SULIT
4531/1
Fizik
Kertas 1
Sept
2010
1 ¼ jam

JABATAN PELAJARAN WILAYAH PERSEKUTUAN
KUALA LUMPUR

PEPERIKSAAN PERCUBAAN SPM 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 .Tiap-tiap soalan diikuti oleh sama ada **tiga, empat** atau **lima** pilihan jawapan .Pilih satu jawapan yang terbaik bagi setiap soalan dan hitamkan ruangan yang sepadan pada kertas jawapan objektif anda.
3. Rajah tidak dilukis mengikut skala kecuali dinyatakan
4. Kalkulator yang tidak boleh diprogramkan boleh digunakan

Kertas soalan ini mengandungi 34 halaman bercetak

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

1. $a = \frac{v-u}{t}$
2. $v^2 = u^2 + 2as$
3. $s = ut + \frac{1}{2}at^2$
4. Momentum = mv
5. $F = ma$
6. Kinetic Energy = $\frac{1}{2}mv^2$
7. Potential Energy = mgh
8. Elastic Potential Energy = $\frac{1}{2}Fx$
9. $\rho = \frac{m}{V}$
10. Pressure, $P = \frac{F}{A}$
11. Heat, $Q = mc\theta$
12. Heat, $Q = ml$
13. $\frac{pV}{T} = constant$
14. $E = mc^2$
15. $v = f\lambda$
16. Power, $P = \frac{energy}{time}$
17. $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$
18. Linear magnification = $\frac{\text{image size}}{\text{object size}}$
19. $\lambda = \frac{ax}{D}$
20. $n = \frac{\text{real depth}}{\text{apparent depth}}$
21. $Q = It$
22. $V = IR$
23. Power, $P = IV$
24. $\frac{N_s}{N_p} = \frac{V_s}{V_p}$
25. Effiency = $\frac{I_s V_s}{I_p V_p} \times 100\%$
26. $g = 10 ms^{-2}$

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 power factor and prefix is **correct** ?
*Antara berikut faktor kuasa dan imbuhan yang manakah **benar**?*

	Power factor *Faktor kuasa*	**Prefix** *Imbuhan*
A	10^{-6}	kilo
B	10^{-3}	milli */mili*
C	10^{6}	micro/ *mikro*
D	10^{3}	mega

2 Which of the following quantities is a scalar quantity.
Antara kuantiti berikut,yang manakah kuantiti skalar?

A Work
Kerja

B Force
Daya

C Weight
Berat

D Momentum
Momentum

3 The diagram 1 shows part of a micrometer screw gauge.
Rajah 1 menunjukkan sebahagian struktur tolok skru mikrometer.

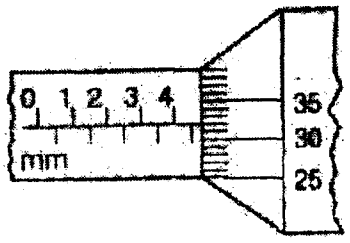


Diagram 1
Rajah 1

What is the reading of the micrometer?
Berapakah bacaan tolok skru micrometer ?

A 4.28 mm

B 4.32 mm

C 4.78 mm

D 4.82 mm

4 Diagram 2 shows a graph of P against Q.
Rajah 2 menunjukkan graf P melawan Q.

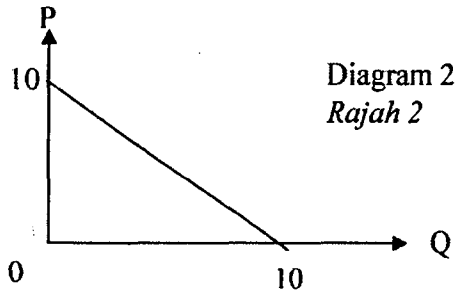


Diagram 2
Rajah 2

Which of the following equation can be related to the diagram ?
Antara persamaan berikut, yang manakah boleh dikaitkan dengan rajah tersebut ?

A $P = Q - 10$

B $P = -2Q + 10$

C $P = -Q + 10$

D $P = 2Q + 1$

5 Diagram 3 shows trolley A and B of same mass on a frictionless plane. Trolley A moves and collides with the stationary trolley B.
Rajah 3 menunjukkan dua troli A dan B bejisim sama yang berada di atas suatu satah tanpa geseran. Troli A bergerak dan melanggar troli B yang pegun.

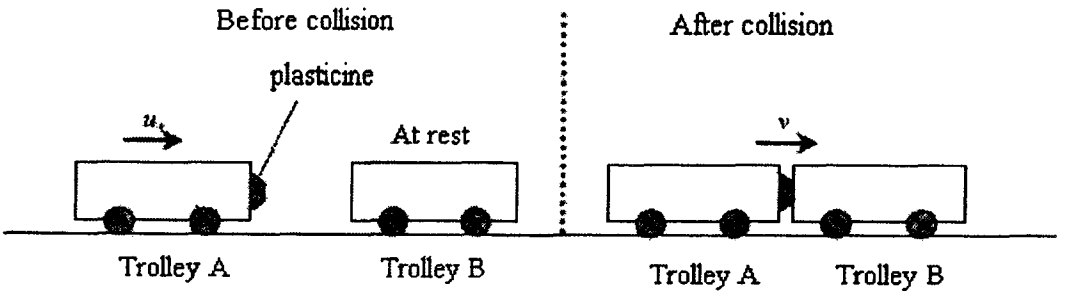


Diagram 3
Rajah 3

Which of the following statements is **true** ?
*Antara pernyataan berikut, yang manakah **benar** ?*

A The collision is an elastic collision
Perlanggaran itu adalah perlanggaran kenyal

B Both trolleys do not undergo changes in momentum
Kedua-dua troli tidak mengalami perubahan momentum

C The total momentum before and after the collision is the same
Jumlah momentum sebelum dan selepas perlanggaran itu adalah sama

D The total kinetic energy before and after the collision is conserved
Jumlah tenaga kinetik sebelum dan selepas perlanggaran itu adalah terabadi

6 Diagram 4 shows a tape chart which is produced by a moving trolley. The frequency of the ticker-tape timer is 50 Hz and each strip of ticker tape contains 5 ticks.
Rajah 4 menunjukkan satu carta pita yang dihasilkan oleh sebuah troli yang bergerak. Frekuensi jangkamasa detik ialah 50 Hz dan setiap keratan pita detik mengandungi 5 detik.

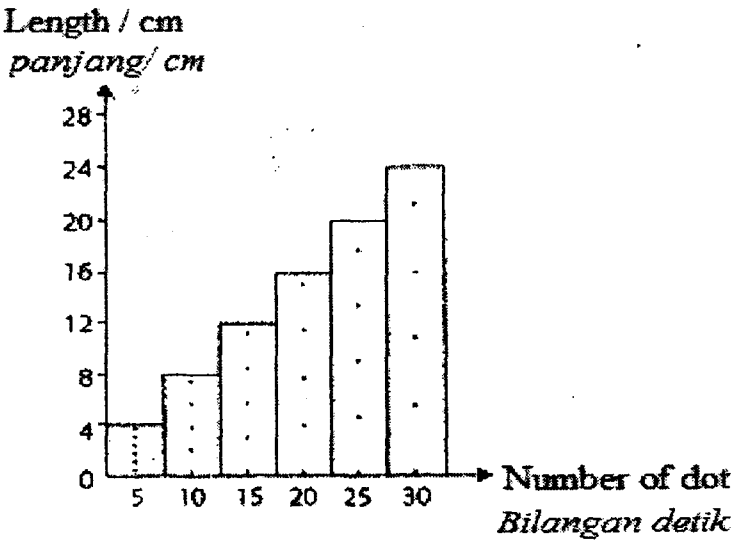


Diagram 4
Rajah 4

What is the trolley's acceleration?
Berapakah pecutan troli tersebut?

A 20 cm s^{-2}

B 200 cm s^{-2}

C 240 cm s^{-2}

D 400 cm s^{-2}

7. Diagram 5 shows two men are lifting a full of water pail with forces F1 and F2 respectively.
Rajah 5 menunjukkan dua orang mengangkat sebuah baldi berisi air dengan daya F1 dan F2 masing-masing.

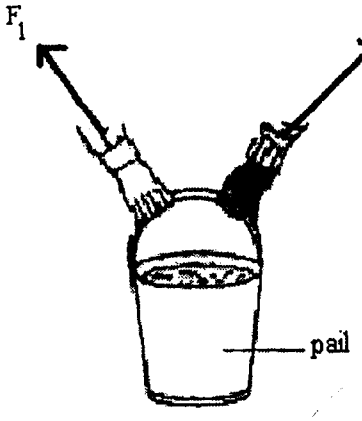
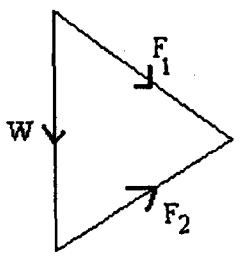


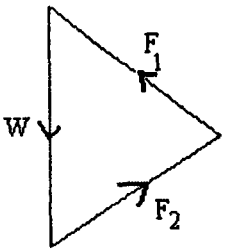
Diagram 5
Rajah 5

Which of the following represents the forces in equilibrium acting on the pail ?
Antara gambarajah berikut, yang manakah mewakili keadaan keseimbangan daya yang bertindak?

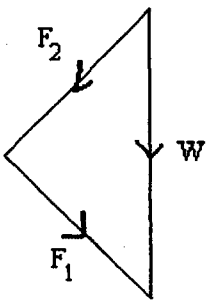
A



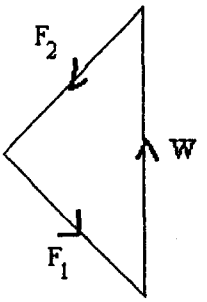
B



C

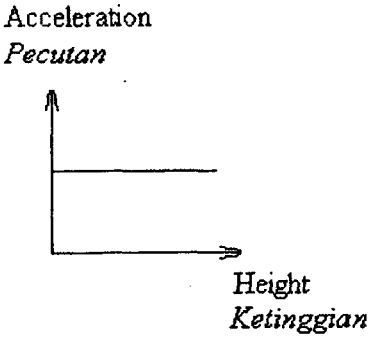


D

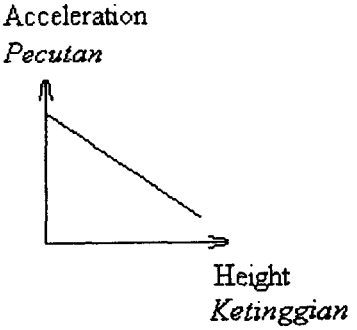


8 Which of the following graphs show the relationship between the acceleration and height for an object that undergoes free fall to the ground?
Antara graf berikut,yang manakah menunjukkan hubungan antara pecutan dan ketinggian bagi suatu objek yang mengalami jatuh bebas kearah permukaan bumi?

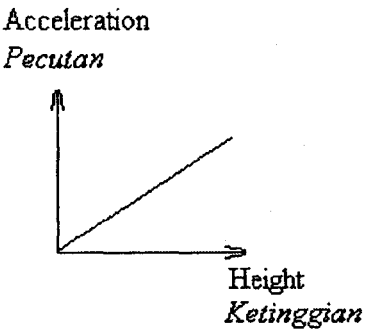
A.



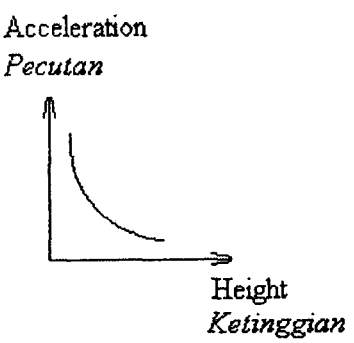
B



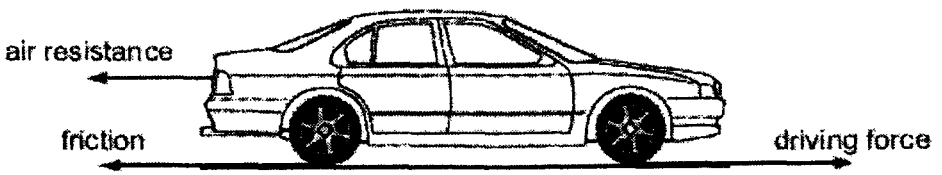
C



D



9 Three horizontal forces act on a car that is moving along a straight level road.
Tiga daya mendatar bertindak ke atas sebuah kereta yang bergerak di sepanjang jalan yang rata.



Which combination of forces would result in the car moving at constant velocity?
Kombinasi daya yang manakah akan menghasilkan halaju yang malar pada kereta tersebut?

	Air resistance *Rintangan udara*	Friction *Daya geseran*	Forward thrust *Tujah ke depan*
A	200 N	1000 N	800 N
B	800 N	1000 N	200 N
C	800 N	200 N	1000 N
D	1000 N	200 N	800 N

10 Diagram 6 shows a man pulling a rope to lift a load of 20 kg through a vertical height of 2 m.
Rajah 6 menunjukkan seorang lelaki menarik tali untuk mengangkat beban 20 kg setinggi 2 m.

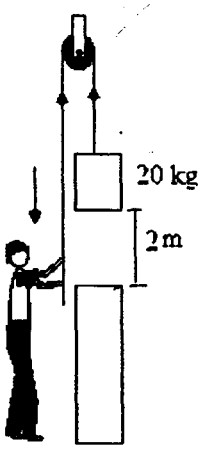


Diagram 6
Rajah 6

What is the work done?
Berapakah kerja yang telah dilakukan?

A 10 J

B 40 J

C 200 J

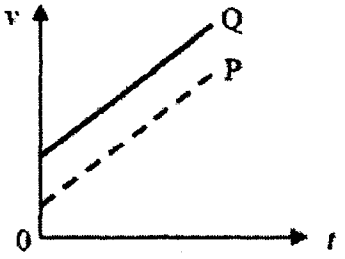
D 400 J

11 Diagram 7 shows two steel ball bearings, P and Q, being dropped near the surface of the earth.
Rajah 7 menunjukkan dua biji bebola keluli, P dan Q, dijatuhkan berhampiran dengan permukaan bumi.

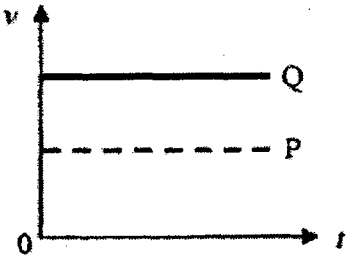
Diagram 7
Rajah 7

Which graph represents the motion of P and Q if both P and Q experience free fall?
Graf yang manakah mewakili gerakan bagi P dan Q jika kedua-dua P dan Q jatuh bebas?

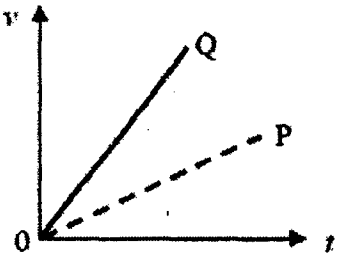
A



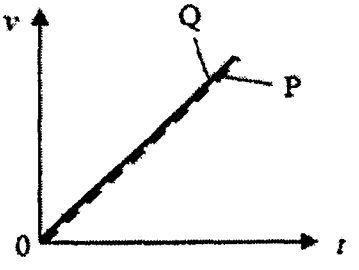
C



B



D



12 Diagram 8 shows three arrangement of springs K, L and M. All the springs used are identical.
Rajah 8, menunjukkan tiga jenis susunan spring K, L dan M. Semua spring yang digunakan adalah serupa.

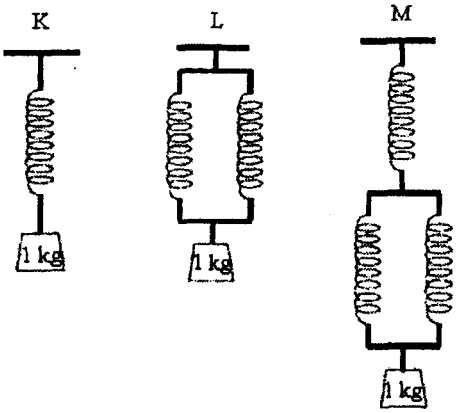
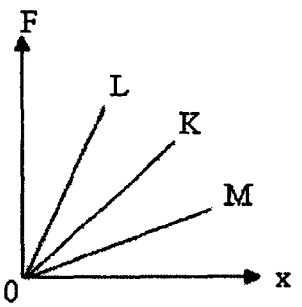


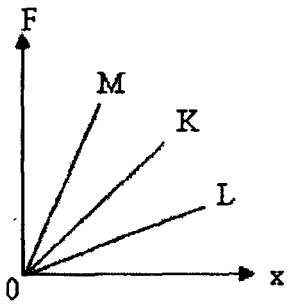
Diagram 8
Rajah 8

Which of the following shows the correct graph of force, F against extension, x for K,L and M ?
Antara berikut yang manakah menunjukkan graf yang betul bagi daya, F melawan, x untuk K, L and M ?

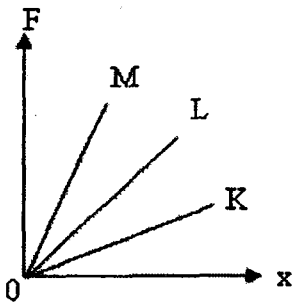
A



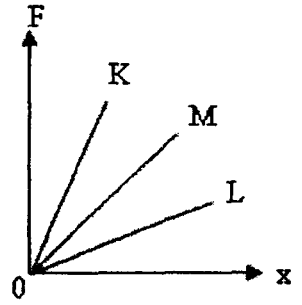
B



C



D



13 Diagram 9 represents gas molecules contained in a cylinder. The piston is moved slowly downwards and the temperature of the gas stays the same.
Rajah 9 menunjukkan molekul-molekul gas di dalam sebuah silinder. Omboh digerakkan perlahan-lahan ke bawah dan suhu gas tidak berubah.

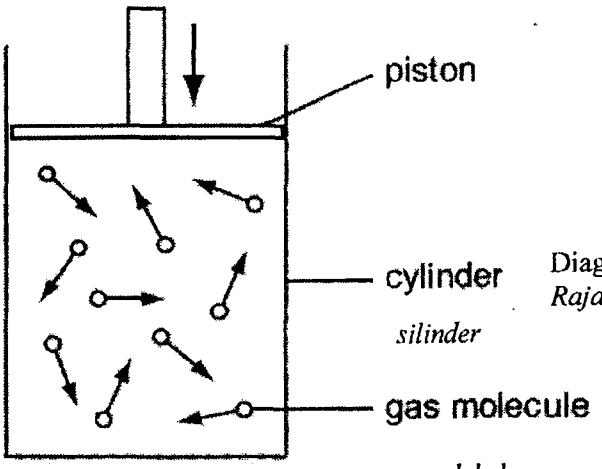


Diagram 9
Rajah 9

Why does the pressure of the gas increase?
Mengapakah tekanan gas meningkat?

A The molecules collide harder with the walls
Molekul-molekul berlanggar dengan lebih kuat pada dinding bekas

B The molecules collide more often with the walls
Molekul-molekul berlanggar dengan kebih kerap dengan dinding bekas

C The molecules move more quickly
Molekul-molekul bergerak dengan lebih laju

D The number of molecules increase
Bilangan molekul-molekul bertambah

14 Diagram 10 shows a hydraulic system.
Rajah 10 di bawah menunjukkan sebuah sistem hidraulik.

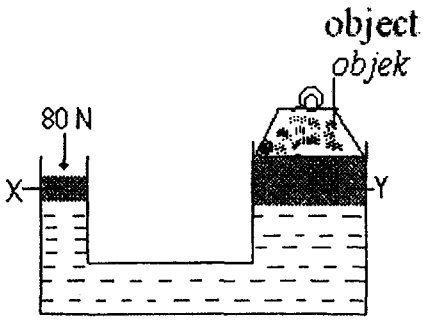


Diagram 10
Rajah 10

If the area of input piston and output piston are 0.03 m^2 and 0.90 m^2 respectively, what is the mass of the object ?.
Jika luas omboh kecil dan omboh besar ialah 0.03 m^2 dan 0.90 m^2 masing-masing, apakah jisim objek itu ?

A 3.2×10^2 kg

B 2.4×10^2 kg

C 2.0×10^2 kg

D 1.8×10^2 kg

E 1.2×10^2 kg

15 Diagram 11 shows a load hung from a spring balance is slowly submerged in water until it is immersed completely.
Rajah 11 menunjukkan satu beban yang digantungkan pada neraca spring di tenggelamkan perlahan-lahan ke dalam air sehingga ia tenggelam sepenuhnya.

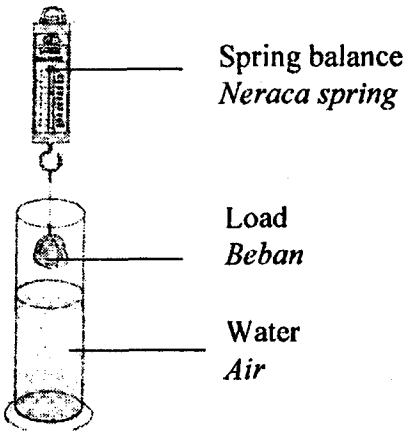


Diagram 11
Rajah 11

What will happen to the spring balance reading?
Apakah akan berlaku pada bacaan neraca spring?

A decreases until zero
berkurang sehingga sifar

B remains unchanged
tetap tidak berubah

C decreases until reaches a constant value
berkurang hingga mencapai satu nilai tetap

16 Diagram 12 shows a card and a glass of water.
Rajah 12 menunjukkan kad dan segelas air.

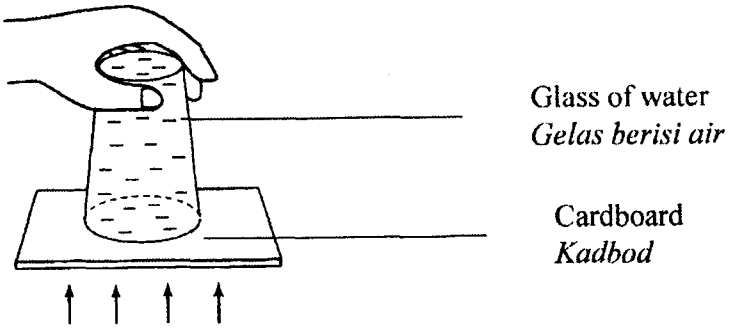


Diagram 12
Rajah 12

When the hand is released, water does not flow out from the glass.
What physic's concept involved in the above situation?
Apabila tangan dialihkan, air tidak mengalir keluar daripada gelas.
Apakah konsep fizik yang terlibat dalam situasi di atas?

A Liquid pressure
Tekanan cecair

B Atmospheric pressure
Tekanan atmosfera

C Gas pressure
Tekanan gas

17 Diagram 13 shows an apple is floating in a beaker of water.
Rajah 13 menunjukkan sebiji epal sedang terapung dalam sebuah bikar berisi air.

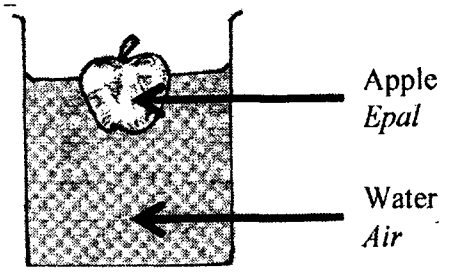


Diagram 13
Rajah 13

Which of the following statements describes the buoyant force correctly?
Manakah pernyataan berikut menerangkan daya keapungan dengan betul ?

A The buoyant force equals to the mass of the water displaced.
Daya keapungan sama dengan jisim air yang disesarkan.

B The buoyant force equals to the weight of the apple.
Daya keapungan sama dengan berat epal.

C The buoyant force equals to the volume of the water displaced.
Daya keapungan sama dengan isipadu air yang disesarkan.

D The buoyant force equals to the mass of the apple.
Daya keapungan sama dengan jisim epal.

18 Diagram 14 shows a cross section of swimming pool which has different depth
Rajah 14 menunjukkan keratan rentas sebuah kolam renang yang mempunyai kedalaman yang berbeza.

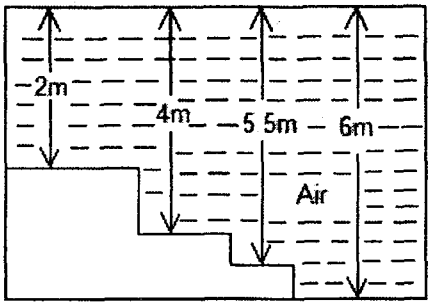


Diagram 14
Rajah 14

What is the maximum pressure experienced at the bottom of the swimming pool?
Berapakah tekanan air yang maksimum di alami oleh dasar kolam itu?
[Density of water = 1000 kg m^{-3}]
[Ketumpatan air = 1000 kg m^{-3}]

A 2.0×10^4 Pa

B 4.0×10^4 Pa

C 5.5×10^4 Pa

D 6.0×10^4 Pa

19 Diagram 15 shows a U-tube manometer connected to a gas tank whose valve is then turned on.
Rajah 15 menunjukkan satu tiub-U manometer disambungkan kepada satu tangki gas yang kemudian dibuka injapnya.

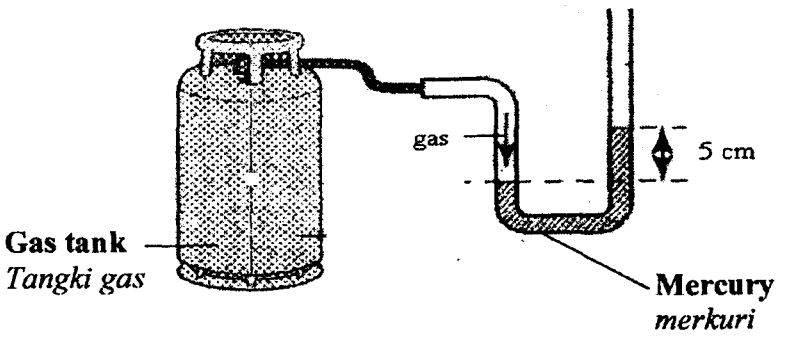


Diagram 15

Rajah 15

Determine the pressure of the gas in the tank.
Tentukan tekanan gas dalam silinder itu.
[Atmospheric pressure / Tekanan udara = 75 cm Hg]

A 5 cm Hg

B 70 cm Hg

C 75 cm Hg

D 80 cm Hg

E 375 cm Hg

20 Diagram 16 shows the length of an air column trapped at 27°C .
Rajah 16, menunjukkan panjang turus udara terperangkap pada 27 °C.

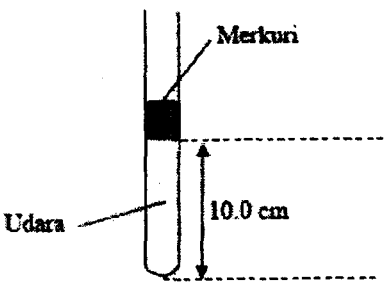


Diagram 16
Rajah 16

What is the length of the air column at 100°C ?
Berapakah panjang turus udara pada 100 ° C?

A 2.7 cm

B 8.0 cm

C 12.4 cm

D 37.0 cm

21 Diagram 17 shows three blocks P, Q, and R. at temperatures T_1, T_2 and T_3 respectively, are in contact with each other.
Rajah 17 menunjukkan tiga buah bongkah P, Q, *dan* R, *pada suhu* T_1, T_2 *dan* T_3 *masing-masing, diletakkan bersentuhan antara satu sama lain.*

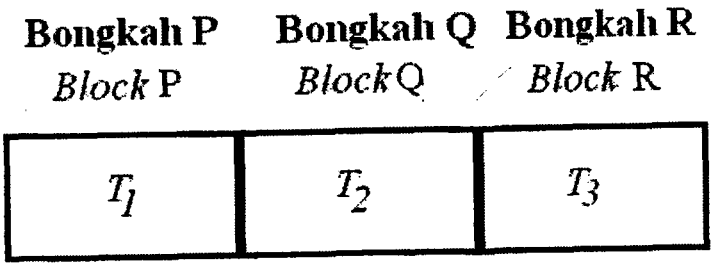


Diagram 17
Rajah 17

Which combination of temperature show the three blocks above are in thermal equilibrium?
Pasangan suhu manakah menunjukkan tiga bongkah di atas berada dalam keseimbangan terma?

	T_1/ °C	T_2/ °C	T_3/ °C
A	25	25	25
B	25	15	25
C	25	35	25
D	35	25	15

22 A blister on the skin caused by steam in Diagram 19 is more painful than the blister caused by boiling water in Diagram 18. This is because
Kesan melecur akibat terkena stim seperti dalam Rajah 19 lebih menyakitkan berbanding kesan melecur akibat terkena air mendidih seperti dalam Rajah 18. Ini disebabkan

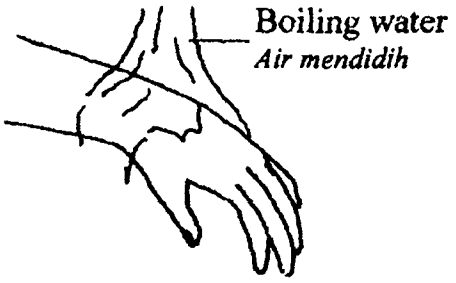


Diagram 18
Rajah 18

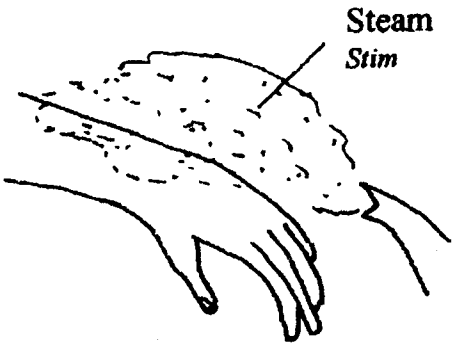


Diagram 19
Rajah 19

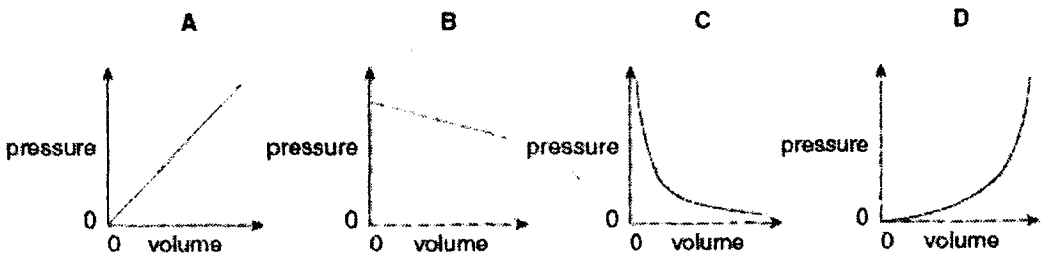
A steam has a higher temperature.
stim mempunyai suhu yang lebih tinggi.

B steam takes a longer time to lose the heat.
stim lebih lambat menghilangkan habanya.

C steam has a higher specific latent heat of vaporization.
stim mempunyai haba pendam tentu pengewapan yang lebih besar.

D steam has a higher specific heat capacity
stim mempunyai muatan haba tentu yang lebih besar.

23 Which graph shows the relationship between the pressure and the volume of a fixed mass of gas at constant temperature?
Graf yang manakah menunjukkan hubungan di antara tekanan dan isipadu gas yang tetap pada suhu yang malar?



24 Diagram 20 shows a concave mirror.
Rajah 20 menunjukkan sebuah cermin cekung.

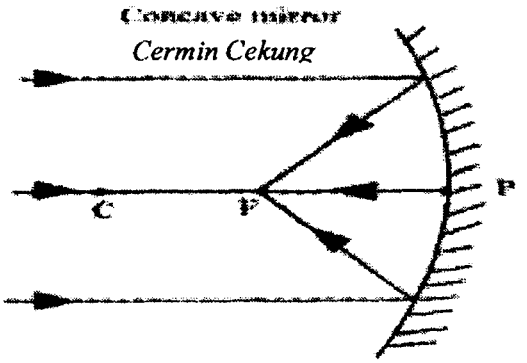


Diagram 20
Rajah 20

The distance between *P* and *F* is
Jarak di antara P dengan F ialah

A the focal length of the mirror
panjang fokus cermin

B the radius of the sphere
jejari sfera

C the diameter of the sphere
diameter sfera

D the line joining the pole to the centre of curvature
garis yang menyambung kutub ke pusat kelengkungan

25 Diagram 21 shows a ray of light travels through a glass block.
Rajah 21 menunjukkan sinar cahaya melalui blok kaca.

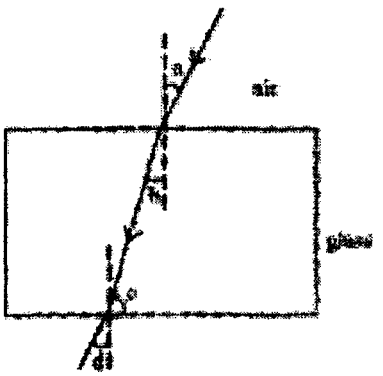


Diagram 21
Rajah 21

What is the refractive index of the glass block ?
Apakah indeks biasan bagi blok kaca tersebut ?

A $\frac{\sin a}{\sin b}$

B $\frac{\sin b}{\sin a}$

C $\frac{\sin a}{\sin d}$

D $\frac{\sin d}{\sin c}$

26 Diagram 22 shows a light ray traveling from air into a semi-circular glass block.
Rajah 22 menunjukkan satu sinar cahaya merambat dari udara menuju blok kaca semi bulatan.

If the critical angle of the glass is 42 °, which path of the ray of light is correct ?
Jika sudut genting kaca ialah 42 °, sinar cahaya yang manakah yang betul ?

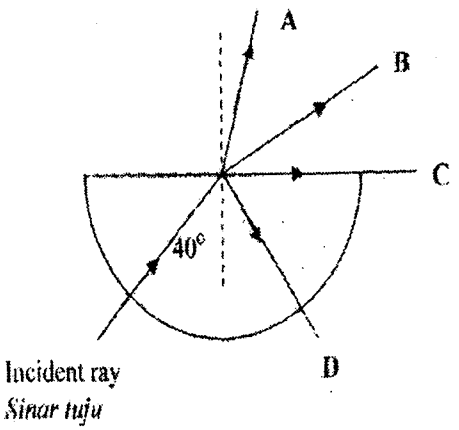


Diagram 22
Rajah 2 2

27 If u is object distance, v is image distance and f is focal length, which of the following is valid for thin lenses?
Jika u ialah jarak objek, v ialah jarak imej dan f ialah panjang fokus, manakah antara berikut benar tentang kanta nipis ?

A $f = \frac{uv}{u+v}$

B $f = \frac{1}{u+v}$

C $\frac{1}{f} = \frac{uv}{u+v}$

D $\frac{1}{f} = \frac{1}{u+v}$

28 What are the required conditions for the lens with focal length f to be used as an objective lens for a microscope ?
Apakah syarat-syarat yang perlu dipatuhi untuk membolehkan kanta berpanjang focus f digunakan sebagai kanta objektif mikroskop ?

	Type of lens ***Jenis kanta***	**Object distance** ***Jarak objek***
A	Convex *Cembung*	Less than f *Kurang dari f*
B	Convex *Cembung*	Between f and 2f *Antara f dan 2f*
C	Concave *Cekung*	Less than f *Kurang dari f*
D	Concave *Cekung*	Between f and 2f *Antara f dan 2f*

29 Diagram 23 shows the displacement- time graph of a wave.
Rajah 23 menunjukkan graf sesaran – masa bagi satu gelombang

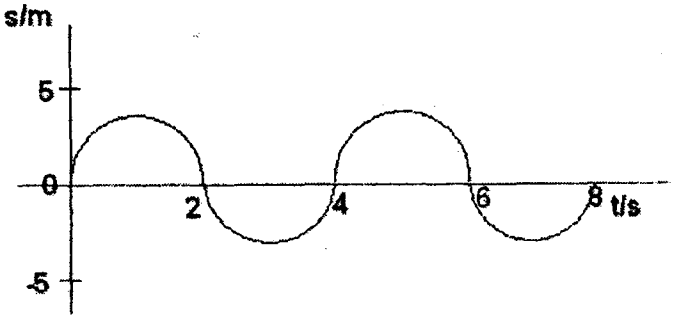


Diagram 23
Rajah 23

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

A 8 Hz.

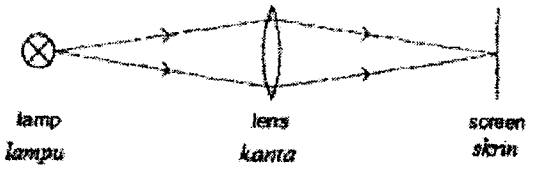
B ⅛ Hz

C 4 Hz.

D ¼ Hz

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

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



B A water ripple caused by a dipper moving up and down.
Riak gelombang air dihasilkan oleh pencelu y a n g bergetar atas dan bawah.

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

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

31 Diagram 24 shows water waves change direction when they move from shallow water to deep water.
Rajah 21 menunjukkan arah gelombang air berubah apabila merambat dari kawasan air cetek ke kawasan air dalam.

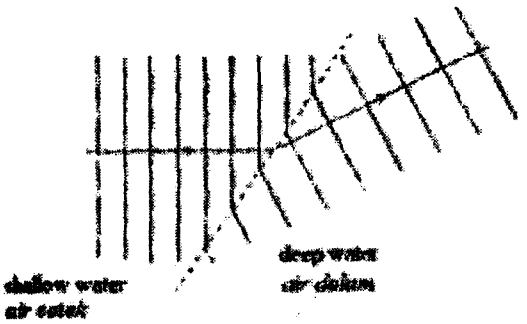


Diagram 24
Rajah 24

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

A refraction
pembiasan

B reflection
pantulan

C diffraction
belauan

D interference
Interferens

32 Diagram 25 shows an inteference pattern of water waves from two coherent sources P and Q.
Rajah 25 menunjukkan corak interferens gelombang air dari dua sumber koheren P dan Q.

Which point is the node ?
Titik yang manakah nod ?

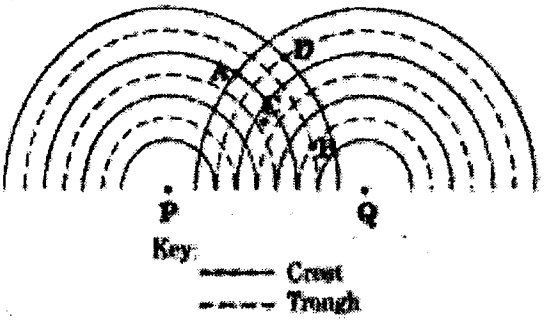


Diagram 25
Rajah 25

33 Diagram 26 shows a climber starts a stopwatch as he shouts. He hears an echo from the opposite side of the valley after 1.0s.
Rajah 26 menunjukkan seorang pendaki menghidupkan jam randik sambil menjerit. Diamendengar gema dari hujung lurah selepas 1.0 s.

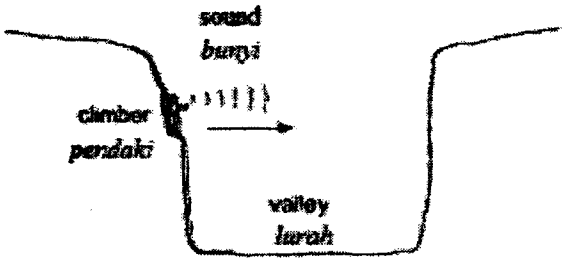


Diagram 26
Rajah 26

The sound travels at 340 ms $^{-1}$. What is the width of the valley. ?
Halaju gelombang bunyi ialah 340 ms^{-1}. Berapakah lebar lurah tersebut ?

A 85 m

B 170 m

C 340 m

D 680 m

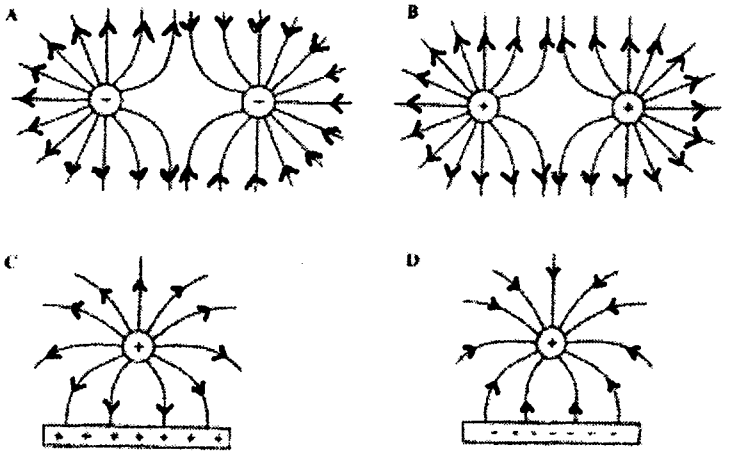
34 Radio waves , visible light and X- rays are all part of the electromagnetic spectrum. What is the correct order of increasing wavelength ?
Gelombang radio , cahaya nampak dan sinar X adalah sebahagian dari spectrum electromagnet.

Apakah susunan yang betul bagi panjang gelombang dalam tertib menaik ?

Shortest → longest
Paling pendek → *paling panjang*

A	Radio waves *Gelombang radio*	Visible light *Cahaya nampak*	X-rays *Sinar X*
B	Radio waves *Gelombang radio*	X-rays *Sinar X*	Visible light *Cahaya nampak*
C	X-rays *Sinar X*	Radio waves *Gelombang radio*	Visible light *Cahaya nampak*
D	X-rays *Sinar X*	Visible light *Cahaya nampak*	Radio waves *Gelombang radio*

35 Which diagram shows the correct electric field?
Rajah manakah yang menunjukkan medan electrik yang betul ?



36 Diagram 27 shows a complete circuit. The reading of the ammeter is *I* and the voltmeter is *V*.
Rajah 27 menunjukkan satu litar lengkap. Bacaan ammeter adalah I dan bacaan voltmeter adalah V.

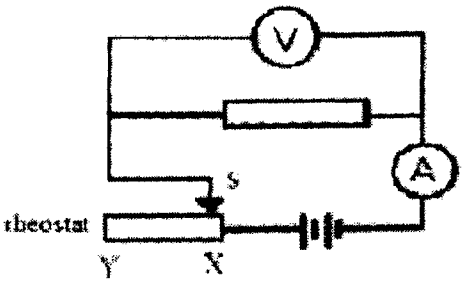


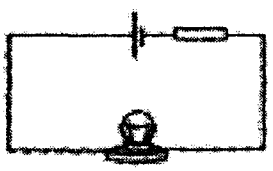
Diagram 27
Rajah 27

How do the values of *I* and *V* change when the sliding contact *S* of the rheostat is Slowly moved from *X* to *Y*?
Bagaimanakah nilai I dan V berubah apabila sentuhan bergerak S reostat digerak secara perlahan-lahan dari X ke Y ?

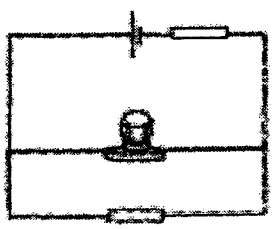
	I	*V*
A	Decreases *Berkurang*	Decreases *Berkurang*
B	Increases *Bertambah*	Decreases *Berkurang*
C	Decreases *Berkurang*	Increases *Bertambah*
D	Increases *Bertambah*	Increases *Bertambah*

37 In the following circuits, all the resistors and light bulbs are similar. In which circuit is the light bulb the brightest?
Tiap perintang dan lampu dalam litar-litar berikut adalah serupa. Lampu dalam litar yang manakah bernyala dengan paling cerah?

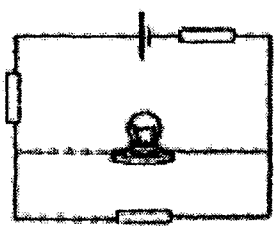
A



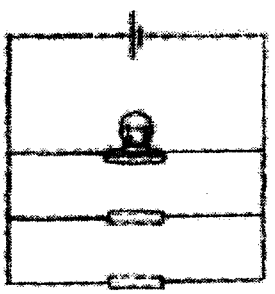
B



C



D



38 Diagram 28 show a lamp connected to a resistor and a battery.
Rajah 28 menunjukkan sebuah lampu disambung kepada perintang dan bateri.

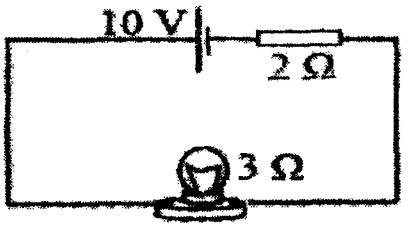


Diagram 28
Rajah 28

Calculate the power used by the light bulb.
Hitungkan kuasa yang digunakan oleh lampu.

A 6 W

B 12 W

C 20 W

D 50 W

39 Diagram 29 shows an electromagnet in a magnetic relay.
Rajah 29 menunjukkan sebuah electromagnet dalam sebuah geganti.

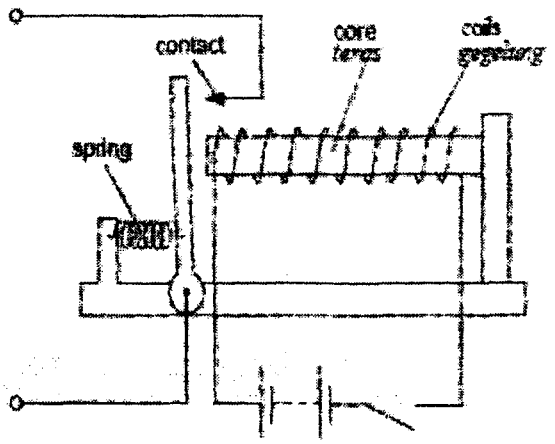


Diagram 29
Rajah 29

What change will increase the strength of the electromagnet ?
Perubahan manakah yang akan menambahkan kekuatan electromagnet ?

A Use a thinner wire to form the coils
Guna dawai yang lebih halus untuk membentuk gegelung

B Reduce the number of coils
Kurangkan bilangan lilitan gegelung

C Increase the magnitude of current
Tambahkan magnitude arus

D The metal used to make the core is aluminium.
Menggunakan aluminium untuk membuat teras

40 Diagram 30 shows a current –carrying conductor in magnetic field.
What is the direction of the force that acts on the conductor ?
Rajah 30 menunjukkan konduktor pembawa arus di dalam medan magnet.
Manakah a r a h daya y a n g bertindak ke atas konduktor ?

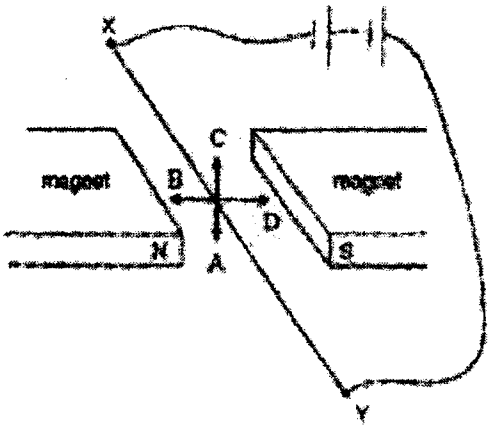


Diagram 30
Rajah 30

41 Diagram 31 shows a solenoid and a permanent magnet.
Rajah 31 menunjukkan sebuah solenoid dan magnet kekal.

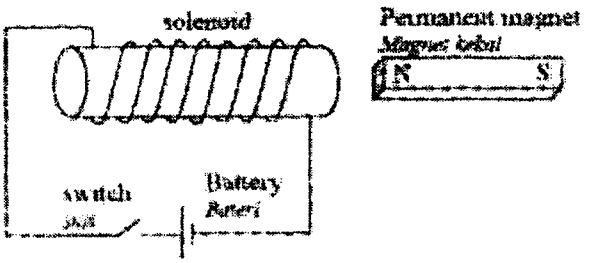


Diagram 31
Rajah 31

What will happen when the switch in Diagram 31 is closed?
Apakah yang akan berlaku apabila suis dalam Rajah 31 dihidupkan?

A. The solenoid and the magnet will mutually attract
Solenoid dan magnet kekal akan saling menarik

B The solenoid and the magnet will mutually repel
Solenoid dan magnet kekal akan saling menolak

C The magnet will vibrate
Magnet akan bergetar

D Nothing happens to the magnet
Tiada apa-apa yang akan berlaku kepada magnet

42 Why is electrical energy usually transmitted at high voltage ?
Kenapakah tenaga elektrik dihantar pada voltan tinggi ?

A To reduce energy loss in the transmission cables
Mengurangkan tenaga yang hilang dalam kabel penghantaran

B To increase the current in the transmission cables .
Meningkatkan arus yang mengalir dalam kabel penghantaran

C To reduce the resistance of the transmission cables .
Mengurangkan rintangan kabel penghantaran.

43 The purpose of using laminated iron core in a transformer is to
Tujuan penggunaan teras besi berlamina dalam transformer ialah untuk

A reduce resistance
Mengurangkan rintangan

B reduce eddy current
mengurangkan arus pusar

C prevent flux leakage
menghalang kebocoran fluks

D magnetized and demagnetized iron core easily.
Memagnet dan menyahmagnetkan teras bes dengan senang.

44. Diagram 32.1 shows the oscilloscope trace produced by an input of 2 V at a frequency of 50 Hz.
Rajah 32.1 menunjukkan surihan osiloskop yang dihasilkan oleh input 2 V pada frekuensi 50 Hz.

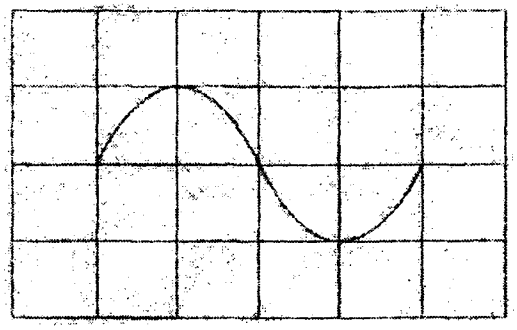


Diagram 32.1
Rajah 32.1

Diagram 32.2 shows the trace from a new input on the same oscilloscope.
Rajah 32.2 menunjukkan surihan dari input baru pada osiloskop yang sama.

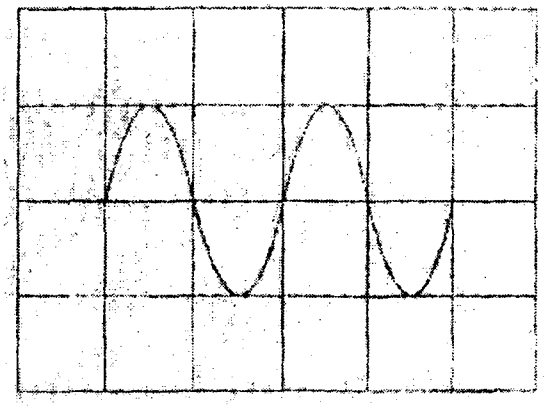


Diagram 32.2
Rajah 32.2

What is the value of the new input ?
Berapakan nilai input yang baru ?

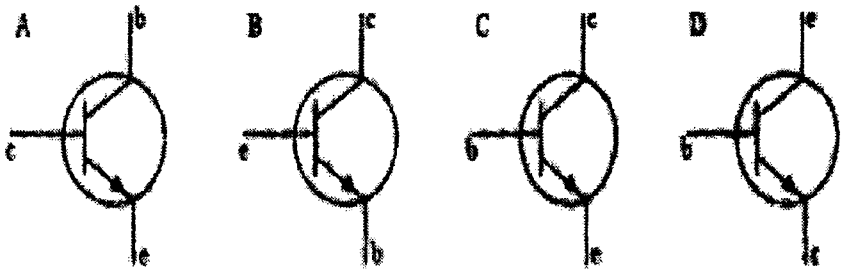
A 1 V at 50 Hz
1 V pada 50 Hz

B 2 V , 50 Hz
2 V pada 50 Hz

C 2 V at 100 Hz
2 V pada 100 Hz

D 4 V at 50 Hz
4 V pada 50 Hz

45. If **c**, **b** and **e** have the usual meanings for a transistor, which one of the transistors above Is correctly labelled ?
*Jika **c**, **b** dan **e** mempunyai maksud yang biasa bagi sebuah transistor, antara transistor di atas, yang manakah dilabelkan dengan betul ?*



46 Diagram 33.2 shows the graph of change of current, *I* with time, *t* for the current Which is flowing through $\mathbf{R}_1$ in Diagram 33.1 . Which of the following is most suitable to represent the current which flows through $\mathbf{R}_2$?
Rajah 33.2 menunjukkan graf perubahan arus, I dengan masa, t bagi arus yang sedang mengalir melalui $\boldsymbol{R}_1$ *dalam Rajah 33.1 . Antara berikut, yang manakah paling sesuai untuk mewakili arus melalui* $\boldsymbol{R}_2$ *?*

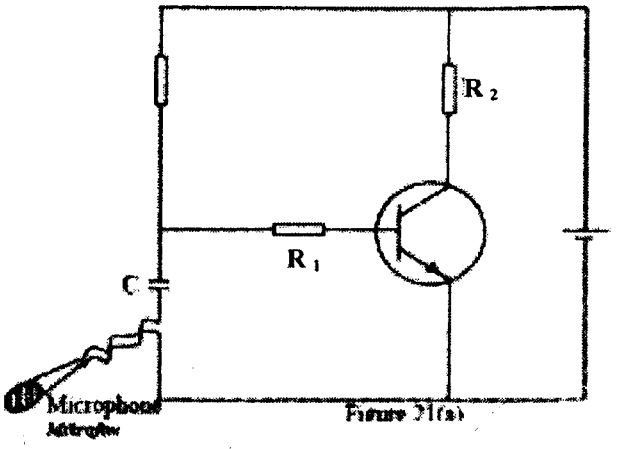


Diagram 33.1
Rajah 33.1

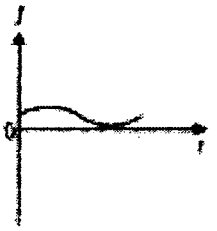
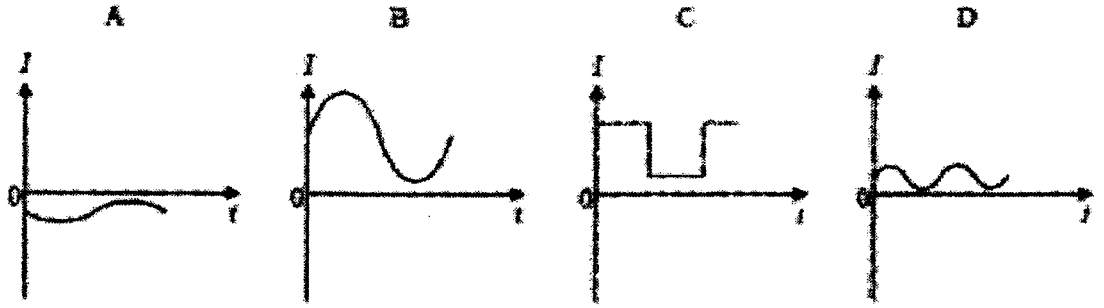


Diagram 33.2
Rajah 33.2



47. Diagram 34 shows a combination of logic gates. The input logics at A, B and C are respectively 1, 0 and 0.
Rajah 34 menunjukkan satu kombinasi get logik. Logik input di A, B *dan* C *adalah masing-masing* 1, 0 *dan* 0.

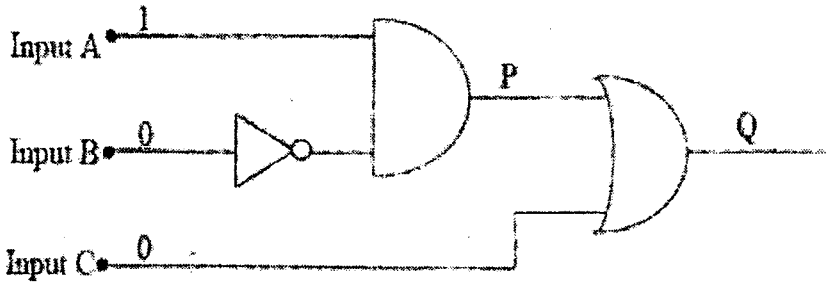


Diagram 34
Rajah 34

The output logics at **P** and **Q** are
Logik output di **P** *dan* **Q** *adalah*

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

48. Diagram 35 shows a series of radioactive decays for the nucleus of uranium-238 to that of radium-226.
Rajah 35 menunjukkan siri pereputan radioaktif nucleus uranium - 238 kepada radium -226.

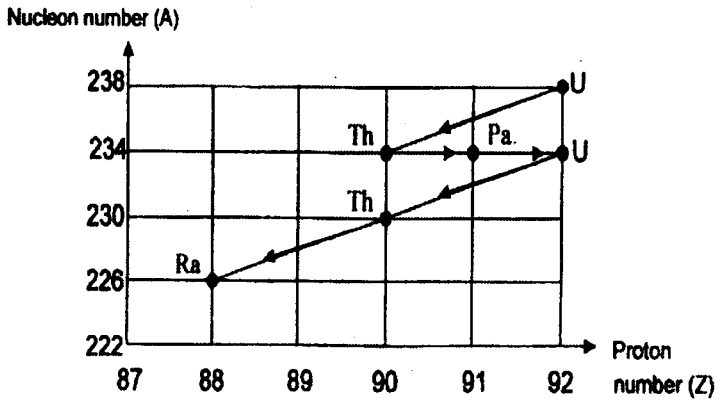


Diagram 35
Rajah 35

How many alpha and beta particles are emitted in this process ?
Berapakah bilangan zarah alpha dan zarah beta yang dipancarkan dalam proses ini ?

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

49 Diagram 36 show a fireman detecting radiation through lead walls of the storeroom. The radiation was emitted by the radioactive material.
Rajah 36 menunjukkan seorang ahli bomba sedang mengesan sinaran melalui dinding plumbum bilik stor. Sinaran tersebut dihasilkan oleh bahan radioaktif

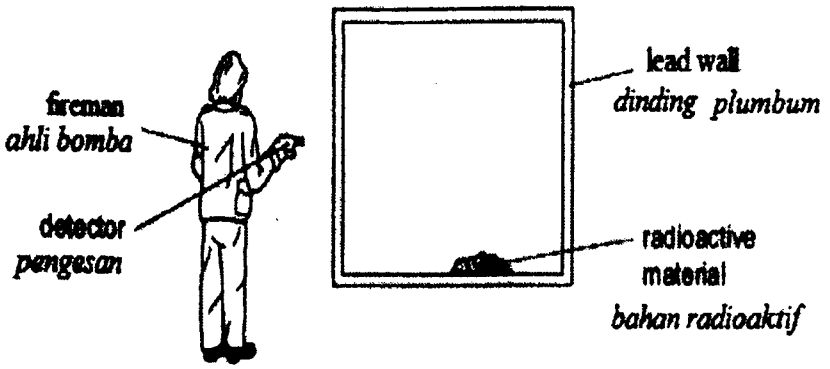


Diagram 36
Rajah 36

Which type of radiation was being detected ?
Apakah jenis sinaran yang dikesan ?

A α particles
zarah α

B β particles
zarah β

C γ rays
Sinar γ

D X-rays
Sinar X

50. The half-life of a radioactive substance is 3 days. How much time is required for 10 g of the substance to decay until 1.25 g is left?
Setengah hayat suatu jenis bahan radioaktif ialah 3 hari. Berapakah masa yang perlu untuk 10 g bahan ini reput hingga tertinggal 1.25 g?

A 3 days
3 hari

B 6 days
6 hari

C 9 days
9 hari

D 12 days
12 hari

END OF QUESTIOS PAPER
KERTAS SOALAN TAMAT

SULIT
4531/2
Fizik
Kertas 2
September
2010
2 ½ jam

Nama : _____

Tingkatan : _____

JABATAN PELAJARAN WILAYAH PERSEKUTUAN
KUALA LUMPUR

PERCUBAAN SPM 2010

FIZIK

Kertas 2

Dua jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Tuliskan* **nama** *dan* **tingkatan** *anda pada ruang yang disediakan.*
2. *Kertas soalan ini mengandung* **tiga** *bahagian:* **Bahagian A, Bahagian B** *dan* **Bahagian C.**
3. *Jawab* **semua** *soalan dalam* **Bahagian A**. *Tuliskan jawapan bagi* **Bahagian A** *dalam ruang yang disediakan dalam kertas soalan.*
4. *Jawab* **satu** *soalan daripada* **Bahagian B** *dan satu soalan daripada* **Bahagian C**.
5. *Tunjukkan kerja mengira, ini membantu mendapatkan markah.*
6. *Masa yang dicadangkan untuk menjawab* **Bahagian A** *ialah 90 minit,* **Bahagian B** *ialah 30 minit dan* **Bahagian C** *ialah 30 minit.*
7. *Gambar rajah yang mengiringi soalan tidak dilukiskan mengikut skala kecuali dinyatakan.*
8. *Anda dibenarkan menggunakan kalkulator saintifik yang tidak diprogramkan.*

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

Kertas soalan ini mengandungi 24 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 = $\frac{1}{2}mv^2$
7. Potential Energy = mgh
8. Elastic Potential Energy = $\frac{1}{2}Fx$
9. $\rho = \frac{m}{V}$
10. Pressure, $P = \frac{F}{A}$
11. Heat, $Q = mc\theta$
12. Heat, $Q = ml$
13. $\frac{pV}{T} = constant$
14. $E = mc^2$
15. $v = f\lambda$
16. Power, $P = \frac{energy}{time}$
17. $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$
18. Linear magnification = $\frac{\text{image size}}{\text{object size}}$
19. $\lambda = \frac{ax}{D}$
20. $n = \frac{\text{real depth}}{\text{apparent depth}}$
21. $Q = It$
22. $V = IR$
23. Power, $P = IV$
24. $\frac{N_s}{N_p} = \frac{V_s}{V_p}$
25. Efficiency = $\frac{I_s V_s}{I_p V_p} \times 100\%$
26. $g = 10 ms^{-2}$

Section A
Bahagian A
[60 marks]
[60 markah]

Answer **ALL** question
*Jawab **SEMUA** soalan*

1. A radioactive source emits two rays P and Q are placed in front of an electric field and the radioactive path is shown in Diagram 1.
Suatu sumber bahan radioaktif memancarkan sinar P dan Q diletakkan di dalam suatu medan elektrik dan lintasan radioaktif ditunjukkan dalam Rajah 1.

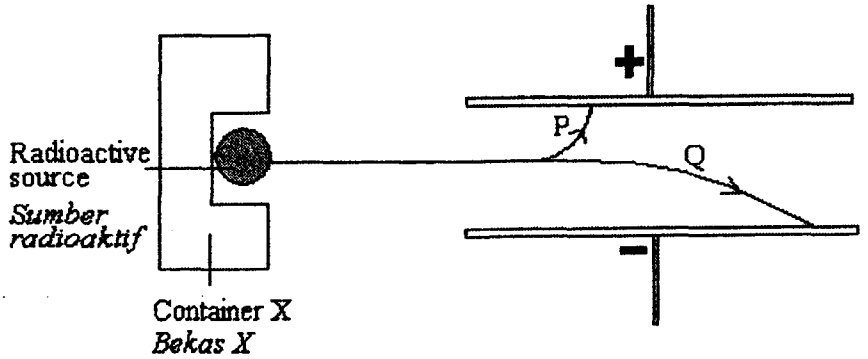


DIAGRAM 1
RAJAH 1

(a) (i) Complete this sentence by ticking (√) correct word.
Lengkapkan ayat berikut dengan menandakan (√) perkataan yang betul.

Ray Q is
Sinar Q ialah

☐ an alpha particle
satu zarah alfa

☐ a beta particle
satu zarah beta

☐ a gamma ray
sinar gama

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

(ii) Give a reason for your answer in (a)(i).
Berikan sebab bagi jawapan anda di (a)(i).

.....

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

(b) Name the material of container X.
Namakan bahan bagi bekas X.

.....

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

(c) Why is the size of deflection of ray Q is lesser than ray P?
Mengapakah saiz pemesongan sinar P lebih besar daripada sinar Q?

.....

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

2. Figure 2 shows two convex lenses, R and S, used in an astronomical telescope. The focal length for R is 40 cm and for S is 10 cm.
Rajah 2 menunjukkan dua kanta cembung , R dan S yang digunakan dalam teleskop astronomi

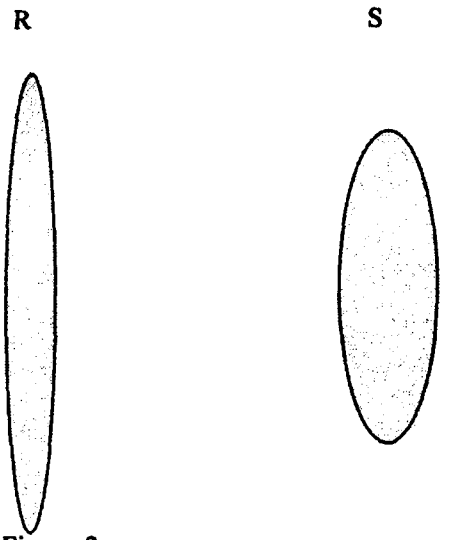


Figure 2
Rajah 2

(a) Define the power of lens
Takrifkan kuasa kanta.

.....

[1 mark]
[1 markah]

(b) Gives two reasons why R is used as the objective lens of the telescope.
Berikan dua sebab kenapa R digunakan sebagai kanta objektif dalam teleskop

.....

.....

.....

[2 mark]
[2 markah]

(c) Calculate the magnification of the final image formed by the telescope at normal adjustment.
Kirakan pembesaran pada imej yang terbentuk oleh teleskop pada kedudukan yang normal.

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

3. Diagram 3 shows an arrangement of logic gates in an electronic device.
Rajah 3 menunjukkan susunan bagi get-get logik dalam satu peranti elektronik.

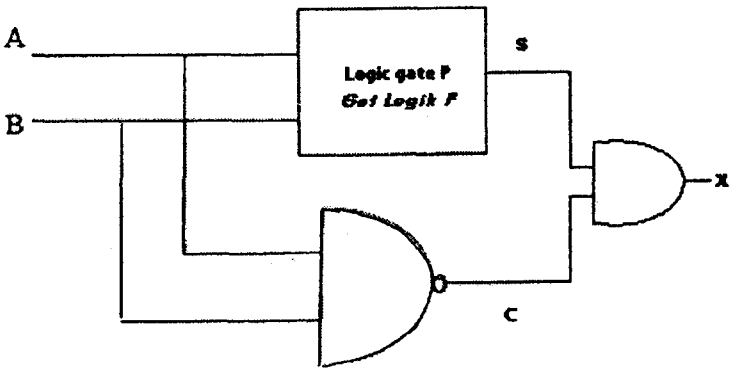


Diagram 3
Rajah 3

(*a*) Table 3.1 shows the truth table for P.
Jadual 3.1 menunjukkan jadual kebenaran bagi P.

A	*B*	*S*
0	0	1
0	1	0
1	0	0
1	1	0

Table 3.1
Jadual 3.1

(i) Name the logic gate P.
Namakan get logik P.

.....

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

(ii) Draw the symbol for logic gate P.
Lukiskan simbol bagi get logik P.

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

(b) Complete the Table 3.2 below for the output from the combination of the logic gates in Diagram 3.
Lengkapkan Jadual 3.2 di bawah bagi output kepada susunan get logik dalam Rajah 3.

A	*B*	*X*
0	0	
0	1	
1	0	
1	1	

Table 3.2
Jadual 3.2

[4 *marks*]
[4 *markah*]

4. Diagram 4 shows a transformer.
Rajah 4 menunjukkan sebuah transformer.

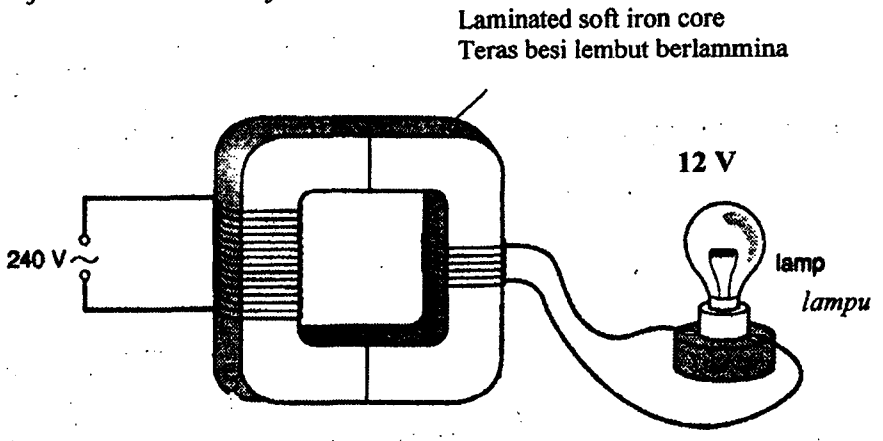


Diagram 4
Rajah 4

a. i.Name the type of transformer shown in Diagram 4.
Namakan jenis transformer yang ditunjukkan dalam Rajah 4.

.....

[1 mark]
[1markah]

ii. State why laminated soft iron is used as a transformer core.
Nyatakan mengapa besi lembut berlamina digunakan sebagai teras transformer.

.....

[1 mark]
[1markah]

b. i. The number of turns on the primary coil in Diagram 4 is 1000.
Calculate the number of turns on the secondary coil.
Bilangan lilitan pada gegelung primer pada Rajah 4 ialah 1000.
Hitung bilangan lilitan pada gegelung sekunder.

[2 marks]
[2markah]

ii. The current in the primary coil is 0.2 A and the efficiency is 80%.
Calculate the output power of the transformer.
Arus yang mengalir dalam gegelung primer ialah 0.2 A dan kecekapannya ialah 80%. Hitungkan kuasa output transformer itu.

[2 marks]
[2markah]

c. An electrical appliance which needs more than 40 W of power is connected to the transformer output.
Suggest a modification to the transformer the enables the appliance to function correctly.
Satu alat elektrik yang memerlukan kuasa 40 W disambung pada output transformer itu.
Cadangkan satu pengubahsuaian pada transformer tersebut supaya alat itu boleh berfungsi dengan sebaiknya.

.....

.....

[1 mark]
[1markah]

5. Diagram 5.1 shows a manometer attached to a non uniform horizontal tube.
Rajah 5.1 menunjukkan manometer yang bersambung kepada tiub yang tidak sekata.

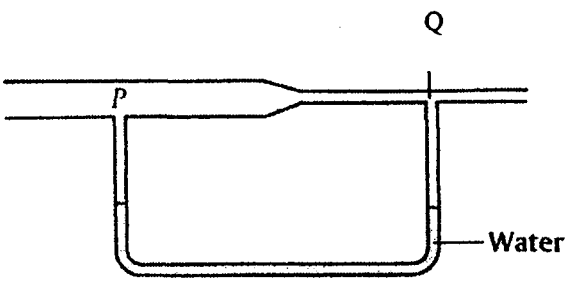


Diagram 5.1
Rajah 5.1

(a) Explain why the two water levels in the two arms of the manometer are at the same height.
Terangkan kenapa paras air pada kedua-dua lengan manometer adalah sama.

.....

.....

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

(b) Air is passed through the horizontal tube as shown in Diagram 5.2
Udara disalurkan melalui tiub mendatar seperti ditunjukkan pada Rajah 5.2

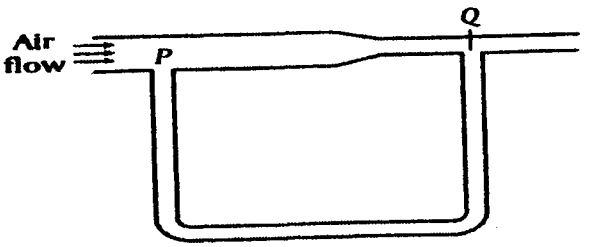


Diagram 5.2
Rajah 5.2

(i) Compare the air speed at P and Q.
Bandingkan kelajuan udara pada P dan Q

.....

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

(ii) Compare the air pressure at P and Q.
Bandingkan tekanan udara pada P dan Q

.....

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

(iii) State the relationship between speed of air and pressure of air.
Nyatakan hubungan di antara laju udara dan tekanan udara.

.....

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

(iv) On Diagram 5.2, mark the water level in the two arms of the manometer as the air is flowing in the horizontal tube.
Pada Rajah 5.2, tandakan paras air pada lengan manometer apabila udara dialirkan melalui tiub mendatar.

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

(v) Name the principle involved in this observation.
Namakan prinsip yang terlibat dalam pemerhatian ini.

.....

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

6. Diagram 6.1 shows the interference pattern from two coherent sources formed by two spherical dippers, S_1 and S_2 in a ripple tank. Each of the circular line represents a crest-line or the wavefront.
Rajah 6.1 menunjukkan corak interferens daripada dua punca yang koheren dengan dua pencelup S_1 *dan* S_2 *dalam tangki riak. Garisan bulatan mewakili garisan puncak atau muka gelombang.*

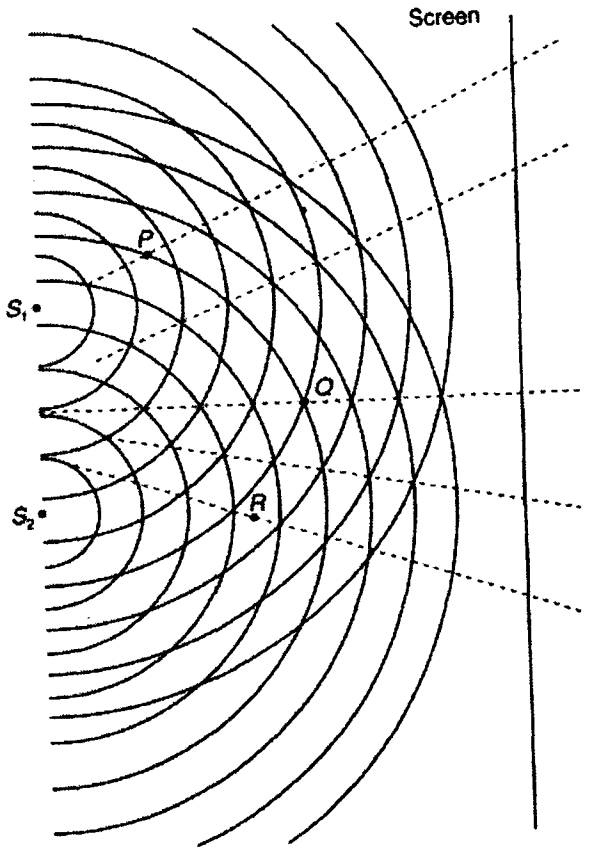


Diagram 6.1
Rajah 6.1

(a) What is meant by two coherent sources ?
Apa yang dimaksudkan dengan dua punca yang koheren ?

.....

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

(b) How can you ensure that the two sources are coherent ?
Bagaimanakah anda memastikan dua punca adalah koheren?

.....

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

(c) Describe the type of interference and the state of motion at
Huraikan jenis interferens dan keadaan pergerakan pada

(i) P :.....

(ii) Q :.....

(iii) R :.....

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

(d) What is the name given to point P, Q and R ?
Namakan titik P, Q dan R

(i) P :.....

(ii) Q :.....

(iii) R :.....

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

7 Diagram 7 shows a dentist chair for children. The chair uses a hydraulic system.
Rajah 7 menunjukkan sebuah kerusi untuk mencabut gigi kanak-kanak. Kerusi ini menggunakan sistem hidraulik.

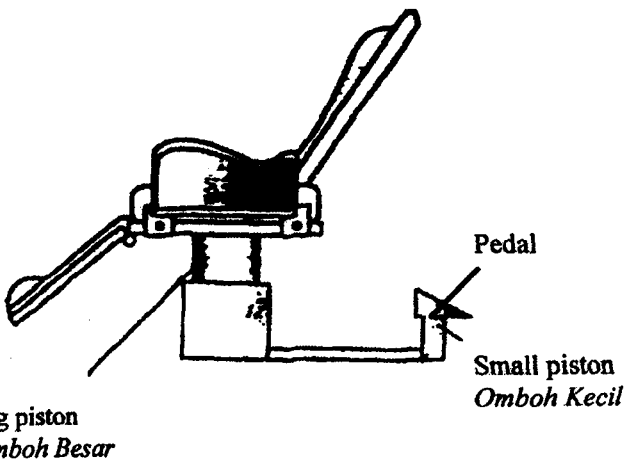


DIAGRAM 7
RAJAH 7

(a) Name the physics principle used in a hydraulic system.
Namakan prinsip fizik yang digunakan dalam sistem hidraulik.

.....

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

(b) Explain how the chair can be lifted up when the pedal is pressed down?
Terangkan bagaimana kerusi itu dapat dinaikkan apabila pedal ditekan ke bawah?

.....

.....

.....

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

(c) Why the system is less effective if air bubbles are present in hydraulic fluid?
Mengapakah sistem itu kurang berkesan jika gelembung udara wujud dalam cecair hidraulik?

.....

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

(d) The cross sectional area of the big piston and the small piston are 100 cm^2 and 30 cm^2 respectively. The mass of the chair is 20 kg.
Calculate the force exerted on the small piston required to lift the child of 30 kg.
Luas keratan rentas omboh besar dan omboh kecil masing-masing adalah 100 cm^2 dan 30 cm^2. Jisim kerusi ialah 20 kg.
Hitungkan daya yang dikenakan pada omboh kecil untuk mengangkat seorang kanak-kanak berjisim 30 kg.

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

(e) Suggest the modifications required to the size of piston and the size of the seat so that the chair is suitable and safe for the use of adults. Give reasons for your answers.
Cadangkan pengubahsuaian yang perlu dilakukan pada saiz omboh dan saiz tempat duduk supaya kerusi ini sesuai dan selamat digunakan untuk orang dewasa. Berikan sebab untuk jawapan anda.

Piston size :.....
Saiz piston :

Reason :.....
Sebab :

Seat size :.....
Saiz tempat duduk:

Reason :.....
Sebab :

[4 *marks*]
[*4 markah*]

[Lihat sebelah
SULIT

8. Diagram 8 shows an electric kettle with specification of 240 V, 1.5 kW.
Rajah 8 menunjukkan sebuah cerek elektrik dengan spesifikasi 240V, 1.5 kW.

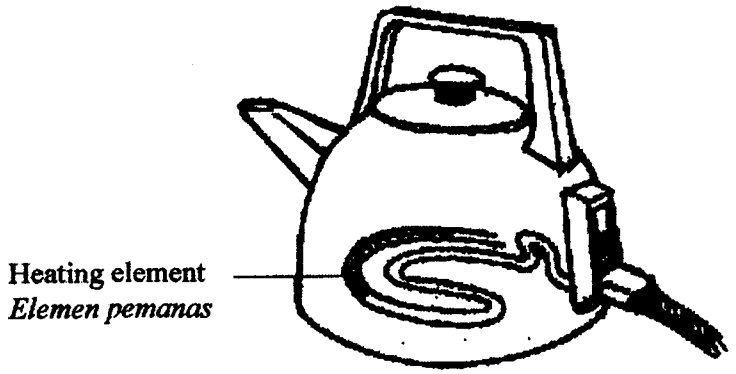


DIAGRAM 8
RAJAH 8

(a) What is meant by the label 240V, 1.5 kW?
Apakah yang dimaksudkan dengan label 240V, 1.5 kW?

.....

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

(b) Calculate
Hitungkan

(i) the current flowing through the electric kettle.
arus yang mengalir melalui cerek elektrik itu.

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

(ii) the resistance of the heating element in the kettle.
Rintangan elemen pemanas dalam cerek elektrik itu.

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

(c) Four electric kettles W, X, Y and Z with specification 240 V, 2 kW are made from the materials with different characteristics. Table 8 shows the characteristics of the materials.
Empat cerek elektrik W, X ,Y dan Z dengan spesifikasi 240 V, 2 kW diperbuat daripada bahan-bahan yang mempunyai ciri yang berlainan. Jadual 8 menunjukkan ciri-ciri bahan tersebut.

Kettle *Cerek*	The characteristics of the materials are used in the heating element in the kettle *Ciri-ciri bahan yang digunakan dalam elemen pemanas cerek .*		
	Melting point *Takat lebur* /°C	Resistivity/ *Kerintangan* 10^{-8} Ω m	Fuse *Fius*
W	3501	13.5	8A
X	1085	5.2	10A
Y	3387	12.4	10A
Z	1064	4.63	8A

TABLE 8
JADUAL 8

(i) Based on the characteristics of the heating elements in Table 8, suggest **two** electric kettles are suitable to heat water. Give reasons for your answers.
*Berdasarkan ciri-ciri elemen pemanas dalam Jadual 8, cadangkan **dua** cerek elektrik yang sesuai untuk memanaskan air. Berikan sebab bagi jawapan anda.*

.....

.....

.....

.....

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

(ii) Based on the fuse used in the Table 8.1, suggest **two** electric kettles are suitable to heat water. Give a reason for your answer.
*Berdasarkan fius yang digunakan dalam Jadual 8.1, cadangkan **dua** cerek elektrik yang sesuai digunakan untuk memanaskan air. Berikan sebab bagi jawapan anda.*

.....

.....

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

(iii) Using your answer in (b)(i) and (b)(ii), suggest which electric kettle is the most suitable to heat water. Give reasons for your answer.
Menggunakan jawapan anda dalam (b)(i) dan (b)(ii), cadangkan cerek elektrik yang paling sesuai digunakan untuk memanaskan air. Berikan sebab bagi jawapan anda.

.....

.....

.....

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

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 professional baseball team trains their players by allowing them to go through "hitting the ball" drills that are ejected from a spring system in two initial state of compression as shown in Diagram 9.1 and Diagram 9.2.
Kumpulan bola lisut profesional telah melatih pemainnya dengan membenarkan mereka menghentam bola yang dilepaskan dari sistem spring dalam dua keadaan mampatan awal seperti yang ditunjukkan dalam Rajah 9.1 dan Rajah 9.2.

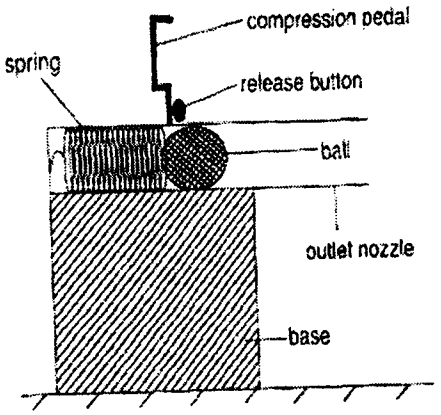


Diagram 9.1
Rajah 9.1

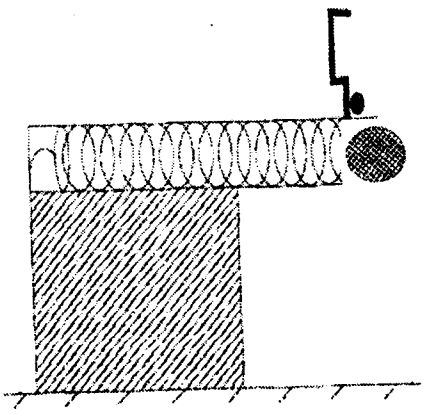


Diagram 9.2
Rajah 9.2

A compression pedal is depressed to compress the spring. The target ball is then placed beside the compressed spring. The release button is depressed which releases the compressed spring and the ball is ejected with a high speed for the base ball players to hit.
Pedal mampatan digunakan untuk memampatkan spring. Bola sasaran diletakkan bersebelahan dengan spring termampat. Butang pelepas akan melepaskan spring termampat dan bola akan memecut dengan halaju tinggi supaya pemain boleh menghentam bola tersebut.

(a) What principle/law explains the relation between the compression of the spring and the applied force? [1 *mark*]
Apakah prinsip/hukum yang menerangkan hubungan di antara mampatan spring dan daya yang dikenakan. [1 *markah*]

(b) Using Diagram 9.1 and Diagram 9.2 compare
(i) the elastic potential energy in the spring
(ii) the speed of the ball after being ejected
(iii) the distance travelled by the ball after ejection
[3 marks]
[3 *markah*]

Menggunakan Rajah 9.1 dan Rajah 9.2, bandingkan
(i) Tenaga keupayaan kenyal dalam spring
(ii) Halaju bola apabila dilepaskan
(iii) jarak yang dilalui apabila dilepaskan

(c) State the relationship between the compression of the spring and
(i) the speed of the ball after being ejected
(ii) the distance travelled by the ball after ejection
[2 marks]
[2 *markah*]

Nyatakan hubungan antara jarak mampatan spring dengan
(i) halaju bola selepas di lepaskan.
(ii) Jarak bola apabila dilepaskan

(d) State two modifications that can be done to the spring in order to generate a higher speed for the ball. Give reasons for your answers.
[4 *marks*]
[4 *markah*]

Nyatakan dua perubahan yang boleh dilakukan kepada spring supaya bola boleh dilepaskan dengan halaju yang tinggi. Berikan sebab untuk jawapan anda.

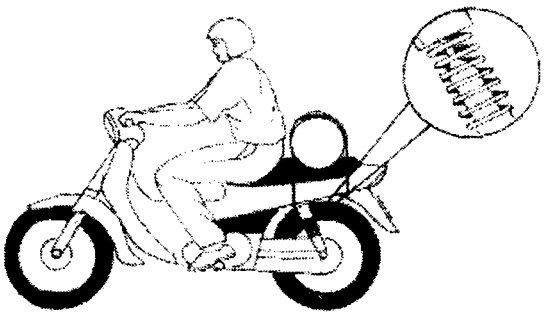


Diagram 9.3
Rajah 9.3

(e) Diagram 9.3 shows a worker carrying a gas tank. The motorcycle is to be modified for beach patrol. It has to travel on soft, sandy beaches and provide maximum comfort for the passengers. Using appropriate concepts in physics, suggest and explain suitable modifications or ways that this can be carried out. Base your answers on the following aspects:

Rajah 9.2 menunjukkan seorang pekerja membawa tangki gas. Motosikal ini diubahsuai untuk meronda tepi pantai. Menggunakan konsep fizik yang sesuai, cadang dan terangkan

pengubahsuaian atau cara yang boleh dilakukan. Jawapan anda seharusnya berdasarkan pada aspek-aspek berikut:

(i) diameter of spring
diameter spring

(ii) width of tyres
kelebaran tayar

(iii) material of the seat
bahan untuk tempat duduk

(iv) material for motorcycle frame
bahan untuk rangka motosikal

(v) thread patterns on the tyres
pola bunga pada tayar

[10 marks]
[10 *markah*]

10 Diagram 10.1 shows a wire coil connected to a d.c power supply, an ammeter and a switch. The pattern of iron fillings shows the pattern of magnetic field produced.
Rajah 10.1 menunjukkan satu gegelung dawai disambungkan ke satu bekalan kuasa a.t, ammeter dan suis. Corak serbuk besi menunjukkan medan magnet yang terbentuk.

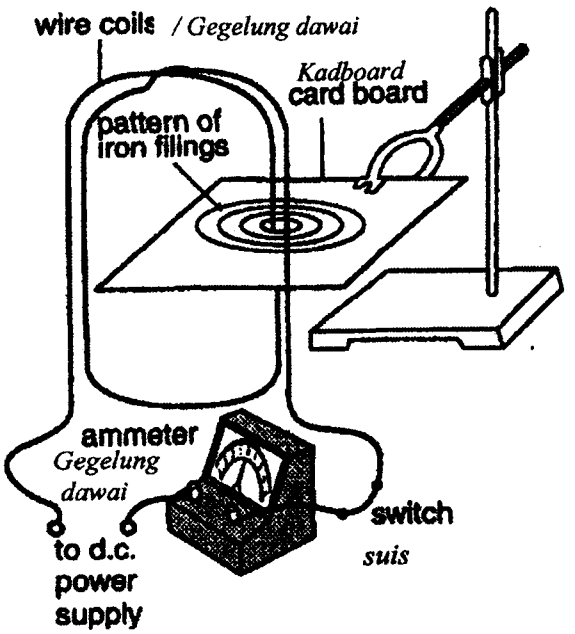


Diagram 10.1
Diagram 10.1

Diagram 10.2, 10.3 and 10.4 show the pattern of magnetic fields with different number of turns in the coils and different values of electric current.
Rajah 10.2, 10.3dan 10.4 menunjukkan corak medan magnet yang menggunakan bilingan lilitan dawai yang berbeza dan nilai arus yang berbeza.

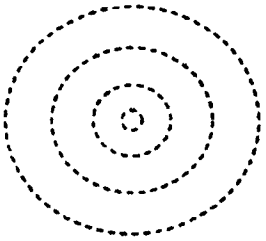


Diagram 10.2
Rajah 10.2
Number of turns = 2
Electric current = 1 A
Bilangan lilitan = 2
Arus elektrik = 1 A

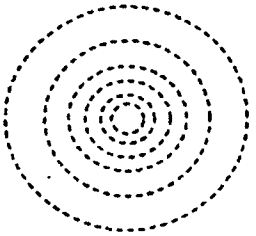


Diagram 10.3
Rajah 10.3
Number of turns = 10
Electric current = 1 A
Bilangan lilitan = 10
Arus elektrik = 1 A

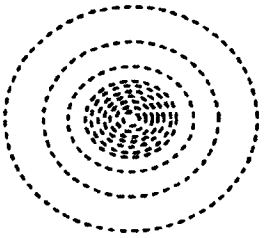


Diagram 10.4
Rajah 10.4
Number of turns = 10
Electric current = 3 A
Bilangan lilitan = 10
Arus elektrik = 3 A

a. i. What is meant by **magnetic field** ?
*Apakah yang dimaksudkan dengan **medan magnet** ?*

[1 mark]
[1 markah]

ii. What is the effect on the strength of magnetic field if the density of magnetic field increased?
Apakah kesan ke atas kekuatan medan magnet jika ketumpatan medan magnet bertambah?

[1 mark]
[1 markah]

b Based on Diagram 10.2, 10.3 and 10.4, compare the
- shape of magnetic field produced by a current-carrying conductor.
- density of the pattern produced by different number of turns when the current is fixed.
- density of the pattern produced with different values of current in a coil with fixed number of turns.

State the relationship between the strength of magnetic field with
- the electric current
- number of turns in a current-carrying coil.

Berdasarkan Rajah 10.2, 10.3 dan10.4, bandingkan
- *corak medan magnet yang dihasilkan oleh konduktor yang membawa arus.*
- *ketumpatan corak yang dihasilkan oleh bilangan lilitan yang berbeza apabila nilai arus ditetapkan.*
- *ketumpatan corak yang dihasilkan dengan nilai arus yang berbeza pada gegelung apabila bilangan lilitan ditetapkan.*

Nyatakan hubungan di antara kekuatan medan magnet dengan
- *arus elektrik*
- *bilangan lilitan gegelung pembawa arus.*

[5 marks]
[5 markah]

c. Diagram 10.5 shows a current carrying conductor being placed between two magnets of opposing polarity.
Rajah 10.5 menunjukkan sebuah konduktor pembawa arus diletakkan di antara dua magnet yang berlawanan kutub.

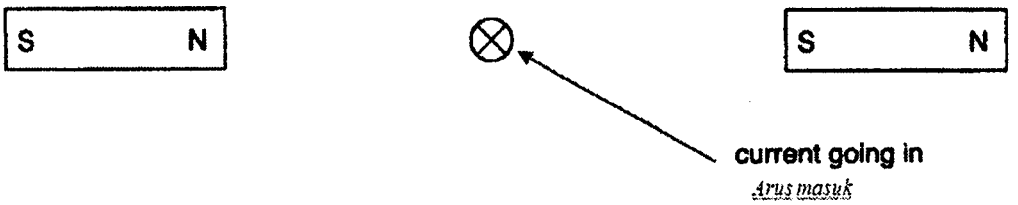


Diagram 10.5
Rajah 10.5

i. Copy the diagram and draw the resultant magnetic field.
Salin rajah di atas dan lukiskan paduan medan magnet .

ii. Show and label the direction of a resultant magnetic force.
Tunjukkan dan tandakan arah daya paduan magnet yang terhasil.

[3 marks]
[3 markah]

d Diagram 10.6 shows a crane transferring loads of scrapped iron.
. *Rajah 10.6 menunjukkan sebuah kren sedang mengangkat besi buruk.*

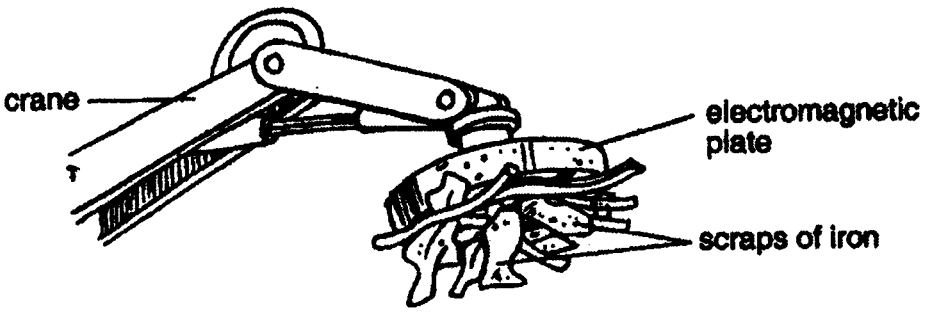


Diagram 10.6
Rajah 10.6

A crane needs an efficient electromagnetic plate so as to work more effectively.
Suggest and explain how to modify a electromagnetic plate which can increase the efficiency and lift more scraps of iron. Based your answers on the following aspect:
Sebuah kren perlukan sebuah plat elektromagnet yang cekap.
Cadang dan terangkan bagaimana untuk membina sebuah plat elektromagnet yang berkesan dan dapat mengangkat lebih banyak besi buruk pada satu masa, berdasarkan aspek-aspek berikut:

i. the size and characteristics of electromagnetic plate
saiz dan ciri-ciri plat elektromagnet.

ii. diameter of wire for current carrying coil
diameter dawai yang digunakan pada gegelung.

iii. number of turns in coil
bilangan lilitan dawai pada gegelung.

[10 marks]
[10 markah]

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 and 1 1 . 2 hows two different situations that happen in our daily life. Diagram 11.1 shows a hand touching a hot kettle and Diagram 11.2 shows a hand holding an ice. Both are having different temperatures. The arrow in both diagrams indicates the direction of heat flow.
Rajah 1 1 .1 dan 11.2 menunjukkan dua situasi yang berlaku didalam kehidupan seharian. Rajah 11.1 menunjukkan tangan tersentuh cerek yang panas dan Rajah 11.2 menunjukkan tangan memegang seketul ais. Kedua-duanya mempunyai suhu yang berbeza.

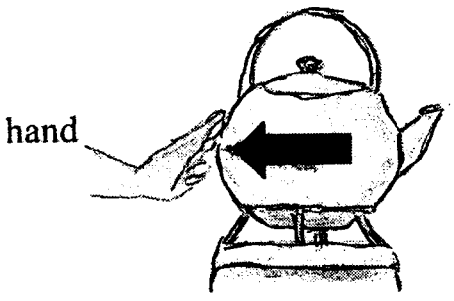


Diagram 11.1
Rajah 11.1

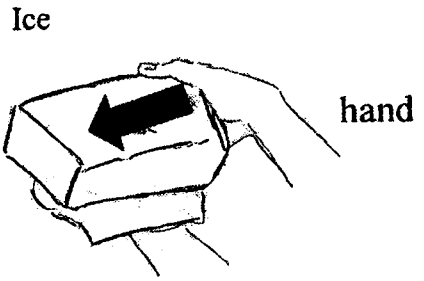


Diagram 11.2
Rajah 11.2

(a) (i) What is meant by temperature?
Apakah yang dimaksudkan dengan suhu?

[1 mark]
[1 markah]

(ii) Using Diagram 11.1 and 11.2, compare the temperature of the objects, the effect of heat experienced by the hands and the direction of heat flow.
Menggunakan Raja1 1 1 .1 dan 11.2 bandingkan suhu kedua-dua objek dan kesan haba yang dirasai oleh kedua-dua tangan dan arah pengaliran haba.

Relate the direction of the heat flow to the difference in temperature between objects which are in thermal contact.
Hubungkaitkan arah pengaliran haba dengan perbezaan suhu antara objek yang bersentuhan secara terma [4 marks]
[4 markah]

(b) (i) Name one substance that has a very high specific heat capacity. Based on this, explain the use of this substance in a practical situation. [2 marks]
[2 markah]
Nama satu bahan yang mempunyai muatan haba yang tinggi. Berdasarkan ini, jelaskan kegunaan bahan tersebut dalam situasi praktik.

(ii) Based on the kinetic Theory of matter, explain what happens to the molecules of a substance when its temperature rises. [1 mark]
[1 markah]
Berdasarkan Teori Kinetik Jirim, jelaskan apa yang berlaku kepada molekul bahan tersebut apabila suhu meningkat.

(iii) A 400 g block of copper is heated to 100 ^{0}C and dropped into a beaker containing 500 g of oil. If the initial temperature of the oil was 20 ^{0}C, calculate the final temperature of the mixture.
Sebuah blok kuprum berjisim 400g dipanaskan kepada 100 ^{0}C dan diturunkan ke dalam bikar yang mengandungi 500 g minyak . Jika suhu awal minyak ialah 20 ^{0}C, tentukan suhu akhir campuran tersebut.
[Specific heat capacity of oil = 2000 J kg^{-1} ^{0} C^{-1}, Specific heat capacity of copper = 390 J kg^{-1} ^{0} C^{-1}]
[muatan haba minyak = 2000 J kg^{-1} ^{0} C^{-1}, muatan haba kuprum = 390 J kg^{-1} ^{0} C^{-1}]
[2 marks]
[2 markah]

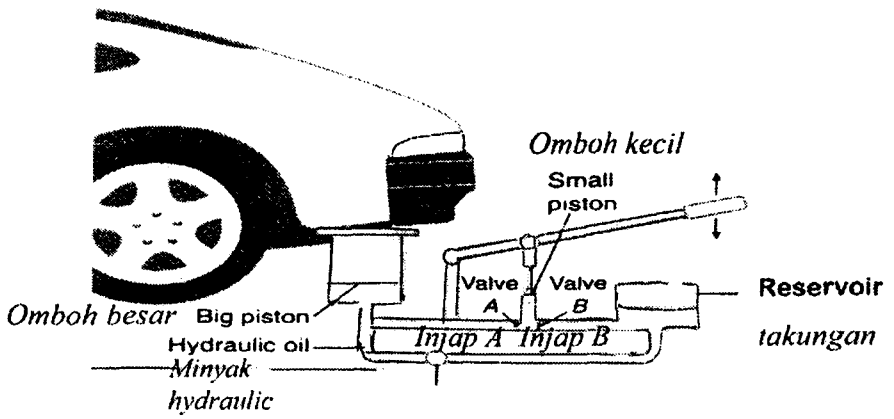


Diagram 11.3
Rajah 11.3

(c) Diagram 11.3 shows a hydraulic jack lifting the back portion of the car.
Rajah 11.3 menunjukkan jet hidraulik digunakan untuk menaikkan bahagian belakang kereta.

Type of liquid Jenis cecair	Boiling point/^{0}C Takat didih/^{0}C	Specific heata capacity/J kg^{-1} ^{0}C^{-1} Muatan haba tentu/J kg^{-1} ^{0}C^{-1}	Density/ Ketumpatan/ kgm^{-3}	Rate of evaporation/ kadar pengewapan
K	357	140	13600	Low Rendah
L	130	2500	800	Low Rendah
M	100	4200	1000	Average Sederhana
N	55	2200	790	High Tinggi

Table 11.3
Jadual 11.3

Table 11.3 shows four type of liquid, K, L, M, and N, with different specifications. You are required to determine the most suitable liquid that can be used as a hydraulic fluid in the hydraulic jack.

Study the specifications of all the four types of liqiud from the following aspects:

Jadual 11.3 menunjukkan empat jenis cecair, K,L,M, dan N, dengan spesifikasi yang berbeza. Anda dikehendaki menentukan cecair yang paling sesuai digunakan sebagai sebagai cecair hidraulik dalam jet hidraulik.

Kaji spesifikasi keempat-empat jenis cecair itu dari aspek berikut:

i) Boiling point of the liquid
Takat didih cecair

ii) Specific heat capacity of liquid
Muatan haba tentu cecair

iii) Density of liquid
Ketumpatan cecair

iv) Rate of vaporation of liquid
Kadar pengewapan cecair

[10 marks]
[10 markah]

12. Radioactive material is used in the field of agriculture as tracers to study the absorption of fertilizers by plants.
Bahan radioaktif digunakan dalam bidang pertanian sebagai penyurih untuk mengkaji penyerapan baja oleh tumbuhan.

(a) A researcher conducted a study on absorption of fertilizers by plants using a radioisotope. Diagram 12.1 shows how the radioisotope is injected into the stem of the plant.
Seorang penyelidik telah menjalankan satu kajian untuk menyiasat penyerapan baja oleh tumbuhan menggunakan sejenis radioisotop. Rajah 12.1 menunjukkan bagaimana radioisotop tersebut disuntik ke dalam batang tumbuhan.

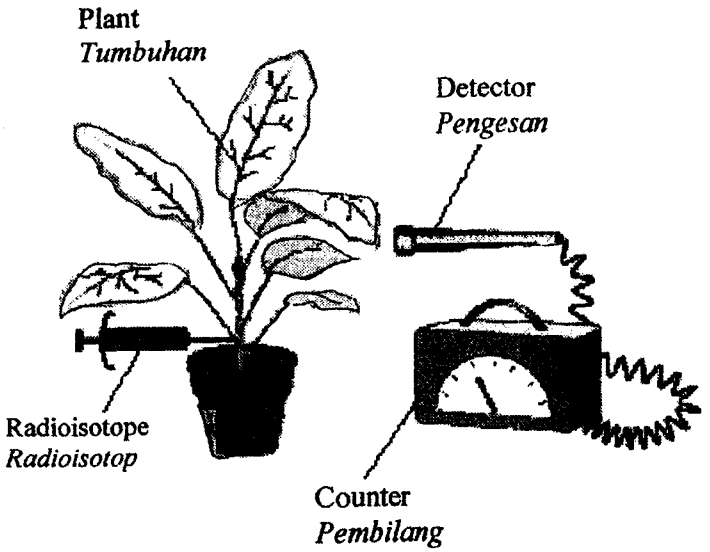


Diagram 12.1
Rajah 12.1

Based on the information on radioactivity and Diagram 12.1:
Berdasarkan maklumat keradioaktifan dan Rajah 12.1:

(i) What is meant by radioisotope?
Apakah yang dimaksudkan dengan radioisotop?

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

(ii) The detector used is able to detect background radiation. State two sources of background radiation.
Alat pengesan yang digunakan dapat mengesan sinaran latar belakang. Nyatakan dua sumber bagi sinaran latar belakang.

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

(b) You are assigned to study the characteristics of some radioisotopes that are suitable to be use in studying the absorption of fertilizers by plants.
Anda ditugaskan untuk mengkaji ciri-ciri beberapa radioisotop yang sesuai digunakan dalam mengkaji penyerapan baja oleh tumbuhan.

Table 12.2 shows the characteristics of four radioisotopes.
Jadual 12.2 menunjukkan ciri-ciri bagi empat radioisotop.

Radioisotope *Radioisotop*	Ionizing power by radiation *Kuasa pengionan oleh sinaran*	Half life *Separuh hayat*	State of matter *Keadaan jirim*
J	High *Tinggi*	140 days *140 hari*	Solid *Pepejal*
K	High *Tinggi*	8 years *8 tahun*	Liquid *Cecair*
L	Low *Rendah*	5.27 years *5.27 tahun*	Solid *Pepejal*
M	Low *Rendah*	14.3 days *14.3 hari*	Liquid *Cecair*

Table 12.1
Jadual 12.1

Explain the suitability of each characteristics of the radioisotope and determine the most suitable radioisotope to be used for studying the absorption of fertilizers by plants.

Give reasons for your choice.

Terangkan kesesuaian setiap ciri radioisotop dan tentukan radioisotop yang paling sesuai untuk digunakan bagi tujuan mengkaji penyerapan baja oleh tumbuhan.
Beri sebab bagi pilihan anda.

[8 *marks*]
[8 *markah*]

(c) Nuclear fission produces a chain reaction. Describe how chain reaction occurs in nuclear fission of Uranium-235.
Pembelahan nukleus menghasilkan tindak balas berantai. Terangkan bagaimana tindakbalas berantai berlaku dalam pembelahan atom Uranium-235.

[4 *marks*]
[4 *markah*]

(d) Diagram 12.2 shows the rate of decay of radioactive substance, Iodine-131.
Rajah 12.21 menunjukkan kadar pereputan bagi suatu bahan radioaktif, Iodin-131.

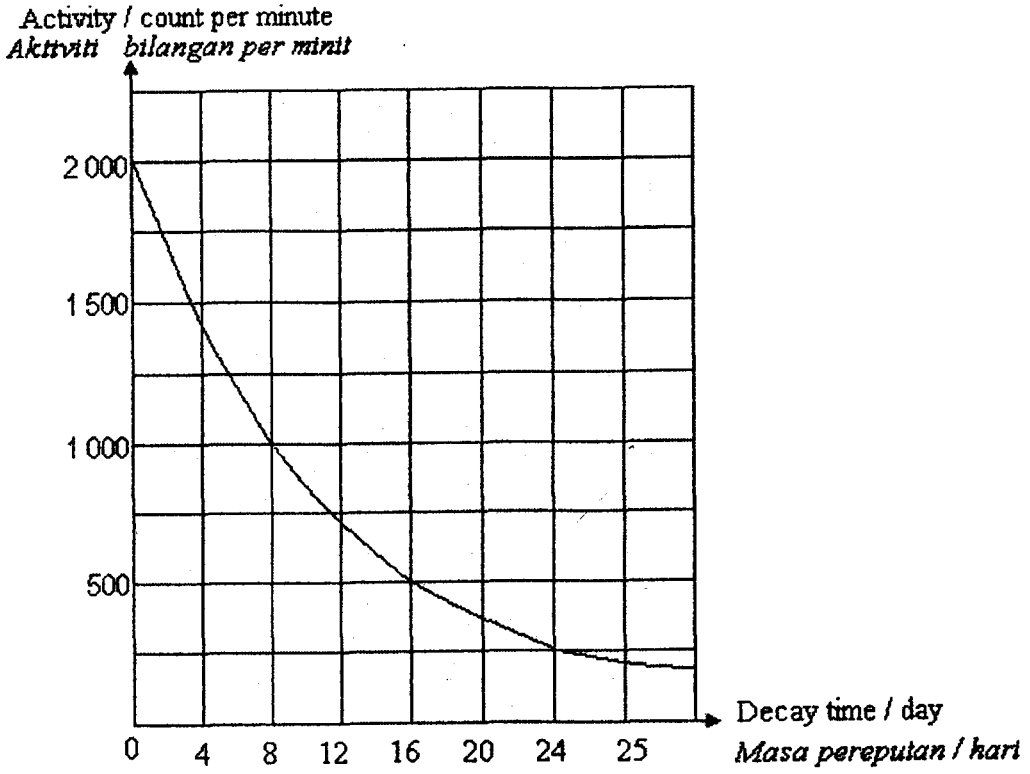


Diagram 12.2
Rajah 12.2

(i) Based on Diagram 12.2, what is the half – life of Iodine-131?
Berdasarkan Rajah 12.2, berapakah separuh hayat Iodin-131?

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

(ii) Calculate the percentage of Iodine-131 that has decayed after 24 days.
Hitung peratus Iodin-131 yang telah mereput selepas 24 hari.

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

(iii) When Iodine-131 decays, it produces a beta particle and Xenon-131(Xe).
Apabila Iodin -131 mereput, Iodin menghasilkan zarah beta dan Xenon -131 (Xe)

Complete the following equation for the decay of Iodine-131.
Lengkapkan persamaan berikut untuk pereputan Iodine-131.

$$^{131}_{53}\mathrm{I} \longrightarrow \text{-----}\,\mathrm{Xe} + \text{-----}$$

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

END OF QUESTION
KERTAS SOALAN TAMAT

4531/3
FIZIK
Kertas 3
1½ jam

Nama : _____

Tingkatan :_____

JABATAN PELAJARAN WILAYAH PERSEKUTUAN
KUALA LUMPUR

PEPERIKSAAN PERCUBAAN SPM 2010

FIZIK

Kertas 3

Satu jam tiga puluh minit

(Anda dinasihatkan untuk memperuntukkan masa 60 minit
untuk Bahagian A dan 30 minit untuk Bahagian B)

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Jawab* **semua** *soalan dalam* **Bahagian A** *dan mana-mana* **satu** *soalan daripada* **Bahagian B.**
2. *Rajah yang mengiringi soalan ini dimasukkan untuk memberi maklumat yang berguna bagi menjawab soalan. Rajah dilukiskan tidak mengikut skala kecuali dinyatakan sebaliknya.*
3. *Jawapan kepada* **Bahagian A** *dan* **Bahagian B** *hendaklah ditulis dalam ruang jawapan yang disediakan dalam kertas soalan. Walau bagaimanapun kertas tulis tambahan boleh digunakan bagi jawapan* **Bahagian B** *dan jawapan itu perlu diikat bersama dengan kertas soalan ini. Dalam jawapan anda, persamaan, gambar rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda boleh digunakan.*
4. *Markah maksimum yang diperuntukkan ditunjukkan dalam kurungan pada hujung tiap-tiap soalan atau bahagian soalan.*
5. *Penggunaan kalkulator saintifik yang tidak boleh diprogramkan adalah dibenarkan. Walau bagaimanapun kaedah penghitungan hendak ditunjukkan*

Untuk Kegunaan Pemeriksa		
Bahagian	Soalan	Markah
A	1	
	2	
B	3	
	4	
JUMLAH		

Kertas soalan ini mengandungi **16** halaman bercetak

INFORMATION FOR CANDIDATES.

1. *This question paper consists of two sections:* ***Section A*** *and* ***Section B.***
2. *Answer all questions in Section A. Write your answer for Section A in the spaces provided in the question paper.*
3. *Answer one question from Section B.*
4. *Answer question Section B in detail. Answer should be clear and logical. You may use equations,, diagrams, tables, graphs and other suitable methods to explain your answer.*
5. *Show your working, it may help you to get marks.*
6. *If you wish to change your answer, neatly cross out the answer that you have done. Then write down the new answer.*
7. *The diagrams in the questions are not drawn to scale unless stated.*
8. *Marks allocated for each question or part question are shown in brackets.*
9. *You may use a non-programmable scientific calculator.*
10. *The time suggested to complete Section A is 60 minutes and Section B is 30 minutes.*
11. *Hand in your answer sheets at the end of the examination.*

Section A
Bahagian A

[28 marks]
[28 markah]

1 A student carries out an experiment to find out the relationship between area, A, and the rate of evaporation, E, of liquid X. A petri dish is filled with 100 ml of liquid X. The beaker is then put on a triple beam balance. The arrangement of the apparatus for the experiment is shown in Figure 1.1.

Seorang pelajar menjalankan eksperimen untuk mencari hubungan antara luas, A dan kadar sejatan, E , cecair X. Piring Pateri diisi dengan 100 ml cecair X. Bikar itu kemudian diletakkan diatas neraca tiga tuas. Susunan radas eksperimen ditunjukkan dalam rajah 1.1

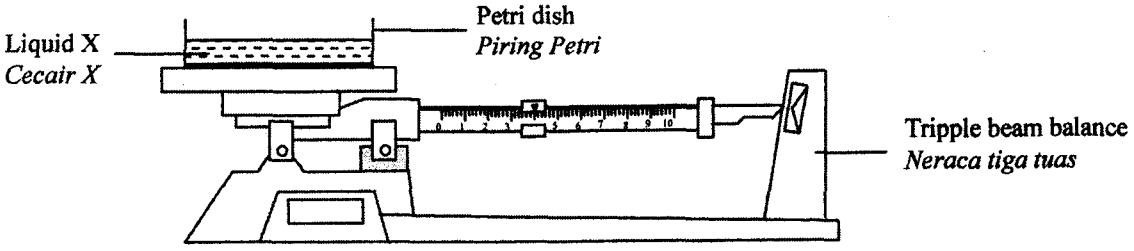


FIGURE 1.1
Rajah 1.1

100 ml of liquid X is poured into a petri dish of the area of 100.0 cm^2 and the initial mass of the liquid X, m_0 is taken as shown in Figure 1.2. After 2 minutes, the final mass of liquid X, m is measured as shown in Figure 1.3.
100 ml cecair X di tuang kedalam piring petri dengan luas 100.0 cm^2 dan jisim asal cecair X, , m_0 di timbang seperti rajah 1.2. Selepas 2 minit, jisim akhir cecair X, m, ditimbang seperti dalam rajah 1.3

The experiment is repeated by using different petri dish with the area of 80.0 cm^2, 60.0 cm^2, 40.0 cm^2 and 20.0 cm^2. The readings of the thermometer are shown in Figure 1.4, 1.5, 1.6 and 1.7.
Ekperimen di ulang dengan menggunakan piring petri dengan luas 80.0 cm^2, 60.0 cm^2, 40.0 cm^2 and 20.0 cm^2. Bacaan thermometer ditunjukkan dalam rajah 1.4, 1.5, 1.6 dan 1.7

The lost of mass, Δm, of liquid X is given by the following equation:
Kehilangan jisim , Δm, cecair X di beri dalam persamaan berikut :

$$\Delta m = m_0 - m$$

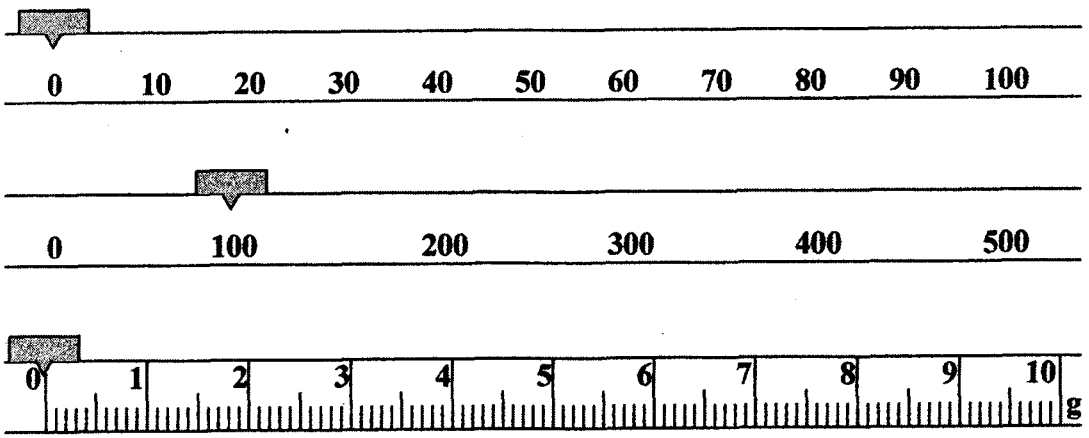


Figure 1.2 :

Initial mass of liquid X, m_0, = ... g
Jisim awal cecair X, m_0

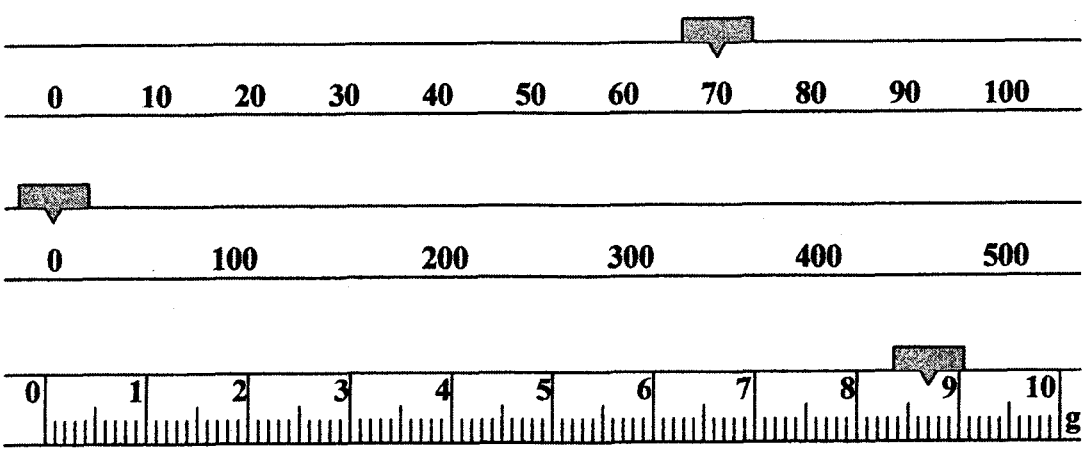


Figure 1.3 :

Area, A = 100.0 cm^2
Luas, A

Final mass of liquid X, m, = ... g
Jisim akhir cecair X, m

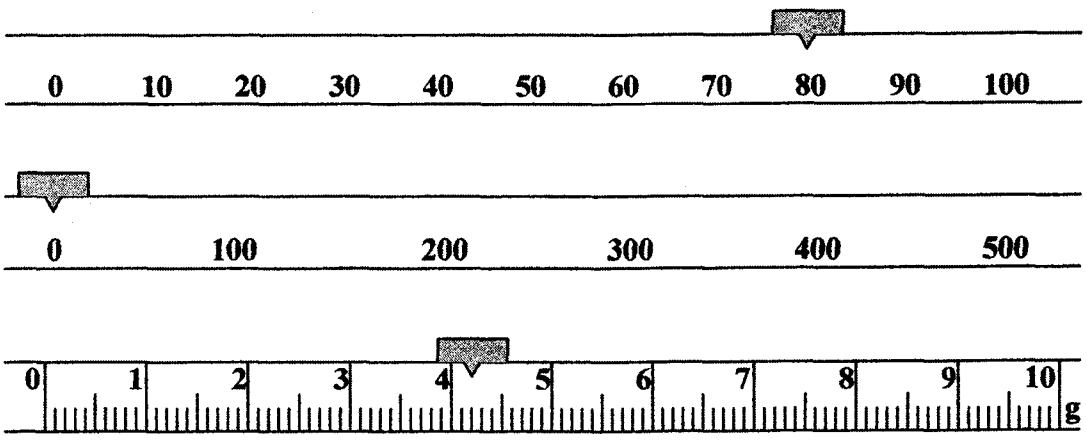


Figure 1.4 :

Area, A = 80.0 cm^2
Luas, A

Final mass of liquid X, m, = ... g
Jisim akhir cecair X, *m*

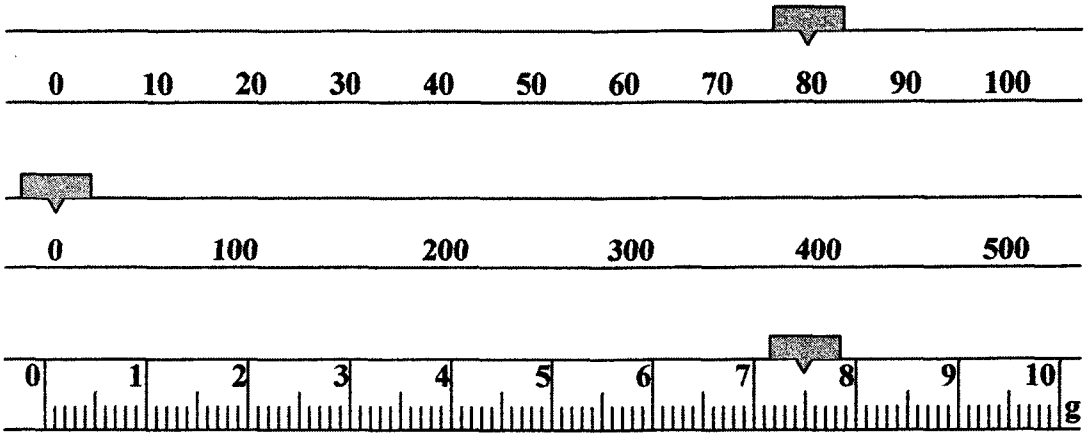


Figure 1.5 :

Area, A = 60.0 cm^2
Luas, A

Final mass of liquid X, m, = ... g
Jisim akhir cecair X, *m*

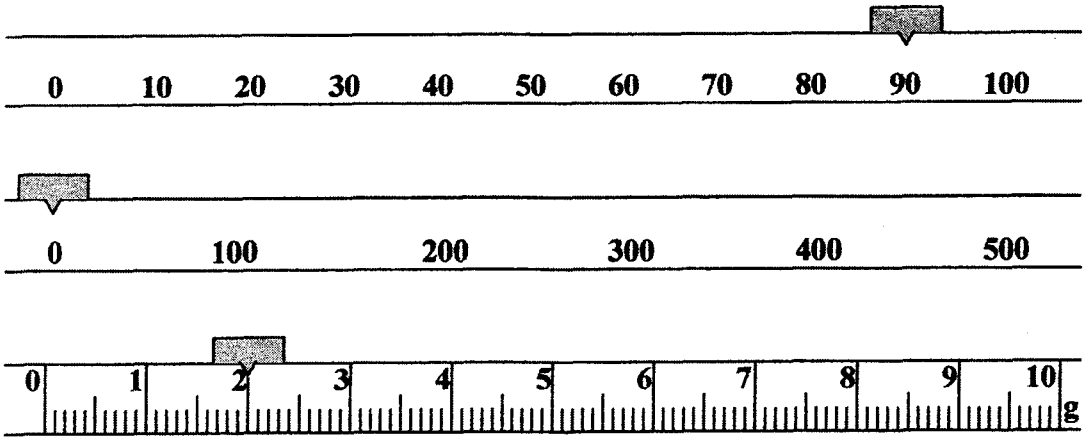


Figure 1.6 :

Area, $A = 40.0\ cm^2$
Luas, A

Final mass of liquid X, *m*, = ... g
Jisim akhir cecair X, m

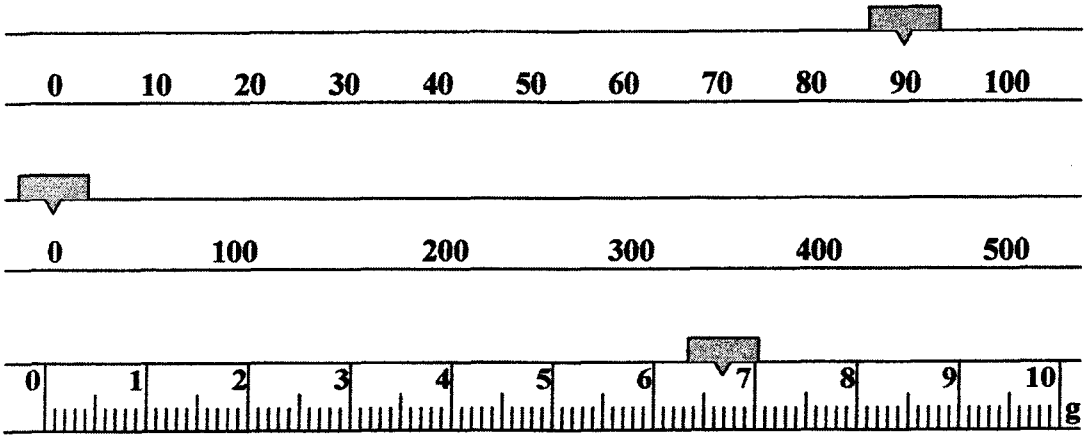


Figure 1.7 :

Area, $A = 20.0\ cm^2$
Luas, A

Final mass of liquid X, *m*, = ... g
Jisim akhir cecair X, m

(a) Based on Figure 1.2, state the initial mass, m_0 of Liquid X.
Berdasarkan rajah 1.2, nyatakan jisim asal, m_0, cecair X

.....

[1 mark / *markah*]

(b) For the experiment described on page 1, identify
Bagi eksperimen yang dinyatakan, kenalpasti

(i) the manipulated variable,
pemboleh ubah dimanipulasi

.....

[1 mark / *markah*]

(ii) the responding variable,
pemboleh ubah bergerak balas

.....

[1 mark / *markah*]

(iii) a constant variable.
Pemboleh ubah dimalarkan

.....

[1 mark / *markah*]

(c) Based on Figures 1.3, 1.4, 1.5, 1.6 and 1.7, determine m when A is equal to 100.0 cm^2, 80.0 cm^2, 60.0 cm^2, 40.0 cm^2 and 20.0 cm^2.
Berdasarkan rajah 1.3, 1.4, 1.5, 1.6 dan 1.7, tentukan m apabila A adalah 100.0 cm^2, 80.0 cm^2, 60.0 cm^2, 40.0 cm^2 dan 20.0 cm^2.

Tabulate your results for A, m, and Δm in the space below.
Jadualkan keputusan A, m, dan Δm dalam ruangan di bawah.

[6 marks / *markah*]

(d) On a graph paper, plot a graph of Δm against A.
Pada kertas graf, plotkan graf Δm lawan A.

[5 marks / *markah*]

(e) Based on your *graph*, *state* the relationship between Δm and A.
Berdasarkan graf anda, nyatakan hubungan antara Δm dan A.

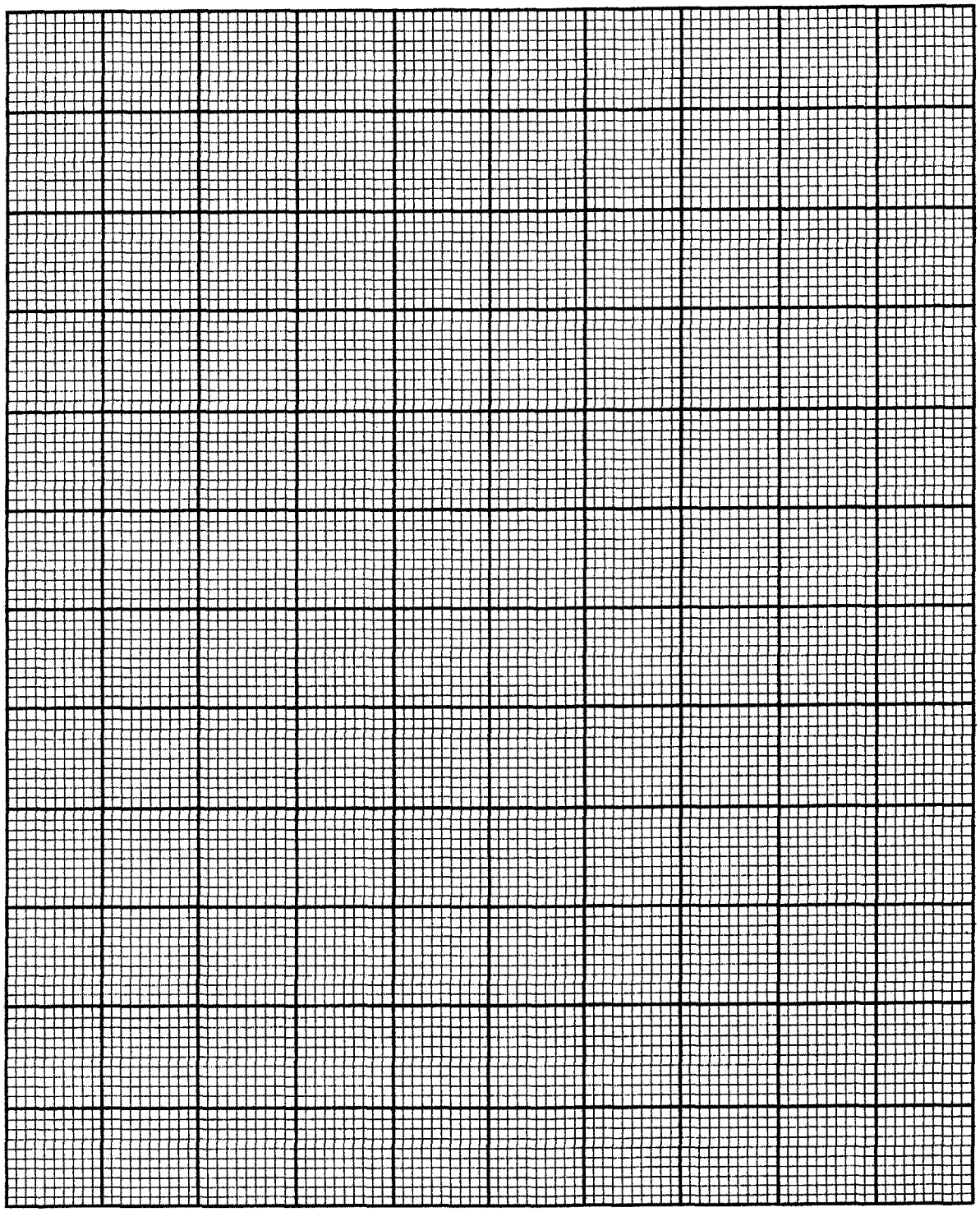
.....

.....

[1 mark / *markah*]

Graph of Δm against A

Graf Δm melawan A



2 A student carried out an experiment to find out the relationship between mass, m, and the acceleration, a, of a trolley, and to determine the magnitude of gravitational field strength. The student carried out the experiment at five different masses.
Seorang pelajar telah menjalankan eksperimen untuk mencari hubungan antara jisim, m, dan pecutan, a, bagi sebuah troli dan menentukan kekuatan medan gravity. Pelajar tersebut menjalankan eksperimen dengan menggunakan lima jisim yang berbeza.

The results of the experiment are shown on a graph of $\frac{1}{a}$ against m as in Figure 2.1

Keputusan eksperimen adalah ditunjukkan dalam graf $\frac{1}{a}$ *lawan m seperti dalam rajah 2.1*

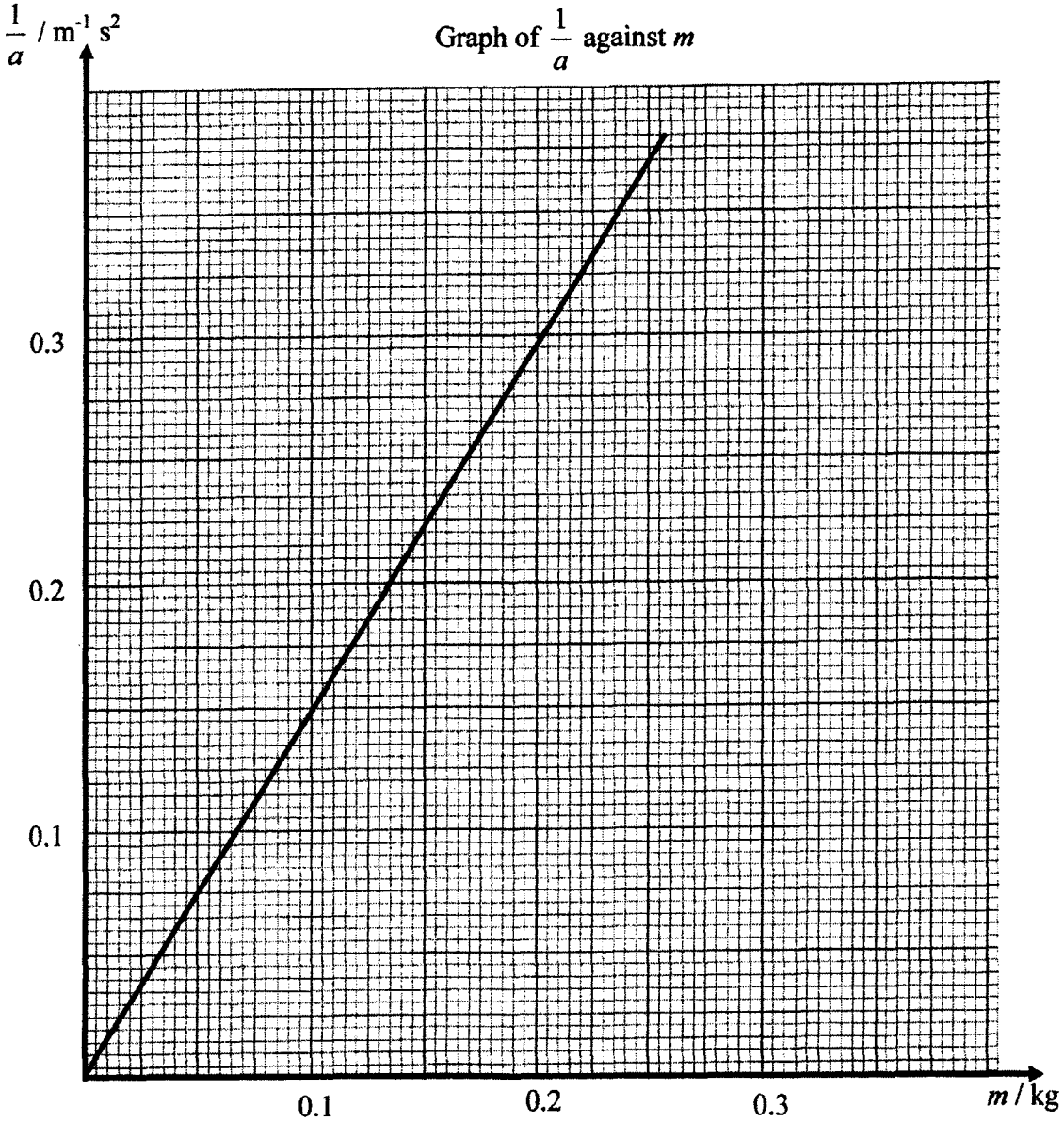


FIGURE 2.1 / *Rajah 2.1*

(a) Based on the graph in Figure 2.1,
Berdasarkan graf pada Rajah 2.1,

(i) state the relationship between a and m.
nyatakan hubungan antara a dan m

.....

[1 mark / *markah*]

(ii) determine the acceleration, a of the trolley when the mass, $m = 0.15$ kg.
Show on the graph, how you determine the acceleration, a.
Tentukan pecutan, a, troli apabila jisim , m = 0.15 kg.
Tunjukkan pada graf bagaimana anda menentukan kecerunan, a.

[3 marks / *markah*]

(b) The Force, F is given by the formula :
Daya, F, diberikan oleh formula:

$$F = \frac{1}{p},$$

where p is the gradient of the graph,
di mana p ialah kecerunan pada graf.

(i) Determine the gradient of the graph $\frac{1}{a}$ against m.

Tentukan kecerunan graf $\frac{1}{a}$ *lawan m.*

Show on the graph how you determine the gradient.
Tunjukkan pada graf bagaiman anda menentukan kecerunan.

$p =$ .....

[3 marks / *markah*]

(ii) Hence, determine the force, F applied on the trolley.
Seterusnya, tentukan daya, F yang dikenakan pada troli.

F = ...

[2 marks / *markah*]

(c) The experiment is carried out with a force, $F = 500$ N
Eksperimen dijalankan dengan daya , F = 500N

Calculate the acceleration, a when mass of the trolley, $m = 2$ kg
Kirakan pecutan, a apabila jisim troli, m = 2 kg.

a = ...

[2 marks / *markah*]

(d) State **one** precaution that should be taken during the experiment.
Nyatakan satu langkah berjaga-jaga yang perlu diambil semasa eksperimen.

.....

.....

[1 mark / *markah*]

Section B
Bahagian B

[12 marks]
[*12 markah*]

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

3. Figure 3.1 and figure 3.2 show a submarine that is near the water surface and close to sea bed respectively. The submarine is dented when it submerges close to the sea bed.

Rajah 3.1 dan rajah 3.2 menunjukkan sebuah kapal selam yang menghampiri permukaan laut dan berada hampir dengan dasar laut. Kapal selam itu kemek apabila ia tenggelam menghampiri dasar laut.

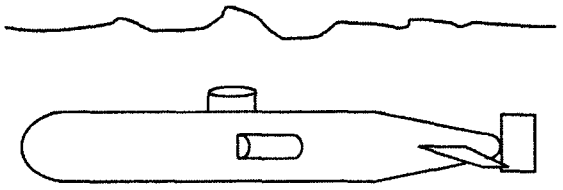


FIGURE 3.1
RAJAH 3.1

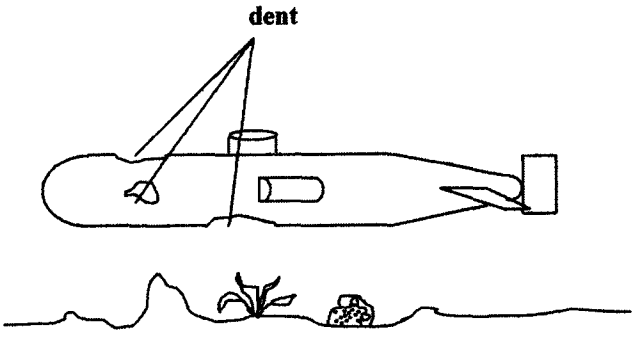


FIGURE 3.2
RAJAH 3.2

Observe the depth of the submarine in the sea and the appearance of the submarine in each diagram.
Perhatikan kedalaman kapal selam didalam laut dan kesan keatas kapal selam pada setiap rajah.

Based on the observations:
Berdasarkan pemerhatian di atas:

(a) State **one** suitable inference that can be made.
*Nyatakan **satu** inferens yang sesuai*

[1 mark / *markah*]

(b) State **one** appropriate hypothesis for an investigation.
*Nyatakan **satu** hipotesis yang boleh disiasat.*

[1 mark / *markah*]

(c) With the use of apparatus such as beaker, thistle funnel and other apparatus, describe an experimental framework to test your hypothesis.
Dengan menggunakan radas seperti bikar, corong tisel dan lain-lain radas, terangkan satu rangka kerja eksperimen untuk menguji hipotesis di atas.

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

(i) aim of the experiment,
tujuan eksperimen

(ii) variables in the experiment,
pemboleh ubah dalam eksperimen

(iii) list of apparatus,
senarai radas

(iv) arrangement of the apparatus,
susunan radas

(v) the procedure of the experiment which include the method of controlling the manipulated variable and the method of measuring the responding variable,
prosedur eksperimen termasuk kaedah mengawal pembolehubah dimanipulasi dan mengukur pembolehubah bergerak balas

(vi) way you would tabulate the data,
cara anda akan menjadualkan data

(vii) way you would analysis the data.
cara anda menganalisis data

[10 marks / *markah*]

4. In a morning assembly, two loudspeakers are connected to an amplifier. When the loudspeakers are located far apart from each other as shown in Diagram 4.1, two students who are marked with arrows heard the loudest sound.
Dalam perhimpunan pagi, dua pembesar suara disambung kepada satu amplifier. Apabila pembesar suara itu di letakkan berjauhan antara satu sama lain seperti dalam rajah 4.1, dua orang pelajar yang ditanda dengan anak panah, mendengar bunyi yang paling kuat.

When the loudspeakers are then adjusted to be closer as shown in Diagram 4.2, another two different students who are marked with arrows heard the loudest sound.
Apabila pembesar suara itu kemudiannya di letakkan berdekatan seperti diagram 4.2, dua pelajar yang lain yang ditanda dengan anak panah mendengar bunyi yang paling kuat.

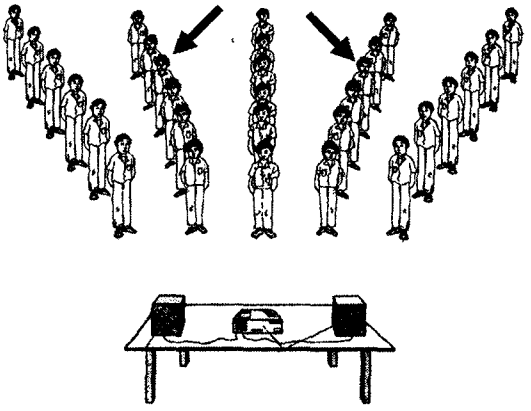


Diagram 4.1
Rajah 4.1

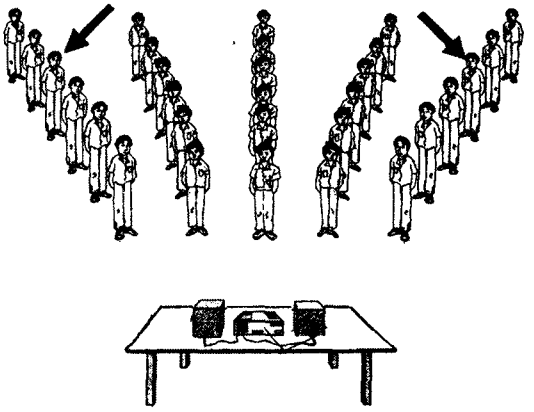


Diagram 4.2
Rajah 4.1

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

(a) State **one** suitable inference that can be made.
*Nyatakan **satu** inferens yang sesuai.*

[1 mark / *markah*]

(b) State **one** appropriate hypothesis for an investigation.
*Nyatakan **satu** hipotesis yang boleh disiasat.*

[1 mark / *markah*]

(c) With the use of apparatus such as ripple tank, spherical dippers and other apparatus, describe an experimental framework to test your hypothesis.
Dengan menggunakan radas seperti tangki riak, pencelup sfera dan lain-lain radas, terangkan satu rangka kerja eksperimen bagi menguji hipotesis anda.

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

(i) aim of the experiment,
tujuan eksperimen

(ii) variables in the experiment,
pemboleh ubah dalam eksperimen

(iii) list of apparatus,
senarai radas

(iv) arrangement of the apparatus,
susunan radas

(v) the procedure of the experiment which include the method of controlling the manipulated variable and the method of measuring the responding variable,
prosedur eksperimen termasuk kaedah mengawal pembolehubah dimanipulasi dan mengukur pembolehubah bergerak balas

(vi) the way you would tabulate the data,
cara anda akan menjadualkan data

(vii) the way you would analysis the data.
cara anda menganalisi data

[10 marks / *markah*]

END OF QUESTION
KERTAS SOALAN TAMAT

JABATAN PELAJARAN WILAYAH PERSEKUTUAN
KUALA LUMPUR

PEPERIKSAAN PERCUBAAN SPM

SIJIL PELAJARAN MALAYSIA 2010

SKEMA JAWAPAN FIZIK

Kertas 1

Physics Paper 1
Trial Examination JPWP 2010
Marking Scheme

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

JABATAN PELAJARAN WILAYAH PERSEKUTUAN
KUALA LUMPUR

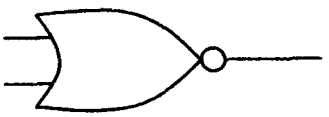
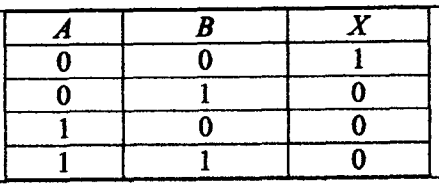
PEPERIKSAAN PERCUBAAN SPM

SIJIL PELAJARAN MALAYSIA 2010

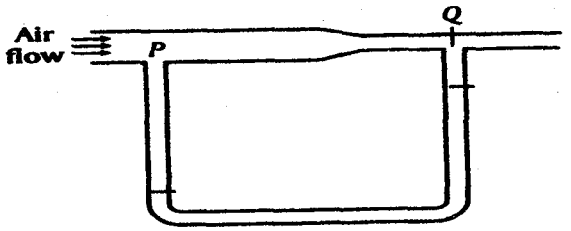
SKEMA JAWAPAN FIZIK

Kertas 2

Marking Scheme TRIAL EXAMINATION SPM 2010 JPWPKL

Question	Answer	Mark
1 (a) i	alpha particle	1
ii	Because it is positively charged / deflect to negative plate	1
(b)	lead	1
(c)	Q has higher mass	1
	Marks	4
2 (a)	Power of the lens = 1 / focal length of the lens (measured in meter)	1
(b)	1. high focal length 2. larger diameter	1 1
(c)	Magnification = distance of object lens / distance of eye lens = 40 cm / 10 cm = 4	2
	Marks	5
3(a) (i)	**NOR**	1
(ii)		1
(b)		1 1 1 1
	Marks	6
4 (a) (i)	Step down transformer	1
(ii)	To reduce eddy current	1
(b) (i)	$N_s = \frac{1000 \times 12}{240}$ $= 50$	1 1
(ii)	$P_i = VI$ $= 240 \times 0.2$ $= 48$ W $P_0 = 48 \times 80$ $= 38.4$ W	1 1
(c)	Increase the diameter of wire of coil	1
	Marks	7

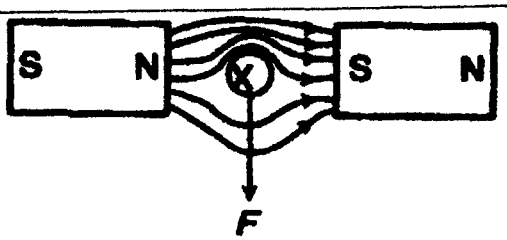
A	*B*	*X*
0	0	1
0	1	0
1	0	0
1	1	0

5. (a)	Air pressure above the surface of the level of two waters are the same. They are at atmospheric pressure.	2
(b) (i)	speed Q is higher than P	1
(ii)	air pressure at Q is lower than P	1
(iii) (iv)	As air speed increases, air pressure decreases. Refer to diagram below  	1 2
(v)	Bernoulli's Principle	1
	Marks	**8**
6 (a)	Two coherent sources are two sources of oscillations which have a constant phase difference	1
(b)	same frequency	1
(c) (i)	P : Destructive interference	1
(ii)	Q : Constructive interference	1
(iii)	R : Constructive interference	1
(d) (i)	P : Node	1
(ii)	Q :Antinodes	1
(iii)	R : Antinodes	1
	Marks	**8**
7 (a)	Pascal's Principle	1
(b)	When the small piston is pressed down, the pressure is exerted on the liquid and transmits uniformly to the large piston The force is produced and pushes the chair up	1 1
(c)	Some of the force is used to compress air bubbles	1
(d)	$\frac{F}{30} = \frac{500}{100}$ $F = 150\ N$	1 1
(e)	Piston size Increase the cross sectional area of the big piston/ Decrease the size of the small piston	1

	Reason To increase the force (multiplier)/ To withstand higher pressure without cracking Seat size Enlarge the size of the seat Reason To accommodate the larger bodies of adults/ To withstand the heavier adults without damage	1 1 1
	Marks	**10**
8 (a)	***State the meaning correctly*** When 240 V potential difference is supplied, 1.5 kW power is produced	1
(b) (i)	***Correct substitution*** $\frac{1.5}{240}$ *or* $\frac{1500}{240}$ ***Answer with the correct unit.*** 6.25 A	1 1
(ii)	***Correct substitution*** $\frac{240}{6.25}$ *or* $\frac{240}{1500}$ ***Answer with the correct unit.*** 38.4 Ω	1 1
(c) (i)	***Give two suggestions correctly*** W and Y ***Give two reasons correctly*** High melting point not melt at high temperature High resistivity // produced more heat	1 1 1
(ii)	***Give two suggestions correctly*** X and Y ***Give the reason correctly*** The fuse rating just bigger the current through the kettle	1 1
(iii)	***Give the correct choice*** Y ***Give the reason correctly*** High melting point , High resistivity and use 10A fuse	1 1
	Marks	**12**
9 (a)	Hooke's Law	1
(b) (i)	Diagram 9.1 , has greater elastic potential energy compare to than Diagram 9.2	1
(ii)	The speed of the ball ejected in Diagram 9.1 is more than Diagram 9.2	1
(iii)	The distance travelled by the ball in Diagram 9.1 is more than Diagram 9.2	1

(c) (i)	The greater the compression, the higher the speed of the ball	1
(ii)	The greater the compression, the greater the distance travelled by the ball	1
(d)	Use thicker spring/ smaller diameter/ stronger spring (any 2) To increase the stiffness of spring/ spring constant Greater elastic potential energy/ kinetic energy	2 1 1
(e)		

	Modification	Explanation	
1.	Use smaller diameter	Higher spring constant thus able to carry heavier load	2 2
2.	Use wider tyre	Increase contact area/reduce pressure	2
3.	Soft material used for seat	Increase contact time/decrease impulsive force	2
4.	Use low density/light material	Reduce weight of motorcycle	2
5.	Deep/rough thread pattern	Increase frictional grip/road holding	

	Marks	**20**
10 (a)	i. The region where a magnetic material experience a force./magnetic field lines exist.	1
	ii. the higher the density of magnetic flux, the larger the magnetic strength.	1
(b)	- All have concentric magnetic fields. - The coil with more turns produces magnetic fields which are more closer / concentrated. - larger current used produces more concentrated / closer magnetic field. - the magnetic strength increases as the larger current is used / the larger the current used the stronger the magnetic field - the coil with more turn produces stronger magnetic field / the more the number of turns used the stronger the magnetic field	1 1 1 1 1
(c)		2 1
(d)	Characteristics	

Characteristics		Reasons	
1.	the size and characteristics of electromagnetic plate - bigger size of plate	Can give more space for trapping iron scraps	2
2.	Soft iron core plate	can be magnetizes and the demagnetizes easily	2

	3.	Rust proof	long lasting	2
	4.	diameter of wire for current carrying coil - using bigger diameter of wire for coil	Reduces the resistance so produce the bigger current	2
	5.	number of turns in coil - higher number of turns	produce stronger magnetic fields	2
	Marks			20
11 (a) (i)	Temperature is the measurement of the average kinetic energy of the atom or molecules in the substance or Temperature is a measurement of degree of hotness of an object.			1
(ii)	1. The kettle is hotter than the ice block / The ice block is colder than the kettle 2. The hand feels hot when it touches the hot kettle / The hand feels cold when it touches the ice block. 3. Diagram 9.1 shows heat flows from the kettle towards the hand while Diagram 9.2 shows the heat flows from the hand towards the ice. 4. The heat will flow from a hotter object towards a colder object Diagram 9.2 shows the heat flows from the hand towards the ice.			1 1 1 1
(b) (i)	water has a very high specific heat capacity Water is used as a cooling liquid in car radiators systems absorb a large quantity of heat. This can perform the cooling function effectively.			1 1
(ii)	when temperature rises, the molecules move faster and the mean kinetic energy increases.			1
(iii)	heat lost by copper = heat gained by oil, final temperature= θ_f. $(mc\theta)_{copper} = (mc\theta)_{oil}$ $0.4 \times 390 \times (100 - \theta_f) = 0.5 \times 2000 \times (\theta_f - 20)$ $15600 - 156\,\theta_f = 1000\,\theta_f - 20\,000$ $15600 + 20000 = 1000\,\theta_f + 156\,\theta_f$ $35600 = 1156\,\theta_f$ $\theta_f = 30.8\ ^0C$			1 1

(c)

Characteristics	Reason	
Has higher boiling point	So that liquid not easily boiling	1+1
Has higher specific heat capacity	So that it can't be easily become hot	1+1
Has lower density	s o the hydraulic jack is not heavy	1+1
Has lower rate of vaporisation	Volume of liquid will not easily vaporise	1+1

Liquid L is chosen — 1

Reasons: L has higher boiling point, higher specific heat capacity, lower density and lower rate of vaporisation — 1

Marks — **20**

12 (a) (i) Isotope which is radioactive — 1

(ii) Cosmic ray — 1
Naturally present radioactive material on earth/surroundings — 1

(b)

Characteristic	Reason	
Low ionizing power	Does not cause cell mutation / does not ionize healthy cell	2
Short / Medium / few days	Sufficient time to get result / prevent over exposure to radiation / less harmful to healthy cell.	2
State of matter liquid	Can be injected	2

- M is suitable — 1
- because low ionizing power, half life is few days and state of matter is liquid — 1

(c)
- Neutron bombard a uranium nucleus — 1
- Three neutrons are produced — 1
- These new neutrons bombard new uranium nucleus — 1
- For every reaction the neutrons produced will generate chain reaction — 1

(d) (i) 8 days — 1

(ii) $= \frac{1750}{2000} \times 100\% = 87.5\%$ — 1 1

(iii) $^{131}_{53}I \longrightarrow {}^{131}_{54}Xe + {}^{0}_{-1}e$ — 2

Marks — **20**

TOTAL — **100**

SULIT
4531/3
Fizik
Kertas 3
September
2010

JABATAN PELAJARAN WILAYAH PERSEKUTUAN
KUALA LUMPUR

PEPERIKSAAN PERCUBAAN SPM

SIJIL PELAJARAN MALAYSIA 2010

SKEMA JAWAPAN FIZIK

Kertas 3

Marking Scheme Trial SPM - Physics 3-2010

<table>
<tr><th>Questions.</th><th>Answer</th><th>mark</th></tr>
<tr><td>1 (a)</td><td>100.0 g</td><td>1</td></tr>
<tr><td>1(b)</td><td>(i) Manipulated variable : area
(ii) Responding variable : mass / rate of evaporation
(iii) Constant variable : density/time/temperature</td><td>1
1
1</td></tr>
<tr><td>1(c)</td><td>
<table>
<tr><th>A / cm^2</th><th>m/g</th><th>Δ m / g</th></tr>
<tr><td>20.0</td><td>96.7</td><td>3.3</td></tr>
<tr><td>40.0</td><td>92.0</td><td>8.0</td></tr>
<tr><td>60.0</td><td>87.5</td><td>12.5</td></tr>
<tr><td>80.0</td><td>84.2</td><td>15.8</td></tr>
<tr><td>100.0</td><td>78.7</td><td>21.3</td></tr>
</table>
All unit are correct
All values of m are correct
(3 - 4 correct : 1 mark)
All values of Δ m are correct
(3 - 4 correct : 1 mark)
Data are consistent</td><td>1
2

2

1</td></tr>
<tr><td>1(d)</td><td>Graph refer lampiran 1.

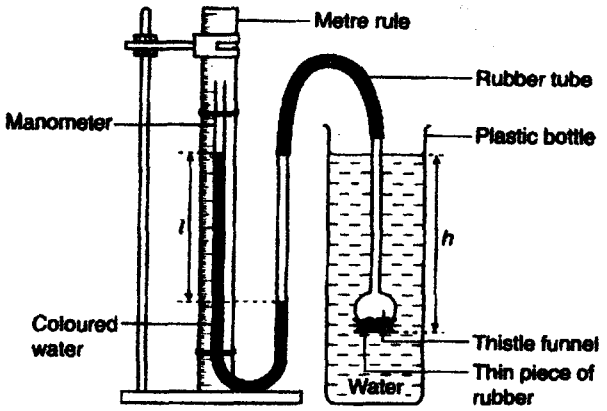
Unit at both axis - 1 mark
Scale - 1 mark
Transfer point - 2 marks
Best fitted graph - 1 mark</td><td>5</td></tr>
<tr><td>1(e)</td><td>Relationship based on graph:
Directly proportional / linear increasing (must refer to graph)</td><td>1</td></tr>
<tr><td></td><td>Total marks</td><td>12</td></tr>
<tr><td>2 (a)</td><td>(i) The acceleration is inversely proportional to its mass / $\frac{1}{a} \alpha$ m (depend on questions)

(ii) show on graph 0.15 at x- axis (extrapolate from graph)
$\frac{1}{a} = 0.225$
a = 4.45 ms^{-2} (answer with unit)</td><td>1

1
1
1

1</td></tr>
</table>

2(b)	(i) Draw big triangle (4 x 5 box) $p = \frac{0.375-0.0}{0.255-0.0} = 1.47\ m^{-1}\ s^2\ kg^{-2}./\ N^{-1}$ Substitute value Answer within range . (ii) Substitute 1/ value of gradient $F = 1/p = 1 / 1.47 = 0.680\ N$ (possible answer = 1 / 1.5) Answer ignore unit. (possible answer 0.67) 500 = 2(a)	1 1 1 1 1 1 1
2(c)	Answer with unit $250\ ms^{-2}$	
2(d)	The eyes position is perpendicular to the reading scale to avoid parallax error.	
	Total marks	**12**
3(a)	**Inference:** The depth of water influence the pressure at sea level. **Hypothesis:** The deeper the water level, the higher the pressure in liquid (coloured water) ***Aims:*** To investigate the relationship between the depth of water and the pressure in liquid. Variable: *Manipulated variable*: depth of water, h *Responding variable*: pressure in water (the difference in the level,l, of coloured water in the manometer) *Fix variable* : Density of water *Apparatus and materials*: Thin piece of rubber, rubber tube, **thistle funnel**, tall plastic bottle, rubber band, retort stand and clamp, **metre rule** and manometer and **water.**	1 1 1 1 1 1



1

Setup up as shown in the labeled diagram or description in the procedure

Procedure:

Controlling the manipulated variables:

1- The apparatus is arranged as shown in the diagram

2- The thistle funnel is immersed into the water so that its depth, h=**5.0 cm**

Measuring the responding varables:

3- The **difference in the levels, *l*** of coloured water in the manometer is measured and recorded using meter rule. 1

Repeating experiment:

4- Procedures 2 and 3 are repeated for **h=10.0 cm, 15.0 cm, 20.0 cm and 25.0 cm**

5- The readings are tabulated 1

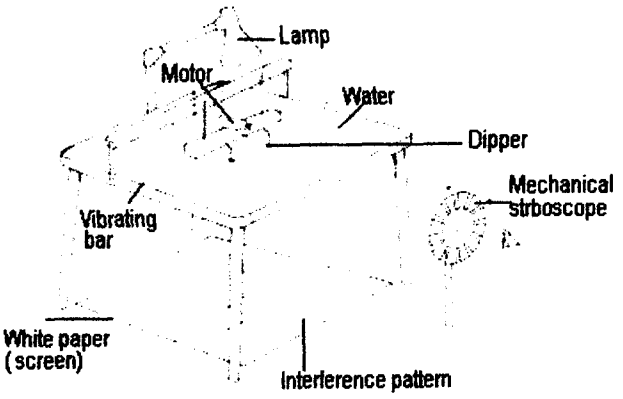
Depth, h / cm	Difference in level, *l* / cm
5.0	
10.0	
15.0	
20.0	
25.0	

1

1

	Analyzing data l/cm  	1
	Total marks	**12**
4. a)	**Inference** : Distance between two loud speakers,a affect / influence the distance between loud sound, x.	1
b)	Hypothesis : The shorter the distance between two loud speaker,a , the further the distance between loud sound, x / when the distance between two loud speaker decreases , the distance between loud sound (antinodal line)increases.	1
(c)		1
	(i) Aim : To investigate the relationship between two coherent sources (a) and the distance between two nodes or two antinodes lines, (x).	
	(ii) Variables : Manipulated : the distance between the two coherent sources Responding : the distance between two consecutive node lines	1
	Fixed variable: frequency of vibrator or the Wavelength	1
	List of apparatus and materials: Ripple tank, lamp, motor ,wooden bar , power supply ,white paper , spherical dippers ,meter rule and mechanical stroboscope.	1

Arrangement of the apparatus:



1

Procedure:

Controlling the manipulated variables:

1- The apparatus is arranged as shown in the diagram

1

2- By using a metre rule , the distance between two dippers (a) is measured **35 cm** (or any length)

Measuring the responding varables:

3- The power supply is switched on to produce two circular waves from the dippers

4- The waves are freeze by a mechanical stroboscope.

5- By using the **metre rule** , the distance between two consecutive node lines is measured = x

1

Repeating experiment:

5- Procedures 2 and 3 are repeated for **a =40.0, 45.0, 50.0 and 55.0**

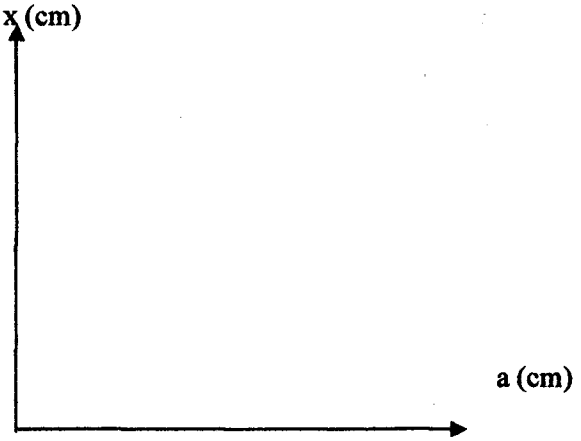
1

Tabulate the data: (table must have unit)

a (cm)	35	40	45	50	55
x (cm)					

1

Analysis the data:

	Plot the graph x against a  	1
	Total marks	**12**

Lampiran. [Soalan 1(d)]