Physics
Kertas 1
Ogos 2014
1 ¼ Jam

BAHAGIAN PENGURUSAN SEKOLAH BERASRAMA PENUH DAN SEKOLAH KECEMERLANGAN

PENTAKSIRAN DIAGNOSTIK AKADEMIK SBP 2014
PERCUBAAN SIJIL PELAJARAN MALAYSIA

FIZIK

Kertas 1

Satu Jam Lima Belas Minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

Arahan:

1. *Kertas soalan ini mengandungi* **50** *soalan.*

2. *Jawab* **semua** *soalan.*

3. *Tiap-tiap soalan diikuti oleh empat pilihan jawapan iaitu* **A, B, C** *dan* **D.** *Bagi tiap-tiap soalan, pilih* **satu** *jawapan sahaja.* **Hitamkan** *jawapan anda pada kertas jawapan objektif yang disediakan.*

Kertas soalan ini mengandungi **34** halaman bercetak.

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

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

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

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

4. momentum = mv
momentum = mv

5. F = ma

6. Kinetic energy = $\frac{1}{2} mv^2$
Tenaga kinetik = ½ mv²

7. Potential energy = mgh
Tenaga keupayaan = mgh

8. Elastic potential energy = 1/2 Fx
Tenaga keupayaan kenyal = 1/2 Fx

9. $\rho = \frac{m}{V}$

10. Pressure, P = hρg
Tekanan, P = hρg

11. Pressure, $P = \frac{F}{A}$
Tekanan, P = $\frac{F}{A}$

12. Heat, Q = mcΘ
Haba, Q = mcΘ

13. $\frac{pV}{T}$ = constant
$\frac{pV}{T}$ = *malar*

14 $E = mc^2$

15 $v = f\lambda$

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

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

18. $\lambda = \frac{ax}{D}$

19. $n = \frac{\sin i}{\sin r}$

20. $n = \frac{\text{real depth}}{\text{apparent depth}}$

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

21 Q = It

22 V = IR

23 Power, P = IV
Kuasa, P = IV

24. $\frac{N_s}{N_p} = \frac{V_s}{V_p}$

25. Efficiency = $\frac{I_s V_s}{I_p V_p} \times 100\%$
Kecekapan = $\frac{I_s V_s}{I_p V_p} \times 100\%$

26 $g = 10 \text{ m s}^{-2}$

Answer **all** questions. Each questions is followed by either three or four options, **A, B, C** and **D**. Choose the best option for each question. **Blacken** the correct space on the answer sheet.

Jawab **semua** *soalan. Tiap-tiap soalan diikuti oleh tiga atau empat pilihan jawapan iaitu* **A, B, C** *dan* **D.** *Bagi tiap-tiap soalan, pilih* **satu** *jawapan terbaik sahaja.* **Hitamkan** *jawapan anda pada kertas jawapan objektif yang disediakan.*

1 Diagram 1 shows a measuring instrument.
Rajah 1 menunjukkan satu alat pengukur.

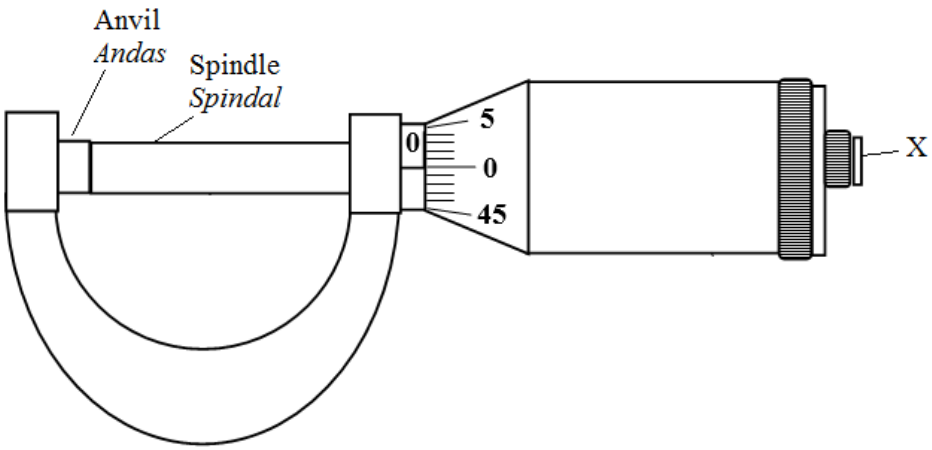


Diagram 1
Rajah 1

The part labeled X is to
Bahagian berlabel X adalah untuk

A Grip the object to be measured
Memegang objek yang hendak diukur

B Limit the pressure exerted on the object
Menghadkan tekanan yang dikenakan ke atas objek

C Be rotated to tighten the anvil and spindle
Dipusingkan untuk mengetatkan andas dan spindal

D Prevent the anvil and spindle from moving when measuring the diameter of an object
Menghalang andas dan spindal daripada bergerak apabila mengukur diameter bagi suatu objek

2 Length can be measured by using metre rule, vernier calipers and micrometer screw gauge.
Which of the following sets of reading is correctly recorded ?

Panjang boleh diukur dengan menggunakan pembaris meter, angkup vernier dan tolok skru mikrometer.
Yang manakah antara set bacaan berikut adalah direkodkan dengan betul?

	Metre rule (cm) ***Pembaris meter (cm)***	**Vernier Calipers (cm)** ***Angkup vernier (cm)***	**Micrometer screw gauge (cm)** ***Tolok skru mikrometer (cm)***
A	2.3	2.25	2.25
B	2.25	2.3	2.246
C	2.246	2.25	2.3
D	2.3	2.25	2.246

3 Table 1 shows the number of goals scored by four players, T, U, V and W in super league matches.
Jadual 1 menunjukkan bilangan gol yang diperoleh oleh tiga pemain, T, U, V dan W dalam perlawanan liga super.

Player ***Pemain***	**Match 1** ***Perlawanan 1***	**Match 2** ***Perlawanan 2***	**Match 3** ***Perlawanan 3***
T	2	1	0
U	0	3	1
V	2	1	2
W	1	2	3

Table 1
Jadual 1

Which player, T, U, V or W shows a high consistency?
Pemain yang manakah, T, U, V dan W yang menunjukkan kepersisan yang tinggi?

A T
B U
C V
D W

4 Diagram 2 shows the fireman holding the hose needs the support of another fireman so that he does not fall backward, when water rushes out of hose with a very high speed and volume.
Rajah 2 menunjukkan seorang ahli bomba yang memegang hos, memerlukan sokongan rakannya supaya dia tidak jatuh ke belakang apabila air yang keluar dari hos dengan halaju dan isipadu yang sangat tinggi.

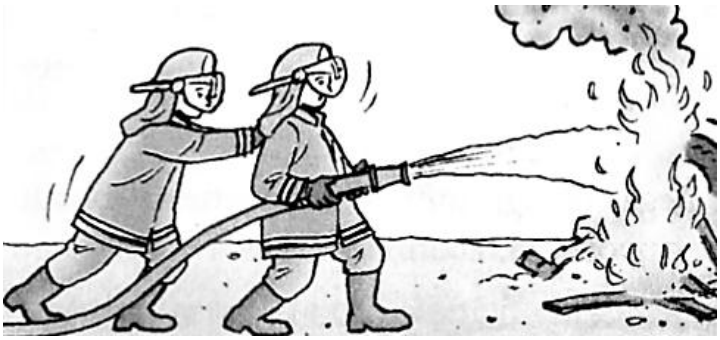


Diagram 2
Rajah 2

Which principle explains the situation above?
Prinsip yang manakah menerangkan situasi di atas?

A Pascal
Pascal

B Bernoulli
Bernoulli

C Conservation of Energy
Keabadian Tenaga

D Conservation of Momentum
Keabadian Momentum

5 Diagram 3 shows displacement-time graph of a moving object.
Rajah 3 menunjukkan graf sesaran-masa bagi suatu objek yang bergerak.

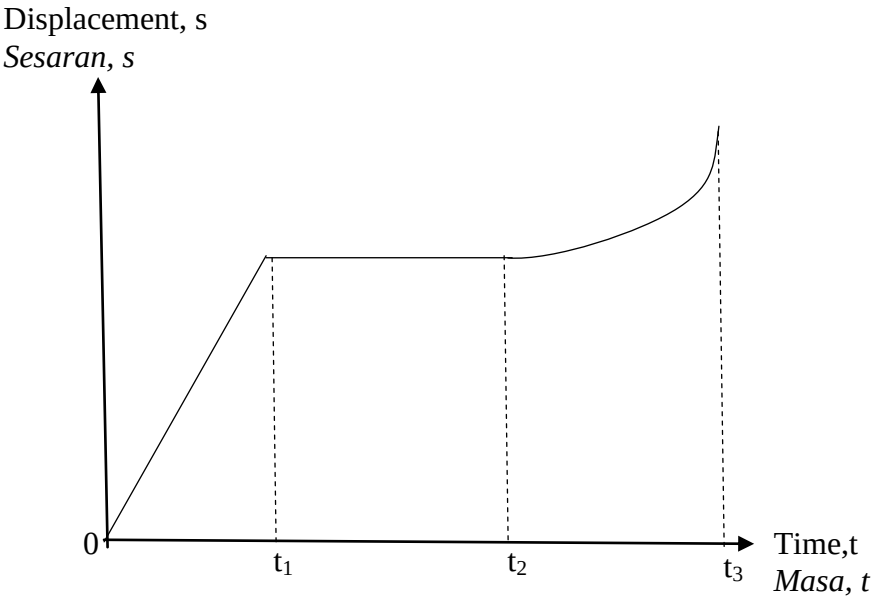
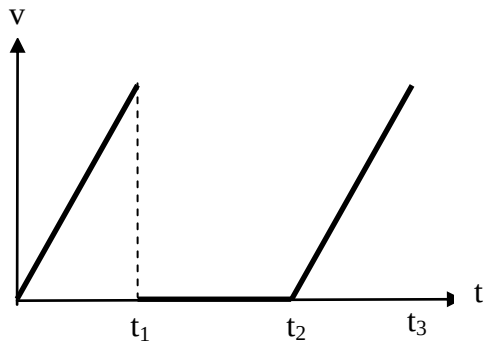


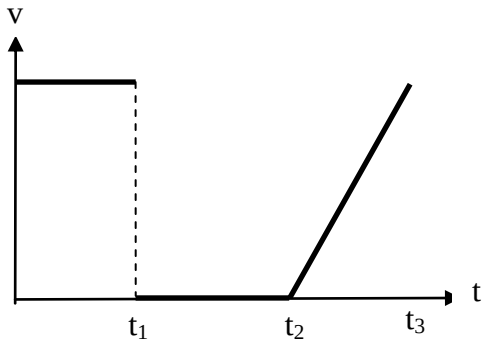
Diagram 3
Rajah 3

Which velocity, v against time,t graph describe the motion of the object?
Graf halaju,v melawan masa,t manakah yang menerangkan gerakan objek tersebut?

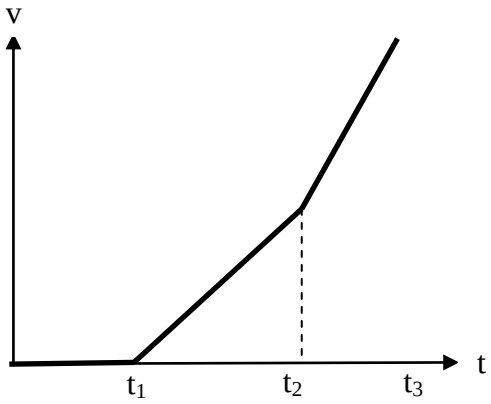
A



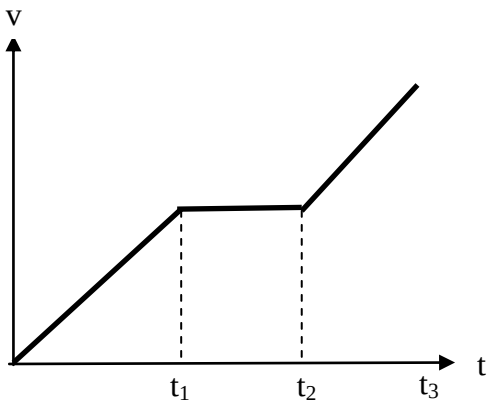
B



C



D



6 An astronaut with mass 70 kg travels from Moon to Earth.
Which comparison is correct?

Seorang angkasawan dengan jisim bergerak dari bulan ke bumi.
Perbandingan manakah adalah betul?

	Mass ***Jisim***	**Weight** **B*erat***
A	Less *kurang*	same *sama*
B	More *lebih*	same *sama*
C	Same *sama*	less *kurang*
D	Same *sama*	more *lebih*

7 Diagram 4 shows Jamal drives a bike at a constant speed of 25 ms^{-1}. The two forces resisting motion are air friction of 30 N and frictional force of 80 N.
Rajah 4 menunjukkan Jamal memandu motorsikal pada laju seragam 25 ms^{-1}. Terdapat dua yang menentang gerakan iaitu rintangan udara 30 N dan daya geseran 80 N.

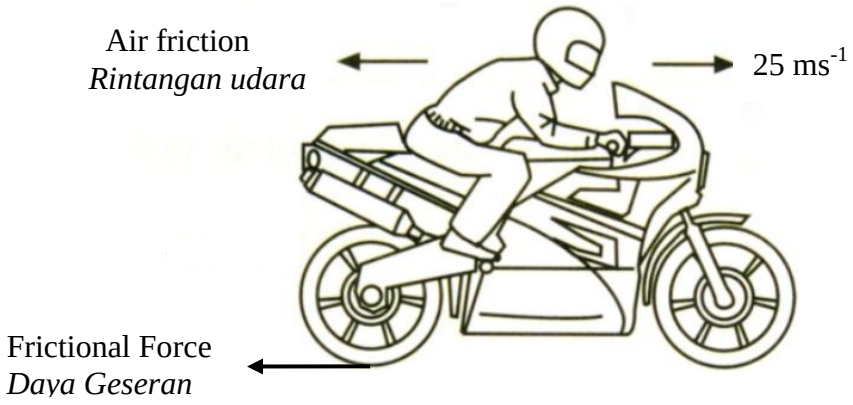


Diagram 4
Rajah 4

Determine the thrust force of the engine.
Hitung kuasa enjin motorsikal.

A 50 N
B 55 N
C 85 N
D 110 N

8 Diagram 5 shows a boy bending his leg upon landing.
Rajah 5 menunjukkan seorang budak lelaki membengkokkan kaki semasa mendarat

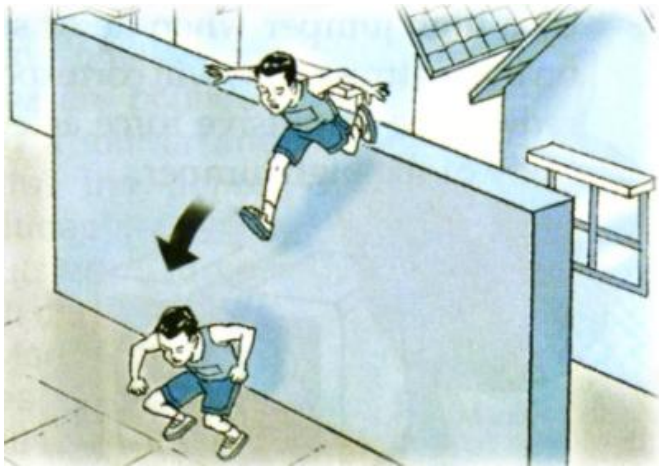


Diagram 5
Rajah 5

Why does the boy bend his leg?
Mengapakah budak itu membengkokkan kakinya?

A To lengthen the time of falling to the ground
Untuk memanjangkan masa jatuh ke tanah

B To shorten the time of falling to the ground
Untuk memanjangkan masa jatuh ke tanah

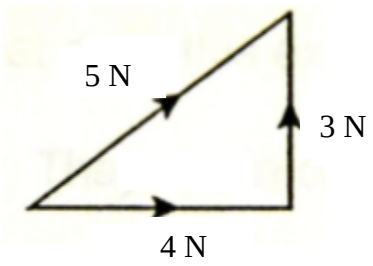
C To lengthen the time of impact of his feet with the ground
Untuk memanjangkan masa hentaman kaki dengan tanah

D To shorten the time of impact of his feet with the ground
Untuk memendekkan masa hentaman kaki dengan tanah

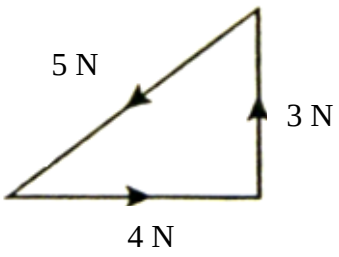
9 Three forces 3N, 4N and 5N acting on an object.
Which diagram shows correctly when the object is in equillibrium state?

Tiga daya 3N, 4N dan 5N sedang bertindak ke atas satu objek.
Rajah manakah yang betul apabila objek tersebut dalam keadaan keseimbangan?

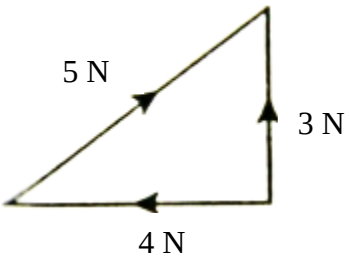
A



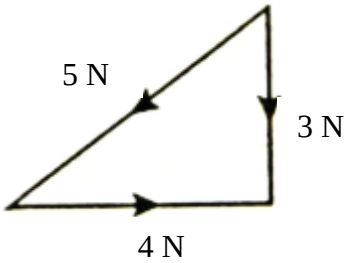
B



C



D



10 Diagram 6 shows the force, F against extension, *x* graph of a spring.
Gambarajah 6 menunjukkan daya melawan pemanjang bagi satu spring.

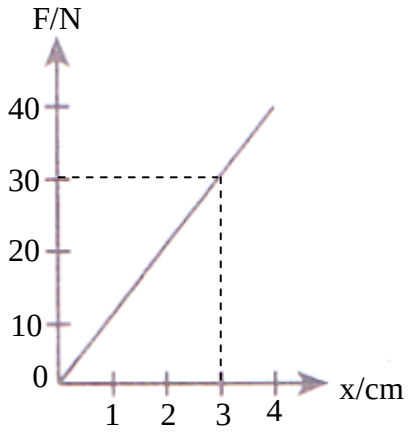


Diagram 6
Rajah 6

Calculate the elastic potential energy stored in the spring when the extension is 3 cm.
Hitung tenaga keupayaan kenyal yang tersimpan dalam spring itu apabila pemanjangan ialah 3 cm.

A 0.45 J
B 45 J
C 80 J
D 90 J

11 Diagram 4 shows a duck. The duck feet do not sink when walking on soft ground.
Rajah 4 menunjukkan seekor itik. Kaki itik tersebut tidak tenggelam apabila berjalan di atas tanah lembut.

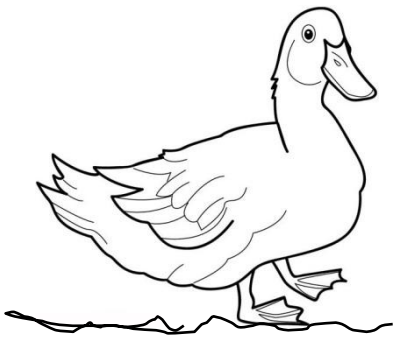


Diagram 7
Rajah 7

What physics concept describes the situation?
Apakah konsep fizik yang menerangkan situasi tersebut?

A Pressure
Tekanan

B Inertia
Inertia

C Momentum
Momentum

D Bouyant force
Daya tujah

12 Diagram 8 shows a simple pressure gauge connected to a thistle funnel. The thistle funnel is immersed in a vessel containing water at height, h from the bottom of the vessel.
Rajah 8 menunjukkan satu pengukur tekanan ringkas yang disambungkan ke satu corong tisel. Corong tisel tersebut direndam di dalam bekas yang mengandungi air pada ketinggian, h dari dasar bekas.

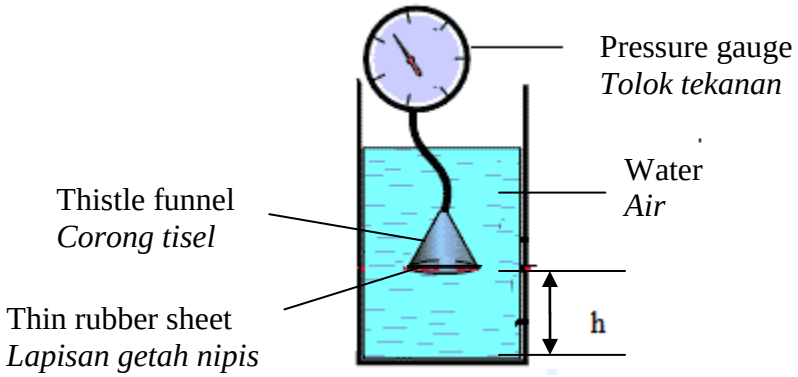


Diagram 8
Rajah 8

What happens to the reading of the pressure gauge if the funnel is lowered into the water?
Apakah yang berlaku kepada bacaan pengukur tekanan jika corong tersebut dimasukkan lebih rendah ke dalam air?

A increases
bertambah

B decreases
berkurang

C remain constant
tidak berubah

13 Diagram 9 shows three manometers connected to three gas containers.

Rajah 9 menunjukkan tiga manometer yang disambungkan ke tiga bekas yang mengandungi gas.

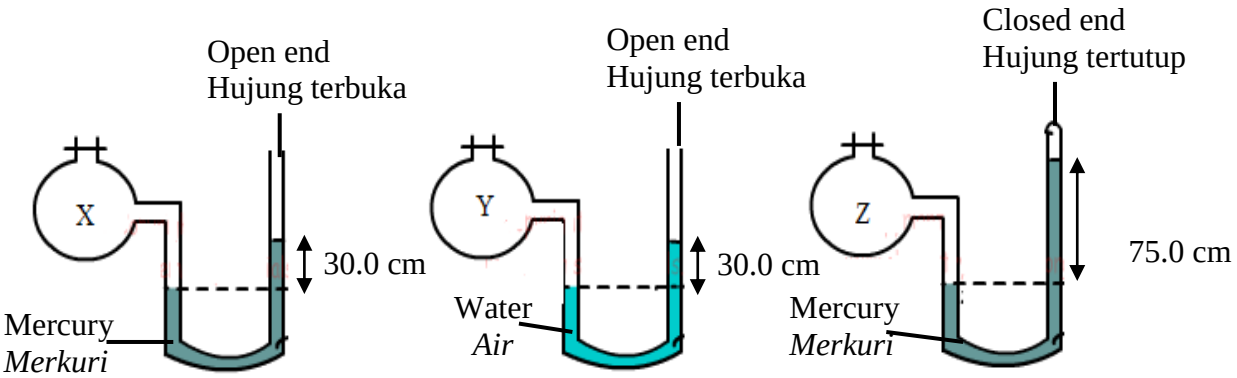


Diagram 9
Rajah 9

Which comparison is correct?
Perbandingan manakah adalah betul?

A Pressure of Z > Pressure of X > Pressure of Y
Tekanan Z > Tekanan Y > Tekanan X

B Pressure of X = Pressure of Y < Pressure of Z
Tekanan X = Tekanan Y < Tekanan Z

C Pressure of X > Pressure of Y > Pressure of Z
Tekanan X > Tekanan Y > Tekanan Z

D Pressure of Y > Pressure of Z > Pressure of X
Tekanan Y > Tekanan Z > Tekanan X

14 Diagram 10 shows Farhan in a water tank where he is weighed while completely submerged. His weight is 1000 N in air and his body volume is 0.08 m^3.
Rajah 10 menunjukkan Farhan berada di dalam sebuah tangki di mana dia ditimbang ketika seluruh badannya terendam. Beratnya di udara ialah 1000 N dan isipadu badannya ialah 0.08 m^3.

Water density = 1000 kg m^{-3}
Ketumpatan air

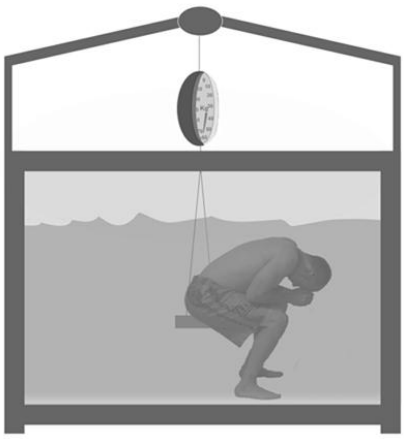


Diagram 10
Rajah 10

What is his apparent weight when he is completely submerged in water?
Berapakah berat ketara Farhan apabila dia tenggelam sepenuhnya di dalam air?

A 80 N
B 200 N
C 800 N
D 920 N

15 Diagram 11 shows Faris is lying on an air mattress. With the mattress he can ignore the rock and sticks that are on the ground beneath him.
Rajah 11 menunjukkan Faris sedang berbaring di atas tilam udara. Dengan menggunakan tilam tersebut, Faris tidak merasakan kesan sakit akibat terkena batu dan kayu.

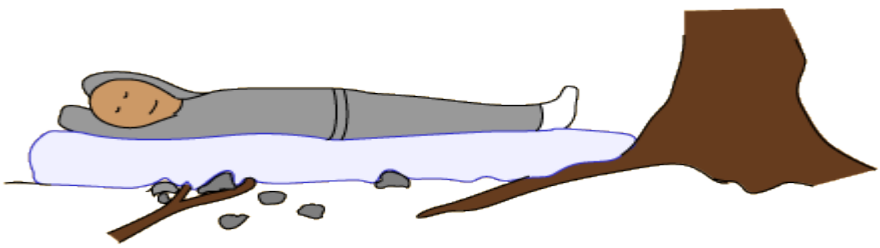


Diagram 11
Rajah 11

The air mattress takes advantage of

Tilam udara itu mengaplikasikan

A Boyle's law
Hukum Boyle

B Pressure law
Hukum Tekanan

C Pascal's principle
Prinsip Pascal

D Archimedes principle
Prinsip Archimedes

16 What instrument is used for measuring the low gas pressure?
Apakah alat yang digunakan untuk mengukur tekanan gas yang rendah?

A Barometer
Barometer

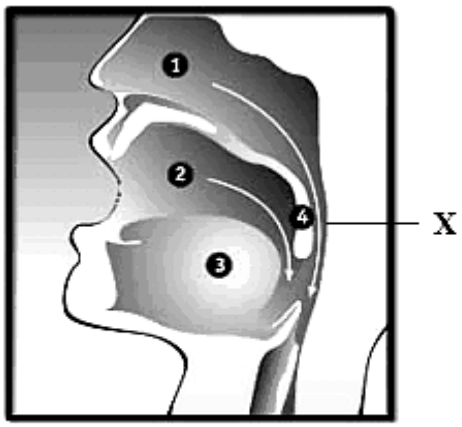
B Altimeter
Altimeter

C Manometer
Manometer

D Bourdon gauge
Tolok Bourdon

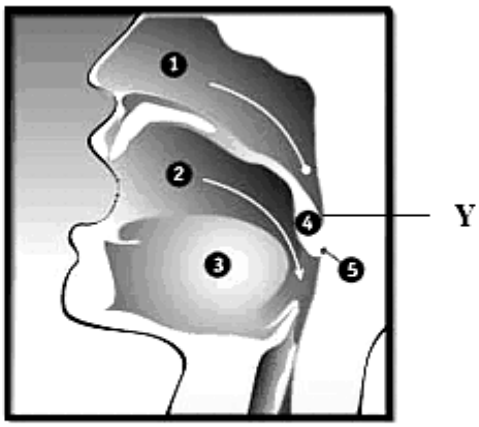
17 Diagram 12(a) shows normal airway for a non snoring person. The nasal and oral airways are open (X).
Diagram 12(b) shows the airways for a snoring person. The uvula and the soft palate partially block the airway (Y) increasing airflow through the narrowed areas in the hollow tube, which causes a drop in the pressure at that point.

Rajah 12(a) menunjukkan laluan udara yang normal bagi orang yang tidak berdengkur. Laluan udara 'nasal' dan 'oral' adalah terbuka (X).
Rajah 12(b) menunjukkan laluan udara bagi orang yang berdengkur. 'Uvula' dan 'palate' lembut separa menghalang laluan udara (Y) dan meningkatkan aliran udara melalui ruang sempit di dalam tiub berongga, menyebabkan pengurangan tekanan pada ruang tersebut.



Non snoring person

Diagram 12 (a)
Rajah 12(a)



Snoring person

Diagram 12 (a)
Rajah 12(a)

1. - Nasal Airway
2. - Oral Airway
3. - Tongue
4. - Uvula/Soft Palate
5. - Soft Palate/Pharynx Obstruction

This phenomena is explained by
Fenomena ini dijelaskan oleh

A Boyle's law
Hukum Boyle

B Pressure law
Hukum tekanan

C Pascal's principle
Prinsip Pascal

D Bernoulli's principle
Prinsip Bernoulli

18 When the gas in air-tight container is compressed, what will remains unchanged?
Apabila gas dalam sebuah bekas kedap udara dimampatkan, apakah yang tidak berubah?

A The gas pressure.
Tekanan gas.

B The number of particles.
Bilangan zarah.

C The average kinetic energy of the particles.
Purata tenaga kinetik zarah-zarah.

D The frequency of collisions between the particles and the walls.
Kekerapan pelanggaran zarah-zarah dengan dinding bekas

19 Diagram 13 shows the heating curve of a substance.
Rajah 13 menunjukkan graf lengkung pemanasan suatu bahan.

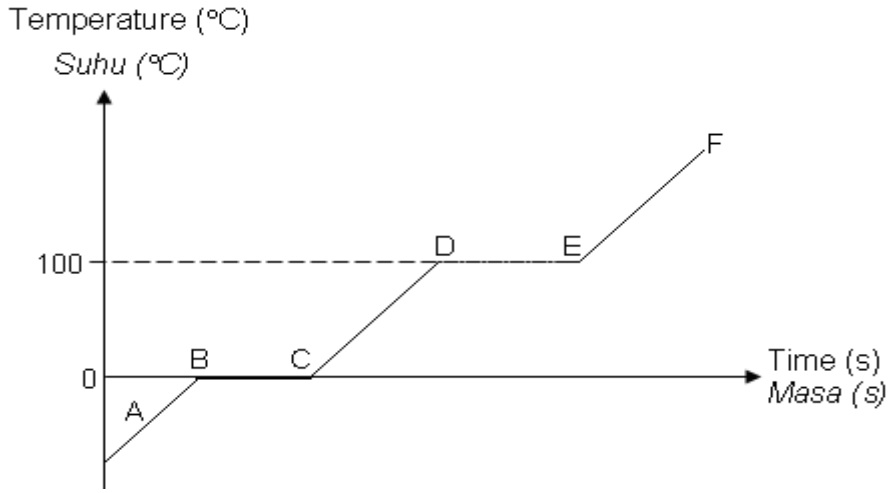


Diagram 13
Rajah 13

Why is the temperature at BC constant even though the heat is supplied continuously?
Mengapakah suhu pada BC adalah malar walaupun haba sentiasa dibekalkan?

A The heat energy is used to reduce the kinetic energy of the molecules
Tenaga haba digunakan untuk mengurangkan tenaga kinetik molekul.

B The heat energy is used to increase the kinetic energy of the molecules
Tenaga haba digunakan untuk meningkatkan tenaga kinetik molekul.

C The heat energy is used to break the bonds between the molecules
Tenaga haba digunakan untuk memutuskan ikatan antara molekul.

D The heat energy is used to strengthen the bonds between the molecules
Tenaga haba digunakan untuk menguatkan ikatan antara molekul.

20 24 000 J of heat is used to increase the temperature of 0.8 kg metal block from 25°C to 55°C.
24 000 J *haba digunakan untuk meningkatkan suhu sebuah blok logam* 0.8 kg *daripada* 25°C *kepada* 55°C.
What is the specific heat capacity of the metal block?
Berapakah muatan haba tentu blok logam itu?

A 375 J $kg^{-1}°C^{-1}$ **B** 545 J $kg^{-1}°C^{-1}$

C 1 000 J $kg^{-1}°C^{-1}$ **D** 1 200 J $kg^{-1}°C^{-1}$

21 Diagram 13 shows a gas trapped inside a glass tube at the temperature 27°C.
Rajah 13 menunjukkan suatu gas terperangkap dalam satu tiub kaca pada suhu 27°C.

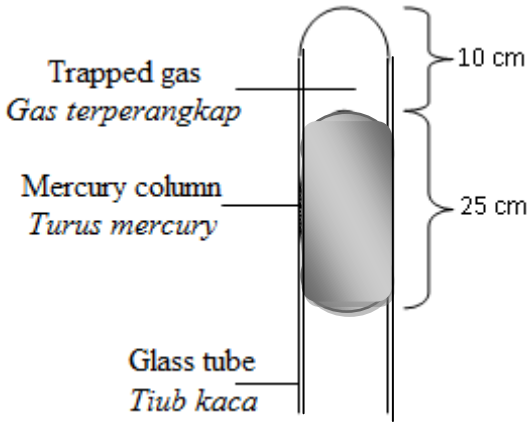
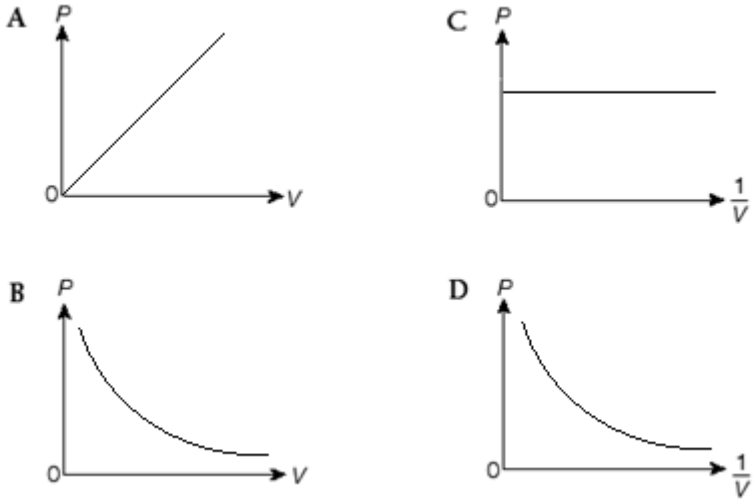


Diagram 13
Rajah 13

What is the temperature if the length of the gas trapped increases to 12 cm?
Berapakah suhu sekiranya panjang turus gas yang terperangkap bertambah kepada 12 cm?

A 27.0 °C
B 32.4 °C
C 44.1 °C
D 87.0 °C

22 Which of the following graphs shows the relationship between the pressure, P, and the volume, V, of a gas according to Boyle's law?
Graf berikut yang manakah menunjukkan hubungan antara tekanan, P dan isipadu, V suatu gas berdasarkan hukum Boyle?



23 Diagram 14 shows an arrangement of objective lens, L_o and eyepiece, L_e in a microscope.
Rajah 14 menunjukkan susunan bagi kanta objektif, L_o dan kanta mata, L_e dalam sebuah mikroskop.

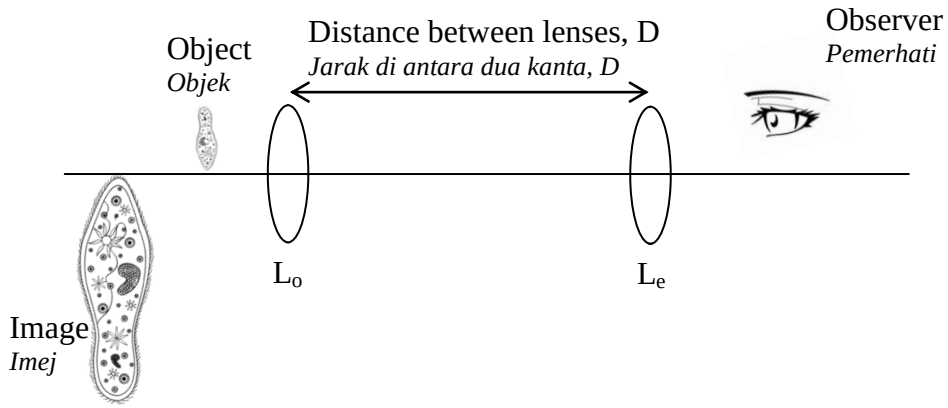


Diagram 14
Rajah 14

What are the required conditions for both lenses to produced large, inverted and virtual final image?
Apakah syarat-syarat yang diperlukan bagi kedua-dua kanta untuk menghasilkan imej akhir yang besar, songsang dan maya?

	Focal length, f ***Jarak fokus, f***	**Normal adjustment** ***Pelarasan normal***
A	$f_e > f_o$	$D = f_e + f_o$
B	$f_e > f_o$	$D > f_e + f_o$
C	$f_e < f_o$	$D < f_e + f_o$
D	$f_e < f_o$	$D = f_e + f_o$

24 The refractive index of a glass block is 1.63. Calculate the velocity of light in the glass block.
Indeks biasan bagi sebuah bongkah kaca ialah 1.63. Kirakan halaju cahaya di dalam bongkah kaca tersebut.

Velocity of light in air = $3.0 \times 10^8\ m\ s^{-1}$
Halaju cahaya dalam udara

A $1.84 \times 10^6\ m\ s^{-1}$
B $4.89 \times 10^6\ m\ s^{-1}$
C $1.84 \times 10^8\ m\ s^{-1}$
D $4.89 \times 10^8\ m\ s^{-1}$

25 Diagram 15 shows a man standing in front of a plane mirror.
Rajah 15 menunjukkan seorang lelaki sedang berdiri di hadapan sebuah cermin satah.

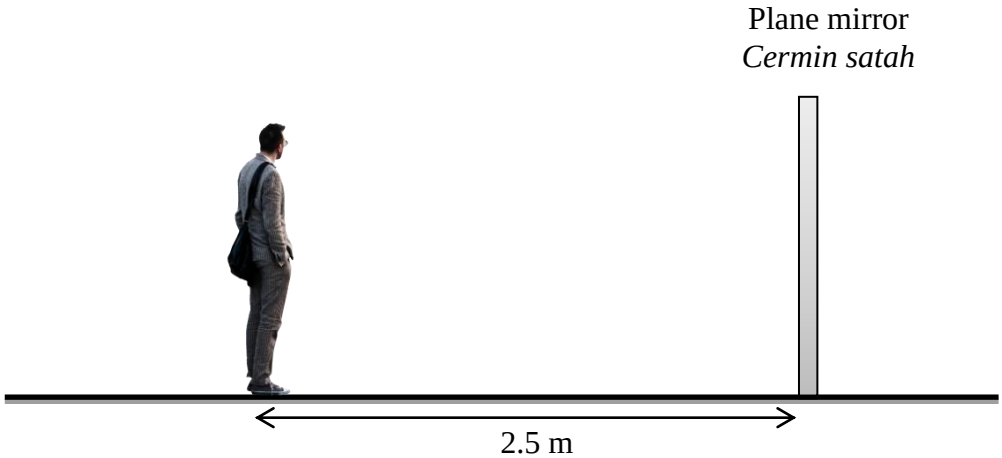


Diagram 15
Rajah 15

The mirror is moved 1.5 m away him. What is the distance between the man and his image right now?
Cermin itu digerakkan 1.5 m menjauhi lelaki itu. Berapakah jarak di antara lelaki itu dengan imejnya sekarang?

A 4.0 m
B 5.0 m
C 8.0 m
D 10.0 m

26 Diagram 16 shows a ray hits a semicircular glass block at an angle, θ. Which is the correct path of light if θ less than critical angle of the glass block?
Rajah 16 menunjukkan satu sinar cahaya melalui suatu bongkah kaca semibulatan pada suatu sudut, θ. Lintasan cahaya yang mahakah yang betul jika θ kurang daripada sudut genting blok kaca?

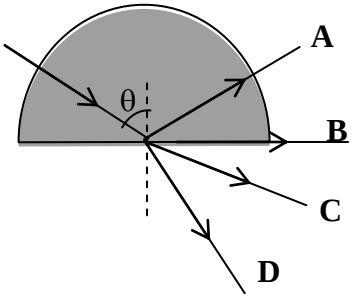
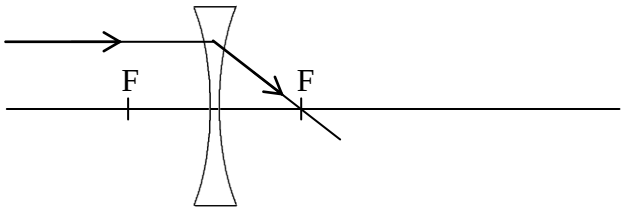


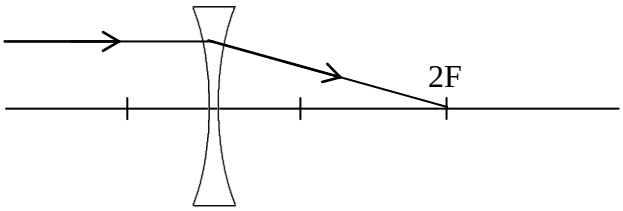
Diagram 16
Rajah 16

27 Which of the diagram shows the correct refraction of light ray after passing through a concave lens?
Rajah manakah yang menunjukkan pembiasan sinar cahaya yang betul selepas melalui sebuah kanta cekung?

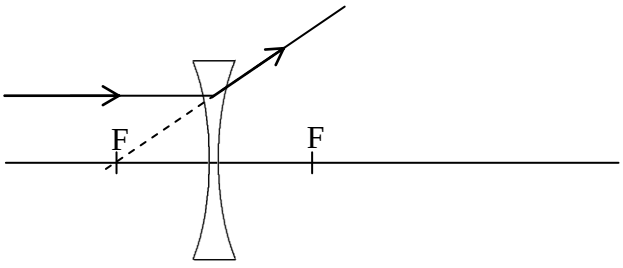
A



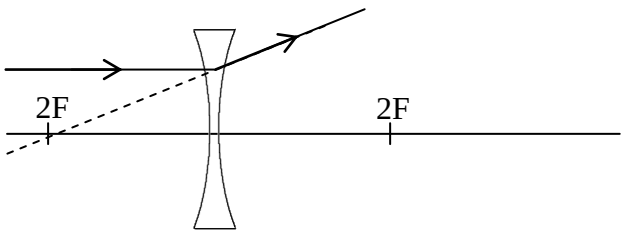
B



C



D



28 Which one is waves that cannot travel through vaccum?
Antara berikut gelombang yang manakah tidak boleh merambat melalui vakum?

A Gamma ray
Sinar gamma

B Ultraviolet ray
Sinaran ultraungu

C Radio waves
Gelombang radio

D Ultrasonic waves
G*elombang ultrasonik*

29 Sound that produced from an ambulance is low frequency.
The purpose is, to make sound waves
Bunyi yang dihasilkan oleh sebuah ambulans adalah berfrekuensi rendah.
Tujuannya adalah supaya gelombang bunyi

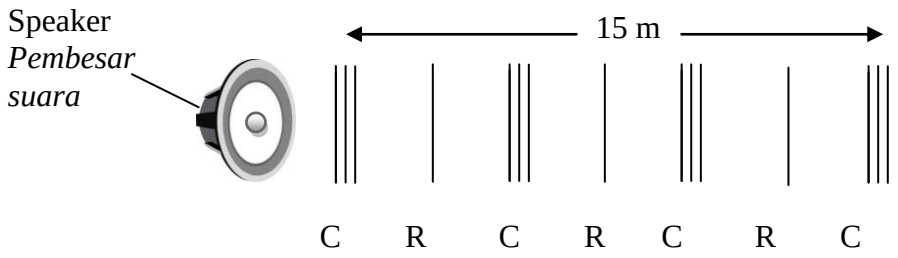
A easily refracted
lebih mudah dibiaskan

B easily diffracted
lebih mudah dibelaukan

C experience interference
mengalami interferens

D produces louder sounds
menghasilkan bunyi yang lebih kuat

30 Diagram 17 shows a pattern of sound waves that produced by a speaker
Rajah 17 menunjukkan corak gelombang bunyi dihasilkan oleh sebuah pembesar suara.



C – Compression *Mampatan*

R – Rarefaction *Renggangan*

Diagram 17
Rajah 17

Velocity of a sound waves is 330 ms^{-1}.
What is the frequency of the sounds waves produced from the speaker?
Halaju gelombang bunyi ialah 330 ms^{-1}.
Berapakah frekuensi gelombang bunyi yang dikeluarkan oleh pembesar suara itu?

A 22 Hz **B** 66 Hz

C 110 Hz **D** 990 Hz

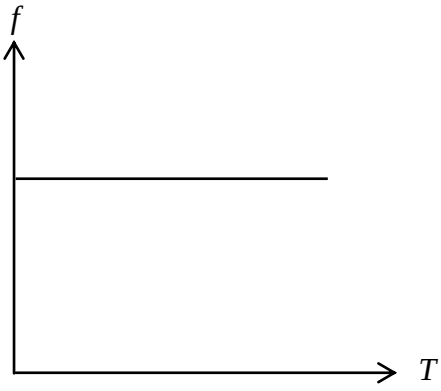
31 Which of the following colours have the shortest wavelength ?
Manakah di antara warna berikut mempunyai panjang gelombang yang terpendek ?

A Violet *Ungu* **B** Blue *Biru*

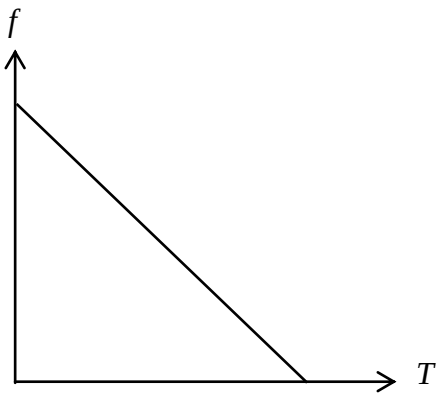
C Green *Hijau* **D** Red *Merah*

32 Which graph shows the relationship between frequency, *f* and period, *T* of a wave?
Graf yang manakah menunjukkan hubungan di antara frekuensi, f dan tempoh, T bagi suatu gelombang ?

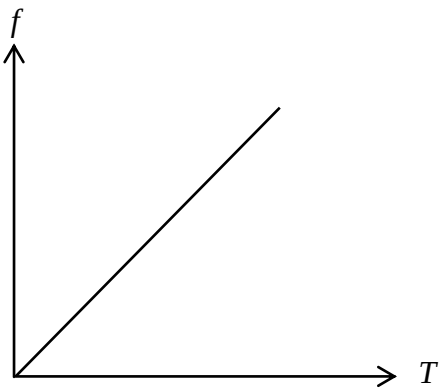
A



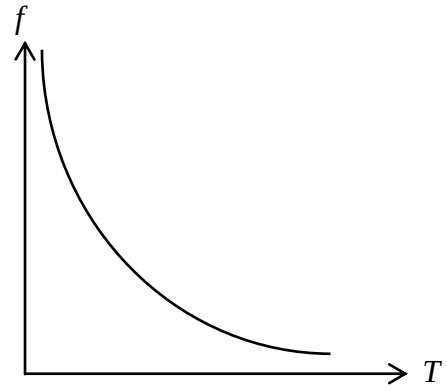
B



C



D



33 The Diagram 18 shows wave fronts that move towards the beach from the sea. It is observed that the sea is calmer at the bay than at the cape.
Gambar rajah 18 menunjukkan muka gelombang merambat menuju pantai dari laut. Adalah diperhatikan laut lebih tenang di teluk berbanding di tanjung.

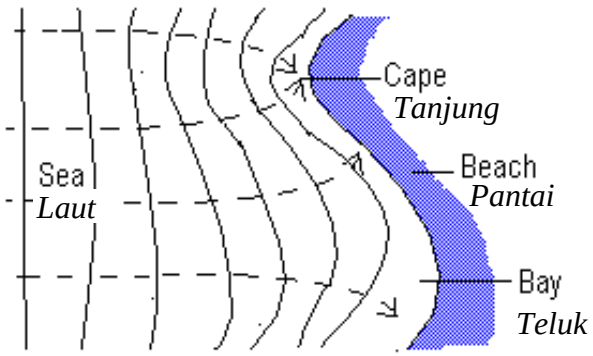


Diagram 18
Rajah 18

The phenomena seen in diagram is
Fenomena yang kelihatan dalam gambar rajah ialah

A refraction
biasan

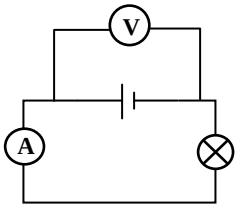
B reflection
pantulan

C diffraction
belauan

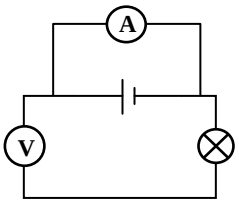
D interference
i*nterferens*

34 Which circuit can be used to determine the electromotive force of a battery?
Litar yang manakah boleh digunakam untuk menentukan daya gerak elektrik?

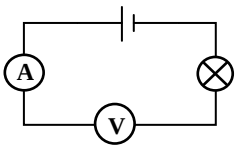
A



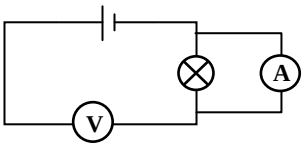
B



C

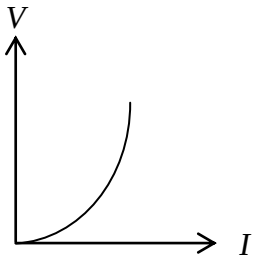


D

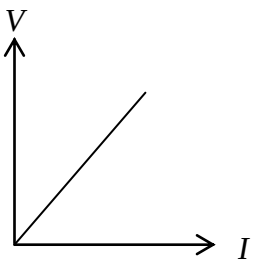


35 Which graph shows the relationship between the potential difference, V and the current, I for an Ohmic conductor?
Rajah manakah yang menunjukkan hubungan di antara bcza keupavaan, V *dan arus,* I *untuk satu konduktor Ohm?*

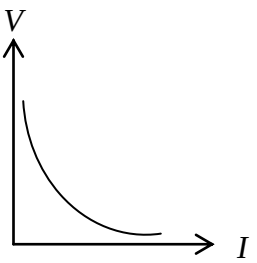
A



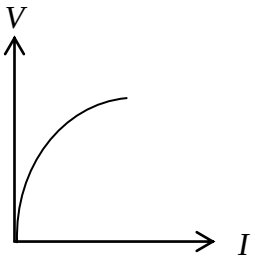
B



C



D



36 Diagram 19 shows a cell of 2 V is connected in series with an ammeter and a light bulb. The resistance of light bulb is 2 Ω and the current flows in the circuit is 1 A.
Rajah 19 menunjukkan satu sel 2 V disambung secara siri *dengan sebuah ammeter dan sebiji mentol. Rintangan mentol tersebut adalah 2 Ω dan arus yang mengalir dalam adalah 1 A.*

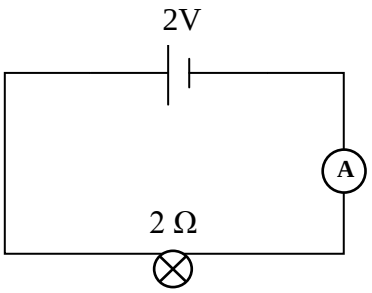
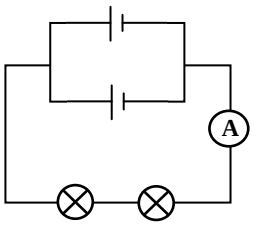


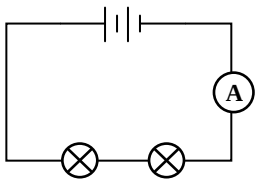
Diagram 19
Rajah 19

If all the cells, bulbs and ammeters are identical, which circuit gives the ammeter reading is 1 A?
Jika sel, mentol dan ammeter adalah sama, litar manakah bacaan ammeter adalah 1 A?

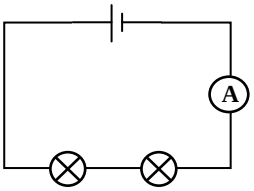
A



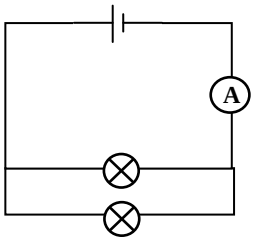
B



C



D



37 Diagram 20 shows a wire which is 1.0 m long has a resistance of 2.0 Ω. When connected to a cell, the current flowing through the wire is 3.0 A.
Rajah 20 menunjukkan seutas dawai sepanjang 1.0 m *mempunyai rintangan* 2.0 Ω. *Apabila disambungkan ke sebiji sel, arus yang melalui dalam dawai ialah* 3.0 A.

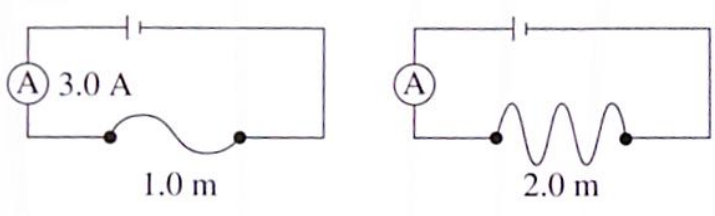


Diagram 20
Rajah 20

If the same wire is 2.0 m long and is connected to the same cell, what will be the resistance of the wire and the current flowing through it?
Seutas dawai yang sama dengan panjang 2.0 m *disambungkan ke sel yang sama, apakah rintangan dawai dan arus yang mengalir melaluinya ?*

	Resistance/ Ω *Rintangan/* Ω	Curent/ A *Arus/* A
A	2.0	1.5
B	1.0	3.0
C	4.0	1.5
D	4.0	3.0

38 Diagram 21 shows an electromagnet PQ.
Rajah 21 menunjukkan satu elektromagnet PQ.

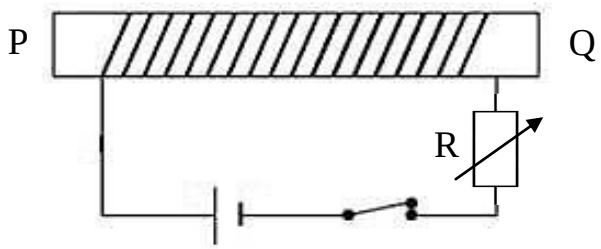


Diagram 21
Rajah 21

Which of the following will increase the strength of the electromagnet?
Antara kaedah berikut, yang manakah akan menambahkan kekuatan elektromagnet?

A Using thinner wire
Menggunakan dawai yang lebih nipis

B Using a smaller current
Menggunakan arus yang lebih kecil

C Increase the resistance of R
Menambahkan rintangan R

D Increasing the number of turns of solenoid
Menambahkan bilangan lilitan solenoid

39 Diagram 22 shows a current-carrying conductor, P, located within the magnetic field.
Rajah 22 menunjukkan satu konduktor pembawa arus, P yang diletakkan di dalam medan magnet.

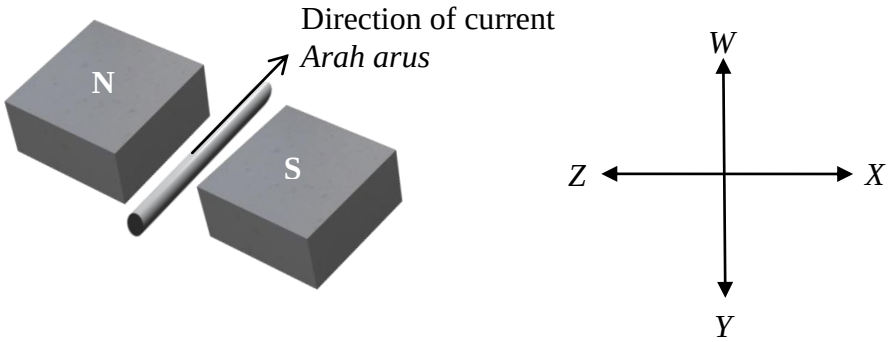


Diagram 22
Rajah 22

Which of the following shows the correct direction of force?
Yang manakah antara berikut menunjukkan arah daya yang betul?

A *W*
B *X*
C *Y*
D *Z*

40 In a long-distance electrical power transmission, high voltage is applied to
Dalam penghantaran kuasa elektrik jarak jauh, voltan yang tinggi digunakan untuk

A increase the current flowing in the cables
menambahkan arus yang mengalir dalam kabel

B reduce the power loss due to heating of the cables
mengurangkan kehilangan kuasa disebabkan pemanasan kabel

C reduce eddy current produced in the cables
mengurangkan arus pusar yang dihasilkan dalam kabel

D increase the speed of the power transmission
menambahkan kelajuan penghantaran kuasa

41 Diagram 23 shows a magnet is moved towards solenoid XY.
Rajah 23 menunjukkan satu magnet digerakkan ke arah solenoid XY.

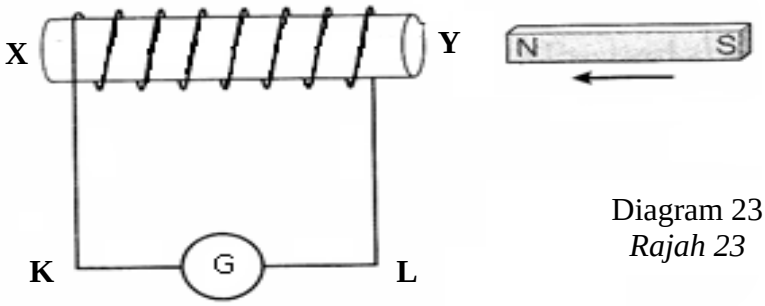


Diagram 23
Rajah 23

Which statement is true?
Pernyataan yang manakah benar?

	Pole at Y *Kutub pada Y*	Direction of induced current *Arah arus aruhan*
A	South *Selatan*	L to K *L ke K*
B	North *Utara*	K to L *K ke L*
C	South *Selatan*	K to L *K ke L*
D	North *Utara*	L to K *L ke K*

42 Diagram 24 shows a transformer that has efficiency of 80%.
Rajah 24 menunjukkan sebuah transformer yang mempunyai kecekapan 80%.

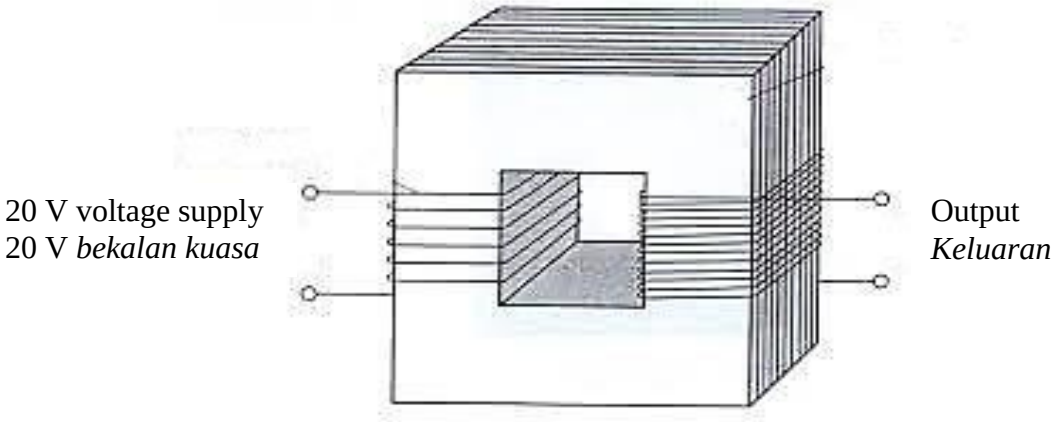


Diagram 24
Rajah 24

If it produces an output power of 100 W, what is the amount of current flowing in the primary coil?
Jika ia menghasilkan kuasa output 100 W, berapakah arus yang mengalir dalam gegelung primer?

A 6.25 A
B 5.15 A
C 4.00 A
D 3.75 A

43 Diagram 25 shows the traces of a C.R.O. (Cathode Ray Oscilloscope) for an alternating current (a.c).
Rajah 25 menunjukkan surihan O.S.K (Osiloskop Sinar Katod) bagi suatu arus ulang alik.(a.u).

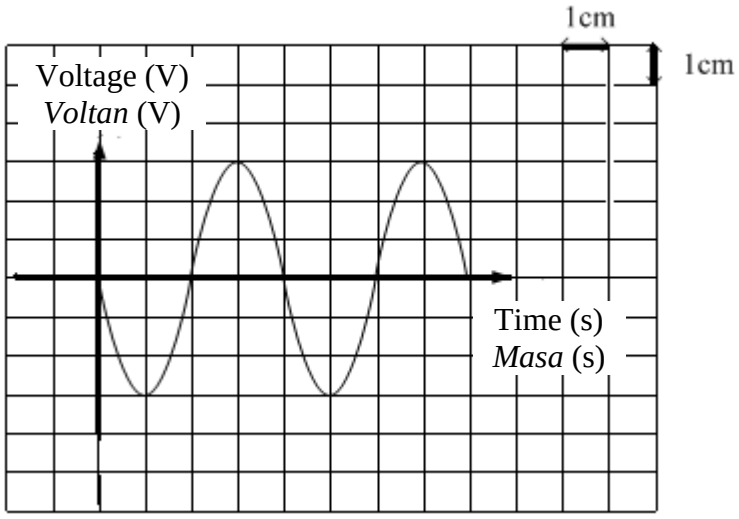


Diagram 25
Rajah 25

What is the peak voltage if the Y-gain is set at 5 V cm^{-1}?
Berapakah voltan puncak jika pelaras–Y dilaraskan pada 5 V cm^{-1}?

A 5 V
B 10 V
C 15 V
D 30 V

44 Diagram 26 shows a circuit connected to the cathode ray oscilloscope (CRO).
Rajah 26 menunjukkan satu litar yang disambungkan kepada osiloskop sinar katod (OSK).

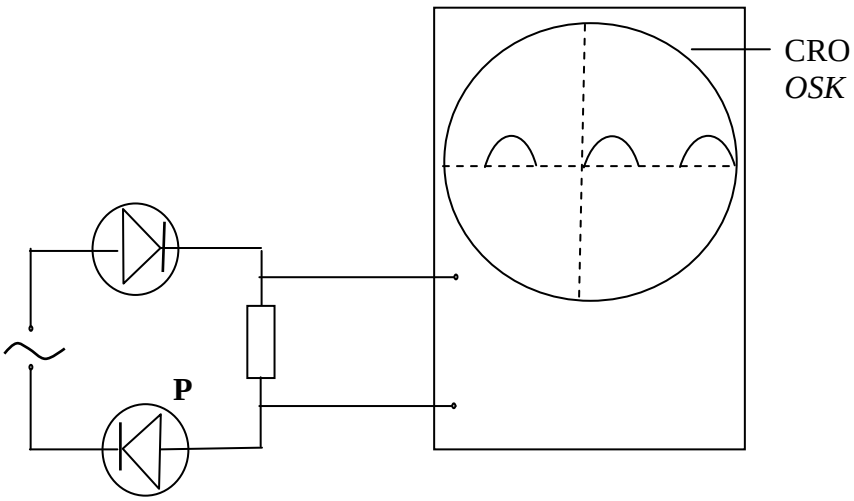
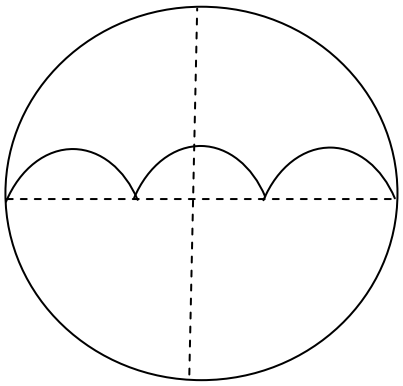


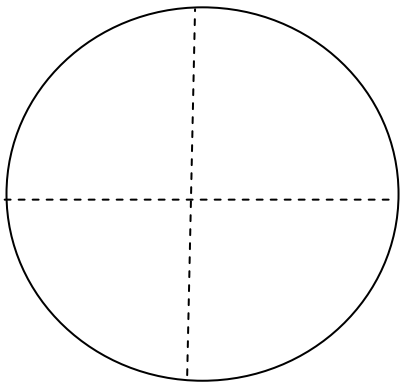
Diagram 28
Rajah 28

Which of the following traces displayed on the CRO is correct when diode **P** is reversed ?
*Antara surihan berikut, yang manakah surihan yang betul dipaparkan pada OSK apabila diod **P** disongsangkan ?*

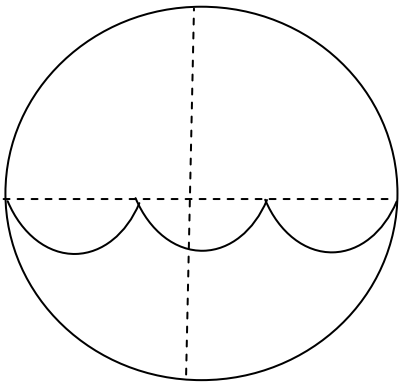
A



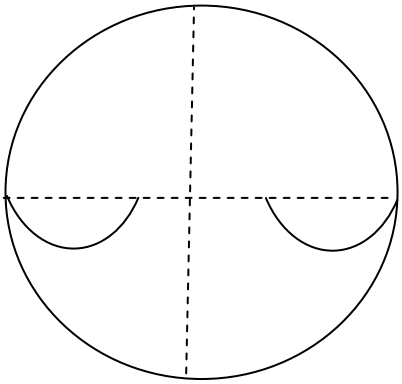
B



C

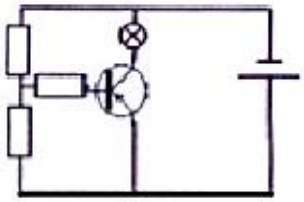


D

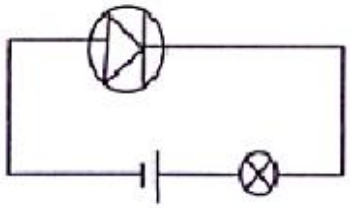


45 Diagram 27 show the electric circuits. Which bulbs will be light up?
Rajah 27 menunjukkan beberapa buah litar elektrik. Mentol mana yang akan menyala?

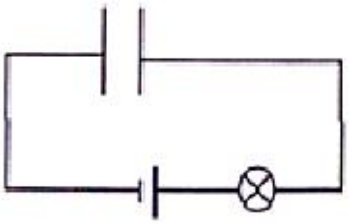
A.



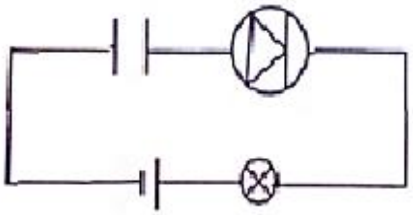
B.



C.



D.



46 Diagram 28 shows a transistor circuit which functions as a safety vault alarm system.
Rajah 28 menunjukkan litar transistor yang berfungsi sebagai satu sistem penggera peti keselamatan.

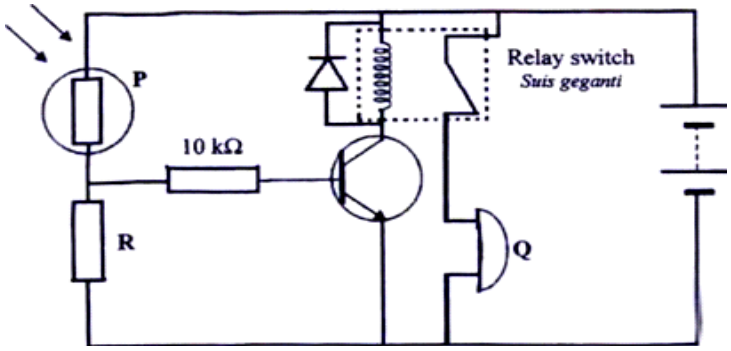


Diagram 28
Rajah 28

What happens to the resistance of P and the state of Q when the surrounding is dark?
Apakah yang berlaku kepada rintangan P dan keadaan Q apabila persekitarannya adalah gelap?

	Resistance of P ***Rintangan P***	**State of Q** ***Keadaan Q***
A	Low *Rendah*	Activated *Dihidupkan*
B	Low *Rendah*	Not activated *Tidak dihidupkan*
C	High *Tinggi*	Activated *Dihidupkan*
D	High *Tinggi*	Not activated *Tidak dihidupkan*

47 Diagram 29 shows a nuclide notation of radioactive element X.
Rajah 29 menunjukkan notasi nuklid bagi suatu unsur radioaktif X.

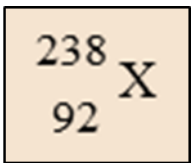


Diagram 29
Rajah 29

Which of the following is correct?
Yang manakah antara yang berikut adalah betul?

	Proton number ***Nombor proton***	**Nucleon number** ***Nombor nukleon***	**Number of neutron** ***Bilangan neutron***
A	238	92	146
B	238	146	92
C	92	238	146
D	92	146	238

48 Diagram 30 shows a radioactive decay curve of a radioactive substance.
Rajah 30 menunjukkan lengkung reputan bagi suatu bahan radioaktif.

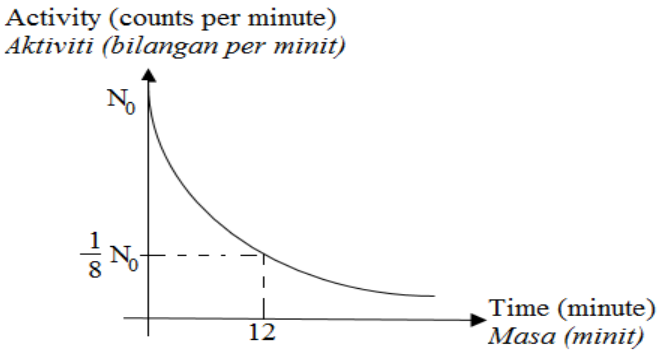


Diagram 30
Rajah 30

What is the half-life of the radioactive substance?
Berapakah separuh hayat bagi bahan radioaktif tersebut?

A 12 minutes
12 minit

B 8 minutes
8 minit

C 6 minutes
6 minit

D 4 minutes
4 minit

49 Diagram 31 shows the radioactive decay series of nucleus W to nucleus Z.
Rajah 31 menunjukkan siri pereputan nucleus W kepada nucleus Z.

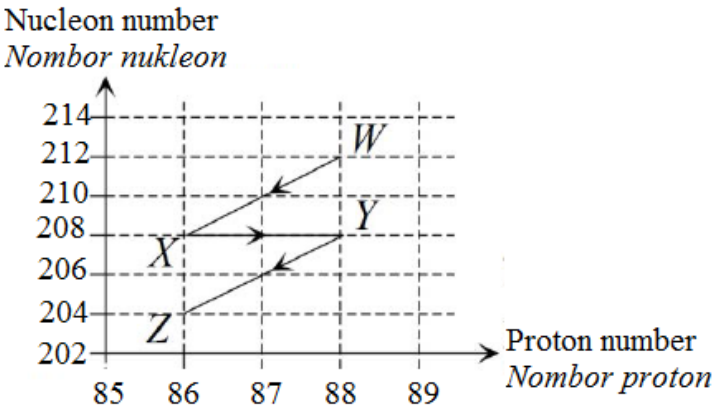


Diagram 31
Rajah 31

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

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

50 The following equation shows the decay of uranium-235.
Persamaan berikut menunjukkan reputan uranium-235.

$$^{235}_{92}U \rightarrow {}^{231}_{90}Th + {}^{4}_{2}He$$

What is the value of mass that is converted to energy?
(Mass of uranium-235 = 235.0439u, mass of thorium = 231.0363u,
mass of alpha particles = 4.0026u)
Berapakah nilai jisim yang ditukarkan kepada tenaga?
(Jisim uranium-235 = 235.0439u, jisim thorium = 231.0363u,
jisim zarah alfa = 4.0026u)

A 0.0025u
B 0.0050u
C 0.0060u
D 0.0075u

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

Physics
Kertas 2
Ogos 2014
2 ½ Jam

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

KEMENTERIAN PENDIDIKAN MALAYSIA

BAHAGIAN PENGURUSAN SEKOLAH BERASRAMA PENUH DAN SEKOLAH KECEMERLANGAN

PENTAKSIRAN DIAGNOSTIK AKADEMIK SBP 2014
PERCUBAAN SIJIL PELAJARAN MALAYSIA

FIZIK

Kertas 2

2 Jam 30 Minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

Arahan:

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

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

Kertas soalan ini mengandungi **33** halaman bercetak.

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

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

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

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

4. Momentum = mv

5. F = ma

6. Kinetic energ = $\frac{1}{2}mv^2$
   Tenaga kinetik

7. Gravitational potential energy = mgh
   Tenaga keupayaan graviti

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

9. $\rho = \frac{m}{V}$

10. Pressure, P = hρg
    Tekanan

11. Pressure, $P = \frac{F}{A}$
    Tekanan

12. Heat, Q = mcθ
    Haba

13. $\frac{PV}{T}$ = Constant (*pemalar)*

14. $E = mc^2$

15. $v = f\lambda$

16. Power, $P = \frac{\text{energy}}{\text{time}}$
    Kuasa, P = $\frac{tenaga}{masa}$

17. V = IR

18. Power, P = IV
    Kuasa

19. $\frac{N_s}{N_p} = \frac{V_s}{V_p}$

20. Efficiency = $\frac{I_s V_s}{I_p V_p} \times 100$
    Kecekapan

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

22. $n = \frac{\sin i}{\sin r}$

23. $n = \frac{\text{real depth}}{\text{apparent depth}}$
    $n = \frac{dalam\ nyata}{dalam\ ketara}$

24. $\lambda = \frac{ax}{D}$

25. Q= It

26. E = I (R + r)

27. $eV = \frac{1}{2}mv^2$

28. $g = 10\ ms^{-2}$

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 light copper rod is placed between two poles of a magnadur magnet. Current from the bare copper plate flows through the rod when the switch is closed.
Rajah menunjukkan satu rod kuprum ringan diletakkan diantara dua kutub magnet magnadur. Arus dari plat kuprum tak bertebat mengalir melalui rod apabila suis ditutup.

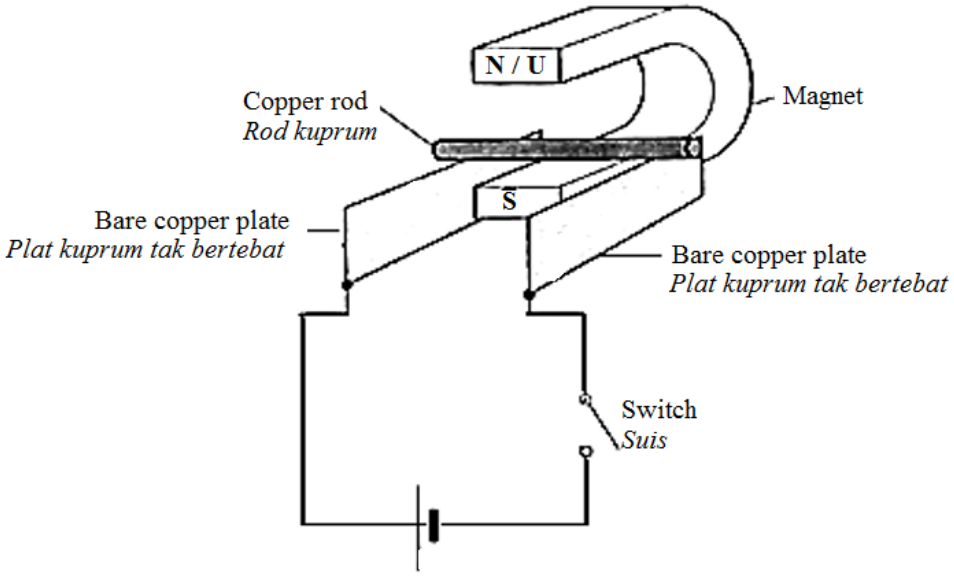


Diagram 1.1
Rajah 1.1

(a) (i) On Diagram 1.1, mark the direction of the current in the rod
Pada Rajah 1.1, tandakan arah arus dalam rod.

[1 mark]
[1 *markah*]

(ii) Determine the direction of the movement of rod.
Tentukan arah gerakan rod.

.....

[1 mark]
[1 *markah*]

(b) Name the physics' rule to determine the answer in 1(a)(ii).
Namakan peraturan fizik untuk menentukan jawapan dalam 1a(ii).

……..

[1 mark]
[1 *markah*]

(c) State the effect on the movement of the rod when the current is increased.
Nyatakan kesan terhadap gerakan rod apabila arus ditambah.

……

[1 mark]
[1 *markah*]

2. Diagram 2 shows an instrument placed in the school laboratory to measure an atmospheric pressure.
Given that the density of mercury is 1.36 x 10^4 kg m^{-3}, and the atmospheric pressure at sea level is 76 cm Hg.
Rajah 2 menunjukkan sebuah instrumen yang diletakkan dalam makmal sekolah untuk mengukur tekanan atmosfera.
Diberi ketumpatan merkuri ialah 1.36 x 10^4 kg m^{-3}, dan tekanan atmosfera pada paras laut ialah 76 cm Hg.

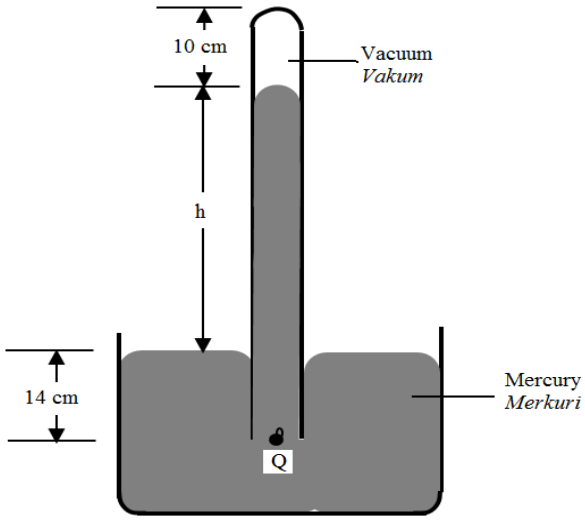


Diagram 2
Rajah 2

(a) Name of the instrument in Diagram 2.
Namakan instrumen pada Rajah 2.

……

[1 mark]
[1 *markah*]

(b) (i) What is the value of h in cm Hg?
Berapakah nilai h dalam cm Hg?

……..**.....**

[1 mark]
[*1 markah*]

(ii) Based on the answer in 2(b)(i), determine the value of h in unit Pa.
Berdasarkan jawapan dalam 2b (i), *tentukan nilai h dalam unit Pa*.

[2 marks]
[*2 markah*]

(c) What will happens to the length of h when the instrument is brought on a high mountain?
Apakah yang akan berlaku kepada panjang turus h apabila instrumen dibawa ke atas gunung yang tinggi?

……...

[1 mark]
[1 *markah*]

3. Diagram 3 shows the decay curve for a radioactive substance Y.
The activity of a radioactive substance Y was measured by a Geiger-Muller tube connected to a rate meter. The half-life of substance Y can be determined from the decay curve.
Rajah 3 menunjukkan lengkung pereputan bagi bahan radioaktif Y.
Aktiviti bahan radioaktif Y diukur oleh tiub Geiger-Muller yang disambung kepada meter kadar. Separuh hayat bahan radioaktif Y boleh ditentukan dari lengkung pereputan itu.

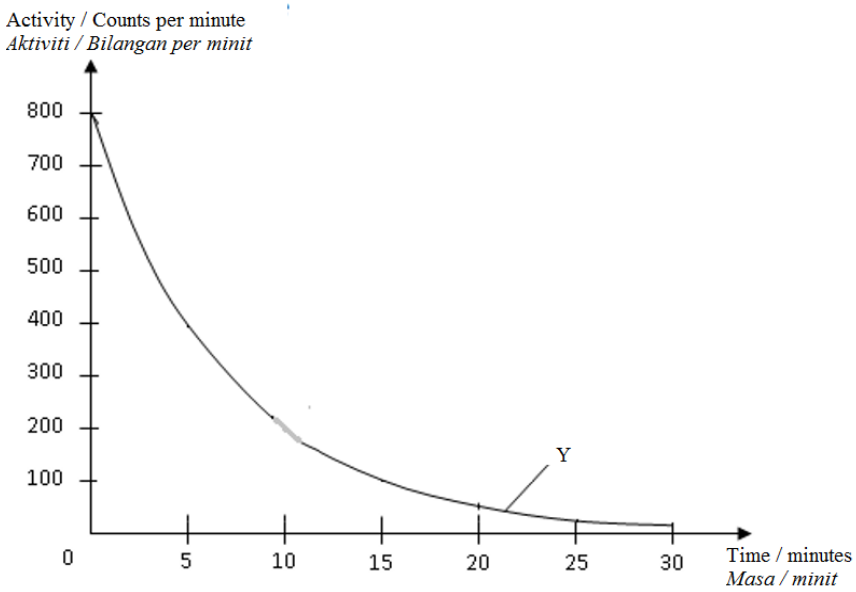


Diagram 3
Rajah 3

(a) What is the meaning of half- life?
Apakah maksud separuh hayat?

.....

[1 mark]
[*1 markah*]

(b) Based on the decay curve in Diagram 3,
Berdasarkan lengkungan pereputan dalam Rajah 3,

(i) Determine the half-life of radioactive substance Y.
Show on the graph how you determine the half life.
Tentukan separuh hayat bagi bahan radioaktif Y.
Tunjukkan pada graf bagaimana anda menentukan separuh hayat.

.....

[*2 marks*]
[2 markah]

(ii) What percentage remains undecayed after 15 minutes?
Berapa peratuskah yang belum mereput selepas 15 *minit?*

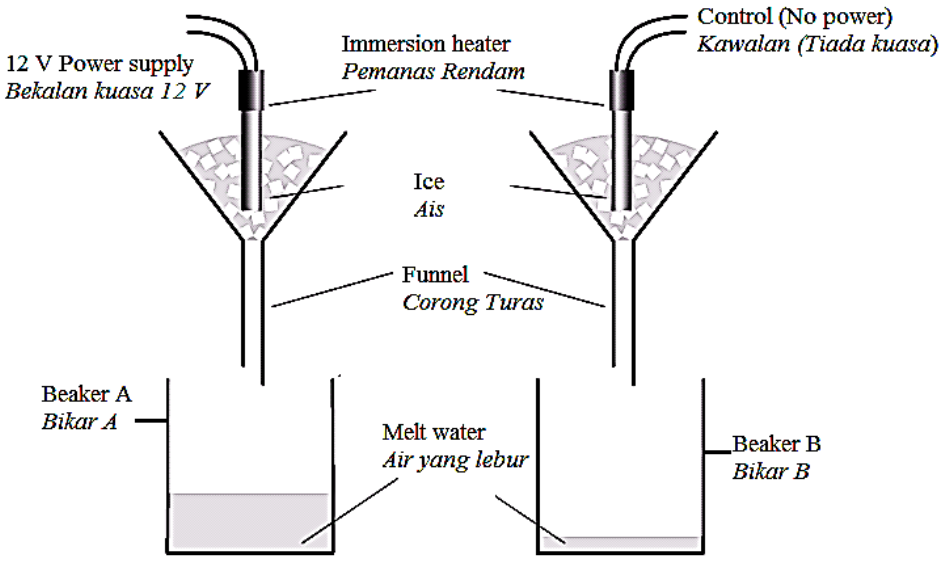
[2 marks]
[*2 markah*]

(c) Give a reason why the readings of the rate meter did not drop to zero after radioactive substance Y was removed.
Beri satu sebab mengapa bacaan meter kadar itu tidak kembali ke sifar selepas bahan radioaktif Y *dialihkan.*

.....

[1 mark]
[*1 markah*]

4. Diagram 4.1 and Diagram 4.2 shows a set-up of apparatus to determine the specific latent heat of fusion of ice.
Rajah 4.1 dan Rajah 4.2 menunjukkan susunan radas untuk menentukan haba pendam tentu pelakuran bagi ais.



EXPERIMENTAL SET-UP
RADAS EKSPERIMEN

Diagram 4.1
Rajah 4.1

CONTROL SET-UP
RADAS KAWALAN

Diagram 4.2
Rajah 4.2

When the power supply is switched on, water will dripped out of the filter funnels. As soon as the dripping is at a constant rate, beaker A and beaker B are placed underneath the filter funnels and stopwatch is started simultaneously.

Apabila bekalan kuasa dihidupkan, air akan menitis dari corong turas. Sebaik sahaja titisan pada kadar seragam, bikar A dan bikar B diletakkan di bawah corong turas dan jam randik dimulakan serentak.

(a) What is the meaning of specific latent heat of fusion?
Apakah yang dimaksudkan dengan haba pendam tentu pelakuran?

……

[1 mark]
[*1 markah*]

(b) What is the purpose of having a control set-up?
Apakah tujuan menggunakan radas kawalan?

……

[1 mark]
[*1 markah*]

(b) After 5 minutes, the mass of water collected in beaker A and B are measured.
Selepas 5 minit, jisim air yang dikumpulkan dalam bikar A dan B itu disukat.

Table 4 shows the data collected from the experiment.
Jadual 4 menunjukkan data yang diperolehi daripada eksperimen tersebut.

Mass of water collected in beaker A, / g *Jisim air yang dikumpulkan dalam bikar A, / g*	112
Mass of water collected in beaker B, / g *Jisim air yang dikumpulkan dalam bikar B, / g*	12
Amount of heat supplied, Q / kJ *Jumlah haba dibekalkan, Q / kJ*	50

Table 4.1
Jadual 4.1

(c) What is the mass of ice melted by the energy supplied by the power supply?
Berapakah jisim ais yang dileburkan oleh tenaga yang dibekalkan oleh bekalan kuasa?

……

[1 mark]
[*1 markah*]

(c) Calculate the specific latent heat of fusion of the ice.
Hitung haba pendam tentu pelakuran bagi ais.

[2 marks]
[2 *markah*]

(d) Give a reason why the value in 4(c) is higher than the actual value.
Berikan satu sebab mengapa nilai dalam 4 (c) lebih tinggi daripada nilai sebenar.

…….....

[1 mark]
[1 *markah*]

(f) Suggest one way to get a more accurate value.
Cadangkan satu kaedah untuk mendapat nilai yang lebih jitu.

…….....

[1 mark]
[1 *markah*]

5. Refraction occurs when light travels through mediums of different optical densities. Table 5 shows the information of crown glass and diamond.
Pembiasan berlaku apabila cahaya merambat dalam medium yang berbeza ketumpatan optikal.
Jadual 5 menunjukkan maklumat bagi kaca 'crown' dan berlian.

		
Medium	Crown Glass *Kaca 'crown'*	Diamond *Berlian*
Speed of light / m s^{-1} *Kelajuan cahaya*	1.97×10^8	1.24×10^8
Refractive index *Indeks biasan*	1.52	2.42

Table 5
Jadual 5

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

.....

[1 mark]
[1 *markah*]

(b) Based on Table 5,
Berdasarkan Jadual 5,

(i) Compare the speed of light in crown glass and diamond
Bandingkan kelajuan cahaya dalam kaca 'crown' dan berlian

.....

[1 mark]
[1 *markah*]

(ii) Compare the refractive index of crown glass and diamond
Bandingkan indeks biasan kaca 'crown' dan berlian

.....

[1 mark]
[1 *markah*]

(iii) Relate the speed of light to the refractive index
Hubungkaitkan laju cahaya dengan indeks biasan

.....

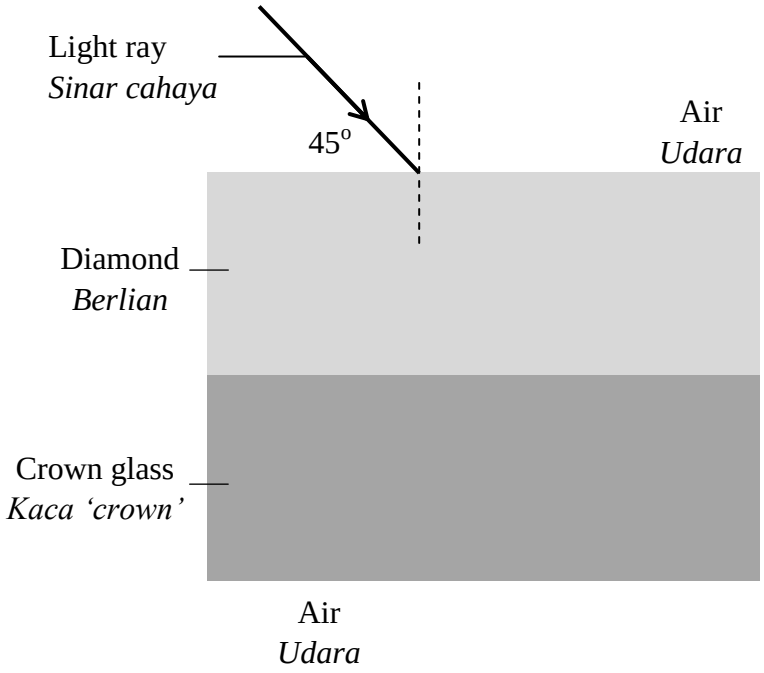
[1 mark]
[1 *markah*]

(c) Using your knowledge in optical density and your answers in 5(b), state the relationship between the refractive index and the optical density of the medium.
Menggunakan pengetahuan anda dalam ketumpatan optik dan jawapan anda dalam 5(b), nyatakan hubungan antara indeks biasan dan ketumpatan optikal medium.

.....

[1 mark]
[1 *markah*]

(d) Diagram 5.1 shows an incomplete ray diagram.
Rajah 5.1 menunjukkan satu rajah sinar yang tidak lengkap.



Complete the ray diagram when the light rays travel in ***both mediums until it leaves the crown glass.***
Lengkapkan rajah sinar itu apabila sinar cahaya tersebut merambat melalui ***kedua-dua medium sehingga ia keluar daripada kaca 'crown'.***

[3 marks]
[*3 markah*]

6. Diagram 6.1 shows the wave's patterns produced by the vibration of two spherical dippers which is connected to an electric motor.
Rajah 6.1 menunjukkan corak-corak gelombang yang dihasilkan oleh getaran dua penggetar sfera yang disambungkan pada motor elektrik.

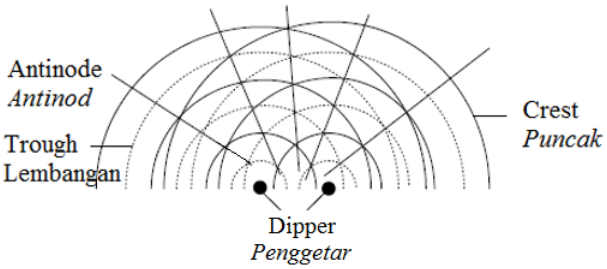


Diagram 6.1
Rajah 6.1

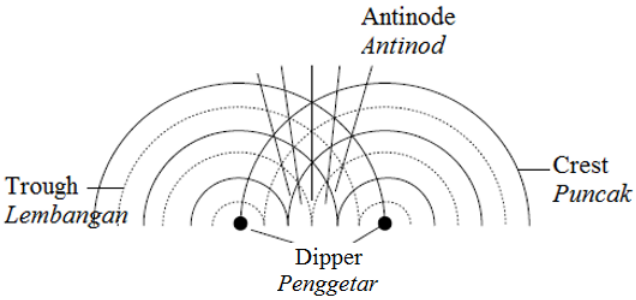


Diagram 6.2
Rajah 6.2

(a) What is the wave phenomena shown in Diagram 6.1 and Diagram 6.2?
Apakah fenomena gelombang yang ditunjukkan dalam Rajah 6.1 dan Rajah 6.2?

……

[1 mark]
[*1 markah*]

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

(i) Compare the distance between the two dippers.
Bandingkan jarak antara dua penggetar.

…….....

[1 mark]
[*1 markah*]

(ii) Compare the distance between two consecutives antinodal lines.
Bandingkan jarak antara dua garis antinod yang berturutan.

…….....

[1 mark]
[*1 markah*]

(c) Relate the distance between the dippers with the distance between two consecutives antinodal lines.
Hubungkaitkan jarak antara penggetar dengan jarak antara dua garis antinod yang berturutan.

……

[1 mark]
[*1 markah*]

(d) (i) An object is placed at one of the antinode.
What happens to the object?
Suatu objek diletakkan pada satu antinod.
Apakah yang berlaku kepada objek itu?

.....

[1 mark]
[*1 markah*]

(ii) Explain your answer in 6(d)(i).
Terangkan jawapan anda dalam 6(d)(i).

.....

.....

[2 marks]
[*2 markah*]

(e) What happens to the distance between two consecutives antinodal lines in Diagram 6.1 if the depth of water in the ripple tank is decreased?
Apakah yang berlaku kepada jarak antara dua garis antinod yang berturutan dalam Rajah 6.1 jika kedalaman air dalam tangki riak itu dikurangkan?

.....

[1 mark]
[*1 markah*]

7 Diagram 7.1 shows a man running a 100 m race with an acceleration of 1.12 m s^{-2} . He reached a final velocity of 11.82 m s^{-1} at the finishing line.
Rajah 7.1 menunjukkan seorang lelaki berlari dalam larian 100m dengan pecutan 1.12 m s^{-2}. Dia mencapai halaju akhir 11.82 m s^{-1} pada garis penamat.

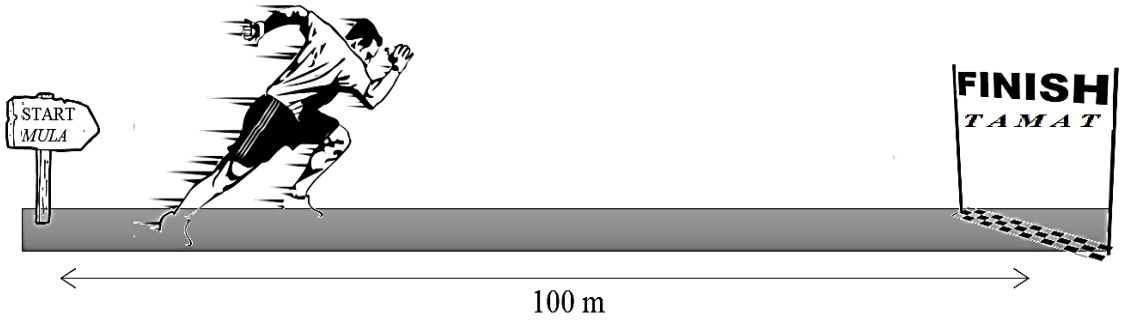


Diagram 7.1
Rajah 7.1

(a) What is the meaning of acceleration?
Apakah yang dimaksudkan dengan pecutan?

……..

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

(b) Calculate the time taken by the man to reach the finishing line.
Hitung masa yang diambil oleh lelaki tersebut untuk tiba ke garis penamat .

[2 marks]
[2 *markah*]

(c) The man should wear a proper attire and shoes, and use additional equipment to make him run faster and achieve maximum acceleration.
Suggest modifications that can be made by the man through these aspects:
Lelaki tersebut perlu memakai pakaian dan kasut yang sesuai, dan menggunakan peralatan tambahan bagi membolehkannya lari dengan lebih pantas dan mencapai pecutan maksimum.
Cadangkan pengubahsuaian yang boleh dibuat oleh lelaki itu melalui aspek-aspek berikut:

(i) Type of attire
Jenis pakaian

……..…….
Reason
Sebab

……...
[2 marks]
[2 *markah*]

(ii) Type of shoes
Jenis kasut

……..…….
Reason
Sebab

……..
[2 marks]
[2 *markah*]

(iii) Additional equipment
Peralatan tambahan

……..……..
Reason
Sebab

...……...
[2 marks]
[2 *markah*]

(d) An athlete for 100 m sprint event moved with a constant acceleration in the first 5 s and continue with contant velocity for another 6 s.
Sketch a velocity-time graph in Diagram 7.2 to describe the movement of the athlete.
Seorang atlet bagi acara larian pecut 100 m bergerak dengan pecutan seragam pada 5 s yang pertama dan meneruskan dengan halaju seragam untuk 6 s berikutnya.
Lakarkan graf halaju-masa pada Rajah 7.2 bagi menerangkan pergerakkan atlet tersebut.

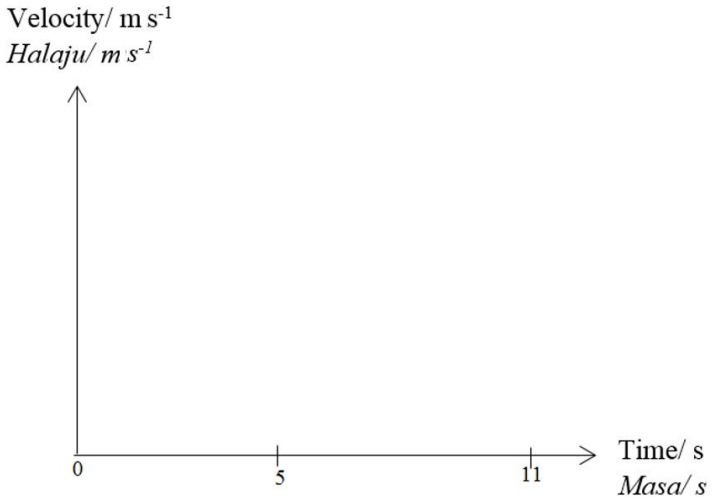


Diagram 7.2
Rajah 7.2

[1 mark]
[1 *markah*]

8. Diagram 8 shows the top view of electric fields apparatus consists of two electrodes mounted in a petri dish filled with oil.
Rajah 8 menunjukkan pandangan atas bagi radas medan elektrik mengandungi dua elektrod dipasang dalam piring petri berisi dengan minyak.

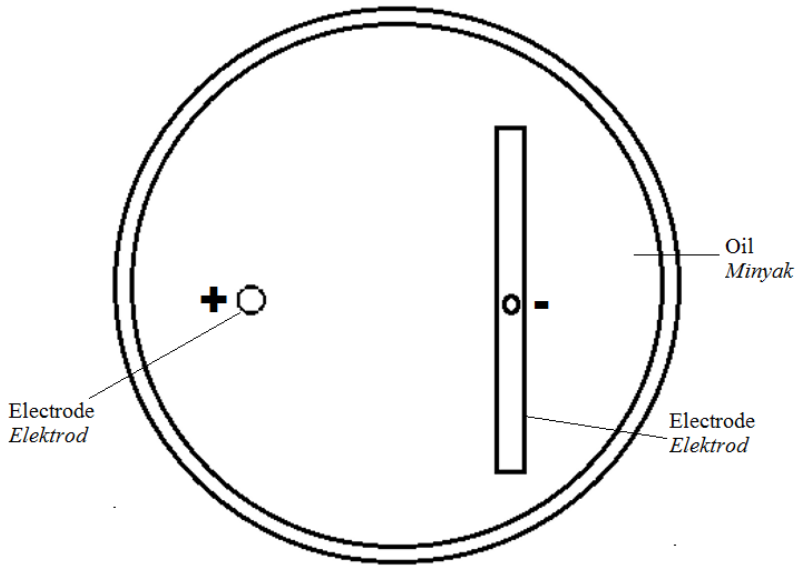


Diagram 8.1
Rajah 8.1

(a) (i) What is meant by electric field?
Apakah yang dimaksudkan dengan medan elektrik?

.....

[1 mark]
[*1 markah*]

(ii) Give a reason why oil is used.
Beri satu sebab mengapa minyak digunakan.

.....

[1 mark]
[*1 markah*]

(iii) On Diagram 8.1, draw the electric field pattern produced when the EHT power supply is switched on.
Pada Rajah 8.1, lukis corak medan elektrik yang dihasilkan apabila bekalan kuasa VLT dihidupkan.

[1 mark]
[*1 markah*]

(b) Diagram 8.2 (a) and Diagram 8.2 (b) show two circuits connected with bulbs P and Q.
Rajah 8.2 (a) dan Rajah 8.2 (b) menunjukkan dua litar disambungkan dengan mentol-mentol P dan Q.

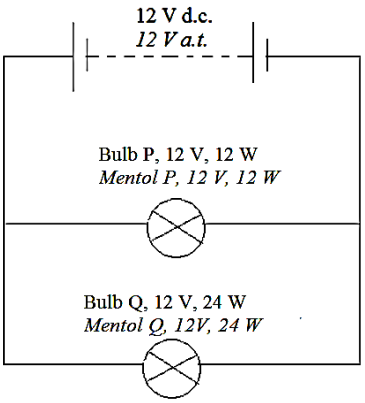


Diagram 8.2 (a)
Rajah 8.2 (a)

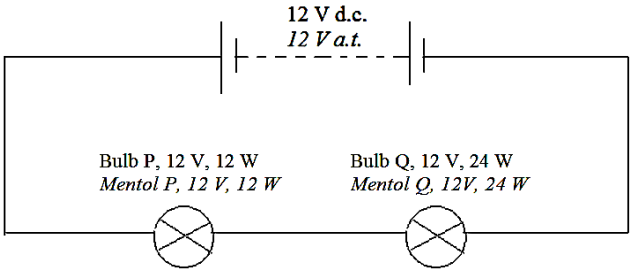


Diagram 8.2 (b)
Rajah 8.2 (b)

In Diagram 8.2 (a), bulb Q is brighter than bulb P, but in Diagram 8.2 (b), bulb P is brighter than bulb Q.
Explain why.
Dalam Rajah 8.2 (a), mentol Q adalah lebih terang daripada mentol P, tetapi dalam Rajah 8.2 (b), mentol P adalah lebih terang daripada mentol Q.
Terangkan mengapa.

……..

……..

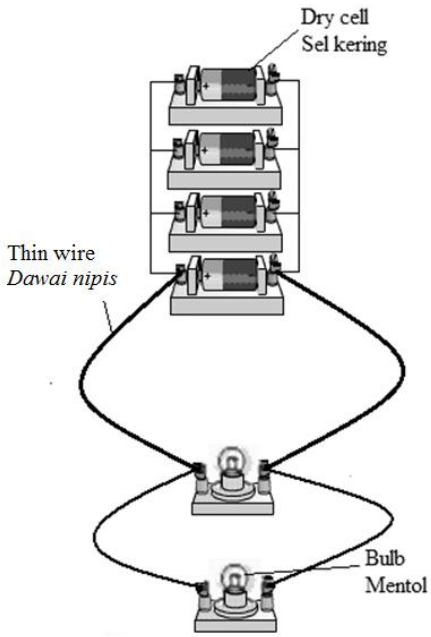
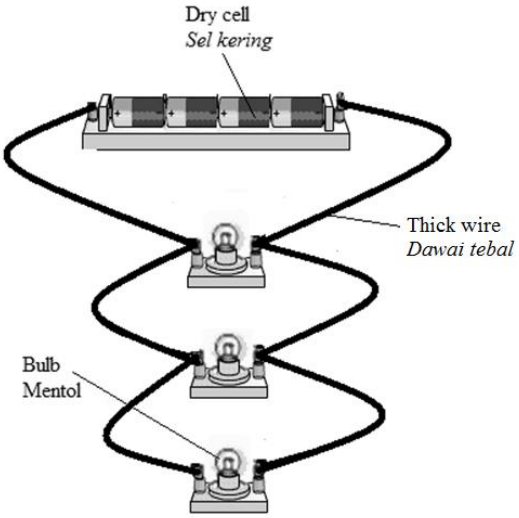
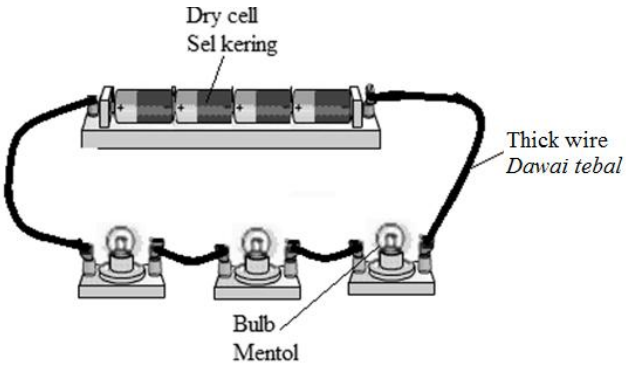
[2 *marks*]
[*2 markah*]

(c) Diagram 8.3 shows a 'brooder' (baby chicks house) which is used to keep the chicks warm during the first week of their life.
Rajah 8.3 menunjukkan sebuah 'brooder' (reban anak ayam) yang digunakan untuk memastikan anak ayam panas dalam masa seminggu pertama kehidupan mereka.

Diagram 8.3
Rajah 8.3

Table 8 shows four types of circuit, V, W, X and Y to be used in the 'brooder'.
Jadual 8 menunjukkan empat jenis litar, V, W, X dan Y yang akan digunakan dalam 'brooder' itu.

All bulbs are identical. The specification of each bulb is 6 V, 12 W. Assume each battery does not have internal resistance.
Semua mentol adalah serupa. Spesifikasi bagi setiap mentol adalah 6 V, 12 W. Anggap setiap bateri tidak mempunyai rintangan dalam.

Circuit V *Litar V*	
Circuit W *Litar W*	
Circuit X *Litar X*	

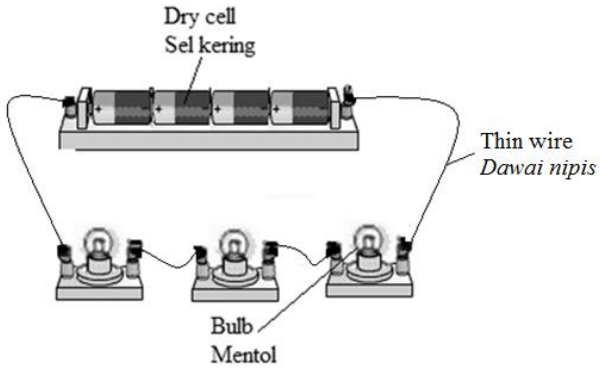
Circuit Y *Litar Y*	

Table 8
Jadual 8

Based on Table 8, state the suitable characteristics of an electric circuit to be used in the 'brooder' to enable enough heat to be supplied to the chicks continously. Give reason for the suitability of the characteristics.
Berdasarkan Jadual 8, nyatakan ciri-ciri yang sesuai bagi satu litar elektrik untuk digunakan di dalam 'brooder' itu bagi membolehkan haba yang mencukupi dibekalkan kepada anak ayam itu secara berterusan. Beri sebab bagi kesesuaian ciri-ciri itu.

(i) Arrangement of dry cell
Susunan sel kering

……

Reason
Sebab

.....

[2 marks]
[*2 markah*]

(ii) Thickness of the wire
Ketebalan Dawai

.....

Reason
Sebab

.....

[2 marks]
[*2 markah*]

(iii) Arrangement of bulbs
Susunan mentol

.....

Reason
Sebab

.....

[2 marks]
[2 *markah*]

(d) Based on answers in 8 (c), determine the most suitable circuit that can be used in the 'brooder'.
Berdasarkan jawapan anda dalam 8 (c), tentukan litar yang paling sesuai yang boleh digunakan dalam 'brooder' itu.

……..

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

Section B
Bahagian B
[20 marks]
[*20 markah*]
Answer any **one** question from this section.
*Jawab mana-mana **satu** soalan daripada bahagian ini.*

9 Diagram 9.1(a) show a metal cylinder hung on a spring balance in air. The reading of the spring balance in Diagram 9.1(a) is the actual weight of the metal cylinder.
Rajah 9.1(a) menunjukkan sebuah selinder logam digantung pada neraca spring di udara.

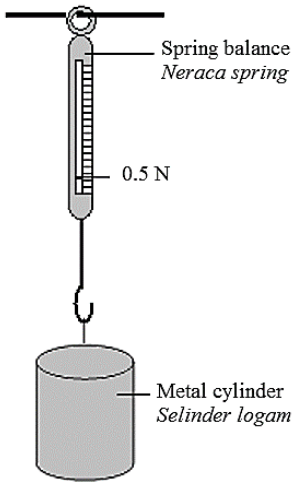


Diagram 9.1 (a)
Rajah 9.1 (a)

Diagram 9.1(b) and Diagram 9.1(c) show the metal cylinder immersed in cooking oil and water. The reading of the spring balance in Diagram 9.1(b) and 9.1(c) are known as the apparent weight.
Bacaan neraca spring pada Rajah 9.1(a) adalah berat sebenar bagi selinder logam itu.
Rajah 9.1(b) dan Rajah 9.1(c) menunjukkan selinder logam itu direndam dalam minyak masak dan air masing-masing. Bacaan neraca spring pada Rajah 9.1(b) dan 9.1(c) dikenali sebagai berat ketara.

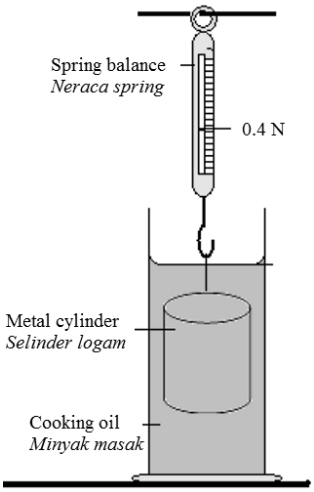


Diagram 9.1(b)
Rajah 9.1(b)

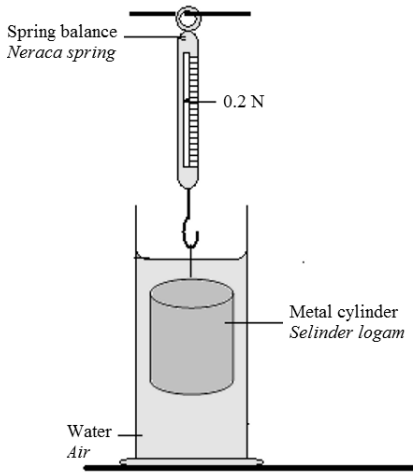


Diagram 9.1(c)
Rajah 9.1(c)

(a) State an equation involving apparent weight, actual weight and buoyant force?
Nyatakan satu persamaan yang melibatkan berat ketara, berat sebenar dan daya apungan?

[1 mark]
[1 *markah*]

(b) (i) Using Diagram 9.1(b) and Diagram 9.1(c), compare the apparent weight, the density of the cooking oil and water, and the buoyant force in cooking oil and water.
Menggunakan Rajah 9.1(b) dan Rajah 9.1(c), bandingkan berat ketara, ketumpatan minyak masak dengan air dan daya apungan dalam minyak masak dan air.

[3 marks]
[3 *markah*]

(ii) State the relationship between the buoyant force with:
Nyatakan hubungan antara daya apungan dengan:

- The density of liquid.
  Ketumpatan cecair.

- The apparent weight.
  Berat ketara.

[2 marks]
[*2 markah*]

(c) Diagram 9.2 shows rod A and rod B of different densities are immersed in water.
Rajah 9.2 menunjukkan rod A dan rod B yang mempunyai ketumpatan yang berbeza direndam di dalam air.

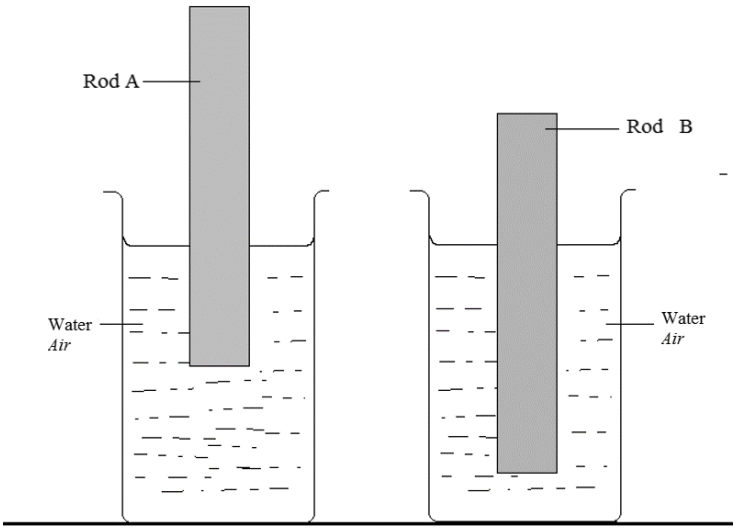


Diagram 9.2
Rajah 9.2

Explain why both rods float in water and rod B floats lower than rod A.
Jelaskan mengapa kedua-dua rod terapung di dalam air dan rod B terapung lebih dalam berbanding rod A.

[4 marks]
[4 markah]

(d) The Ministry of Defence is organizing a competition among the Engineering students to build a submarine.
As a team leader, you are required to give some suggestions to design the submarine.
Kementerian Pertahanan akan menganjurkan pertandingan di kalangan pelajar-pelajar bidang Kejuruteraan untuk membina kapal selam.
Sebagai ketua pasukan, anda dikehendaki untuk memberi cadangan untuk merekabentuk kapal selam tersebut.

Using the appropriate physics concepts, suggest and explain suitable characteristics of the material and design of a submarine that is safe, fast and can travel deep underwater.
Menggunakan konsep-konsep fizik yang sesuai, cadang dan terangkan ciri-ciri bagi bahan dan rekabentuk sebuah kapal selam yang selamat, laju dan boleh menyelam lebih dalam.

[10 marks]
[*10 markah*]

10. Diagram 10.1 and Diagram 10.2 show two circuits with battery P and battery Q which are used to determine the electromotive force, E and the internal resistance, r of each battery.
Table 10.1 and Table 10.2 show the readings of the voltmeter and ammeter when the switch in each circuit is off and on.
Rajah 10.1 *dan Rajah 10.2 menunjukkan dua litar dengan bateri P dan bateri Q yang digunakan untuk menentukan daya gerak elektrik, E dan rintangan dalam, r bagi setiap bateri.*
Jadual 10.1 dan Jadual 10.2 menunjukkan bacaan voltmeter dan ammeter apabila suis bagi setiap litar terbuka dan tertutup.

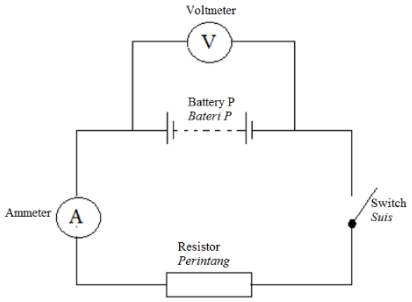


Diagram 10.1
Rajah 10.1

	Circuits with battery P *Litar bateri P*	
	Switch off *Suis terbuka*	**Switch on** *Suis tertutup*
Voltmeter reading *Bacaan voltmeter*	**15.0 V**	**12.0 V**
Ammeter reading *Bacaan ammeter*	**0.0 A**	**2 A**

Table 10.1
Jadual 10.1

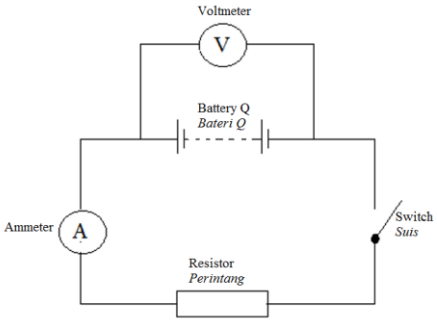


Diagram 10.2
Rajah 10.2

	Circuits with battery Q *Litar bateri Q*	
	Switch off *Suis terbuka*	**Switch on** *Suis tertutup*
Voltmeter reading *Bacaan voltmeter*	**15.0 V**	**10.0 V**
Ammeter reading *Bacaan ammeter*	**0.0 A**	**1.5 A**

Table 10.2
Jadual 10.2

(a) (i) What is meant by electromotive force?
Apakah yang dimaksudkan dengan daya gerak elektrik? [1 mark]
[1 markah]

(ii) Based on Table 10.1 and Table 10.2, compare the electromotive force, and the reading of voltmeter and ammeter when the switch is on.
State the relationship between the voltage loss with the ammeter's reading and internal resistance.
Berdasarkan Jadual 10.1 *dan* Jadual 10.2, *bandingkan daya gerak elektrik dan bacaan voltmeter dan ammeter apabila suis dihidupkan. Nyatakan hubungan antara kehilangan voltan dengan bacaan ammeter dan rintangan dalam.* [5 marks]/ [*5 markah*]

(b) Batteries with internal resistance connected in series and in parallel as shown in Diagram 10.3 will affect the brightness of the bulbs. Explain why.
Bateri yang mempunyai rintangan dalam disambung secara bersiri dan selari seperti yang ditunjukkan pada Rajah 10.3 akan mempengaruhi kecerahan mentol. Huraikan mengapa.

[4 marks]
[4 *markah*]

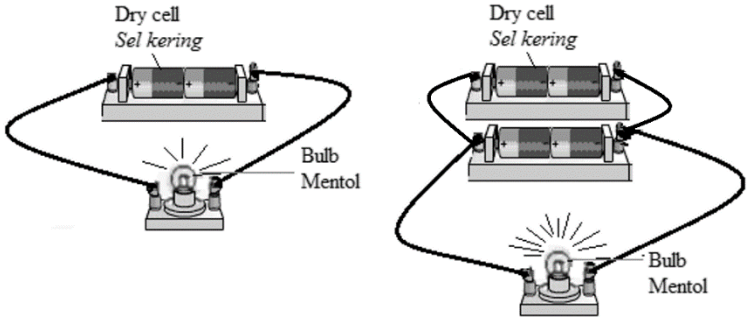


Diagram 10.3
Rajah 10.3

(c) Diagram 10.4 shows a stove coil that contains heating filament.Suzana uses the stove to cook.
Rajah 10.4 *menunjukkan sebuah dapur gegelung yang mengandumgi filamen pemanas. Suzana menggunakan dapur itu untuk memasak.*

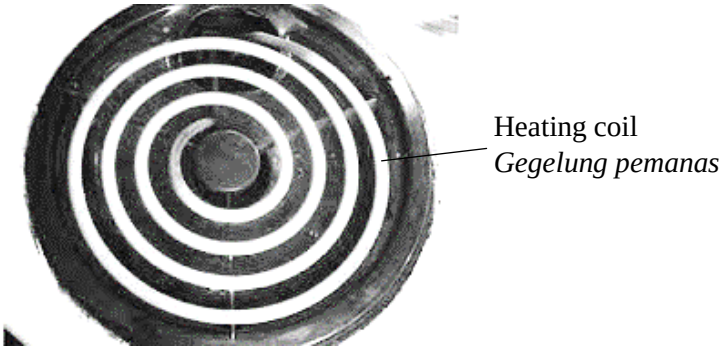


Diagram 10.4
Rajah 10.4

By using the concepts in physics, suggest and explain suitable modifications to the heating filament to increase its efficiency.
Dengan menggunakan konsep-konsep fizik, cadang dan jelaskan pengubasuaian yang sesuai bagi filamen pemanas itu untuk meningkatkan kecekapannya.

[10 marks]
[*10 markah*]

11. Diagram 11.1 shows a prism periscope in a submarine.
Rajah 11.1 menunjukkan sebuah periskop prisma pada sebuah kapal selam.

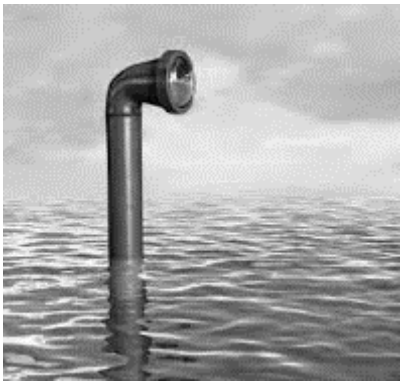


Diagram 11.1
Rajah 11.1

(a) What is the light phenomena occurs in prism periscope?
Apakah fenomena cahaya yang berlaku dalam periskop prisma?

[1 mark]
[*1 markah*]

(b) (i) Copy Diagram 11.2 and draw the ray path to show the formation of image by a prism periscope.
Salin Rajah 11.2 dan lukiskan lintasan sinar untuk menunjukkan pembentukkan imej bagi satu periskop prisma.

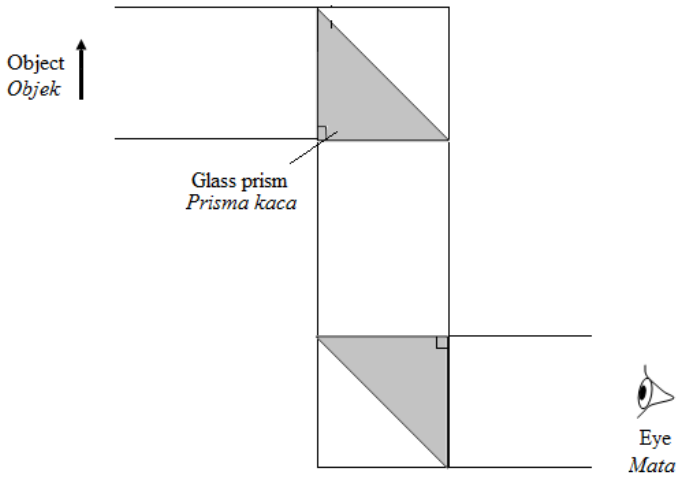


Diagram 11.2
Rajah 11.2

[2 marks]
[2 *markah*]

(ii) State the characteristics of the image formed.
Nyatakan ciri-ciri imej yang terhasil. [2 marks]
[2 *markah*]

(c) Diagram 11.3 shows an incomplete light ray path entering a glass prism.
The refractive index of the glass prism is 1.5.
Rajah 11.3 menunjukkan lintasan sinar cahaya yang tidak lengkap memasuki satu prisma kaca .
Indeks biasan prisma kaca itu ialah 1.5.

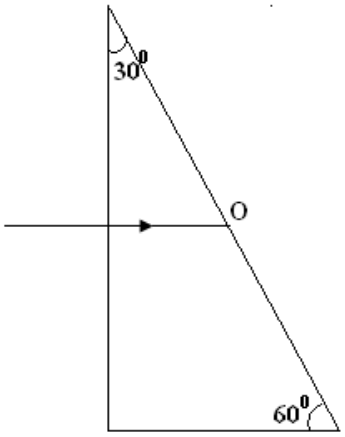


Diagram 11.3
Rajah 11.3

(i) Calculate the critical angle of the glass prism.
Hitungkan sudut genting bagi prisma kaca. [1 mark]
[*1 markah*]

(ii) Copy Diagram 11.3 and complete the ray path and state the incident angle.
Salin Rajah 11.3 dan lengkapkan lintasan sinar dan nyatakan sudut tuju.
[2 marks]
[*2 markah*]

(iii) Calculate the refracted angle after the light pass through point O.
Hitungkan sudut biasan selepas cahaya melalui titik O.
[2 marks]
[2 *markah*]

(d) Diagram 11.4 shows Farah is using an astronomical telescope to see a distant object.
Rajah 11.4 menunjukkan Farah sedang menggunakan sebuah teleskop astronomi untuk melihat suatu objek jauh.

Diagram 11.4
Rajah 11.4

Table 11 shows the specifications of four simple astronomical telescopes, J, K, L and M. You are required to determine the most suitable telescope to see clearer distant object.
Study the specifications of all the four telescopes in Table 11 below:
Jadual 11 menunjukkan ciri-ciri bagi empat teleskop astronomi ringkas, J, K, L dan M. Anda dikehendaki menentukan teleskop yang paling sesuai untuk melihat objek jauh dengan lebih jelas.
Kaji spesifikasi keempat-empat teleskop itu dalam Jadual 11 dibawah:

Telescope ***Teleskop***	**Type of lenses** ***Jenis kanta***	**Focal length of objective lens,f_o / Focal length of eyepiece lens,f_e** ***Jarak fokus kanta objek f_o/ Jarak fokus kanta mata f_e***	**Distance between two lenses, L (cm)** ***Jarak antara dua kanta, L (cm)***	**Power of eyepiece** ***Kuasa kanta mata***
J	Concave *Cekung*	80 cm / 2 cm	$L > f_o + f_e$	high *tinggi*
K	Concave *Cekung*	6 cm / 2 cm	$L = f_o + f_e$	low *rendah*
L	Convex *Cembung*	80 cm / 2 cm	$L = f_o + f_e$	high *tinggi*
M	Convex *Cembung*	6 cm / 2 cm	$L > f_o + f_e$	low *rendah*

Table 11
Jadual 11

Explain the suitability of each characteristic and then determine the most suitable telescope used to see distant object clearly.

Give reason for your choice.
Terangkan kesesuaian setiap ciri dan seterusnya tentukan teleskop yang paling sesuai digunakan untuk melihat objek jauh dengan jelas.
Beri sebab bagi jawapan anda.

[10 marks]
[*10 markah*]

12. Diagram 12.1 shows a wave is formed on the screen of a cathode ray oscillospe (CRO). The time base of the CRO is set at 1 ms cm^{-1}.
Rajah 12.1 *menunjukkan satu gelombang pada skrin sebuah osiloskop sinar katod (OSK). Dasar masa OSK ditetapkan pada* 1 ms cm^{-1}.

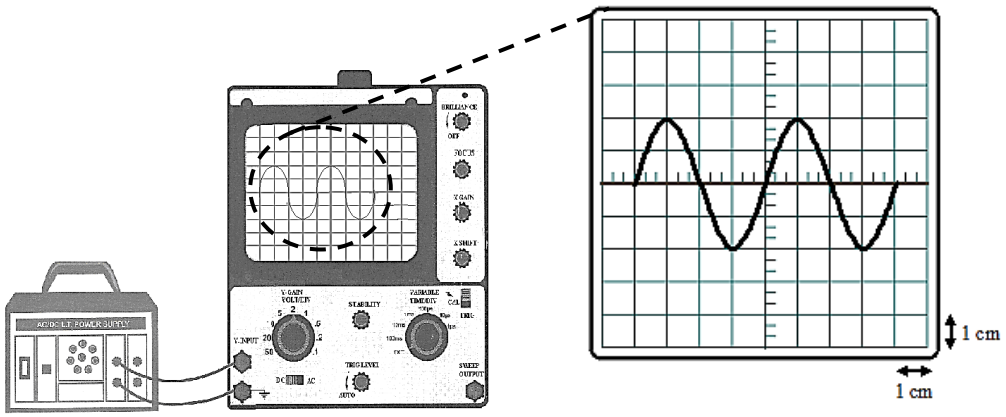


Diagram 12.1
Rajah 12.1

(a) What is the meaning of cathode ray? [1 mark]
Apakah yang dimaksudkan dengan sinar katod? [1 *markah]*

(b) Explain how the CRO can be used to determine a short time interval.
[4 marks]
Terangkan bagaimana OSK tersebut dapat digunakan untuk menentukan sela masa yang singkat. [4 *markah*]

(c) Based on the wave on CRO in Diagram 12.1,
Berdasarkan gelombang pada skrin osiloskop dalam Rajah 12.1,
Calculate
Hitung

(i) the period of the wave
tempoh gelombang itu

(ii) the frequency of the wave
frekuensi gelombang itu

(iii) the wave length of the wave if the speed of sound wave is 330 m s^{-1}.
panjang gelombang bagi gelombang itu jika kelajuan gelombang bunyi adalah 330 *m* s^{-1}.

[5 marks]
[5 *markah*]

(d) Diagram 12.2 shows a row of street lamps. The lamps will be automatically switched on at night or when the surrounding is dark. The lamps will be automatically switched off at day time or the surrounding is bright.
Rajah 12.2 *menunjukkan sebaris lampu jalan. Lampu itu akan menyala secara automatik pada waktu malam atau apabila kawasan sekitar adalah gelap. Lampu itu akan padam secara automatik pada waktu siang atau kawasan sekitar adalah cerah.*

Diagram 12.2
Rajah 12.2

Diagram 12.3 shows four transistor circuits that will be used in the street lighting circuit. You are required to determine the most suitable circuit to switch on the street lamps automatically at night.
Rajah 12.3 menunjukkan empat litar bertransistor yang akan digunakan dalam litar lampu jalan. Anda dikehendaki untuk menentukan litar yang paling sesuai untuk menyalakan lampu jalan secara automatik pada waktu malam.

Study the specifications of the four circuits based on the following aspects:
Kaji spesifikasi keempat-empat litar berdasarkan aspek-aspek berikut:

(i) Number of resistors in series used
Bilangan perintang dalam siri yang digunakan

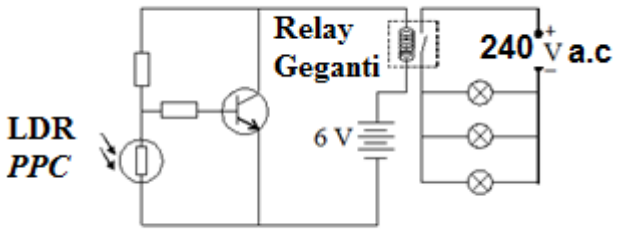
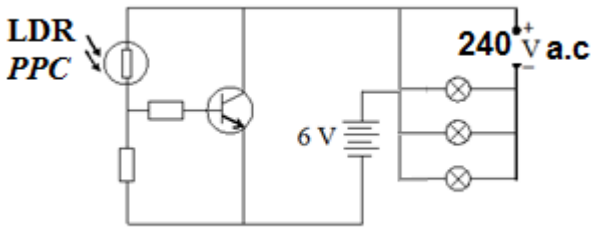
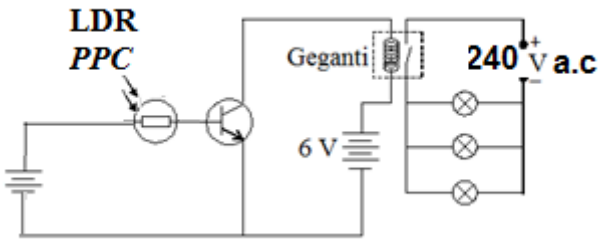
(ii) Position of light dependent resistor, LDR
Kedudukan perintang peka cahaya, PPC

(iii) type of transistor used
jenis transistor yang digunakan

(iv) additional component used to light the lamp connected to 240V a.c. supply.
komponen tambahan yang digunakan untuk menyalakan lampu jalan yang disambungkan kepada voltan 240V a.t.

Explain the suitability of each aspect and determine the most suitable circuit to be used.
Give reasons for your choice.
Terangkan kesesuaian setiap aspek dan seterusnya tentukan litar manakah yang paling sesuai.
Beri sebab untuk pilihan anda.

[10 marks]
[10 *markah*]

Circuit P *Litar* P	
Circuit Q *Litar* Q	
Circuit R *Litar* R	

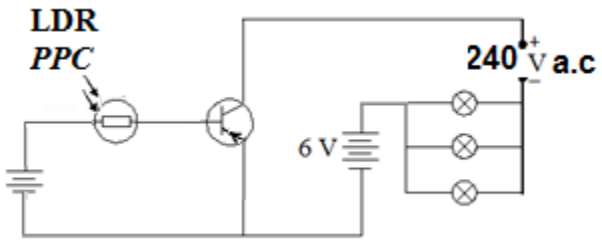
Circuit S *Litar* S	

Diagram 12.3
Rajah 12.3

[10 marks]
[*10 markah*]

END OF QUESTION.
SOALAN TAMAT.

Physics
Kertas 3
Ogos 2014
1 ½ Jam

KEMENTERIAN PENDIDIKAN MALAYSIA

BAHAGIAN PENGURUSAN SEKOLAH BERASRAMA PENUH DAN SEKOLAH KECEMERLANGAN

PENTAKSIRAN DIAGNOSTIK AKADEMIK SBP 2014
PERCUBAAN SIJIL PELAJARAN MALAYSIA

FIZIK

Kertas 3

1 Jam 30 Minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

Arahan:

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

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

Kertas soalan ini mengandungi 14 halaman bercetak.

Section A
Bahagian A
[28 marks/*28 markah*]
Answer all questions in this section
Jawab semua soalan dalam bahagian ini.

1 A student carries out an experiment to investigate the relationship between the increase of temperature, θ and the mass of water,m. The apparatus is set up as shown in Diagram 1.1
Seorang pelajar menjalankan eksperimen untuk mengkaji hubungan antara peningkatan suhu, θ dan jisim air, m. Susunan alat radas ditunjukkan dalam Rajah 1.1.

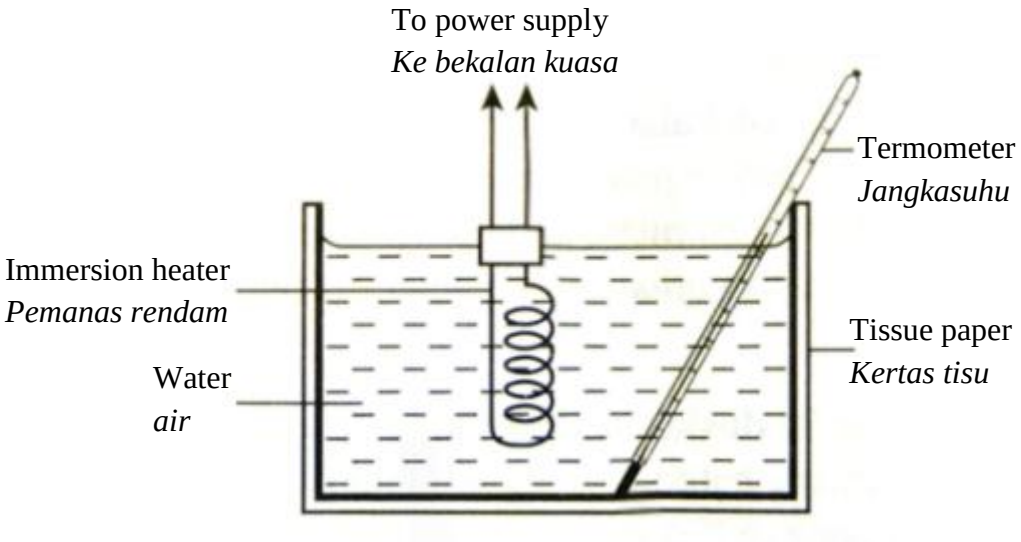
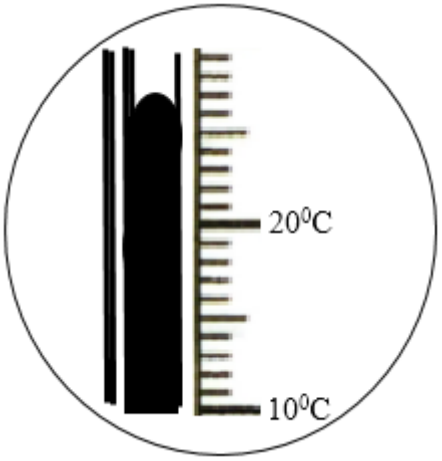


Diagram 1.1
Rajah 1.1

A heater is immersed in water and the switch is on. After 4 minutes, the maximum temperature, θ_1 is recorded.
Pemanas rendam dimasukkan di dalam air dan suis dihidupkan. Selepas 4 minit, suhu maksimum, θ_1 direkodkan.

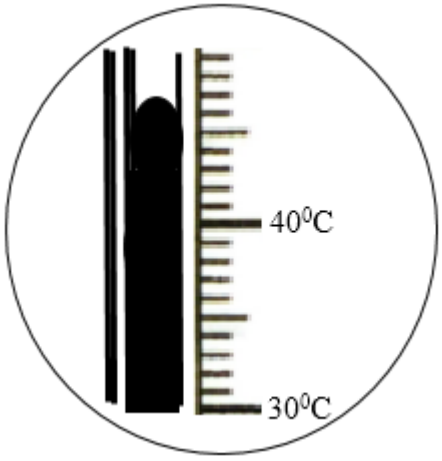
Diagram 1.2 shows the initial temperature, θ_0.
Rajah 1.2 menunjukkan suhu awal, θ_0.



θ_0 = ...^{0}C

Diagram 1.2
Rajah 1.2

Diagram 1.3 shows the maximum temperature, θ_1 for m = 0.1 kg.
Rajah 1.3 menunjukkan suhu maksimum, θ_1 untuk m = 0.1 kg.



m = 0.1 kg

$\frac{1}{m}$ = ……..kg^{-1}

θ_1 = ……..^{0}C

θ =……..^{0}C

Diagram 1.3
Rajah 1.3

The procedure is repeated with m = 0.2 kg, 0.3 kg, 0.4 kg and 0.5 kg. The corresponding reading termometer shows in Diagram 1.4, 1.5, 1.6 and 1.7.
Prosedur ini diulang dengan jisim, m = 0.2 kg, 0.3 kg, 0.4 kg dan 0.5 kg. Bacaan termometer yang sepadan ditunjukkan pada gambarajah 1.4, 1.5, 1.6 dan 1.7.

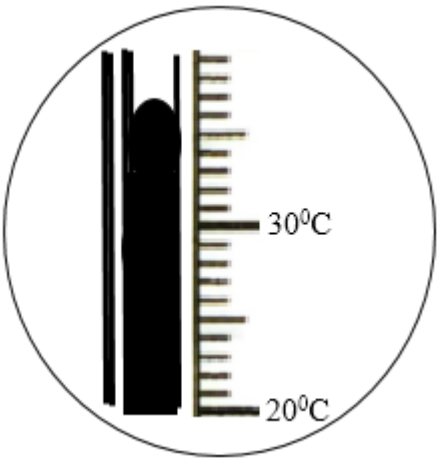


Diagram 1.4
Rajah 1.4

m = 0.2 kg

$\frac{1}{m}$ = ……..kg^{-1}

θ_1 = ……..^0C

θ =……..^0C

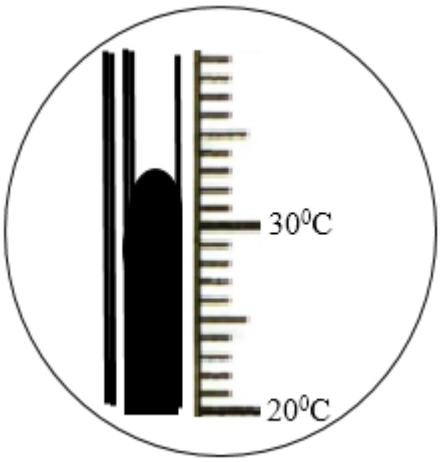


Diagram 1.5
Rajah 1.5

m = 0.3 kg

$\frac{1}{m}$ = ……..kg^{-1}

θ_1 = ……..^0C

θ =……..^0C

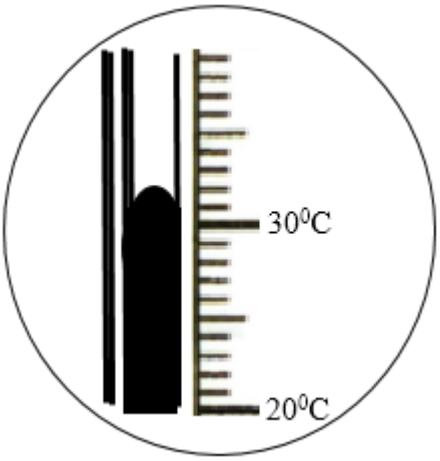


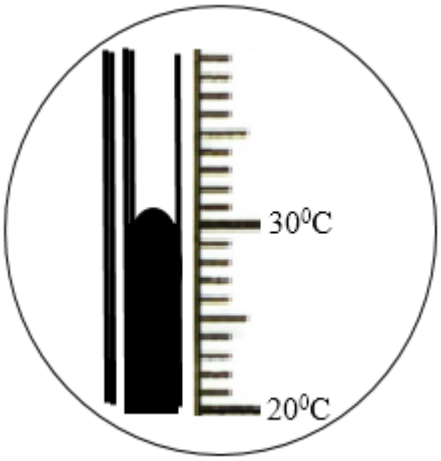
Diagram 1.6
Rajah 1.6

m = 0.4 kg

$\frac{1}{m}$ = ……..kg^{-1}

θ_1 = ……..^0C

θ =……..^0C



m = 0.5 kg

$\frac{1}{m}$ = ……..kg^{-1}

θ_1 = ……...^0C

θ =……...^0C

Diagram 1.7
Rajah 1.7

(a) For the experiment described on page 2, identify,
Bagi eksperimen yang diterangkan di halaman 2, kenal pasti ;

(i) The manipulated variable,
Pembolehubah yang dimanipulasikan,

.....

[*1 mark*]

(ii) The responding variable
Pembolehubah bergerak balas,

.....

[*1 mark*]

(iii) A fixed variable,
Pembolehubah yang dimalarkan,

.....

[*1 mark*]

(b) Based on Diagram 1.2, 1.3, 1.4, 1.5,1.6 and 1.7 on page 3, 4 and 5.
Berdasarkan Rajah 1.2, 1.3, 1.4. 1.5, 1.6 dan 1.7 dihalaman 3, 4 dan 5.

(i) Record the reading of θ_0.
Rekod bacaan θ_0.

[1 mark]

(ii) Calculate $\frac{1}{m}$ for each m.
Hitung $\frac{1}{m}$ *bagi setiap m.*

[1 mark]

(iii) Record the readings of θ_1.
Rekod bacaan θ_1.

[2 mark]

(iv) For each value of θ_1, in b(iii), calculate increase of temperature, θ using the formula below:
Untuk setiap nilai θ_1 *di b(iii), hitung peningkatan suhu,* θ *mengunakan rumus di bawah:*

$$\theta = \theta_1 - \theta_0$$

[1 mark]

(v) Tabulate your results for m, $\frac{1}{m}$, θ_1 and θ in the space below.
Jadualkan data anda bagi semua nilai m, $\frac{1}{m}$, θ_1 *and* θ *dalam ruang di bawah.*

[2 marks]

(c) On the graph paper on page 7, draw a graph of θ against $\frac{1}{m}$.
Pada kertas graf di halaman 7 , lukiskan graf θ *melawan* $\frac{1}{m}$.

[5 marks]

(d) Based on the graph on page 7, state the relationship between θ and m .
Berdasarkan graf anda di halaman 7, nyatakan hubungan antara θ *dan m.*

.....

[1 mark]

Graph of θ against $\frac{1}{m}$.

Graf θ melawan $\frac{1}{m}$.

2 A student carries out an experiment to investigate the relationship between the wavelength, λ and the distance of consecutive bright fringes, *x*. The result of the experiment is shown in Diagram 2.
Seorang pelajar menjalankan eksperimen untuk menyiasat hubungan antara jarak gelombang dengan jarak pinggir cerah berturutan, x. Keputusan eksperimen ditunjukkan dalam Rajah 2.

Graph x against λ
.Graf x lawan λ

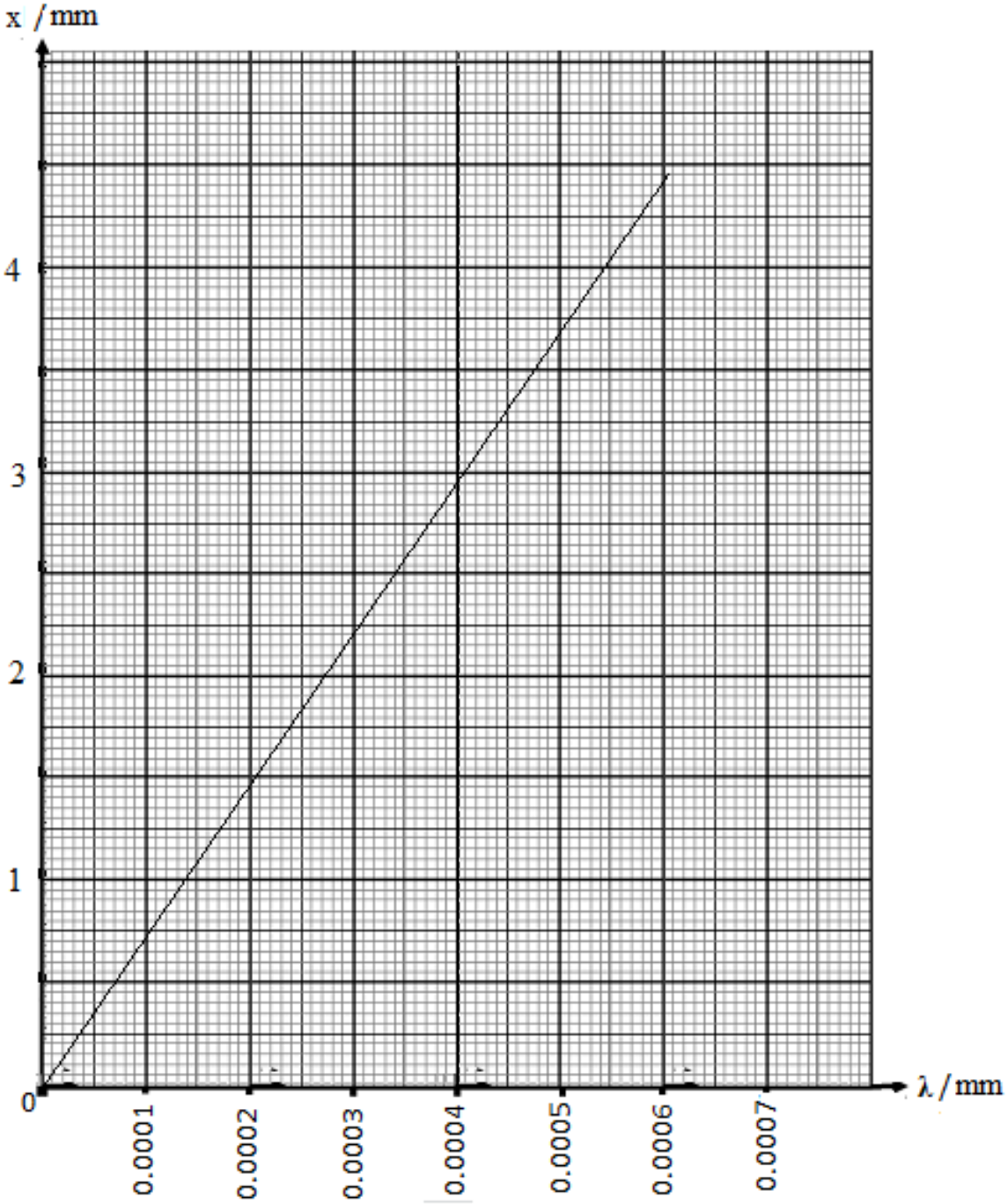


Diagram 2/*Rajah 2*

(a) Based on the graph in Diagram 2, determine the value of *x* when the red filter is used where the wavelength, λ is 0.000650 mm. Show on the graph how you determine the value of *x*.

Berdasarkan graf dalam Rajah 2, tentukan nilai x bila penuras merah digunakan dimana panjang gelombangnya, λ ialah 0.000650 mm. Tunjukkan di atas graf anda bagaimana anda menentukan nilai x.

.....

[3 marks]

(b) What happens to the value of *x*, when the wavelength, λ is increase ?

Apakah yang berlaku terhadap nilai x, jika panjang gelombang, λ bertambah?

.....

[1 mark]

(c) (i) Calculate the gradient, k and its unit.

Show on the graph how you determine the value of k.

Kirakan kecerunan, k dan unitnya.

Tunjukkan di atas graf bagaimana anda menentukan nilai k.

k =.....

[3 marks]

(ii) Distance between the slit (coherent sources) and the screen, D is 4m.
Jarak antara dwicelah dan skrin, D ialah 4 m.
Calculate the distance between two slits, a by using equation,
Kirakan jarak pemisah antara dua celah, a dengan menggunakan persamaan,

$$ka = D$$

[3 marks]

(iii) If the magnitude of D is decreased, what happens to the distance between two consecutive fringes, *x* ?
Jika magnitud D dikurangkan, apakah yang berlaku pada jarak pinggir cerah berturutan, x?

.....

[1 mark]

(d) State **one** precaution that can be taken to improve the accuracy of the reading in this experiment.
*Nyatakan **satu** langkah berjaga-jaga yang perlu diambil untuk memperbaiki keputusan eksperimen.*

.....

[1 mark]

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

Answer any one from this section
Jawab mana-mana satu soalan dari bahagian ini

The time suggested to answer this section is 30 minutes.
Masa yang dicadangkan untuk menjawab bahagian ini ialah 30 minit.

3. Diagram 3 shows a laser ray is directed to point A and hits fish P. When the laser is directed to point B, the ray hits fish Q.

Rajah 3 menunjukkan sinaran laser ditujukan ke titik A dan mengenai ikan P. Apabila sinaran laser ditujukan ke titik B, pancaran laser terkena pada ikan Q.

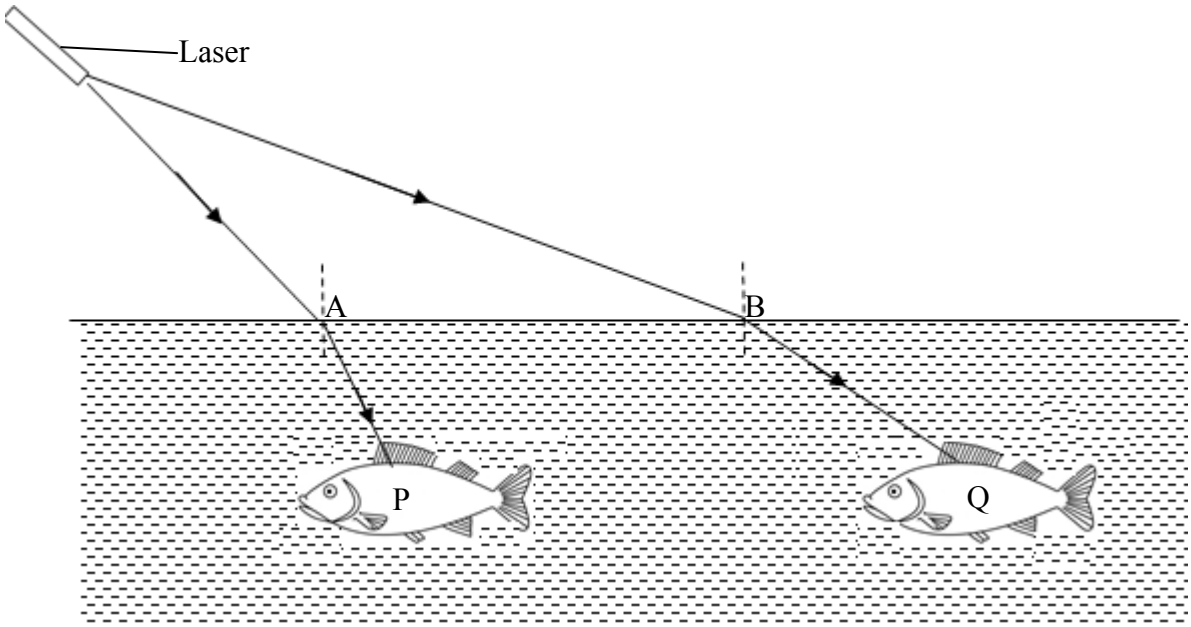


Diagram 3/ *Rajah 3*

Based on the observation of the phenomena of light:
Berdasarkan pemerhatian pada fenomena cahaya:

Based on the above information and obsevation:
Berdasarkan pernyataan dan pemerhatian di atas:

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

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

(c) With the use of apparatus such as a rectangular glass block, ray box. white paper and other apparatus, describe **one** experiment to investigate the hypothesis stated in 3(b).

Dengan menggunakan radas seperti bongkah kaca, kotak sinar, kertas putih dan radas-radas lain, terangkan satu eksperimen untuk menyiasat hipotesis yang dinyatakan di 3 (b).

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

(i) Aim of the experiment.
Tujuan eksperimen.

(ii) Variables in the experiment.
Pembolehubah dalam eksperimen

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

(iv) Arrangement of the apparatus.
Susunan radas

(v) The procedure used in the experiment which should include one method of controlling the manipulated variable and one method of measuring the responding variable.
Prosedur eksperimen yang mesti termasuk satu kaedah mengawal pembolehubah dimanipulasikan dan satu kaedah mengukur pembolehubah bergerak balas.

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

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

[10 marks]

4. Diagram 4.1 and Diagram 4.2 shows a table fan. In Diagram 4.1, the dial is set to minimum current, while in Diagram 4.2, the dial is set to maximum current.

Rajah 4.1 dan Rajah 4.2 menunjukkan sebuah kipas meja. Dalam Rajah 4.1, pelarasnya dilaraskan pada arus minima manakala dalam Rajah 4.2, pelarasnya dilaraskan pada arus maksima.

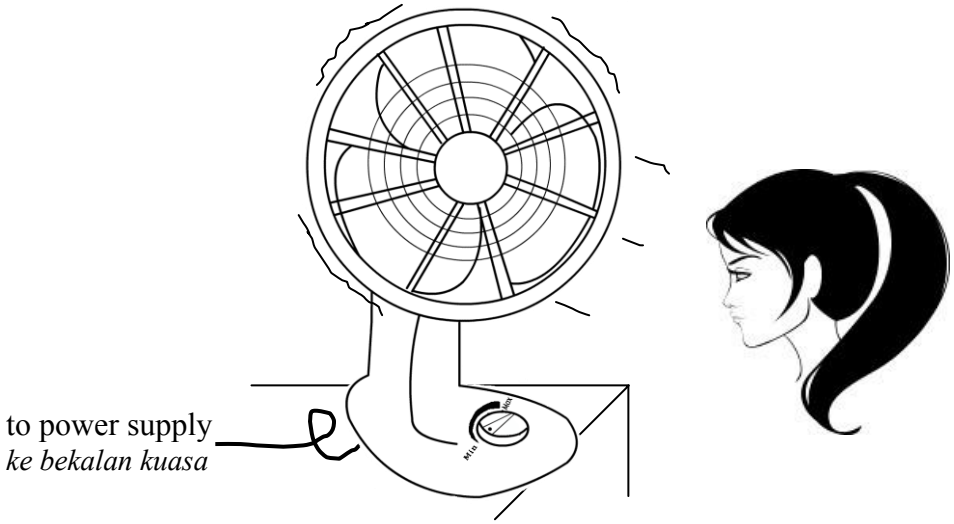


Diagram 4.1
Rajah 4.1

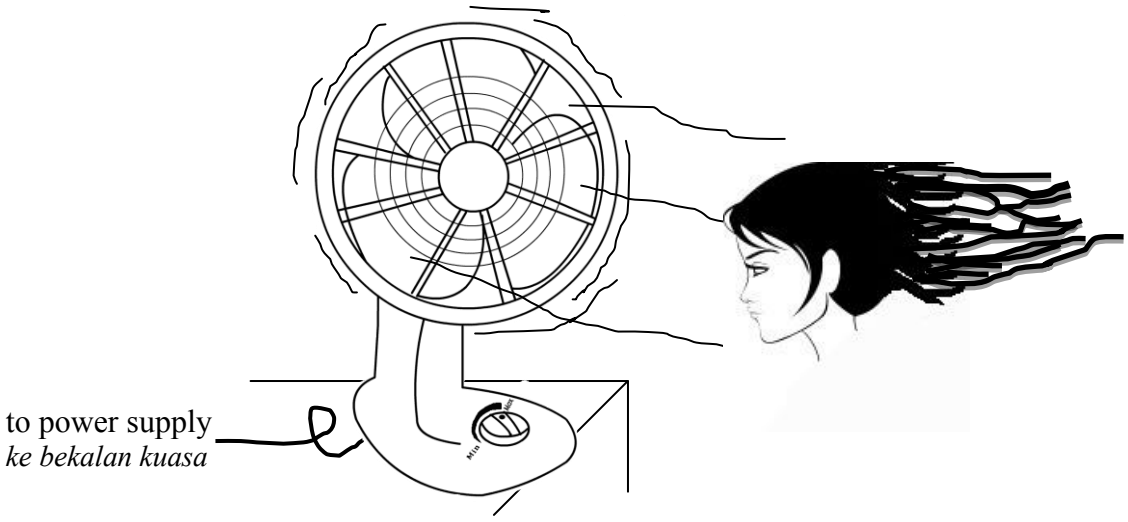


Diagram 4.2
Rajah 4.2

Based on the above information and obsevation:
Berdasarkan pernyataan dan pemerhatian di atas:

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

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

(c) With the use of apparatus such as d.c power supply, magnadur magnets, U-shaped iron yoke, bare copper wire, sliding conductor and other apparatus, describe an experiment to investigate the hypothesis stated in 4(b).

Dengan menggunakan radas seperti bekalan kuasa a.t, magnet kekal, dening besi berbentuk-U, dawai kuprum tak bertebat, konduktor boleh gelongsor dan radas-radas lain, terangkan satu eksperimen untuk menyiasat hipotesis yang dinyatakan 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 apparatus and materials.
Senarai radas dan bahan

(iv) Arrangement of the apparatus.
Susunan radas

(v) The procedure used in the experiment which should include **one** method of controlling the manipulated variable and **one** method of measuring the responding variable.
Prosedur eksperimen yang mesti termasuk **satu** *kaedah mengawal pembolehubah dimanipulasikan dan* **satu** *kaedah mengukur pembolehubah bergerak balas.*

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

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

[10 *marks*]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

ERATA : PEMBETULAN SKEMA KERTAS 1 (HITAM TEBAL – BOLD)
cikguadura.wordpress.com

SKEMA JAWAPAN KERTAS 1
UJIAN DIAGNOSTIK SBP 2014
Fizik Kertas 1

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

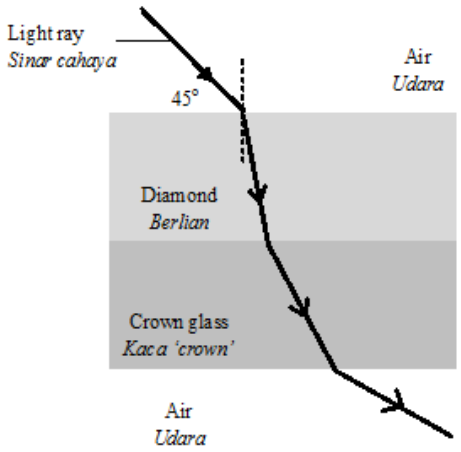
MARKING SCHEME PHYSICS (PAPER 2) TRIAL SBP SBP 2014

No	Mark Scheme	Sub Mark	Total Mark
1(a) (i)	Show the direction of current on the rod correctly	**1**	
(ii)	The rod moves inward	**1**	**2**
(b)	Fleming's left hand rule	**1**	**1**
(c)	The rod moves faster / further	**1**	**1**
			4

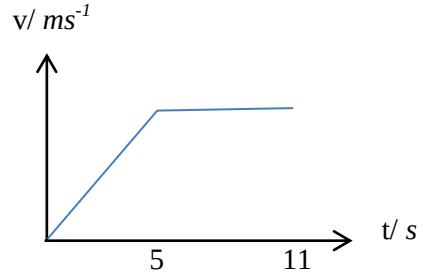
No	Mark Scheme	Sub Mark	Total Mark
2 (a)	Barometer	**1**	**1**
(b)	76 cm	**1**	**1**
(c)	P = 0.76 X 1.36 X 10^4 X 10 = 1.034 X 10^5 Pa	**1** **1**	**2**
(d)	h decrease	**1**	**1**
			5

No 3	mark		Note
a	1 M	Time for the activity of the radioactive substance to become halved of the original activity // Time taken for half of the mass of radioactive substance to decay	
b(i)	2 M	1. Show on the graph how the half-life is determined 2. Half-life = 5 mins	
b(ii)	2 M	**Correct substitution** $\frac{100}{800} \times 100\%$ **Correct answer with correct unit** - **12.5%**	
c	1 M	Background radiation	
TOTAL	6 M		

No	Mark Scheme	Sub Mark	Total Mark
4 (a)	Heat absorbed to change 1 kg of solid to liquid without any change of temperature.	1	1
(b)	To determine the mass of water collected due to the melting of ice at room temperature	1	1
(c)	100 g		1
(d)	$L_f = Q/m = Pt/m$ $= 50\ 000/0.1$ $= 500\ 000\ J\ kg^{-1}$	1 1	 2
(e)	Heat loss to surrounding	1	1
(f)	The heater must be fully immersed in ice.	1	1
			7

5	(a)	***Refraction*** is the bending of light when it travels through different medium where the magnitude of speed and direction change	1	1
	(b)(i)	the speed of light in crown glass is greater than in diamond	1	3
	(ii)	the refractive index of crown glass is less than in diamond	1	
	(iii)	The greater the refractive index, the lower the speed of light	1	
	(c)	The greater the refractive index, the greater the optical density and the lower the speed of light.	1	1
	(d)	 1 Light refracted towards normal in diamond 2 Light refracted away from normal in crown glass 3 Light refracted away from normal in air	1 1 1	3
				8

No	Mark Scheme	Sub Mark	Total Mark
6 (a)	interference	**1**	**1**
(b) (i)	Distance between 2 dippere diagram 6.2 > diagram 6.1	**1**	**1**
(ii)	Distance between two conecutive antinodal line Diagram 6.2 < Diagram 6.1 // vice-versa	**1**	**1**
(c)	As ***a*** increases ***x*** decreases	**1**	**1**
(d) (i)	Moves up and down // moves with greater amplitude	**1**	**1**
(d) (ii)	1. Constructive interference occurs at antinode 2. Amplitude increases	**1** **1**	**2**
(e)	*x* decreases	**1**	**1**
			8

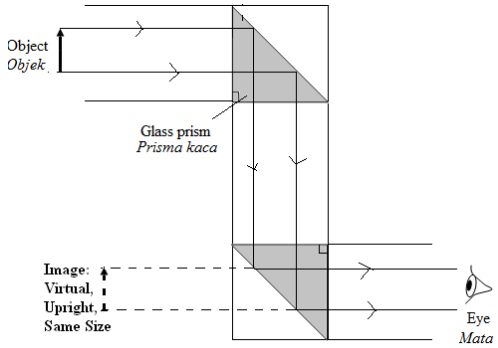
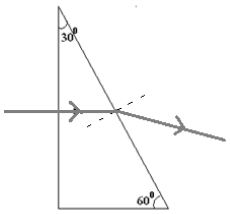
No	Mark scheme	Sub Mark	Total Marks
7 (a)	Rate of change of velocity	1	1
(b)	$1.12 = \frac{11.82 - 0}{x}$ $x = 10.55\ s$	1 1	2
(c) (i)	Use light// tight// smooth attire Less air friction	1 1	2
(ii)	Use spike shoes// shoes with grooves Better grip// prevent slippery	1 1	2
(iii)	Use starting block Increase forward force at starting	1 1	2
(c)		1	
		Total	10

No 8	Mark Scheme	Sub Mark	Total Mark
(a)(i)	A region where electric charges will experience a force	**1**	**1**
(ii)	Oil is an insulator	**1**	**1**
(iii)	Draw the pattern and direction correctly	**1**	**1**
(b)	1. In diagram 8.2(a) bulb Q is brighter because it has **less resistance and more current flow.** 2. In diagram 8.2(b) bulb P is brighter because with the same current and higher resistance it has **more potential difference.**	**1** **1**	**2**
(c) (i)	Series arrangement To increase voltage	**1** **1**	**2**
(ii)	Decrease the thickness of wire Increases resistance	**1** **1**	**2**
(iii)	Bulbs in parallel If one bulb is blown the other can still function.	**1** **1**	**2**
(d)	Circuit W	**1**	**1**
	TOTAL		**12**

9	(a)		Apparent weight is actual weight minus the buoyant force.	1
	(b)	(i)	1. Apparent weight in 9.1(b) is more than 9.1(c) 2. The density of water is greater than density of oil 3. The buoyant force in 9.1(b) is less than 9.1(c)	1 1 1
		(ii)	1. The higher the density the greater the buoyant force. 2. The greater the buoyant force the smaller the apparent weight.	1 1
	(c)		1. Rod A and rod B floats in water because their weights are equal to buoyant force. // their densities are less than water. 2. Rod B has greater mass/weight and density compared to Rod A. 3. Hence buoyant force/ weight of water displaced of rod B is greater than rod A. 4. Since the cross section of both rods are equal, rod B floats lower than rod A.	1 1 1 1
	(d)		<table><tr><th>Suggestion</th><th>Reason</th></tr><tr><td>The submarine must be streamlined shape</td><td>To reduce water resistance</td></tr><tr><td>The material used must be</td><td>To withstand increasing</td></tr></table>	

			strong	pressure underwater		10
			Equip with ballast tanks	To pump in water to submerge and pump out water to float		
			Divide the submarine into smaller compartments with strong doors	To protect the crews from drowning if leakage happens		
			Equip the submarine with oxygen tanks	To provide air to the crew.		
					Total	**20**

No	Mark Scheme	Sub Mark	Total Mark
10 (a) (i)	Electromotive force is defined as work done by the battery in driving one coulomb of charge round a complete circuit // voltage when I = 0	**1**	**1**
(ii)	1. Emf for both bateries P and Q are the same. 2. The reading of the voltmeter for battery P is higher. 3. Ammeter reading for battery P is highere. 4. The higher the voltage loss the lower the current. **5.** The higher the voltage loss the higher the internal resistance.	**1** **1** **1** **1** **1**	**5**
(b)	1. Bulb is brighter using 4 batteries in parallel. 2. 4 batteries in parallel has the same emf as 2 batteries in series. 3. Internal resistance for batteries in parallel is less 4. Current flow is higher when 4 batteries are connected parallel.	**1** **1** **1** **1**	**4**
(c) (i)	High melting point Does not melt easily.	**2**	
(ii)	Specific heat capacity of the filament is low Get hot easily/ the temperature rises faster	**2**	
(iii)	Coiled coil filament. Longer in length / high resistance / concentrate heat.	**2**	
(iv)	Thin filament High resistance	**2**	
(v)	Nichrome / Tungsten / Wolfrum High resistance	**2**	**10**
			20

<table>
<tr><th>No</th><th>Mark Scheme
cikguadura.wordpress.com</th><th>Sub Mark</th><th>Total Mark</th></tr>
<tr><td>11 (a)</td><td>Total internal reflection</td><td>1</td><td>1</td></tr>
<tr><td>(b) (i)</td><td>1. total internal reflections are shown correctly
2. direction of rays are shown correctly
 
</td><td>1
1</td><td>2</td></tr>
<tr><td>(ii)</td><td>Virtual, Upright, Same size (any two)</td><td>1
1</td><td>2</td></tr>
<tr><td>(c) (i)</td><td>$n = \frac{1}{\sin c}$
$\sin c = \frac{1}{1.5}$
$c = 41.81^0$</td><td>1</td><td>1</td></tr>
<tr><td>(c) (ii)</td><td>1. Draw the ray path correctly
 

2. Incident angle is 30^0</td><td>1
1</td><td>2</td></tr>
<tr><td>(c) (iii)</td><td>$n_g = \frac{\sin r}{\sin i}$
$\sin r = n_g \sin i$
$= 1.5 \times \sin 30^0$
$r = 48.59^0$</td><td>1
1</td><td>2</td></tr>
<tr><td>(d)</td><td><table>
<tr><td>Characteristics</td><td>Explanation</td></tr>
<tr><td>Type of lenses
Jenis kanta:
convex</td><td>Produce real image</td></tr>
<tr><td>Focal length of objective lens,f_o /</td><td>-produce bigger final image/
-increase the linear</td></tr>
</table></td><td>2</td><td></td></tr>
</table>

	Focal length of eyepiece lens, f_e *Jarak fokus kanta objek* f_o/ *Jarak fokus kanta mata* f_e, **80 cm / 2 cm**	magnification		**2**	
	Distance between two lenses, L (cm) *Jarak antara dua kanta, L (cm)* **L = f_o + f_e**	Normal adjustment to produce sharp image		**2**	
	Power of eyepiece *Kuasa kanta mata* **High / *tinggi***	-Produce bigger final image/ -increase the linear magnification		**2**	
	Choosen : **L**	Because R are convex lenses,has f_0= 4 cm and f_e = 6 cm, L > f_o + f_e and has high power of eyepiece.		**2**	**10**
					20

No	**Mark Scheme**	**Sub Mark**	**Total Mark**
12 (a)	A beam of electron that flows from cathode to anode // fast moving electron.	1	1
(b)	1. Connect the microphone to input Y of the CRO 2.Adjust the time base and Y gain to a suitable value 3.Make 2 claps infront of the microphone 4.The time interval = length of 2 claps on the screen x magnitude of the time base	1 1 1 1	4
(c) (i)	T = 4 cm x 1ms cm^{-1} = 4 ms = 0.004 s	1	1
(ii)	$f = \frac{1}{T}$ $= \frac{1}{0.004}$ = 250 Hz	1 1	2
(iii)	$v = f\lambda$ $\lambda = v/f$		

<table>
<tr><td></td><td>= 330
250
= 1.32 m</td><td>1

1</td><td>

2</td></tr>
<tr><td>(d)</td><td><table>
<tr><td>Characteristics</td><td>Explanation</td></tr>
<tr><td>2 resistors in series</td><td>The resistors act as the potential divider</td></tr>
<tr><td>Position of LDR is below // at base circuit</td><td>Produce higher base voltage // Vb > junction voltage</td></tr>
<tr><td>Npn type is used</td><td>Forward biased connection of the cell</td></tr>
<tr><td>Relay switch</td><td>To switch on the secondary circuit</td></tr>
<tr><td>Circuit P is chosen</td><td>The circuit has 2 resistors in series. Position of LDR is below, Npn type is used and Relay switch is used</td></tr>
</table></td><td>2

2
2

2

2</td><td>

10</td></tr>
<tr><td></td><td></td><td></td><td>20</td></tr>
</table>

MARKING SCHEME TRIAL SPM PAPER 3 2014

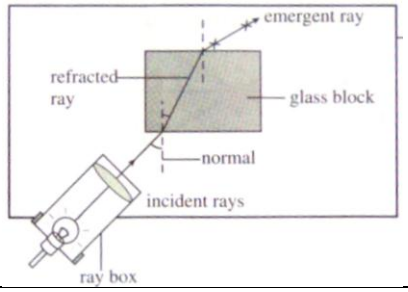
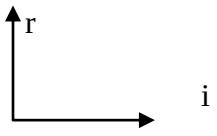
SECTION A

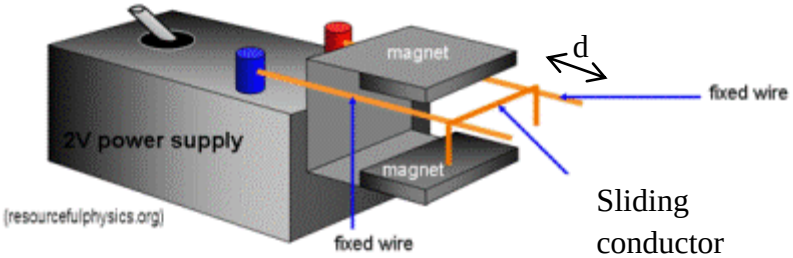
<table>
<tr><td>No.
1</td><td>Answer</td><td>Mark</td></tr>
<tr><td>(a)
(i)</td><td>Manipulated variable = mass//m</td><td>1</td></tr>
<tr><td>(ii)</td><td>Responding variable = rise of temperature/θ//reading of thermometer/θ_1</td><td>1</td></tr>
<tr><td>(iii)</td><td>Constant variable = Energy//power//Initial temperature/θ_0//time for heating</td><td>1</td></tr>
<tr><td>(b)
(i)</td><td>27</td><td>1</td></tr>
<tr><td>(ii)</td><td>1/m =10.00,5.00, 3.33, 2.50 and 2.00</td><td>1</td></tr>
<tr><td>(iii)</td><td>θ_1 =47, 37,33,32,31</td><td>1</td></tr>
<tr><td>(iv)</td><td>θ = 20, 10, 6, 5 , 4</td><td>1</td></tr>
<tr><td>(v)</td><td><table><tr><th>m/kg</th><th>1/m/kg^{-1}</th><th>θ_1/^{0}C</th><th>θ/^{0}C</th></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr></table></td><td>2</td></tr>
<tr><td></td><td>-table -1
-unit- 1</td><td></td></tr>
<tr><td>(c)</td><td>Draw the graph of θ against 1/m .
A - Label y-axis and x-axis correctly
B - States the unit at the axis correctly
C - Both axes with the even and uniform scale:
D - 5 points correctly plotted:
E - a smooth best straight line
F - minimum size of the graph is 5 x 4 squares of 2 x 2 cm.
Draw the graph of θ against 1/ m .
A - Label y-axis and x-axis correctly
B - States the unit at the axis correctly
C - Both axes with the even and uniform scale:
D - 5 points correctly plotted:
E - a smooth best straight line
F - minimum size of the graph is 5 x 4 squares of 2 x 2 cm.
<table><tr><th>No of ticks</th><th>Score</th></tr><tr><td>6</td><td>5</td></tr><tr><td>5</td><td>4</td></tr><tr><td>3-4</td><td>3</td></tr><tr><td>2</td><td>2</td></tr><tr><td>1</td><td>1</td></tr></table></td><td></td></tr>
</table>

		5
(d)	**State the correct relationship <u>based on the candidate's graph</u>** θ is increasing linearly to 1/m // θ α 1/m	1
	TOTAL	16
No 2	Answer	
(a)(i)	Extrapolation straight line from λ = 0.00065 to the graph x = 4.75 mm (without unit)	1 1 1
(b)	x increase	1
(c)(i)	Show a big Δ on the graph to determine the gradient(5 x 4 blocks) The correct $\frac{y_2 - y_1}{x_2 - x_1}$ from the Δ drawn m = 7.27 x 10^3	1 1 1
(c)(ii)	a = D/k = 4 /(7.27 x 10^3) = 5.50 x 10^{-4} m	1 1 1
(d)	decrease	1
(e)	1. Do experiment in dark room 2. The eye is perpendicular to the scale of ruler Max 1 mark	1
	Total	12

SECTION B

NO	ANSWER	MARK
3 (a)	**State the suitable inference** The angle of refraction depends on angle of the incidence.	1
(b)	**State a relevant hypothesis** When the angle of incidence increases, the angle of refraction increases.	1
(c)(i)	**State the aim of experiment** To investigate the relationship between the angle of refraction and the angle of incidence	1
(ii)	**State the suitable manipulated variables and responding variable (Quantity that can be measured)** Manipulated variable: Angle of incidence, i Responding variable: Angle of refraction, r	1
(iii)	**State the constant variable** Constant variable: Refractive index of the glass block, n//Dencity	1

	State the complete list of apparatus and materials Protractor, rectangular glass block, ray box. white paper and power supply	1
	Draw the functional arrangement of the apparatus  	1
	State the method to control the manipulated variable The power supply is switched on. The light ray is directed at an angle of incidence. i = 20°.	1
	State the method to measure the responding variable The palh of the emergent ray is drawn. The angle of refraction, r, is measured and recorded.	1
	Repeat the experiment at least 4 times with the values The experiment is repeated with i = 30°. 40''. 50° and 60°.	1
	State how the data tabulated with the title MV and RV i | r 20 | 30 | 40 | 50 | 60 |	1
	State how the data is analysed, plot a graph RV against MV  	1
	TOTAL MARK	**12**

No		ANSWER	MARK
4			
	(a)	**State the suitable inference** The **force** depends on **current**// the fan **rotate faster** because more **current** flow	1
	(b)	**State a relevant hypothesis** The higher the current, the higher the force	1
	(c)(i)	**State the aim of experiment** To study the relationship between current and force	1
	(ii)	**State the aim of experiment** MV: Current, I RV: Force/ Distance/ Displacement by sliding conductor wire/ d **State the constant variable** CV: Strength of electromagnet/	1 1
	(iii)	**State the complete list of apparatus and materials** Ruler, Ammeter, rheostat, C-shaped iron yoke, magnets, bare copper wire, sliding copper wire and d.c power supply.	1
	(iv)	**Draw the functional arrangement of the apparatus**  **Rheostat at bare copper wire (fixed wire)*	1
	(v)	**State the method to control the manipulated variable** 1. Switch on the power supply and the current is set to I = 1.0A using rheostat. **State the method to measure the responding variable** 2. The displacement moved by the sliding conductor is measured using ruler. The data is recorded in the table. **Repeat the experiment at least 4 times with the values** 3. The experiment is repeated with currents, I = 2.0A, 3.0A, 4.0A and 5.0A.	1 1 1

<table>
<tr>
<td></td>
<td>(vi)</td>
<td>State how the data tabulated with the title MV and RV

<table>
<tr><td>Current, I/A</td><td>Distance of movement of sliding conductor, d/cm</td></tr>
<tr><td>1.0</td><td></td></tr>
<tr><td>2.0</td><td></td></tr>
<tr><td>3.0</td><td></td></tr>
<tr><td>4.0</td><td></td></tr>
<tr><td>5.0</td><td></td></tr>
</table>

*Unit is optional</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>(vii)</td>
<td>State how the data is analysed, plot a graph RV against

*Unit is optional</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>12</td>
</tr>
</table>