4531/1
Fizik
Kertas 1
OGOS
2010
1 ¼ jam

BAHAGIAN PENGURUSAN
SEKOLAH BERASRAMA PENUH DAN SEKOLAH KLUSTER
KEMENTERIAN PELAJARAN MALAYSIA

PEPERIKSAAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA 2010

FIZIK

KERTAS 1

Satu jam lima belas minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Kertas soalan ini mengandungi 50 soalan.*
2. *Jawab semua soalan.*
3. *Jawab dengan menghitamkan ruangan yang betul pada kertas jawapan.*
4. *Bagi setiap soalan hitamkan satu ruangan sahaja.*
5. *Sekiranya anda hendak menukarkan jawapan , padamkan tanda yang telah dibuat.*
6. *Kemudian hitamkan jawapan yang baru.*
7. *Satu senarai rumus disediakan di halaman 2.*
8. *Penggunaan kalkulator saintifik yang tidak boleh diprogramkan adalah dibenarkan.*

Kertas soalan ini mengandungi 36 halaman bercetak

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

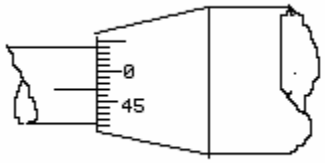
1. $a = \frac{v - u}{t}$
2. $v^2 = u^2 + 2as$
3. $s = ut + \frac{1}{2}at^2$
4. Momentum = mv
5. F = ma
6. Kinetic energy = $\frac{1}{2}mv^2$
(*Tenaga kinetik*)
Tenaga keupayaan
7. Potential energy = mgh
Tenaga keupayaan
8. Elastic potential energy = $\frac{1}{2}Fx$
(*Tenaga keupayaan kenyal)*
9. $\rho = \frac{m}{V}$
10. Pressure, ρ = hpg.
Tekanan
11. Pressure, $\rho = \frac{F}{A}$
Tekanan
12. Heat, Q = mcθ
Haba
13. PV = Constant (*pemalar)*
14. $E = mc^2$
15. $v = f\lambda$
16. Power, P = $\frac{\text{energy}}{\text{time}}$
17. V = IR
18. Power, P = IV
kuasa
19. $\frac{N_s}{N_p} = \frac{V_s}{V_p}$
20. Efficiency = $\frac{I_s V_s}{I_p V_p} \times 100\ \%$
(kecekapan)
21. $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$
22. $n = \frac{\sin i}{\sin r}$
23. $n = \frac{\text{Real depth}}{\text{Apparent depth}}$
24. $\lambda = \frac{ax}{D}$
25. Q= It
26. E = I (R + r)
27. $eV = \frac{1}{2}mv^2$
28. $g = 10\ ms^{-2}$

Answer all questions. Each question is followed by either three or four options.
Choose the best option for each question then blacken the correct space on the answer sheet.
Jawab semua soalan.Tiap – tiap soalan diikuti oleh sama ada tiga atau, empat pilihan jawapan. Pilih satu jawapan yang terbaik bagi setiap soalan dan hitamkan ruangan yang sepadan pada kertas jawapan objektif anda

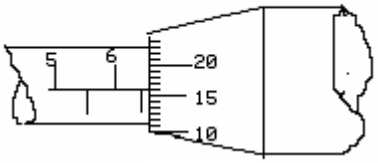
1. Which of the following value of prefix is correct?
Yang manakah di antara nilai faktor pendaraban berikut adalah benar?

	Prefix / *Imbuhan*	**Value of prefix / *Faktor pendaraban***
A	Giga	10^{8}
B	Desi	10^{-1}
C	Milli	10^{-6}
D	Nano	10^{-7}

2. Based on Diagram 1 below, what is the actual diameter of the object?
Berdasarkan Rajah 1 di bawah, berapakah bacaan sebenar objek ini?



Without object
Tanpa objek



With object
Dengan objek

Diagram 1
Rajah 1

A 6.50 mm

B 6.63 mm

C 6.66 mm

D 6.69 mm

3. Which of the following students recorded the correct reading of the thickness of a text book?
Manakah antara pelajar berikut yang memberikan bacaan yang betul bagi ketebalan sebuah buku teks?

	Student *Pelajar*	Ruler/*Pembaris* /cm	Vernier Callipers / *Angkup vernier*/cm	Micrometer Screw Gauge / *Tolok skru mikrometer* /cm
A	P	2.98	2.9	2.998
B	Q	2.998	2.9	2.98
C	R	2.98	2.998	2.9
D	S	2.9	2.98	2.998

4. The equation below shows the relationship between image distance, *v* with magnification, *M,* for a convex lens.

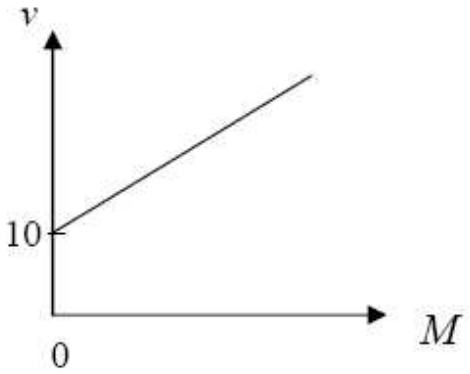
Persamaan di bawah menunjukkan hubungan antara jarak imej, v dengan pembesaran ,M, untuk sebuah kanta cembung.

$$v - 10 = 10M$$

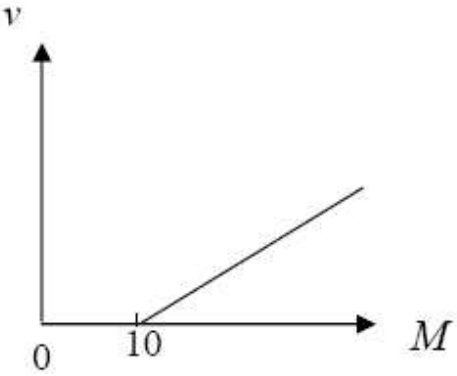
Which of the following graphs shows the relationship between v and M for the above equation?

Antara graf-graf berikut, yang manakah menunjukkan hubungan antara v dan M bagi persamaan di atas ?

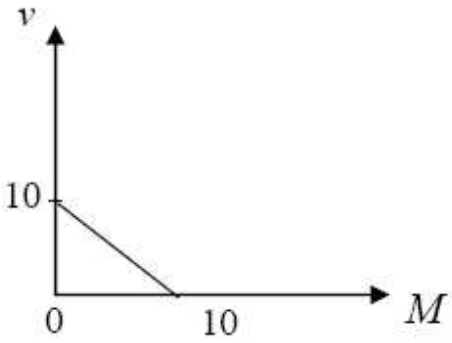
A.



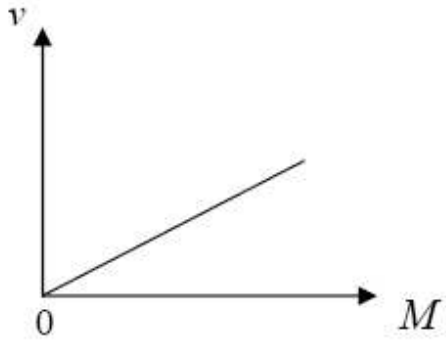
B.



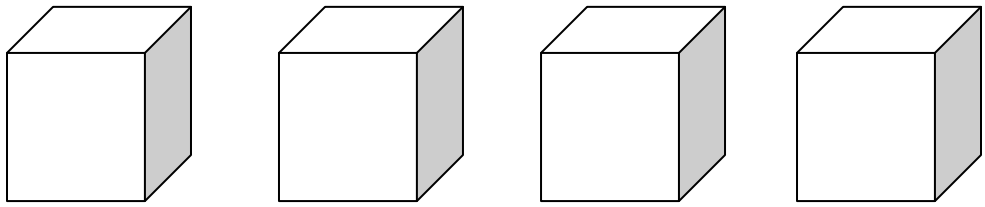
C.



D.



5. Diagram 2 shows four cubes made from four different types of material dropped from a tall bench.
Rajah 2 menunjukkan empat kubus yang diperbuat daripada empat jenis bahan berlainan dijatuhkan daripada sebuah bangku yang tinggi.



Lead/ *Plumbum* | Rubber / Getah | Glass / *Kaca* | Balsa wood / *Kayu balsa*

Diagram 2
Rajah 2

Which cubes have the same acceleration?
Kubus mana yang akan mempunyai pecutan yang sama?

A Lead and glass only
Plumbum dan kaca sahaja

B Rubber and balsa wood only
Getah dan kayu balsa sahaja

C Glass, rubber and lead only
Kaca, getah dan plumbum sahaja

D Lead, rubber, glass and balsa wood
Plumbum, getah, kaca dan kayu balsa

6. Diagram 3 shows a graph of velocity against time for the motion of a bus.
Rajah 3 menunjukkan graf halaju terhadap masa bagi pergerakan sebuah bas.

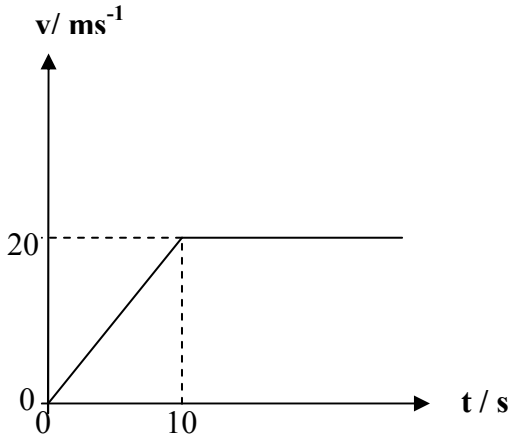
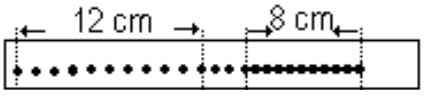


Diagram 3
Rajah 3

How far does the bus travel before it reaches a steady velocity?
Berapa jauhkah bas itu akan bergerak sebelum mencapai halaju yang seragam?

A. 10 m
B. 20 m
C. 100 m
D. 200 m

7. Diagram 4 shows a ticker tape that was obtained from an experiment by using trolley A of mass 2 kg and a trolley B. Trolley A was released from one end of platform so that it moves downwards and collides with the stationary trolley B. After the collision they stick and move together. What is the mass of trolley B?
Rajah 4 menunjukkan pita detik yang diperolehi daripada satu eksperimen yang menggunakan troli A berjisim 2 kg dan troli B. Troli A dilepaskan daripada hujung sebuah landasan supaya ia bergerak ke bawah dan berlanggar dengan troli B yang pegun. Selepas perlanggaran kedua-dua troli itu bercantum dan bergerak bersama-sama. Berapakah jisim bagi troli B



Before Collision/ *Sebelum perlanggaran* After collision/ *Selepas perlanggaran*

Diagram 4
Rajah 4

A 0.5 kg
B 1.0 kg
C. 1.5 kg
D. 2.0 kg

8. Diagram 5 shows a cyclist riding along a hilly road. At which position does the cyclist have the highest kinetic energy?
Rajah 5 di bawah menunjukkan seorang penunggang basikal dijalan yang berbukit bukau. Pada kedudukan manakah penunggang itu mempunyai tenaga kinetik yang paling tinggi?

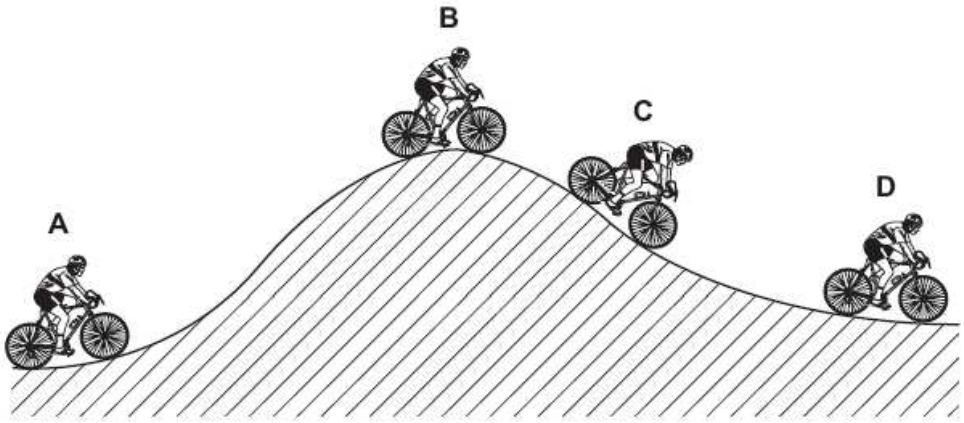


Diagram 5
Rajah 5

9. Diagram 6 shows a reading of a weighing machine when the lift is stationary.
Rajah 6 menunjukkan bacaan mesin penimbang ketika lif pegun.

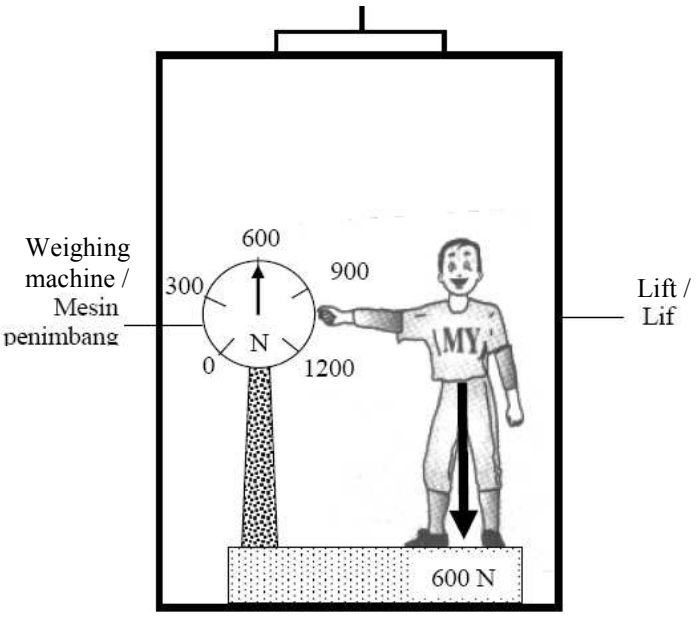
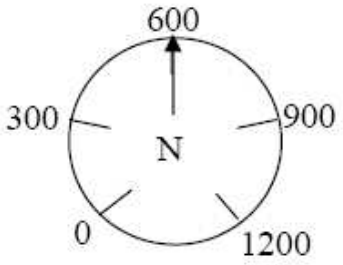


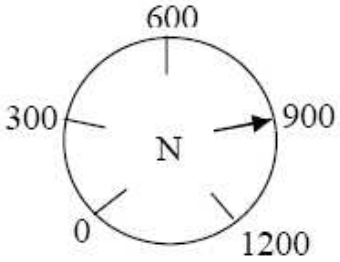
Diagram 6
Rajah 6

What is the reading of the weighing machine if the lift experiences a free fall?
Berapakah bacaan mesin penimbang ketika lif jatuh bebas ?

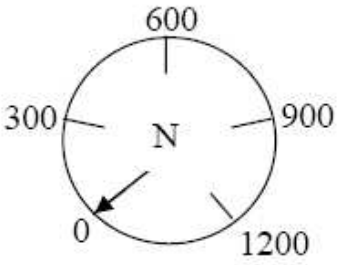
A.



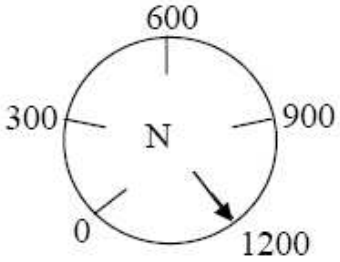
B.



C.



D.



10. Diagram 7 shows two identical springs are arranged parallel to each other. A load of 30 N is suspended to the springs. Each spring extends by 4 cm when 10 N is suspended from it.
Rajah 7 menunjukkan dua spring yang serupa disusun secara selari antara satu sama lain. Beban 30 N di gantung kepada kedua-dua spring tersebut. Setiap spring akan memanjang sebanyak 4 cm apabila beban 10 N digantung.

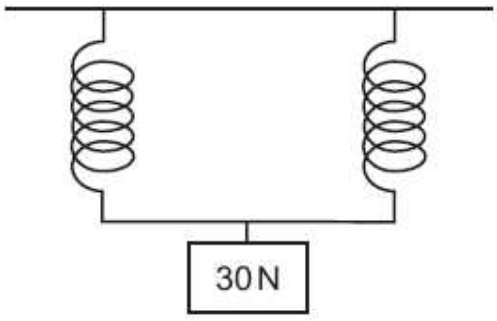


Diagram 7
Rajah 7

What is the extension of each spring in Diagram 7?
Berapakah pemanjangan bagi setiap spring dalam Rajah 7?

A 4 cm

B 6 cm

C 8 cm

D 12 cm

11. Diagram 8 shows a Formula-1 racing car.
Rajah 8 menunjukkan sebuah kereta lumba Formula-1.

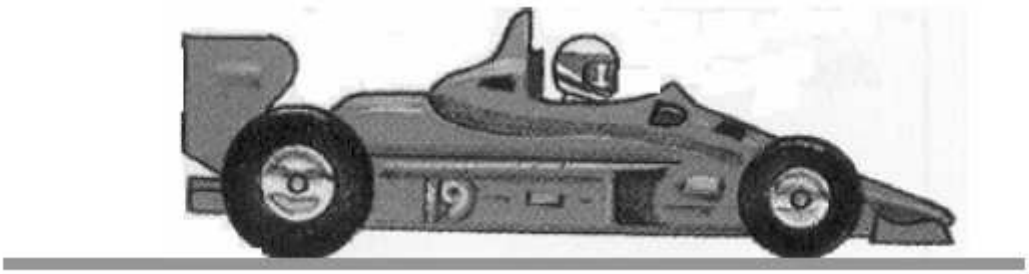


Diagram 8
Rajah 8

Why does the car's design engineer use light composite materials for making the body of the car although its engine is powerful ?

Mengapakah badan kereta lumba tersebut perlu diperbuat daripada bahan komposit yang ringan walaupun enjinnya berkuasa tinggi ?

A Acceleration increases if mass decreases.
Pecutan akan bertambah jika jisimnya berkurang.

B A small mass produces a large force.
Jisim yang rendah menghasilkan daya yang tinggi.

C A large force produces a large inertia.
Daya yang besar menghasilkan inersia yang besar.

D The cost of composite material of small mass is low.
Kos bagi bahan komposit yang berjisim rendah adalah kecil.

12. Diagram 9 shows a simple mercury barometer. The barometer reading is h cm of mercury.
Rajah 9 di bawah menunjukkan sebuah barometer merkuri ringkas. Bacaan barometer ini ialah h cm merkuri.

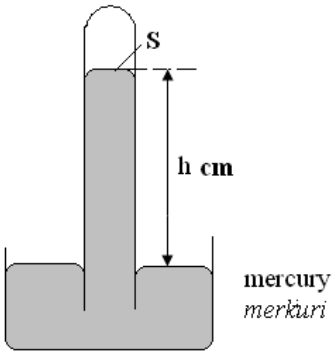


Diagram 9
Rajah 9

The physical quantity measured *h* is the
Kuantiti fizik yang diukur oleh h *iala*h

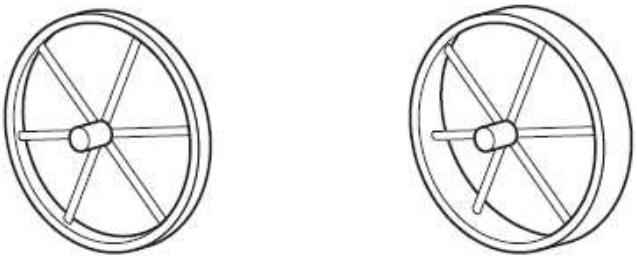
A liquid pressure
Tekanan cecair

B vacuum
vakum

C atmospheric pressure
Tekanan atmosfera

D gas pressure
Tekanan gas

13. Diagram 10 below shows two types of wheel from two different carts. One cart has four narrow wheels and the other has four wide wheels.
Rajah 10 menunjukkan dua jenis roda daripada dua kenderaan yang berbeza. Satu kenderaan mempunyai empat roda yang tirus dan sebuah lagi kenderaan mempunyai roda yang lebar.



Narrow wheel /
roda tirus

wide wheel /
roda lebar

Diagram 10
Rajah 10

In rainy weather, which cart sinks **less** into soft ground, and why?
*Dalam keadaan hujan, roda yang manakah yang **kurang** tenggelam ke dalam tanah dan mengapa?*

	Wheel / ***roda***	**Reason /** ***sebab***
A	Narrow *tirus*	Greater pressure on the ground *Tekanan yang tinggi ke atas tanah*
B	Narrow *tirus*	Less pressure on the ground *Tekanan yang rendah ke atas tanah*
C	Wide *lebar*	Greater pressure on the ground *Tekanan yang tinggi ke atas tanah*
D	Wide *lebar*	Less pressure on the ground *Tekanan yang rendah ke atas tanah*

14. Diagram 11 shows the side view of a swimming pool.
Rajah 11 menunjukkan pandangan sisi sebuah kolam renang.

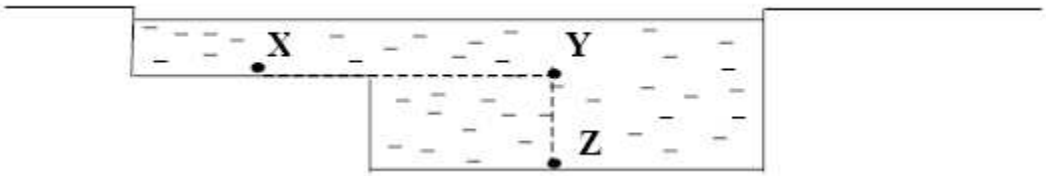


Diagram 11
Rajah 11

The correct comparison for the pressure at X, Y and Z is
*Perbandingan yang betul bagi tekanan di **X, Y** dan **Z** ialah*

A Px = Py = Pz

B Px = Py < Pz

C Px = Py > Pz

D Px > Py = Pz

15. Diagram 12 shows water spurts out from a vessel when the piston is pushed downward**.**
Rajah 12 menunjukkan air memancut keluar dari sebuah bekas bila omboh ditolak kebawah.

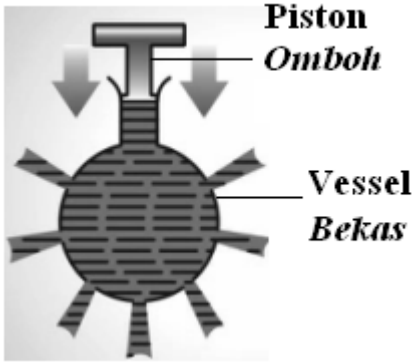


Diagram 12
Rajah 12

Which of the physic's principle can explain the above situation?
Manakah antara prinsip fizik berikut yang dapat menerangkan situasi di atas?

A. Bernoulli's Principle
Prinsip Bernoulli
B. Pascal's Principle
Prinsip Pascal
C Archimedes Principle
Prinsip Archimedes

16. Diagram 13 shows a boy in a raft.
Rajah 13 menunjukkan seorang budak di atas rakit.

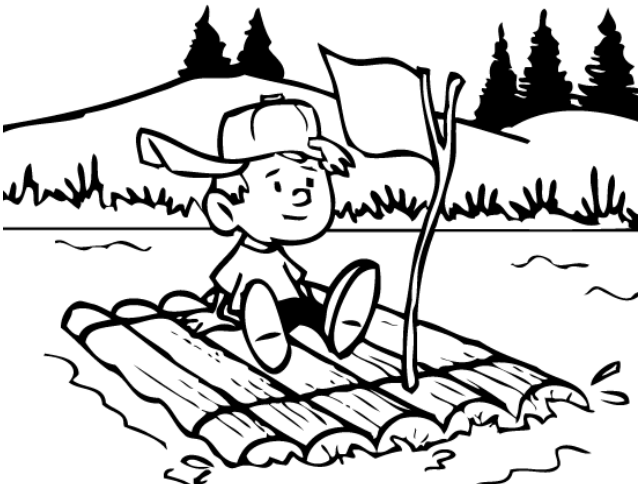


Diagram 13
Rajah 13

If the weight of the boy and the raft is 1200 N, what is the volume of the raft which is submerged?
Jika berat budak dan rakitnya ialah 1200 N, apakah isipadu bahagian rakit yang tenggelam?
[Density of water = 1000 kg m^{-3} and g = 10 m s^{-2}]
[Ketumpatan air = 1000 kg m^{-3} dan g = 10 m s^{-2}]

A 0.12 m^3

B 0.83 m^3

C 1.20 m^3

D 8.33 m^3

17. Diagram 14 shows a thistle funnel connected to a mercury manometer.
Rajah 14 menunjukkan set radas corong tisel yang disambungkan kepada sebuah manometer merkuri.

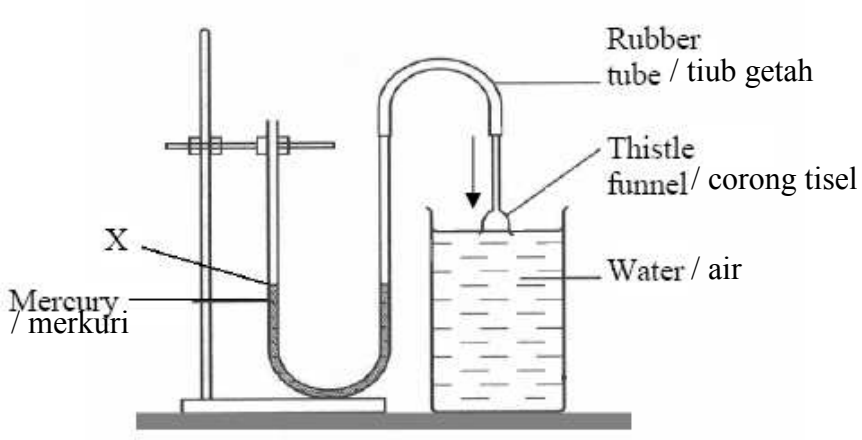


Diagram 14
Rajah 14

When the funnel is pushed deeper into the water, what happens to the mercury level X in the manometer?
Apabila corong ditolak ke dalam air, apa akan terjadi pada aras merkuri X dalam manometer?

A Remains unchanged
Tiada perubahan

B Rises
Meningkat

C Drops
Menurun

18. A substance is heated at a steady rate. It changes from solid state to liquid state , and then to gas. The graph in Diagram 15 shows how its temperature changes with time.

Sejenis bahan dipanaskan dengan kadar yang sekata. Ia berubah daripada keadaan pepejal menjadi keadaan cecair, kemudian menjadi gas. Rajah 15 menunjukkan graf yang menunjukkan bagaimana suhunya berubah terhadap masa.

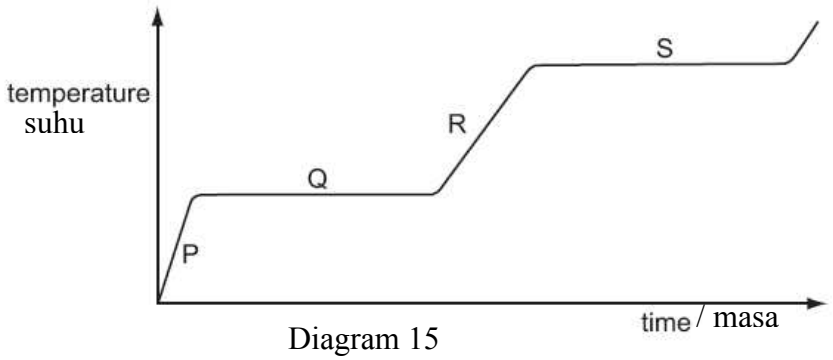


Diagram 15
Rajah 15

Which parts of the graph show a change of state taking place?
Bahagian manakah pada graf menunjukkan berlakunya perubahan fasa?

A P and R
P dan R

B P and S
P dan S

C Q and R
Q dan R

D Q and S
Q dan S

19. Diagram 16shows two ice cubes of masses m and 2m, melting at room temperature. The temperature of the ice cubes were initially at -5 ºC.
Rajah 16 menunjukkan dua ketulan ais yang masing-masing berjisim m dan 2m cair apabila berada di dalam suhu bilik. Suhu awal kedua-dua ketulan ais ini ialah -5 ºC.

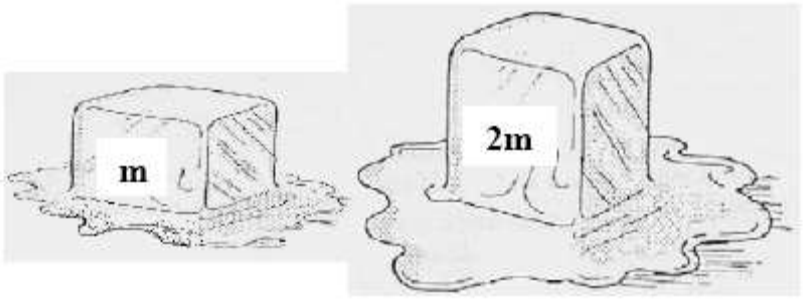
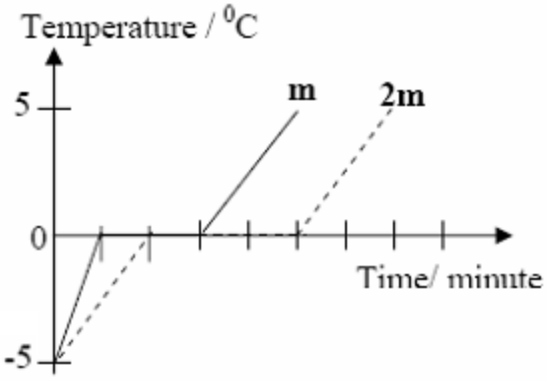


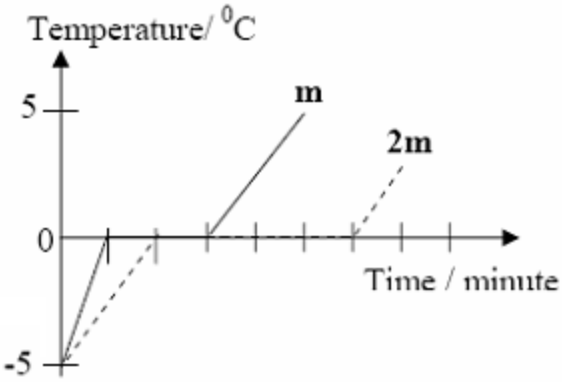
Diagram 16
Rajah 16

Which graph shows the correct temperature versus time relationship for the two ice cubes ?
Graf manakah yang menunjukkan hubungan suhu melawan masa yang betul bagi kedua-dua ketulan ais itu?

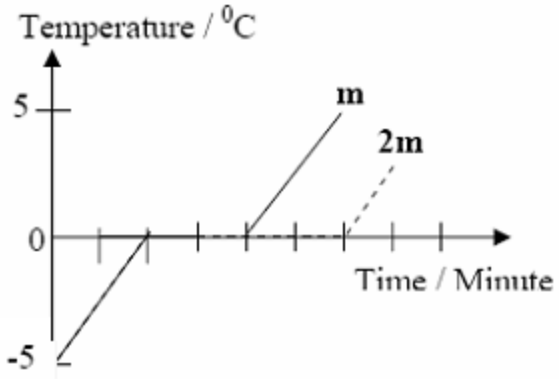
A



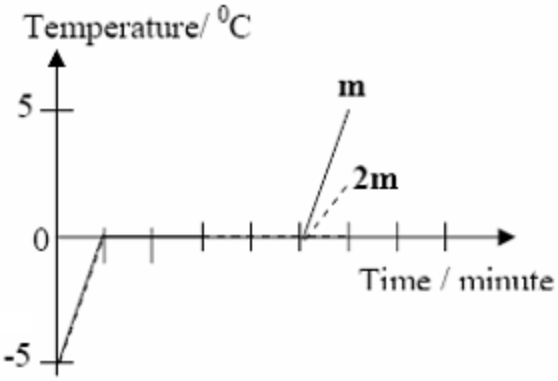
B



C



D



20. Equal volumes of tea at 800ºC are poured into two containers of different materials. Diagram 17 shows the thermometer readings after 10 minutes.
Air teh pada suhu 800ºC dan sama banyak dituangkan ke dalam dua bekas yang diperbuat daripada bahan yang berbeza. Rajah 17 menunjukkan bacaan termometer selepas 10 minit.

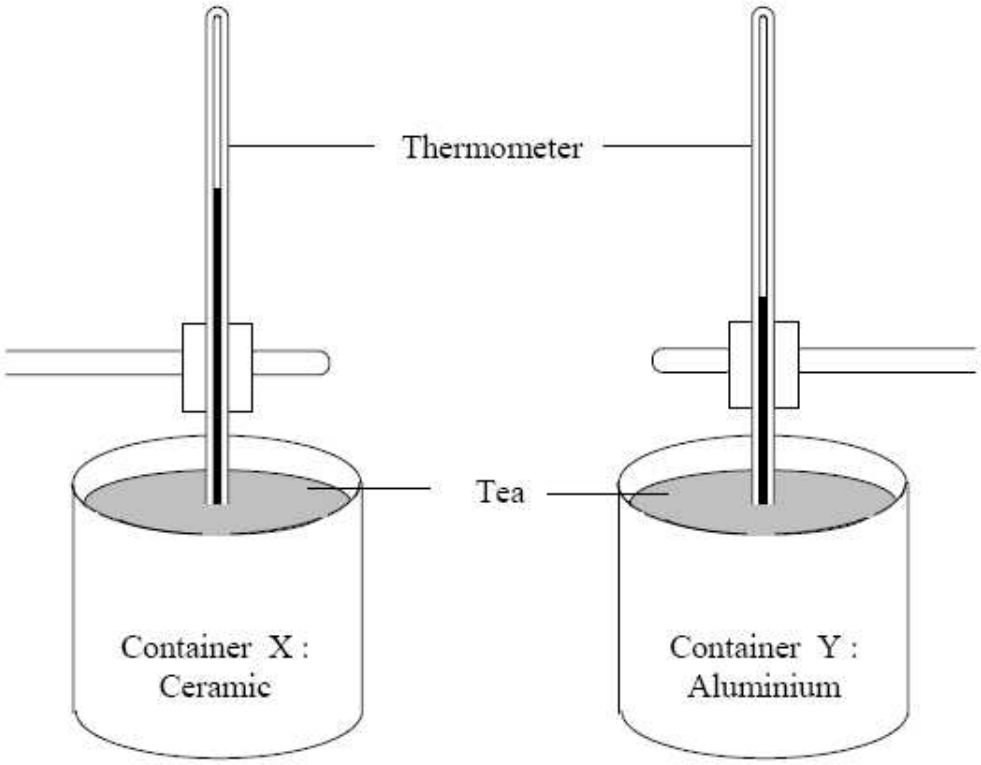


Diagram 17
Rajah 17

The thermometer readings differ because
Bacaan termometer berbeza kerana

A the heat capacity of container X > the heat capacity of container Y
muatan haba bekas X > muatan haba bekas Y

B the heat capacity of container X < the heat capacity of container Y
muatan haba bekas X < muatan haba bekas Y

C the heat capacity of container X > the heat capacity of tea
muatan haba bekas X > muatan haba air teh

D the heat capacity of container Y > the heat capacity of tea
muatan haba bekas Y > muatan haba air teh

21. Diagram 18 shows a mercury thermometer which has not been calibrated. The length of mercury column in the thermometer is 5 cm at 0 ^{0}C and 50 cm at 100 ^{0}C.
Rajah 18 menunjukkan sebuah termometer merkuri yang belum ditentukur. Panjang turus merkuri pada thermometer ialah 5 cm pada 0 ^{0}C dan 50 cm pada 100 ^{0}C.

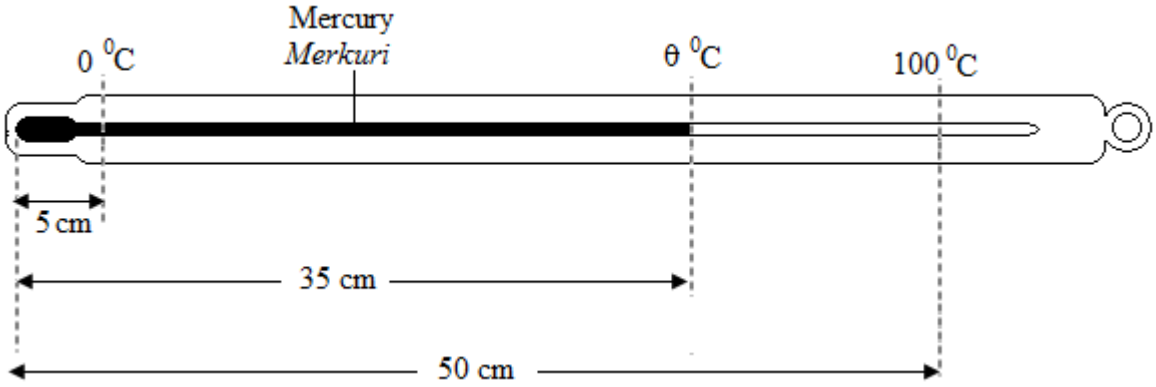


Diagram 18
Rajah18

When the thermometer is placed in hot water, the length of the mercury column is 35 cm. What is the temperature of hot water ?
Apabila termometer itu dimasukkan ke dalam air panas, panjang turus merkuri menjadi 35 cm. Berapakah suhu air panas?

A 35.0 ^{0}C
B 40.0 ^{0}C
C 66.7 ^{0}C
D 70.0 ^{0}C

22. Diagram 19 shows a candle placed in front of a plane mirror.
Rajah 19 menunjukkan sebuah lilin yang diletakkan di hadapan sebuah cermin satah.

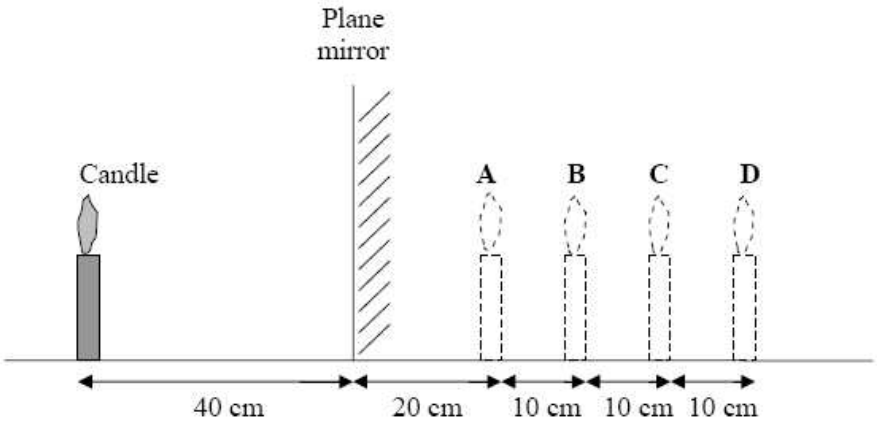


Diagram 19
Rajah 19

Referring to the above diagram, which is the correct position of the image of the candle ?
Berdasarkan rajah di atas, di manakah kedudukan yang betul bagi imej lilin tersebut?

23. Diagram 20shows a light ray KLMN passing through three different mediums.
Rajah 20 menunjukkan satu sinar cahaya KLMN merambat melalui tiga medium yang berbeza

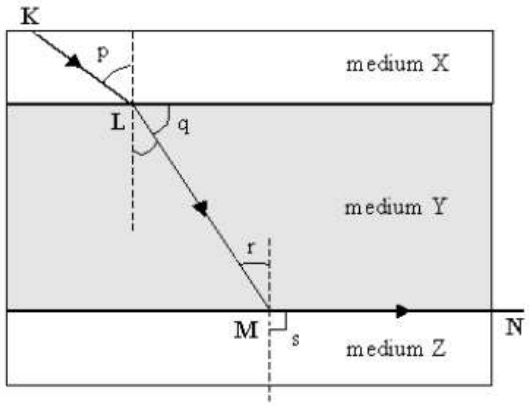


Diagram 20
Rajah 20

Which of the following is the critical angle?
Antara berikut yang manakah sudut genting?

A p

B q

C r

D s

24. Diagram 21 shows a light ray passing through medium X. The critical angle for medium X is 42º.
Rajah 21 menunjukkan sinar cahaya yang melalui medium X. Sudut genting bagi medium X ialah 42º.

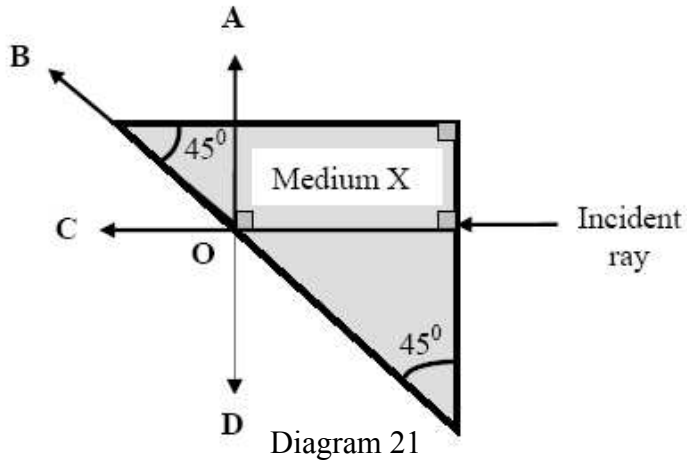
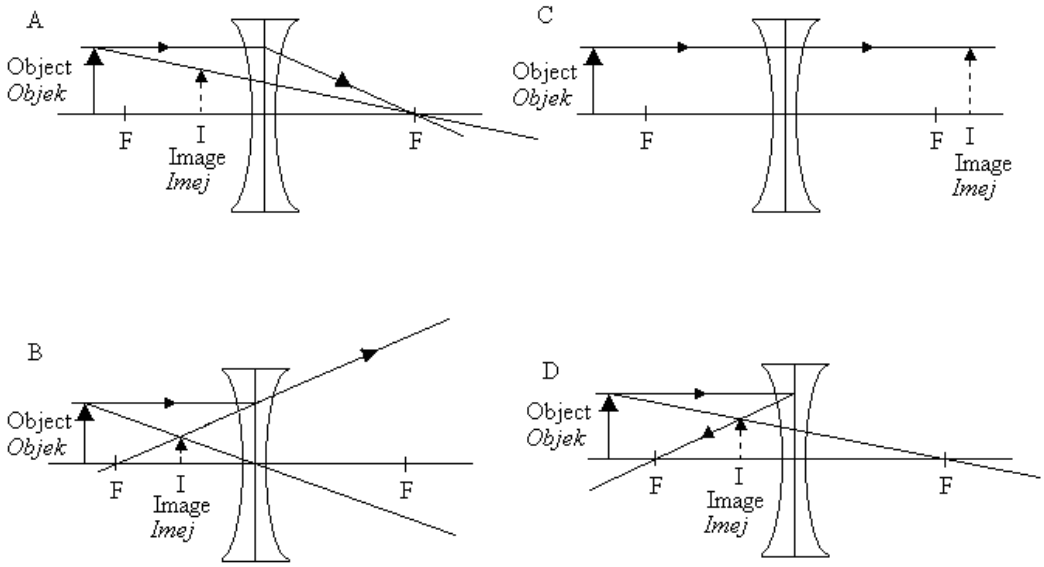


Diagram 21
Rajah 21

Referring to the above diagram, what is the light path after point O ?
Berdasarkan rajah di atas, apakah arah sinar selepas titik O?

25. Which drawing shows the correct path of light rays passing through a concave lens?
Lukisan manakah yang menunjukkan lintasan sinar cahaya yang melalui kanta cekung yang betul?



26. The power of a conves lens is 20D. What is the focal length of the lens.
Kuasa sebuah kanta cembung adalah 20D. Berapakah panjang fokus kanta tersebut?

A. 0.5 cm

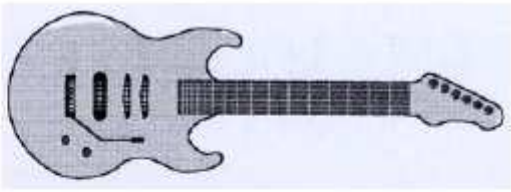
B. 5.0 cm

C. 50.0 cm

D. 500.0 cm

27. Which of the following produces longitudinal waves ?
Yang manakah antara berikut menghasilkan gelombang membujur?

A

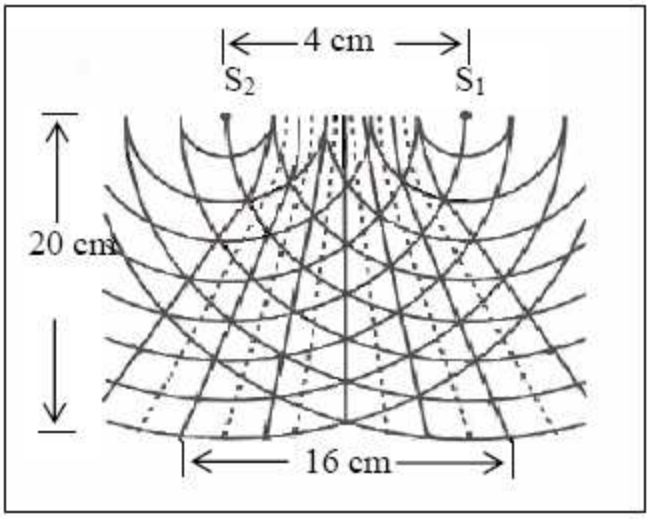


B

C

D

28. Diagram 22 shows the phenomenon of interference of water waves.
Rajah 22 di bawah menunjukkan fenomena interferens gelombang air.



Key / *Petunjuk:*

S_1: Water source 1
Punca air 1

S_2: Water source 2
Punca air 2

Diagram 22
Rajah 22

What is the wavelength of the water waves ?
Berapakah panjang gelombang air?

A 0.8 cm

B 1.2 cm

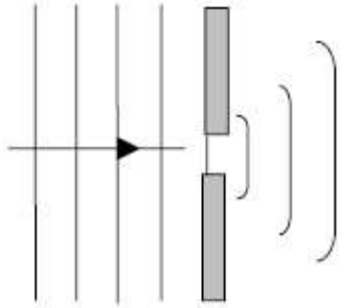
C 3.2 cm

D 5.0 cm

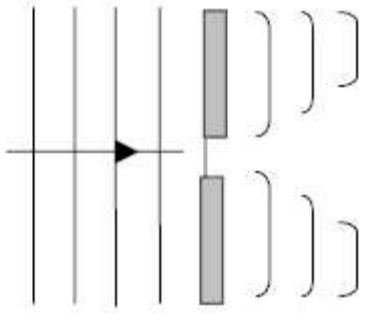
29. Which of the diagrams below shows the pattern of water waves which passes through a small gap correctly ?

Antara rajah berikut, yang manakah menunjukkan corak gelombang air yang melalui satu celahan sempit dengan betul ?

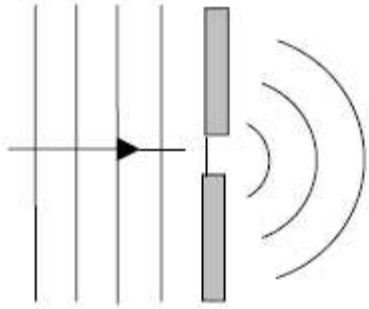
A.



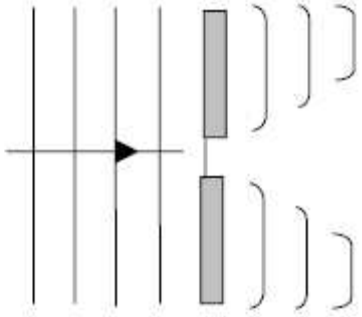
B.



C



D



30. Diagram 23 shows an interference pattern produced by a ripple tank.
Rajah 23 di bawah ialah corak interferens gelombang air yang dihasilkan dalam tangki riak.

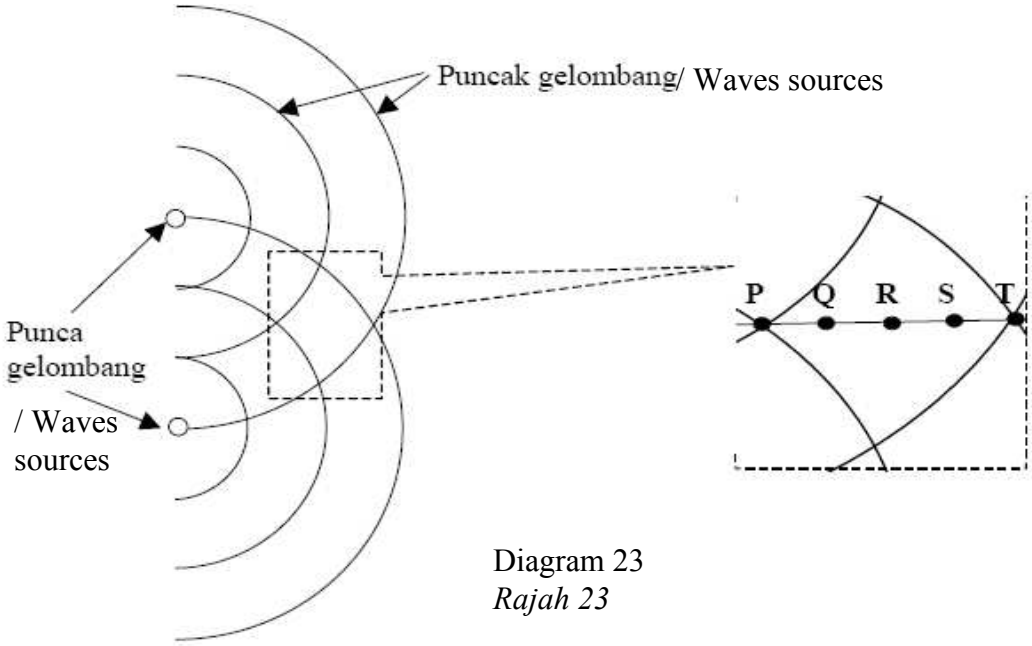
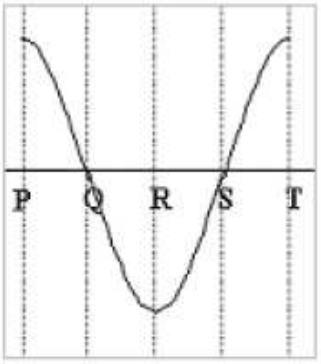


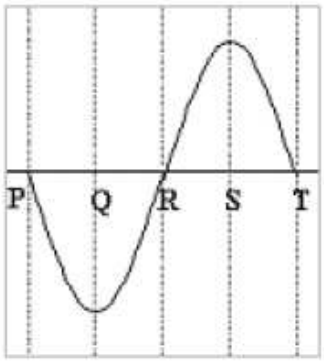
Diagram 23
Rajah 23

Which of the following shows the patterns formed at point P, Q, R, S and T at a certain period of time?
Antara berikut yang manakah menunjukkan corak gelombang pada titik-titik P, Q, R, S dan T pada suatu masa tertentu ?

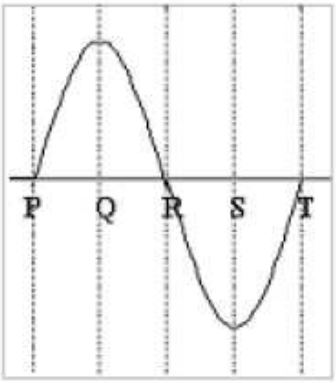
A



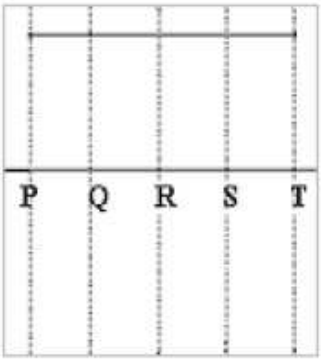
B



C

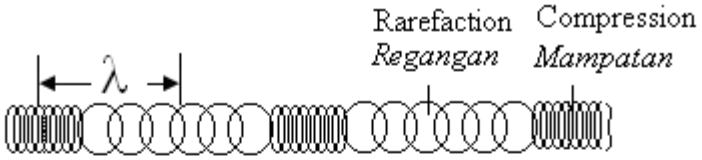


D

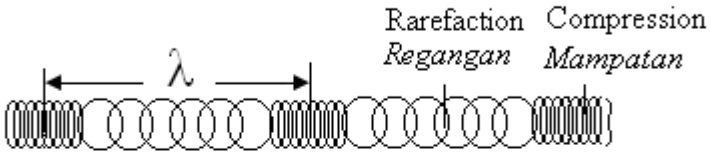


31. Which of the following diagram shows the correct label of wavelength produce by a slinky spring?
Antara rajah berikut yang manakah menunjukkan label yang betul untuk panjang gelombang bagi gelombang yang dihasilkan oleh spring slinki?

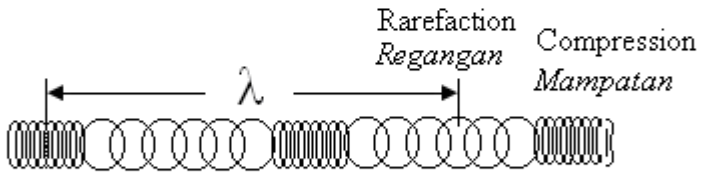
A



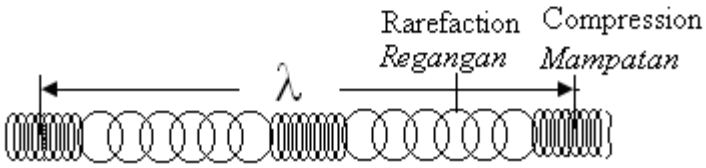
B



C



D

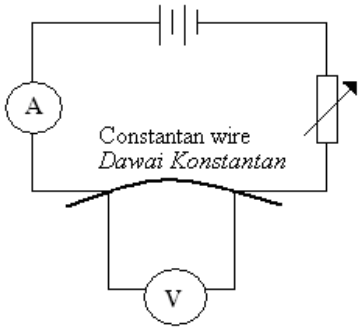


32. The speed of sound waves varies in different state of matter.
Which of the following shows the speed of sound in ascending order?
Laju gelombang bunyi berubah di dalam rupabentuk jirim yang berbeza.
Mana antara berikut menunjukkan laju gelombang bunyi dalam susunan menaik?

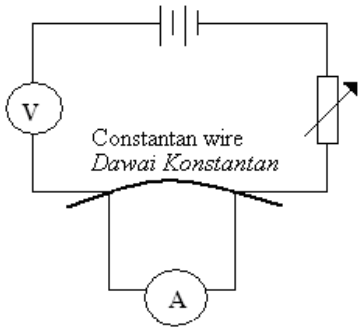
	Low speed → high speed *Laju rendah* → *laju tinggi*		
A	Air *Udara*	Liquid *cecair*	Solid *pepejal*
B	Solid *Pepejal*	Liquid *cecair*	Air *udara*
C	Liquid *cecair*	Air *udara*	Solid *pepejal*
D	Liquid *cecair*	Solid *pepejal*	Air *udara*

33. Which circuit can be used to determine the electromotive force of a dry cell?
Litar manakah boleh digunakan untuk menentukan daya gerak elektrik sebuah sel kering?

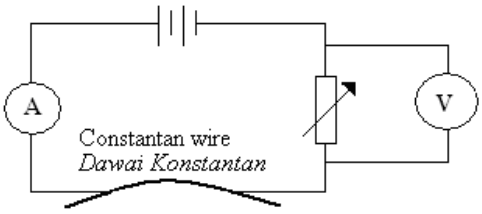
A



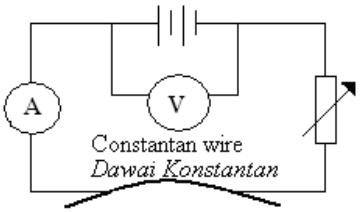
C



B



D



34. The device X in Diagram 24 below is designed to cut off the electricity supply automatically if excess current flows.
Alat X dalam litar pada Rajah 24 di bawah direka untuk mematikan bekalan elektrik sekiranya aliran arus berlebihan mengalir.

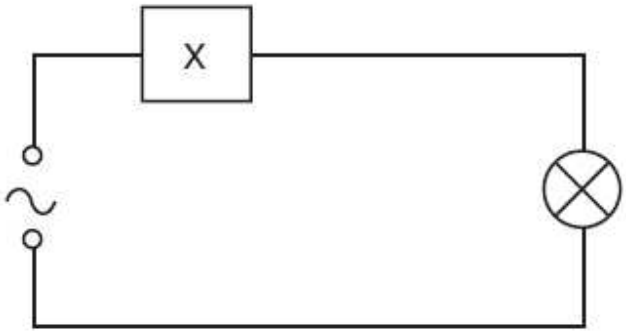


Diagram 24
Rajah 24

What is device X?
Apakah alat X?

A a fuse
fius

B a relay
geganti

C a resistor
perintang

D an ammeter
ammeter

35. A 1.0 Ω resistor and a 2.0 Ω resistor are connected in series across a 12V d.c. supply.
What is the current in the circuit?
Sebuah perintang 1.0 Ω dan perintang 2.0 Ω disambungkan secara sesiri merentasi bekalan a.t.
Apakah nilai arus dalam litar tersebut?

A 0.25 A

B 4.0 A

C 6.0 A

D 12 A

36. Diagram 25 shows 9 identical resistor is connected in circuit, P,Q and R . Which of the following is correct for Ip, Iq and Ir.
Rajah 25 menunjukkan 9 perintang yang serupa disambung dalam litar P,Q dan R.Antara berikut yang manakah betul bagi Ip, Iq dan Ir.

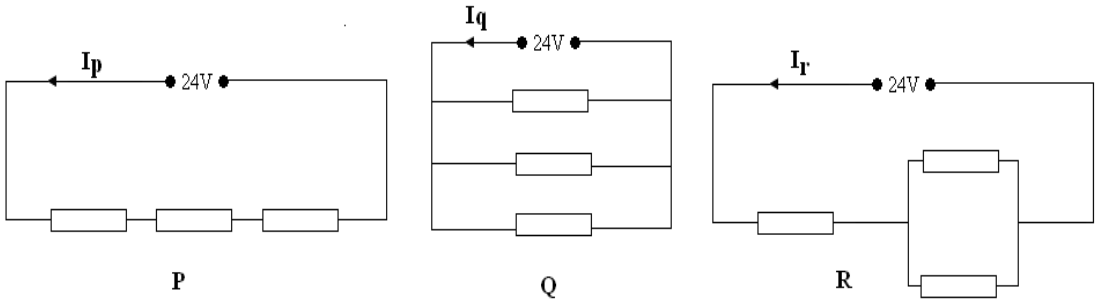


Diagram 25
Rajah 25

A Ip < Iq < Ir

B Ip < Ir < Iq

C Iq < Ip < Ir

D Iq < Ir < Ip

37. Diagram 26 shows a graph which shows how the potential difference, *V,* across the terminals of a cell changes with the current, *I,* through the cell.

Rajah 26 menunjukkan graf beza keupayaan,V, merentasi terminal sebuah sel berubah dengan arus, I, melalui sel itu.

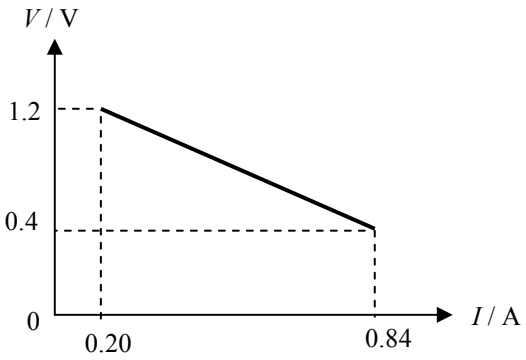


Diagram 26
Rajah 26

What is the internal resistance of the cell?
Berapakah rintangan dalam sel itu?

A 0.80 Ω

B 1.16 Ω

C 1.25 Ω

D 1.43 Ω

38. Diagram 27 shows a solenoid connected to a sensitive galvanometer centered zero..
Rajah 27 menunjukkan sebuah solenoid yang disambungkan kepada sebuah galvanometer berpusat sifar.

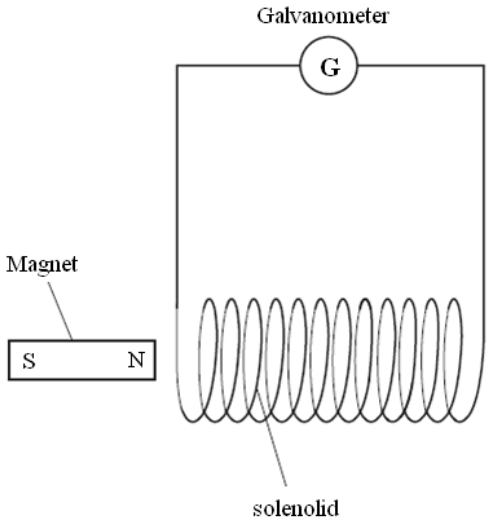


Diagram 27
Rajah 27

Which of the following would give a zero reading on the voltmeter?
Antara yang berikut, yang manakah akan memberi bacaan sifar pada voltmeter?

A moving the solenoid towards the magnet
menggerakkan solenoid ke arah magnet

B moving the magnet away from the solenoid
menggerakkan magnet menjauhi solenoid

C moving the magnet towards the solenoid
menggerakkan magnet mendekati solenoid

D moving the magnet and the solenoid in the same direction with constant velocity
menggerakkan magnet dan solenoid dalam arah yang sama dengan halaju malar

39. X and Y in Diagram 28 are the ends of a coil in which electric current flows.
X dan Y pada Rajah 28 adalah hujung sebuah gegelung yang membawa arus.

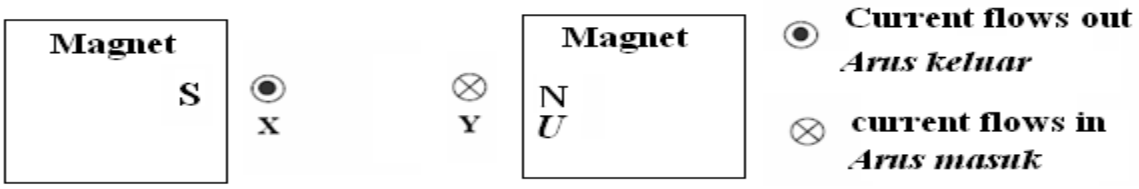


Diagram 28
Rajah 28

What is the direction of the force exerted on X and Y?
Apakah arah tindakan daya yang dikenakan ke atas X dan Y ?

	X	Y
A	upwards *ke atas*	upwards *ke atas*
B	upwards *ke atas*	downwards *ke bawah*
C	downwards *ke bawah*	upwards *ke atas*
D	downwards *ke bawah*	downwards *ke bawah*

40. Alternating current supply is use in the transmission of electricity because
Arus ulangalik digunakan dalam penghantaran tenaga elektrik kerana

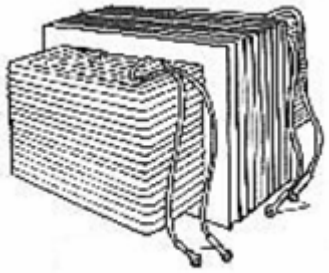
A alternating current is easier to generate
arus ulang alik lebih mudah dijana

B the voltage of the alternating current can be changed easily
voltan arus ulang alik boleh diubah dengan mudah

C the frequency of the alternating current can be changed easily
frekuensi arus ulang alik boleh diubah dengan mudah

D the power of the supply can be maintained at a constant value
kuasa bekalan boleh dikekalkan pada satu nilai yang tetap

41. Diagram 29 shows a transformer.
Rajah 29 menunjukkan sebuah transformer.



Transformer

Diagram 29
Rajah 29

Which of the following method is used to increase the efficiency of the transformer above?
Manakah antara langkah berikut digunakan untuk meningkat lagi kecekapan transformer di atas?

A Use a thinner wire
Menggunakan wayar lebih nipis
B Use solid iron core
Menggunakan teras besi pejal
C Use steel iron core
Menggunakan teras besi keluli
D Use laminated iron core
Menggunakan teras besi berlamina

42. Diagram 30 shows the internal parts of a cathode ray oscilloscope.
Rajah 30 menunjukkan bahagian dalam bagi sebuah osiloskop sinar katod.

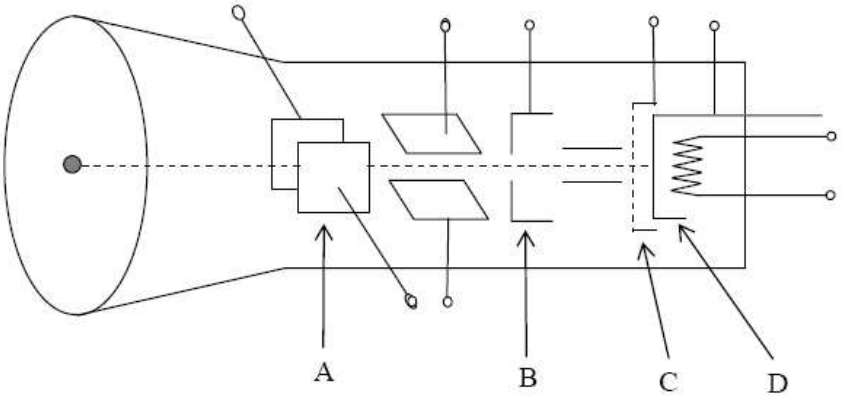


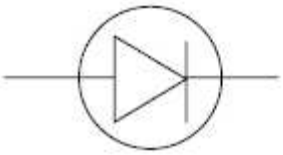
Diagram 30
Rajah 30

Which part of the oscilloscope shown in Diagram 32 emits electron ?
Bahagian manakah pada osiloskop di Rajah 32 yang mengeluarkan elektron?

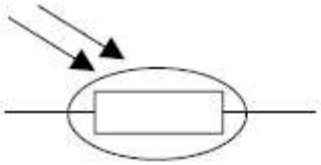
43. Which of the following is the symbol for a light sensitive component?
Yang manakah antara berikut adalah simbol bagi satu komponen peka cahaya ?

A

B



C



D

43. Diagram 31 .1 shows the combination of three logic gates. Diagram 31 .2shows the input signals P and Q.
Rajah 31.1 menunjukkan kombinasi tiga get logik. Rajah 31.2 menunjukkan isyarat input P dan input Q.

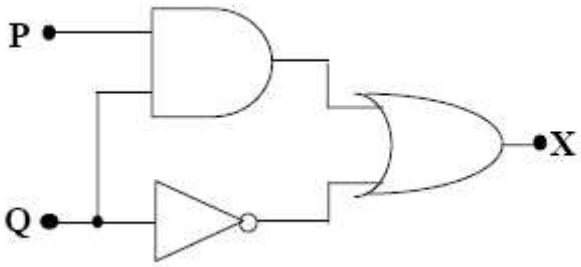


Diagram 31.1
Rajah 31 .1

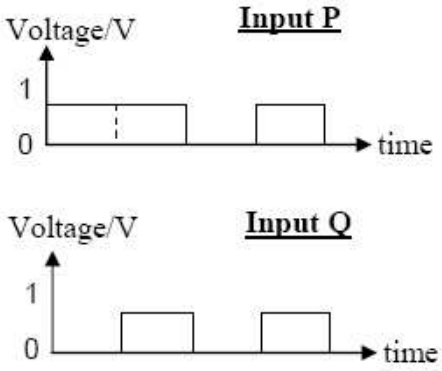
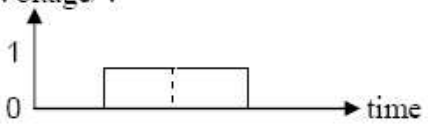
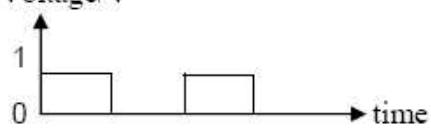
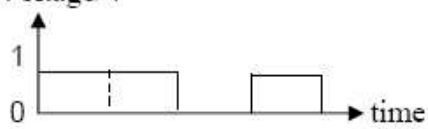


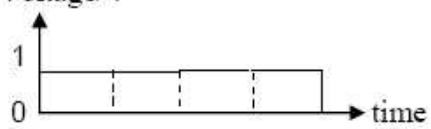
Diagram 31.2
Rajah 31.2

Which of the following shows the output signal X ?
Antara berikut, yang manakah adalah isyarat output X ?

A


B


C


D


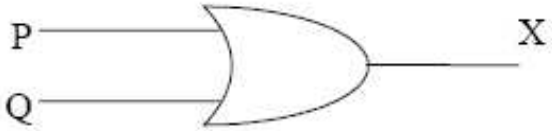
45. The truth table for a logic gate is shown below.
Jadual kebenaran untuk satu get logik adalah seperti berikut.

Input		Output
P	**Q**	**X**
0	0	0
0	1	0
1	0	0
1	1	1

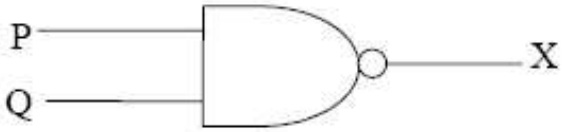
The most appropriate symbol for the logic gate is
Simbol get logik yang sesuai dengan jadual kebenaran di atas ialah

A

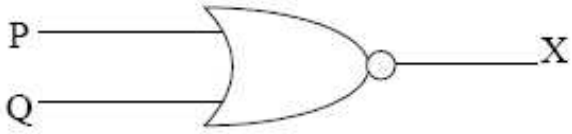
B



C



D



46. A cathode ray oscilloscope (CRO) is connected in a circuit as shown in Diagram 32.
Sebuah osiloskop sinar katod (OSK) disambungkan kepada sebuah litar seperti yang ditunjukkan dalam Rajah 32.

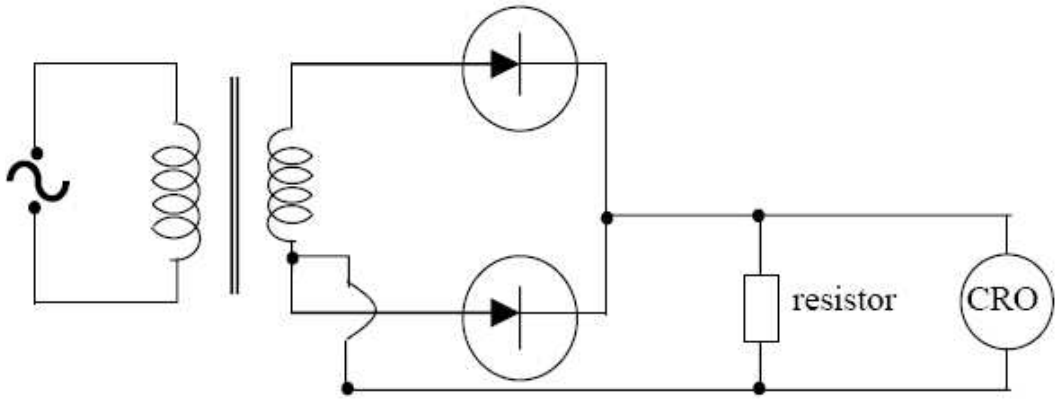
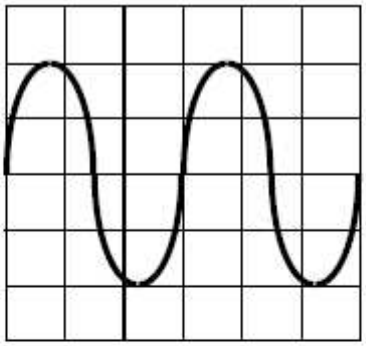


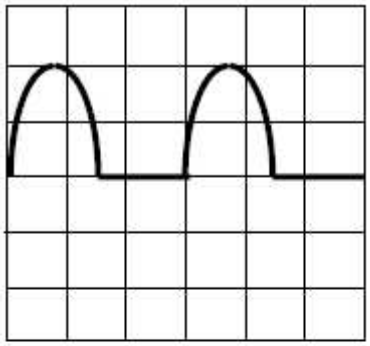
Diagram 32
Rajah 32

Which of the following trace is produced by the Cathode Ray Oscilloscope (CRO) screen in the circuit of Diagram 32?
Manakah antara surihan berikut dihasilkan oleh skrin Osiloskop Sinar Katod (OSK) pada litar di Rajah 32?

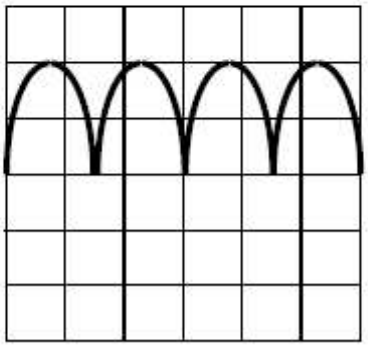
A.



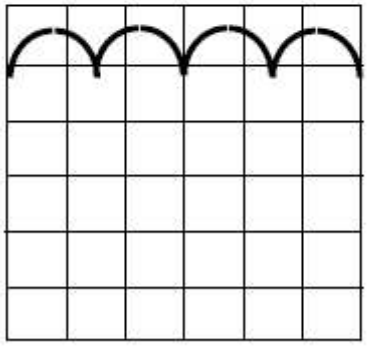
B.



C.



D.



47. Diagram 33 shows an electric circuit set up by a student. He discovered that the bulb did not light up. What needs to be changed in the circuit so that the bulb lights up?
Rajah 33 menunjukkan sebuah litar elektrik yang dipasang oleh seorang pelajar.B eliau mendapati mentol tidak menyala. Apakah yang perlu dtukar supaya mentol dapat menyala?

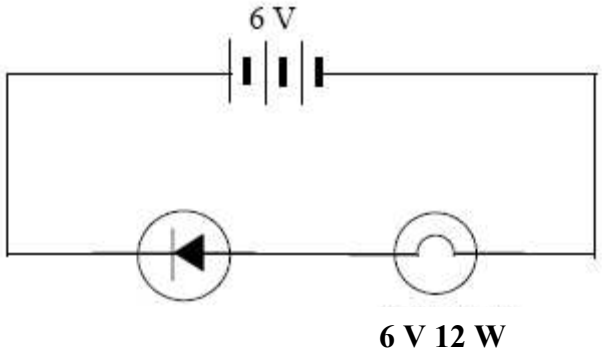


Diagram 33
Rajah 33

A Connect a fuse to the circuit.
Sambungkan fius ke dalam litar.

B Reverse the polarity of the battery.
Menyongsangkan sambungan bateri.

C Change the power supply to a 12 V battery.
Menukar sumber bekalan kuasa kepada bateri 12 V.

D Change the bulb with a new one.
Menggantikan mentol di atas dengan mentol yang baru.

48. The figure below shows the decaying series of the isotope Uranium-238
Persamaan di bawah menunjukkan satu siri reputan bagi isotop Uranium-238.

$$^{238}_{92}\mathrm{U} \longrightarrow {}^{234}_{90}\mathrm{Th} \longrightarrow {}^{234}_{91}\mathrm{Pa} \longrightarrow {}^{234}_{92}\mathrm{U} \longrightarrow {}^{230}_{90}\mathrm{Th}$$

Calculate the number of alpha and beta particles emitted.
Hitungkan bilangan zarah alfa dan zarah beta yang dipancarkan?

	Number of alpha particles *Bilangan zarah alfa*	Number of beta particles *Bilangan zarah beta*
A	1	3
B	3	1
C	2	2
D	0	4

49. Choose the statement which **does not** explain the half life of an isotope.
*Pilih pernyataan yang **tidak** benar tentang setengah hayat suatu isotop radioaktif.*

A Time is halved
Masa diseparuhkan

B Isotope's activity is halved
Keaktifan radioisotop diseparuhkan

C Isotope's mass is halved
Jisim radioisotop diseparuhkan

D The number of unstable nuclei is halved
Bilangan nukleus yang tidak stabil diseparuhkan

50. Diagram 34 shows how the thickness of paper is measured during manufacture.
If the sheet is too thick, fewer beta-particles can reach the detector

Rajah 34 menunjukkan ketebalan kertas yang diukur dalam satu industri pembuatan kertas. Sekiranya ketebalan kertas adalah terlalu tinggi, hanya sedikit sahaja zarah beta akan sampai ke alat pengesan.

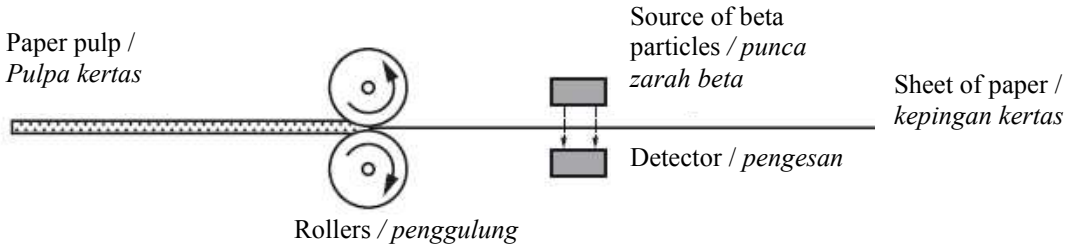


Diagram 34
Rajah 34

A source of alpha-particles is **not** used for this purpose because alpha-particles
*Zarah alfa **tidak** digunakan untuk tujuan ini kerana zarah alfa*

A are all stopped by the paper.
semuanya akan dihalang oleh kertas

B are too dangerous to those working nearby.
adalah merbahaya untuk mereka yang kerja berdekatan

C have a short half-life.
mempunyai separuh hayat yang pendek

D make the paper radioactive.
menjadikan kertas itu radioaktif

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

NAMA:..... Tingkatan :.....

4531/2
Fizik

OGOS 2010
2 ½ Jam

BAHAGIAN PENGURUSAN
SEKOLAH BERASRAMA PENUH DAN SEKOLAH KLUSTER
KEMENTERIAN PELAJARAN MALAYSIA

PEPERIKSAAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA 2010

FIZIK

Kertas 2

Dua jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Tulis* **nama** *dan* **tingkatan** *anda pada ruang yang disediakan.*
2. *Kertas soalan ini adalah dalam dwibahasa.*
3. *Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam bahasa Inggeris atau bahasa Melayu.*
4. *Jawapan kepada* **Bahagian A** *hendaklah ditulis dalam ruang yang disediakan dalam kertas soalan.*
5. *Rajah tidak dilukis mengikut skala* **kecuali** *dinyatakan.*
6. *Markah maksimum yang diperuntukkan ditunjukkan dalam kurungan pada hujung tiap-tiap soalan atau*
7. *Penggunaan kalkulator saintifik yang* **tidak** *boleh diprogramkan adalah dibenarkan.*

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

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

1. $a = \dfrac{v-u}{t}$
2. $v^2 = u^2 + 2as$
3. $s = ut + \dfrac{1}{2}at^2$
4. Momentum = mv
5. $F = ma$
6. Kinetic energy = $\frac{1}{2}mv^2$
7. Gravitational potential energy = mgh
8. Elastic potential energy = $\dfrac{1}{2}$ Fx
9. Power, $P = \dfrac{\text{energy}}{\text{time}}$
10. $\rho = \dfrac{m}{V}$
11. Pressure, $p = h\rho g$
12. Pressure, $p = \dfrac{F}{A}$
13. Heat, Q = $mc\theta$
14. Heat, Q = $m\ell$
15. $P_1V_1 = P_2V_2$
16. $\dfrac{V_1}{T_1} = \dfrac{V_2}{T_2}$
17. $\dfrac{P_1}{T_1} = \dfrac{P_2}{T_2}$
18. $\dfrac{PV}{T}$ = constant
19. $n = \dfrac{\sin i}{\sin r}$
20. $n = \dfrac{\text{real depth}}{\text{apparent depth}}$
21. $\dfrac{1}{f} = \dfrac{1}{u} + \dfrac{1}{v}$
22. Linear magnification, $m = \dfrac{v}{u}$
23. $P = 1/f$
24. $v = f\lambda$
25. $\lambda = \dfrac{ax}{D}$
26. $Q = It$
27. $E = VQ$
28. $V = IR$
29. $E = V + Ir$
30. Power, $P = VI$
31. $\dfrac{N_S}{N_P} = \dfrac{V_S}{V_P}$
32. Efficiency = $\dfrac{I_S V_S}{I_P V_P}$ x 100%
33. $eV = \frac{1}{2}mv^2$
34. $E = mc^2$
35. $g = 10\ \text{ms}^{-2}$

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 Barton's pendulum which consists of five simple pendulums

hanging on a horizontal string. When A is pulled and released, it will cause the other four pendulums to oscillate.
Rajah 1 menunjukkan bandul Barton yang mengandungi lima bandul ringkas digantung pada tali yang mengufuk. Bila A di tarik dan dilepaskan ia menyebabkan empat bandul yang lain turut berayun.

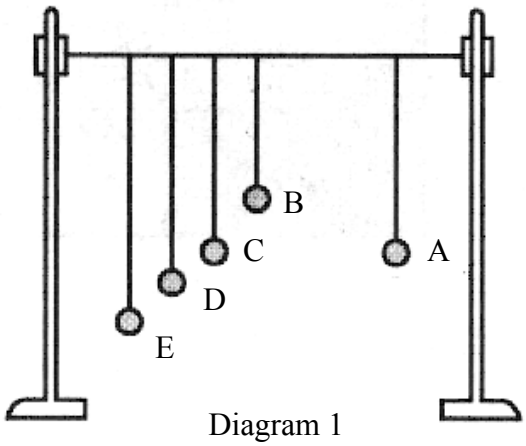


Diagram 1
Rajah 1

It is observed that the four pendulums B, C, D and E will oscillate with different amplitudes but with the same frequency.
Didapati empat bandul B, C, D dan E akan berayun dengan amplitud yang berbeza tetapi mempunyai frekuensi yang sama.

(a) What is the meaning of amplitude?
Apakah yang dimaksudkan dengan amplitud?

.....
[*1 mark*]

(b) (i) Which pendulum oscillates with the maximum amplitude?

Bandul yang manakah berayun dengan amplitud maksimum?

……...
[*1 mark*]

(ii) State **one** reason for your answer in 1(b)(i).
Nyatakan satu sebab bagi jawapan anda di 1(b)(i)

……

[*1 mark*]

(c) Name the phenomenon stated in (b)

Namakan fenomena yang dinyatakan di (b)

……

[*1 mark*]

2 Diagram 2 shows a cross-section of a bunsen burner.
Rajah 2 menunjukkan keratan rentas sebuah penunu bunsen.

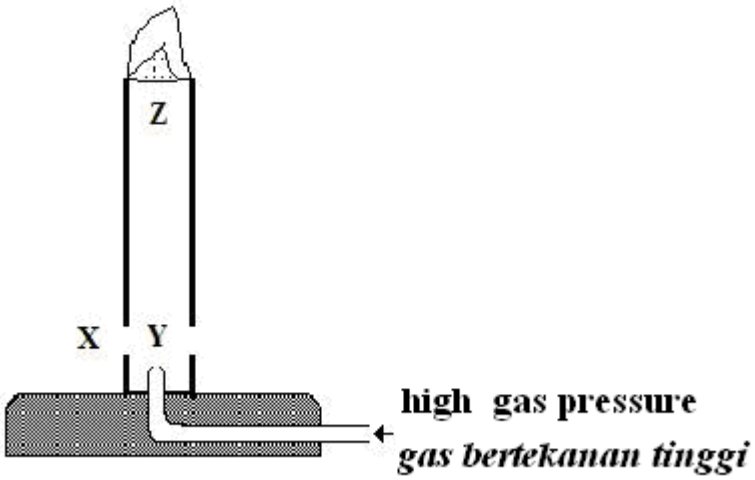


Diagram 2
Rajah 2

(a) (i) Name the Physic's principle involved in the working principle of bunsen burner.
Namakan prinsip fizik yang terlibat dalam prinsip kerja penunu bunsen.

……

[*1 mark*]

(ii) Which region X, Y or Z, experiences low pressure?
Kawasan manakah X, Y atau Z yang mengalami tekanan rendah?

……

[*1 mark*]

(b) State one reason for your answer in 2(a) (ii).
Nyatakan satu sebab untuk jawapan anda dalam 2(a)(ii).

……

[*1 mark*]

(c) Explain how a bunsen burner can produced blue flame.
Terangkan bagaimana penunu bunsen boleh menghasilkan nyalaan api yang berwarna biru.

……

……

[*2 marks*]

3 Diagram 3 shows one of the tyres of En Hassan's car before travelling from Kuala Lumpur to Kuala Terengganu.
Rajah 3 menunjukkan salah satu tayar kereta En Hassan sebelum perjalanan dari Kuala Lumpur ke Kuala Terengganu.

Diagram 3.1
Rajah 3.1

(a) After a long journey;
Selepas satu perjalanan yang jauh;

(i) State what happens to the pressure of the air in the tyre?
Nyatakan apakah yang berlaku kepada tekanan udara di dalam tayar?

……

[1 *mark*]

(ii) Give 2 reasons to your answer in (a)(i).
Berikan 2 sebab kepada jawapan anda di (a)(i).

…… ……

……

[2 *marks*]

(b) Name the Gas Law involved in (a).
Namakan Hukum Gas yang terlibat dalam (a).

…….....
.

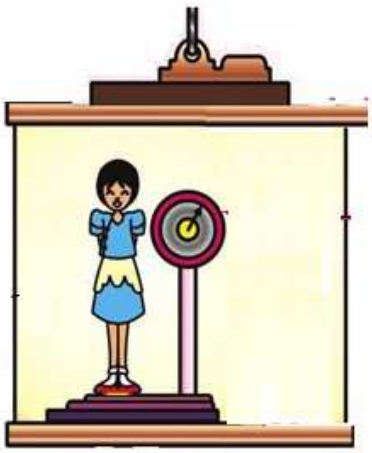
[1 *mark*]

(c) Before the journey, En Hassan checked the air pressure of his car tyre. The air pressure of the tyre is 200 kPa at a temperature of 30°C. After the journey, the temperature of the tyre becomes 60^{o}C . Calculate the air pressure of the tyre at this temperature.

Sebelum memulakan perjalanan, En. Hassan telah memeriksa tekanan udara tayar keretanya. Tekanan udara tayarnya adalah 200 kPa pada suhu 30℃. Selepas perjalanan tersebut, suhu udara menjadi 60^{o}C.Hitungkan tekanan udara dalam tayar tersebut pada suhu ini.

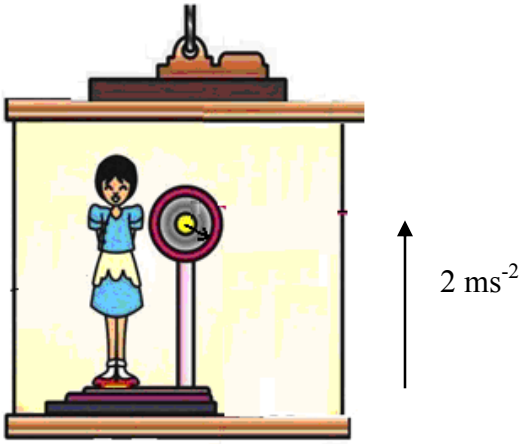
[2 marks]

4 Diagram 4.1 shows a girl standing on a weighing scale in a stationary lift. Diagram 4.2 shows the same girl in a lift which is accelerating upwards at 2 ms^{-2}.
Rajah 4.1 menunjukkan seorang budak perempuan berdiri di atas penimbang berat di dalam lif yang pegun . Rajah 4.2 menunjukkan budak yang sama berada di dalam lif yang bergerak ke atas dengan pecutan 2 ms^{-2}.



At rest
Pegun

Diagram 4.1
Rajah 4.1



Moving up
Bergerak naik

Diagram 4.2
Rajah 4.2

(a) Which of the two weighing scales shows the bigger reading?
Manakah di antara dua penimbang menunjukkan bacaan yang lebih besar?

……..

[*1 mark*]

(b) Name and label the two forces acting on the girl in Diagram 4.1
Namakan dan labelkan dua daya yang bertindak keatas budak itu dalam Rajah 4.1.

[*2 marks*]

(c) If the mass of the girl is 50 kg, what is the reading of the weighing scale in Diagram 4.1?
Jika jisim budak itu ialah 50 kg, berapakah bacaan penimbang berat dalam Rajah 4.1?

.

[*1 mark*]

(d) Calculate the reading of the weighing scale in Diagram 4.2.
Hitungkan bacaan penimbang dalam Rajah 4.2.

[*2 marks*]

(e) If the cable of the lift in Diagram 4(b) snaps, what will be the reading of the weighing scale?

Jika kabel lif dalam Rajah 4(b) putus, berapakah bacaan yang akan ditunjukkan pada penimbang tersebut?

……

[1 *mark*]

5 Diagram 5.1 shows light rays passing through the eyelens when a person is having a myopia.
Diagram 5.2 shows the light rays passing through the eyelens when a person is having a
hyper- metropia.
Rajah 5.1 menunjukkan gambarajah sinar cahaya yang melalui kanta mata apabila seseorang mengalami myopia.
Rajah 5.2 menunjukkan gambarajah sinar cahaya yang melalui kanta mata apabila seseorang mengalami hyper-metropia.

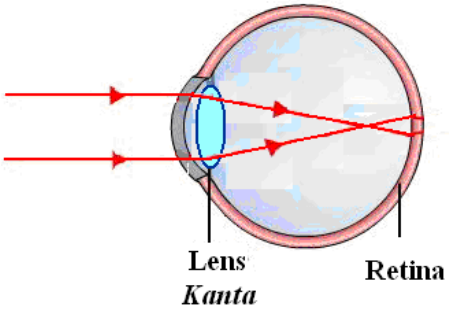


Diagram 5.1
Rajah 5.1

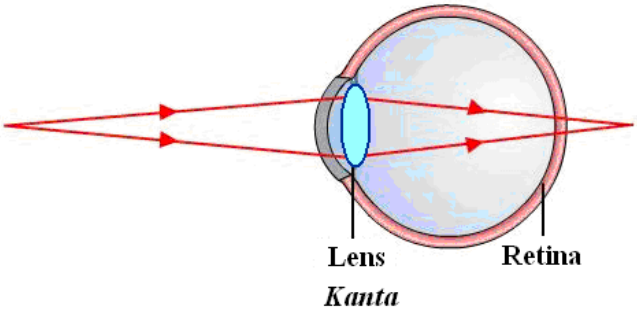


Diagram 5.2
Rajah 5.2

(a) Name the light phenomenon involved in both diagrams.
Namakan fenomena cahaya yang terlibat bagi kedua-dua rajah.

……

[*1 mark*]

(b) Based on Diagram 5.1 and Diagram 5.2, compare;
Berdasarkan Rajah 5.1 dan Rajah 5.2, bandingkan;
(i) their object distance
jarak objek

……..

[*1 mark*]

(ii) their image distance
jarak imej

……..

[*1 mark*]

(c) In order for a person to see clearly, state where should the image formed in the eye?
Bagi membolehkan seseorang melihat dengan jelas, nyatakan di manakah imej terbentuk di dalam mata?

……

[*1 mark*]

(d) Based on Diagram 5.1 and Diagram 5.2, state the type of lens that can be used to correct the situation in;
Berdasarkan Rajah 5.1 dan Rajah 5.2, nyatakan jenis kanta yang boleh digunakan untuk membetulkan keadaan dalam;

(i) Diagram 5.1:
Rajah 5.1:

.....

[*1 mark*]

(ii) Diagram 5.2 :
Rajah 5.2 :

……

[*1 mark*]

(e) By using your answer in (d)(i), draw the lens in the box provided and complete the ray diagram in Diagram 5.3 to show how myopia can be corrected.
Dengan menggunakan jawapan anda dalam d(i), lukiskan kanta dalam kotak yang disediakan dan lengkapkan gambarajah sinar dalam Rajah 5.3 untuk menunjukkan bagaimana masalah myopia bole[illegible]

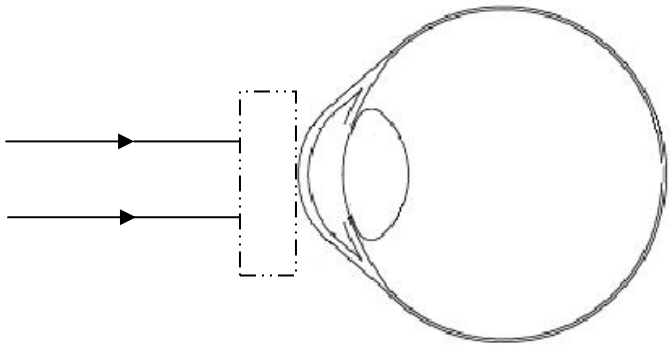


Diagram 5.3
Rajah 5.3

6 Diagram 6.1 and Diagram 6.2 show circuits used to investigate the relationship between resistance and cross sectional area of a wire. Constantan wire of s.w.g. 36 and s.w.g 24 with same length are used.

Rajah 6.1 dan Rajah 6.2 menunjukkan litar yang digunakan untuk menyiasat hubungan antara rintangan dan luas keratan rentas dawai. Dawai konstantan s.w.g. 36 dan s.w.g 24 dengan panjang yang sama digunakan.

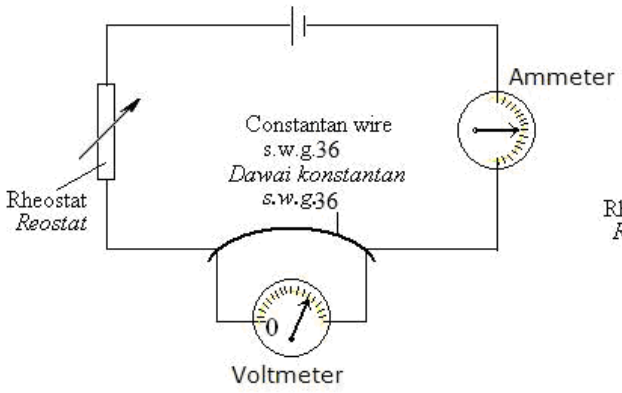


Diagram 6.1
Rajah 6.1

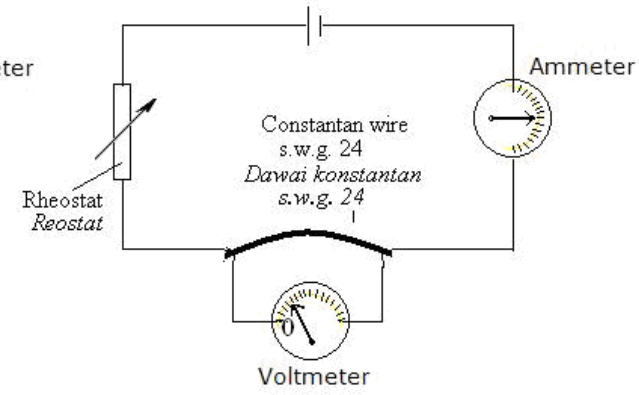


Diagram 6.2
Rajah 6.2

(a) What is the meaning of resistance?
Apakah maksud rintangan ?

……

[*1 mark*]

(b) Using Diagram 6.1 and Diagram 6.2;
Dengan menggunakan Rajah 6.1 dan Rajah 6.2;

(i) Compare the cross sectional area of the constantan wires .
Bandingkan luas keratan rentas dawai konstantan.

…….....

[*1 mark*]

(ii) Compare the potential difference across the constantan wires.
Bandingkan beza keupayaan melalui dawai konstantan.

…….....

[*1 mark*]

(iii) Compare the magnitude of the current that flow along the constantan wires.
Bandingkan magnitud arus yang mengalir melalui dawai-dawai konstantan tersebut.

…….....

[*1 mark*]

(c) Using your answers in 6(b);
Dengan menggunakan jawapan anda dalam 6(b);

(i) Compare the resistance of the constantan wires.
Bandingkan rintangan dawai konstantan.

.....

[*1 mark*]

(ii) Relate the cross sectional area of constantan wire to the resistance of the wire.
Hubungkait luas keratan rentas dawai konstantan dengan rintangan dawai.

…….....

[*1 mark*]

(d) What will happen to the reading of voltmeter when another constantan wire s.w.g 36 of the same length is connected parallel to the wire in circuit Diagram 6.1? Explain your answer.
Apakah yang berlaku kepada bacaan voltmeter apabila dawai konstantan s.w.g 36 yang sama panjang dipasang selari dengan dawai dalam litar Rajah 6.1? Jelaskan jawapan anda.

…….....

…….....

[*2 marks*]

7. Diagram 7 shows a fixed coil is placed in between an iron rod and a bar magnet.
Rajah 7 menunjukkan satu gegelung yang tetap diletakkan di antara sebatang rod besi dan sebuah magnet bar.

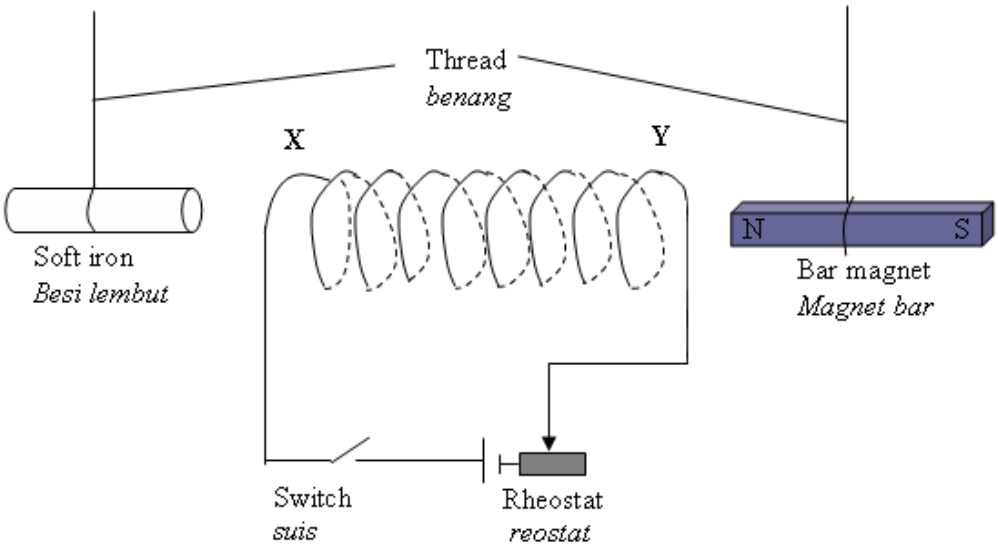


Diagram 7
Rajah

When the switch is closed, both of the iron rod and the bar magnet are attracted towards the coil.
Apabila suis dihidupkan, kedua-dua rod besi dan magnet bar tertarik kepada gegelung.

(a) State the polarity at X.
Nyatakan kutub di X.

.....

[1 *mark*]

(b) Suggest two modifications that can be done in Diagram 7 in order to increase the force of attraction between the coil and the iron rod.
Cadangkan dua pengubahsuaian yang boleh dilakukan dalam Rajah 7 bagi menambahkan daya tarikan antara gegelung dan rod besi.

.....

.....

.

[2 *marks*]

(c) (i) What will happen to the iron rod and the bar magnet when the connections to the terminals
of the battery are reversed?
Apakah akan berlaku kepada rod besi dan magnet bar jika sambungan kepada terminal bateri diterbalikkan.

.....

.....

[2 *marks*]

(ii) Explain your answer in 7(c)(i).
Terangkan jawapan anda di 7(c)(i).

.....

.....

[2 *marks*]

(d) The battery is then replaced by a low alternating current power supply. The switch is then closed.
Bateri kemudian ditukar dengan bekalan arus ulang-alik yang berkuasa rendah. Suis dihidupkan.

(i) Describe the motion of the iron rod.
Jelaskan pergerakan rod besi.

…….....

[1 *mark*]

(ii) Describe the motion of the bar magnet.
Jelaskan pergerakan magnet bar.

…….....

[1 *mark*]

(e) Using your answers in 7(c) and 7(d),state one application of iron rod with the coil in everyday life.
Dengan menggunakan jawapan anda dalam 7(c) dan 7(d), nyatakan satu aplikasi rod besi bersama gegelung dalam kehidupan harian.

……

[1 *mark*]

8. Diagram 8.1 shows a graph of the number of radioactive nuclei, N versus time for a radioisotope P .
Rajah 8.1 menunjukkan graf bilangan nukleus radioaktif, N lawan masa bagi satu radioisotop P.

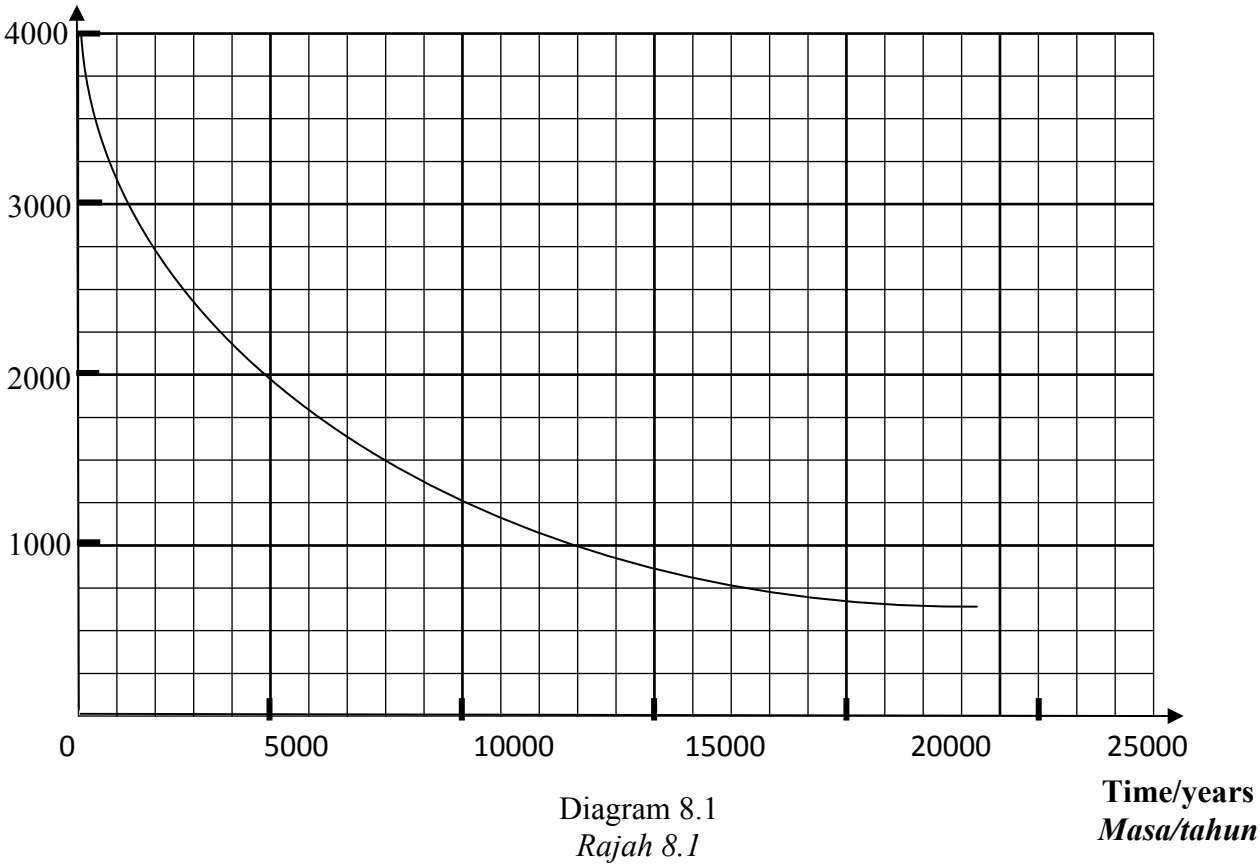


Diagram 8.1
Rajah 8.1

(a) What is the meaning of half- life?
Apakah yang dimaksudkan dengan separuh hayat?

……

……

[*1 mark*]

(b) Determine the half- life of radioisotope P from the graph in Diagram 8.1.
Tentukan separuh hayat bagi radioisotop P dari graf pada Rajah 8.1.

……

[*2 marks*]

(c) The equation below shows the decay of Actinium (Ac) to Thorium(Th) by emitting a beta-particle.
Persamaan di bawah menunjukkan pereputan bagi Actinium(Ac) menjadi Thorium (Th) dengan memancar zarah beta.

$$^{227}_{89}Ac \longrightarrow {}^{a}_{b}Th + \beta$$

(i) Find the value of *a* and *b*
Cari nilai bagi a dan b

a: :……

b:……..

[*2 marks*]

(ii) Determine the number of protons and neutrons of Actinium-227
Tentukan bilangan proton dan neutron bagi Actinium-277

Proton:……..

Neutron:……

[*2 marks*]

(d) A company which manufactures breakfast cereals wishes to check the level of cereal in the packed boxes. A radioactive source and a detector are used to detect the level of cereal in the boxes as shown in Diagram 8.2.

Sebuah syarikat bijirin sarapan pagi ingin memeriksa aras bijirin di dalam kotak bungkusan. Satu sumber radioaktif dan sebuah pengesan digunakan untuk mengesan aras bijirin di dalam kotak bungkusan seperti ditunjukkan dalam Rajah 8.2

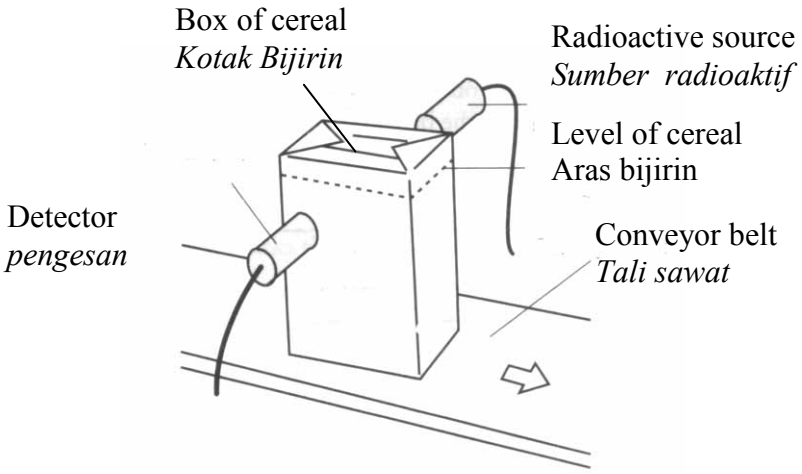


Diagram 8.2
Rajah 8.2

Table 8 shows the properties of four radioactive sources.
Jadual 8 menunjukkan sifat-sifat 4 sumber radioaktif.

Source *Sumber*	Type of radiation *Jenis Sinaran*	Half-life *Separuh hayat*
A	Alpha *Alfa*	50 years *50 tahun*
B	Gamma gama	40 days *40 hari*
C	Beta *beta*	300 years *300 tahun*
D	Gamma *gama*	50 minutes *50 minit*

Table 8
Jadual 8

Based on Table 8, state the suitable properties of the radioactive sources to detect the level of cereal in the packed boxes. Give reason for the suitability of the properties.

Berdasarkan Jadual 8, nyatakan sifat-sifat sumber radioaktif yang sesuai untuk mengesan paras bijirin dalam kotak bungkusan. Beri sebab mengapa sifat-sifat itu sesuai.

(i) Type of radiation
Jenis Sinaran

.....

Reason
Sebab

.....

[2 *marks*]

(ii) Half-life
Separuh hayat

.....

Reason
Sebab

.....

[2 *marks*]

(e) Based on the answers in 8 (d), determine the most suitable radioactive source in Table 8 to detect the level of cereal in the packed boxes.
Berdasarkan jawapan di 8(d), tentukan sumber radioaktif dalam Jadual 8 yang paling sesuai yang boleh digunakan untuk mengesan paras cereal di dalam kotak bungkusan.

.....

[*1 mark*]

Section B
Bahagian B

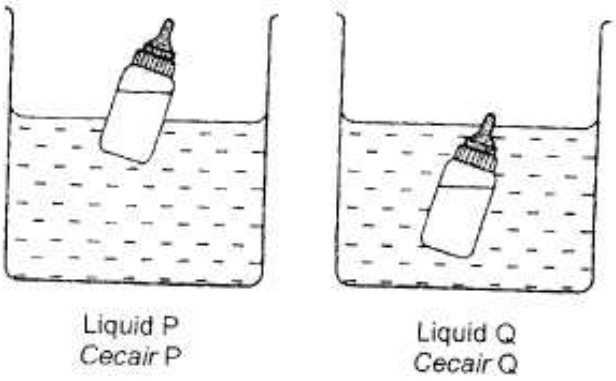
[20 *marks*]
[20 *markah*]

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

9. (a) Diagram 9.1 shows two identical feeding bottles floating in liquid P and liquid Q respectively.The feeding bottle floats because the net force acting on the bottle is zero.

Rajah 9.1 menunjukkan dua botol susu yang serupa terapung dalam cecair P dan cecair Q masing-masing. Botol susu itu terapung kerana daya bersih yang bertindak ke atas botol itu adalah sifar.

(i) What is the mea
Apakah maksud



1 *mark*]

Diagram 9.1
Rajah 9.1

(ii) Using Diagram 9.1 compare the position of the bottles in liquid P and liquid Q. Compare also the weights and the buoyant forces that are acting on the bottles in liquid P and liquid Q. Compare the density of liquid P and liquid Q.
Relate the position of the bottle and the density of liquid to deduce a relevant physics concept.
Menggunakan Rajah 9.1, bandingkan kedudukan botol susu dalam cecair P dan cecair Q. Bandingkan juga berat botol dan daya julangan yang bertindak ke atas botol dalam cecair P dan cecair Q. Bandingkan ketumpatan cecair P dan cecair Q.

Hubungkaitkan kedudukan botol dengan ketumpatan cecair bagi menghasilkan satu konsep fizik yang sesuai.

[5 *marks*]

(b) Diagram 9.2 shows a simple hydraulic jack.
Rajah 9.2 menunjukkan satu jek hidraulik yang ringkas.

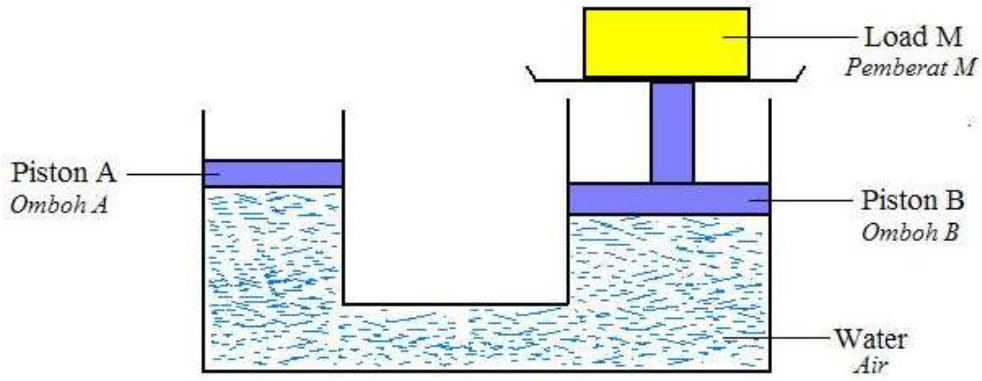


Diagram 9.2
Rajah 9.2

Explain how load M can be lifted and give a reason why the cross sectional area of piston A is smaller than the cross sectional area of piston B.

Terangkan bagaimana pemberat M boleh diangkat dan berikan satu sebab mengapa luas keratan rentas omboh A lebih kecil dari luas keratan rentas omboh B.

[4 *marks*]

(c) The simple hydraulic jack in Diagram 9.2 is not suitable to use to lift a car in a workshop.
Using suitable physics concepts, explain the required modification that need to be done to enable the machine to lift a car easily in a workshop.
You can emphasise on the following aspects in your modification;
Jek hidraulik ringkas dalam Rajah 9.2 tidak sesuai untuk digunakan bagi mengangkat sebuah kereta di dalam bengkel membaiki kereta. Menggunakan konsep fizik yang sesuai terangkan pengubahsuaian yang diperlukan bagi membolehkan mesin ini mengangkat kereta dengan lebih mudah. Pengubahsuaian adalah merangkumi aspek-aspek berikut:

(i) method so that only small force is applied at piston A
kaedah supaya daya yang kecil sahaja dikenakan pada omboh A

(ii) component to control flow of liquid in the hydraulic jack
komponen untuk mengawal pengaliran cecair di dalam jek hidraulik

(iii) component in the hydraulic jack to lowered the car
komponen di dalam jek hidraulik untuk menurunkan kereta

(iv) Size of pistons
Saiz piston

(v) Type of liquid used
Jenis cecair yang digunakan

[*10 marks*

10. A semiconductor diode is an electronic device made by joining pieces of p-type and n-type semiconductors. n-type and p- type semiconductors are produced through the doping process.

Diod semikonduktor adalah peranti elektronik yang diperbuat dengan menggabungkan semikonduktor jenis-p dan jenis-n. Semikonduktor jenis-p dan jenis-n dihasilkan melalui proses pendopan.

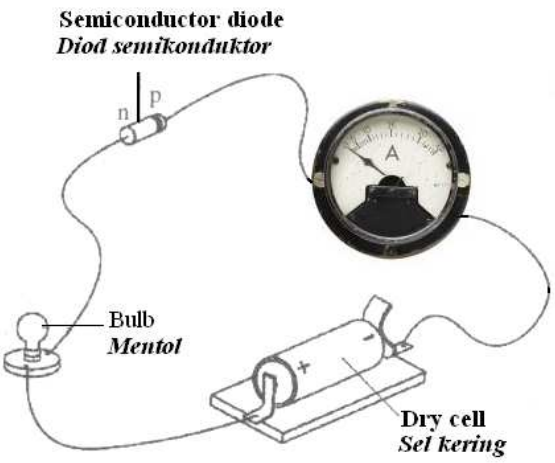


Diagram 10.1
Rajah 10.1

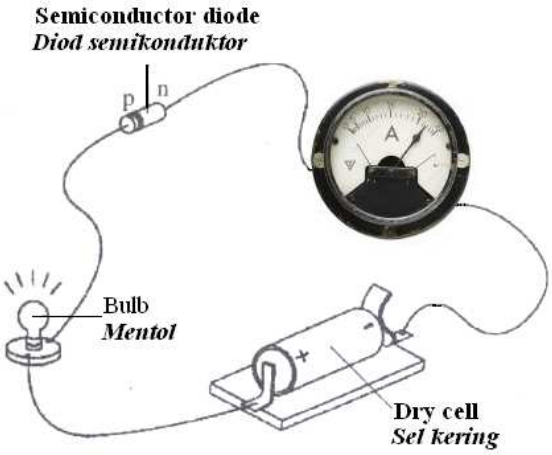


Diagram 10.2
Rajah 10.1

(a) What is the meaning of doping?
Apakah maksud pendopan.? [*1 mark*]

(b) Using Diagram 10.1 and Diagram 10.2 , compare the connection of diode to the dry cell, the lighting of bulbs and the reading of ammeter. Relate the lighting of bulbs with the connection of diode to the dry cell to make a deduction regarding the relation between the current flowing in the circuits and the connection of diode to the dry cell..

Menggunakan Rajah 10.1 dan Rajah 10.2, bandingkan sambungan diod kepada sel kering, nyalaan mentol dan bacaan ammeter. Hubungkaitkan nyalaan mentol dengan sambungan diod kepada sel kering untuk membuat satu kesimpulan tentang hubungan antara arus yang mengalir di dalam litar -litar itu dengan sambungan diod kepada sel kering.

[*5 marks*]

(c) Box Y contains four identical electronics component for full wave rectification.

Kotak Y mengandungi empat komponen elektonik yang serupa untuk menghasilkan rektifikasi gelombang penuh.

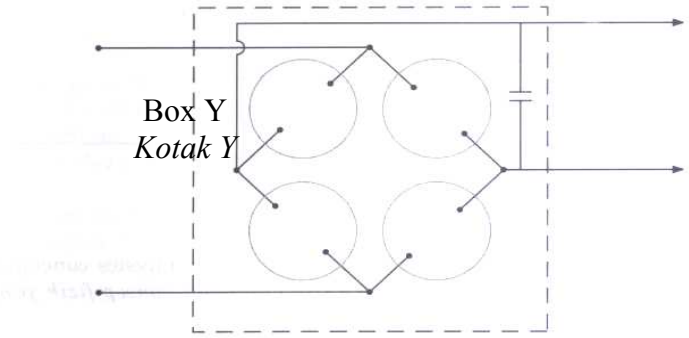


Diagram 10.3
Rajah 10.3

(i) On Diagram 10.3 draw the electronic components in the circles provided.
Pada Rajah 10.3, lukiskan komponen elektronik tersebut dalam bulatan yang disediakan.

(ii) A capacitor is placed across the output to smooth the current. In Diagram 10.3, draw the wave form produced . Explain how a capacitor is used to smooth the current.
Sebuah kapasitor diletakkan merentasi output untuk meratakan arus dalam litar itu.Pada Rajah 10.3, lukis bentuk gelombang yang dihasilkan. Jelaskan bagaimana kapasitor digunakan untuk melicinkan arus.

[*4 marks*]

(d) Diagram 10.4 shows a circuit with a transistor that acts as an automatic switch. LED will light up when it is dark.
Rajah 10.4 menunjukkan sebuah litar bertransistor yang bertindak sebagai suis automatik. LED akan menyala apabila gelap.

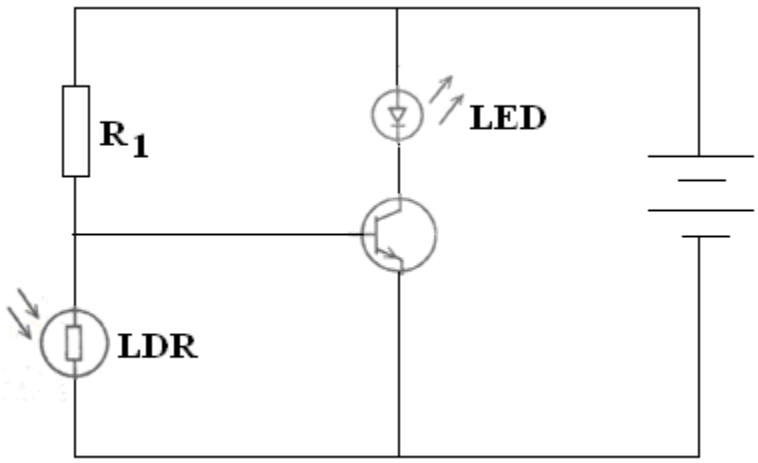


Diagram 10.4
Rajah 10.4

A technician wants three fans labelled 240 V, 100 W in a room to be automatically switched on when the room is hot.
Suggest modifications that can be made to the circuit in Diagram 10.4 so that the three fans can be automatically switched on when the room is hot based on the following aspect:
Seorang juruteknik ingin tiga buah kipas bertanda 240 V , 100W dalam sebuah bilik dihidupkan secara otomatik apabila bilik itu panas.
Cadangkan pengubahsuaian ynag boleh dilakukan pada litar dalam Rajah 10.4 supaya tiga buah kipas dapat dihidupkan secara otomatik apabila bilik itu panas berdasarkan aspek-aspek berikut:

State and explain the modifications based on the following aspects:
Nyatakan dan beri penerangan tentang pengubahsuaian itu berdasarkan aspek-aspek berikut:

- The electric component to replace light dependent resistor in the circuit.
  Komponen electrik untuk menggantikan perintang peka cahaya
- The position of electric component.
  Kedudukan komponen elektrik.
- the used of relay switch in the circuit.
  Penggunaan suis geganti dalam litar.
- the arrangement of the three fan.
  Susunan tiga kipas.
- electric component to protect the transistor
  komponen elektrik untuk melindungi transistor

[*10 marks*]

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 'Newton's cradle' which consists of five identical balls suspended in a row from a wooden frame by wires.

Rajah 11.1 menunjukkan 'Newton's cradle' yang terdiri daripada lima biji bola yang serupa tergantung dalam satu baris pada satu kerangka kayu dengan menggunakan dawai.

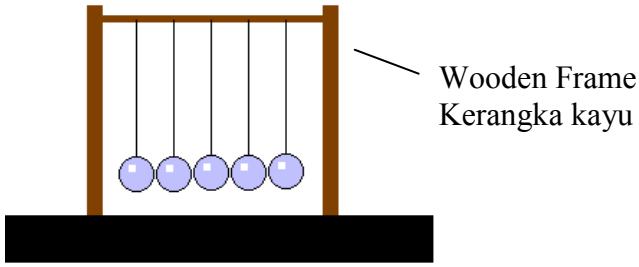


Diagram 11.1
Rajah 11.1

When the ball on left end is pulled aside (Diagram 11.2) and allowed to fall, the ball on the far end is knocked away from the others with the same speed as the first ball (Diagram 11.3).
Apabila bola pada hujung kiri ditarik (Rajah 11.2) dan dijatuhkan, bola yang berada pada hujung satu lagi akan di ketuk jauh daripada bola-bola yang lain dengan laju yang sama seperti bola yang pertama. (Rajah 11.3)

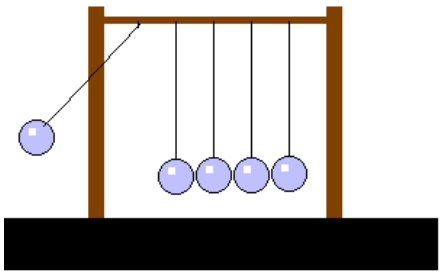


Diagram 11.2
Rajah 11.2

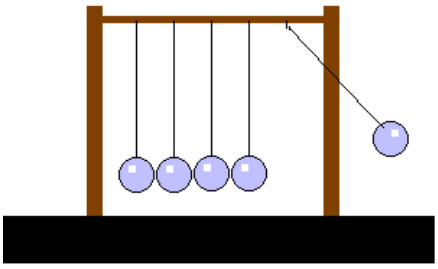


Diagram 11.3
Rajah 11.3

(a) Name the physics principle involved which makes the ball on the other far end is knocked away from the others.

Namakan prinsip fizik yang terlibat yang membuatkan bola pada hujung yang satu lagi tertolak menjauhi bola yang lain.

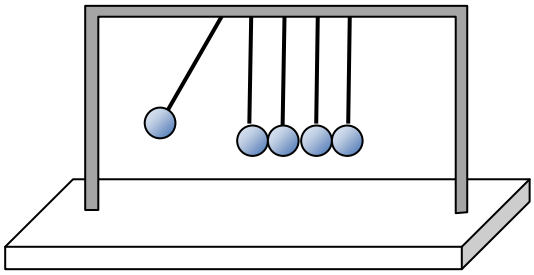
[*1 mark*]

(b) Explain, in term of momentum and energy transfer, why the ball on the opposite end is knocked away from the others.
Terangkan dalam konteks momentum dan pemindahan tenaga, mengapa bola pada hujung yang bertentangan tertolak menjauhi bola yang lain.

[*4 marks*]

(c) Diagram 11.4 shows five designs of *'Newton's Cradle'*, P, Q, R, S and T, with different specifications. You are required to determine the most suitable design to make the ball at the end swings up to higher level and at bigger speed. Study all the five designs from the following aspects:
- The arrangement of the balls
- The type of material used to make the balls
- the number of string used to hang the balls
- the position of the ball to start the oscillation

Rajah 11.4 menunjukkan lima rekabentuk 'Newton's Cradle'*, P, Q, R, S dan T dengan spesifikasi yang berbeza.*
Anda dikehendaki menentukan rekabentuk yang paling sesuai digunakan untuk menghasilkan ayunan bola pada setiap hujung lebih tinggi dan lebih laju.
Kaji kelima-lima rekabentuk itu dari aspek berikut:
- *Susunan bebola*
- *Jenis bahan yang digunakan untuk membuat bebola*
- *bilangan tali yang digunakan untuk menggantung bebola*
- *kedudukan bebola untuk memulakan ayunan*

Newton's Cradle P Material used to make the balls : rubber *Bahan yang digunakan untuk membuat bebola: Getah*	

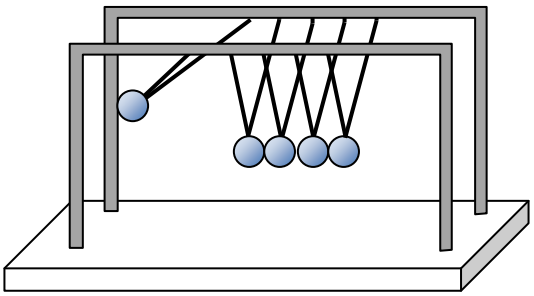
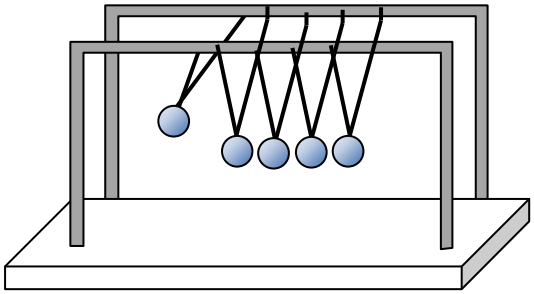
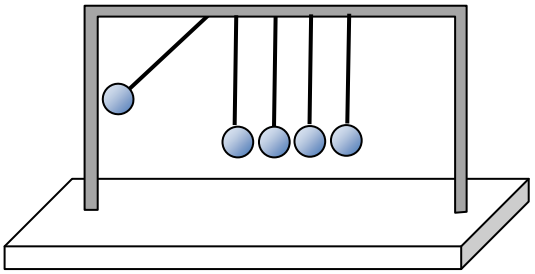
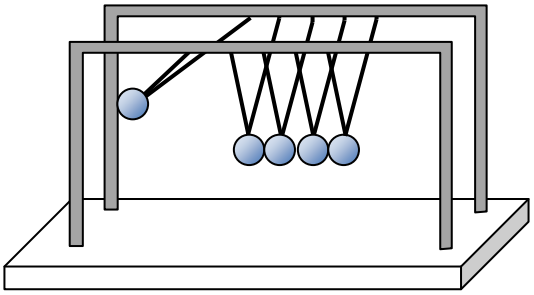
Newton's Cradle Q Material used to make the balls : steel *Bahan yang digunakan untuk membuat bebola: Keluli*	
Newton's Cradle R Material used to make the balls : steel *Bahan yang digunakan untuk membuat bebola: Keluli*	
Newton's Cradle S Material used to make the balls : steel *Bahan yang digunakan untuk membuat bebola: Keluli*	
Newton's Cradle T Material used to make the balls : rubber *Bahan yang digunakan untuk membuat bebola: Getah*	

Diagram 11.4
Rajah 11.4

Explain the suitability of the aspects. Justify your choice.
Terangkan kesesuaian aspek-aspek itu. Beri sebab bagi pilihan anda.

[*10 marks*]

(d) In a game, a 50 g white ball of speed 0.8 m s^{-1} hits a 30 g red ball at rest . If the white ball stops after the collision, calculate;

Dalam satu permainan, sebiji bola putih 50 g dengan kelajuan 0.8 m s^{-1} berlanggar dengan sebiji bola merah 30 g yang pegun. Jika bola putih berhenti selepas perlanggaran, hitung

(i) the velocity of the red ball after the elastic collision.
kelajuan bola merah selepas perlanggaran elastik itu.

(ii) the change of the momentum of the white ball.
perubahan momentum bola putih.

(iii) the impulsive force acting on the white ball during the collision if it is stopped in 0.05 seconds.
daya impuls yang bertindak terhadap bola putih ketika perlanggaran jika ia diberhentikan dalam masa 0.05 saat.

[*5 marks*]

12. (a) Diagram 12.1 shows the pattern of sea waves when approaching the beach.
Rajah 12.1 menunjukkan bentuk gelombang air semasa menghampiri pantai.

Diagram 12.1
Rajah 12.1

(i) Name the wave phenomenon shown in Diagram 12.1.
Namakan fenomena gelombang yang ditunjukkan dalam Rajah 12.1.

[*1 mark*]

(ii) Explain in terms of the wave phenomena in 12 (a) (i), why the water waves follow the shape of the beach as it approaches the shore.

Terangkan dalam konteks fenomena gelombang dalam 12 (a) (i) mengapa gelombang air mengikut bentuk pantai apabila menghampiri tepi pantai.

[*4 marks*]

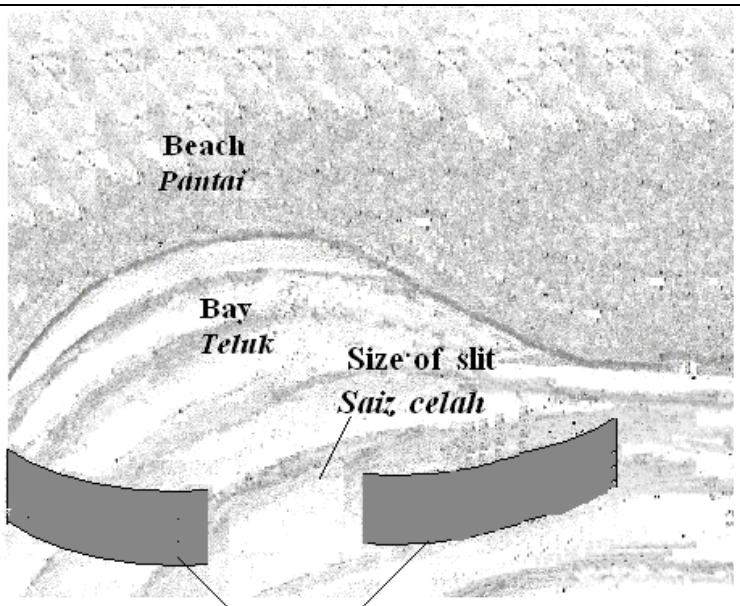
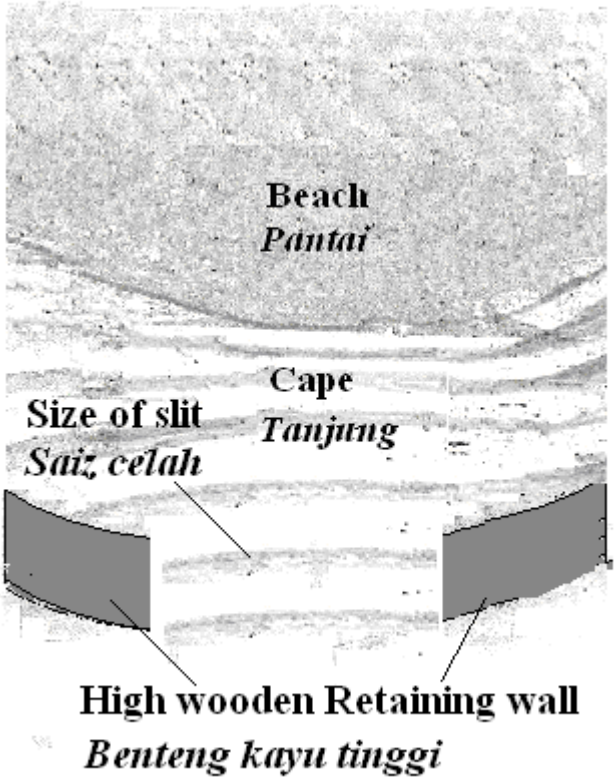
(b) The beach in Diagram 12.1 will be used as a place where fisherman boats are kept.
Pantai yang ditunjukkan dalam rajah 12.1 akan digunakan sebagai tempat bot-bot nelayan berlabuh.

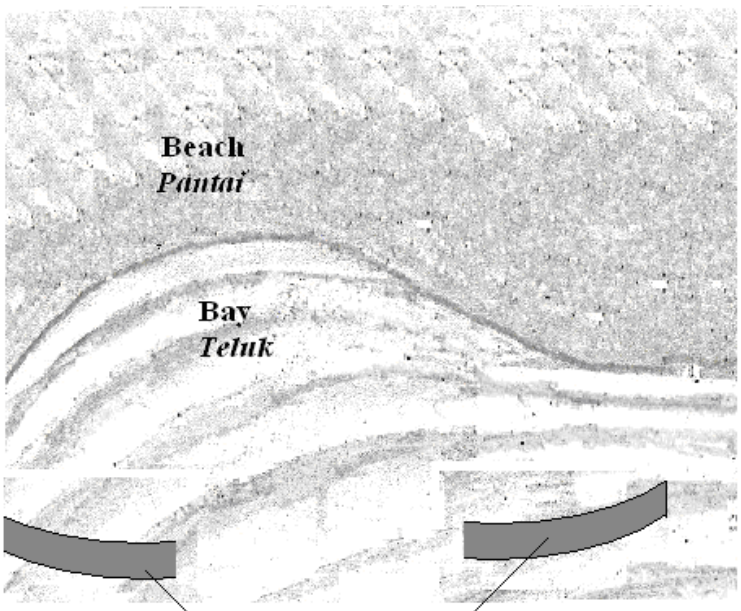
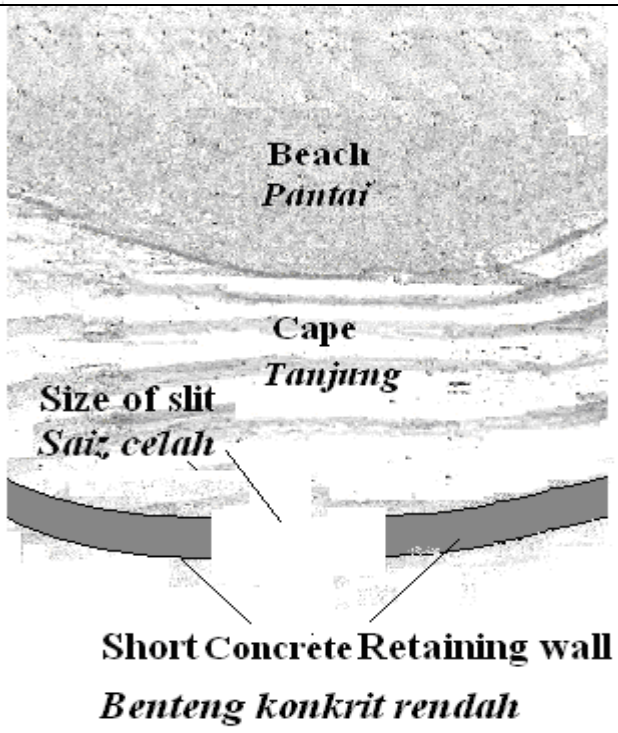
You are assigned to investigate the design for the location to keep the boats and the characteristics of the retaining wall as shown in Diagram 12.2 based on the following aspects:
- the location to keep the boat
- material used for the retaining wall
- the height of retaining wall
- size of slit

Anda ditugaskan untuk mengkaji rekabentuk bagi lokasi untuk melabuhkan bot-bot itu dan ciri-ciri benteng penghalang ombak seperti dalam Rajah 12.2 berdasarkan aspek-aspek berikut:
- *lokasi untuk melabuhkan bot*
- *bahan yang digunakan untuk membina benteng*
- *ketinggian benteng*
- *saiz celah*

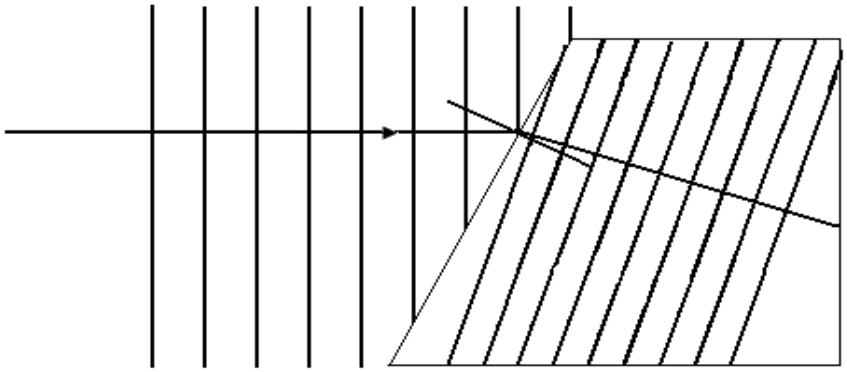
Explain the suitability of the location and the characteristics of the retaining wall and determine the most suitable design to keep the boat safely.
Terangkan kesesuaian lokasi dan ciri-ciri benteng penghalang ombak dan tentukan rekabentuk yang paling sesuai untuk melabuhkan bot-bot dengan selamat.

[*10 marks*]

Design P	
Design Q	

Design R	
Design S	

(c) Diagram 12.3 show a pattern of wave formed when the water waves with a speed of 6 cm s^{-1} propagates from a deeper area to a shallow region in a ripple tank.
Rajah 12.3 menunjukkan corak gelombang air yang terhasil apabila gelombang air dengan laju 6 cm s^{-1} merambat dari kawasan dalam ke kawasan cetek di dalam sebuah tangki riak.



Deep area
Kawasan dalam
Wavelength, $\lambda = 0.8$ cm
Panjang gelombang, $\lambda = 0.8$ cm

Shallow area
kawasan cetek
Wavelength , $\lambda = 0.5$ cm
panjang gelombang, $\lambda = 0.5$ cm

Diagram 12.3
Rajah 12.3

Calculate:
Hitungkan:

(iii) the frequency of water waves at the deeper region
frekuensi gelombang air pada kawasan dalam.

(iv) the speed of the water waves at shallow region.
laju gelombang air pada kawasan cetek.

[*5 marks*]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

NAMA:..... Tingkatan :.....

4531/3
Fizik
Kertas 3
Ogos
2010
1 ½ jam

BAHAGIAN PENGURUSAN
SEKOLAH BERASRAMA PENUH DAN SEKOLAH KLUSTER
KEMENTERIAN PELAJARAN MALAYSIA

PEPERIKSAAN PERCUBAAN SPM 2010

FIZIK

KERTAS 3

Satu jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Kertas soalan ini mengandungi dua bahagian :* ***Bahagian A*** *dan* ***Bahagian B****.*
2. *Jawab semua soalan dalam* ***Bahagian A****. Tuliskan jawapan bagi* ***Bahagian A*** *dalam ruang yang disediakan dalam kertas soalan.*
3. *Jawab* ***satu*** *soalan daripada* ***Bahagian B****. Tuliskan jawapan* ***Bahagian B*** *pada ruangan yang disediakan.* ***.*** *Jawab* ***Bahagian B*** *dengan lebih terperinci. Jawapan mestilah jelas dan logik.*
4. *Tunjukkan kerja mengira, ini membantu anda mendapat markah.*
5 *Gambarajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.*
6. *Markah yang diperuntukkan bagi setiap soalan atau ceraian soalan ditunjukkan dalam kurungan.*
7 *Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh di programkan.*
8 *Masa yang dicadangkan untuk menjawab* ***Bahagian A*** *ialah 60 minit dan* ***Bahagian B*** *ialah 30 minit.*
9 *Serahkan semua kertas jawapan anda di akhir peperiksaan.*

Kegunaan Pemeriksa			
Bahagian	Soalan	Markah Penuh	Markah
A	1	16	
	2	12	
B	3	12	
	4	12	
JUMLAH			

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

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

1. A student carried out an experiment to study the relationship between distance of image ,v and linear magnification ,m produce from the beaker filled with water. 100 cm^3 of water filled into the beaker and put it between a light bulb and a screen. The arrangement of the apparatus for this experiment is shown in Diagram 1.1.

Seorang pelajar menjalankan satu eksperimen untuk mengkaji hubungan diantara jarak imej, v dan pembesaran linear, m yang terhasil daripada bikar yang berisi air. 100 cm^3 air diisi ke dalam bikar dan diletakkan diantara mentol dan skrin. Susunan radas bagi eksperimen adalah ditunjukkan i dalam Rajah 1.1.

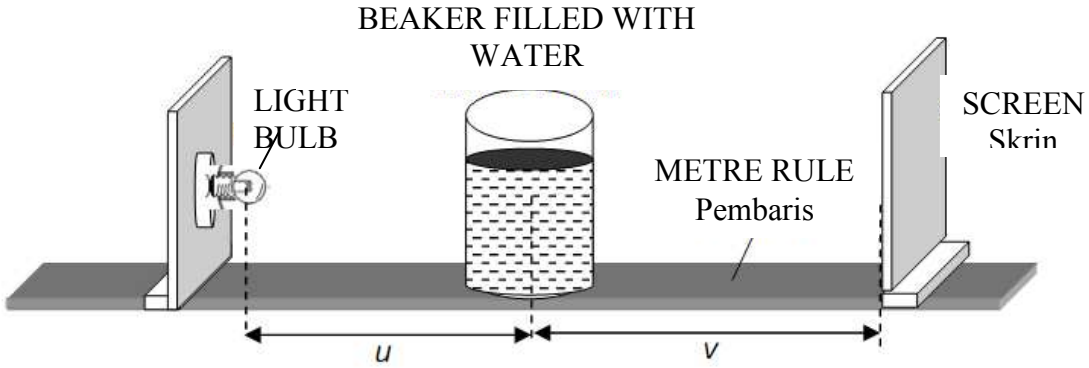


Diagram 1.1
Rajah 1.1

The light bulb is switch on and the beaker filled with water is placed at a distance 9.0 cm from the light bulb. Screen position is adjusted until a sharp image appear on the screen. Distance between screen and beaker filled with water , v is measured. The real distance between screen and beaker filled with water ,v are shown in Diagram 1.2.
The experiment repeated with different value of distance between light bulb and beaker filled with water such as u = 10.0 cm, 11.0 cm, 12.0 cm, 13.0 cm and 14.0 cm. The real distance between the screen and the beaker filled with water, v , are shown in Diagram 1.3, 1.4, 1.5,1.6 and 1.7.

Equation of linear magnification, m is shown as below

$$m = \frac{v}{u}$$

Mentol dinyalakan dan bikar yang diisi dengan air diletakkan 9.0 cm daripada mentol. Kedudukan skrin di ubah-ubah sehingga imej tajam terbentuk di atas skrin. Jarak diantara skrin dan bikar berisi air, v diukur. Jarak sebenar antara skrin dan bikar berisi air, v adalah seperti ditunjukkan dalam Rajah 1.1. Eksperimen diulang menggunakan nilai yang berlainan untuk mentol dan bekas berisi air iaitu u=10.0 cm, 11.0 cm, 12.0 cm, 13.0 cm dan 14.0 cm. Jarak sebenar antara skrin dan bikar berisi air, v ditunjukkan seperti dalam Rajah 1.3,1.4,1.5, 1.6 dan 1.7.

Persamaan pembesaran linear ditunjukkan seperti di bawah :

$$m = \frac{v}{u}$$

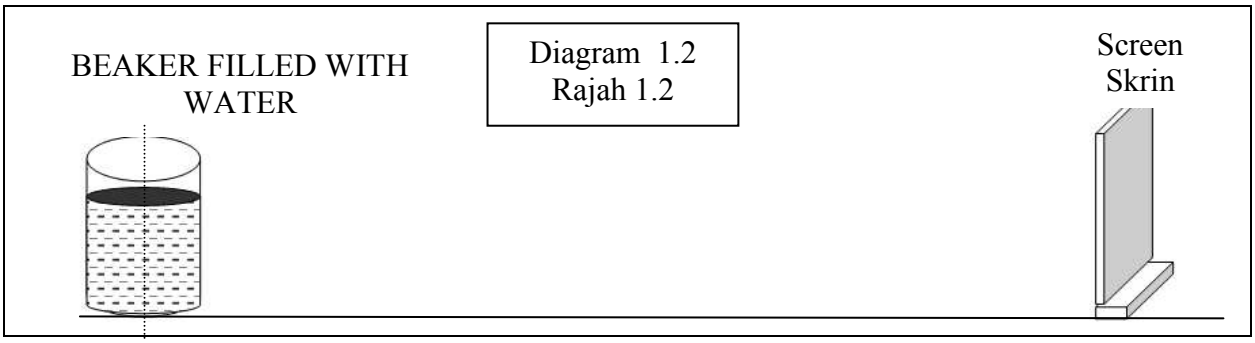


Diagram 1.2
Rajah 1.2

U = 9.0 cm, V = …….....cm

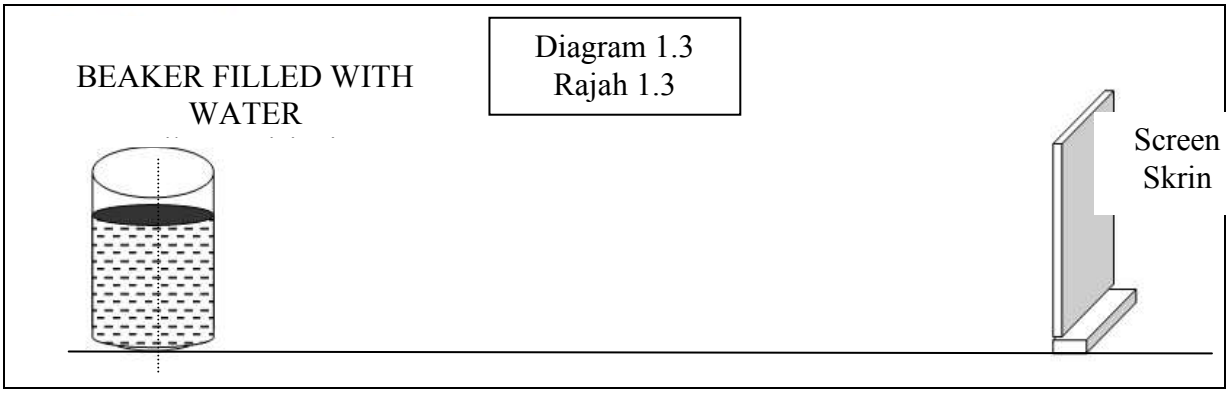
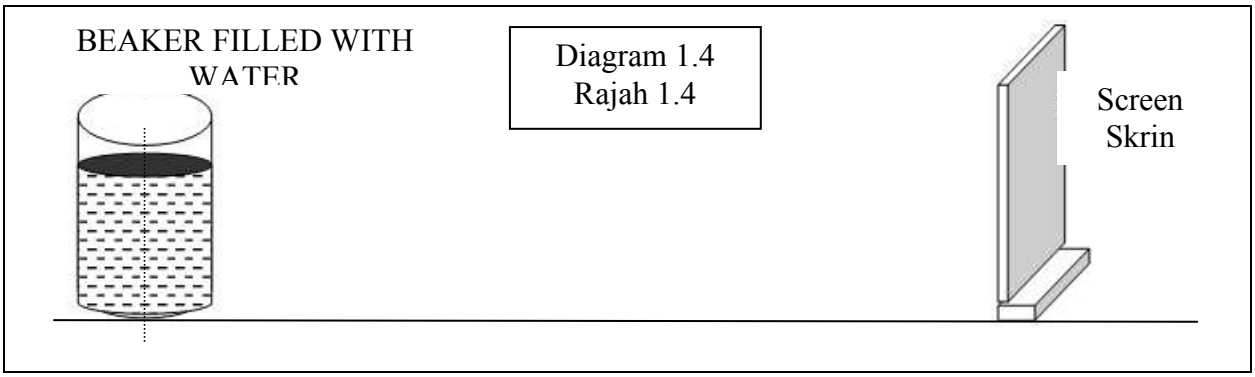
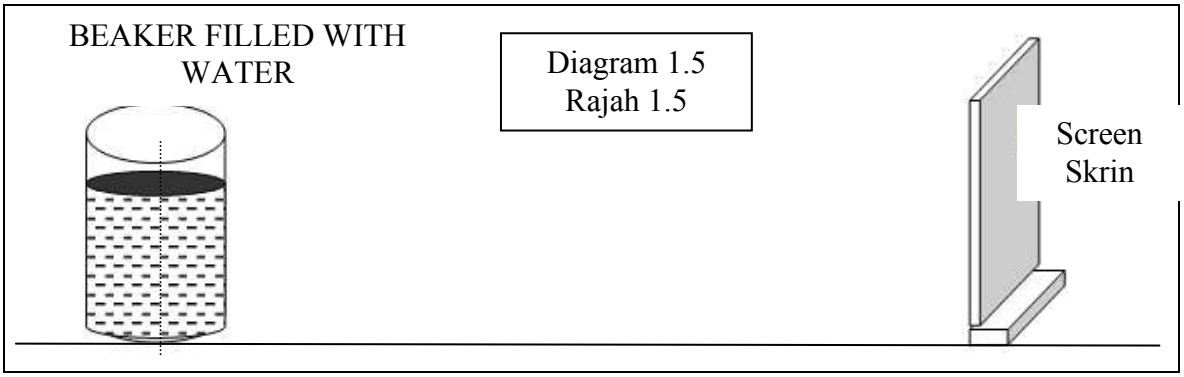


Diagram 1.3
Rajah 1.3

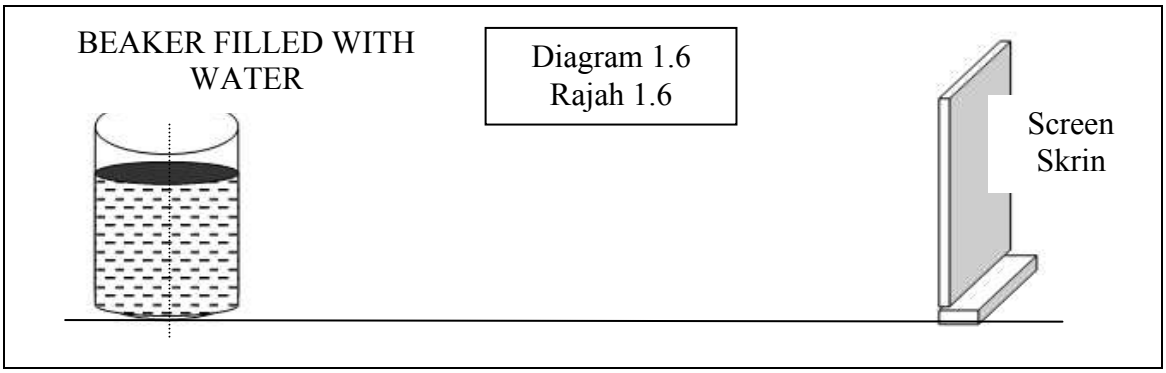
U =10.0 cm, V = …….....cm



U = 11.0 cm, V = …….....cm



U = 12.0 cm, V = …….....cm



U = 13.0 cm, V = …….....cm

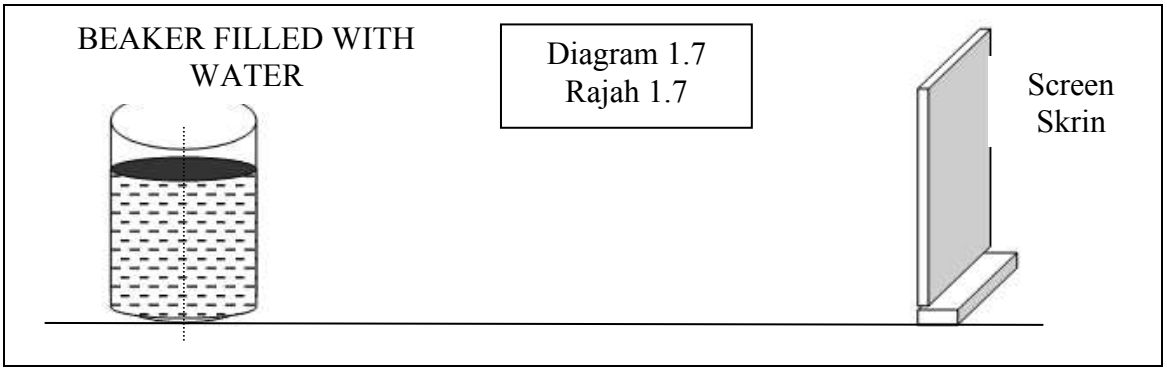


Diagram 1.7
Rajah 1.7

U = 14.0 cm, V = ……....cm

(a) For the experiment described above , identify;
Bagi eksperimen yang diterangkan di atas, kenalpasti ;

(i) The manipulated variable,
Pembolehubah dimanipulasi,

……..……..…
[1 *mark*]
[*1 markah*]

(ii) The responding variable,
Pembolehubah bergerakbalas,

……..……..
[1 *mark*]
[*1 markah*]

(iii) The constant variable.
Pembolehubah dimalarkan,

……..…….
[1 mark]
[*1 markah*]

(b) Based on Diagram 1.2, 1.3, 1.4, 1.5, 1.6 and 1.7, measure the value of v when beaker filled with water is put at the distance of 9.0 cm, 10.0 cm, 11.0 cm, 12.0 cm, 13.0 cm and 14.0 cm.
Tabulate your results for the value of u, v and m for every result in the space below.
Berdasarkan Rajah 1.2,1.3,1.4,1.5,1.6 dan 1.7, ukur nilai v bila bikar yang diisi dengan air diletakkan pada kedudukan 9.0 cm, 10.0 cm, 11.0 cm, 12.0 cm, 13.0 cm and 14.0 cm.
Jadualkan keputusan anda untuk nilai u,v dan m dalam ruang di bawah.

[6 *marks*]
[*6 markah*]

(c) On the graph paper on page 7, plot a graph of v against m.
Pada kertas graf di halaman 7, lukis graf v against m.

[5 *marks]*
[*5 markah*]

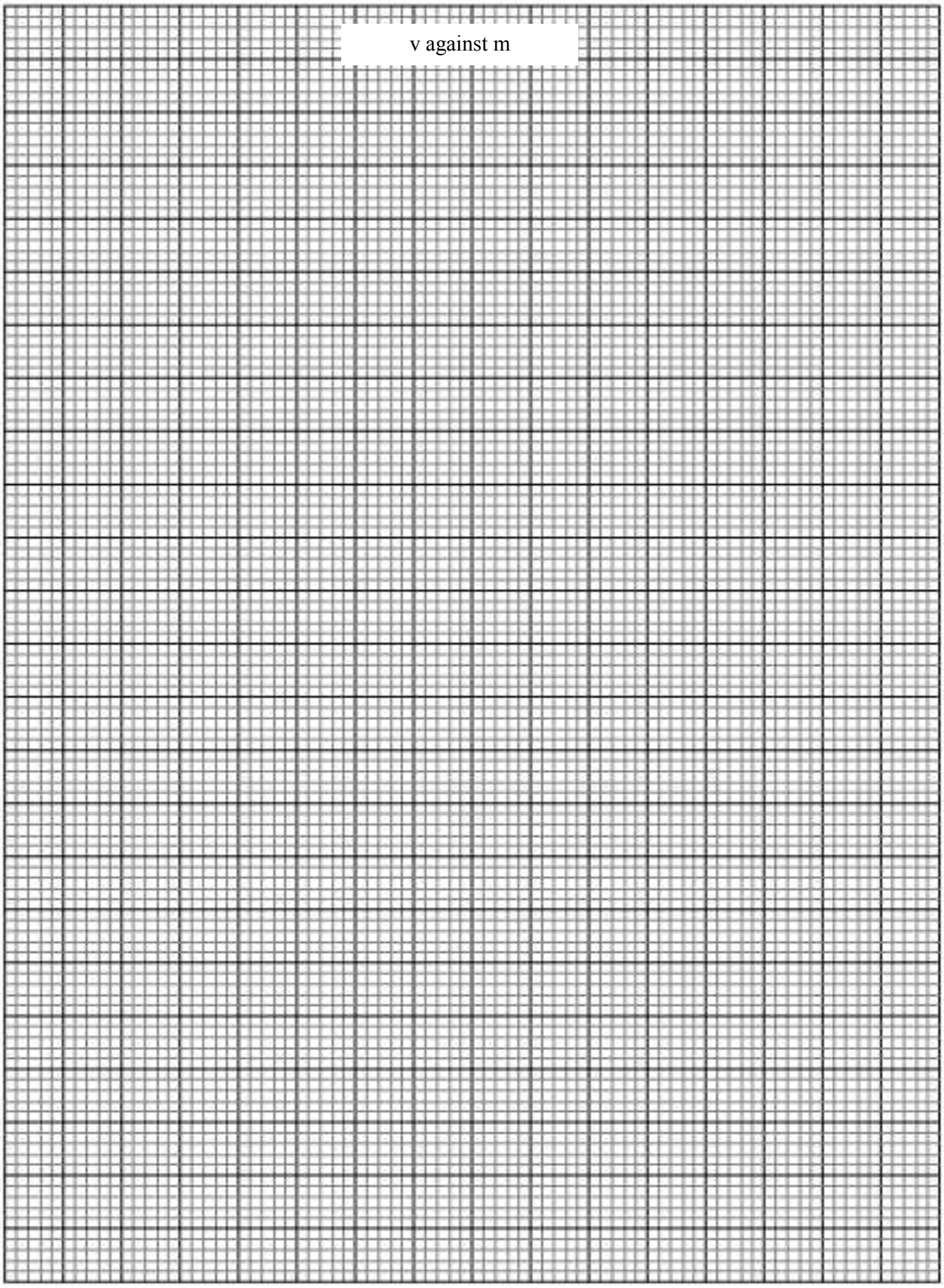
(d) Based on your graph , state the relationship between v and m.
Berdasarkan graf anda, nyatakan hubungan antara v dan m.

……..
[1 *mark*]
[*1 markah*]

(e) State **one** precaution that should be taken to improve the result of this experiment.
Nyatakan satu langkah berjaga-jaga yang perlu diambil untuk memperbaiki keputusan eksperimen ini.

……

……
[1 mark]
[*1 markah*]


v against m

2. A student carries out an experiment to investigate the relationship between the sinus angle of incidence, i and the sinus angle of refraction, r of glass block.
The results of this experiment are shown in the graph of sin i against sin r in Diagram 2 on page 10.
Seorang murid menjalankan satu eksperimen untuk menyiasat hubungan antara sin sudut tuju, i dengan sin sudut biasan, r bagi bongkah kaca.
Keputusan eksperimen ini ditunjukkan oleh graf sin i melawan sin r pada Rajah 2 di halaman 10.

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

(i) State the relationship between sin i and sin r.
Nyatakan hubungan antara sin i dengan sin r.

……..

[1 *mark*]
[*1 markah*]

(ii) Determine the value of i when sin r = 0.4.
Show on the graph, how you determine the value of i.
Tentukan nilai i apabila sin r = 0.4.
Tunjukkan pada graf itu bagaimana anda menentukan nilai i.

i = ……..

[3 *marks*]
[*3 markah*]

(iii) Calculate the gradient, m of the graph.
Show on the graph, how you calculate m.
Hitung kecerunan, m bagi graf itu.
Tunjukkan pada graf itu bagaimana anda menghitung m.

m = ……

[3 *marks*]
[*3 markah*]

(b) The refractive index, n of the glass block is given by the formula n = m, where m is the gradient of the graph. Determine the value of n.
Indeks biasan, n bagi bongkah kaca itu diberi oleh rumus n = m dengan keadaan m ialah kecerunan graf. Tentukan nilai n.

n = ……

[2 *marks*]
[*2 markah*]

(c) The relationship between the refractive index, n of the glass block and the speed of light in medium, v is :

$$n = \frac{c}{v}$$

Using the answer in 2 (b), calculate the speed of light in medium,v if the speed of light in vacuum, c = 3 x 10^8 ms^{-1}.

Hubungan antara indeks biasan,n bagi bongkah kaca itu dengan kelajuan cahaya dalam medium,v ialah

$$n = \frac{c}{v}$$

Menggunakan jawapan di 2 (b), hitung kelajuan cahaya dalam medium,v jika kelajuan cahaya dalam vakum,c = 3 x 10^8 ms^{-1}.

v = ……

[2 *marks*]
[*2 markah*]

(d) 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*

…….....

……....

[1 *mark*]
[*1 markah*]

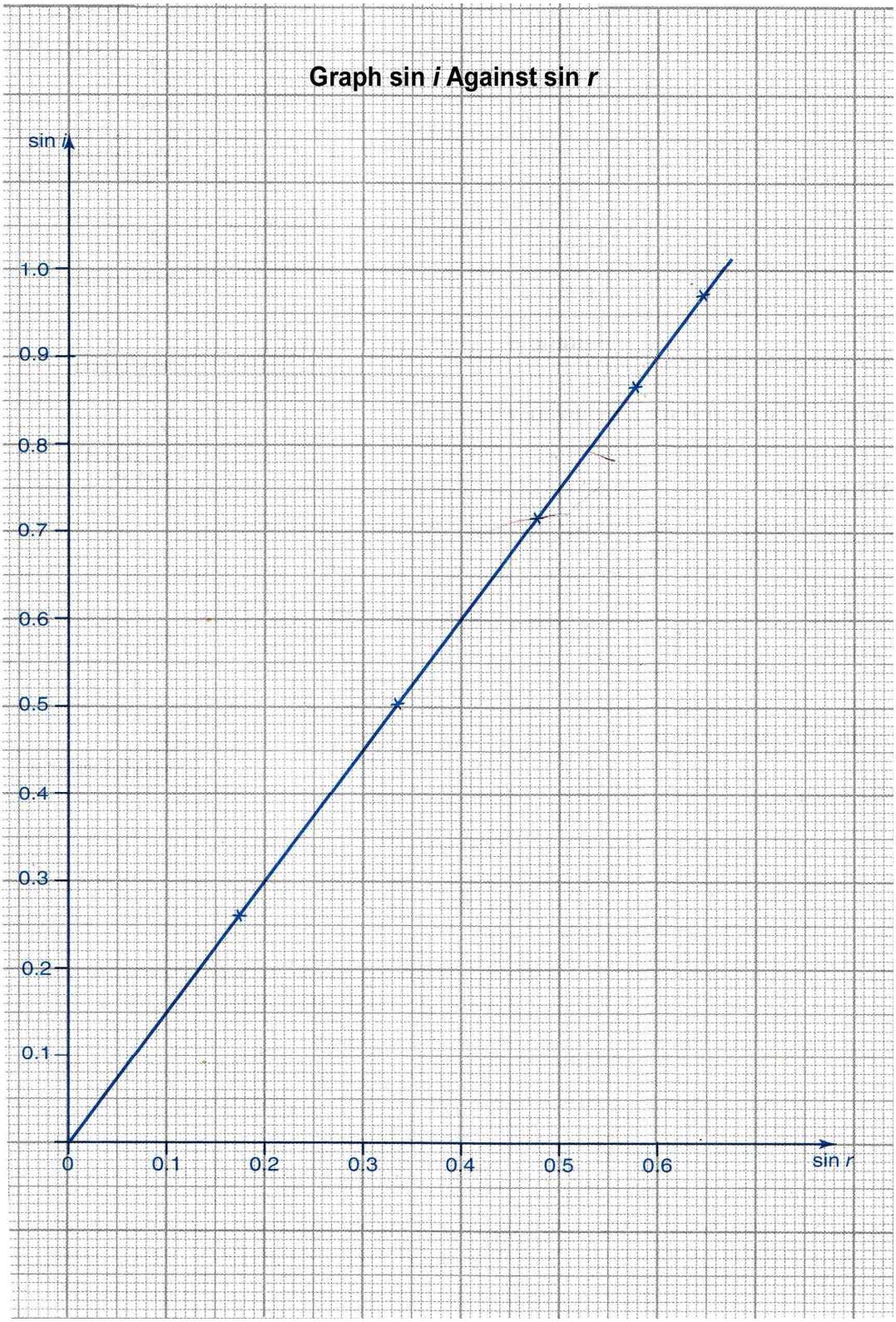


Diagram 2
Rajah 2

Section B
Bahagian B

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

3. A man who is fishing, pulled out a fish out of the water as shown in Diagram 3.1. It becomes more difficult to pull out the fish out of the water and the rod is getting bender in Diagram 3.2.
Seorang lelaki yang sedang memancing menarik keluar seekor ikan dari dalam air seperti dalam Rajah 3.1 di bawah. Dia mendapati adalah semakin sukar menarik keluar ikan dari dalam air tersebut dan menyebabkan batang jorannya melentur lebih seperti dalam Rajah 3.2

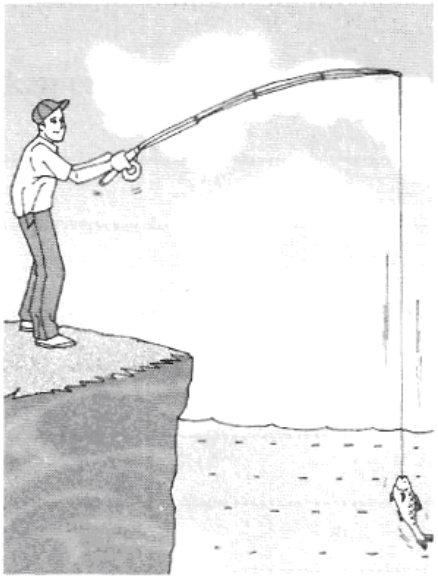


Diagram 3.1
Rajah 3.1

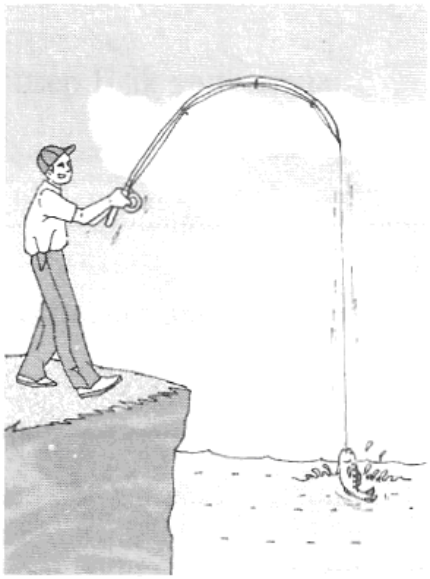


Diagram 3.2
Rajah 3.2

Based on the information and your observation above:
Berdasarkan maklumat dan pemerhatian di atas :

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

[1 *mark*]
[1 *markah*]

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

[1 *mark*]
[1 *markah*]

(c) With the use of apparatus such as measuring cylinder, spring balance, metal rod and other apparatus, describe an experiment framework to investigate the hypothesis stated in 3(b)
Dengan menggunakan radas seperti silinder penyukat, neraca spring, rod logam dan lain-lain radas, terangkan satu rangka kerja eksperimen untuk menyiasat hipotesis yang anda nyatakan di 3 (b).

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

(i) The aim of the experiment.
Tujuan eksperimen.

(ii) The variables in the experiment.
Pembolehubah 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 exsperiment.
Describe how to control the manipulated variable and how to measure the responding variable.
Prosedur yang digunakan dalam eksperimen.
Terangkan bagaimana mengawal pembolehubah dimanipulasikan dan bagaimana mengukur pemboleh bergerak balas.

(vi) The way you would tabulate the data.
Cara untuk menjadualkan data.

(v) The way you would analyse the data.
Cara untuk menganalisis data.

[10 marks]
[10 *markah*]

4 Diagram 4 shows two audio technicians is going to set a close hall so that the audient can enjoy the sound perform by a singer clearly. When the workers bring the two speakers closely to another, the distance beside two chairs must be set further apart so that the sound effect is good enough. The works can be illustrated as shown in the diagram below.

Rajah 4 menunjukkan dua orang juruteknik audio sedang membuat persiapan di sebuah dewan tertutup supaya para pendengar dapat menikmati bunyi dengan baik. Apabila pekerja-pekerja itu meletakkan dua pembesar suara lebih dekat, maka jarak di antara dua kerusi bersebelahan perlu dijauhkan sedikit supaya kesan bunyi menjadi baik. Kerja-kerja ini dapat diilustrasikan seperti gambarajah di bawah.

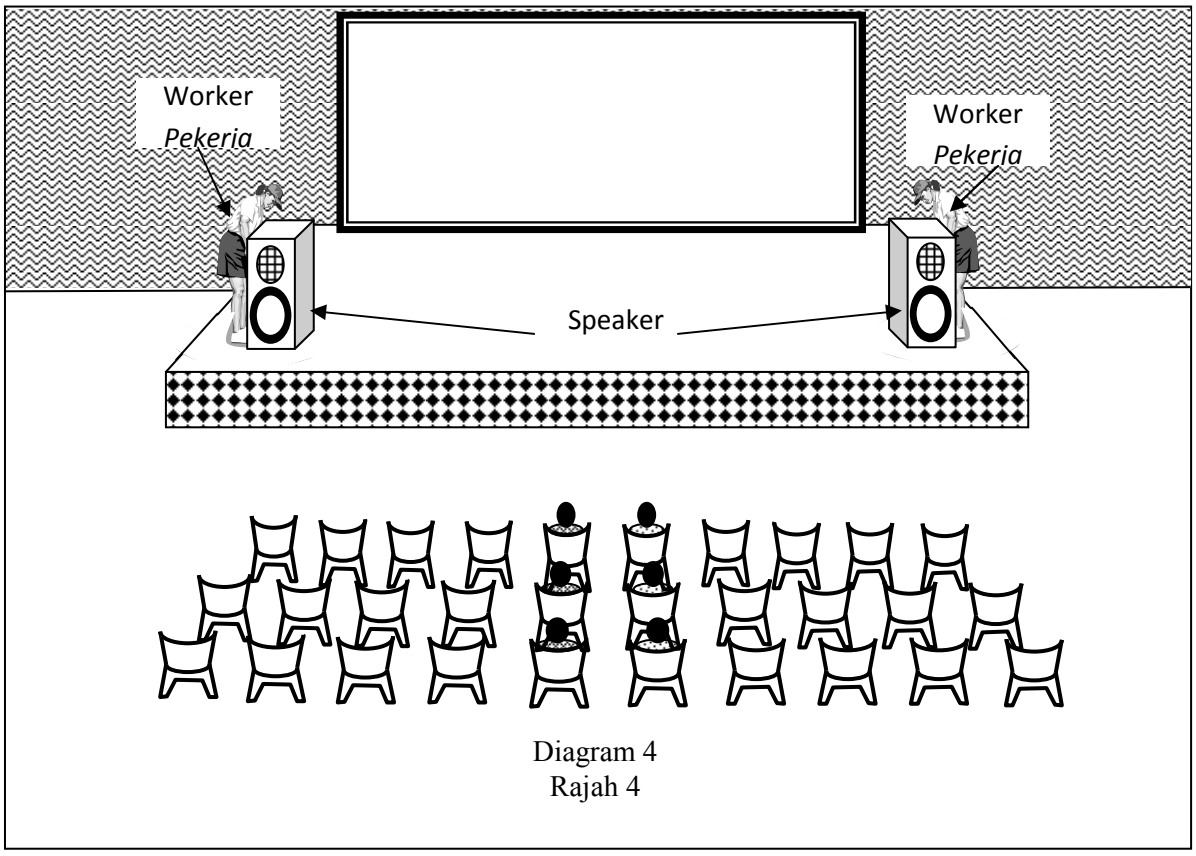


Diagram 4
Rajah 4

Based on the situation above,

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

[1*mark*]
[1 *markah*]

(b) State **one** hypothesis that could be investigated.
Nyatakan satu hipotesis yang boleh disiasat.

[1 *mark*]
[1 *markah*]

(c) With the use of apparatus such loudspeakers, audio signal generator and others to set your apparatus, describe an experiment framework to investigate the hypothesis stated in 3(b).
Dengan mengunakan alat radas seperti speaker, penjana isyarat audio dan lain-lain radas, terangkan satu rangka eksperimen untuk menyiasat hipotesis yang anda nyatakan di 3(b).

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

(i) The aim of the experiment.
Tujuan eksperimen.

(ii) The variables in the experiment.
Pembolehubah dalam eksperimen.

(iii) The list of apparatus and materials.
Senarai radas dan bahan.

(iv) The arrangement of the apparatus.
Susunan radas.

(vi) The procedure used in the exsperiment.
Describe how to control the manipulated variable and how to measure the responding variable.
Prosedur yang digunakan dalam eksperimen.
Terangkan bagaimana mengawal pembolehubah dimanipulasikan dan bagaimana mengukur pemboleh bergerak balas.

(vi) The way you would tabulate the data.
Cara untuk menjadualkan data.

(v) The way you would analyse the data.
Cara untuk menganalisis data.

[10 marks]
[10 *markah*]

END OF QUESTION
SOALAN TAMAT

BAHAGIAN PENGURUSAN
SEKOLAH BERASRAMA PENUH DAN SEKOLAH KLUSTER
KEMENTERIAN PELAJARAN MALAYSIA

PEPERIKSAAN PERCUBAAN SPM 2010

FIZIK

PERATURAN PERMARKAHAN

KERTAS 1, KERTAS 2 & KERTAS 3

Physics Paper 1
Trial Examination SBP 2010
Marking Scheme

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

[50 *marks*]

MARKING SCHEME PAPER 2, 2010

PART A:

No			Answer	Mark
1	(a)		Maximum displacement from the rest point	1
	(b)	(i)	C	1
		(ii)	The length of pendulum C same as A	1
	(c)		Resonance	1
			Total	**4**
2	(a)	(i)	Bernoulli's principle	1
		(ii)	Y	1
	(b)		Gas flow out the nozzle at highest speed	1
	(c)		1. Air from the outside is pushed (sucked) into the hole 2. Resulting in complete combustion.	1 1
			Total	**5**
3	(a)	(i)	Pressure increases	1
		(ii)	1. Temperature increases// kinetic energy of air molecules increases 2. Hit the wall of the tyre with higher velocity/momentum since the volume of tyre is constant.	1 1
	(b)		Pressure Law	1
	(c)		1. Temperature is change into kelvin scale and correct substitution $\frac{200\ kPa}{303} = \frac{P_2}{333}$ 2. $P_2 = 219.8\ kPa$	1 1
			Total	**6**
4	(a)		When the lift accelerate upwards // Diagram 4(b)	1
	(b)		1. Weight acting downwards 2. Normal force, R acting upwards	1 1
	(c)		500 N // 490 N	1
	(d)		1. R = mg + ma // R = 500 + 100 2. R = 600 N	1 1
	(e)		zero	1
			Total	**7**
5	(a)		Refraction	1
	(b)	(i)	Object distance 5.1 > 5.2	1
		(ii)	Image distance 5.1 < 5.2	1
	(c)		Image must be on the retina.	1
	(d)	(i)	Concave lens	1
		(ii)	Convex lens	1
	(e)		1. Correct shape of lens (concave) drawn in the box 2. Light rays diverge after passing through concave lens then converge on the retina after passing through eye lens.	1 1
			Total	**8**

6	(a)		Resistance is the ratio of potential difference to the current flow // a device that resists/impedes the current/electron flow in a circuit.	1
	(b)	(i)	Cross sectional area 6.2 > 6.1	1
		(ii)	Potential difference 6.1 > 6.2	1
		(iii)	Current for both circuits are the same.	1
	(c)	(i)	Resistance 6.1 > 6.2	1
		(ii)	As the cross sectional area increases, resistance decreases	1
	(d)		1. Decreases 2. Because total/effective resistance decreases	1 1
			Total	**8**
7	(a)		North pole	1
	(b)		1. Increase the number of turns of coil 2. Increase magnitude of current / reduce resistance in the rheostat	1 1
	(c)	(i)	1. Soft iron rod is attracted to the coils 2. Bar magnet pushed away	1 1
		(ii)	1. X becomes South pole and still attract the iron rod 2. Y becomes North pole / same pole as the bar magnet / force of repulsion	1 1
	(d)	(i)	Iron rod is still attracted to the coil	1
		(ii)	Bar magnet will oscillate/ vibrate	1
	(e)		Relay switch // electric bell etc	1
			Total	**10**
8	(a)		The half-life of a radioactive material is the time taken for the activity of radioactive fall to half its original activity	1
	(b)		From graph $T_{1/2}$ = 5000 years	1 1
	(c)	(i)	a: 227 b: 90	1 1
		(ii)	Proton: 89 Neutron: 227-89//138	1 1
	(d)	(i)	-Beta -can penetrate the box	1 1
		(ii)	- Long half-life - Long lasting	1 1
	(e)		C	1
			Total	**12**

PART B:

<table>
<tr><th>NO. 9</th><th>MARKING CRITERIA</th><th colspan="2">MARK</th></tr>
<tr><th></th><th></th><th>SUB</th><th>TOTAL</th></tr>
<tr><td>9(a) (i)</td><td>Sum of two or more forces to produce one resultant force.</td><td>1</td><td>1</td></tr>
<tr><td></td><td>1. Bottle in liquid Q floats lower</td><td>1</td><td></td></tr>
<tr><td>(ii)</td><td>2. Weight and the buoyant force are equal and the same in both cases.</td><td>1</td><td></td></tr>
<tr><td></td><td>3. Density of liquid P is higher.</td><td>1</td><td></td></tr>
<tr><td></td><td>4. As the density of liquid decreases, the lower the bottle floats.</td><td>1</td><td></td></tr>
<tr><td></td><td>5. When density of liquid decreases the volume of liquid displaced increases to produce the same buoyant force.</td><td>1</td><td>5</td></tr>
<tr><td>(b)</td><td>1. When force is applied to piston A</td><td></td><td></td></tr>
<tr><td></td><td>2. Pressure is produced and transmitted uniformly throughout the liquid towards piston B // Pascal’s Principle</td><td>1
1</td><td></td></tr>
<tr><td></td><td>3. Pressure multiply by the surface area of piston B will produce the output force that lift load M.</td><td>1</td><td></td></tr>
<tr><td></td><td>4. Cross-sectional area of piston A is smaller than piston B to produce large output force.</td><td>1</td><td>4</td></tr>
<tr><td>(c)</td><td>
<table>
<tr><th>Suggestion</th><th>Reasons</th></tr>
<tr><td>Fix a long handle on piston A</td><td>Small force can produce bigger force /torque to press piston A</td></tr>
<tr><td>Equip the hydraulic jack with valves</td><td>Liquid can flow in one direction and does not back flow</td></tr>
<tr><td>Use released valves</td><td>Liquid flows back to the storage reservoir</td></tr>
<tr><td>Piston A is made smaller // piston B bigger.</td><td>To produce large output force.</td></tr>
<tr><td>Oil as liquid</td><td>Does not evaporate easily // does not flow out easily// prevent from rust.</td></tr>
</table>
</td><td>2
2
2
2
2</td><td>10

20 marks</td></tr>
</table>

NO.10	MARKING CRITERIA	MARK	
		SUB	TOTAL
10 (a)	Doping is a process of adding a certain amount of specific impurities to semiconductors to increase their conductivity	1	1
(b)	• Diagram 10.1, the p end of diode is connected to negative terminal of dry cell // Diagram 10.2 the p end of diode is connected to positive terminal of dry cell • Bulb in Diagram 10.1 does not lights up • No current flow in Diagram 10.1 // Current flow in Diagram 10.2 • The bulb will lights up when the p end of diode is connected to the positive terminal of dry cell // vice versa • Current only flow in the circuit when p end of diode is connected to positive terminal of dry cell or in forward bias	1 1 1 1 1	5
(c) (i)	Draw correct symbol and correct direction	1	
(ii)	Draw smooth waveform Capasitors **store charge** when current flow Capasitor discharge when current does not flow	3	4
(d)	1 LDR is replace by termistor / diagram 2 resistance decrease when temperature increase 3 Termistor is place at R_1 and R_1 replace LDR / diagram 4 So that V across R_1 increase when the room is hot 5 Relay switch replace LED 6 To switch on secondary circuit /to switch on the fan 7 Fans are arranged parallel 8 All fans received 240 V power supply / other fans still functioning even though one fan did not function 9 Resistor connected to the base of transistor 10 limit the current to the transistor	10	10
			20 marks

PART C:

QUESTION 11:

<table>
<tr><td>(a)</td><td>The Principle of Conservation of Momentum / Energy</td><td>1</td><td>1</td></tr>
<tr><td>(b)</td><td>• When the ball on one end is pulled up and let to fall, it strikes the second ball which is at rest and comes to a dead stop.
• The momentum of the ball becomes zero as its velocity is zero.
• The Principle of Conservation of Momentum states that in a collision between two objects the total momentum of the objects in the system remains unchanged.
• The energy and momentum from the first ball is transferred to the second ball and then transmitted through the balls at rest to the ball on the other end.
• Because the momentum and energy is maintained in this system, the ball on the opposite side will move at the same velocity as the ball that were in initial motion
(any four)</td><td>1
1
1
1
1</td><td>4</td></tr>
<tr><td>(c)</td><td><table><tr><td>The balls touch each other</td><td>This will reduce losses of energy which will reduce the speed of the balls</td></tr><tr><td>The type of material used to make the balls is steel</td><td>Steel balls are hard and produce highly elastic collision. Energy can easily propagates through the intermediate balls.</td></tr><tr><td>Two strings used to hang each ball</td><td>This string arrangement restricts the balls' movements to the same plane.</td></tr><tr><td>the position of the ball to start the oscillation</td><td>High position of the ball, high potential energy and will change to high kinetic energy. The last end ball will swing at bigger speed.</td></tr></table>
The most suitable design is Q because the ball s touch each other, made from steel, use two strings attached to each ball and the initial position of the ball is high.</td><td>2
2
2
2
2</td><td>10</td></tr>
<tr><td>(d)(i)</td><td>$m_1u_1 + m_2u_2 = m_1v_1 + m_2v_2$
$(5)(0.8) + (3)(0) = 0 + (3)\ v_2$
$v_2 = 1.33\ ms^{-1}$</td><td>1
1</td><td></td></tr>
<tr><td>(ii)</td><td>$m_1v_1 - m_2u_2 = 0 - (0.05)(0.8)$
$= -0.04\ kgms^{-1}$</td><td>1
1</td><td></td></tr>
<tr><td>(iii)</td><td>Impulsive force = -0.04 / 0.05 = 0.8 N</td><td>1</td><td>5</td></tr>
</table>

QUESTION 12:

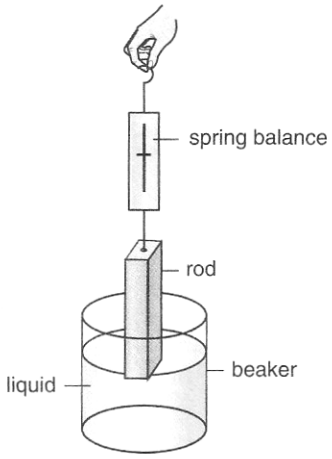
<table>
<tr><th>NO.</th><th>MARKING CRITERIA</th><th colspan="2">MARK</th></tr>
<tr><th></th><th></th><th>SUB</th><th>TOTAL</th></tr>
<tr><td>12.(a) (i)</td><td>Refraction</td><td>1</td><td>1</td></tr>
<tr><td>(ii)</td><td>wave move from deeper to shallow area
the wavelength decrease
the speed decrease
the direction of wave bends towards normal</td><td>1
1
1
1</td><td>4</td></tr>
<tr><td>(b)</td><td><table><tr><th>Characteristics</th><th>Reason</th></tr><tr><td>Bay</td><td>Wave is calmer</td></tr><tr><td>Concrete retaining wall</td><td>Stronger/ / lasting</td></tr><tr><td>High wall</td><td>Prevent high wave</td></tr><tr><td>Smaller opening/ aperture / slit of retaining wall</td><td>Diffraction obvious // low wave energy</td></tr><tr><td>P</td><td>At bay, concrete retaining wall , high wall and smaller slit</td></tr></table></td><td>2
2
2
2
2</td><td>10</td></tr>
<tr><td>(c) (i)</td><td>$f = \frac{v}{\lambda}$
$= \frac{6}{0.8}$
$= 7.5$ Hz</td><td>1
1
1</td><td>5</td></tr>
<tr><td>(ii)</td><td>$V = \lambda f$
$= 0.5 \times 7.5$
$= 3.75$ cm</td><td>1
1</td><td>20 marks</td></tr>
</table>

MARKING SCHEME PAPER 3 2010

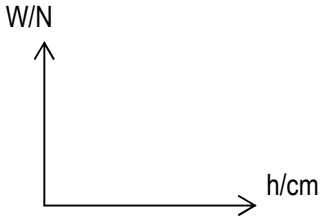
<table>
<tr><td>No. 1</td><td>Answer</td><td>Mark</td></tr>
<tr><td>(a) (i)</td><td>Manipulated variable = Object distance, u</td><td>1</td></tr>
<tr><td>(ii)</td><td>Responding variable = Image distance, v</td><td>1</td></tr>
<tr><td>(iii)</td><td>Constant variable = Volume of water used, V</td><td>1</td></tr>
<tr><td>(b)</td><td>Tabulate u, v and m correctly in the table.
A Shows a table u,v and m.
B State the correct unit of u, v and m.
C All values of u are correct
D All values of v are correct
E All values of m are correct
F State a consistent decimal place for u, v and m.
<table>
<tr><th>u/cm</th><th>v/cm</th><th>m</th></tr>
<tr><td>9.0</td><td>12.2</td><td>1.36</td></tr>
<tr><td>10.0</td><td>11.5</td><td>1.15</td></tr>
<tr><td>11.0</td><td>11.0</td><td>1.00</td></tr>
<tr><td>12.0</td><td>10.4</td><td>0.87</td></tr>
<tr><td>13.0</td><td>9.9</td><td>0.76</td></tr>
<tr><td>14.0</td><td>9.4</td><td>0.67</td></tr>
</table></td><td>6</td></tr>
<tr><td>(c)</td><td>Draw the graph of v against m.
A - Label y-axis and x-axis correctly
B - States the unit at the axis correctly
C - Both axes with the even and uniform scale:
D - 5 points correctly plotted:
E - a smooth best straight line
F - minimum size of the graph is 5 x 4 squares of 2 x 2 cm.
Draw the graph of v against m.
A - Label y-axis and x-axis correctly
B - States the unit at the axis correctly
C - Both axes with the even and uniform scale:
D - 5 points correctly plotted:
E - a smooth best straight line
F - minimum size of the graph is 5 x 4 squares of 2 x 2 cm.
<table>
<tr><th>No of ticks</th><th>Score</th></tr>
<tr><td>6</td><td>5</td></tr>
<tr><td>5</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></td><td>5</td></tr>
<tr><td>(d)</td><td>State the correct relationship <u>based on the candidate's graph</u>
v is directly proportional to m // v is increasing linearly to m</td><td>1</td></tr>
<tr><td>(e)</td><td>1- The eye's of observer must be perpendicular to the scale reading in order to avoid the parallax error.
2- Repeat the experiment and find the average.</td><td>1</td></tr>
<tr><td></td><td>TOTAL</td><td>16</td></tr>
</table>

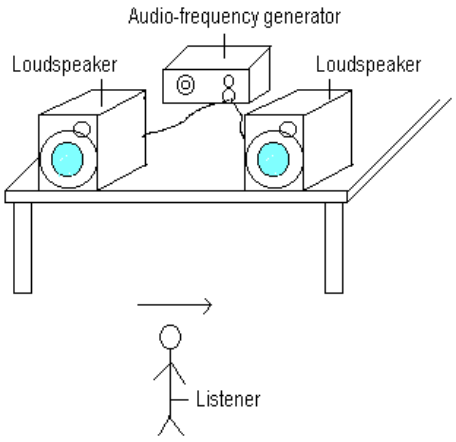
2. (a) (i)	Sin i is directly proportional to sin r.	1
(ii)	-Show the vertical line corresponding to sin r at point 0.4. -Identify the value of sin i = 0.6 -State the value of i correctly = 0.644^0	1 1 1
(iii)	-Draw a sufficiently large triangle minimum (8 x 8) cm -Correct substitution (Follow candidate's triangle) $\frac{0.9}{0.6}$ -Correct answer and no unit 1.5	1 1 1
(b)	n = gradient n = 1.5	1 1
(c)	-Correct substitution $1.5 = \frac{3 \times 10^8}{v}$ -Correct answer with correct unit $v = 2 \times 10^8\ ms^{-1}$	 1 1
(d)	-<u>State one precaution correctly.</u> 1. Position of eyes are perpendicular to the scale. 2. Repeat the experiment and calculate the average. 3. Make sure do the experiment in the dark room.	 1
		12

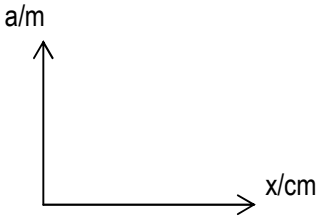
Marking Scheme
Section B

3 (a)	1	**State a suitable inference** The buoyant force can be determined by finding the weight of water displaced
(b)	1	**State a relevant hypothesis** The more the rod is immersed, the lower the reading on the spring balance
(c)(ii)	1	**State the aim of experiment** To investigate the relationship between weight of water displaced and the buoyant force
	1	**State the manipulated variable and the responding variable** **Manipulated :** length of rod below the liquid level **Responding :** weight/ loss in weight
	1	**State <u>ONE</u> variable that kept constant** Density of liquid
	1	**Complete list of apparatus and materials** Beaker, rod, spring balance, metre rule
	1	**Arrangement of apparatus :** 
	1 1	**State the method of controlling the manipulated variable** • A rod which is 10 cm long is marked at intervals of 1 cm and suspended from the hook of a spring balance. • The experiment is started by lowering the rod to depth of 5.0 cm and reading on the spring balance, W is recorded.

<table>
<tr><td></td><td>1</td><td>State the method of measuring the responding variable
• The length of rod below the liquid level is measured and the reading on the spring balance is recorded.

Repeat the experiment at least 4 times
• The experiment is repeated by lowering the rod to different depths, i.e, H = 6.0 cm, 7.0 cm, 8.0 cm and 9.0 cm</td></tr>
<tr><td></td><td>1</td><td>Tabulation of data:<table><tr><td>h/ cm</td><td>W/ N</td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr></table></td></tr>
<tr><td></td><td>1</td><td>Analyse the data .
 
</td></tr>
<tr><td></td><td>Total marks 12</td><td></td></tr>
</table>

4 (a)	1	**State a suitable inference** The distance between 2 loud speaker affect the distance between 2 loud or soft sound.
(b)	1	**State a relevant hypothesis** When the distance between two coherent sources of sound is increase, the distance between two consecutive constructive or destructive interference is decrease.
(c)(ii)	1	**State the aim of experiment** To investigate the relationship between two coherent sources and the distance between two consecutive constructive and destructive interference.
	1	**State the manipulated variable and the responding variable** **Manipulated :** Distance between two coherent sources, a **Responding :** Distance between two consecutive constructive or destructive Interference, x
	1	**State <u>ONE</u> variable that kept constant** Distance between the source and the screen.
	1	**Complete list of apparatus and materials** Loud speaker, audio signal/frequency generator, connection wire, power supply, measuring tape.
	1	**Arrangement of apparatus :** 
	1 1 1	**State the method of controlling the manipulated variable** • By using a metre rule the distance between the listener from the loudspeaker is measured= D • The audio-frequency generator is switched on. • Use a distance between two loud speaker, a= 1.0m. • The listener is requested to walk in a straight path from left to right. **State the method of measuring the responding variable** • the distance between two successive loud regions is measured by a metre rule = x

<table>
<tr><td></td><td></td><td>Repeat the experiment at least 4 times
• The experiment is repeated using a distance between two loud speaker a=1.5m, 2.0m, 2.5m and 3.0m.</td></tr>
<tr><td></td><td>1</td><td>Tabulation of data:
<table>
<tr><th>a/m</th><th>x/m</th></tr>
<tr><td>1.0</td><td></td></tr>
<tr><td>1.5</td><td></td></tr>
<tr><td>2.0</td><td></td></tr>
<tr><td>2.5</td><td></td></tr>
<tr><td>3.0</td><td></td></tr>
</table></td></tr>
<tr><td></td><td>1</td><td>Analyse the data .
 
</td></tr>
<tr><td></td><td>Total marks 12</td><td></td></tr>
</table>