4531/1
PHYSICS
Kertas 1
Ogos 2011
1¼ jam

MAJLIS PENGETUA SEKOLAH MENENGAH MALAYSIA
CAWANGAN NEGERI SEMBILAN

PEPERIKSAAN PERCUBAAN BERSAMA
SIJIL PELAJARAN MALAYSIA 2011

PHYSICS (FIZIK)

Paper1 (Kertas 1)

One hour and fifteen minutes (Satu jam lima belas minit)

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Kertas soalan ini adalah dalam dwibahasa.*

2. *Soalan dalam Bahasa Inggeris mendahului soalan yang sepadan* dalam Bahasa Melayu.

3. *Calon dikehendaki membaca maklumat di halaman 2 atau halaman 3.*

Kertas soalan ini mengandungi 38 halaman bercetak

INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON

1. This question paper consists of 50 questions.
Kertas soalan ini mengandungi 50 soalan.

2. Answer **all** questions.
*Jawab **semua** soalan.*

3. Answer each question by blackening the correct space on the answer sheet.
Jawab dengan menghitamkan ruangan yang betul pada kertas jawapan.

4. Blacken only **one** space for each question.
*Hitamkan **satu** ruangan sahaja bagi setiap soalan.*

5. If you wish to change your answer, erase the blackened mark that you have made. Then blacken the space for the new answer.
Sekiranya anda hendak menukar jawapan, padamkan tanda yang telah dibuat. Kemudian hitamkan jawapan yang baru.

6. The diagrams in the questions provided are not drawn to scale unless stated.
Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.

7. You may use a non-programmable scientific calculator.
Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.

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

1.	$a = \frac{v-u}{t}$	15.	Power, $P = \frac{\text{energy}}{\text{time}}$
2.	$v^2 = u^2 + 2as$	16.	$\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$
3.	$s = ut + \frac{1}{2}at^2$	17.	$\lambda = \frac{ax}{D}$
4.	Momentum $= mv$	18.	$n = \frac{\sin i}{\sin r}$
5.	$F = ma$	19.	$n = \frac{\text{real depth}}{\text{apparent depth}}$
6.	Kinetic energy $= \frac{1}{2}mv^2$	20.	$Q = It$
7.	Gravitational potential energy $= mgh$	21.	$V = IR$
8.	Elastic potential energy $= \frac{1}{2}Fx$	22.	Power, $P = VI$
9.	$\rho = \frac{m}{V}$	23.	$\frac{N_p}{N_s} = \frac{V_p}{V_s}$
10.	Pressure, $P = h\rho g$	24.	Efficiency $= \frac{V_s I_s}{V_p I_P} \times 100\%$
11.	Pressure, $P = \frac{F}{A}$	25.	$g = 10\ \text{m s}^{-2}$
12.	Heat, $Q = mc\theta$	26.	$E = mc^2$
13.	$\frac{PV}{T} = \text{constant}$	27.	Linear magnification, $m = \frac{v}{u}$
14.	$v = f\lambda$	28.	$P = \frac{1}{f}$

Each question is followed by **three** or **four** options. Choose the best option for each question then blacken the correct space on the answer sheet.
*Setiap soalan diikuti dengan **tiga** atau **empat** pilihan jawapan. Pilih jawapan terbaik untuk setiap soalan dan hitamkan ruang yang betul pada kertas jawapan.*

1. All derived quantities can be derived by using based quantities.
Which of the combination of base quantities are **correct** for the following physical quantity?
*Semua kuantiti terbitan boleh diterbitkan dengan menggunakan kuantiti asas. Yang manakah gabungan kuantiti asas adalah **benar** bagi kuantiti fizik yang berikut ?*

	Physical Quantities *Kuantiti Fizik*	Base Quantities *Kuantiti asas*
A	Heat *Haba*	Mass , time , temperature *Jisim, masa, suhu*
B	Power *Kuasa*	Mass, current, time *Jisim, arus, masa*
C	Energy *Tenaga*	Mass, length, time *Jisim, panjang, masa*
D	Charge *Cas*	Length, current, time *Panjang, arus, masa*

2. Diagram 1 shows a micrometer screw gauge .
Rajah 1 menunjukkan sebuah tolok skru mikrometer.

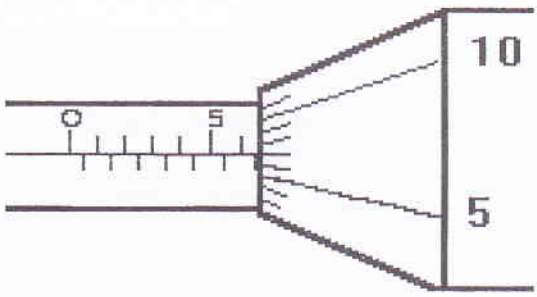


Diagram 1
Rajah 1

What is the reading of the micrometer screw gauge ?
Apakah bacaan tolokskru mikrometer itu?

A 5.57 mm
B 6.07 mm
C 6.12 mm
D 6.57 mm

3. A wooden block has measurement of 20 mm x 12.5 cm x 0.3 m.
The volume of the wooden block in SI unit is
Sebuah buah blok kayu mempunyai ukuran 20 mm x 12.5 cm x 0.3 m.
Isipadu blok kayu itu dalam unit SI adalah

A 7.5×10^{-6} m
B 7.5×10^{-4}m
C 7.5×10^{2}m
D 7.5×10^{4} m

4. Diagram 2 shows a velocity-time graph of a uniformly accelerated a particle.
Rajah 2 menunjukkan graf halaju-masa bagi satu zarah dengan pecutan seragam.

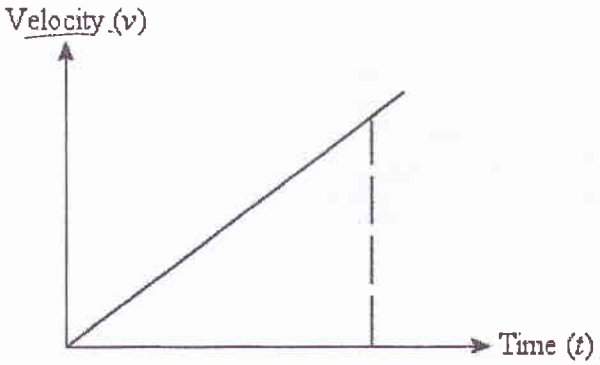


Diagram 2
Rajah2

Which of the following is correct?
Di antara berikut, manakah yang benar?

	Gradient of the graph *Kecerunan graf*	**Area under the graph** *Luas dibawah graf*
A	Displacement *Sesaran*	Kinetic energy *Tenaga kinetic*
B	Acceleration *Pecutan*	Kinetic energy *Tenaga kinetic*
C	Displacement *Sesaran*	Acceleration *Pecutan*
D	Acceleration *Pecutan*	Displacement *Sesaran*

5. The forces are in equilibrium in all the following phenomena **except**
Daya-daya adalah berada di dalam keseimbangan ***kecuali***

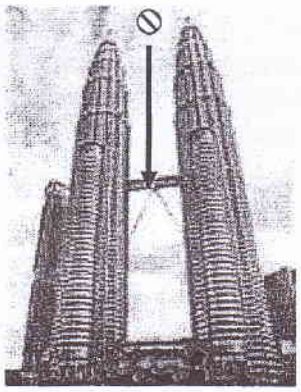
A a coconut falling from the tree.
buah kelapa yang jatuh dari pokok

B a car descending a hill at constant velocity
kereta yang menuruni bukit dengan halaju seragam

C a ship floating in the sea
kapal laut yang terapung di laut

D a ball is not moving
bola di tidak bergerak

6. An object is dropped from the top of KLCC building.
Which physical quantity remains constant as the ball falls?
Satu objek dijatuhkan dari atas bangunan KLCC.
Di antara berikut, manakah yang seragam semasa bola itu jatuh?



A Gravitational potential energy
Tenaga keupayaan gravity

B Kinetic energy
Tenaga kinetik

C Acceleration
Pecutan

D Velocity
Halaju

7. Diagram 3 shows a bullet is fired from a riffle.
Rajah 3 menunjukkan sebutir peluru ditembak dari sepucuk senapang.

Diagram 3
Rajah3

Which of the following statements is **true**?
*Di antara berikut, manakah yang **benar**?*

A The momentum of the bullet is more than the momentum of the rifle.
Momentum peluru adalah lebih dari momentum senapang.

B The total momentum of the bullet and the riffle is zero
Jumlah momentuk peluru dan senapang adalah sifar.

C The speed of the riffle is more than the speed of bullet
Kelajuan peluru adalah lebih dari kelajuan peluru.

D The kinetic energy of the bullet is equal to the kinetic energy of the riffle.
Tenaga kinetik peluru adalah sama dengan tenaga kinetic senapang.

8. Diagram 4 shows an object at rest on a rough inclined plane.
Rajah 4 menunjukkan satu objek berada pegun di atas permukaan kasar landasan condong

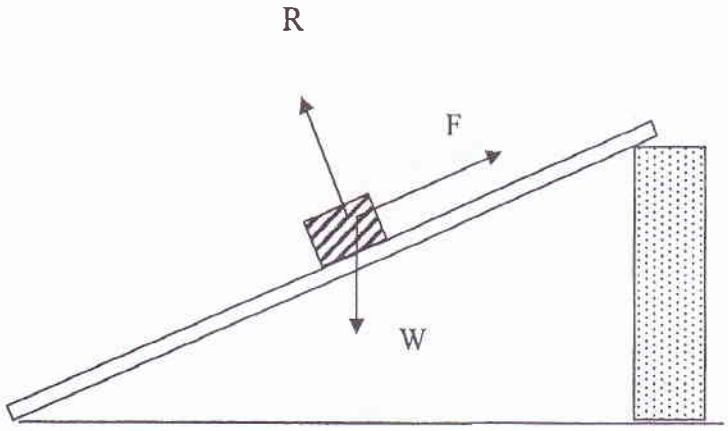
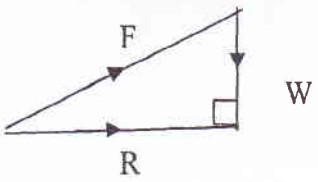


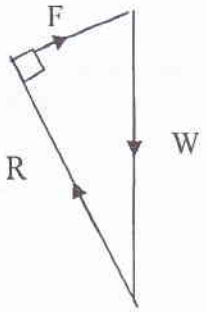
Diagram 4
Rajah 4

Which vector diagram represents the forces R, W and F that acts on the object?
Manakah di antara berikut menunjukkan daya-daya R, W dan F yang bertindak ke atas objek itu?

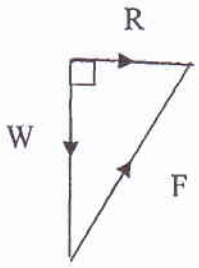
A



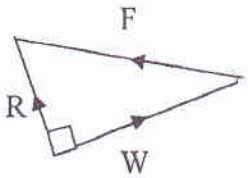
B



C



D



9. Diagram 5 shows a box of mass 5 kg slides down a smooth curved ramp.
Rajah 5 menunjukkan sebuah kotak 5 kg meluncur ke bawah landasan licin.

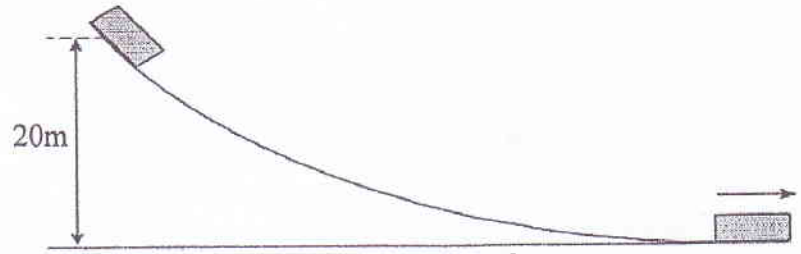


Diagram 5
Rajah 5

What is the speed of the box when it reaches the bottom? [Take $g = 10\ m\ s^{-2}$]
Berapakah kelajuan kotak itu semasa sampai ke bawah? [Ambil $g = 10\ m\ s^{-2}$]

A $10\ ms^{-1}$
B $20\ ms^{-1}$
C $30\ ms^{-1}$
D $40\ ms^{-1}$

10. Diagram 6 shows an object of mass 5 kg suspended by two strings from points *X* and *Y*.
Rajah 6 menunjukkan satu objek dengan jisim 5 kg digantung oleh dua tali pada dua titik X dan Y.

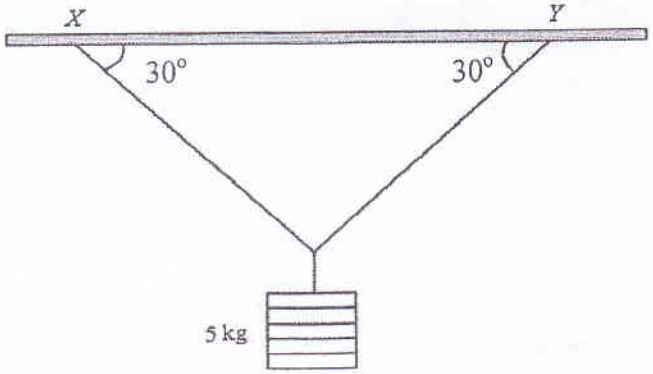


Diagram 6
Rajah 6

The tension in each of the strings is
Ketegangan pada setiap tali itu adalah

A 2.5 N
B 12.5 N
C 25.0 N
D 50.0 N

11. Diagram 7 shows a force-extension graph for a spring which is loaded.
[Assume that the expansion of the spring does not exceed the elasticity limit]
Rajah 7 menunjukkan graf daya-pemanjangan bagi satu spring
[Andaikan pemanjangan spring tidak melebihi had kenyal]

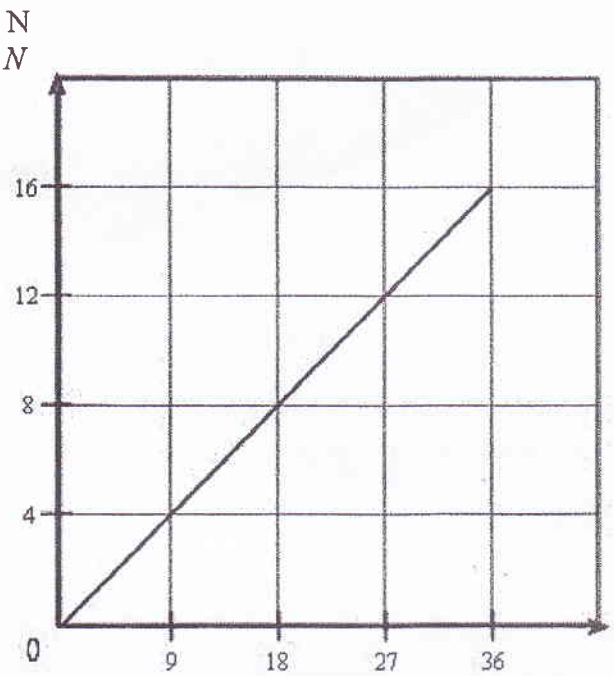


Diagram 7
Rajah 7

How much elastic potential energy is stored in the spring when its extension is 36 cm?
Berapakah tenaga keupayaan kenyal yang disimpan apabila pemanjangan adalah 36 cm?

A 9.6 J
B 2.88 J
C 5.76 J
D 11.52 J

12. Diagram 8 shows a glue tube with the glue is coming out through the mouth and the holes on the tube when pressed.
Rajah 8 menunjukkan gam keluar dari mulutnya dan keluar dari lubang-lubang yang terdapat pada tiub itu setelah dipicit.

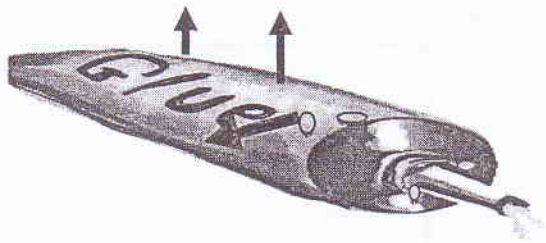


Diagram 8
Rajah 8

What is the principal involved in this situation?
Apakah prinsip yang terlibat dalam situasi ini?

A Pascal's Principle
Prinsip Pascal

B Bernoulli's Principle
Prinsip Bernoulli

C Boyle's Principle
Prinsip Boyle

D Archimedes' Principle
Prinsip Archimedes

13. Diagram 9 shows a sucking hook on a glass surface.
Rajah 9 menunjukkan penggantung lekat pada permukaan kaca.

Diagram 9
Rajah 9

Which of the following explanations is correct?
Manakah di antara penjelasan berikut adalah benar?

A The hook is actually pressed on the glass surface by the surrounding atmospheric pressure.
Penggantung itu sebenarnya di tekan oleh tekanan atmosfera dari udara sekelilingi.

B The opposite electrostatic charges on hook and glass attract each other.
Cas elektrostatik yang bertentangan pada penggantung dan cermin menarik bersama .

C There is no friction between the glass and the hook that can cause it to move.
Tiada geseran diantara cermin dan penggantung yang membolehkannya bergerak.

D No forces act on the surface of the hook.
Tiada daya yang bertindak ke atas permukaan penggantung.

14. Diagram 10 shows the area of two pistons in a hydraulic brake system.
If 50N force applied to the pedal, what is the force exerted on the wheels?
Rajah 10 menunjukkan luas dua piston di dalam sistem hidraulik.
Jika 50N dikenakan pada pedal, berapakah daya dikenakan pada roda?

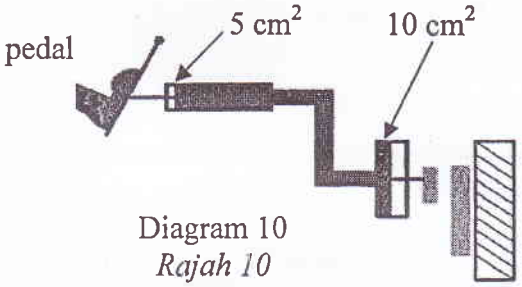


Diagram 10
Rajah 10

A 50N
B 100N
C 160N
D 250N

15. Diagram 11 shows a hot balloon is rising up in the air.
Rajah 11 menunjukkan sebuah belon udara panas naik ke atas udara.

Diagram 11
Rajah 11

Which of the following statements is correct?
Manakah di antara penyataan berikut benar?

A Hot air has a lower density than the surrounding air.
Ketumpatan udara panas lebih rendah daripada udara sekeliling

B Bouyant force of hot air balloon is lower than the weight of the balloon.
Daya apungan belon udara panas lebih rendah daripada berat belon itu.

C The balloon is half vacuumed.
Belon itu separa vakum.

D Gravitational force does not act on hot balloon.
Daya graviti tidak bertindak ke atas belon udara panas.

16 Nowadays football players like to use 'banana kick' technique to change the direction of the ball. The principle used in banana kick can also be used in following instrument laboratory.
Pemain bola sepak masa kini suka mengguna tendangan teknik 'banana kick' untuk mengubah arah pergerakan bola. Prinsip yang digunakan dalam tendangan 'banana kick' juga digunakan dalam peralatan makmal berikut

A Hydrometer
Hidrometer

B Bourdon gauge
Tolok Bourdon

C Bunsen Burner
Penunu Bunsen

D Aneroid Barometer
Barometer Aneroid

17. Diagram 12 shows an elephant of 5000 kg mass on a wooden platform with an area of 50 cm^2 during a circus performance.
Rajah 12 menunjukkan seekor gajah berjisim 5000 kg kē atas sebuah pentas dengan luas 50 cm^2 semasa satu pertunjukkan sarkis.

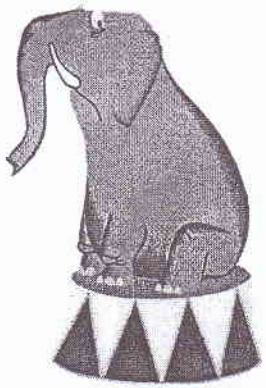


Diagram 12
Rajah 12

What is the pressure applied on the platform?
Berapakah tekanan dikenakan pada pentas itu ?

A 0.1 N m^{-2}
B 1×10^2 N m^{-2}
C 1×10^5 N m^{-2}
D 1×10^7 N m^{-2}

18. Diagram 13 shows a barometer mercury.
Rajah 13 menunjukkan sebuah barometer merkuri.

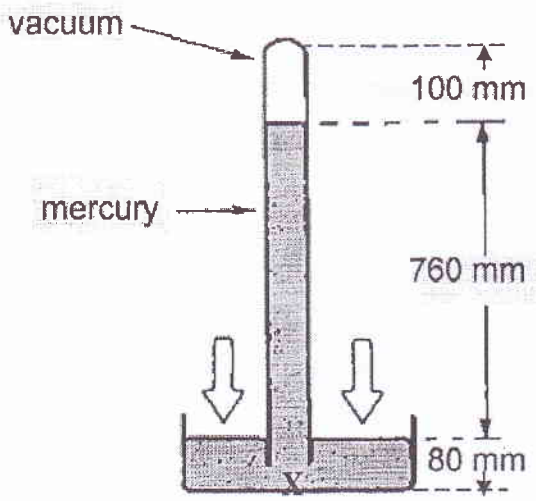


Diagram 13
Rajah 13

What is the pressure at X ?
Berapakah tekanan pada X ?

A 76 cm Hg
B 84 cm Hg
C 86 cm Hg
D 94 cm Hg

19. Two objects in contact is said to be in thermal equilibrium if
Dua objek yang bersentuhan dikatakan dalam keadaan keseimbangan terma jika

A No heat transfer between the objects.
Tiada *baba perpindahan haba di antara objek.*

B They possess the same amount of heat.
Kedua-duanya mempunyai jumlah tenaga haba yang sama

C The temperature of the objects are different.
Suhu kedua-dua objek adalah berbeza.

D The net rate of heat transfer between the two objects is zero.
Perbezaan tenaga haba dipindahkan antara dua objek adalah sifar.

20 Aluminium has a higher specific heat capacity than copper.
When heat is supplied at the same rate to two identical blocks of aluminium and copper, which of the following will take place?
Aluminium mempunyai muatan haba tentu yang tinggi berbanding kuprum. Apabila haba dibekalkan dengan kadar yang sama kepada dua blok aluminium dan kuprum yang sama, yang manakah antara berikut akan berlaku?

A The aluminium block melts earlier than the copper block.
Blok aluminium melebur lebih cepat daripada blok kuprum.

B The aluminium block will expand more than the copper block.
Blok aluminium mengembang dengan banyaknya berbanding blok kuprum.

C The temperature rise in the copper block is higher than aluminium block.
Peningkatan suhu dalam kuprum lebih tinggi berbanding blok aluminium.

D The temperature rise in the aluminium block is the same as copper block.
Peningkatan suhu dalam blok aluminium adalah sama dengan blok kuprum.

21. A heater rated with power of 2.0 kW takes 10 s to raise the temperature of a liquid of mass 500g by 5^0C.
What is the specific heat capacity of the liquid in $Jkg^{-1}\,^oC^{-1}$?
Sebuah pemanas dengan kadar kuasa 2.0kW mengambil masa 10 s untuk meningkatkan suhu suatu cecair berjisim 500g sebanyak 5 °C. Apakah muatan haba tentu cecair tersebut dalam $Jkg^{-1}\,^oC$?

A 0.8
B 8.0
C 8×10^{-3}
D 8×10^{3}

22. The pressure of a gas decreases from 2.5×10^5 Pa to 5.4×10^4 Pa at 30 °C.
If the volume of the gas is constant, what is the initial temperature of the gas?
Tekanan suatu gas berkurang daripada 2.5×10^5 Pa kepada 5.4×10^4 Pa pada 30 °C. Jika isipadu gas adalah malar, apakah suhu awal gas tersebut?

A 6.48 °C
B 65.4 °C
C 1129.8 °C
D 1402.8 °C

23. The velocity of light in vacuum is 3×10^8 ms^{-1}.
The refractive index of water is 1.30. What is the velocity of light in the water?
Halaju cahaya di dalam vakum ialah $3x10^8$ ms^{-1}.
Indeks biasan bagi air ialah 1.30. Berapakah halaju cahaya di dalam air?

A 2.11×10^8 ms^{-1}
B 2.31×10^8 ms^{-1}
C 3.11×10^8 ms^{-1}
D 4.26×10^8 ms^{-1}

24. Diagram 14 shows a ray diagram of a concave mirror.
Rajah 14 menunjukkan sebuah cermin cekung.

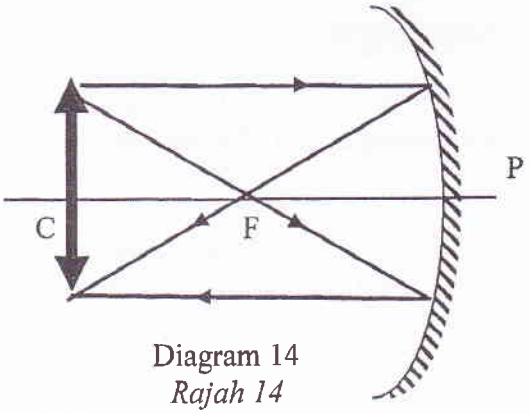


Diagram 14
Rajah 14

Which of the following shows the correct relationship between the object distance,u and the focal length, f?
Yang manakah menunjukkan hubungan yang betul di antara jarak objek,u dan panjang fokus, f ?

A $u > f$
B $u = f$
C $u = 2f$
D $u > 2f$

25. Table 1 shows three different mediums with its refractive index.
Jadual 1 menunjukkan tiga medium yang mempunyai indeks biasan yang berbeza.

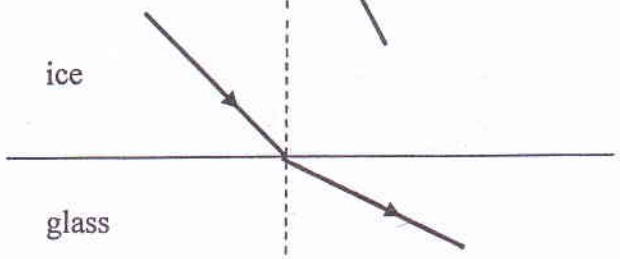
Medium *Medium*	**Refractive index, n** **Indeks biasan, n**
Glass *Kaca*	1.52
Water *Air*	1.33
Ice *Ais*	1.30

Table 1
Jadual 1

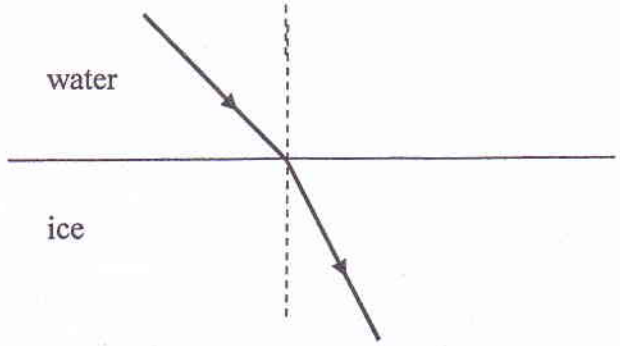
Which of the following ray diagrams is **correct**?
*Yang manakah menunjukkan lintasan sinar dengan **betul**?*

A

B



C



26. A boy stands 2m from a mirror. He sees an upright image two times his actual height. What is the type of the mirror?
Seorang budak lelaki berdiri 2m di depan sebuah cermin. Dia melihat imejnya dua kali ganda lebih tinggi. Apakah jenis cermin tersebut?

A Plane mirror
Cermin satah

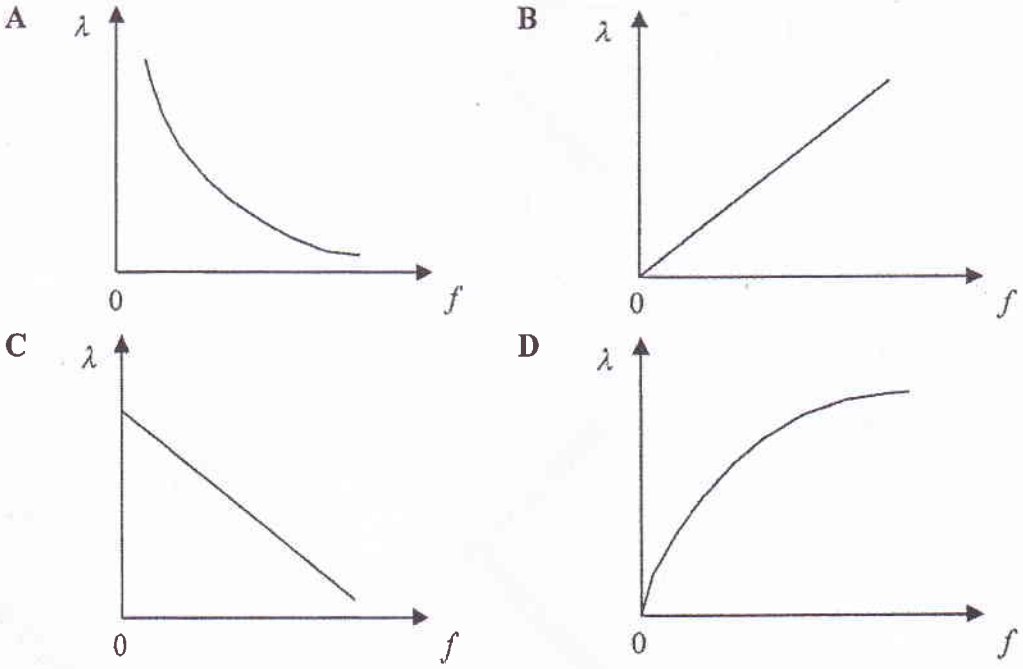
B Concave mirror
Cermin cekung

C Convex mirror
Cermin cembung

27. An astronomical telescope has two lenses with the focal length of 60 cm and 15 cm. Which of the following is true about the focal lenght of the objective lens, f_o and the eyepiece lens, f_e and its magnification, m?
Sebuah teleskop mempunyai dua jenis kanta dengan panjang fokus 60 cm dan 15 cm masing-masing. Yang manakah menunjukkan panjang fokuskanta ojek f_o, dan panjang fokus kanta mata, fe serta pembesarannya dengan betul?

	f_o(cm)	f_e(cm)	m
A	15	60	4
B	15	60	¼
C	60	15	4
D	60	15	¼

28. Which graph shows the **correct** relationship between the wavelength, λ, and the frequency, *f*, of water waves in a ripple tank where the depth of water is constant?
*Graf yang manakah menunjukkan hubungan yang **betul** antara panjang gelombang, λ, dan frekuensi, f, gelombang air dalam tangki riak dengan kedalaman air yang seragam?*



29. Diagram 15 shows a wave pattern.
Rajah 15 menunjukkan satu corak gelombang.

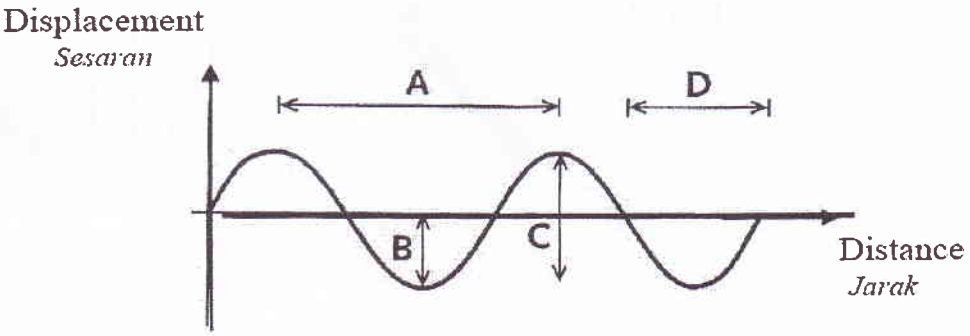


Diagram 15
Rajah 15

Which of the distances labelled **A**, **B**, **C** or **D**, represents one wavelength?
Antara jarak berlabel **A**, **B**, **C** atau **D**, yang manakah mewakili satu panjang gelombang?

30. Diagram 16 shows plane water waves travelling towards an L-shaped barrier in a ripple tank.
Rajah 16 menunjukkan gelombang air satah bergerak menuju sebuah halangan yang berbentuk L dalam sebuah tangki riak.

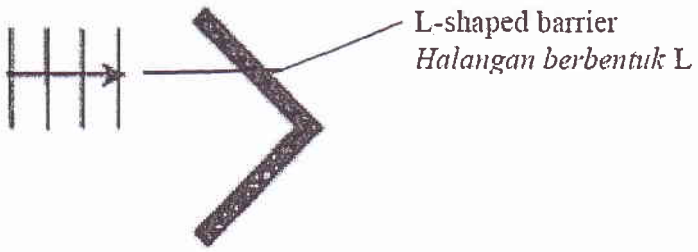
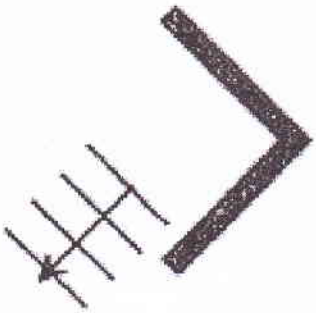


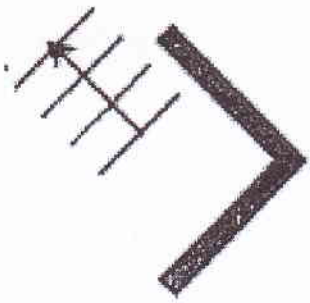
Diagram 16
Rajah 16

Which diagram shows the reflected wave pattern?
Rajah manakah menunjukkan corak gelombang yang dipantulkan?

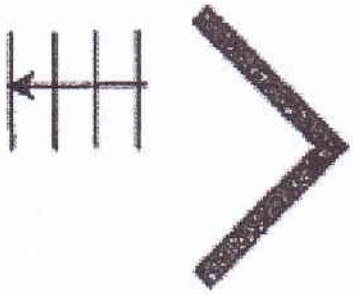
A



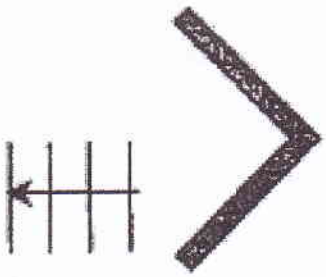
B



C



D



31. Diagram 17 shows the diffraction of water waves in a ripple tank.
Rajah 17 menunjukkan belauan gelombang air dalam tangki riak.

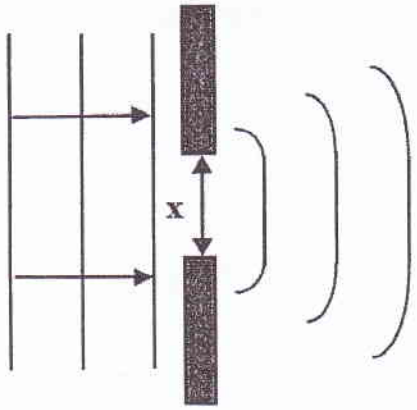


Diagram 17
Rajah 17

When x decreases, the effect of diffraction will
Apabila x berkurang, kesan belauan akan

A decreases
berkurang

B increases
bertambah

C remains the same
tidak berubah

32. Diagram 18 shows a ship in front of a cliff. It produces a loud sound which travels at a velocity of 330 ms^{-1}. An echo is heard 4 seconds later.
Rajah 18 menunjukkan sebuah kapal di hadapan sebuah tebing. Ia menghasilkan bunyi yang kuat yang merambat pada kelajuan 330 ms^{-1}. Gema kedengaran 4 saat kemudian.

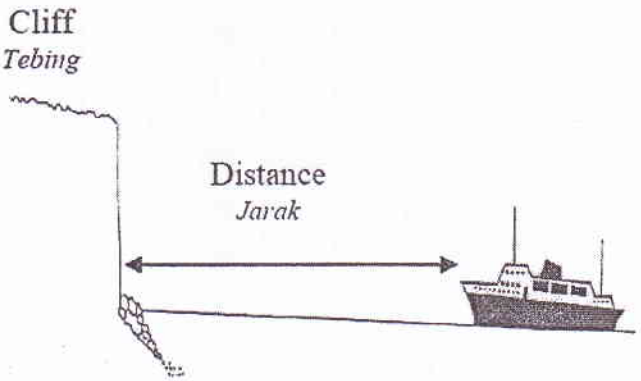


Diagram 18
Rajah 18

Calculate the distance between the ship and the cliff.
Hitung jarak antara kapal dan tebing.

A 82.5 m
B 330.0 m
C 660.0 m
D 1200.0 m

33. Diagram 19 shows the displacement-time graph for wave **P**, **Q** and **R**.
*Rajah 19 menunjukkan graf sesaran-masa bagi gelombang **P**, **Q** dan **R**.*

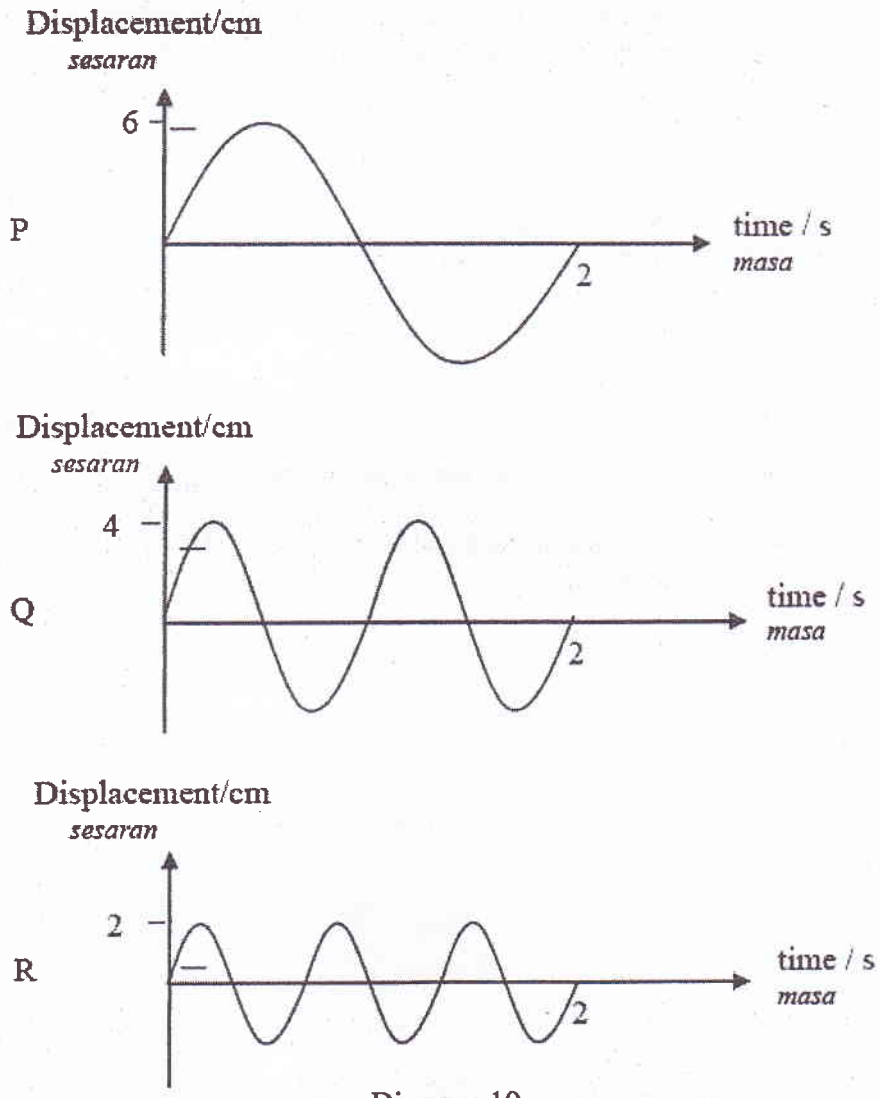


Diagram 19
Rajah 19

Arrange the pitch of the waves **P**, **Q** and **R** in a descending order.
*Susun gelombang **P**, **Q** and **R** berdasarkan kelangsingan dari tinggi ke rendah.*

A **P, Q, R**

B **R, Q, P**

C **Q, R, P**

D **P, R, Q**

34. Table 2 shows part of electromagnetic waves spectrum.
Jadual 2 menunjukkan sebahagian gelombang electromagnet.

Microwave *Gelombang mikro*	Infrared rays *Sinar inframerah*	Ultraviolet rays *Sinar ultraungu*	X-rays *Sinar-X*	Gamma rays *Sinar Gamma*

Table 2
Jadual 2

The position of the visible light is
Kedudukan cahaya nampak adalah

A between gamma rays and ultraviolet rays
di antara sinar gamma dan sinar ultraungu

B between infrared rays and ultraviolet rays
di antara sinar inframerah dan sinar ultraungu

C between microwave and infrared rays
di antara gelombang mikro dan sinar inframerah

D between ultraviolet rays and X-rays
di antara sinar ultraungu dan sinar-X

35. Diagram 20 shows a circuit consisting of two resistors and a bulb.
Rajah 20 menunjukkan satu litar mengandungi dua perintang dan sebuah mentol

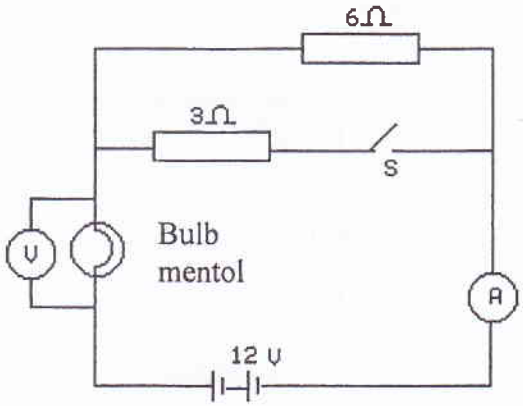


Diagram 20
Rajah 20

When switch S is opened, the reading of the ammeter is 1.5 A.
What is the reading of the voltmeter when the switch is closed?

Apabila suis S dibuka, bacaan ammeter adalah 1.5 A.
Apakah bacaan voltmeter apabila suis ditutup?

A 3 V
B 6 V
C 8 V
D 12 V

36. Diagram 21 shows a circuit. When the switch, S is opened and then closed, the reading of the ammeter is I_1 and I_2 respectively.
Rajah 21 menunjukkan satu litar. Apabila suis, S terbuka dan tertutup, bacaan ammeter ialah I_1 dan I_2.

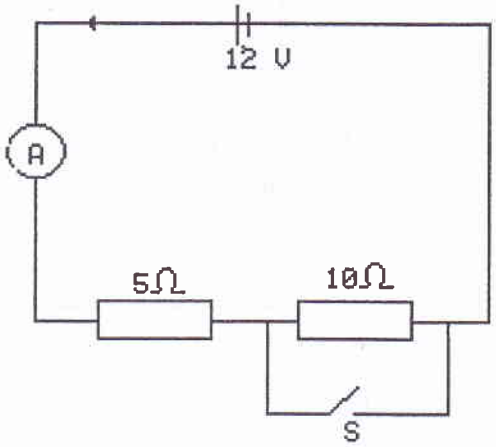


Diagram 21
Rajah 21

What the ratio of $I_1 : 1_2$?
Apakah nisbah $I_1 : 1_2$?

A 1 : 2
B 2 : 1
C 1 : 3
D 3 : 1

37. Diagram 22.1 shows a circuit to determine the e.m.f and internal resistance of a cell.
Diagram 22.2 shows the experiment is repeated by using the same cell.
Rajah 22.1 menunjukkan satu litar untuk menentukan d.g.e dan rintangan dalam suatu sel.
Rajah 22.2 menunjukkan satu eksperimen diulang menggunakan sel yang sama.

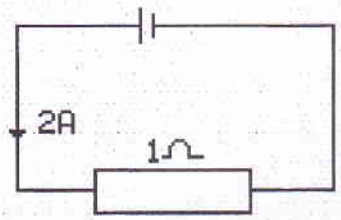


Diagram 22.1
Rajah 22.1

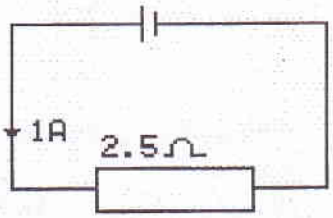


Diagram 22.2
Rajah 22.2

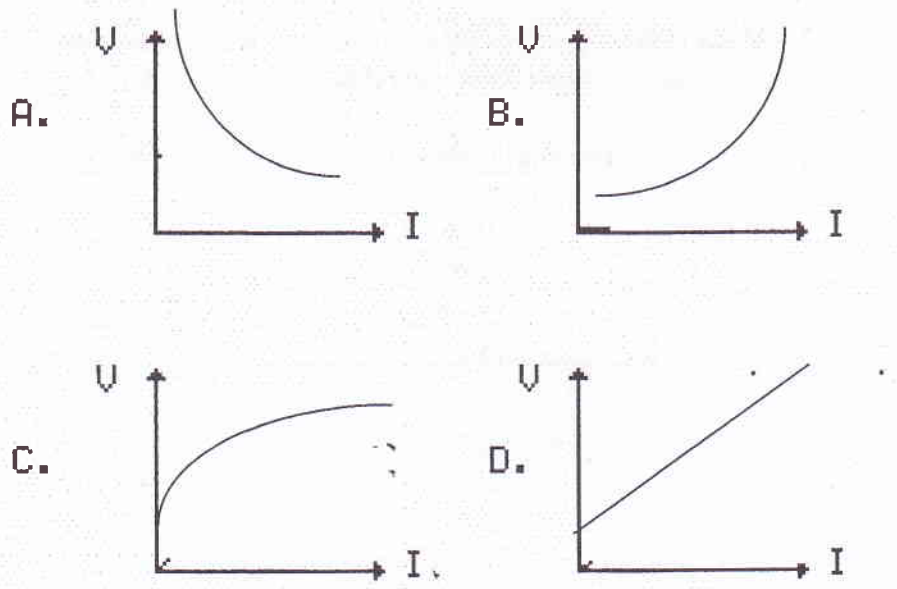
What is the internal resistance and the electromotive force of the cell?
Apakah rintangan dalam dan daya gerak elektrik sel?

	Internal resistance / Ω	E.m.f / V
A	0.25	1.5
B	0.50	3.0
C	1.00	3.0
D	1.25	4.5
E	1.50	4.5

38. An electric bulb is labeled "240V, 25W. How much energy is used by the bulb in one minute if the bulb is connected to a 240V power supply?
Satu mentol berlabel "240V, 25W". Berapakah tenaga yang digunakan oleh mentol tersebut dalam satu minit jika ia disambung kepada bekalan kuasa 240V?

A 25 J
B 1500 J
C 6000 J
D 14 400 J

39. Which of the following V-I graph shows the resistance increasing as the current rises?
Manakah di antara berikut graf V-I menunjukkan rintangan bertambah apabila arus bertambah?



40. Diagram 23 shows a square coil rotating at a steady speed in a magnetic field.
Rajah 23 menunjukkan gegelung segiempat berputar dengan kelajuan seragam di dalam medan magnet.

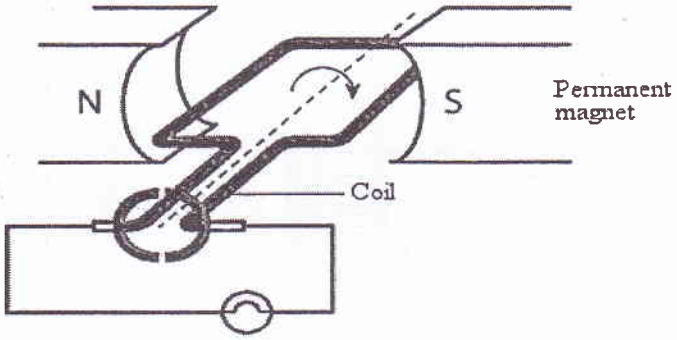
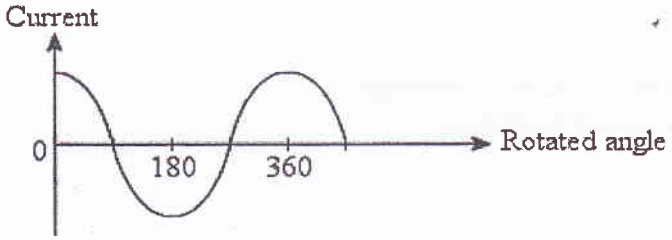


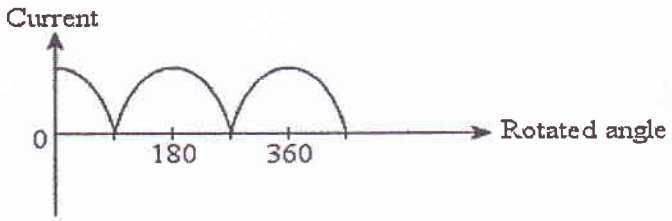
Diagram 23
Rajah 23

Which of the following graphs shows the fluctuation in the current flowing through the lamp starting with the coil being in the horizontal position?
Graf manakah menunjukkan perubahan arus yang mengalir melalui mentol bermula dari gegelung berada di dalam keadaan kedudukan mendatar?

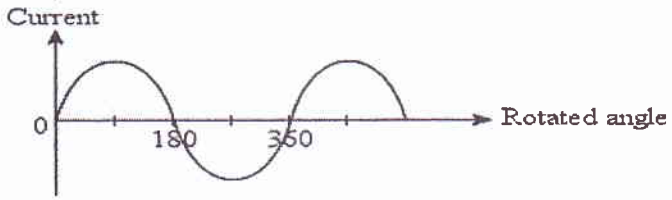
A



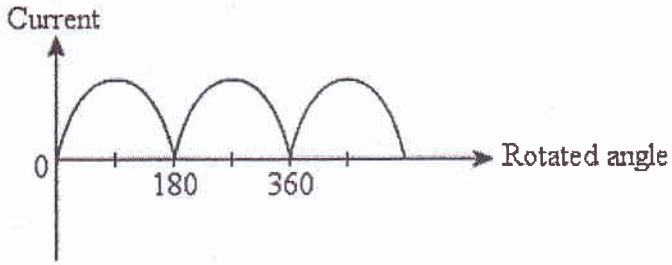
B



C



D



41. Diagram 24 shows a simple transformer with bulb lights up at normal brightness.
Rajah 24 menunjukkan sebuah transformer ringkas dengan mento menyala dengan kecerahan biasa.

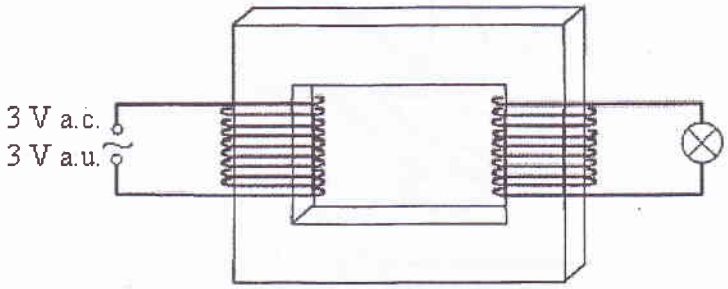


Diagram 24
Rajah 24

What will happen if the alternaring current, a.c input is replaced by a 3 V battery?
Apakah yang berlaku jika arus ulangalik digantikan dengan bateri 3V?

A The bulb blows
Mentol terbakar

B The brightness of the bulb decreases
Kecerahan mentol berkurang

C The brightness of the bulb increases
Kecerahan mentol bertambah

D The bulb does not light up
Mentol tidak menyala

42. Diagram 25 shows a wire coiled around an iron rod.
Rajah 25 menunjukkan dawai gegelung pada satu rod besi.

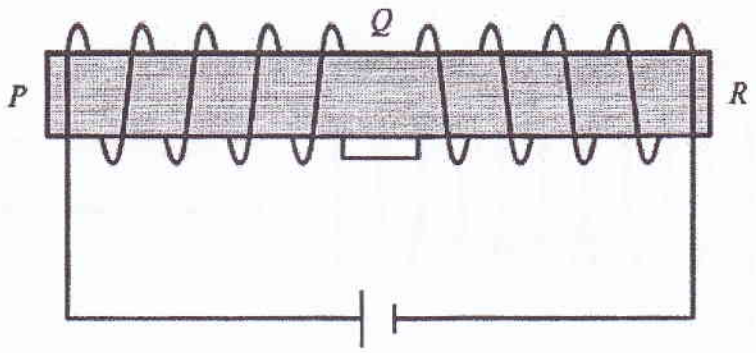


Diagram 25
Rajah 25

What is the magnetic polarity at *P*, *Q* and *R*?
Apakah kekutuban magnetic P, Q dan R?

	P	*Q*	*R*
A	North *Utara*	Neutral *Neutral*	North *Utara*
B	South *Selatan*	Neutral *Neutral*	South *Selatan*
C	North *Utara*	South *Selatan*	North *Utara*
D	South *Selatan*	North *Utara*	South *Selatan*

43. Diagram 26 shows a coil of wire placed next to a magnet.
The galvanometer pointer deflects when the magnet is pushed into the coil.
Rajah 26 menunjukkan gegelung dawai berada di sebelah satu magnet.
Jarum galvanometer itu terpesong apabila magnet itu di tolak kea rah gegelung.

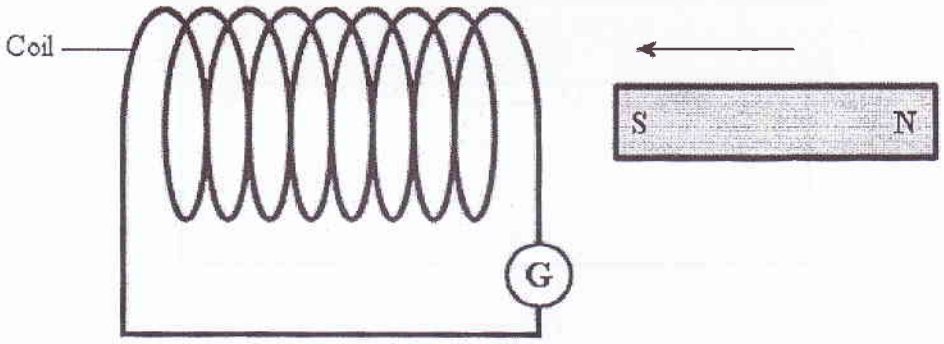


Diagram 26
Rajah 26

Which action will increase the deflection of the galvanometer pointer?
Apakah tindakan yang akan meningkatkan pesongan jarum galvanometer?

A The magnetic pole is reversed
Kekutuban magnet diterbalikkan.

B The number of turns of coils is increased
Bilangan lilitan gegelung ditambah.

C The coil is made from insulated wire.
Gegelung dibuat daripada dawai bertebat.

D The magnet is pushed slowly into the coil.
Magnet itu ditolak secara perlahan ke dalam gegelung.

44. Diagram 27 shows a graph of the output current from a source of alternating current supply.
Rajah 27 menunjukkan graf arus output daripada satu bekalan arus ulangalik.

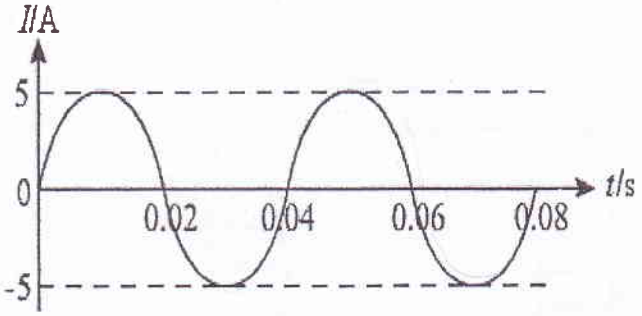


Diagram 27
Rajah 27

Which statement about this output current is true.
Pernyataan manakah yang benar berkenaan arus output?

A The peak current is 10 A.
Arus puncak ialah 10 A

B The magnitude of current is always constant.
Magnitud arus sentiasa malar.

C The period of the alternating current is 0.02 s.
Tempoh arus ulangalik itu ialah 0.02 s.

D The frequency of the alternating current is 25 Hz.
Frekuensi arus ulangalik ialah 25 Hz

45. Diagram 28 shows the primary coil of a transformer is connected to a 240 V a.c. supply and an output voltage of 12V is produced.
Rajah 28 menunjukkan gegelung primer sebuah transformer disambung ke bekalan 240V a.u dan voltan output 12V dihasilkan.

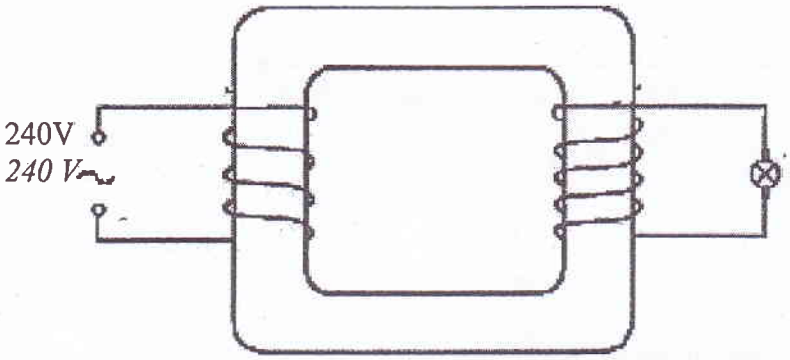


Diagram 28
Rajah 28

What is the ratio of the number of turns in the secondary coil, N_S to the number of turns in the primary coil, N_P?
Apakah nisbah bilangan lilitan gegelung sekunder N_S kepada bilangan lilitan gegelung primer N_P ?

A 40 : 2
B 4 : 45
C 1 : 20
D 2 : 40

46. Diagram 29 shows a full wave rectifier circuit.
Rajah 29 menunjukkan litar rektifikasi gelombang penuh.

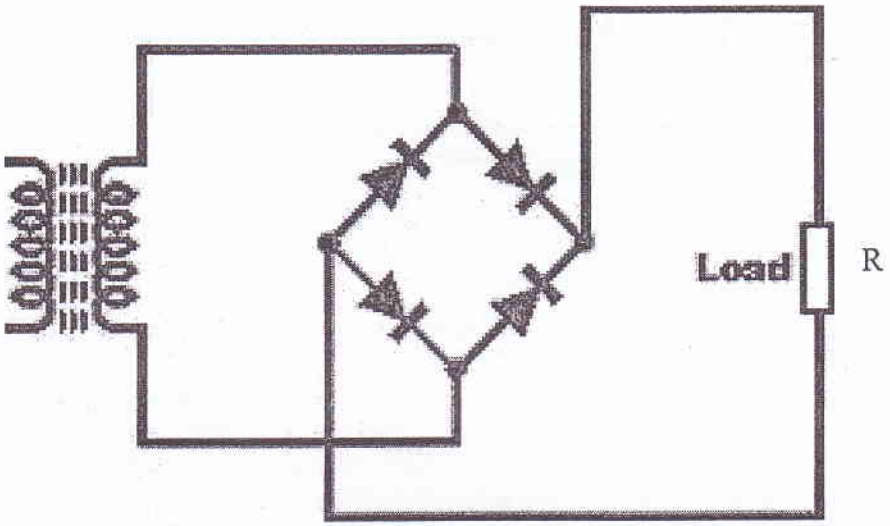


Diagram 29
Rajah 29

Suggest a modification that has to be done to the circuit in Diagram 29 to obtain a smoothened full wave rectification ?
Cadangkan satu modifikasi yang perlu lakukan pada litar di Rajah 29 untuk memperolehi rektifikasi gelombang penuh yang licin?

A Add a transformer parallel to R
Tambah sebuah transformer selari dengan R

B Add a transistor parallel to R
Tambah sebuah transistor selari dengan R

C Add an inductor parallel to R
Tambah sebuah inductor selari dengan R

D Add a capacitor parallel to R
Tambah sebuah kapasitor selari dengan R

47. Diagram 30 shows combination of two logic gates circuit.
Rajah 30 menunjukkan litar kombinasi bagi dua get logik.

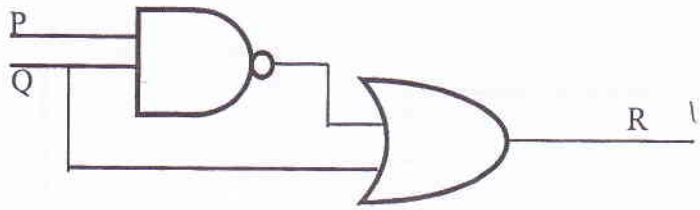


Diagram 30
Rajah 30

If P and Q are inputs and R is output, which of the following truth table is correct for the circuit in diagram
Jika P dan Q input dan R output, manakah Jadual kebenaran yang berikut betul bagi litar pada Rajah

A

P	Q	R
0	0	0
1	0	0
0	1	0
1	1	1

B

P	Q	R
0	0	1
1	0	0
0	1	1
1	1	0

C

P	Q	R
0	0	0
1	0	0
0	1	1
1	1	1

D

P	Q	R
0	0	1
1	0	1
0	1	1
1	1	1

48. Which of the following nuclide notation is correct for a nuclide X has 29 protons and 5 neutrons ?
Yang manakahsymbol nuklidbetulbaginuklid X yang mempunyai 29 proton dan 5 neutron?

A. $^{29}_{5}X$

B $^{5}_{29}X$

C. $^{34}_{29}X$

D. $^{29}_{34}X$

49. The process of splitting a heavier nucleus into lighter nuclei by released of a large amount of energy is called
Proses yang membelah nukleus berat kepada nucleus yang ringan serta menghasilkan tenaga yang besar di panggil

A Nuclear Fusion
Pelakuran nucleus

B Nuclear Fission
Pembelahan nucleus

C Radioactive Decay
Reputan Radioaktif

D Half life
Separuh hayat

50. In a nuclear fission, about 0.05 a.m.u. is lost. How much energy is given out ?
Dalam suatu pembelahan nukleus, 0.05 u.j.a hilang. Berapakah tenaga terhasil ?
[Given 1 a.m.u. = 1.66×10^{-27}kg , and $c = 3.0 \times 10^{8}$ m s^{-1}]
[Diberi 1 u.j.a. = $1.66 \times 10^{-27} kg$ *,dan* $c = 3.0 \times 10^{8} m\ s^{-1}$*]*

A 4.50×10^{-19} J
B 7.47×10^{-12} J
C 8.31×10^{-20} J
D 9.06×10^{-27}J

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

4531/2

4531 / 2
Physics
Paper 2
August
2011
2 ½ hours

Name : .....

Form : .....

MAJLIS PENGETUA SEKOLAH MENENGAH MALAYSIA
CAWANGAN NEGERI SEMBILAN

PEPERIKSAAN PERCUBAAN BERSAMA
SIJIL PELAJARAN MALAYSIA 2011

PHYSICS (FIZIK)

Paper 2 (Kertas 2)

Two hours and thirty minutes (Dua jam tiga puluh minit)

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Tuliskan* **nama dan kelas** *anda pada ruang yang disediakan.*
2. *Kertas soalan ini adalah dalam dwibahasa.*
3. *Soalan dalam Bahasa Inggeris mendahului soalan yang sepadan dalam dalam Bahasa Melayu.*
4. *Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam Bahasa Inggeris atau BahasaMelayu.*
5. *Calon dikehendaki membaca maklumat di halaman 2 atau halaman 3.*

KodPemeriksa			
Bahagian	*Soalan*	*Markah Penuh*	*Markah Diperoleh*
A	1	4	
	2	5	
	3	6	
	4	7	
	5	8	
	6	8	
	7	10	
	8	12	
B	1	20	
	2	20	
C	3	20	
	4	20	
Jumlah			

Kertas soalan ini mengandungi 32 halaman bercetak

INFORMATION FOR CANDIDATES

1. This question paper consists of **three** sections: **Section A, Section B** and **Section C.**
2. Answer **all** questions in **Section A.** Write your answers for **Section A** in the spaces provided in the question paper.
3. Answer **one** question in **Section B** and **one** question from **Section C.** Write your answers for **Section B** and **Section C** on the line pages provided at the end of this question paper. Answer questions in **Section B** and **Section C** in detail. Answers should be clear and logical. Equations, diagrams, tables, graphs and other suitable methods can be used to explain your answer.
4. If you wish to cancel any answer, neatly cross out the answer.
5. The diagrams in the questions provided are not drawn to scale unless stated.
6. The marks allocated for each question and sub-section of a question are shown in brackets.
7. A list of formulae is provided on page 5.
8. You may use a non-programmable scientific calculator. However, steps in calculation must be shown.
9. The time suggested to complete **Section A** is **90** minutes, **Section B** is **30** minutes and **Section C** is **30** minutes.
10. Hand in all your answer sheets at the end of the examination.

MAKLUMAT UNTUK CALON

1. *Kertas soalan ini mengandungi tiga bahagian:* ***Bahagian A, Bahagian B*** *dan* ***Bahagaian C.***
2. *Jawab* ***semua*** *soalan dalam* ***Bahagian A****. Jawapan kepada* ***Bahagian A*** *hendaklah ditulis dalam ruang yang disediakan dalam kertas soalan*
3. *Jawab* ***satu*** *soalan daripada* ***Bahagian B*** *dan* ***satu*** *soalan daripada* ***Bahagian C.*** *Jawapan kepada Bahagian B dan* ***Bahagian C*** *hendaklah ditulis dalam ruang bergaris yang disediakan di bahagian akhir kertas soalan ini. Anda diminta menjawab dengan lebih terperinci untuk* ***Bahagian B*** *dan* ***Bahagian C.*** *Jawapan mestialh jelas dan logik. Persamaan, gambar rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda boleh digunakan.*
4. *Sekiranya anda hendak membatalkan sesuatu jawapan, buat garisan di atas jawapan itu.*
5. *Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.*
6. *Markah yang diperuntukkan bagi setiap soalan atau ceraian soalan ditunjukkan dalam kurungan di hujung setiap soalan atau ceraian soalan.*
7. *Satu senarai rumus disediakan di halaman 5.*
8. *Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram. Walau bagaimanapun, langkah mengira perlu ditunjukkan.*
9. *Masa yang dicadangkan untuk menjawab* ***Bahagian A*** *ialah* ***90*** *minit.* ***Bahagian B*** *ialah* ***30*** *minit dan* ***Bahagaian C*** *aialah* ***30*** *minit.*
10. *Ikatkan semua kertas jawapan dan serahkan di akhir peperiksaan.*

BLANK PAGE

(HALAMAN KOSONG)

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

1.	$a = \frac{v-u}{t}$	15.	Power, $P = \frac{\text{energy}}{\text{time}}$
2.	$v^2 = u^2 + 2as$	16.	$\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$
3.	$s = ut + \frac{1}{2}at^2$	17.	$\lambda = \frac{ax}{D}$
4.	Momentum $= mv$	18.	$n = \frac{\sin i}{\sin r}$
5.	$F = ma$	19.	$n = \frac{\text{real depth}}{\text{apparent depth}}$
6.	Kinetic energy $= \frac{1}{2}mv^2$	20.	$Q = It$
7.	Gravitational potential energy $= mgh$	21.	$V = IR$
8.	Elastic potential energy $= \frac{1}{2}Fx$	22.	Power, $P = VI$
9.	$\rho = \frac{m}{V}$	23.	$\frac{N_p}{N_s} = \frac{V_p}{V_s}$
10.	Pressure, $P = h\rho g$	24.	Efficiency $= \frac{V_s I_s}{V_p I_P} \times 100\%$
11.	Pressure, $P = \frac{F}{A}$	25.	$g = 10\ \text{m s}^{-2}$
12.	Heat, $Q = mc\theta$	26.	$E = mc^2$
13.	$\frac{PV}{T} = \text{constant}$	27.	Linear magnification, $m = \frac{v}{u}$
14.	$v = f\lambda$	28.	$P = \frac{1}{f}$

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

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

1. Diagram 1.1 shows a mercury thermometer.
Rajah 1.1 menunjukkan satu termometer merkuri.

Diagram 1.1
Rajah 1.1

(a) Complete the sentence below by ticking (✔) the correct box.
Lengkapkan ayat di bawah dengan menandakan (✔) dalam kotak yang betul.

Thermometer is used to measure
Termometer digunakan untuk mengukur

the change in temperature of an object
perubahan suhu sesuatu objek ☐

the heat energy of an object
tenaga haba sesuatu objek ☐

1(a) ☐

[1 mark]
[1 *markah*]

(b) Complete the following sentence by underlining the correct phrase in the bracket.
Lengkapkan ayat berikut dengan menggariskan frasa yang betul di dalam kurungan .

smaller bulb
bebuli kecil

larger bulb
bebuli besar

Diagram 1.2
Rajah 1.2

The thermometer with smaller bulb in Diagram 1.2 is
(more sensitive, less sensitive) than thermometer with larger bulb.
Termometer dengan bebuli yang kecil dalam Rajah 1.2
(lebih peka, kurang peka) berbanding termometer dengan bebuli besar.

[1 mark]
[1 *markah*]

1(b) ☐

(c) State the physical change in the mercury when the temperature increases.
Nyatakan perubahan sifat fizikal pada merkuri apabila suhu bertambah.

.....

[1 mark]
[1 *markah*]

1(c) ☐

(d) Give one reason, why mercury is used in the thermometer?
Berikan satu sebab, mengapa merkuri digunakan dalam termometer itu?

.....

[1 mark]
[1 *markah*]

1(d) ☐

2 Diagram 2 shows a path of light ray being refracted in liquid P.
Rajah menunjukkan lintasan sinar cahaya dibiaskan kedalam cecair P.

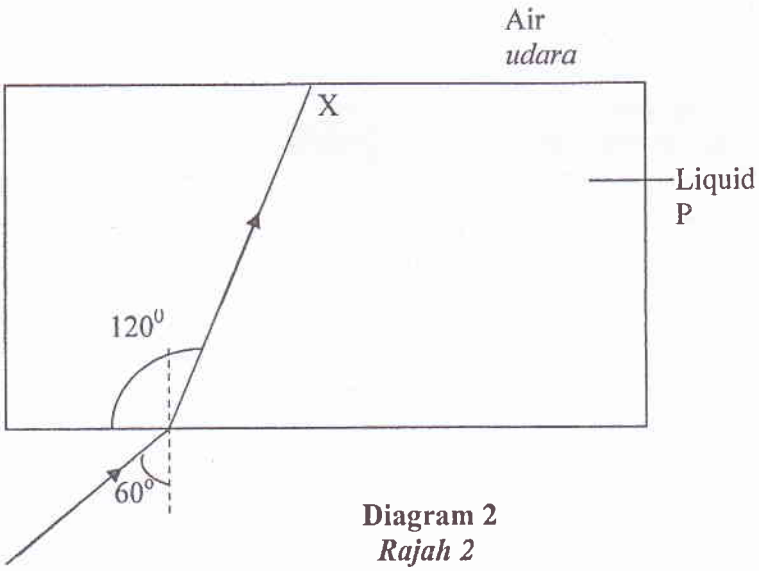


Diagram 2
Rajah 2

(a) What is meant by refractive index.
Apakah yang dimaksudkan dengan indeks biasan?

2(a)

.....

[1 mark]
[1 *markah*]

(b) Determine the refractive angle in liquid P.
Tentukan sudut biasan dalam cecair P.

2(b)

.....

[1 mark]
[1 *markah*]

(c) Calculate the refractive index for liquid P.
Hitung indeks biasan bagi cecair P.

2(c)

[2 marks]
[2 *markah*]

(d) In Diagram 2, draw the path ray after passing point X.
Dalam Rajah 2, lukis sinar cahaya selepas melalui titik X.

2(d)

[1 mark]
[1 *markah*]

3. Diagram 3 shows a logic gate used as a switch for a cooler in a manufacturing machine in a factory. The cooler only switched on during working hours (day time) and hot temperature (more than 24^0C)
Rajah 3 menunjukkansebuah get logik diguna untuk menghidupkan sebuah penyejuk dalam mesin pengeluar pada sebuah kilang. Penyejuk itu dihidupkan semasa waktukerja (sianghari) dan suhu panas (lebihdari 24^0C).

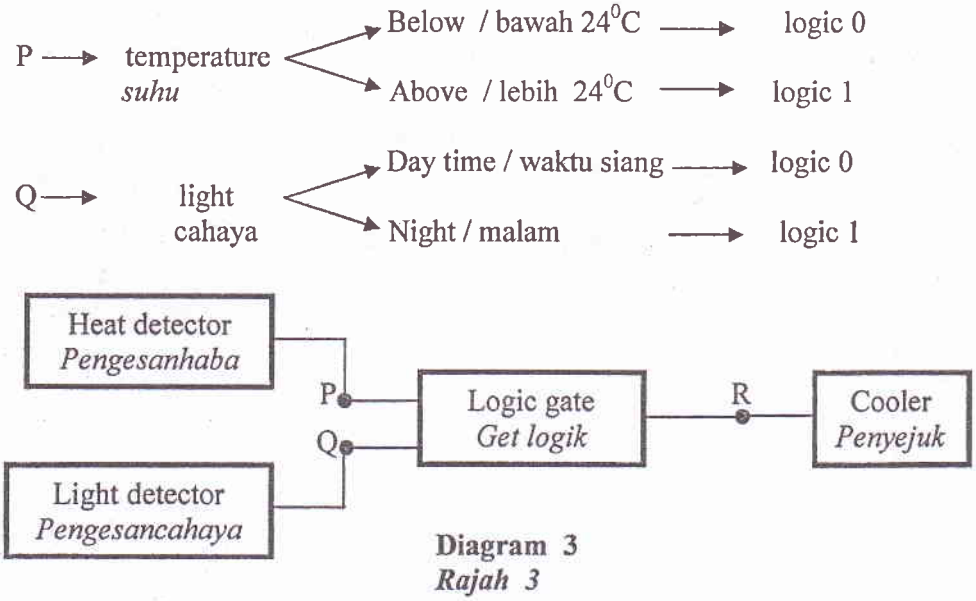


Diagram 3
Rajah 3

(a) Based on the above description,
Berasaskan penerangan di atas

(i) complete the truth table.
Lengkapkan jadual kebenaran berikut.

Input		Output
P	Q	R
0	0	
1	0	
0	1	
1	1	

[1 mark]
[1 *markah*]

3(a)(i)

(ii) deduce the type of logic gate used in Diagram 3.
Tentukan jenis get logik digunakan dalam Rajah 3.

.....

[1 mark]
[1 markah]

3(a)(ii)

(iii) draw the symbol of the logic gate on (a)(ii)
lukiskan simbol bagi get logik pada (a)(ii)

[1 mark]
[1 markah]

3(a)(iii)

(b) What is the modification that can be done on the circuit Diagram 3 so that the cooler will be switched on in the dark and off during day time?
Apakah modifikasi kita boleh buat di litar pada Rajah 3 supaya penyejuk itu dapat berfungsi semasa gelap dan tutup semasa siang ?

3(b)

.....

[1 mark]
[1 markah]

(c) If the cooler is to be off at night with temperature less than 24^0C, what is your suggestion of improvement to the circuit on Diagram 3? Draw the complete circuit.
Jika penyejuk itu hanya berhenti pada waktu malam yang suhunya kurang pada 24^0C, apakah cadangan anda untuk pengubahsuaian litar pada Rajah 3? Lukiskan litar itu dengan lengkap.

3(c)

[2 marks]
[2 markah]

4 Diagram 4 shows the arrangement of apparatus to determine the wavelength of monochromatic light. A fringe pattern is formed on the translucent screen. The distance between the two slits S_1 and S_2 is x mm and the distance from the screen with double slits screen is D m.
Rajah 4 menunjukkan susunan alat radas untuk mencari panjang gelombang cahaya monokromatik. Corak jalur terhasil pada skrin legap. Jarak antara 2 celah S_1 dan S_2 ialah x mm dan jarak antara skrin dan dwicelah ialah D mm.

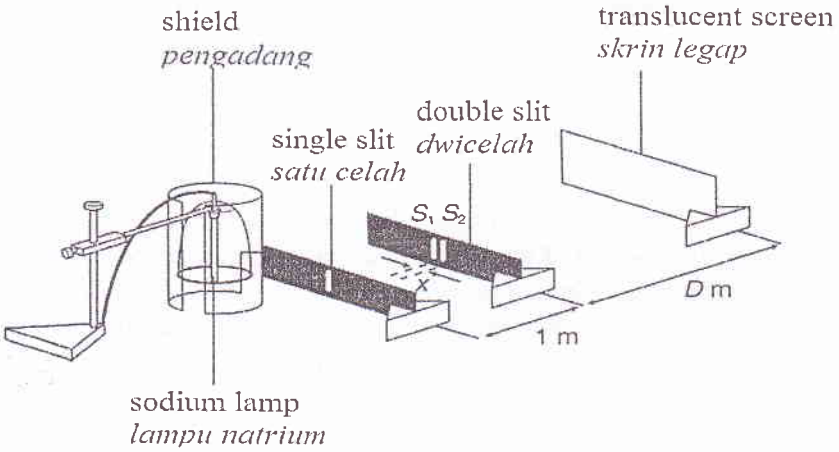


Diagram 4
Rajah 4

(a) What is meant by monochromatic light?
Apakah yang dimaksudkan dengan cahaya monokromatik?

4(a)

.....

[1 mark]
[1 *markah*]

(b) (i) Describe the fringe pattern which can be observed on the screen.
Terangkan corak jalur yang dapat diperhatikan pada skrin.

.....

[1 mark]
[1 *markah*]

(ii) What is the wave phenomenon involved in (b)(i)?
Apakah fenomena gelombang yang berlaku di (b)(i)?

4(b)

.....

[1 mark]
[1 *markah*]

(c) What happens to the pattern of the fringes when
Apakah yang terjadi kepada corak jalur apabila

(i) distance between S_1 and S_2 increases:
jarak di antara S_1 dan S_2 bertambah:

.....

4(c)

(ii) D decreases :
D berkurangan :

.....

[2 marks]
[2 *markah*]

(d) If D = 3m, a = 0.5 mm and the distance between four fringes is 12 mm, calculate the wavelength of the light wave formed on the screen.
Jika D = 3 m, a = 0.5 mm dan jarak antara empat jalur ialah 12 mm, kira panjang gelombang bagi gelombang cahaya yang dipapar pada skrin.

[2 marks]
[2 *markah*]

4(d)

5. (a) A bar magnet is dropped through a coil of wire as shown in Diagram 5
Sebatang magnet di jatuhkan ke dalam gegelung dawai seperti dalam Rajah 5.

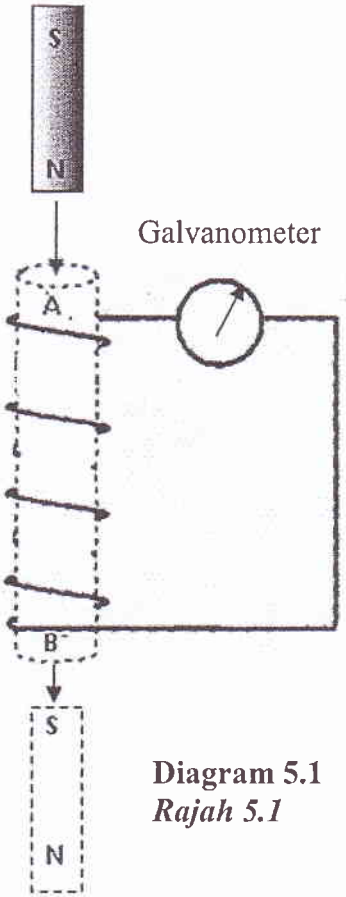


Diagram 5.1
Rajah 5.1

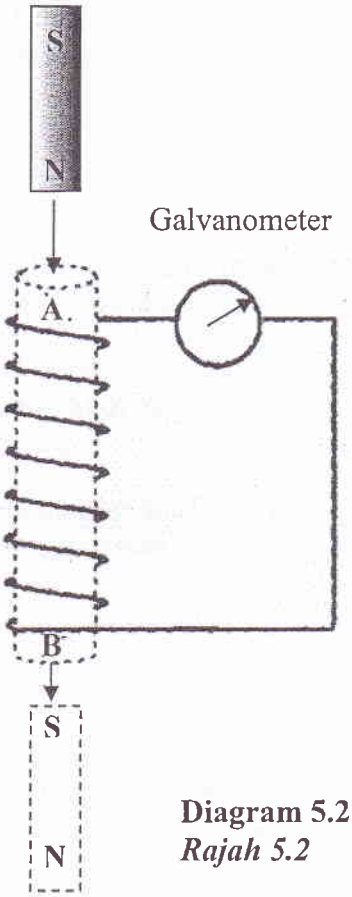


Diagram 5.2
Rajah 5.2

The direction of induced current in the coil can be determined by using Lenz's law.
Arah arus aruhan di dalam gegelung boleh ditentukan dengan menggunakan Hukum Lenz.

(i) State Lenz's law.
Nyatakan Hukum Lenz

.....

.....

[1 mark]
[1 *markah*]

5(a)(i)

(b) Based on Diagram 5.1 and Diagram 5.2, what can be observed when the magnet bar dropped through the coil?
Berdasarkan Rajah 5.1 dan Rajah 5.2, apakah yang diperhatikan Apabila magnet itu jatuh ke dalam gegelung?

5(b)

.....

.....

[2 marks]
[2 *markah*]

(c) Based on Diagram 5.1 and Diagram 5.2, compare
Nyatakan dua perbezaan di antara

(i) number of turns of coil
bilangan lilitan gegelung

.....

5(c)

(ii) angle of deflection of galvanometer
sudut pesongan galvanometer

.....

[2 marks]
[*2 markah*]

(d) State the relationship between the number of turns of coil and angle of deflection of the galvanometer.
Nyatakan hubungan di antara bilangan lilitan gegelung dan sudut pesongan galvanometer .

5(d)

.....

[1 mark]
[*1 markah*]

(e) State two other ways to increase the angle of deflection of galvanometer.
Nyatakan dua cara lain untuk meningkatkan sudut pesongan galvanometer.

5(e)

1. .....

2.....

[2 marks]
[*2 markah*]

(f) Based on question 5(e), state the law involved.
Berdasarkan soalan 5(e), nyatakan hukum yang berkaitan.

5(f)

.....

[1 mark]
[*1 markah*]

6 Diagram 6.1 and Diagram 6.2 shows the deflection of a radioactive emission in an electric field.
Rajah 6.1 dan Rajah 6.2 menunjukkan pesongan satu sinaran radioaktif di dalam suatu medan elektrik.

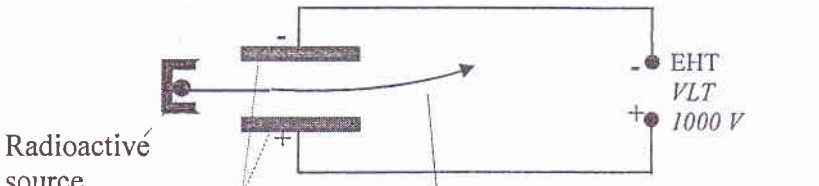


Diagram 6.1
Rajah 6.1

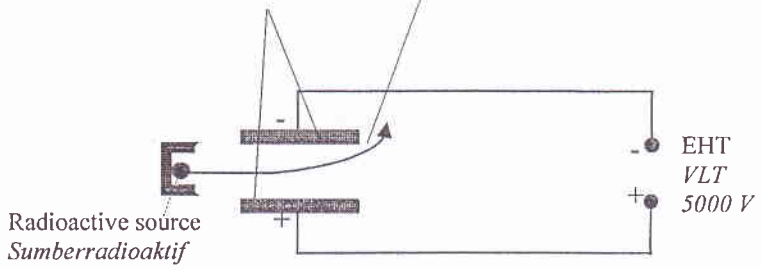


Diagram 6.2
Rajah 6.2

(a) What is the meaning of radioactivity ?
Apakah maksud keradioaktifan ?

.....

[1 mark]
[1 markah]

6(a)

(b) Observe Diagram 6.1 and Diagram 6.2
Perhatikan Rajah 6.1 dan Rajah 6.2

(i) state the type radioactive emission and its charge.
nyatakan jenis sinaran radioaktif dan casnya.

.....

[2 marks]
[2markah]

6(b)(i)

(ii) compare the voltage of the EHT
bandingkan voltan VLT

.....

[1 mark]
[1 markah]

6(b)(ii)

(iii) compare the deflection of the radioactive emission.
bandingkan pesongan sinaran randioaktif.

.....

[1 mark]
[1 markah]

6(b)(iii)

c) State the relationship between
Nyatakan hubungan antara

(i) the voltage of the EHT and the strength of the electric field between the plates,
voltan VLT dengan kekuatan medan elektrik di antara plat,

6(c)(i)

.....

[1 mark]
[1 markah]

(ii) the strength of the electric field between the plates and deflection of the radioactive emission.
Kekuatan medan elektrik di antara plat dengan pesongan pancaran radioaktif.

6(c)(ii)

.....

[1 mark]
[1 markah]

d) 7000 atoms of a 28000 atom a sample left after 12 hours. What is the half-life, $T_{1/2}$ of the sample?
7 000 atom dari 28000 atom pada suatu sampel tinggal selepas 12jam. Apakah separuh hayat, $T_{1/2}$ sample itu ?

6(d)

.....

[1 mark]
[1 markah]

7 Figure 7.1 shows a circuit consisting of 3 identical resistors K , L, M and two measuring instruments R and S.
Rajah 7.1 menunjukkan satu litar yang mengandungi 3 perintang yang serupa K, L, M dan alat pengukur R dan S.

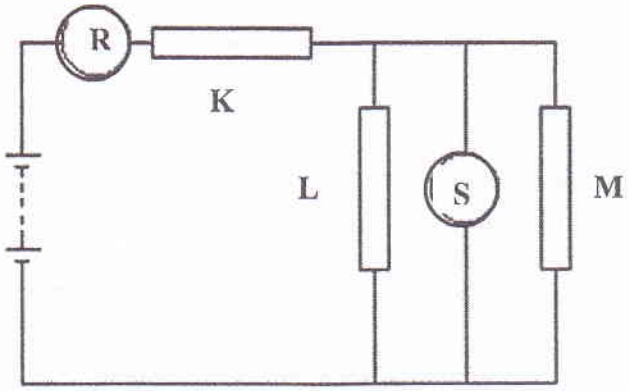


Diagram 7.1
Rajah 7.1

(a) Name the measuring instruments,
Namakan alat-alat pengukur,

(i) R.....

(ii) S.....

[2 mark]
[2*markah*]

7(a)

(b) When an identical resistor is connected parallel to resistor M, what happens to the reading of R and S?
Apabila satu lagi perintang yang serupa disambung selari kepada perintang M, apakah berlaku kepada bacaan R dan S?

(i) R.....

(ii) S.....

[2 marks]
[2 *markah*]

7(b)

(c) Give the reasons for your answer in (b)(i) and (b)(ii).
Berikan sebab-sebab bagi jawapan anda dalam (b)(i) dan (b)(ii).

(i) Reason for (b)(i):
Sebab bagi (b)(i):

.....

... .

[2 marks]
[2 *markah*]

7(c)(i)

(ii) Reason for (b)(ii):
Sebab bagi (b)(ii):

7(c)(ii)

.....

.....

[2 marks]
[2 *markah*]

(d) The resistors K, L and M are replaced by three identical bulb X, Y and Z as shown in Figure 7.2
Perintang-perintang K, L dan M kemudian diganti dengan tiga mentol yang serupa X, Y dan Z seperti dalam Rajah 7.2.

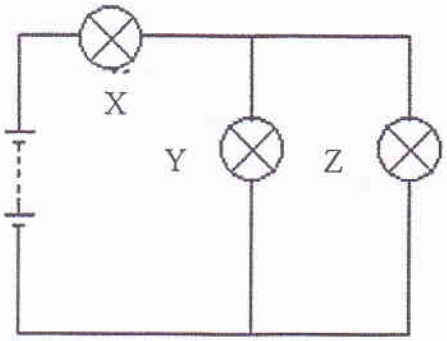


Diagram 7.2
Rajah 7.2

(i) Compare the brightness between the bulb
Bandingkan kecerahan di antara mentol-mentol

7(d)(i)

X and Y
X dan Y

.....

[1 mark]
[1 *markah*]

7(d)(ii)

Y and Z
Y dan Z

.....

[1 mark]
[1*markah*]

8 Table 8.1 shows three types of remote control toy car and their characteristics.
Jadual 8.1 menunjukkan tiga jenis kereta mainan kawalan jauh dan ciri-cirinya.

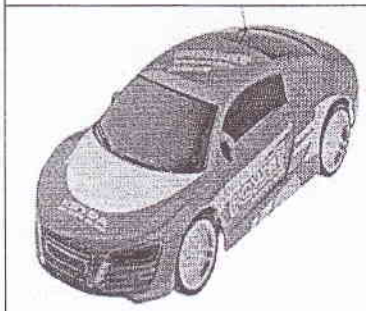
Types of toy car *Jenis kereta mainan*	Tyre diametre *Diameter tayar*	Mass *Jisim*	Voltage of battery used *Voltan bateri yang digunakan*
 Toy car A / *Kereta mainan A*	4.0 cm	1.3 kg	9.0 V
 Toy car B / *Kereta mainan B*	4.0 cm	2.5 kg	9.0 V
 Toy car C / *Kereta mainan C*	4.0 cm	1.7 kg	9.0 V

Table 8.1
Jadual 8.1

(a) (i) Based on Table 8.1, which toy car is the most difficult to start moving?
Berdasarkan Jadual 8.1, kereta mainan yang manakah paling sukar untuk mula bergerak?

8(a)(i)

.....

[1 mark]
[*1 markah*]

(ii) Give one reason for the answer in 8a(i) and state the relationship between the reason and physics concept involved.
Berikan satu sebab kepada jawapan di 8a(i) dan nyatakan hubungan di antara sebab dan konsep fizik yang terlibat.

8(a)(ii)

.....

.....

[2 mark]
[*2 markah*]

(b) Diagram 8.2 shows, Sarah is pushing a 5.0 kg box with difference forces on three type of rough surface of wooden plane, P, Q and R.
Rajah 8.2 menunjukkan Sarah sedang menolak kotak 5.0 kg dengan daya-daya yang berbeza di atas permukaan kasar satah kayu, P, Q, dan R.

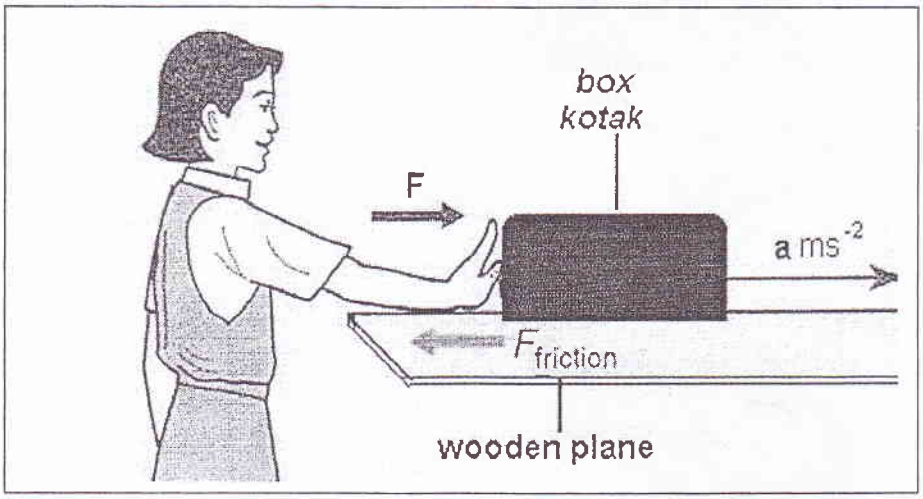


Diagram 8.2
Rajah 8.2

Table 8.2 shows the magnitude accelerations, a and force applied, F to push the box on each surface of wooden plane.
Jadual 8.2 menunjukkan magnitud pecutan, a dan daya F yang digunakan untuk menolak kotak tersebut di atas setiap permukaan satah kayu.

Wooden Plane *Satah kayu*	P	Q	R
Acceleration, a *Pecutan, a* (ms^{-2})	4.0	2.5	4.5
Force, F *Daya, F* (N)	50.0	40.0	30.0

(i) What is the meaning of frictional force?
Apakah yang dimaksudkan dengan daya geseran?

8(b)(i)

.....

.....

[1 mark]
[*1 markah*]

(c) Calculate the friction force of each surface of wooden plane.
Hitung daya geseran untuk setiap permukaan satah kayu.

(i) wooden plane A
satah kayu A

8(c)(i)

[2 marks]
[2 *markah*]

(ii) wooden plane B
satah kayu B

8(c)(ii)

[1 mark1]
[1 *markah*]

(iii) wooden plane C
satah kayu C

8(c)(iii)

[1 mark]
[*1 markah*]

(d) Determine the most suitable surface of wooden plane to build a slide at children's playgrounds. Give a reason.
Tentukan permukaan satah yang paling sesuai untuk membina gelongsor di taman permainan kanak-kanak. Berikan satu sebab.

8(d)

.....

.....

[2 marks]
[2 *markah*]

(e) State two modifications that can be done to reduce the friction of the slide.

8(e)

.....

.....

[2 marks]
[2 *markah*]

SECTION B
Bahagian B
[20 marks]
[*20 markah*]
Answer any **one** question.
*Jawab mana-mana **satu** soalan.*

9 Figure 9.1 shows two test tubes containing aluminium dust and copper dust of the same mass but having different specific heat capacity . Both the test tubes are heated with the same rate for a same period of time.
Rajah 9.1 menunjukkan dua tabung uji mengandungi serbuk aluminium dan serbuk kuprum yang sama jisim tetapi mempunyai muatan haba tentu yang berbeza. Kedua- dua tabung uji dipanaskan dengan kadar yang sama untuk tempoh masa yang sama.

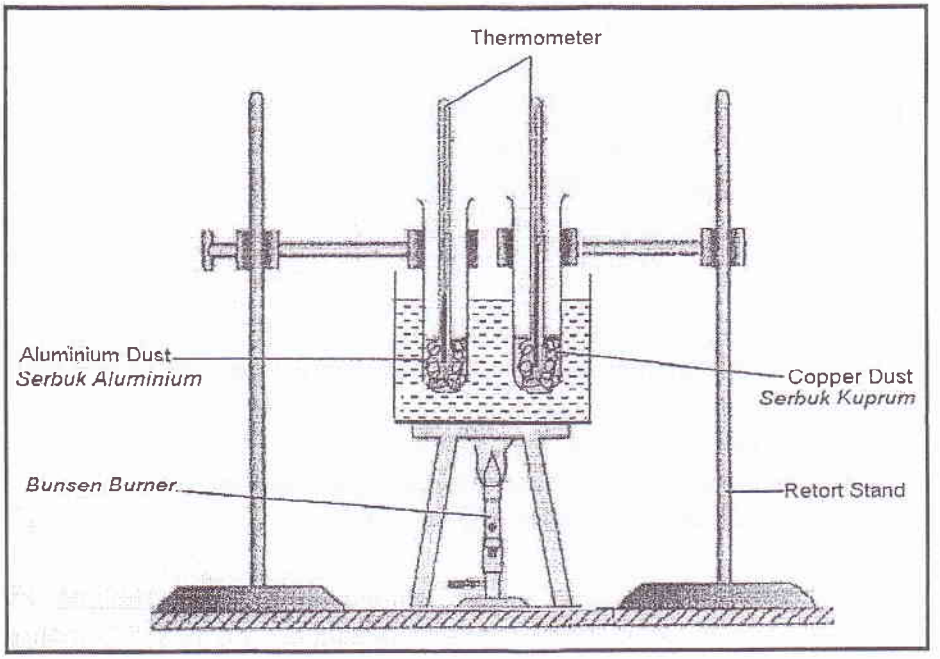


Figure 9.1
Rajah 9.1

Table 9.2 shows some important data for aluminium and copper dust.
Jadual 9.2 menunjukkan beberapa data penting berkenaan serbuk aluminium dan kuprum.

	Temperature before heating / °C *Suhu sebelum dipanaskan / °C*	Temperature after heating / °C *Suhu selepas dipanaskan / °C*	Specific heat capacity / $Jkg^{-1}\,°C^{-1}$ *Muatan Haba Tentu* $Jkg^{-1}\,°C^{-1}$
Aluminium dust *Serbuk Aluminium*	35	50	900
Copper dust *Serbuk Kuprum*	35	70	380

Table 9.2
Jadual 9.2

(a) (i) What is meant by *specific heat capacity* ?
Apakah yang dimaksudkan dengan muatan haba tentu ?

[1 mark]
[*1 markah*]

(ii) Using the information given in Table 9.2, compare the temperature rise and the specific heat capacity of aluminium and copper dust.
Dengan menggunakan maklumat yang diberikan dalam Jadual 9.2, bandingkan suhu dan muatan haba tentu bagi serbuk aluminium dan kuprum.

Relate the amount of heat supplied with the temperature rise for aluminium and copper dust. Hence state the relationship between specific heat capacity and the amount of heat required for the same temperature rise of a substance.
Hubungkaitkan jumlah haba yang dibekalkan dengan peningkatan suhu oleh serbuk aluminium dan kuprum. Seterusnya nyatakan hubungan antara muatan haba tentu dan jumlah haba yang diperlukan untuk peningkatan suhu yang serupa oleh sesuatu bahan.

[5 marks]
[*5 markah*]

(b) Explain why the body of a cooking pot is made of good heat conductor whereas the handle of the pot is made of poor heat conductor.
Terangkan mengapakah periuk memasak diperbuat daripada konduktor haba yang baik sementara pemegangnya diperbuat daripada konduktor haba yang lemah.

[4 marks]
[*4 markah*]

(c) A family is having a picnic at Port Dickson beach. An open aluminium container with some ice cubes is used to cool the packet drinks as shown in the Figure 9.2.
Sebuah keluarg sedang berkelah di pantai Port Dickson. Sebuah bekas aluminium yang terbuka dengan beberapa ketulan ais digunakan untuk menyejukkan minuman dalam kotak seperti Rajah 9.2.

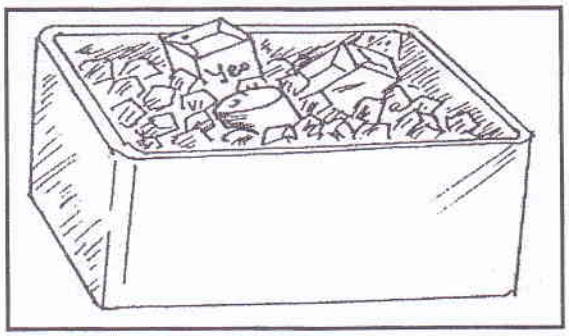


FIGURE 9.2
RAJAH 9.2

Use appropriate concepts in physics, explain the modifications required to the above aluminium container so as to effectively
Dengan menggunakan konsep fizik yang bersesuaian, terangkan pengubahsuaian yang diperlukan kepada bekas aluminium supaya berfungsi dengan lebih berkesan untuk

(a) cool packet drinks in a shorter time.
menyejuk kotak minuman dalam tempoh yang singkat.

(b) keep the packet drinks remain cold for a longer period.
memastikan kotak minuman kekal sejuk untuk tempoh yang lama.

[10 marks]
[10markah]

10. Diagram 10.1 and Diagram 10.2 show a ray of light passing into crystal and diamond respectively.
Rajah 10.1 dan 10.2 masing-masing menunjukkan satu sinar cahaya melalui kristaldan intan.

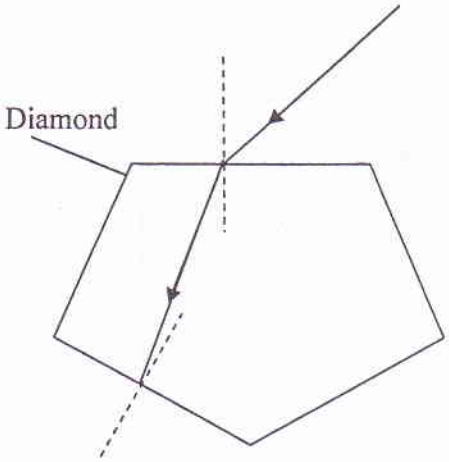


Diagram 10.1
Rajah 10.1

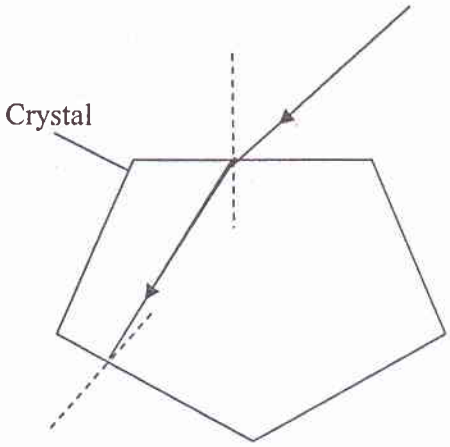


Diagram 10.2
Rajah 10.1

(a) (i) What is the meaning of refraction?
Apakah maksud pembiasan?

[1 mark]
[*1 markah*]

(ii) Using Diagram 10.1 and Diagram 10.2 compare the incidence angle, refractive angle and the density when the ray passing through the crystal and the diamond.
Relate the incidence angle and the refractive angle to make a Deduction to a relevant physics concept.
Menggunakan Rajah 10.1 dan Rajah 10.2, bandingkan sudut tuju, sudut biasan dan ketumpatan bagi kristal dan intan.
Hubungkaitkan sudut tuju dan sudut biasan untuk membuat kesimpulan tentang satu konsep fizik yang berkaitan.

[5 marks]
[5 *markah*]

(b) Explain why the diamond is sparkling when the ray of light pass through.
Terangkan mengapa intan bercahaya apabila sinar cahaya melaluinya.

[4 marks]
[4 *markah*]

(c) Diagram 10.3 shows a simple solar tank as a water heater.
Rajah 10.3 menunjukkan sebuah tangki solar yang ringkas.

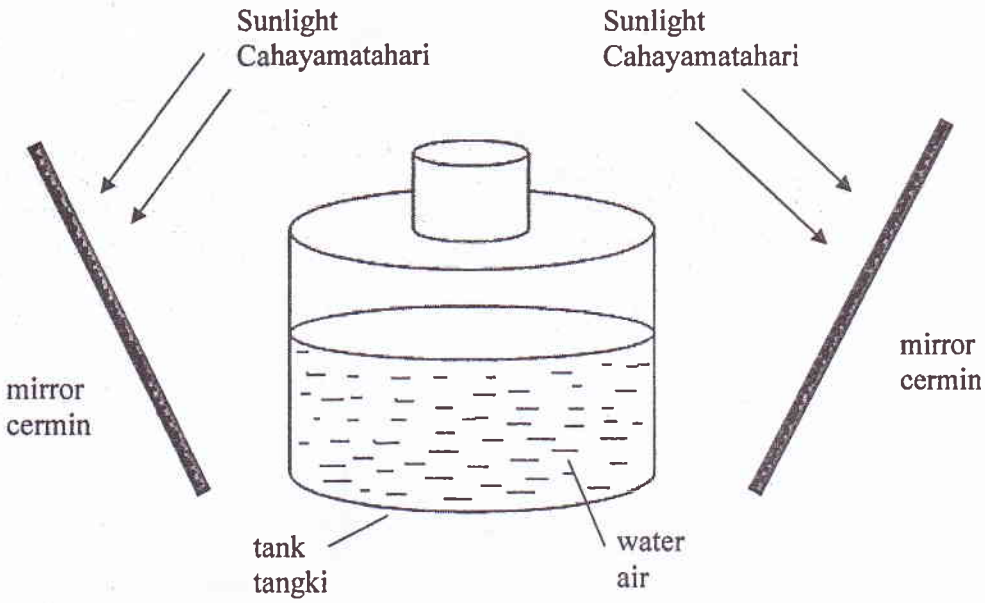


Diagram 10.3
Rajah 10.3

Using appropriate physics concept, explain the modification that can be used to make a solar tank more efficient.
Your answer should include the following aspects:
Menggunkan konsep fizik yang sesuai, terangkan pengubahsuaian yang boleh digunakan untuk membuat tangki solar yang lebih efisyen.
Jawapan anda hendaklah merangkumi aspek-aspek yang berikut:

(i) Type of mirror
Jenis cermin

(ii) Radius of curvature
Jejari kelengkungan

(iii) Colour of the tank wall
Warna dinding tangki

(iv) Specific heat capacity.
Muatan haba tentu.

[8 marks]
[*8 markah*]

(d) State two advantages of using solar energy.
Nyatakan dua kelebihan menggunakan tenaga solar.

[2 marks]
[*2 markah*]

SECTION C
Bahagian C
[20 marks]
[*20 markah*]
Answer any **one** question.
*Jawab mana-mana **satu** soalan.*

11. Bunsen burner is one of the important apparatus in science laboratories to do any heating experiment.
Penunu Bunsen merupakan salah satu alat pemanas yang penting dalam makmal sains.

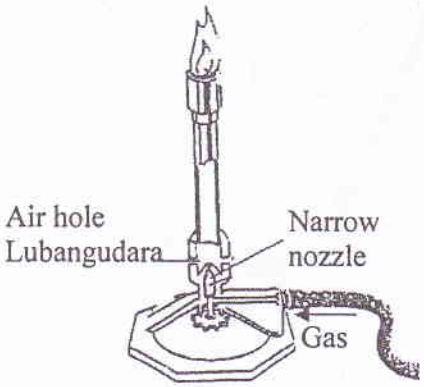


Diagram 11.1
Rajah 11.1

(a) State the principle involved in the use of bunsenburner .
Nyatakan prinsip yang digunakan dalam penunu Bunsen.

[1 mark]
[1 markah]

(b) With the help of diagram 11.1, explain how a bunsen burner functions.
Dengan bantuan Rajah 11.1,huraikan bagaimana satu penunu Bunsen berfungsi.

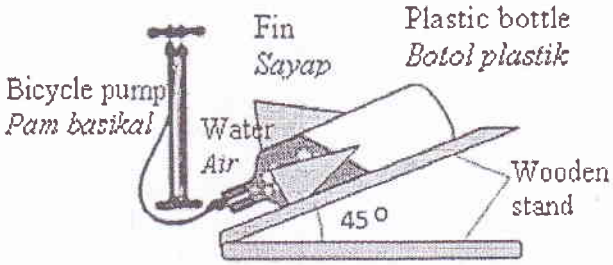
[4 marks]
[4 markah]

(c) At National Water Rocket competition, the winner is supposed to design a water rocket which can be launched to a higher altitude, further distance and take the longest time to land.
Padapertandingan Roket Air Kebangsaan, pemenang perlu Merekabentuk sebuah roket air yang boleh dilancarkan pada ketinggian yang maksimum, jarak yang lebih jauh dan mengambil masa yang lama untuk mendarat.

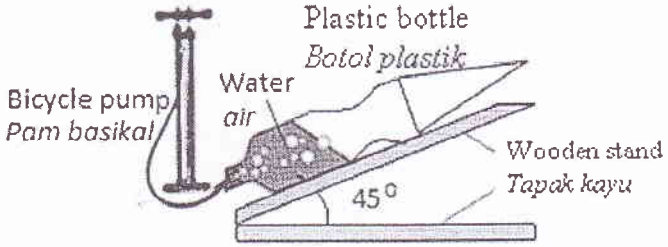
You are asked to investigate the characteristics of the water rockets in The Diagram 11.2 and determine the best rocket to be used in the competition. Give reasons for your choice.

Anda ditugaskan untuk mengkaji ciri-ciri roket yang ditunjukkan dalam rajah 11.2 dan menentukan roket air yang paling sesuai digunakan dalam pertandingan ini. Beri sebab untuk pilihan anda

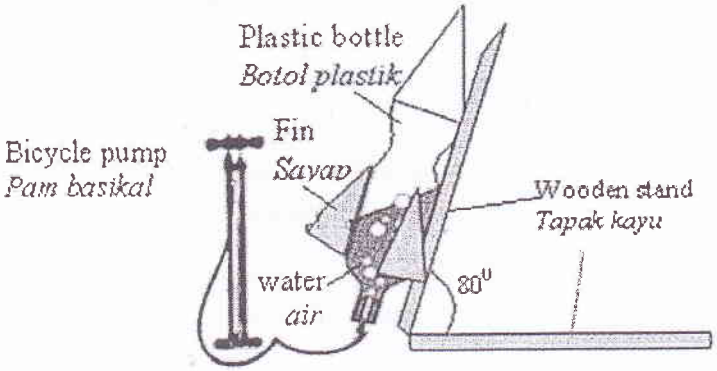
P



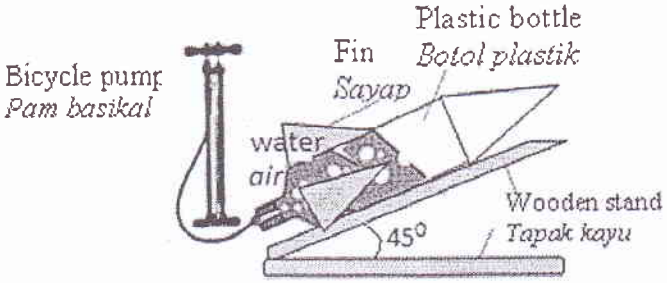
Q



R



S



T

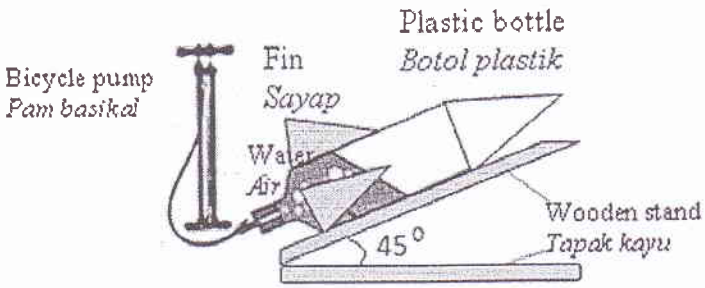


Diagram 11.2
Rajah 11.2

[10 marks]
[10 markah]

(d) Weight of the object in air and in water are shown in Diagram 11.3.
Berat suatu objek di udara dandi dalam air ditunjukkan dalam Rajah 11.3.

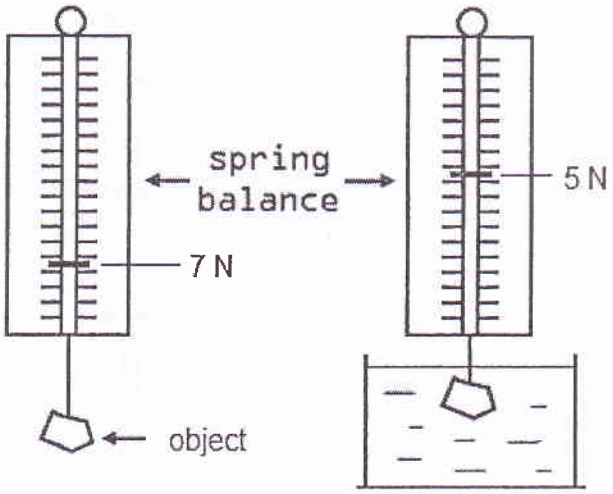


Diagram 11.3
Rajah 11.3

Calculate the

(i) weight of water displaced,
berat air yang tersesar

(ii) volume of the object
Isipadu objek itu

(iii) density of the object
Ketumpatan objek itu.

[5 marks]
[5 markah]

12. Diagram 12 shows a bulb labeled 12V, 24W is connected to the output of a step-down transformer . The efficiency of the transformer is 40%.
Rajah 12 menunjukkan sebuah mentol berlabel 12V, 24W disambung kepada output sebuah transformer. Kecekapan transformer itu ialah 40%.

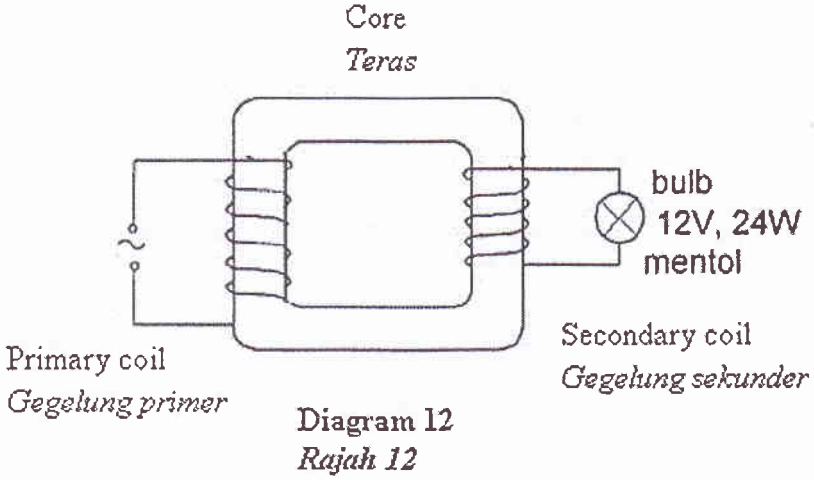


Diagram 12
Rajah 12

(a) (i) What is a step-down transformer?.
Apakah transformer injak turun?

[1 mark]
[*1 markah*]

(ii) What is the meaning of 12V, 24W labeled on the bulb?
Apakah dimaksudkan dengan label 12V, 24W pada mentol?

[1 mark]
[*1 markah*]

(iii) Explain the working principle of the transformer.
Terangkan prinsip kerja transformer itu.

[4 marks]
[4 *markah*]

(b) Calculate
Hitungkan

(i) the current flows in the secondary coil
arus yang mengalir di dalam gegelung sekunder.

(ii) input power in the primary coil.
kuasa input pada gegelung primer.

[4 marks]
[4 *markah*]

(c) You are advised to investigate the design and characteristics of four transformers shown in Table 12.
Anda ditugaskan untuk mengkaji rekabentuk dan ciri-ciri bagi empat transformer seperti ditunjukkan pada Jadual 12.

Transformer *Trasnformer*	Types of wire *Jenis dawai*	Type of core *Jenis teras*	Design of the core *Reka bentuk teras*	Method of Winding the coil *Kaedah Lilitan gegelung*
P	copper *Kuprum*	Soft iron *Besi lembut*	Laminated *Berlamina*	Winding of the secondary coil at the side of the primary coil *Lilitan gegelung sekunder di sebelah gegelung primer*
Q	nichrome *nikrom*	Steel *Keluli*	Solid *Padat*	Winding of the secondary coil at the side of the primary coil *Lilitan gegelung sekunder di sebelah gegelung primer*
R	copper *Kuprum*	Soft iron *Besi lembut*	Laminated *Berlamina*	Winding the secondary coil on top of the primary coil *Lilitan gegelung sekunder di atas gegelung primer*
S	copper *Kuprum*	Steel *Keluli*	Solid *Padat*	Winding the secondary coil on top of the primary coil *Lilitan gegelung sekunder di atas gegelung primer*

Table 12
Jadual 12

Explain the suitability of each characteristic of the transformer and determine which transformer has the highest efficiency.
Give reasons for your choice.

Terangkan kesesuaian setiap ciri transformer itu dan tentukan transformer yang mempunyai kecekapan paling tinggi.
Beri sebab bagi jawapan anda.

[10 marks]
[*10 markah*]

END OF QUESTION PAPER

Nama : .....

Tingkatan : .....

4531 / 3
PHYSICS
Kertas 3
Ogos 2011
1 ½ jam

MAJLIS PENGETUA SEKOLAH MENENGAH MALAYSIA
CAWANGAN NEGERI SEMBILAN

PEPERIKSAAN PERCUBAAN BERSAMA
SIJIL PELAJARAN MALAYSIA 2011

PHYSICS (FIZIK)

Paper 3 (Kertas 3)

One hour and thirty minutes (Satu jam tiga puluh minit)

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

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

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

This question paper has 15 printed pages

INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON

1. This question paper consists of two sections: **Section A** and **Section B.**
*Kertas soalan ini mengandungi dua bahagian: **Bahagian A** dan **Bahagian B**.*

2. Answer **all** questions in **Section A**. Write your answer for **Section A** in the space provided in this question paper.
*Jawab **semua** soalan dalam **Bahagian A**. Jawapan anda bagi **Bahagian A** hendaklah ditulis pada ruang yang disediakan dalam kertas soalan ini.*

3. Answer **one** question in **Section B.** Write your answers for **Section B** in a separate answer sheet. You may use equations, diagrams, tables, graphs and other suitable methods to explain your answers.
*Jawab **satu** soalan daripada **Bahagian B.** Tulis jawapan anda pada helaian tambahan. Anda boleh menggunakan persamaan, rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda.*

4. Show your working. It may help you to get marks.
Tunjukkan kerja mengira. Ini membantu anda mendapatkan markah.

5. The diagrams in the questions are not drawn to scale unless stated.
Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.

6. If you wish to change your answer, cross out the answer that you have done. Then write down the new answer.
Jika anda hendak menukar jawapan, batalkan jawapan yang telah dibuat. Kemudian tulis jawapan yang baru.

7. You may use a non-programmable scientific calculator.
Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogramkan.

8. You are advised to spend 60 minutes to answer question in **Section A** and 30 minutes for **Section B.**
*Anda dinasihati supaya mengambil masa 60 minit untuk menjawab soalan dalam **Bahagian A** dan 30 minit untuk **Bahagian B.***

HALAMAN KOSONG

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

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

1 A student carries out an experiment to investigate the relationship between the power of the lens, P and the image distance, v of a convex lens. The student use a lens with power 25 D and focus a tree outside the laboratory. The position of the screen is adjusted until sharp image is formed on the screen.The image distance, v measured and is recorded.
Diagram 1.1 shows the arrangement of apparatus for the experiment.
Seorang murid menjalankan eksperimen untuk mengkaji hubungan antara kuasa kanta, P dengan jarak imej, v, bagi kanta cembung. Murid itu menggunakan kanta berkuasa 25 D dan fokuskan sebuah pokok di luar makmal. Kedudukan skrin dilaraskan sehingga imej tajam diperolehi pada skrin. Jarak imej, v dicatatkan. Rajah 1.1 menunjukkan susunan radas bagi eksperimen tersebut.

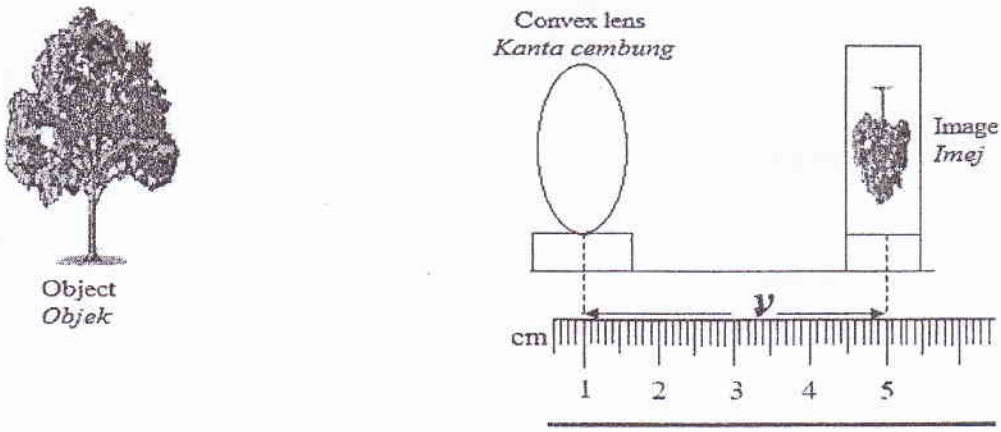
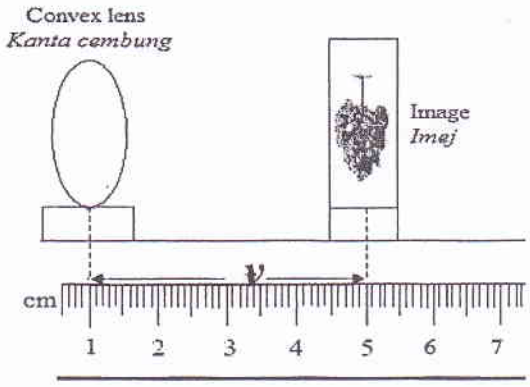


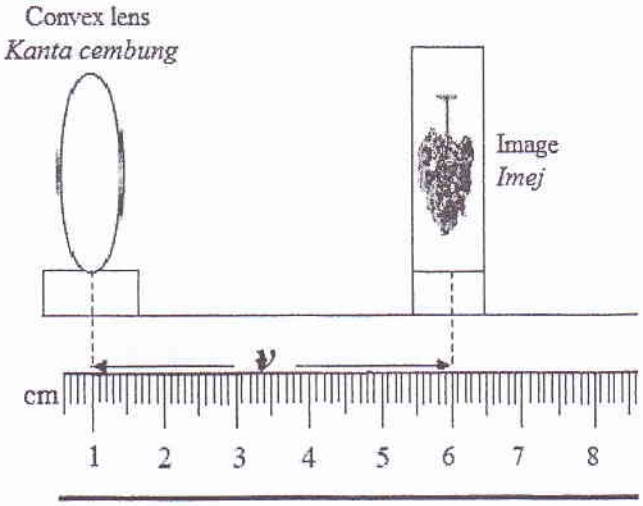
Diagram 1.1
Rajah 1.1

The experiment is repeated lens with different power, P = 20 D, 15 D, 10 D and 5 D. The corresponding image distances,v on the screen are shown in Diagram 1.3, 1.4, 1.5 and 1.6.
Eksperimen diulang dengan kanta berkuasa, P= 20 D, 15 D, 10 D and 5 D. Jarak imej yang sepadan ditunjukkan pada Rajah 1.3, 1.4, 1.5 dan 1.6.



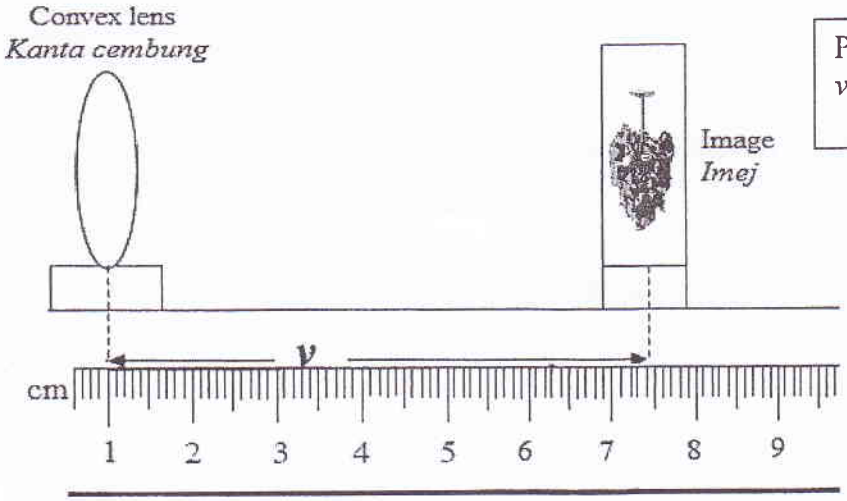
P = 25 D
v = ...

Diagram 1.2
Rajah 1.2



P = 20 D
v = ...

Diagram 1.3
Rajah 1.3



P = 15 D
v = ...

Diagram 1.4
Rajah 1.4

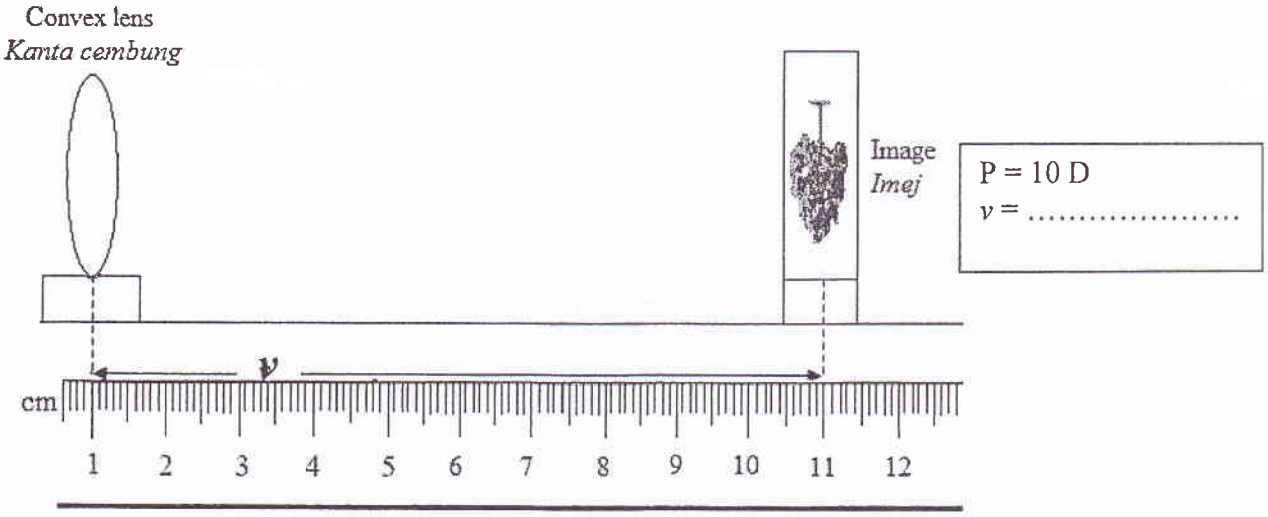


Diagram 1.5
Rajah 1.5

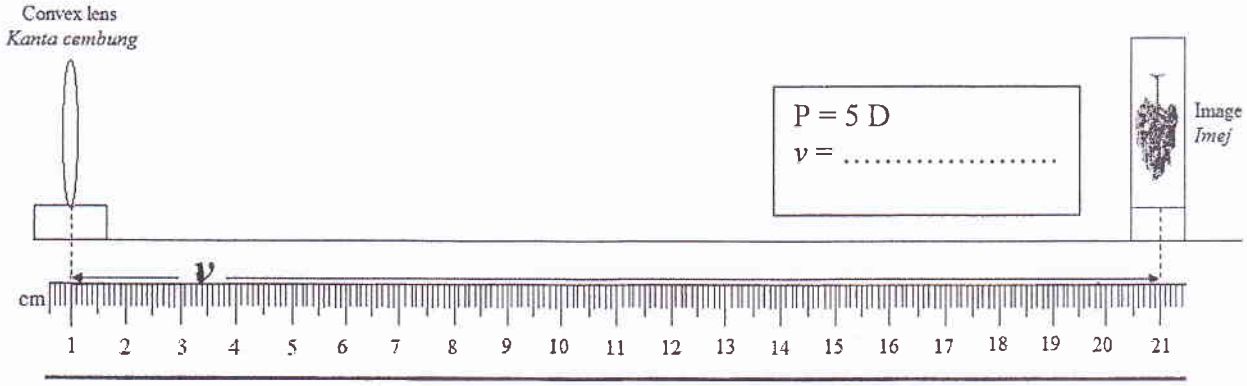


Diagram 1.6
Rajah 1.6

(a) For the experiment described, identify:
Bagi eksperimen yang diterangkan, kenalpasti:

1(a)(i)

(i) The manipulated variable
Pembolehubah dimanipulasikan

.....

[1 mark]
[1 *markah*]

1(a)(ii)

(ii) The responding variable
Pembolehubah bergerakbalas

.....

[1 mark]
[1 *markah*]

(iii) The constant variable
Pembolehubah dimalarkan

.....

[1 mark]
[1 *markah*]

1(a)(iii)

(b) Based on Diagram 1.2, 1.3, 1.4, 1.5 and 1.6, tabulate your results for all values of lens power, P and corresponding image distance, *v* in the space below.
Berdasarkan Rajah 1.2, 1.3, 1.4, 1.5 dan 1.6, jadualkan keputusan anda bagi semua nilai kuasa kanta, P, dan jarak ime,j v yang sepadan.

[5 marks]
[5 *markah*]

1(b)

(c) On the graph paper, draw a graph v against P
Pada kertas graf, lukis graf v melawan P.

[6 marks]
[6 *markah*]

1(c)

(d) Based on your graph in 1(c), state the relationship between v and P.
Berdasarkan pada graf 1(c), nyatakan hubungan di antara v dan P.

.....

[1 mark]
[1 *markah*]

1(d)

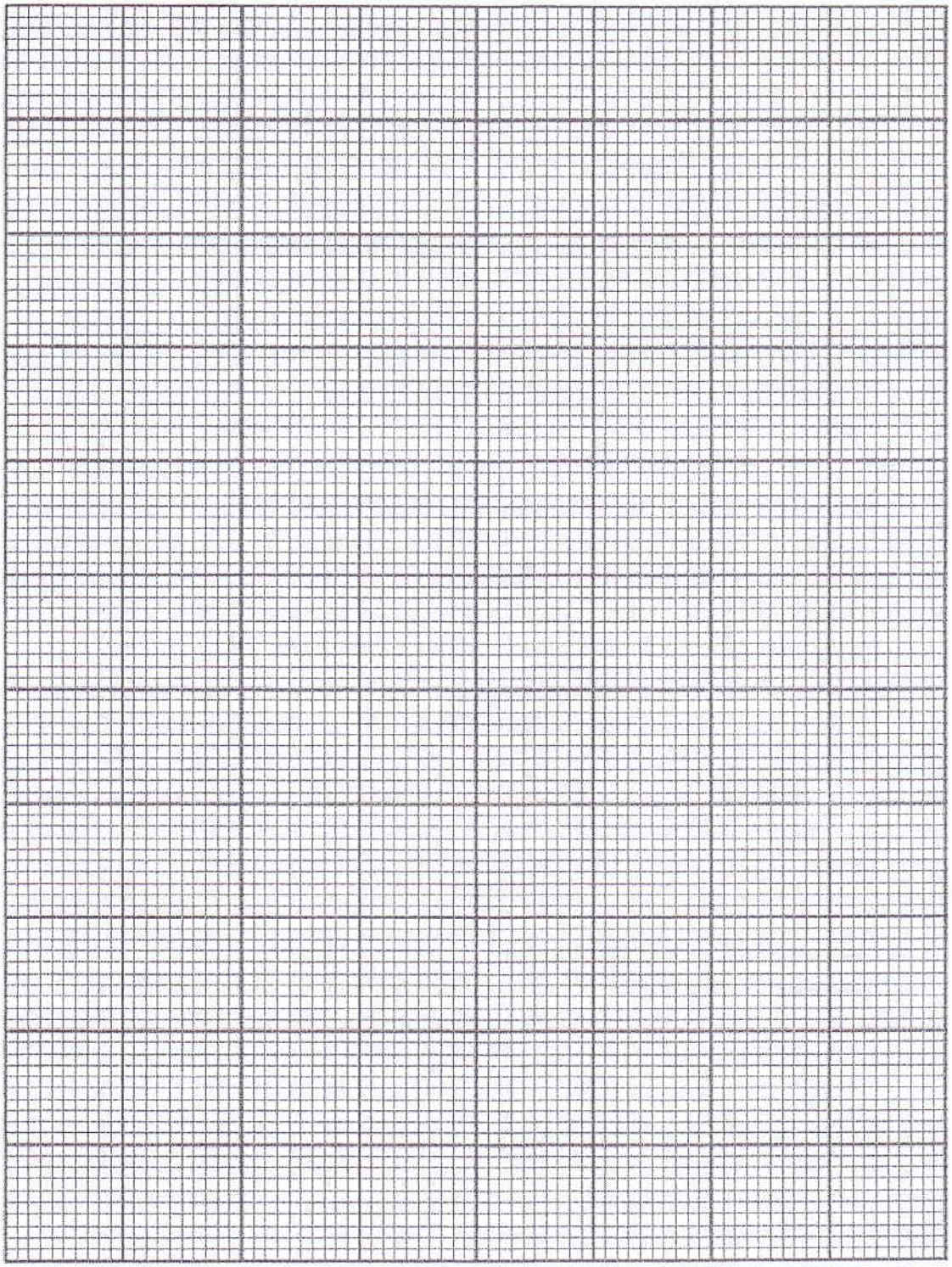
(e) State one precaution that should be taken to improve the accuracy of the result of this experiment.
Nyatakan satu langkah berjaga-jaga yang perlu diambil untuk memperbaiki ketepatan bacaan dalam eksperimen ini.

.....

[1 mark]
[1 *markah*]

1(e)

Graph *v* aginst P
Graf v melawan P



2 A student carries out an experiment to investigate the relationship between the speed of water wave, v and the distance between two consecutive bright bands, x, on the screen using a ripple tank. The results of the experiment are shown in the graph of v against x as shown in Diagram 2.1.
Seorang pelajar menjalankan satu eksperimen untuk mengkaji hubungan antara laju gelombang air, v dan jarak antara dua jalur cerah berturutan, x, pada skrin dengan menggunakan sebuah tangki riak. Keputusan eksperimen ini ditunjukkan pada graf v melawan x pada Rajah 2.1.

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

(i) state the relationship between v and x.
nyatakan hubungan antara v dan x.

.....

[1 mark]
[1 *markah*]

2(a)(i)

(ii) determine the value of x when the speed of the water wave, $v = 4.0$ cms^{-1}.
Show on the graph how you determine the value.
Tentukan nilai x, apabila laju gelombang air, v = 4.0 cms^{-1}.
Tunjukkan pada graf bagaimana anda menentukan nilai ini.

x = ...

[2 marks]
[2 *markah*]

2(a)(ii)

(b) (i) Calculate the gradient of the graph, k.
Show on the graph how you calculate k.
Hitungkan kecerunan graf, k.
Tunjukkan pada graf bagaimana anda menghitung k.

k = ...

[3 marks]
[3 *markah*]

2(b)(i)

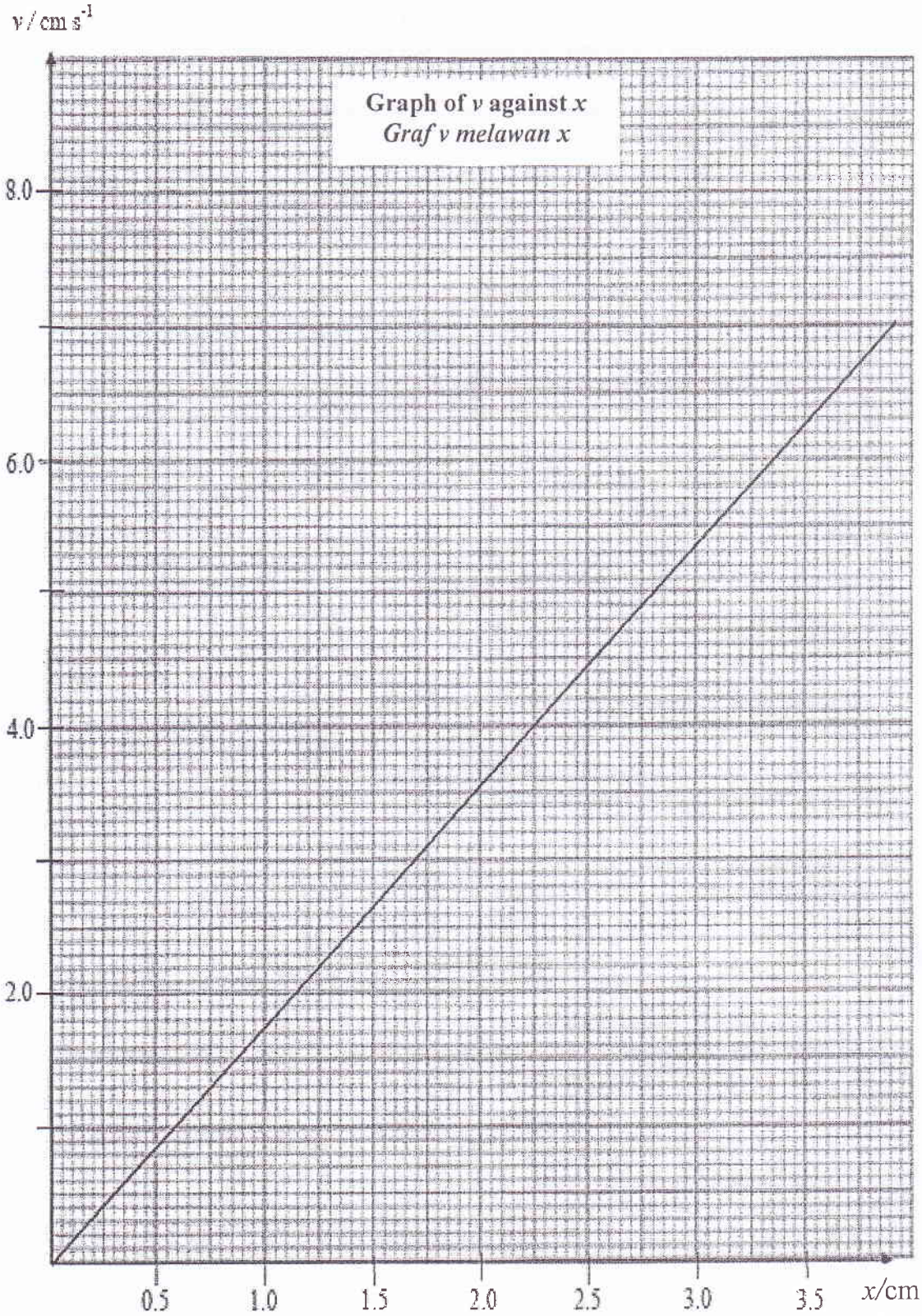


Diagram 2.1
Rajah 2.1

(ii) The gradient of the graph, k is related to a physical quantity, P by the following formula:
Kecerunan graf, k dihubungkaitkan dengan kuantiti fizik, P oleh formula:

$$k = 0.1P$$

Calculate the value of P.
Hitung nilai P.

2(b)(ii)

P = ...

[2 marks]
[2 *markah*]

(c) The time taken, t for the waves to travel a distance, x, is given by formula:
Masa, t, yang diambil oleh gelombang untuk merambat jauh, x, diberi oleh formula:

$$t = \frac{1}{P}$$

Calculate time, t.
Hitungkan masa, t.

2(c)

t = ...

[2 marks]
[2 *markah*]

(d) State **two** other factors that can increase distance between two consecutive bright bands, x
*Nyatakan **dua** faktor lain yang boleh menambahkan jarak antara dua jalur cerah berturutan, x.*

1. .....

.....

2. .....

.....

2(d)

[2 marks]
[2 *markah*]

Section B
Bahagian B
[12 marks]
[12 *markah*]

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

3 An Eskimo used a snow sledge pulled by dogs to transport his goods from one place to another over the grounds covered with ice and snow. The snow sledge driver found that the acceleration his sledge increased by adding more dogs to the sledge as shown in Diagram 3.2 and to Diagram 3.1.
Seorang Eskimo mengangkut barang dari satu tempat ketempat lain yang dipenuhi ais dan salji dengan menggunakan andur salji yang ditarik oleh anjing. Pemandu andur salji mendapati kenderaannya semakin laju apabila bilangan anjing ditambah pada andurnya seperti yang ditunjukkan dalam Rajah 3.2 dan dengan Rajah 3.1.

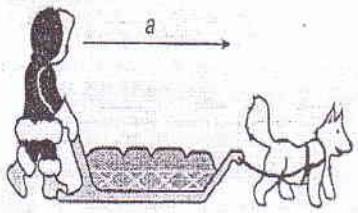


Diagram 3.1
Rajah 3.1

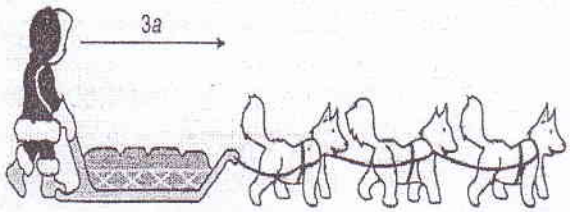


Diagram 3.2
Rajah 3.2

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

(a) State **one** suitable inference. [1 mark]
*Nyatakan **satu** inferens yang sesuai.* [1 *markah*]

(b) State **one** suitable hypothesis. [1 mark]
*Nyatakan **satu** hipotesis yang sesuai.* [1 *markah*]

(c) With the use of apparatus such as trolley, elastic cord and other apparatus, describe an experiment framework to investigate the hypothesis stated in **3**(b).
Dengan menggunakan radas seperti troli, tali kenyal dan lain-lain radas, terangkan satu rangka kerja eksperimen untuk menyiasat hipotesis yang anda nyatakan di **3**(b).

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

(i) Aim of the experiment.
Tujuan eksperimen.

(ii) Variables in the experiment.
Pembolehubah dalam eksperimen.

(iii) List of the apparatus and materials.
Senarai radas dan bahan.

(iv) Arrangement of the apparatus.
Susunan radas dan bahan.

(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 dimanipulasikan dan kaedah mengukur pembolehubah bergerakbalas.

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

(vii) The way you would analyse the data.
Cara anda akan menganalisis data.

[10 marks]
[10 *markah*]

4 Diagram 4.1 shows the brightness of bulb A when it is connected to the power supply using cabel P. When it is connected to the power supply using cabel Q, the brightness of the bulb is shown as in Diagram 4.2.
Rajah 4.1 menunjukkan kecerahan mentol A apabila disambungkan kepada bekalan kuasa menggunakan kabel P. Apabila mentol itu disambungkan kepada bekalan kuasa menggunakan kabel Q, kecerahan mentol adalah ditunjukkan dalam Rajah 4.2.

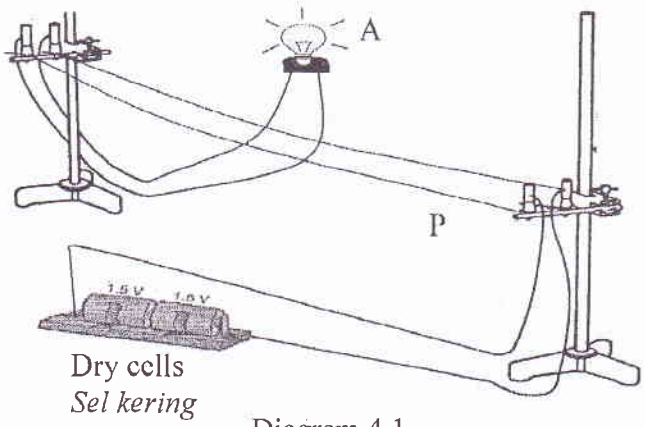


Diagram 4.1
Rajah 4.1

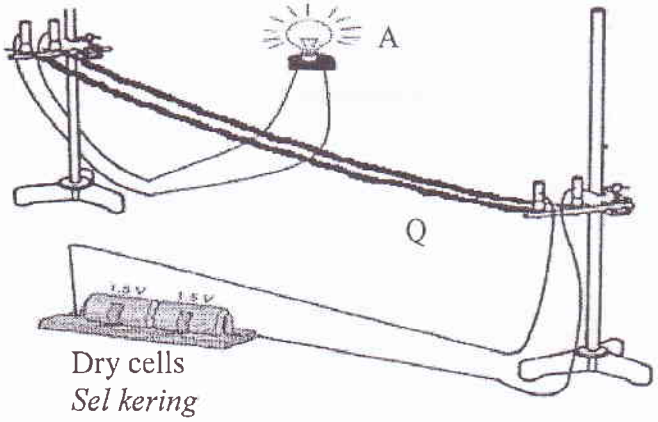


Diagram 4.2
Rajah 4.2

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

(a) State one suitable inference. [1 mark]
Nyatakan satu inferens yang sesuai. [1 *markah*]

(b) State one suitable hypothesis. [1 mark]
Nyatakan satu hipotesis yang sesuai. [1 *markah*]

(c) With the use of apparatus such as a rheostat, constantan wire and other apparatus, describe an experiment framework to investigate the hypothesis stated in **4**(b).
Dengan menggunakan radas seperti reostat, wayar konstantan dan lain-lain radas, terangkan satu rangka kerja eksperimen untuk menyiasat hipotesis yang anda nyatakan di 4(b).

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.
Pembolehubah dalam eksperimen.

(iii) List of the apparatus and materials.
Senarai radas dan bahan.

(iv) Arrangement of the apparatus.
Susunan radas dan bahan.

(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 dimanipulasikan dan kaedah mengukur pembolehubah bergerakbalas.

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

(vii) The way you would analyse the data.
Cara anda akan menganalisis data.

[10 marks]
[10 *markah*]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

MAJLIS PENGETUA SEKOLAH MENENGAH MALAYSIA
CAWANGAN NEGERI SEMBILAN

PEPERIKSAAN PERCUBAAN BERSAMA
SIJIL PELAJARAN MALAYSIA 2011

FIZIK

SKEMA PEMARKAHAN

KERTAS 1

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

4531
Fizik

MAJLIS PENGETUA SEKOLAH MENENGAH MALAYSIA
CAWANGAN NEGERI SEMBILAN

PEPERIKSAAN PERCUBAAN BERSAMA
SIJIL PELAJARAN MALAYSIA 2011

FIZIK

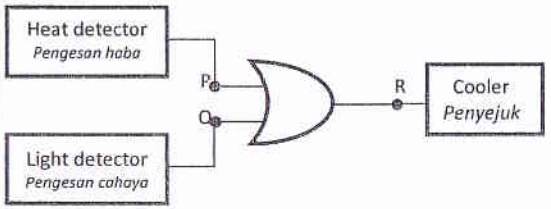
SKEMA PEMARKAHAN

KERTAS 2

PHYSICS PAPER 2

SECTION A

NO		ANSWERS	MARKS
1	a	The change in temperature of an object ✔	1
	b	More sensitive	1
	c	Volume of mercury increase // Expansion of the mercury	1
	d	It is opaque so can be seen easily // good heat conductor // uniform expansion // does not stick to the glass wall of the thermometer	1
		Total	4
2	a	Refractive index is the ratio of sine of angle of incidence to sine of angle of refraction. Or $n = \frac{\sin i}{\sin r}$ i= incidence angle r= refractive angle	1
	b	30^0	1
	c	$n = \frac{\sin 60^0}{\sin 30^0}$ $= 1.73$	1 1
	d	Show: Ray bend away from normal	1
		Total	5
3	a(i)	Input P Q / Output R 0 0 0 1 0 0 0 1 0 1 1 1	1
	(ii)	AND gate	1
	(iii)		1
	b	Add NOT gate before Q	1

	c	Replace the AND gate with OR gate  	2
		Total	6
4	a	The light with one wavelength/one colour	1
	b(i)	Alternative bright and dark fringes.	1
	(ii)	Interference	1
	c(i)	Distance between the fringes decreases	1
	(ii)	Distance between the fringes decreases	1
	d	$\lambda = \frac{0.5\times10^{-3}\times\frac{12}{3}\times10^{-3}}{3}$ m $= 6.67\times10^{-7}$ m	1 1
		Total	7
5	a	Lenz's law – the direction of induced current in a solenoid is such that its magnetic effect always opposes the change producing it.	1
	b	Pointer of galvanometer deflect.	1
	c	(i)Number of turns of coil in Diagram 5.2 > 5.1 (ii)Angle of deflection of galvanometer in Diagram 5.2>5.1	1 1
	d	When the number of turns of coil increases, the angle of deflection of galvanometer increases.	1
	e	- increase the strength of magnet - increase the speed of the magnet/increase the height of the magnet dropped	1 1
	f	Faraday's Law	1
		Total	8
6	a	The spontaneous emission of radiation from the unstable nucleus of an atom	1
	b(i)	α- particles, positive charge	1,1
	(ii)	EHT in Diagram 6.2 higher than EHT in Diagram 6.1	1
	(iii)	The deflection of the radioactive emission in Diagram 6.2 higher than EHT in Diagram 6.1	1

	c(i)	When the voltage of the EHT is higher, the strength of the electric field between the plates is higher.	1
	(ii)	When the strength of the electric field between the plates higher and deflection of the radioactive emission higher	1
	d	28000 ⟶ 14000 ⟶ 7000 2 $T_{1/2}$ = 12 hours $T_{1/2}$ = 6 hours	1
		Total	8
7	a	(i) R – ammeter (ii) S - voltmeter	1 1
	b	(i) R – increases (ii) S – decreases	1 1
	c	(i)Reason for (b)(i) : - Current increases because the effective resistance decreases / resistance of the circuit decreases - I α 1/R (ii)Reason for (b)(ii) : - As the effective resistance of 3 parallel resistance decreases, the potential difference decreases - V α R	1 1 1 1
	d(i)	X is brighter than Y	1
	(ii)	Brightness of Y and Z same	1
		Total	10
8	a(i)	Toy car B	1
	(ii)	Toy car B has largest mass. Larger mass has a larger inertia.	1 1
	b	Force oppose / resist motion // force act opposite direction of forward force // Force against the movement of object	1
	c(i)	50 – F_{fric} = 5(4) F_{fric} = 30 N	1
	(ii)	40 – F_{fric} = 5(2.5) F_{fric} = 27.5 N	1
	(iii)	30 – F_{fric} = 5(4.5) F_{fric} = 7.5 N	1 (all correct answers with unit = 1 mark)

	d	Wooden Plane C. Least friction.	1 1
	e	1.smoothen the surface(any method) 2.increase the angle of inclined slide.	1 1
		Total	12

SECTION B

NO		ANSWERS	MARKS
9	a(i)	Amount of heat required to the substance to increase its temperature by 1°C for a mass of 1kg.	1
	(ii)	1. Aluminium is heated up slower than copper. // Aluminium has a lower temperature rise // vice versa. 2. Specific heat capacity for aluminium is higher than that for copper// vice versa. 3. For the same amount of heat supplied, aluminium has a smaller temperature rise. 4. Aluminium requires more heat to raise the temperature by 1°C// vice versa 5. Amount of heat required for the same temperature rise increases when the specific heat capacity of a substance increases.	1 1 1 1 1
	b	1. Good heat conductor has a smaller specific heat capacity. 2. Hence the body of the cooking pot can be heated up very fast. 3. Poor heat conductor has a larger specific heat capacity. 4. Hence the handle may absorb a great amount of heat without a high increase in temperature// will not become too hot.	1 1 1 1
	c	**Suggestions** / **Reason** Add more ice / Large mass of ice can absorb more heat from the drinks. Add water to the ice / Increase the rate of heat transferred through conduction. Container made of heat insulator / To reduce heat absorbed from the surrounding. Container made of substance with high specific heat capacity / Not easily heated up. Use white container / Do not absorb heat Cover the container / Reduce heat absorbed through radiation. Accept any suitable suggestion. Give one mark for the suggestion and one mark for correct reason. MAXIMUM 10 MARKS.	1+1 1+1 1+1 1+1 1+1 1+1
		Total	20
10	a(i)	Refraction of light is the changing in the direction of light ray as it crosses the boundary with different optical densities.	1
	(ii)	1. Incidence angle in diagram 10.1 and diagram 10.2 is equal. 2. Refraction angle in diagram 10.1 is smaller than in diagram 10.2 3. The density of diamond is greater than crystal. 4. The ratio of sin i/sin r is constant. 5. Snell's Law= sin i/ sin, r = refractive index.	1 1 1 1 1
	b	1. A diamond has a very high refractive index. 2. Its critical angle is small. 3. The facets of a diamond are cut so that angle of incidence greater than the critical angle. 4. Total internal reflection cause the diamond to sparkle.	1 1 1 1

	c	<table><tr><th>Suggestions</th><th>Reason</th></tr><tr><td>1. Concave mirror</td><td>Sunlight ray will converge to the tank. The water can absorb heat more//hot faster.</td></tr><tr><td>2. Radius of curvature</td><td>Radius of curvature is smaller. More light will reflect to the tank.</td></tr><tr><td>3. Colour of the tank wall</td><td>Black or dull. Absorbed heat more//hot faster.</td></tr><tr><td>4. Specific heat capacity</td><td>Low. The water can be heat up faster.</td></tr></table> Accept any suitable suggestion. Give one mark for the suggestion and one mark for correct reason. MAXIMUM 8 MARKS	1+1 1+1 1+1 1+1
	d	1. No pollution 2. Renewable	1 1
		Total	**20**
		SECTION C	
11.	a	Bernoulli's Principle	1
	b	- Gas flow rapidly through the jet of Bunsen burner - it cause air pressure inside is reduced. - the air(oxygen) from outside drawn in - mix with the gas and help in combustion	1 1 1 1
	c	<table><tr><th>Characteristics</th><th>Explanation</th></tr><tr><td>Straight cut shape bottle</td><td>Move faster/increase the speed</td></tr><tr><td>The body is streamline shape</td><td>Reduce air friction</td></tr><tr><td>The angle of launching is 45^0</td><td>The rocket can achieve maximum distance</td></tr><tr><td>The volume of water 1/3 of the bottle</td><td>To produce optimum momentum/speed</td></tr><tr><td>The rocket has functional fins</td><td>Increase stability</td></tr></table> **(any 4 answers)** The best water rocket is T, because it has straight cut shape, body is streamline, angle of launching is 45^0 the volume of water is 1/3 of the bottle and the rocket has functional fins.	1+1 1+1 1+1 1+1 1 1

	d(i)	7-5 = 2N	1
	(ii)	Volume of the object = volume water displaced = 0.2/1000 = 2.0×10^{-4} m^3	 1 1
	(iii)	Density of the object = m/V = $0.2/2.0 \times 10^4$ = 1.0×10^{-5} kg m^{-3}	 1 1
		Total	20
12.	a(i)	Step down transformer– decreases the output voltage /output voltage less than input	1
	(ii)	It uses the energy of 24 J per second when it is connected to 12V power supply	1
	(iii)	1. When a.c flows in the primary coil 2. It produces changes in magnetic field of the core 3. cause the changes in magnetic flux in the secondary coil 4. Produced emf /induced current in the secondary coil	1 1 1 1
	b(i)	I = 24 /12 = 2A	1 1
	(ii)	$40 = \frac{24}{P} \times 100\%$ P = 60W	1 1
	c	<table><tr><th>Characteristic</th><th>Explanation</th></tr><tr><td>Type of wire – copper wire</td><td>Low resistance</td></tr><tr><td>Type of core - soft iron</td><td>Easy to magnetized and demagnetized</td></tr><tr><td>Design of core – laminated</td><td>reduce energy loss due to eddy current</td></tr><tr><td>Method of winding - Winding the secondary coil on top of the primary coil</td><td>Reduce flux leakage / field lines</td></tr></table> The most suitable transformer – R -copper wire, soft iron, laminated and winding the secondary coil on top of the primary coil	1+1 1+1 1+1 1+1 1 1
		Total	20

4531
Fizik

MAJLIS PENGETUA SEKOLAH MENENGAH MALAYSIA
CAWANGAN NEGERI SEMBILAN

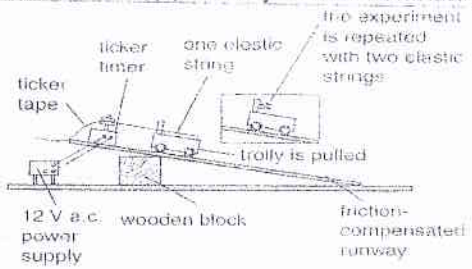
PEPERIKSAAN PERCUBAAN BERSAMA
SIJIL PELAJARAN MALAYSIA 2011

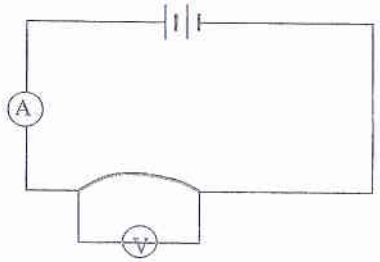
FIZIK

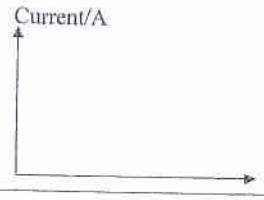
SKEMA PEMARKAHAN

KERTAS 3

No	Scheme	Mark
1(a) (i)	Power of lens,P	1
(ii)	Image distance, v	1
(iii)	Object distance,u	1
(b)	Power of lens,P (D): 5 | 10 | 15 | 20 | 25 Image distance, v(cm): 20.0 | 10.0 | 6.7 | 5.0 | 4.0 M1 – two column ,P and v M2 – with unit M3 – list of P M4- list of v M5 – the reading of v is consistent	5
(c)	M1 – label x-axis (P) and y-axis (V) correct M2- correct unit for x-axis and y-axis M3 - uniform scale M4 & M5 – plotted all points correctly (4 points only M4) M6 – best curve M7- 4/5 graph paper filled 7 corrects – 6 marks 5 – 6 corrects – 5 marks 4 corrects – 4 marks 3 corrects – 3 marks 2 corrects – 2 marks 1 correct – 1 mark	6
(d)	Power of the lens, P increases ,the image distance, v decrease // P inversely proportional to V	1
(e)	The lens, the screen and object must be straight line // The position of the eyes is perpendicular to scale readings to avoid parallax error.	1
	TOTAL	16
2 (a) (i)	v directly proportional to x	1
(ii)	Show in the graph $s = 2.25$ cm	1 1
(b) (i)	Show the triangle (4 x 4 cm) Substitution the coordinates $k = 1.78\ s^{-1}$ (give mark with unit)	1 1 1
(ii)	$P = \frac{k(\text{any k in (b)(i)})}{0.1}$ $P = 7.8\ s^{-1}$	1 1
(c)	$t = \frac{1}{P(\text{any P in (b)(ii)})}$ $t = 0.056$ s	1 1

(d)	1. Decrease the frequency of motor. 2. Increase the depth of water.	1 1
	TOTAL	12
3 (a)	Acceleration of the sledge depends with the number of dogs attach on it.	1
(b)	The acceleration of an object increases when the net force acting on it increases // The higher the force, the higher the acceleration.	1
(c) (i)	To investigate the relationship between force and acceleration	1
(ii)	Manipulated variable : force acting on the object Responding variable : acceleration of the object	1
	Fixed variable : mass of the object	1
(iii)	Ticker tape, cellophane tape, identical elastic cords, ticker timer, trolley, power supply, runaway, wooden block, metre rule	1
(iv)		1
(v)	The ticker timer which is connected to the 12V a.c. power supply is switched on and the trolley is pulled down the runaway. The elastic cord is always maintained at the same length and parallel with the trolley.	1
	The ticker tape obtained is cut into 5-tick strips and a tape chart for the motion of the trolley is made. The acceleration of the trolley is calculated from $a=\frac{v-u}{t}$ and recorded.	1
	The above steps are repeated with two, three, four and then five identical elastic cords.	1
(vi)	**Force, F / number of elastic cords** | **Acceleration, a / cms^{-2}** 1 2 3 4 5	1

(vii)	a/cms^{-2} F/N // No of cords	1
	TOTAL	12
4 (a)	Brightness/Current depends on the thickness/diameter/cross sectional area of the wire	1
(b)	The current I the wire increases when the the diameter of the wire increase	1
(c) (i)	To investigate the relationship between current and the diameter of a wire	1
(ii)	Manipulated variable : diameter of the wire Responding variable : current	1
	Fixed variable : the length of wire	1
(iii)	Dry cells, voltmeter, ammeter, conductor wire, switch	1
(iv)		1
(v)	Use conductor wire with diameter of, d = 0.2mm.	1
	Record the reading of the ammeter and tabulate the data.	1
	Repeat the experiment using d = 0.4mm, 0.6mm, 0.8mm and 1.0mm	1
(vi)	**Diameter/mm** | **Current/A** 0.2 0.4 0.6 0.8 1.0	1

(vii)		1
	TOTAL	**12**