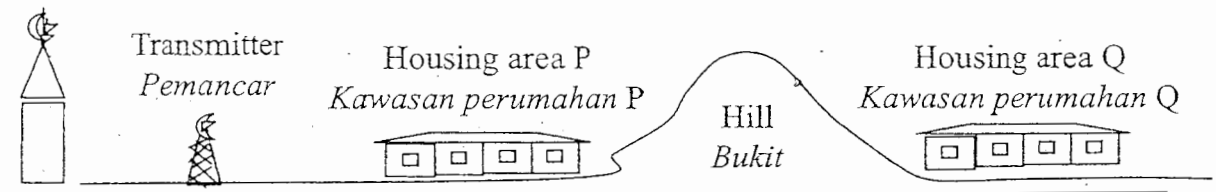


Diagram 10.3

Rajah 10.3

As a researcher, you are required to give suggestions about the modifications of television signal from broadcasting station so that the residents of housing area at Q are enable to receive better signal.

Sebagai seorang pengkaji, anda diperlukan untuk memberikan beberapa cadangan mengenai pengubahsuaian isyarat televisyen daripada stesyen penyiaran bagi penduduk di kawasan perumahan Q menerima isyarat yang lebih baik.

State and explain the modification based on the following aspects:

Nyata dan terangkan pengubahsuaian berdasarkan aspek-aspek berikut:

- (i) the frequency of the signals [2 marks]
frekuensi isyarat [2 markah]
- (ii) the location of the transmitter [2 marks]
kedudukan pemancar [2 markah]

- | | |
|---|-------------------------|
| (iii) the number of the transmitter
<i>bilangan pemancar</i> | [2 marks]
[2 markah] |
| (iv) the strength of the signals
<i>kekuatan isyarat</i> | [2 marks]
[2 markah] |
| (v) the distance between two transmitters
<i>jarak antara dua pemancar</i> | [2 marks]
[2 markah] |

(c)

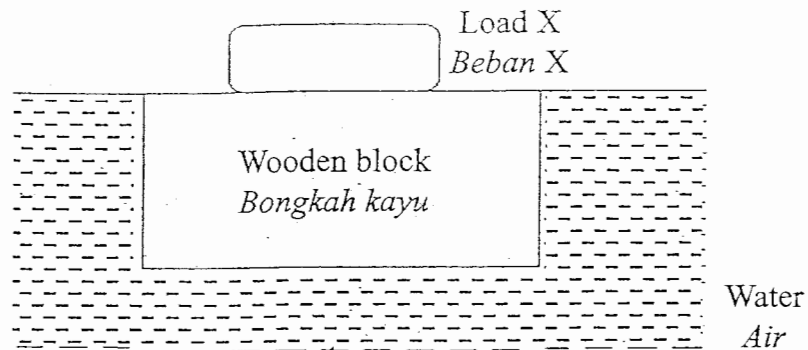


Diagram 11.4

Rajah 11.4

Diagram 11.4 shows a load X is placed on a wooden block. Both of them is then placed in water of density 1000 kgm^{-3} . The mass of the wooden block is 3 kg and the density is 800 kgm^{-3} .

Rajah 11.4 menunjukkan satu beban X diletakkan di atas sebuah bongkah kayu. Keduanya dimasukkan ke dalam air yang mempunyai ketumpatan 1000 kgm^{-3} . Jisim bongkah kayu itu adalah 3 kg dan ketumpatannya adalah 800 kgm^{-3} .

- (i) Calculate the volume of water displaced by the load and the wooden block. [2 marks]

Hitung isi padu air yang disesarkan oleh beban dan bongkah kayu itu. [2 markah]

- (ii) Calculate the mass of the load X. [3 marks]

Hitung jisim beban X tersebut. [3 markah]

- (d) Diagram 11.5 shows a hot air balloon.

Rajah 11.5 menunjukkan belon udara panas.

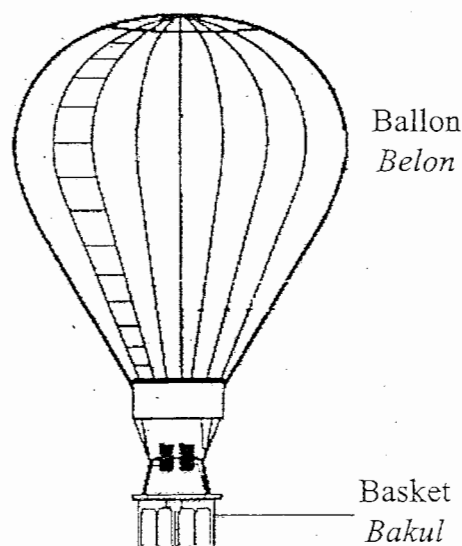


Diagram 11.5

Rajah 11.5

Section C
Bahagian C

[20 marks]

[20 markah]

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

Jawab mana-mana **satu** soalan daripada bahagian ini.

- 11 Diagram 11.1 shows an apparatus which is used to determine the density of a liquid. These apparatus is an application of Archimedes' Principle.

Rajah 11.1 menunjukkan satu radas yang digunakan untuk menentukan ketumpatan cecair. Radas ini merupakan aplikasi Prinsip Archimedes.

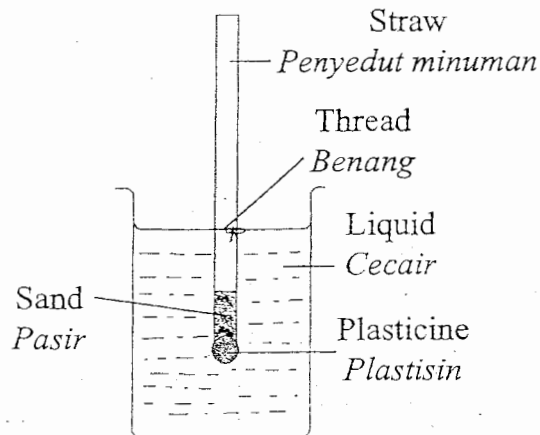


Diagram 11.1

Rajah 11.1

- (a) State the Archimedes' Principle.

[1 mark]

Nyatakan Prinsip Archimedes.

[1 markah]

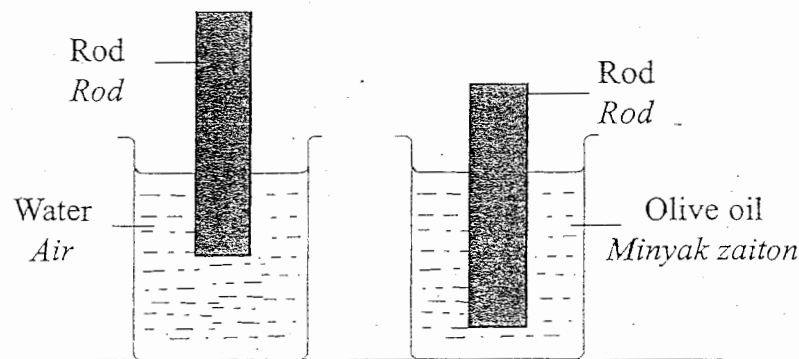


Diagram 11.2

Rajah 11.2

Diagram 11.3

Rajah 11.3

- (b) Diagram 11.2 shows a rod immersed in water and Diagram 11.3 shows the same rod immersed in olive oil. Explain why the rod floats in water and sinks deeper in olive oil.

[4 marks]

Rajah 11.2 menunjukkan sebatang rod direndam di dalam air dan Rajah 11.3 menunjukkan rod yang sama direndam dalam minyak zaitun. Jelaskan mengapa rod tersebut terapung di dalam air dan lebih tenggelam di dalam minyak zaitun. [4 markah]

Table 11.1 shows four hot air balloon with different specifications.

Jadual 11.1 menunjukkan empat belon udara panas dengan spesifikasi yang berlainan.

Hot air balloon <i>Belon udara panas</i>	Volume of the balloon (envelope) <i>Isi padu belon (karung)</i>	Material used for the balloon <i>Bahan yang digunakan untuk belon</i>	Material used for the basket <i>Bahan yang digunakan untuk bakul</i>	Temperature of air inside the balloon <i>Suhu udara di dalam belon</i>
J	560 m ³	Nylon <i>Nilon</i>	Aluminium <i>Aluminium</i>	50 °C
K	2800 m ³	Nylon <i>Nilon</i>	Rattan <i>Rotan</i>	99 °C
L	4 m ³	Cotton <i>Kapas</i>	Aluminium <i>Aluminium</i>	50 °C
M	25 m ³	Cotton <i>Kapas</i>	Rattan <i>Rotan</i>	120 °C

Table 11.1

Jadual 11.1

You are required to determine the most suitable hot air balloon which can travel at higher altitude. Explain the suitability of each of the characteristic of the balloon. Choose the most suitable balloon and reason for your choice. [10 marks]

Anda dikehendaki menentukan belon udara panas yang paling sesuai yang boleh terbang pada altitud lebih tinggi. Terangkan kesesuaian setiap ciri-ciri belon. Pilih belon paling sesuai dan berikan sebab untuk pilihan anda. [10 markah]

- 12 Diagram 12.1 shows a cloud chamber which is used to observe the radioactive radiation.
Rajah 12.1 menunjukkan kebuk awan yang digunakan untuk memerhati sinaran radioaktif.

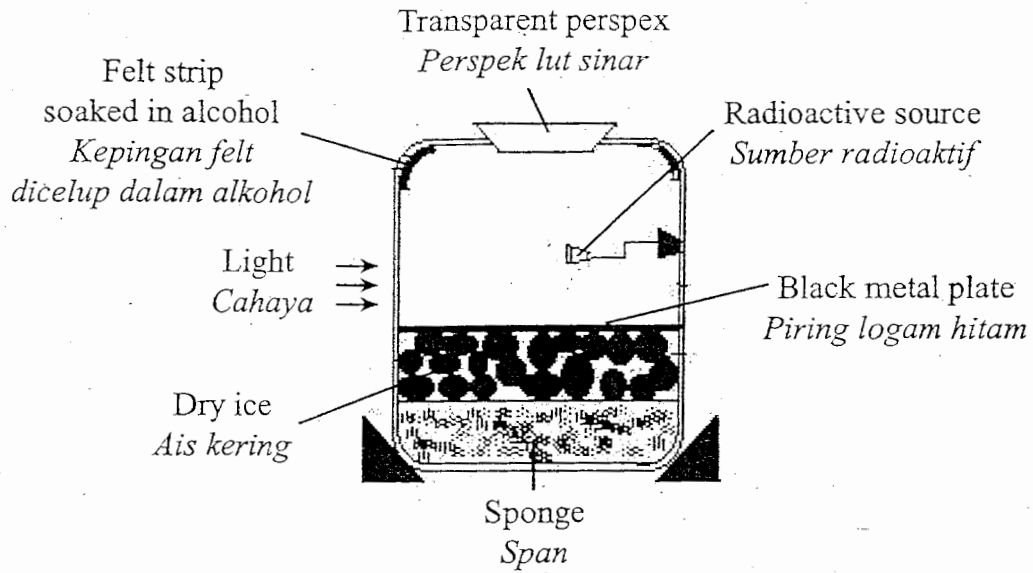


Diagram 12.1
Rajah 12.1

- (a) What is the meaning of radioactive decay? [1 mark]
Apakah maksud reputan radioaktif? [1 markah]
- (b) With the aid of diagrams of tracks, explain how the tracks of alpha decay can be distinguished from the tracks of beta decay. [4 marks]
Dengan bantuan gambar-gambar runut, terangkan bagaimana runut bagi pereputan alfa dapat dibezakan dengan runut bagi pereputan beta. [4 markah]

(c) Table 12.1 shows the characteristics of five radioisotopes.

Jadual 12.1 menunjukkan ciri-ciri lima radioisotop.

Radioisotope <i>Radioisotop</i>	Characteristics of radioisotopes <i>Ciri-ciri radioisotop</i>			
	Type of ray <i>Jenis sinar</i>	Half-life <i>Separuh hayat</i>	Absorption by thyroid cell <i>Penyerapan oleh sel tiroid</i>	Absorption by other body cells <i>Penyerapan oleh sel badan yang lain</i>
P	Beta <i>Beta</i>	1 month <i>1 bulan</i>	Low <i>Rendah</i>	High <i>Tinggi</i>
Q	Gamma <i>Gama</i>	15 seconds <i>15 saat</i>	High <i>Tinggi</i>	Low <i>Rendah</i>
R	Alpha <i>Alfa</i>	10 days <i>10 hari</i>	Moderate <i>Sederhana</i>	No <i>Tiada</i>
S	Beta <i>Beta</i> Gamma <i>Gama</i>	8 days <i>8 hari</i> 6 hours <i>6 jam</i>	High <i>Tinggi</i>	No <i>Tiada</i>
T	Beta <i>Beta</i> Gamma <i>Gama</i>	6 hours <i>6 jam</i> 8 days <i>8 hari</i>	High <i>Tinggi</i>	Low <i>Rendah</i>

Table 12.1
Jadual 12.1

Radioactive iodine treats cancer of the thyroid by using implant method. A small amount of radioactive material is placed near the tumor located in the neck of a patient.

Explain the suitability of each characteristic of the radioisotope and determine the most suitable radioisotope to be used to treat thyroid cancer.

Give reasons for your choice.

[10 marks]

Radioaktif iodin digunakan untuk rawatan kanser tiroid menggunakan kaedah implan. Bahan radioaktif dalam kuantiti kecil diletakkan berhampiran tumor yang terdapat pada leher pesakit.

Terangkan kesesuaian setiap ciri radioisotop dan tentukan radioisotop yang paling sesuai untuk digunakan bagi merawat kanser tiroid.

Beri sebab untuk pilihan anda.

[10 markah]

- (d) Diagram 12.2 shows the decay graph of cesium-137.
Rajah 12.2 menunjukkan graf reputan bagi cesium-137.

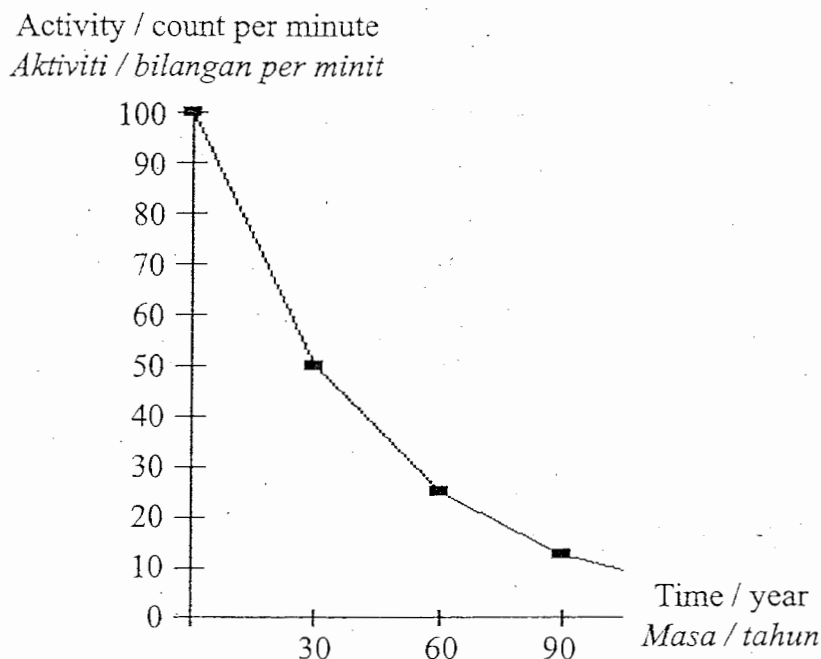


Diagram 12.2
Rajah 12.2

- (i) What is the meaning of half-life? [1 mark]
Apakah maksud separuh hayat? [1 markah]
- (ii) Based on the graph in Diagram 12.2, state the half-life of cesium-137. [1 mark]
Berasaskan graf dalam Rajah 12.2, nyatakan separuh hayat bagi cesium-137. [1 markah]
- (iii) A Geiger Muller detector is used to detect the leakage of radiation by cesium-137 at a nuclear power plant; the reading of the rate meter is 8055 count/minute. The background reading is 55 count/minute. The rate count which is safe for human being is below 1200 count/minute. Calculate how long does it take for human being to enter safely into the nuclear power plant. [3 marks]
Sebuah pengesan Geiger Muller telah digunakan untuk mengesan kebocoran radiasi cesium-137 di sebuah stesen penjana kuasa nuklear; bacaan meter kadar adalah 8055 bilangan/minit. Bacaan latar belakang adalah 55 bilangan/minit. Kadar bacaan yang selamat untuk manusia adalah di bawah 1200 bilangan/minit. Hitungkan masa yang diperlukan untuk manusia masuk ke stesen penjana nuklear itu dengan selamat. [3 markah]

END OF QUESTION PAPER
 KERTAS SOALAN TAMAT

NO. KAD PENGENALAN

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ANGKA GILIRAN

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Nama Tingkatan



JABATAN PELAJARAN NEGERI SELANGOR
MAJLIS PENGETUA SEKOLAH MALAYSIA NEGERI SELANGOR



PROGRAM PENINGKATAN PRESTASI AKADEMIK
PEPERIKSAAN PERCUBAAN

SIJIL PELAJARAN MALAYSIA 2011

4531/3

PHYSICS

Kertas 3

September

$1\frac{1}{2}$ jam

Satu jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Tulis nombor kad pengenalan, angka giliran, nama dan tingkatan anda pada ruangan yang disediakan.*
2. *Kertas soalan ini adalah dalam dwibahasa.*
3. *Soalan dalam bahasa Inggeris mendahului soalan yang sepadan dalam bahasa Melayu.*
4. *Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam bahasa Inggeris atau bahasa Melayu.*
5. *Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.*

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

Kertas soalan ini mengandungi 16 halaman bercetak

Section A
Bahagian A

[28 marks]

[28 markah]

Answer **all** questions in this section.

Jawab **semua** soalan dalam bahagian ini.

- 1 A student carries out an experiment to investigate the relationship between the length of a constantan wire, ℓ , with the resistance, R . The circuit is connected as shown in Diagram 1.1.

Seorang murid menjalankan eksperimen untuk mengkaji hubungan antara panjang suatu dawai konstantan, ℓ , dengan rintangan, R . Sambungan litar ditunjukkan pada Rajah 1.1.

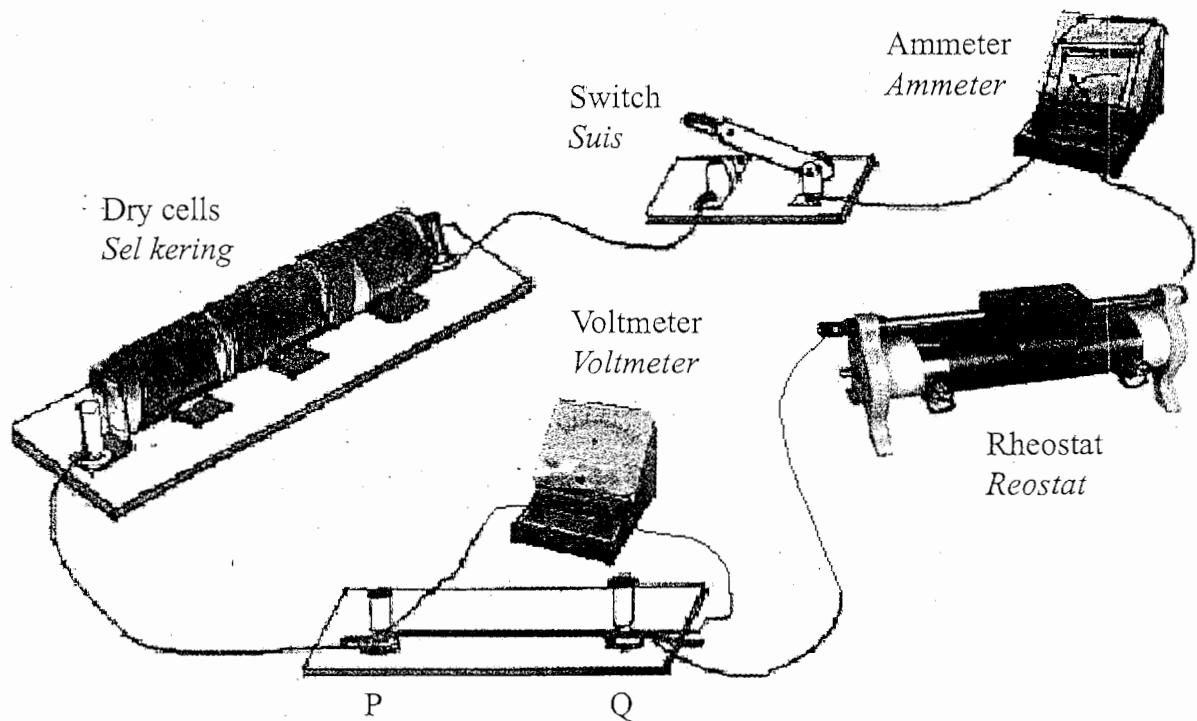


Diagram 1.1

Rajah 1.1

The length of the constantan wire between P and Q is adjusted so that its length, $\ell = 20.0$ cm. The switch is closed and the rheostat is adjusted until the current, I , flowing in the circuit is 0.2 A. The potential difference, V , across the wire is recorded.

Dawai konstantan antara P dan Q dilaraskan supaya panjangnya, $\ell = 20.0$ cm. Suis dihidupkan reostat dilaraskan sehingga arus elektrik, I , yang mengalir di dalam litar adalah 0.2 A. Beza keupayaan merentasi dawai, V , direkodkan.

The procedure is repeated by varying the length of constantan wire, $\ell = 30.0 \text{ cm}$, 40.0 cm , 50.0 cm and 60.0 cm .

For each length of constantan wire, the rheostat is adjusted so that the current is at a constant value of 0.2 A .

The corresponding readings of the voltmeter are shown in Diagram 1.2, 1.3, 1.4, 1.5 and 1.6.

Prosedur diulang dengan mengubah panjang dawai konstantan, $\ell = 30.0 \text{ cm}$, 40.0 cm , 50.0 cm dan 60.0 cm .

Untuk setiap panjang dawai konstantan, reostat dilaraskan supaya arus elektrik sentiasa mengalir pada nilai tetap 0.2 A .

Bacaan-bacaan yang sepadan bagi voltmeter adalah ditunjukkan pada Rajah 1.2, 1.3, 1.4, 1.5 dan 1.6.

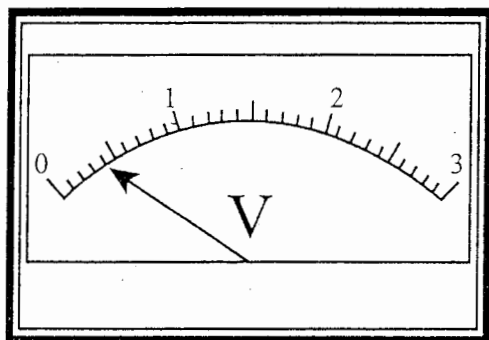


Diagram 1.2

Rajah 1.2

$\ell = 20.0 \text{ cm}$

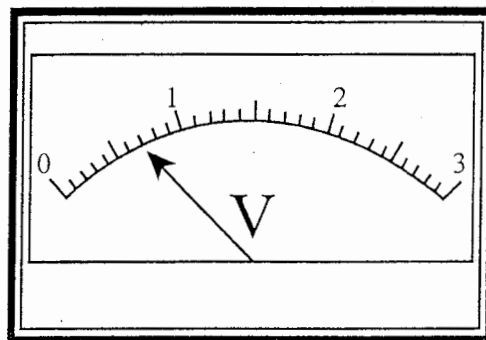


Diagram 1.3

Rajah 1.3

$\ell = 30.0 \text{ cm}$

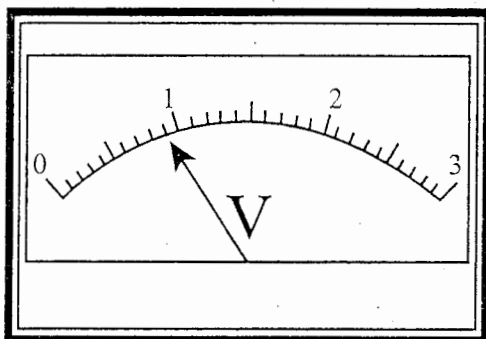


Diagram 1.4

Rajah 1.4

$\ell = 40.0 \text{ cm}$

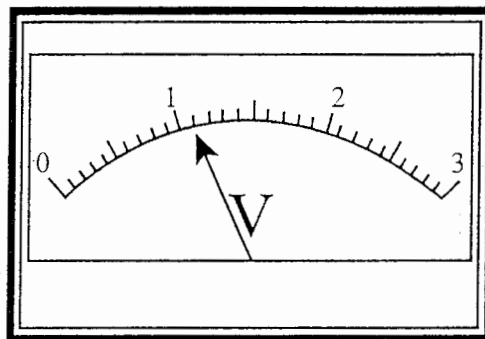


Diagram 1.5

Rajah 1.5

$\ell = 50.0 \text{ cm}$

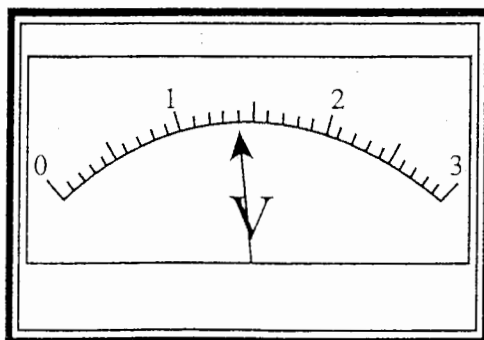


Diagram 1.6

Rajah 1.6

$\ell = 60.0 \text{ cm}$

For
Examiner's
Use

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

1(a)(i)

	1
--	---

- (i) The manipulated variable
Pembolehubah dimanipulasikan

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

1(a)(ii)

	1
--	---

- (ii) The responding variable
Pembolehubah yang bergerak balas

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

1(a)(iii)

	1
--	---

- (iii) The constant variable
Pembolehubah dimalarkan

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

- (b) Record the readings of the voltmeter, V , in Diagram 1.2, 1.3, 1.4, 1.5 and 1.6, when different length of wires, ℓ are used. In each case, calculate the resistance, R , of the wire where:

Rekodkan bacaan voltmeter, V , dalam Rajah 1.2, 1.3, 1.4, 1.5 dan 1.6, pada bacaan panjang dawai yang berbeza, ℓ yang digunakan. Pada setiap nilai tersebut hitungkan rintangan R dawai tersebut di mana:

$$R = \frac{V}{I}$$

Tabulate your results for ℓ , V , I and R in the space below.

Jadualkan keputusan anda bagi ℓ , V , I dan R dalam ruang di bawah.

1(b)

7

[7 marks]
[7 markah]

1(c)

5

- (c) On the graph paper on page 7, plot a graph of R against ℓ .
Pada kertas graf di halaman 7, plotkan graf R melawan ℓ .

[5 marks]
[5 markah]

1(d)

1

- (d) Based on the graph in 1(c), state the relationship between R and ℓ .
Berdasarkan graf di 1(c), nyatakan hubungan antara R dan ℓ .

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

- 2 A student carries out an experiment to investigate the relationship between the pressure, P , and the volume, V , of a fixed mass of gas. The result of the experiment is shown in the graph of P against $\frac{1}{V}$ as shown in Diagram 2.

Seorang murid menjalankan satu eksperimen untuk mengkaji hubungan antara tekanan, P , dengan isi padu, V , bagi gas dengan jisim yang tetap. Keputusan eksperimen ini ditunjukkan oleh graf P melawan $\frac{1}{V}$ pada Rajah 2.

Graph P against $\frac{1}{V}$

Graf P melawan $\frac{1}{V}$

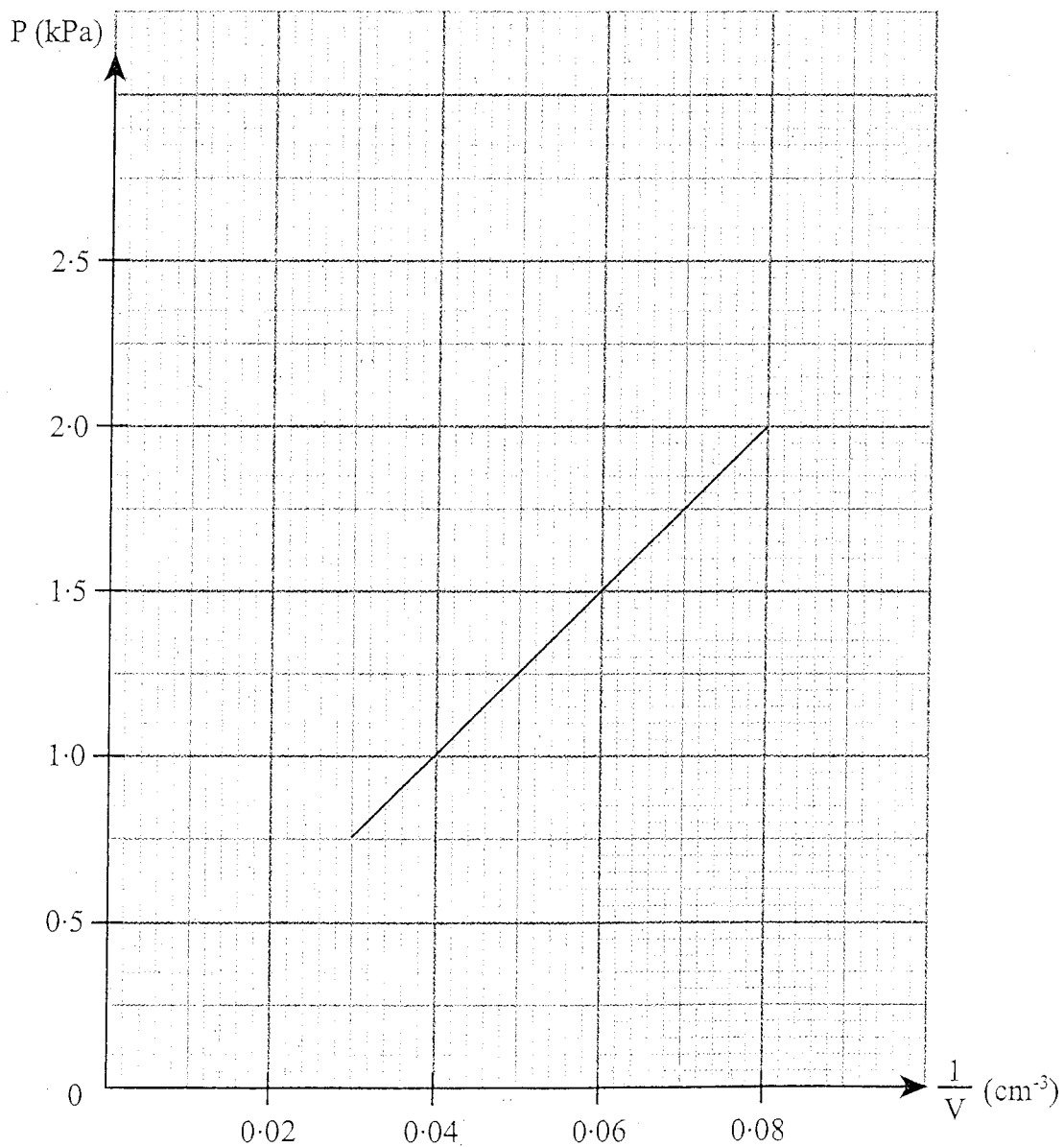


Diagram 2
Rajah 2

- (a) Based on the graph in Diagram 2:
Berdasarkan graf pada Rajah 2:

(i) State the relationship between P and $\frac{1}{V}$.

Nyatakan hubungan antara P dan $\frac{1}{V}$.

2(a)(i)

	1
--	---

[1 mark]

[1 markah]

- (ii) Determine the value of V when $P = 0.5$ kPa.
Show on the graph, how you determine the value of V .

Tentukan nilai V apabila $P = 0.5$ kPa.

Tunjukkan pada graf bagaimana anda menentukan nilai V .

2(a)(ii)

	3
--	---

[3 marks]

[3 markah]

- (b) Calculate the gradient, m , of the graph.
Show on the graph, how you calculate m .

Hitung kecerunan, m , bagi graf itu.

Tunjukkan pada graf bagaimana anda menghitung m .

2(b)

	3
--	---

[3 marks]

[3 markah]

- (c) The relationship between the pressure and the volume of gas is given by the formula $PV = m$, where m is the gradient of the graph.
The student repeats the experiment with $V = 40 \text{ cm}^3$. Using the answer in 2(b), calculate the value of the pressure, P , in kPa.

Hubungan antara tekanan dan isi padu bagi gas yang diberi oleh formula $PV = m$, di mana m ialah kecerunan graf.

Murid tersebut mengulangi eksperimen dengan $V = 40 \text{ cm}^3$. Dengan menggunakan jawapan di 2(b), hitung nilai tekanan, P , dalam kPa.

2(c)

	3
--	---

[3 marks]
[3 markah]

- (d) (i) Name the physics law involved in this experiment.
Namakan hukum fizik yang terlibat dalam eksperimen ini.

2(d)(i)

	1
--	---

[1 mark]
[1 markah]

- (ii) State **one** precaution that should be taken to improve the accuracy of the result of this experiment.

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

2(d)(ii)

	1
--	---

[1 mark]
[1 markah]

Section B
Bahagian B

[12 marks]

[12 markah]

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

Jawab mana-mana **satu** soalan daripada bahagian ini.

- 3 A student used a slide projector to produce an image on the screen. Diagram 3.1 and Diagram 3.2 show the relative positions of the slide, projector lens and the screen. It is observed that when the projector lens is moved nearer to the slide as shown in Diagram 3.2, the screen has to be moved further away from the slide to obtain a sharp image.

Seorang murid menggunakan projektor slaid untuk menghasilkan imej pada skrin. Rajah 3.1 dan Rajah 3.2 menunjukkan kedudukan slaid, kanta projektor dan skrin.

Adalah diperhatikan apabila kanta projektor digerakkan mendekati slaid seperti ditunjukkan pada Rajah 3.2, skrin perlu digerakkan lebih jauh daripada slaid untuk mendapatkan imej yang tajam.

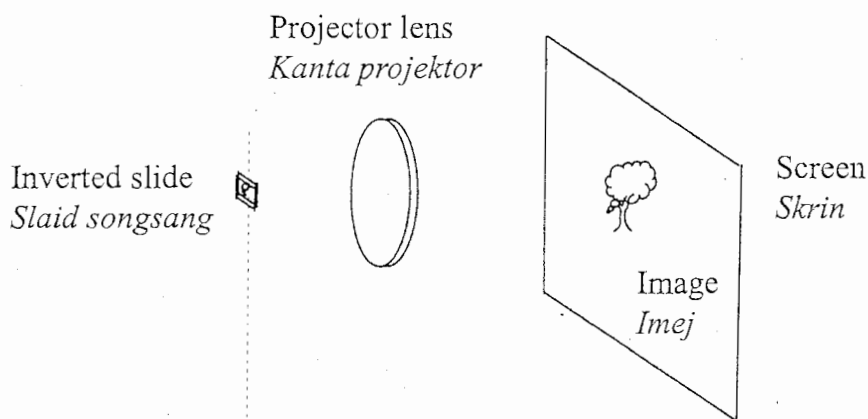


Diagram 3.1
Rajah 3.1

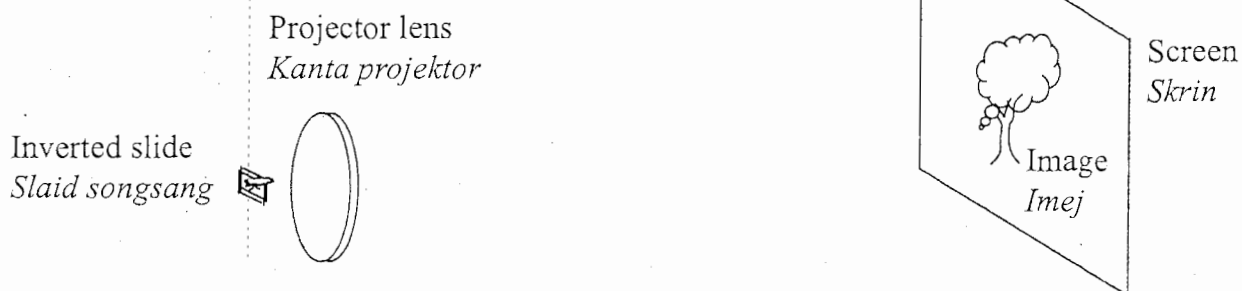


Diagram 3.2
Rajah 3.2

Based on the information and observation:

Berdasarkan maklumat dan pemerhatian tersebut:

- (a) State **one** suitable inference. [1 mark]
*Nyatakan **satu** inferens yang sesuai.* [1 markah]
- (b) State **one** suitable hypothesis. [1 mark]
*Nyatakan **satu** hipotesis yang sesuai.* [1 markah]
- (c) With the use of apparatus such as convex lens, filament bulb and other apparatus, describe **one** experiment to investigate the hypothesis stated in 3(b).
*Dengan menggunakan radas seperti kanta penumpu, mentol filamen dan lain-lain radas, terangkan **satu** eksperimen untuk menyiasat hipotesis yang dinyatakan dalam 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 dalam eksperimen.
- (iii) The list of apparatus and materials.
Senarai radas dan bahan.
- (iv) The arrangement of the apparatus.
Susunan radas.
- (v) The procedure used in the experiment 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]

4

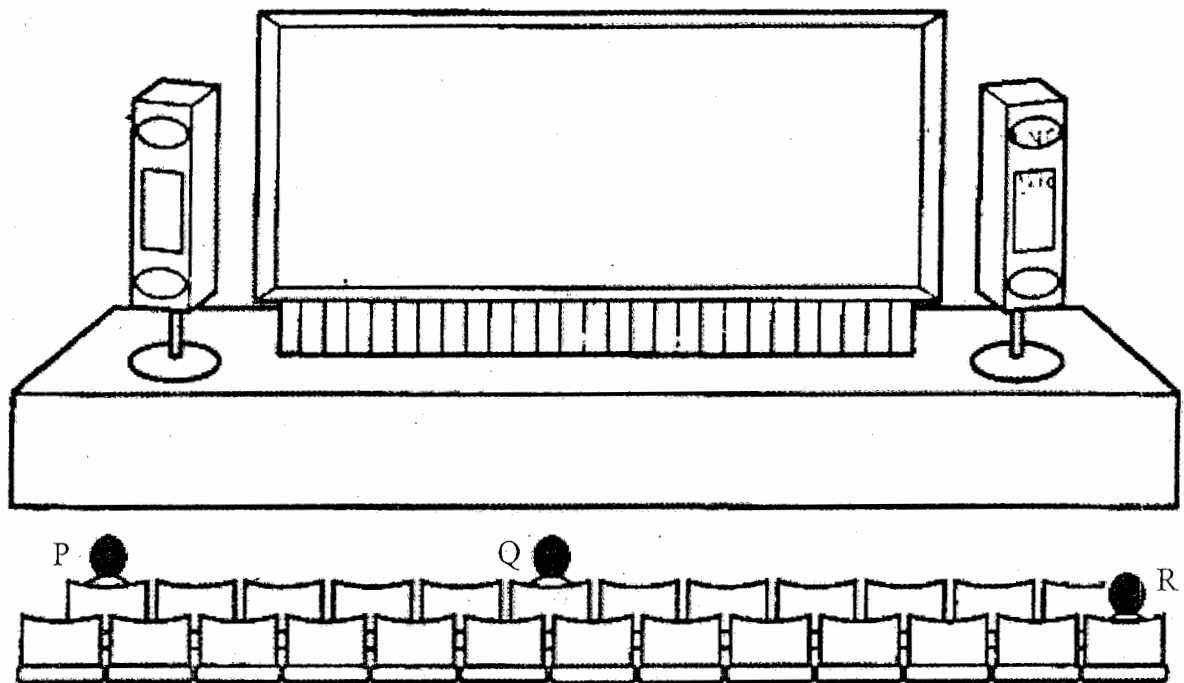


Diagram 4
Rajah 4

Diagram 4 shows an audio technician checking and testing the audio system in a mini theatre by changing his seating positions. Clear and loud sound can only be heard at seating positions P and Q which is equals to 4 seatings away from each other with a certain distance from the loudspeakers. When the technician moves further away from the loudspeakers, the clear and loud sound can only be heard between Q and R which is equals to 6 seatings away from each other.

Rajah 4 menunjukkan juruteknik audio sedang memeriksa dan menguji sistem audio di dalam teater mini dengan mengubah posisi tempat duduknya. Bunyi jelas dan kuat hanya kedengaran pada posisi P dan Q yang bersamaan dengan jarak 4 buah kerusi antara satu sama lain pada suatu jarak tetap dari pembesar suara. Apabila juruteknik itu bergerak lebih jauh dari pembesar suara itu, bunyi jelas dan kuat hanya kedengaran pada posisi Q dan R yang bersamaan dengan jarak 6 buah kerusi antara satu sama lain.

Based on the information and observation:
Berdasarkan maklumat dan pemerhatian tersebut:

- (a) State **one** suitable inference. [1 mark]
*Nyatakan **satu** inferens yang sesuai.* [1 markah]
- (b) State **one** suitable hypothesis. [1 mark]
*Nyatakan **satu** hipotesis yang sesuai.* [1 markah]
- (c) With the use of apparatus such as audio generator, loudspeakers and other apparatus, describe **one** experiment to investigate the hypothesis stated in 4(b).
*Dengan menggunakan radas seperti penjana audio, pembesar suara dan lain-lain radas, terangkan **satu** eksperimen untuk menyiasat hipotesis yang dinyatakan dalam 4(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 dalam eksperimen.
- (iii) The list of apparatus and materials.
Senarai radas dan bahan.
- (iv) The arrangement of the apparatus.
Susunan radas.
- (v) The procedure used in the experiment 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

PERATURAN PEMARKAHAN
PROGRAM PENINGKATAN PRESTASI AKADEMIK
PEPERIKSAAN PERCUBAAN
SPM 2011

JPS

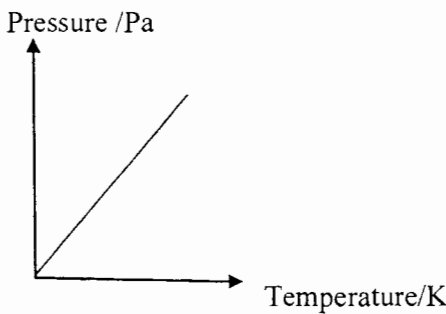
FIZIK KERTAS 1
PHYSICS PAPER 1 MARKING SCHEME

No.	Answer	No.	Answer	No.	Answer	No.	Answer	No.	Answer
1	C	11	B	21	C	31	A	41	B
2	B	12	B	22	C	32	C	42	D
3	B	13	B	23	B	33	A	43	B
4	A	14	C	24	C	34	A	44	B
5	C	15	A	25	B	35	C	45	A
6	A	16	A	26	C	36	B	46	C
7	B	17	B	27	D	37	D	47	A
8	A	18	B	28	A	38	A	48	B
9	D	19	B	29	A	39	C	49	D
10	D	20	D	30	B	40	A	50	C

PERATURAN PEMARKAHAN
PROGRAM PENINGKATAN PRESTASI AKADEMIK
PEPERIKSAAN PERCUBAAN
SPM 2011

FIZIK KERTAS 2
PHYSICS PAPER 2 MARKING SCHEME

Q	Answer	Mark
1(a)	Switching circuit in computer and other electronic system	1
(b)(i)	AND gate	1
(iii)	Out put Y : 0, 0, 1, 0	2
	Total	(4)
2(a)	Change in momentum	1
(b)(i)	Distance travels in diagram 2.1 more than diagram 2.2	1
(ii)	Impulsive force in 2.1 more than 2.2	1
(c)	Kick with higher velocity, it will increase the impulsive force// Kick with more force, increase the velocity of the ball// Inflate the ball with more air, decrease the time collision/increase impulsive force	2
	Total	(5)
3 (a)	Pascal Principle	1
(b)	$P = \frac{F}{A} = \frac{100 \text{ N}}{0.01 \text{ m}^2}$	1
	$= 10\,000 \text{ N m}^{-2}$	1
(c)(i)	Increase	1
(ii)	$\frac{F_1}{A_1} = \frac{F_2}{A_2}, \quad 10\,000 = \frac{F_2}{0.2}$	1
	$F_2 = 2\,000 \text{ N}$	1
	Total	(6)
4(a)(i)	Alternating current / a.c	1
(ii)	Direct current / d.c	1
(b)	Diode as rectifier / diode change a.c to d.c / diode allow current flow in one direction	1
(c)	Half wave rectification	1
(d)(i)		1
(ii)	Capacitor	1
	Total	(6)

5(a)	Image that cannot be form on the screen	1
(b)(i)	Same	1
(ii)	Image size in diagram 5.1 > diagram 5.2	1
(iii)	Image in diagram 5.1 is inverted but image in diagram 5.2 is upright	1
(c)(i)	5.1 : real	1
	5.2 : virtual	1
(ii)	Enlarge / bigger / magnified	1
(d)	The nearer the object distance, the bigger the size of image // vise versa	1
Total		(8)
6(a)	Induced current	1
(b)(i)	Number of turns of coil in Diagram 6.1 is more than 6.2	1
(ii)	The deflection of pointer of the galvanometer in diagram 6.1 is more than 6.2	1
(iii)	When the number of turns of the coil is increases, the deflection of pointer increase	1
(c)(i)	North	1
(ii)	Direction of induced current oppose the movement of the permanent magnet. The pole of solenoid is same with the pole of magnet/ repel	1
(iii)	Lenz's Law	1
Total		(8)
7(a)	Pressure Law	1
(b)(i)	Correct line of graph (directly proportional)	1
		
(ii)	-273 °C	1
(c)	$\frac{P_1}{T_1} = \frac{P_2}{T_2}$ $\frac{3.2 \times 10^5}{2 + 273} = \frac{P_2}{32 + 273}$	1

	$\frac{3.2 \times 10^5}{275} = \frac{P_2}{305}$	1
	$P_2 = \frac{305}{275} \times 3.2 \times 10^5 \text{ Pa} = 3.55 \times 10^5 \text{ Pa}$	1
(d)	Kinetic energy increased Rate of collision between particles and the wall increase	1 1
(e)(i)	Use thicker aluminium wall / clamp or clip at the cover To withstand higher pressure in the pot	1 1
	Total	(10)
8(a)	The bulb dissipated 40 J energy in one second when it is connected to 240 V power supply.	1
(b)	$I = \frac{P}{V} = \frac{40}{240}$	1
	$= 0.167 \text{ A}$	1
(c)(i)	$E = Pt$ $= \left(\frac{20}{100} \times 40 \right) \times 1$ $= 8 \text{ J}$	1 1
(ii)	$E = Pt$ $= \left(\frac{80}{100} \times 40 \right) \times 1$ $= 32 \text{ J}$	1 1
(d)(i)	Same Produce same brightness/light energy	1 1
(ii)	Bulb in diagram 8.2 is more efficient	1
(iii)	Bulb in 8.2 Less energy lost	1 1
	Total	(12)
9(a)(i)	Rate of change of momentum.	1
(ii)	1. Egg in diagram 9.2 break/ egg in diagram 9.1 does not break. 2. Force (act on the egg) on surface A is less than on surface B // vice versa. 3. Time of impact on surface A is less than on surface B//vice versa. 4. The egg breaks when the force is big because the time of impact on the egg is small. 5. The smaller the time if impact the bigger the force acting on the egg.	5

(b)	1. Soft material/ thick material 2. reduce impulsive force act on the egg 3. increase the time of impact 4. the shorter the time impact, the higher the impulsive force	4												
(c)	<table><tr><th>Modification</th><th>Explanation</th></tr><tr><td>Shape of the shuttle – conical shape /oval /diagram</td><td>Allow for better / fast air flow//produce more lift force // reduce air resistance</td></tr><tr><td>Material used for shuttle – feather / small mass/ low density</td><td>Light// high velocity/ acceleration //further distance travelled//reduce inertia // smaller mass</td></tr><tr><td>Material used for base of the shuttle – cork/ small mass/ low density</td><td>Light// high velocity/ acceleration //further distance travelled//reduce inertia // smaller mass</td></tr><tr><td>Material used for the string of the racquet – strong/ low elasticity</td><td>Not easily broken //withstand high force</td></tr><tr><td>High tension</td><td>Short time impact// high impulsive force</td></tr></table>	Modification	Explanation	Shape of the shuttle – conical shape /oval /diagram	Allow for better / fast air flow//produce more lift force // reduce air resistance	Material used for shuttle – feather / small mass/ low density	Light// high velocity/ acceleration //further distance travelled//reduce inertia // smaller mass	Material used for base of the shuttle – cork/ small mass/ low density	Light// high velocity/ acceleration //further distance travelled//reduce inertia // smaller mass	Material used for the string of the racquet – strong/ low elasticity	Not easily broken //withstand high force	High tension	Short time impact// high impulsive force	10
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High tension	Short time impact// high impulsive force													
	Total	(20)												
10(a)	diffraction	1												
(b)(i)	wavelength $10.1 > 10.2$ size of slit are same circular wave for 9.1 or plane wave for 9.2	1 1 1												
(ii)	10.2 size of slit $>$ wavelength, plane wave bending at the edge/slightly bend plane wave is produced // 10.1 size of slit $<$ wavelength, circular wave is produced The smaller the size of the slit compared to the wavelength, the diffraction effect more obvious.	1 1												
(c)	Radio wave is electromagnetic wave Radio wave have higher velocity than sound wave Radio wave can travel without medium but sound wave need the medium has high frequency / carry more information carry more energy/ can move further	Max 4												
(d)	<table><tr><th>Modification</th><th>Reason</th></tr><tr><td>Frequency of signal is low</td><td>Longer wavelength/ diffraction easier</td></tr><tr><td>The location of transmitter higher</td><td>no blocking / capture more signal</td></tr><tr><td>the number of transmitter is more / many</td><td>increase the strength of signal/ increase energy of signal reduce energy lost during transmission</td></tr><tr><td>The strength of signal is higher</td><td>have more energy / can move further</td></tr><tr><td>The distance between two transmitter is closer</td><td>increase the strength of signal/ increase energy of signal</td></tr></table>	Modification	Reason	Frequency of signal is low	Longer wavelength/ diffraction easier	The location of transmitter higher	no blocking / capture more signal	the number of transmitter is more / many	increase the strength of signal/ increase energy of signal reduce energy lost during transmission	The strength of signal is higher	have more energy / can move further	The distance between two transmitter is closer	increase the strength of signal/ increase energy of signal	10
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	Total	(20)												

11(a)	Buoyant force equal to the weight of water displaced	1												
(b)	Rod A float because weight of rod equal to the buoyant force	1												
	Buoyant force equal to weight of water displaced	1												
	Rod A sink deeper in olive oil because olive oil less dense than water	1												
	When the density decrease, volume of water displaced increase	1												
(c)(i)	$\rho = \frac{m}{V}, \quad V = \frac{m}{\rho}$ $= \frac{3}{800}$ $= 3.75 \times 10^{-3} \text{ m}^3$	1												
(ii)	$W_L + W_B = W_{\text{water displaced}}$ $W_L + 3 \times 10 = \rho_w V g$ $W_L + 30 = 37.5$ $W_L = 7.5 \text{ N}$ $m_L = \frac{7.5}{10} = 0.75 \text{ kg}$	1												
(d)	<table border="1"> <thead> <tr> <th>Characteristics</th> <th>reason</th> </tr> </thead> <tbody> <tr> <td>Volume of the balloon is bigger</td> <td>Produced bigger buoyant force / displaced more volume of air</td> </tr> <tr> <td>Material used for balloon is nylon</td> <td>Stronger / does not break easily</td> </tr> <tr> <td>Material used for basket is rattan</td> <td>Lighter / low mass / increase the time impact / reduce impulsive force</td> </tr> <tr> <td>Temperature of air inside the balloon is higher</td> <td>Reduce the density of air / reduce the mass of air in the balloon / increase upward resultant force / can carry more load</td> </tr> <tr> <td colspan="2">The best chosen is K because volume of the balloon is bigger, material used for balloon is nylon, material used for basket is rattan and temperature of air inside the balloon is higher</td> </tr> </tbody> </table>	Characteristics	reason	Volume of the balloon is bigger	Produced bigger buoyant force / displaced more volume of air	Material used for balloon is nylon	Stronger / does not break easily	Material used for basket is rattan	Lighter / low mass / increase the time impact / reduce impulsive force	Temperature of air inside the balloon is higher	Reduce the density of air / reduce the mass of air in the balloon / increase upward resultant force / can carry more load	The best chosen is K because volume of the balloon is bigger, material used for balloon is nylon, material used for basket is rattan and temperature of air inside the balloon is higher		
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	Total	10												
		(20)												
12(a)	Radioactive decay refers to the process of an unstable nucleus of a radioactive element disintegrate (break-up) in order to become more stable.	1												
(b)	Track alpha straight / thicker / diagram	1												
	Alpha has higher ionization power / higher mass	1												
	Track Beta twisted / thinner / diagram	1												
	Beta moderate ionization power / low mass	1												

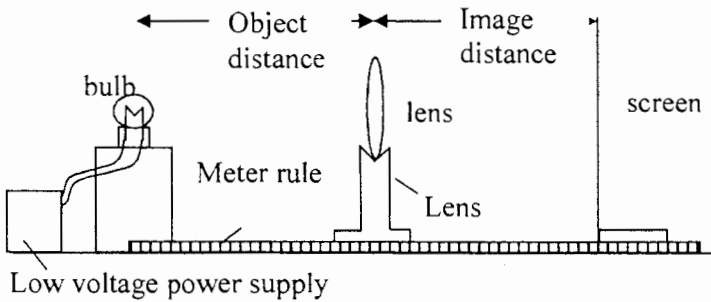
(c)	characteristics	reason	
	Beta & Gamma	Beta can be trace by topography tracer. Gamma can kill cancerous cells.	
	8 days for beta and 6 hours for Gamma	Half-life of gamma decay is short to prevent damage to surrounding cells. Half-life of beta decay is longer for the tracer to detect the possible spreading of cancerous cells because it is less harmful.	
	Good absorption by thyroid cells.	Radioisotope captures and accumulates in the thyroid to kill cancerous cell.	
	No absorption by other body cells	Reduce the damage to other normal cells // less damage to normal cells in the body.	
	The best chosen is S because using beta & Gamma, shorter half life, good absorption by thyroid cells and no absorption by other body cells		10
(d)(i)	Time taken for unstable nucleus to decay to half of its mass/activity		1
(ii)	30 years		1
	8055-55 = 8000		1
	8000 $\rightarrow$ 4000 $\rightarrow$ 2000 $\rightarrow$ 1000 // 8055 $\rightarrow$ 4055 $\rightarrow$ 2055 $\rightarrow$ 1055(actual reading)		1
	3 x 30 = 90 years		1
Total			(20)

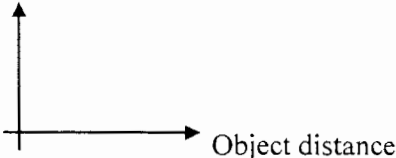
FIZIK KERTAS 3
PHYSICS PAPER 3 MARKING SCHEME

Section A																										
No	Answer	Mark																								
1a i)	State the correct manipulated variable : Length / L	1																								
ii)	State the correct responding variable : Resistance / R // Potential difference / V	1																								
iii)	State one fixed variable correctly : Diameter of the wire // Cross-sectional area of the wire // Type of wire //current	1																								
1b	Tabulate L, I, V and R correctly Give a tick (✓) based on the following: 1 ✓ Columns L, I, V and R 2 ✓ Correct units for I, V and R 3 & 4 ✓ All values of V correct 5 correct 3 ✓ 4 ✓ 3-4 correct 3 ✓ 4 ✗ 1-2correct 3 ✗ 4 ✗ 5 & 6 ✓ All values for R correct (e.c.f.) 5 correct 3 ✓ 4 ✓ 3-4 correct 3 ✓ 4 ✗ 1-2correct 3 ✗ 4 ✗ 7 ✓ All values consistent (V & R) <table border="1"> <thead> <tr> <th>L / cm</th> <th>V / V</th> <th>I / A</th> <th>R / Ω</th> </tr> </thead> <tbody> <tr> <td>20.0</td> <td>0.4</td> <td>0.2</td> <td>2.0</td> </tr> <tr> <td>30.0</td> <td>0.7</td> <td>0.2</td> <td>3.5</td> </tr> <tr> <td>40.0</td> <td>0.9</td> <td>0.2</td> <td>4.5</td> </tr> <tr> <td>50.0</td> <td>1.1</td> <td>0.2</td> <td>5.5</td> </tr> <tr> <td>60.0</td> <td>1.4</td> <td>0.2</td> <td>7.0</td> </tr> </tbody> </table>	L / cm	V / V	I / A	R / Ω	20.0	0.4	0.2	2.0	30.0	0.7	0.2	3.5	40.0	0.9	0.2	4.5	50.0	1.1	0.2	5.5	60.0	1.4	0.2	7.0	
L / cm	V / V	I / A	R / Ω																							
20.0	0.4	0.2	2.0																							
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50.0	1.1	0.2	5.5																							
60.0	1.4	0.2	7.0																							

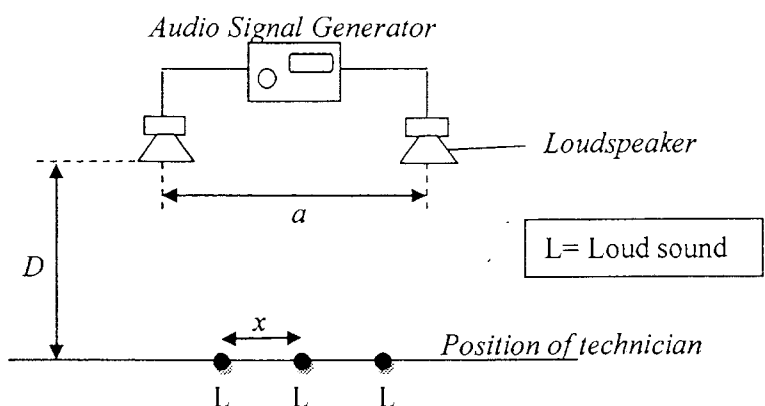
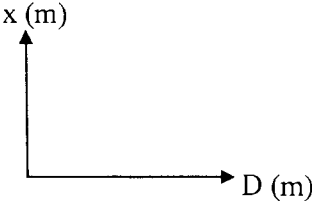
7

1c	Draw correctly a graph of R against L Give a tick (✓) based on the following: 1 ✓ R at the y-axis, L at the x-axis 2 ✓ Correct units at both axes 3 ✓ Uniform scale at both axes 4&5 ✓✓ 5 points plotted correctly [Note : 3 or 4 points plotted correctly : ✓] 6 ✓ Best straight line 7 ✓ Minimum size of graph 5×4 big squares (Big square : $2 \text{ cm} \times 2 \text{ cm}$) (From the origin to the last point) Marks awarded : <table><tr><th>Number of ✓</th><th>Marks</th></tr><tr><td>7 ✓</td><td>5</td></tr><tr><td>5 – 6 ✓</td><td>4</td></tr><tr><td>3 – 4 ✓</td><td>3</td></tr><tr><td>2 ✓</td><td>2</td></tr><tr><td>1 ✓</td><td>1</td></tr></table>	Number of ✓	Marks	7 ✓	5	5 – 6 ✓	4	3 – 4 ✓	3	2 ✓	2	1 ✓	1	5
Number of ✓	Marks													
7 ✓	5													
5 – 6 ✓	4													
3 – 4 ✓	3													
2 ✓	2													
1 ✓	1													
1d	State the correct relationship based on the straight line drawn For a straight line with positive gradient passing through the origin, Resistance is directly proportional to length / R directly proportional to L / $R \propto L$													
1e	State one suitable precaution Check the voltmeter for zero error and make zero adjustment // Position of the eye such that the image of the pointer in the mirror is blocked by the pointer to avoid parallax error	1												
	Jumlah	16												
2a i)	P is inversely proportional to V // P is directly proportional to $\frac{1}{V}$	1												
ii)	Show the vertical line corresponding to $P = 0.5 \text{ kPa}$ Identify the value of $\frac{1}{V} = 0.02$ State the value of V correctly = 50 cm^3	1 1 1												
2b	Draw a sufficiently large triangle minimum $(8 \times 8) \text{ cm}$ Correct substitution (Follow candidate's triangle) Correct answer and unit. $\frac{2}{0.08} = 25 \text{ kPa cm}^3$	1 1 1												
2c	$(25 \text{ kPa cm}^3) = p \times 40$ (e.c.f. for gradient) Correct substitution $P = \frac{25 \text{ kPa cm}^3}{40 \text{ cm}^3}$ Correct answer with correct unit $P = 0.625 \text{ kPa}$	1 1 1												
2d (i)	Boyle's Law (reject wrong spelling)	1												
d (ii)	State one precaution correctly 1. Position of eyes are perpendicular to the scale reading of Bourdon Gauge or syringe to avoid parallax error	1												
	Jumlah	12												

Section B		
3a	The image distance / size of image / height of image / magnification depends on the object distance	1
b	The greater the object distance, the smaller the image distance / size of image / height of image / magnification	1
c(i)	Aim of the experiment To investigate the relationship between object distance and image distance / size of image / height of image / magnification for a convex lens.	1
(ii)	Variables in the experiment Manipulated variable : object distance Responding variable : image distance / size of image / height of image / magnification Fixed variable : Focal length of lens / thickness of lens / power of lens	1 1 1
(iii)	List of apparatus and material light bulb, convex lens of focal length 10 cm , white screen, metre rule, low voltage power supply and lens holder	1
(iv)	Arrangement of apparatus 	1
(v)	The apparatus set up as in figure shown. Adjust the bulb so that the object distance (filament), u is 35 cm from the lens. Light up the electric bulb, adjust the screen position until a sharp image of the filament is formed on the screen. Record the image distance, v / height of image // calculate magnification, $m = \frac{v}{u}$ Repeat steps 2 and 3 for objects distances of, $u = 30\text{cm}$, 25 cm , 20 cm , and 15 cm .	1 1 1

(vi)	How you tabulate the data.	1												
	<table><tr><th>object distance, u / cm</th><th>Image distance, v / cm / height of image , cm / Magnification</th></tr><tr><td>35</td><td></td></tr><tr><td>30</td><td></td></tr><tr><td>25</td><td></td></tr><tr><td>20</td><td></td></tr><tr><td>15</td><td></td></tr></table>	object distance, u / cm	Image distance, v / cm / height of image , cm / Magnification	35		30		25		20		15		
object distance, u / cm	Image distance, v / cm / height of image , cm / Magnification													
35														
30														
25														
20														
15														
(vii)	How you analyse the data.	1												
	Image distance / height of image , cm / Magnification  Object distance													
	Jumlah	12												

4(a)	The distance between two successive positions of clear and loud sound depends on the distance of the loudspeakers and the position of technician.	1
(b)	The distance between two successive loud sounds, x , increases when the distance between the loudspeakers and position of the technician, D , increases.	1
	Jumlah	2
(c)(i)	Aim: To investigate the relationship between distance, x , and D .	1
(ii)	Manipulated variable: Distance between loudspeakers and position of technician, D Responding variable: Distance between two successive positions of loud sound, x Constant/fixed variable: Distance between the two loudspeakers / frequency of sound wave.	1 1 1
(iii)	List of apparatus: Audio signal generator, two (identical) loudspeakers, connecting wires, metre rule or measuring tape.	1

(iv)	Arrangement of apparatus:  $L = \text{Loud sound}$	1												
(v)	1. The apparatus is set up with the two loudspeakers placed apart at a distance , $a = 1.0 \text{ m}$ as shown in the diagram. 2. <u>The observer will stand at a distance, $D = 5 \text{ m}$, from the speakers.</u> 3. The audio generator is <u>switched on</u> and set at a frequency, $f = 600 \text{ Hz}$. 4. The observer will move along a parallel straight line at a distance $D = 5.0 \text{ m}$ from the loudspeakers. 5. <u>The positions of loud sound that can be heard are marked as L.</u> 6. Distance between 2 successive loud sound, x is measured using a metre rule <u>and recorded</u>. 7. The experiment is <u>repeated with different values of D which is 10 m, 15 m, 20 m and 25 m.</u> 8. All the readings are tabulated.	1 1 1												
(vi)	Tabulate the data <table data-bbox="469 1263 716 1464"><tr><th>$D \text{ (m)}$</th><th>$x \text{ (m)}$</th></tr><tr><td>5.0</td><td></td></tr><tr><td>10.0</td><td></td></tr><tr><td>15.0</td><td></td></tr><tr><td>20.0</td><td></td></tr><tr><td>25.0</td><td></td></tr></table>	$D \text{ (m)}$	$x \text{ (m)}$	5.0		10.0		15.0		20.0		25.0		1
$D \text{ (m)}$	$x \text{ (m)}$													
5.0														
10.0														
15.0														
20.0														
25.0														
(vii)	Analysis of data  A graph of x against D is drawn to analyse the data.	1												
	Jumlah	11 (Maximum 10)												
	Jumlah Besar	12												