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Fizik
Kertas 1
OGOS
2009
1 ¼ jam



**BAHAGIAN PENGURUSAN
SEKOLAH BERASRAMA PENUH DAN SEKOLAH KLUSTER
KEMENTERIAN PELAJARAN MALAYSIA**

**PEPERIKSAAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA 2009**

FIZIK

KERTAS 1

Satu jam lima belas minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

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

Kertas soalan ini mengandungi 32 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. | $a = \frac{v - u}{t}$ | 16 | Power, $P = \frac{\text{energy}}{\text{time}}$ |
| 2. | $v^2 = u^2 + 2as$ | | <i>Kuasa, $P = \frac{\text{tenaga}}{\text{masa}}$</i> |
| 3. | $s = ut + \frac{1}{2} at^2$ | 17. | $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$ |
| 4. | momentum = mv
<i>momentum = mv</i> | 18. | $\lambda = \frac{ax}{D}$ |
| 5. | $F = ma$ | 19. | $n = \frac{\sin i}{\sin r}$ |
| 6. | Kinetic energy = $\frac{1}{2} mv^2$
<i>Tenaga kinetik = $\frac{1}{2} mv^2$</i> | 20. | $n = \frac{\text{real depth}}{\text{apparent depth}}$ |
| 7. | Potential energy = mgh
<i>Tenaga keupayaan = mgh</i> | | $n = \frac{\text{dalam nyata}}{\text{dalam ketara}}$ |
| 8. | Elastic potential energy = $\frac{1}{2} Fx$
<i>Tenaga keupayaan kenyal = $\frac{1}{2} Fx$</i> | 21 | $Q = It$ |
| 9. | $\rho = \frac{m}{V}$ | 22 | $V = IR$ |
| 10. | Pressure, $P = h\rho g$
<i>Tekanan, $P = h\rho g$</i> | 23 | Power, $P = IV$
<i>Kuasa, $P = IV$</i> |
| 11. | Pressure, $P = \frac{F}{A}$
<i>Tekanan, $P = \frac{F}{A}$</i> | 24. | $\frac{N_s}{N_p} = \frac{V_s}{V_p}$ |
| 12. | Heat, $Q = mc\theta$
<i>Haba, $Q = mc\theta$</i> | 25. | Efficiency = $\frac{I_s V_s}{I_p V_p} \times 100\%$
<i>Kecekapan = $\frac{I_s V_s}{I_p V_p} \times 100\%$</i> |
| 13. | $\frac{pV}{T} = \text{constant}$
$\frac{pV}{T} = \text{malar}$ | 26 | $g = 10 \text{ m s}^{-2}$ |
| 14 | $E = mc^2$ | | |
| 15 | $v = f \lambda$ | | |

Answer all questions. Each question is followed by either three or four options. Choose the best option for each question then blacken the correct space on the answer sheet.

Jawab semua soalan. Tiap – tiap soalan diikuti oleh sama ada tiga atau, empat pilihan jawapan. Pilih satu jawapan yang terbaik bagi setiap soalan dan hitamkan ruangan yang sepadan pada kertas jawapan objektif anda

1. Which of the following is **NOT** a base unit?

*Yang manakah antara berikut **BUKAN** merupakan unit bagi kuantiti asas?*

- A Joule
Joule
- B Ampere
Ampere
- B Kilogram
Kilogram
- C Second
Saat

2. 108 km h^{-1} is equivalent to

108 km h^{-1} adalah bersamaan dengan

- A 20 m s^{-1}
- B 30 m s^{-1}
- C 50 m s^{-1}
- D 60 m s^{-1}

3. The graph shows the relationship between v and t .

Graf menunjukkan hubungan antara v dan t

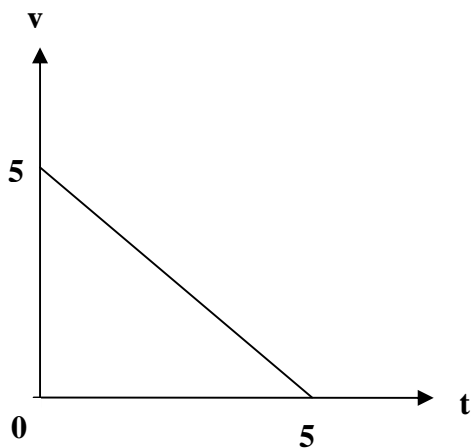


Diagram 1
Rajah 1

The relationship between v and t can be represented by the equation

Hubungan v dan t diwakili oleh persamaan

- A $V = t + 5$
- B $V = t + 1$
- C $V = -t + 5$
- D $V = -t + 1$

4. Table 1 shows the results of an experiment to investigate the relationship between load and extension when a spring is stretched.

Jadual 1 menunjukkan keputusan suatu eksperimen untuk menyiasat hubungan antara beban dan regangan apabila satu spring diregang.

Load Beban F/N	Extension Regangan x /cm
100	1.0
150	1.5
200	2.0
250	2.5
300	3.0

Table 1
Jadual 1

The original length of the spring is $l_0 = 15.0$ cm. What is the responding variable?

Panjang asal spring ialah $l_0 = 15.0$ cm. Apakah pembolehubah yang bergerakbalas?

- A Load, F
Beban, F
- B Extension, x
Regangan, x
- C Original length of the spring, l_0
Panjang asal spring, l_0
- D Material used to make the spring
Bahan yang digunakan untuk membuat spring

5. Diagram 2 shows trolley A and B of same mass on a frictionless plane. Trolley A moves and collides with the stationary trolley B.

Rajah 2 menunjukkan dua troli A dan B bejisim sama yang berada di atas suatu satah tanpa geseran. Troli A bergerak dan berlanggar troli B yang pegun.

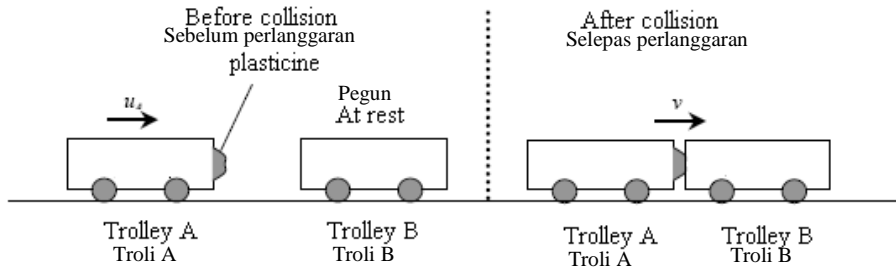


Diagram 2
Rajah 2

Which of the following statements is **true**?

Antara pernyataan berikut, yang manakah benar?

- A The collision is an elastic collision
Perlanggaran itu adalah perlanggaran kenyal
- B Both trolleys do not undergo changes in momentum
Kedua-dua troli tidak mengalami perubahan momentum
- C The total momentum before and after the collision is the same
Jumlah momentum sebelum dan selepas perlanggaran itu adalah sama
- D The total kinetic energy before and after the collision is conserved
Jumlah tenaga kinetik sebelum dan selepas perlanggaran itu adalah terabadi

6. Diagram 3 shows a man diving into the water.
Rajah 3 menunjukkan seorang lelaki yang sedang terjun ke dalam air.

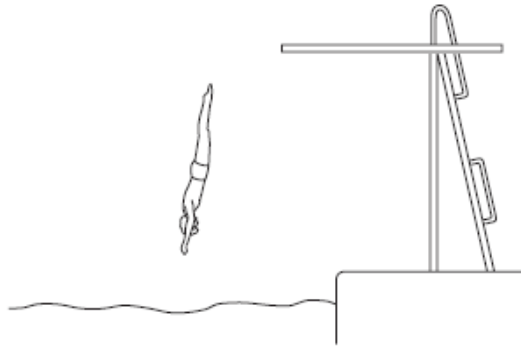


Diagram 3
Rajah 3

Which form of energy is increasing as he falls?
Apakah jenis tenaga yang semakin bertambah semasa dia membuat penerjunan?

- A Chemical
Kimia
- B Gravitational
Graviti
- C Kinetic
Kinetik
- D Potential
Keupayaan

7. Diagram 4 shows a box being pulled by a man. What is the resultant force acting on the box?
Rajah 4 menunjukkan sebuah kotak ditarik oleh seorang lelaki. Apakah daya paduan yang bertindak ke atas kotak itu?

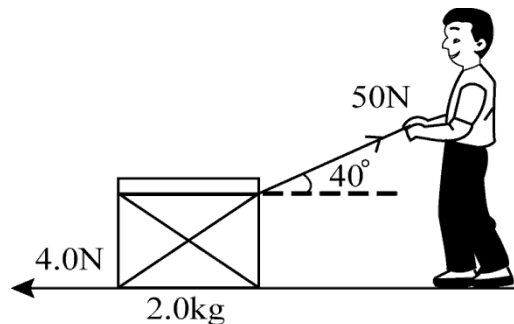


Diagram 4
Rajah 4

- A 34.3 N
- B 38.3 N
- C 48 N
- D 50 N

8. Diagram 5 shows an aeroplane flying horizontally with increasing velocity.
Rajah 5 menunjukkan sebuah kapal terbang sedang terbang secara mendatar dengan halaju bertambah.

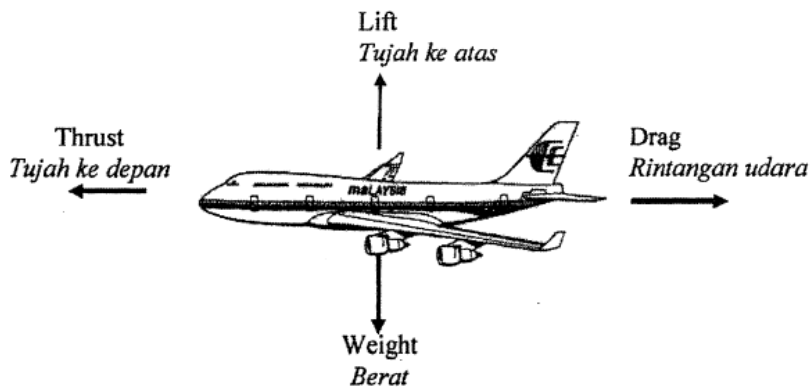


Diagram 5
Rajah 5

Which of the following statement is correct?
Antara pernyataan berikut, yang manakah betul?

- A Weight > Lift
Berat > Tujah ke atas
- B Lift > Weight
Tujah ke atas > Berat
- C Drag = Thrust
Rintangan udara = Tujah ke depan
- D Thrust > Drag
Tujah ke depan > Rintangan udara

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

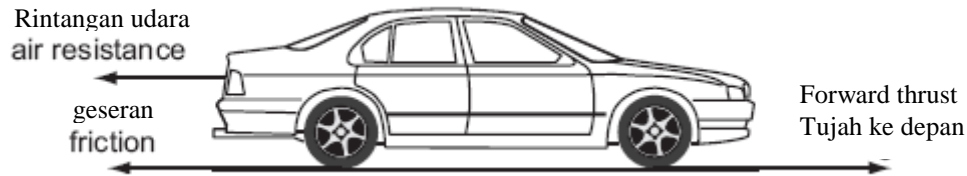


Diagram 6
Rajah 6

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

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

10. Diagram 7 shows a stroboscopic photograph of a ball dropped from a height.
Rajah 7 menunjukkan gambarfoto stroboskop bagi sebiji bola yang dijatuhkan daripada sebuah ketinggian.

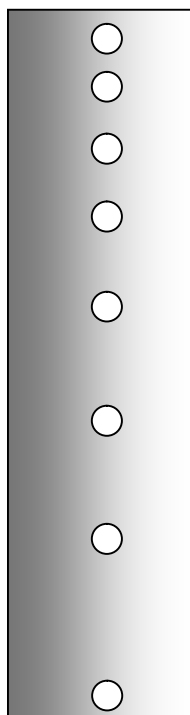


Diagram 7
Rajah 7

Which physics quantity remains constant as the ball falls?
Kuantiti fizik manakah yang tetap semasa bola itu dijatuhkan?

- A Velocity
Halaju
- B Momentum
Momentum
- C Acceleration
Pecutan
- D Kinetic energy
Tenaga kinetik

11. Diagram 8 represents gas molecules contained in a cylinder. The piston is moved slowly downwards and the temperature of the gas stays the same.

Rajah 8 menunjukkan molekul-molekul gas di dalam sebuah silinder. Ombok digerakkan perlahan-lahan ke bawah dan suhu gas tidak berubah.

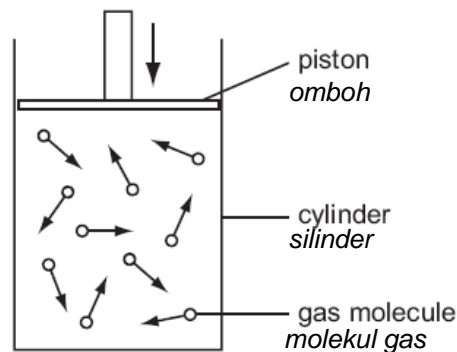


Diagram 8
Rajah 8

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

- A The molecules collide harder with the walls
Molekul-molekul berlanggar dengan lebih kuat pada dinding bekas
- B The molecules collide more often with the walls
Molekul-molekul berlanggar dengan lebih kerap dengan dinding bekas
- C The molecules move more quickly
Molekul-molekul bergerak dengan lebih laju
- D The number of molecules increase
Bilangan molekul-molekul bertambah

12. Diagram 9 shows two boys X and Y, both have the same weight and are standing on soft ground.

Rajah 9 menunjukkan dua orang budak X dan Y mempunyai berat yang sama sedang memijak tanah yang lembut.

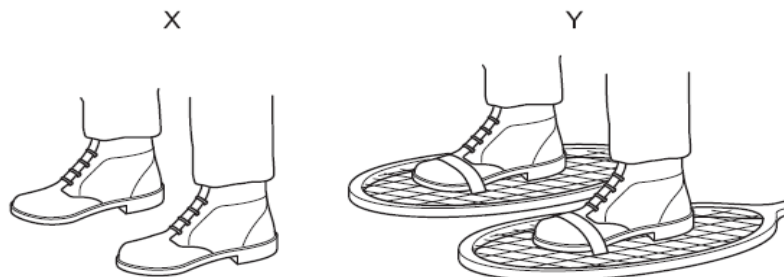


Diagram 9
Rajah 9

Which boy is more likely to sink into the ground?

Budak yang manakah mungkin terbenam ke dalam tanah?

	Boy more likely to sink <i>Budak yang mungkin terbenam</i>	Pressure on soft ground <i>Tekanan pada tanah lembut</i>
A	X	Larger than Y <i>Lebih besar daripada Y</i>
B	X	Smaller than Y <i>Lebih kecil daripada Y</i>
C	Y	Larger than X <i>Lebih besar daripada X</i>
D	Y	Smaller than X <i>Lebih kecil daripada X</i>

13. The measuring cylinder containing some water stands on a scale pan. A solid ball is lowered into the water.

The water level rises from the 30 cm³ mark to the 40 cm³ mark as shown in diagram 10.1 and 10.2. The scale reading increases from 100 g to 180 g.

Silinder penyukat di bawah menunjukkan air di dalam sebuah penimbang. Sebiji bola pejal dimasukkan ke dalam air tersebut.

Air naik daripada bacaan 30 cm³ ke 40 cm³ seperti yang ditunjukkan pada rajah 10.1 dan 10.2. Bacaan penimbang pula meningkat daripada 100 g menjadi 180 g.

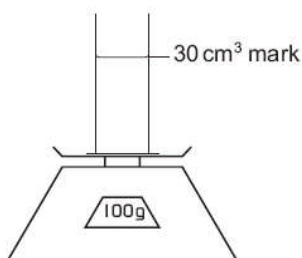


Diagram 10.1
Rajah 10.1

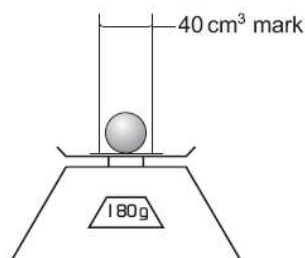


Diagram 10.2
Rajah 10.2

What is the density of the ball?
Apakah ketumpatan bola tersebut?

- A 2.0 g cm^{-3}
- B 4.5 g cm^{-3}
- C 8.0 g cm^{-3}
- D 18.0 g cm^{-3}

14. When the depth of a liquid increases, its pressure
Apabila kedalaman bertambah, tekanan

- A remains constant
tetap
- B Increases
meningkat
- C Decreases
menurun

15. Diagram 11 shows a hydraulic jack. Given the cross-sectional areas of the smaller piston and larger piston are 20 cm^2 and 80 cm^2 respectively.

Rajah 11 menunjukkan sebuah jek hidraulik. Diberi luas keratan rentas omboh yang kecil dan omboh yang besar ialah masing-masing 20 cm^2 and 80 cm^2 .

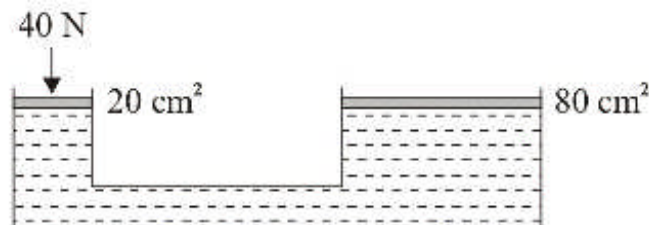


Diagram 11
Rajah 11

If the smaller piston is pushed with a force of 40 N , what will be the force experienced by the larger piston?

Sekiranya omboh yang kecil ditolak dengan daya 40 N , apakah daya yang akan dialami oleh omboh yang besar?

- A 80 N
- B 100 N
- C 160 N
- D 200 N

16. Diagram 12 shows a ship floating on the surface of the sea. The density of sea water is 1020 kg m^{-3} .

Rajah 12 menunjukkan kapal yang terapung di permukaan air laut. Ketumpatan air laut ialah 1020 kg m^{-3} .



Diagram 12
Rajah 12

The volume of the ship below the water level of the sea is 600 m^3 . The weight of the ship is *Isipadu kapal yang berada di bawah permukaan air laut ialah 600 m^3 . Berat kapal tersebut ialah*

- A $6.12 \times 10^5 \text{ N}$
- B $6.13 \times 10^5 \text{ N}$
- C $6.00 \times 10^6 \text{ N}$
- D $6.12 \times 10^6 \text{ N}$

17. Diagram 13 shows water spurting out from a hole of a container at a distance of a .
Rajah 13 menunjukkan air terpancut keluar dari lubang sebuah bekas pada jarak a .

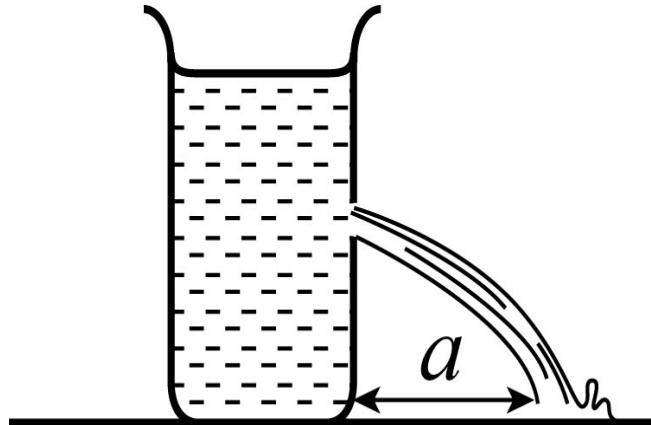


Diagram 13
Rajah 13

When the level of the water decreases, what will happen to the distance, a ?
Apabila paras air berkurangan, apakah yang berlaku pada jarak a ?

- A Increases
Bertambah
- B Decreases
Berkurang
- C Remains constant
Tidak berubah

18. Diagram 14 shows a stream of air flowing through a tube with a narrow neck.
Rajah 14 menunjukkan udara mengalir melalui sebuah tiub yang sempit di bahagian tengah.

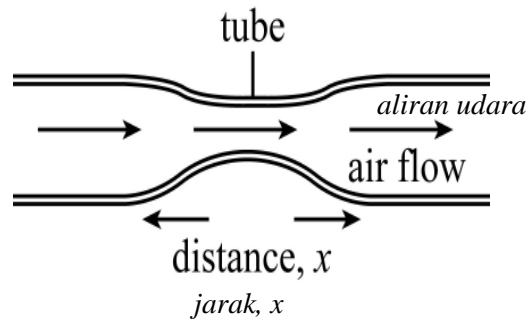
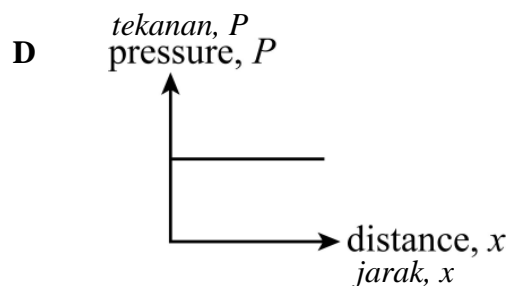
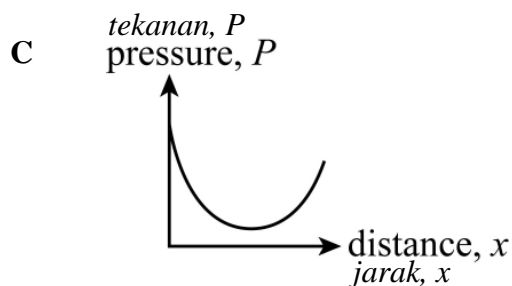
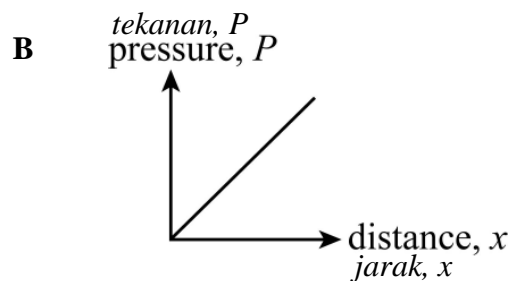
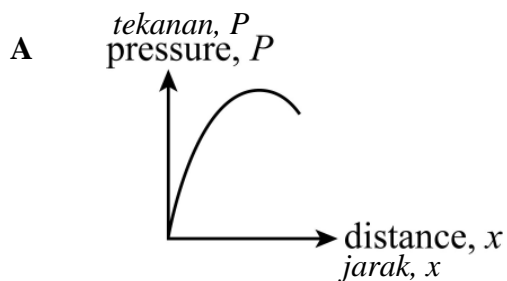


Diagram 14
Rajah 14

Which of the following graphs describes the relationship between the air pressure, P and the distance, x ?

Manakah antara graf berikut menerangkan hubungan antara tekanan udara, P dengan jarak, x ?

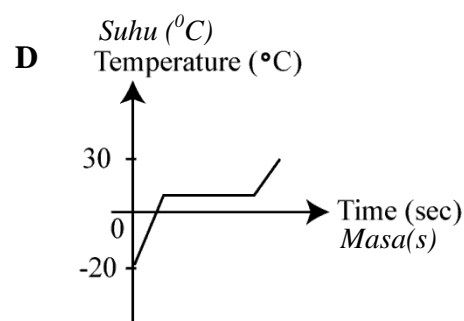
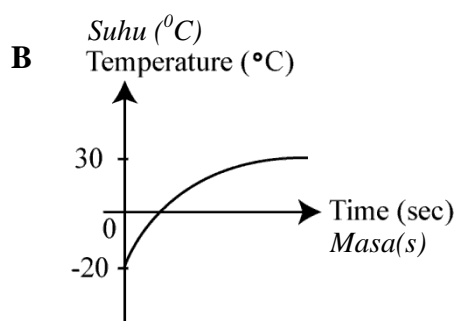
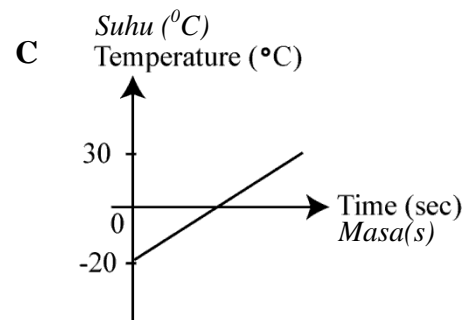
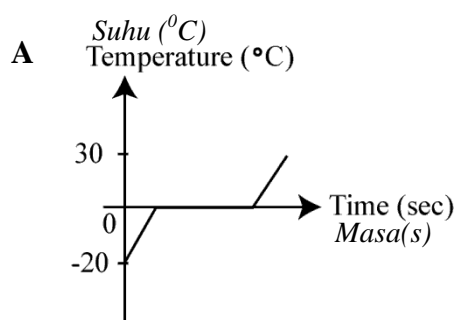


19. When water boils at 100°C , the heat absorbed by the water
Apabila air mendidih pada suhu 100°C , haba yang diserap oleh air

- A increases the kinetic energy of the water molecules
meningkatkan tenaga kinetik molekul-molekul air
- B makes the steam molecules moves randomly
membuat molekul-molekul stim bergerak secara rawak
- C breaks the bonds between the water molecules
memutuskan ikatan antara molekul-molekul air
- D is lost to the surroundings
hilang ke persekitaran

20. Ice at a temperature of -20°C is heated at a steady rate until it changes to water at 30°C . Which of the following temperature-time graphs best describes the process above?

Ais pada suhu -20°C dipanaskan pada kadar yang tetap sehingga ia berubah menjadi air pada suhu 30°C . Yang manakah antara graf suhu-masa berikut paling sesuai bagi mewakili proses tersebut?



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

Sejenis bahan dipanaskan pada kadar yang tetap. Ia berubah daripada pepejal menjadi cecair, dan kemudian gas. Graf berikut menunjukkan bagaimana suhunya berubah terhadap masa.

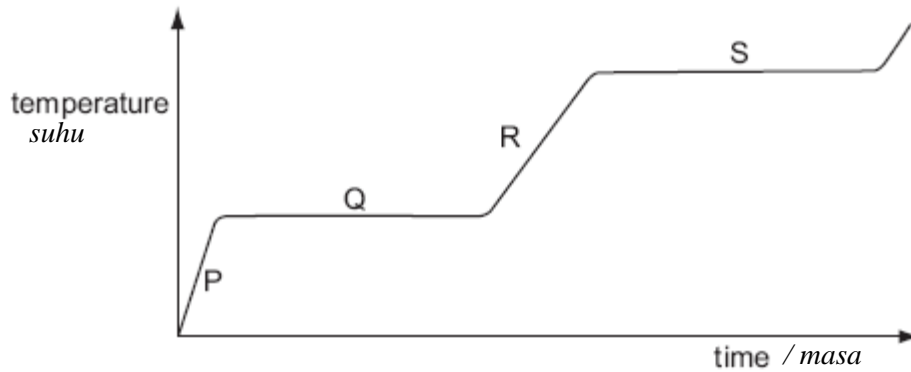


Diagram 15
Rajah 15

Which part of the graph show a change of state taking place?

Bahagian manakah pada graf yang mewakili keadaan perubahan fasa?

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

22. Diagram 16 shows a diver releasing air bubbles as he dives.
Rajah 16 menunjukkan seorang penyelam mengeluarkan udara semasa menyelam.

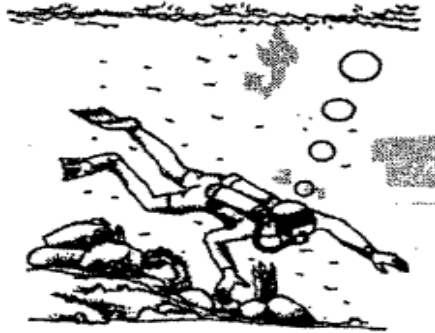


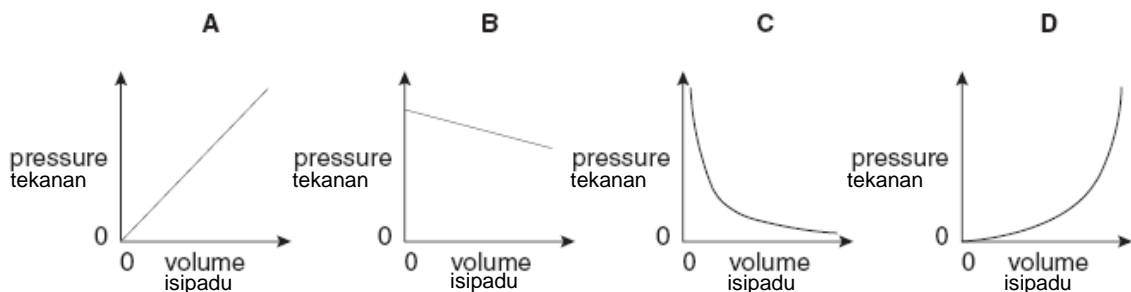
Diagram 16
Rajah 16

The size of the air bubbles increases as it reaches the surface. Which law explains the situation above?

Saiz udara semakin membesar apabila ia menaik ke permukaan. Hukum yang manakah yang menerangkan situasi di atas?

- A Pressure Law
 B Boyle's Law
 C Charles' Law
 D Snell's Law
23. Which graph shows the relationship between the pressure and the volume of a fixed mass of gas at constant temperature?

Graf yang manakah menunjukkan hubungan di antara tekanan dan isipadu gas yang tetap pada suhu yang malar?



24. Diagram 17 shows a concave mirror.
Rajah 17 menunjukkan sebuah cermin cekung.

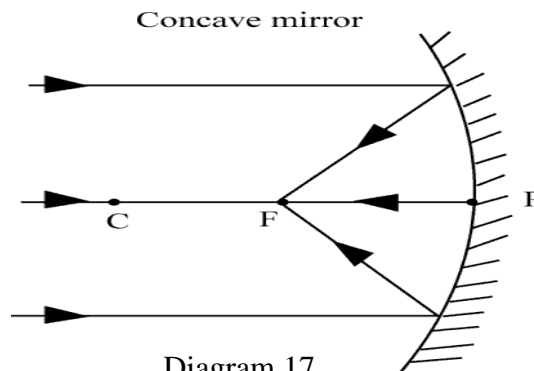


Diagram 17
Rajah 17

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

- A the focal length of the mirror
panjang fokus cermin
 - B the radius of the sphere
jejari sfera
 - C the diameter of the sphere
diameter sfera
 - D the line joining the pole to the centre of curvature
garis yang menyambung kutub ke pusat kelengkungan
25. Diagram 18 shows a ray of light travels through a glass block.
Rajah 18 menunjukkan sinar cahaya melalui blok kaca.

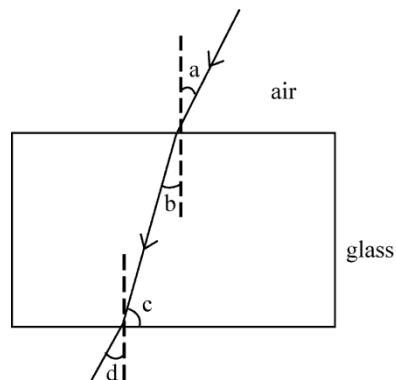


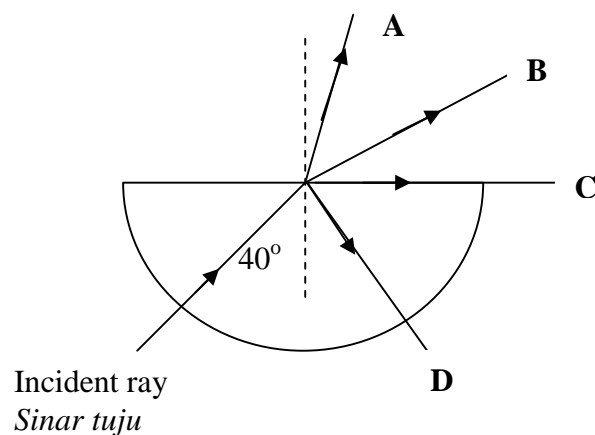
Diagram 18
Rajah 18

What is the refractive index?
Apakah indeks biasan kaca tersebut?

- A $\frac{\sin a}{\sin b}$
- B $\frac{\sin b}{\sin a}$
- C $\frac{\sin a}{\sin d}$
- D $\frac{\sin d}{\sin c}$

26. Diagram 19 shows a light ray traveling from air into a semi-circular glass block.
Rajah 19 menunjukkan satu sinar cahaya merambat dari udara menuju blok kaca semi bulatan.

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



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

- A $f = \frac{uv}{u+v}$
- B $f = \frac{1}{u+v}$
- C $\frac{1}{f} = \frac{uv}{u+v}$
- D $\frac{1}{f} = \frac{1}{u+v}$

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

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

29. Diagram 20 shows the displacement- time graph of a wave.
 Rajah 20 menunjukkan graf sesaran –masa bagi satu gelombang.

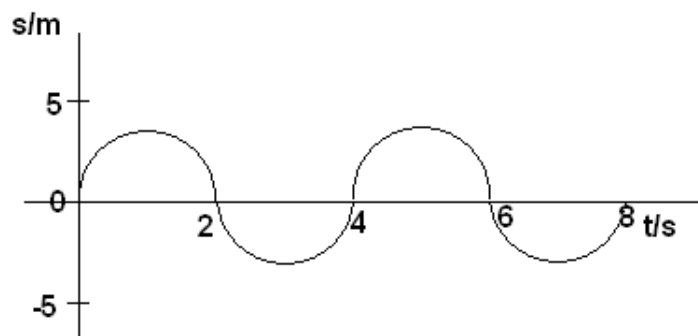


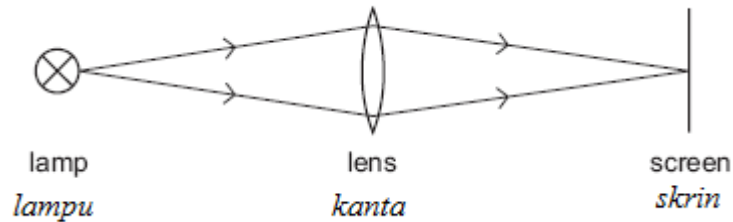
Diagram 20
 Rajah 20

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

- A 8 Hz.
 B $\frac{1}{8}$ Hz
 C 4 Hz.
 D $\frac{1}{4}$ Hz

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

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



- B A water ripple caused by a dipper moving up and down
Riak gelombang air dihasilkan oleh pencelup bergetar atas dan bawah.



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



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



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

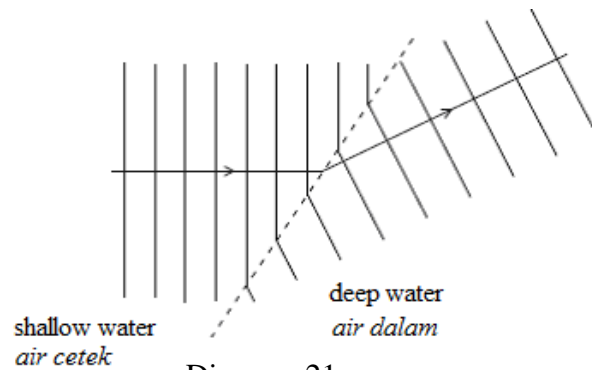


Diagram 21
Rajah 21

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

- A refraction
pembiasan
- B reflection
pantulan
- C diffraction
belauan
- D interference
interferens
32. Diagram 22 shows an interference pattern of water waves from two coherent sources P and Q.
Rajah 22 menunjukkan corak interferens gelombang air dari dua sumber koheren P dan Q.

Which point is the node ?
Titik yang manakah nod ?

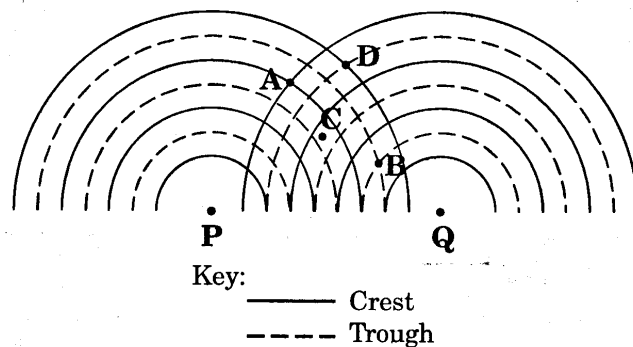


Diagram 22
Rajah 22

33. Diagram 23 shows a climber starts a stopwatch as he shouts. He hears an echo from the opposite side of the valley after 1.0s.
Rajah 23 menunjukkan seorang pendaki menghidupkan jam randik sambil menjerit. Dia mendengar gema dari hujung lurah selepas 1.0 s.

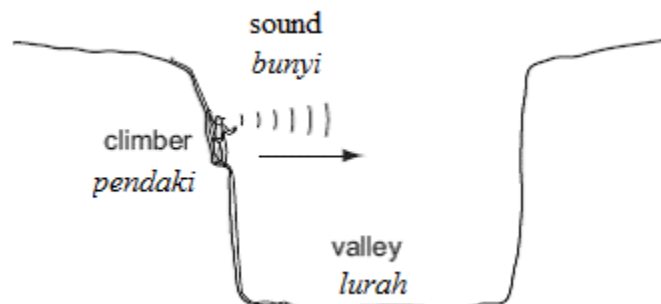


Diagram 23
Rajah 23

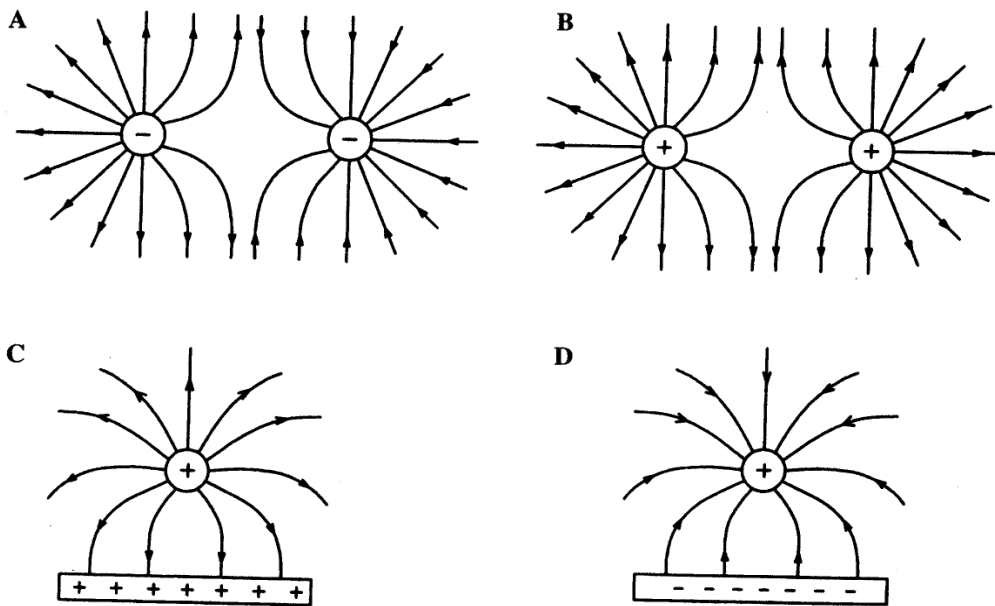
The sound travels at 340 ms^{-1} . What is the width of the valley. ?
Halaju gelombang bunyi ialah 340 ms^{-1} . Berapakah lebar lurah tersebut ?

- A 85 m
 B 170 m
 C 340 m
 D 680 m
34. Radio waves, visible light and X-rays are all part of the electromagnetic spectrum. What is the correct order of increasing wavelength ?
Gelombang radio, cahaya nampak dan sinar X adalah sebahagian dari spektrum electromagnet.
Apakah susunan yang betul bagi panjang gelombang dalam tertib menaik ?

Shortest —————> longest
Paling pendek *paling panjang*

A	Radio waves <i>Gelombang radio</i>	Visible light <i>Cahaya nampak</i>	X-ray <i>Sinar X</i>
B	Radio waves <i>Gelombang radio</i>	X-rays <i>Sinar X</i>	Visible light <i>Cahaya nampak</i>
C	X-rays <i>Sinar X</i>	Radio waves <i>Gelombang radio</i>	Visible light <i>Cahaya nampak</i>
D	X-rays <i>Sinar X</i>	Visible light <i>Cahaya nampak</i>	Radio waves <i>Gelombang radio</i>

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



36. Diagram 24 shows a complete circuit. The reading of the ammeter is I and the voltmeter is V .
Rajah 24 menunjukkan satu litar lengkap. Bacaan ammeter adalah I dan bacaan voltmeter adalah V .

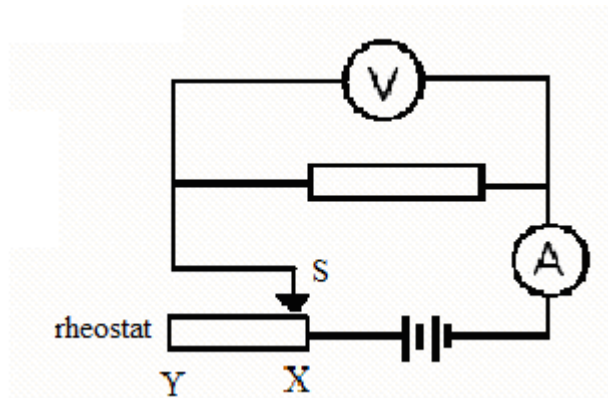


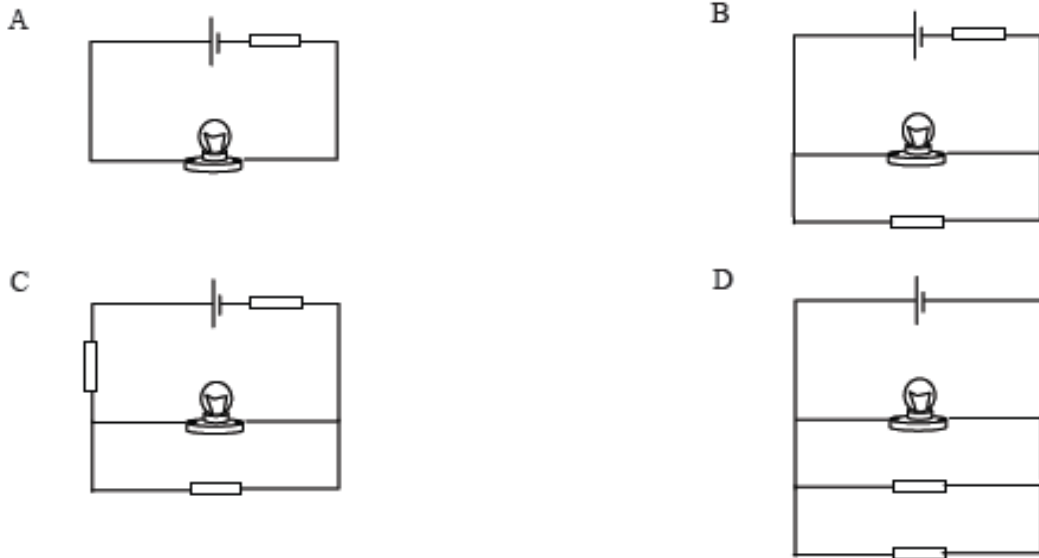
Diagram 24
Rajah 24

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

	<i>I</i>	<i>V</i>
A	Decreases <i>Berkurang</i>	Decreases <i>Berkurang</i>
B	Increases <i>Bertambah</i>	Decreases <i>Berkurang</i>
C	Decreases <i>Berkurang</i>	Increases <i>Bertambah</i>
D	Increases <i>Bertambah</i>	Increases <i>Bertambah</i>

37. In the following circuits, all the resistors and light bulbs are similar. In which circuit is the light bulb the brightest?

Tiap perintang dan lampu dalam litar-litar berikut adalah serupa. Lampu dalam litar yang manakah bernyala dengan paling cerah?



38. Diagram 25 show a lamp connected to a resistor and a battery.
Rajah 25 menunjukkan sebuah lampu disambung kepada perintang dan bateri.

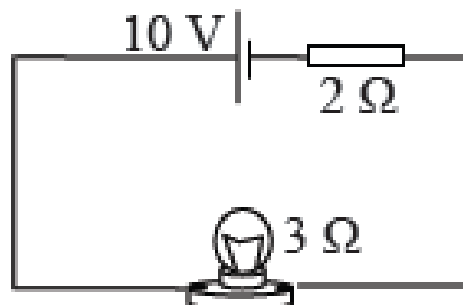


Diagram 25
Rajah 25

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

- A 6 W
- B 12 W
- C 20 W
- D 50 W

39. Diagram 26 shows an electromagnet in a magnetic relay.
Rajah 26 menunjukkan sebuah electromagnet dalam sebuah geganti.

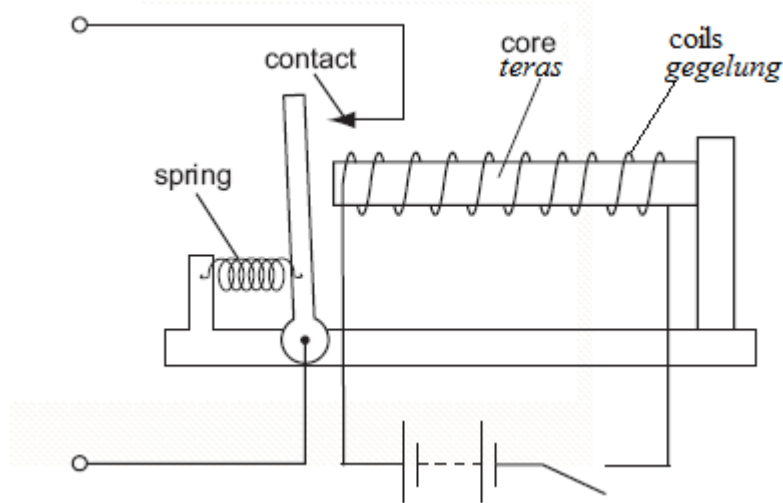


Diagram 26
Rajah 26

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

- A Use a thinner wire to form the coils
Guna dawai yang lebih halus untuk membentuk gegelung
- B Reduce the number of coils
Kurangkan bilangan lilitan gegelung
- C Increase the magnitude of current
Tambahkan magnitude arus
- D The metal used to make the core is aluminium.
Menggunakan aluminium untuk membuat teras .

40. Diagram 27 shows a current – carrying conductor in magnetic field.
 What is the direction of the force that acts on the conductor ?
*Rajah 27 menunjukkan konduktor pembawa arus di dalam medan magnet.
 Pada arah manakah daya itu bertindak ke atas konduktor ?*

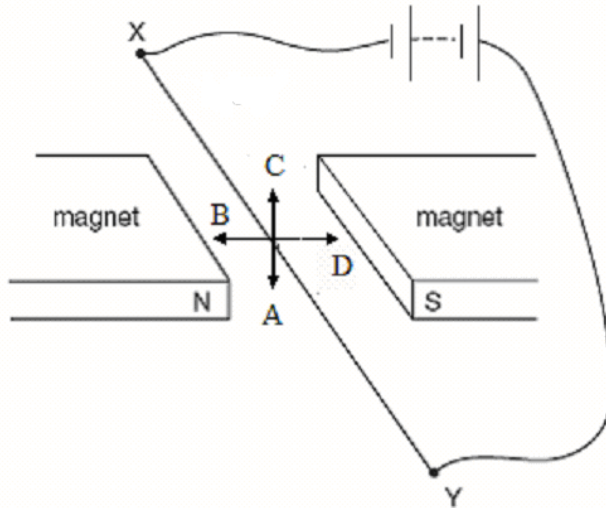


Diagram 27
Rajah 27

41. Diagram 28 shows a solenoid and a permanent magnet.
Rajah 28 menunjukkan sebuah solenoid dan magnet kekal.

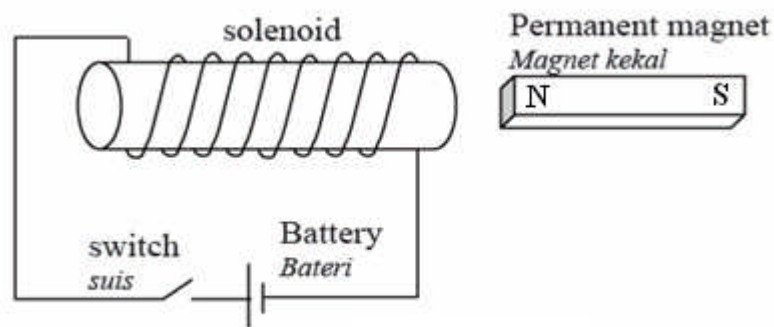


Diagram 28
Rajah 28

What will happen when the switch in Diagram 28 is closed?
Apakah yang akan berlaku apabila suis dalam Rajah 28 dihidupkan?

- A. The solenoid and the magnet will mutually attract
Solenoid dan magnet kekal akan saling menarik
- B. The solenoid and the magnet will mutually repel
Solenoid dan magnet kekal akan saling menolak
- C. The magnet will vibrate
Magnet akan bergetar
- D. Nothing happens to the magnet
Tiada apa-apa yang akan berlaku kepada magnet

42. Why is electrical energy usually transmitted at high voltage ?
Kenapakah tenaga elektrik dihantar pada voltan tinggi ?
- A To reduce energy loss in the transmission cables
Mengurangkan tenaga yang hilang dalam kabel penghantaran
 - B To increase the current in the transmission cables .
Meningkatkan arus yang mengalir dalam kabel penghantaran
 - C To reduce the resistance of the transmission cables .
Mengurangkan rintangan kabel penghantaran.
43. The purpose of using laminated iron core in a transformer is to
Tujuan penggunaan teras besi berlamina dalam transformer ialah untuk
- A reduce resistance
mengurangkan rintangan
 - B reduce eddy current
mengurangkan arus pusar
 - C prevent flux leakage
menghalang kebocoran fluks
 - D magnetized and demagnetized iron core easily.
senang memagnet dan menyahmagnetkan teras besi.
44. Diagram 29.1 shows the oscilloscope trace produced by an input of 2 V at a frequency of 50 Hz.
Rajah 29.1 menunjukkan surihan osiloskop yang dihasilkan oleh input 2 V pada frekuensi 50 Hz.

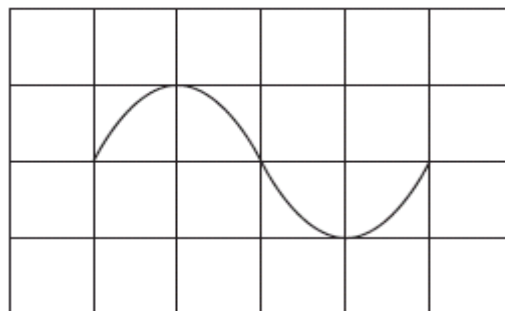


Diagram 29 .1
Rajah 29.1

Diagram 29.2 shows the trace from a new input on the same oscilloscope.
Rajah 29.2 menunjukkan surihan dari input baru pada osiloskop yang sama.

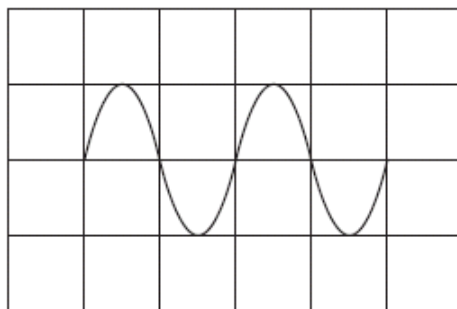
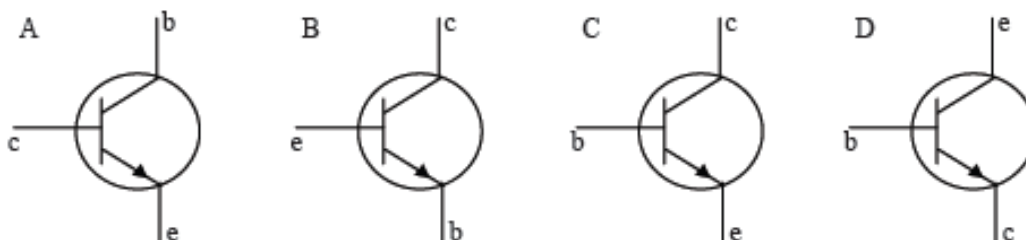


Diagram 29.2
Rajah 29.2

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

- A** 1 V at 50 Hz
1 V pada 50 Hz
- B** 2 V , 50 Hz
2 V pada 50 Hz
- C** 2 V at 100 Hz
2 V pada 100 Hz
- D** 4 V at 50 Hz
4 V pada 50 Hz

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



- 46.** Diagram 31.2 shows the change of current, I with time, t for the current which is flowing through R_1 in Diagram 31.1 . Which of the following is most suitable to represent the current which flows through R_2 ?
Rajah 31.2 menunjukkan perubahan arus, I dengan masa, t bagi arus yang sedang mengalir melalui R_1 dalam Rajah 31.1 . Antara berikut, yang manakah paling sesuai untuk mewakili arus melalui R_2 ?

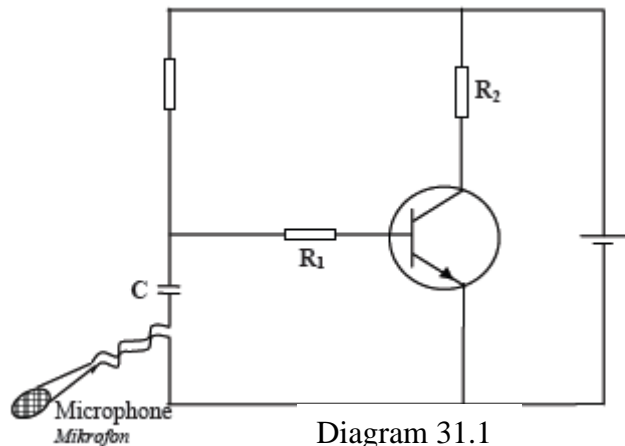


Diagram 31.1
Rajah 31.1

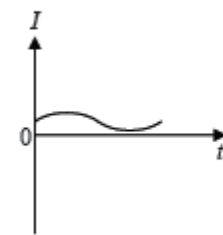
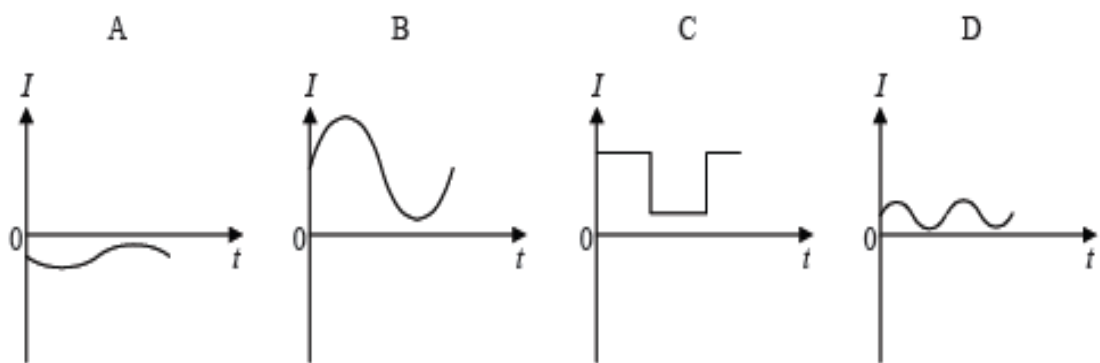


Diagram 31.2
Rajah 31,2



47. Diagram 32 shows a combination of logic gates. The input logics at A, B and C are respectively 1, 0 and 0.

Rajah 32 menunjukkan satu kombinasi get logik. Logik input di A, B dan C adalah masing-masing 1, 0 dan 0.

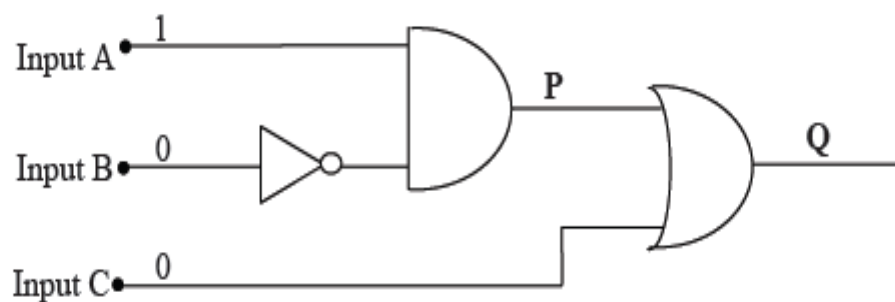


Diagram 32
Rajah 32

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

P **Q**

- A 0 0
- B 0 1
- C 1 0
- D 1 1

48. Diagram 33 shows a series of radioactive decays for the nucleus of uranium-238 to that of radium-226.

Rajah 33 menunjukkan siri pereputan radioaktif nucleus uranium - 238 kepada radium - 226.

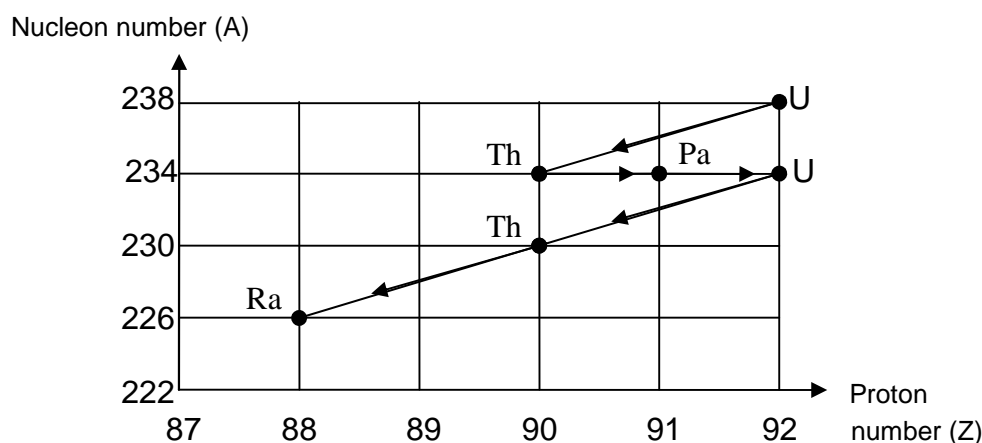


Diagram 33
Rajah 33

How many alpha and beta particles are emitted in this process ?

Berapakah bilangan zarah alpha dan zarah beta yang dipancarkan dalam proses ini ?

	Number of alpha particles <i>Bilangan zarah alfa</i>	Number of beta particles <i>Bilangan zarah beta</i>
A	3	2
B	2	3
C	4	1
D	1	1

49. Diagram 34 show a fireman detecting radiation through lead walls of the storeroom. The radiation was emitted by the radioactive material.

Rajah 34 menunjukkan seorang ahli bomba sedang mengesan sinaran melalui dinding plumbum bilik stor. Sinaran tersebut dihasilkan oleh bahan radioaktif.

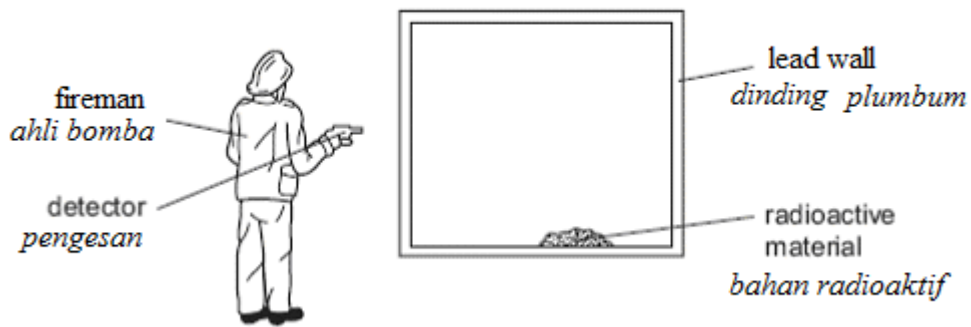


Diagram 34
Rajah 34

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

- A α particles
zarah α
 - B β particles
zarah β
 - C γ rays
Sinar γ
 - D X-rays
Sinar X
50. The half-life of a radioactive substance is 3 days. How much time is required for 10 g of the substance to decay until 1.25 g is left?
Setengah hayat suatu jenis bahan radioaktif ialah 3 hari. Berapakah masa yang perlu untuk 10 g bahan ini reput hingga tertinggal 1.25 g?
- A 3 days
3 hari
 - B 6 days
6 hari
 - C 9 days
9 hari
 - D 12 days
12 hari

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

NAMA:.....

Tingkatan :.....

4531/2
Fizik
Kertas 2
OGOS 2009
2 ½ Jam



**BAHAGIAN PENGURUSAN
SEKOLAH BERASRAMA PENUH DAN SEKOLAH KLUSTER
KEMENTERIAN PELAJARAN MALAYSIA**

**PEPERIKSAAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA 2009**

FIZIK

Kertas 2

Dua jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

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

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

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

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

Section A
Bahagian A

[60 marks]

[60 markah]

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

1. Diagram 1 shows a stopwatch.
Rajah 1 menunjukkan sebuah jam randik.

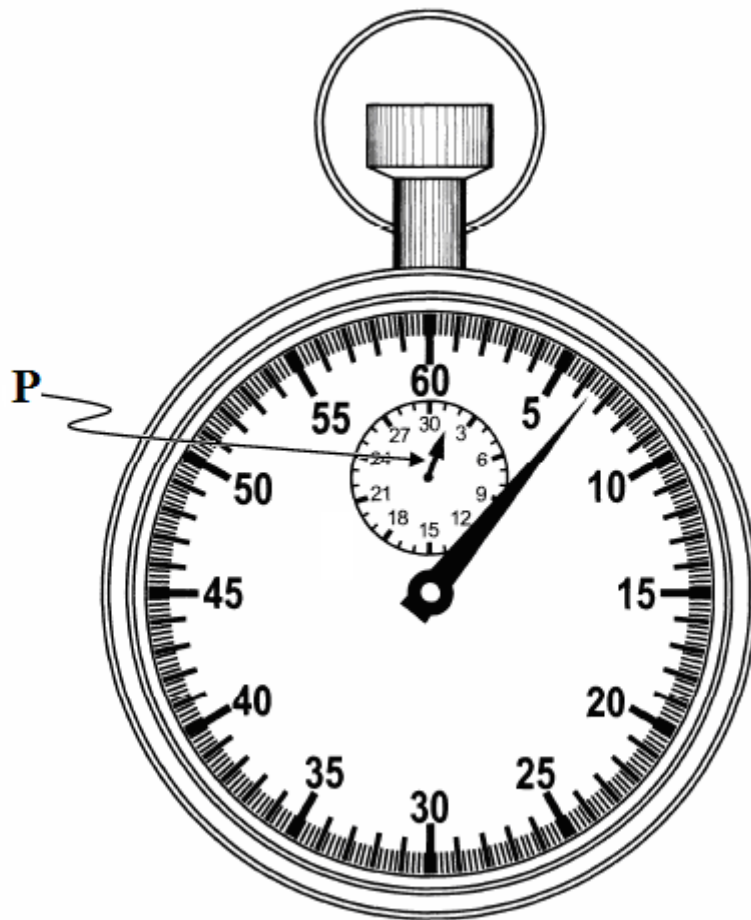


Diagram 1
Rajah 1

- (a) Name the physical quantity measured by the stopwatch.
Namakan kuantiti fizik yang diukur oleh jam randik.

.....
[1 mark]

- (b) State the unit used by this stopwatch.
Nyatakan unit yang digunakan oleh jam randik ini.

.....
[1 mark]

(c) What does the pointer P indicate?

Apakah yang ditunjukkan oleh jarum P?

.....

[1 mark]

(d) What is the reading of the stopwatch?

Apakah bacaan jam randik?

.....

[1 mark]

2. Diagram 2 shows a bar magnet is being pushed towards a solenoid.
Rajah 2 menunjukkan sebatang magnet bar ditolak masuk ke satu solenoid.

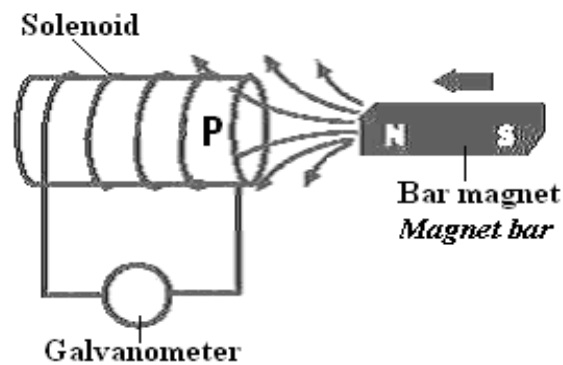


Diagram 2
Rajah 2

(a) State the magnetic pole at P when the magnet is moved towards the solenoid.
Nyatakan kutub magnet pada P apabila magnet itu digerakkan mendekati solenoid .

.....

[1 mark]

(b) In Diagram 2, when the magnet is pushed towards the solenoid;
Pada Rajah 2, apabila magnet ditolak masuk ke dalam solenoid itu;

(i) mark the direction of induced current on the solenoid
tandakan arah arus aruhan pada solenoid

[1 mark]

(ii) show the direction of pointer on the zero centered galvanometer.
tunjukkan arah jarum penunjuk pada galvanometer sifar di tengah.

[1 mark]

(c) Name the physics law involved in determining the poles in (a) above
Namakan hukum fizik yang terlibat dalam menentukan kutub pada (a) di atas.

.....

[1mark]

- (d) State one method to increase the induced current in the solenoid.
Nyatakan satu kaedah untuk meningkatkan arus aruhan pada solenoid

.....
 [1 mark]

3. Diagram 3.1 shows a metal P at 100°C being placed in a beaker of water at 28 °C. After a few minutes thermal equilibrium state is achieved.
 The mass of metal P and the water are 0.4 kg and 0.2 kg respectively.
*Rajah 3.1 menunjukkan logam P pada suhu 100°C di letakkan di dalam bikar mengandungi air pada suhu 28°C. Selepas beberapa minit keadaan keseimbangan terma dicapai.
 Jisim logam P dan air masing-masing adalah 0.4 kg dan 0.2 kg.*

Diagram 3.2 shows a temperature against time graph of the water in the beaker.
Rajah 3.2 menunjukkan graf suhu berbanding masa bagi air dalam bikar itu.

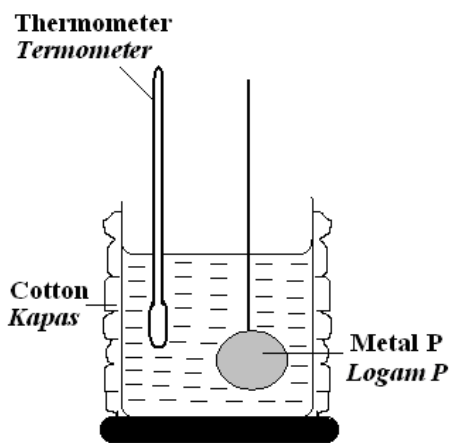


Diagram 3.1
Rajah 3.1

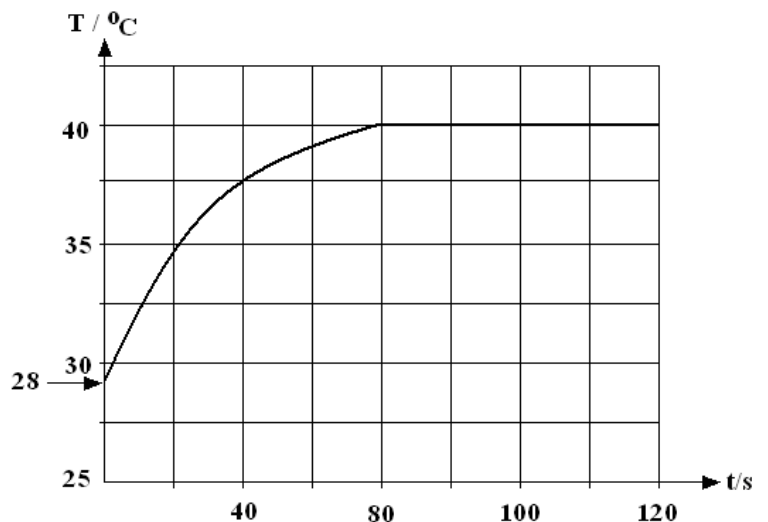


Diagram 3.2
Rajah 3.2

- (a) (i) What is the meaning of thermal equilibrium?
Apakah yang di maksudkan dengan keseimbangan terma?

.....
 [1 mark]

- (ii) Based on the graph in Diagram 3.2, what is the temperature when the thermal equilibrium is achieved?
Berdasarkan graf dalam Rajah 3.2 berapakah suhu apabila keadaan keseimbangan terma dicapai?

.....
 [1 mark]

(iii) What is the purpose of wrapping the beaker with cotton layer?
Apakah tujuan membalut bikar dengan lapisan kapas?

.....
 [1 mark]

(b) (i) Calculate the specific heat capacity of metal P.
 (Specific heat capacity of water is $4200 \text{ J kg}^{-1} \text{ }^\circ\text{C}^{-1}$)
Hitungkan muatan haba tentu logam P.
(Muatan haba tentu air adalah $4200 \text{ J kg}^{-1} \text{ }^\circ\text{C}^{-1}$)

[2 marks]

(ii) State the assumption you made in (b)(i)
Nyatakan anggapan yang dibuat dalam (b) (i).

.....
 [1 mark]

4. Diagram 4 shows a simple control system using logic gates which can switch on an air conditioner automatically.
Rajah 4 menunjukkan satu sistem kawalan menggunakan get logik yang boleh menghidupkan sebuah penyaman udara secara automatik.

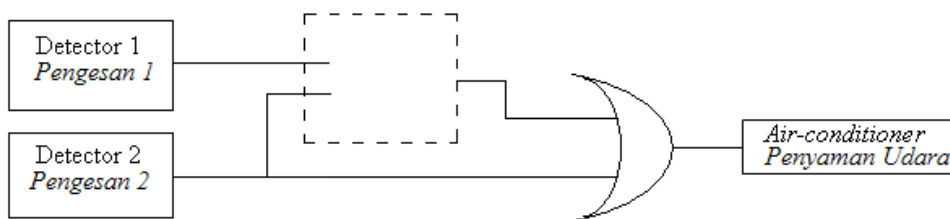


Diagram 4
 Rajah 4

(a) What is logic gates?
Apakah get logik?

.....
 [1 mark]

- (b) The air conditioner only switches on during *hot days or hot nights*.
Penyaman udara hanya dihidupkan pada hari yang panas atau malam yang panas.

- (i) Complete the truth table to show the operation of the logic gates in the circuit above. Use the keys below to complete your truth table.
Bina sebuah jadual kebenaran untuk menunjukkan operasi get logik di atas. Guna kekunci dibawah untuk melengkapkan jadual kebenaran anda.

Keys:

Kekunci:

Detector 1 <i>Pengesan 1</i>		Detector 2 <i>Pengesan 2</i>		Air Conditioner <i>Penghawa dingin</i>	
In the day <i>Waktu siang</i>	1	Hot <i>Panas</i>	1	Switch on <i>Dihidupkan</i>	1
At night <i>Waktu malam</i>	0	Cool <i>Sejuk</i>	0	Switch off <i>Dimatikan</i>	0

Detector 1 <i>Pengesan 1</i>		Detector 2 <i>Pengesan 2</i>		Air Conditioner <i>Penghawa dingin</i>	
0		0			
0		1			
1		0			
1		1			

Truth table
Jadual Kebenaran

[2 marks]

- (ii) Using diagram 4 and your answer in b(i), name a suitable logic gate which can carry out the required operation
Berdasarkan jawapan anda dalam diagram 4 dan b(i), namakan satu get logik yang boleh melaksanakan operasi tersebut..

.....
 [1 mark]

- (iii) In Diagram 4, draw the logic gate in the box provided.
Dalam Rajah 4 lukiskan get logik tersebut di dalam kotak yang disediakan

[1 mark]

- (c) Suggest suitable electrical components that can be used as detector 1 and detector 2 in the circuit above.
Cadangkan komponen- komponen elektrik yang sesuai digunakan sebagai pengesan 1 dan pengesan 2 dalam litar di atas.

Detector 1:
Pengesan 1

Detector 2:
Pengesan 2

[2 marks]

5. Diagram 5.1 shows an airplane maintaining a steady and level flight under the influence of four forces.

Diagram 5.2 shows an load hanging from the middle of the string. T_1 and T_2 are tensions of the string and W is the weight of the load. The dotted line shows the resolved component of the tensions T_1 and T_2 .

Rajah 5.1 menunjukkan sebuah kapal terbang yang sedang bergerak dengan penerbangan yang tetap pada aras yang sama di bawah pengaruh empat daya.

Rajah 5.2 menunjukkan satu beban digantung pada bahagian tengah tali. T_1 dan T_2 adalah tegangan tali dan W adalah berat beban. Garis putus-putus menunjukkan komponen leraian daya bagi tegangan T_1 and T_2 .

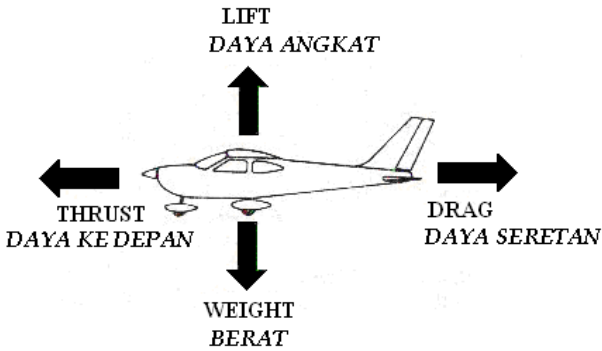


Diagram 5.1
Rajah 5.1

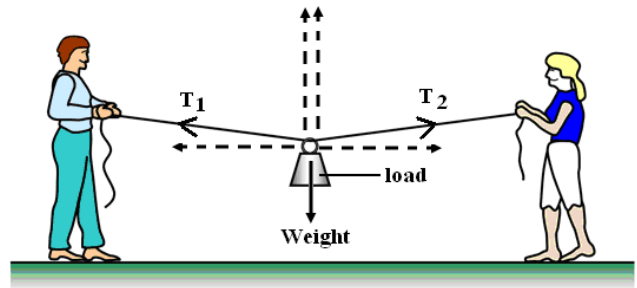


Diagram 5.2
Rajah 5.2

(a) What is meant by weight?
Apakah yang dimaksudkan dengan berat?

.....
[1 mark]

(b) Based on Diagram 5.1 and Diagram 5.2,
Berdasarkan Rajah 5.1 dan Rajah 5.2,

(i) compare the forces acting on the airplane
bandingkan daya yang bertindak ke atas kapal terbang

vertically :.....
secara menegak

horizontally :.....
secara mengufuk

[2 marks]

(ii) compare the forces acting on the load.
bandingkan daya yang bertindak ke atas beban.

vertically :.....
secara menegak

horizontally :.....
secara mengufuk

[2 marks]

(c) Compare the type of motion of the airplane and the object
Bandingkan jenis gerakan kapal terbang dan objek

.....
.....

[1 mark]

(d) Based on your answer in 5(b) and 5(c), relate the type of motion with the resultant forces acting on the aeroplane or on the load.
Berdasarkan jawapan anda dalam 5(b) dan 5(c), hubungkan antara jenis gerakan dengan daya paduan yang bertindak ke atas kapal terbang atau beban.

.....
.....

[1 mark]

(e) Name the phenomenon shown in Diagram 5.1 and Diagram 5.2.
Namakan fenomena fizik yang ditunjukkan dalam Rajah 5.1 dan Rajah 5.2.

.....
[1 mark]

6. Diagram 6.1 and Diagram 6.2 show fringes are formed when identical monochromatic lights pass through the double slits.
Rajah 6.1 dan Rajah 6.2 menunjukkan corak pinggir yang dihasilkan apabila cahaya monokromatik yang sama melalui dwicelah.

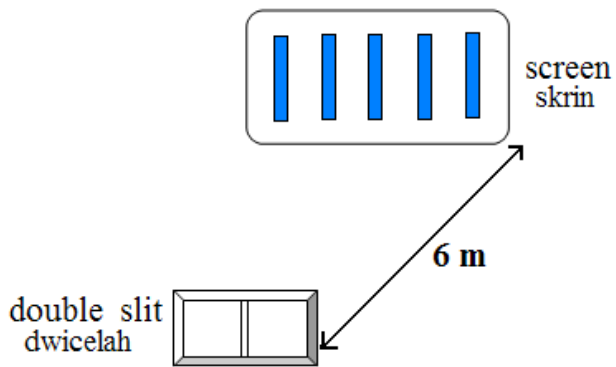


Diagram 6.1.
Rajah 6.1

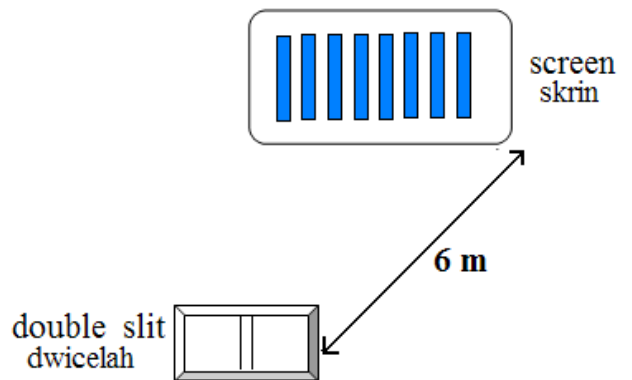


Diagram 6.2
Rajah 6.2

- (a) What is the meaning of monochromatic light?
Apakah yang dimaksudkan dengan cahaya monokromatik?

..... [1 mark]

- (b) Explain how fringes are formed on the screen?
Terangkan bagaimana pinggir-pinggir terbentuk di atas skrin?

.....
.....
..... [2 marks]

- (c) Using Diagram 6.1 and Diagram 6.2:
Menggunakan Rajah 6.1 dan 6.2:

- (i) Compare the distance between the slits, a .
Bandingkan jarak di antara dua celah, a .

..... [1 mark]

- (ii) Compare the wavelength of the light, λ , that passes through the double slits.
Bandingkan panjang gelombang cahaya, λ , yang melalui dwicelah.

..... [1 mark]

- (iii) Compare the distance between the double slits and the screen, D .
Bandingkan jarak di antara dwicelah dan skrin, D .

..... [1 mark]

- (iv) Compare the distance between the fringes, x .
Bandingkan jarak di antara pinggir-pinggir, x .

..... [1 mark]

- (d) Using your answers in 6 (c) state the relationship between x and a .
Menggunakan jawapan anda di 6(c) nyatakan hubungan antara x dan a .

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

7. Diagram 7.1 shows a concrete water tank filled with water.
Rajah 7.1 menunjukkan sebuah tangki konkrit yang diisi dengan air.

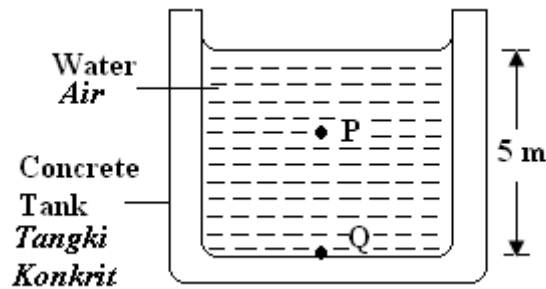


Diagram 7.1
Rajah 7.1

- (a) State a factor that affects the water pressure in the tank.
Nyatakan satu faktor yang mempengaruhi tekanan air di dalam tangki.

.....
 [1 mark]

- (b) (i) Compare the water pressure at P and Q
Bandungkan tekanan air pada P dan Q

.....
 [1 mark]

- (ii) Calculate the water pressure at Q.
 (Density of water = 1000 kg m^{-3})
Hitungkan tekanan air pada Q
 (Ketumpatan air = 1000 kg m^{-3})

[2 marks]

- (c) Diagram 7.2 shows water flows from the concrete tank to the house water tank.
Rajah 7.2 menunjukkan air mengalir dari tangki konkrit ke tangki air di rumah.

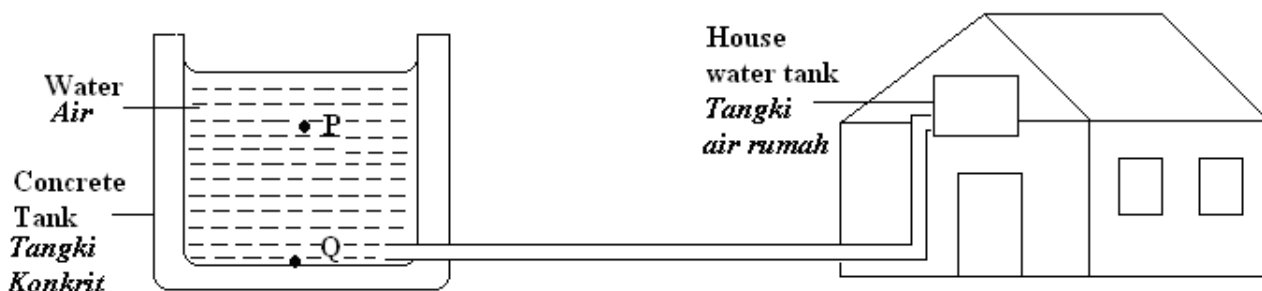


Diagram 7.2
Rajah 7.2

- (i) What is the factor that causes the water to flow from the concrete tank to the water tank in the house?

Apakah faktor yang menyebabkan air boleh mengalir dari tangki konkrit ke tangki air di rumah?

.....
 [1 mark]

- (ii) The flow of water from the concrete tank to the house will stop at level P.

Explain why the supply stops?

Pengaliran air dari tangki konkrit ke tangki air di rumah akan terhenti pada paras P. Terangkan mengapa pengalirannya berhenti?

.....

 [2 mark]

- (d) (i) Suggest two modifications that can be done to ensure the water flow continuously to the house water tank.

Cadangkan dua pengubahsuaian yang boleh dibuat untuk memastikan air dapat mengalir secara berterusan ke tangki di rumah kediaman.

.....

 [2 mark]

- (ii) Draw a water tank that can withstand high water pressure .

Lukiskan tangki air yang boleh menampung tekanan yang tinggi.

[1 mark]

8. Diagram 8.1 and Diagram 8.2 shows three identical filament bulbs marked 6V, 12W arranged in two different ways and connected to a battery 6 V .
Rajah 8.1 dan Rajah 8.2 menunjukkan tiga mentol filamen yang serupa berlabel 6V,12W disusun dengan dua cara berbeza dan disambungkan kepada bateri 6 V.

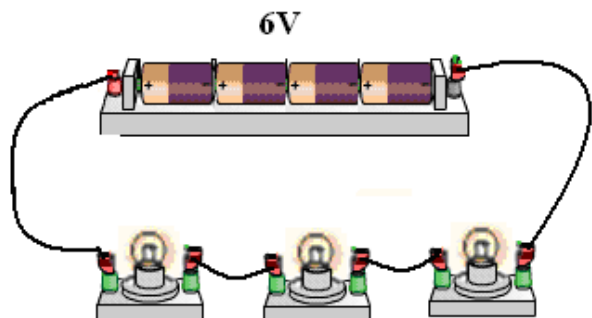


Diagram 8.1
Rajah 8.1

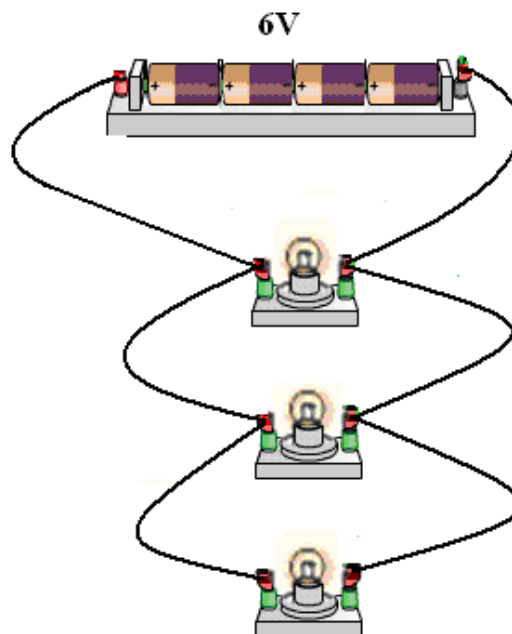


Diagram 8.2
Rajah 8.2

- (a) What is meant by 6V,12W ?
Apakah yang dimaksudkan dengan 6V,12W ?

.....

[1 mark]

- (b) State the type of circuit in Diagram 8.1 and 8.2
Nyatakan jenis sambungan litar dalam Rajah 8.1 dan 8.2.

Diagram 8.1:
Rajah 8.1

Diagram 8.2.....
Rajah 8.2

[2 marks]

- (c) The bulbs in Diagram 8.2 are brighter than the bulbs in Diagram 8.1. Explain your answer .
Mentol-mentol dalam Rajah 8.2 lebih cerah dari mentol dalam Rajah 8.1. Terangkan jawapan anda.

.....
.....
.....

[2 marks]

- (d) The resistance of each bulb in Diagram 8.1 and Diagram 8.2 is 4Ω . Determine the current flow in each bulb.
Rintangan setiap mentol dalam Rajah 8.1 dan Rajah 8.2 adalah 4Ω . Tentukan arus yang mengalir dalam setiap mentol.

- (i) Diagram 8.1:
Rajah 8.1:

- (i) Diagram 8.2:
Rajah 8.2:

[4 marks]

- (e) A student wants to design an incubator. Bulbs are used to heat up the incubator.
Seorang pelajar hendak merekabentuk sebuah inkubator. Mentol digunakan untuk memanaskan inkubator itu.

- (i) Between the circuit in Diagram 8.1 and in Diagram 8.2, which circuit is the most suitable to be used by the student to heat up the incubator.
Di antara litar Rajah 8.1 dan Rajah 8.2, litar yang manakah paling sesuai digunakan oleh pelajar untuk memanaskan inkubator.

.....

[1 mark]

- (ii) Give two reasons for your answer in 8(e)(i).
Berikan dua sebab kepada jawapan anda di 8(e)(i).

.....
.....

[2 marks]

Section B
Bahagian B

[20 marks]

[20 markah]

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

9. Diagram 9.1 and Diagram 9.2 show a light ray is refracted when passing through two different mediums.

The refractive index for medium A is 1.33 and the refractive index for medium B is 1.50.

Rajah 9.1 dan Rajah 9.2 menunjukkan satu sinar cahaya terbias apabila merambat melalui dua medium yang berbeza..

Indeks biasan untuk medium A ialah 1.33 dan indeks biasan untuk medium B adalah 1.50.

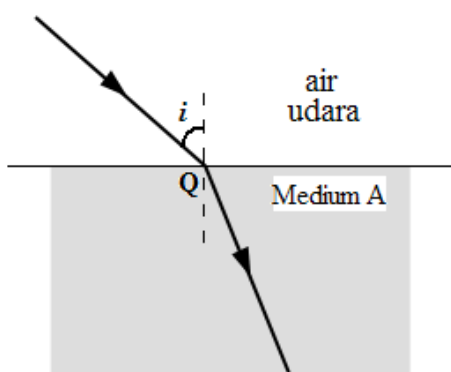


Diagram 9.1

Rajah 9.1

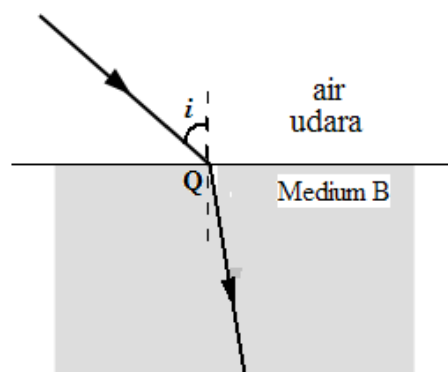


Diagram 9.2

Rajah 9.2

- (a) What is meant by refraction?
Apakah yang dimaksudkan dengan pembiasan?

[1 mark]

- (b) Based on Diagram 9.1 and Diagram 9.2, compare the refractive index, the refracted angle and the density between medium A and medium B

Relate the refractive index with the refracted angle and the refractive index with the ratio of sin of incident angle, i to the sin of the refracted angle, r to deduce a physics law that is involved.

Berdasarkan Rajah 9.1 dan Rajah 9.2, bandingkan indeks biasan, sudut biasan dan ketumpatan medium A dan medium B

Hubungkan indeks biasan dengan sudut biasan dan indeks biasan dengan nisbah sinus sudut tuju, i kepada sinus sudut biasan, r bagi menghasilkan hukum fizik yang terlibat.

[5 marks]

- (c) Diagram 9.3 shows a simple overhead projector. A *real* and inverted image is formed by the projector on the ceiling.

Rajah 9.3 menunjukkan sebuah projektor 'overhead' ringkas. Satu imej nyata dan songsang dibentuk oleh projektor pada siling.

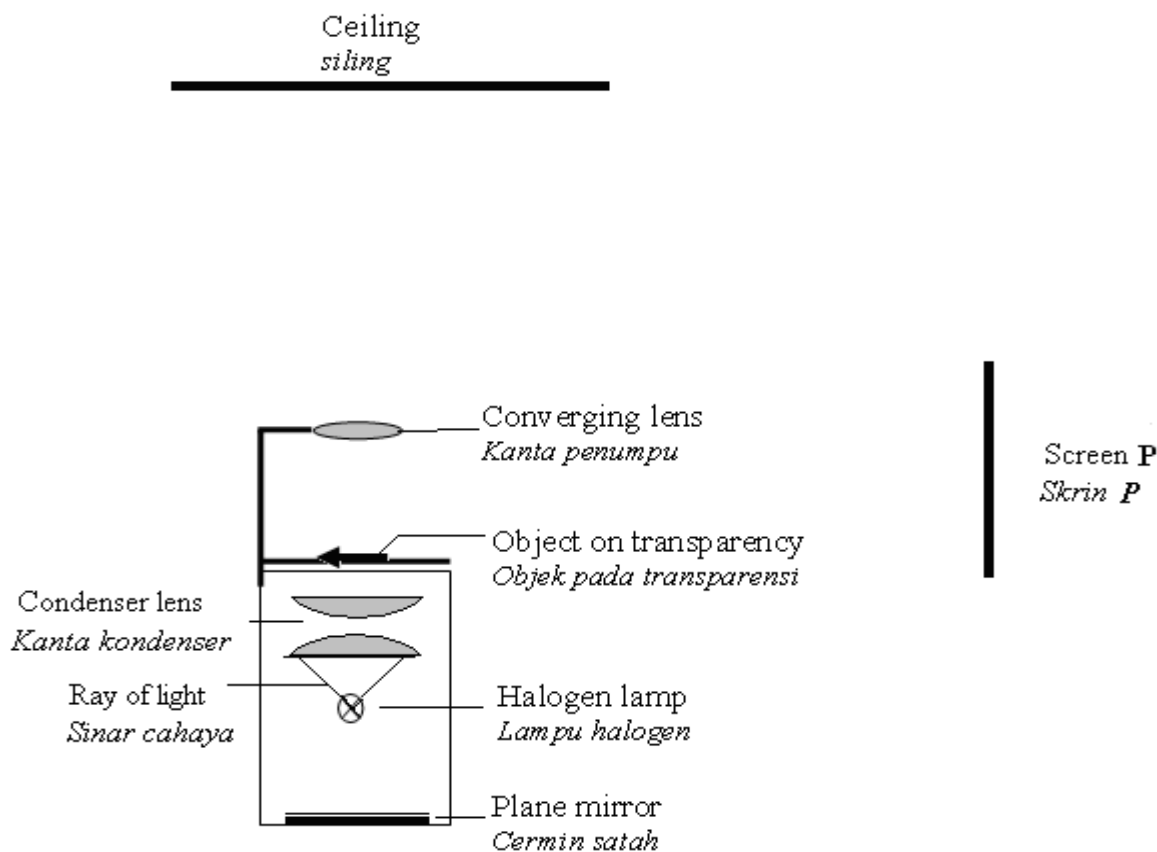


Diagram 9.3
Rajah 9.3

- (i) With the aid of a ray diagram, show how the ray travel from the halogen lamp to form the image on the ceiling.

Dengan bantuan rajah sinar, tunjukkan bagaimana sinar yang bergerak dari lampu halogen dapat membentuk imej pada siling.

[4 marks]

- (ii) Using an appropriate physics concept, suggest and explain suitable modifications or ways to enable the projector to increase its efficiency and to form a brighter and clear image on the screen P. Your modifications can be emphasised on the following aspects;

Menggunakan konsep fizik yang sesuai, cadang dan terangkan pengubahsuaian atau cara yang boleh dilakukan untuk meningkatkan keberkesanannya bagi menghasilkan imej yang terang dan jelas pada skrin P. Pengubahsuaian anda boleh berdasarkan kepada aspek-aspek berikut:

- Component used to form the image on the screen
Komponen yang boleh digunakan untuk menghasilkan imej pada skrin
- Component to produce brighter image
Komponen untuk menghasilkan imej yang lebih terang
- The position of the halogen lamp
Kedudukan lampu halogen
- Component to increase the projectors lifetime
Komponen untuk meningkatkan jangkahayat project
- Component to protect the transparency from extreme heat
Komponen untuk melindungi transparenasi dari haba yang melampau.

[10 marks]

10. (a) Diagram 10.1 and Diagram 10.2 shows two identical electromagnet, X and Y .
Rajah 10.1 dan Rajah 10.2 menunjukkan dua elektromagnet yang serupa, X dan Y.

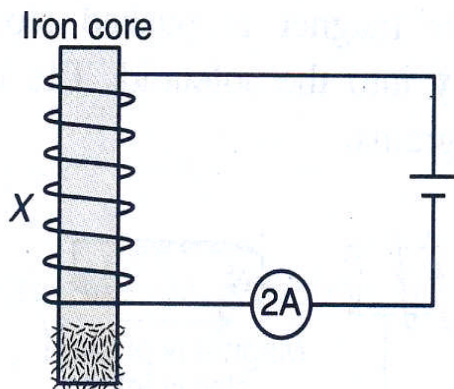


Diagram 10.1
Rajah 10.1

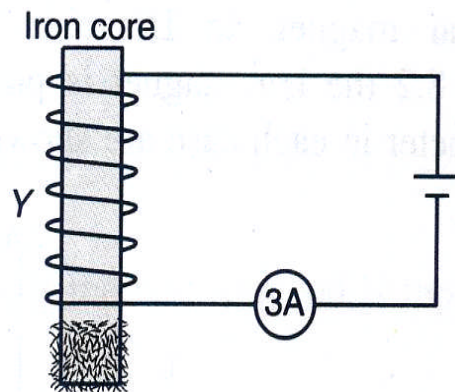


Diagram 10.2
Rajah 10.2

- (i) What is meant by electromagnet?
Apakah yang dimaksudkan dengan elektromagnet?

[1 mark]

- (ii) Using Diagram 10.1 and Diagram 10.2 compare the current flow, the amount of iron filing and the magnetic field strength of the two electrodes. Relate the current flow and amount of iron filing attracted by the electromagnet and the magnetic field strength.

Menggunakan Rajah 10.1 dan Rajah 10.2 bandingkan pengaliran arus, kuantiti serbuk besi dan kekuatan medan magnet kedua-dua elektrod. Hubungkait pengaliran arus dengan kuantiti serbuk besi yang tertarik kepada elektromagnet dan kekuatan medan magnet.

[5 marks]

- (b) Diagram 10.3 shows a circuit breaker.
Rajah 10.3 menunjukkan sebuah pemutus litar.

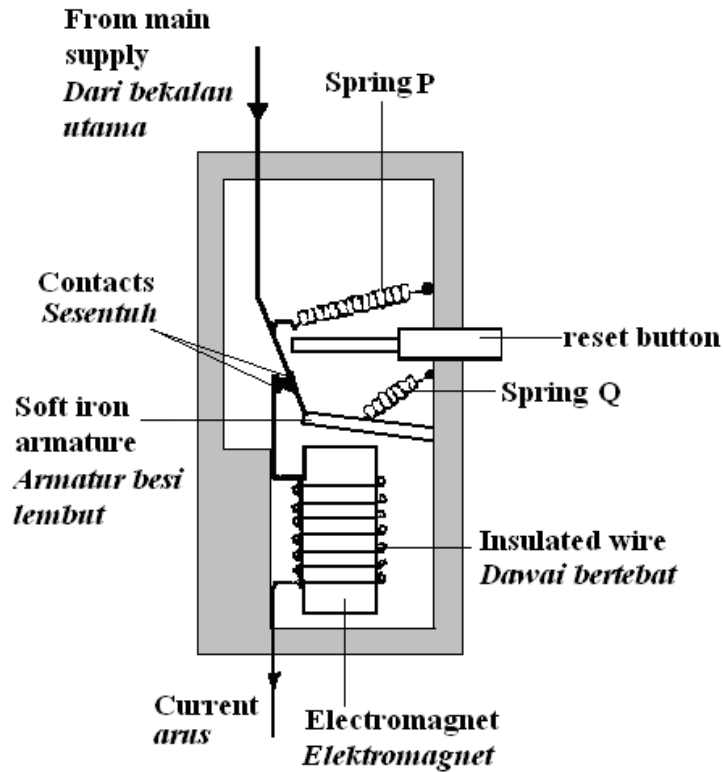


Diagram 10.3
Rajah 10.3

Explain how the circuit breaker works.
Terangkan bagaimana pemutus litar berfungsi.

[4 marks]

- (c) Diagram 10.4 shows an a.c generator
Rajah 10.4 menunjukkan sebuah penjana a.u

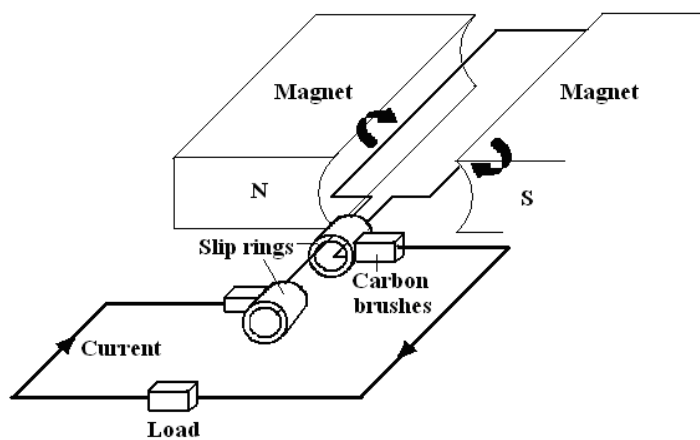


Diagram10.4
Rajah 10.4

- (i) Explain how the generator works to produce alternating current.
Terangkan bagaimana penjana berfungsi untuk menghasilkan arus ulang alik. [4 marks]
- (ii) Explain the modification that needs to be done on the generator and the external circuit to enable the generator to be a d.c generator and produce more current.
Terangkan pengubahsuaian yang perlu dibuat kepada penjana dan litar luar untuk membolehkan penjana menjadi penjana a.t dan menghasilkan arus yang lebih tinggi. [6 marks]

Section C
Bahagian C

[20 marks]

[20 markah]

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

11. Diagram 11.1 shows a cargo ship is sailing in sea water.
Rajah 11.1 menunjukkan sebuah kapal kargo sedang belayar di lautan.

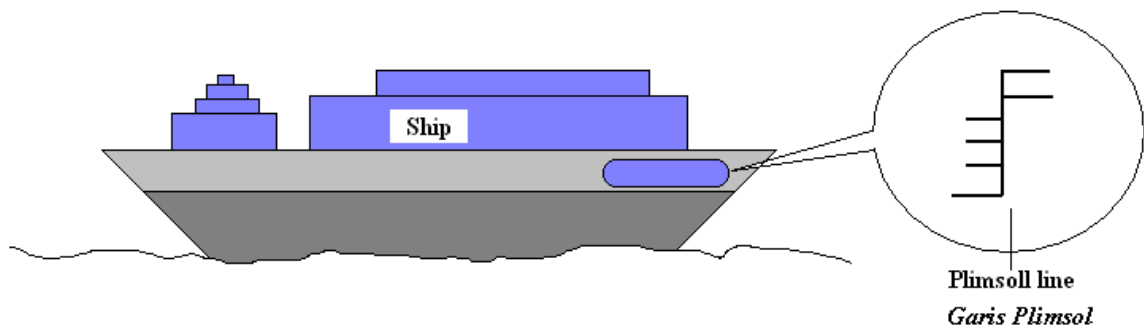


Diagram 11.1
Rajah 11.1

- (a) Name the physics principle involved which makes the ship float in sea water.
Namakan prinsip fizik yang terlibat yang membuatkan kapal itu terapung di lautan. [1 marks]
- (b) Explain why the ship can float in sea water
Terangkan mengapa kapal boleh terapung di dalam air laut. [2 marks]
- (c) Plimsoll lines are marked at the sides of the ship.
Garis-garis plimsol ditandakan pada tepi kapal itu.
- (i) State the purpose of plimsoll lines
Nyatakan kegunaan garis plimsol itu.
- (ii) Explain why plimsoll lines have many levels.
Terangkan mengapa garis plimsol itu mempunyai banyak aras. [2 marks]

(d) Table 11.2 shows the characteristics of four structures of ship P, Q, R, and S.

Jadual 11.2 menunjukkan ciri-ciri bagi empat struktur kapal P, Q, R, dan S.

Structure of ships <i>Struktur kapal</i>	Shape <i>Bentuk</i>	Strength Of the metal used <i>Kekuatan logam yang digunakan</i>	Ship Base Cross section area <i>Luas keratan rentas dasar kapal</i>	Volume of the air space in the ship <i>Isipadu ruangan udara dalam kapal</i>
P	Streamlined <i>Larus</i>	High <i>Tinggi</i>	Wide <i>Luas</i>	High <i>Tinggi</i>
Q	Oval <i>Bujur</i>	Low <i>Rendah</i>	Wide <i>Luas</i>	High <i>Tinggi</i>
R	Circle <i>Bulat</i>	High <i>Tinggi</i>	Smal <i>kecil</i>	Low <i>Rendah</i>
S	Streamlined <i>Larus</i>	Low <i>Rendah</i>	Small <i>kecil</i>	Low <i>Rendah</i>

Table 11.2
Jadual 11.2

As a researcher in a ship manufacturing company, you are assigned to study the structure used to make the ship to support heavy cargoes..

You are given four choices of the structures P, Q, R and S. The table above shows the structures of the boat.

Sebagai seorang penyelidik dalam syarikat pembinaan kapal, anda dikehendaki mengkaji struktur kapal yang sesuai untuk membina kapal yang dapat menampung kargo yang berat. Anda di berikan empat pilihan struktur P, Q, R dan S. Jadual di atas menunjukkan struktur-struktur kapal itu.

Explain the suitable characteristics of the structure to be used to make the ship.

Determine the most suitable structure to be used to make the ship to support heavy cargoes.

Give reasons for your choice.

Terangkan ciri-ciri struktur yang sesuai untuk digunakan untuk membuat kapal itu.

Tentukan struktur yang paling sesuai untuk digunakan untuk membina kapal yang dapat menampung kargo yang berat.

Beri sebab untuk pilihan anda.

[10 marks]

(e)

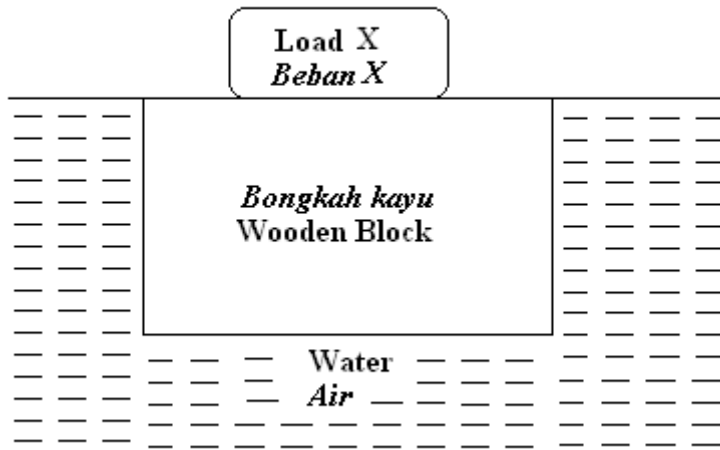


Diagram 11.2
Rajah 11.2

Diagram 11.2 shows a load X is placed on a wooden block. Both of them is then placed in water of density 1000 kgm^{-3} . The mass of the wooden block is 3 kg and the density is 800 kgm^{-3} .

Rajah 11.2 menunjukkan satu beban X di letakkan diatas sebuah bongkah kayu. Keduanya di masukkan ke dalam air yang mempunyai ketumpatan 1000 kgm^{-3} . Jisim bongkah kayu itu adalah 3 kg dan ketumpatannya adalah 800 kgm^{-3} .

- (i) Calculate the volume of water displaced by the load and the wooden block.
Hitungkan isipadu air yang disasarkan oleh beban dan bongkah kayu itu.

[2 marks]

- (ii) Calculate the mass of the load X .
Hitungkan jisim beban X tersebut.

[3 marks]

12. Diagram 12.1 shows a system used in a factory to ensure the volume of guava juice in a bottle is uniform.

Rajah 12.1 menunjukkan satu sistem yang digunakan di sebuah kilang untuk memastikan isipadu jus buah jambu yang diisi ke dalam botol adalah seragam.

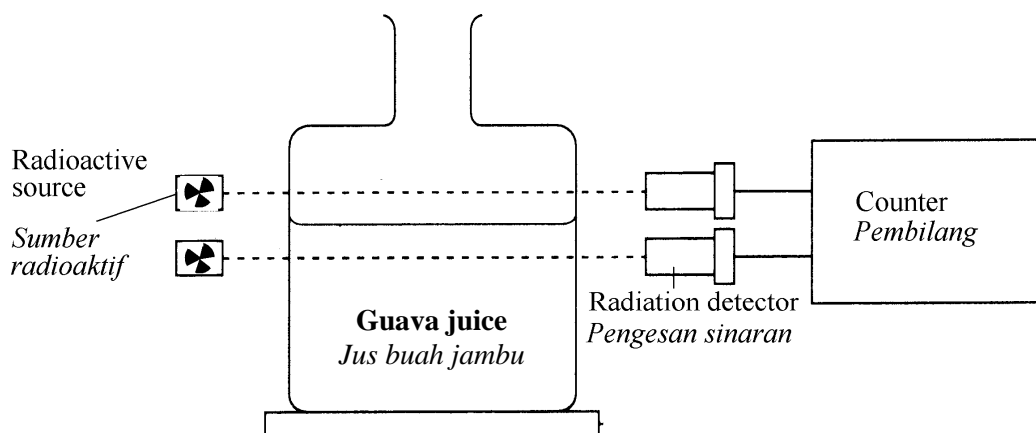


Diagram 12.1
Rajah 12.1

The radioactive source, radiation detector and counter are used to detect the volume of guava juice. The radioactive source contains a radioisotope.

Sumber radioaktif, pengesan sinaran dan pembilang digunakan untuk mengesan isipadu jus buah jambu. Sumber radioaktif itu mengandungi radioisotop.

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

[1 mark]

- (b) Table 12.2 shows the characteristics of five radioisotopes P, Q, R, S and T.
Jadual 12.2 menunjukkan ciri-ciri bagi lima radioisotop P, Q, R, S dan T.

Radioisotope <i>Radioisotop</i>	Half life <i>Separuh hayat</i>	Types of ray <i>Jenis sinar</i>	State of matter <i>Keadaan jirim</i>	Ionising power <i>Kuasa pengionan</i>
P	7 hours <i>7 jam</i>	alfa	solid <i>pepejal</i>	high <i>tinggi</i>
Q	10 days <i>10 hari</i>	beta	liquid <i>cecair</i>	moderate <i>sedehana</i>
R	100 days <i>100 hari</i>	gamma	solid <i>pepejal</i>	low <i>rendah</i>
S	10 years <i>10 tahun</i>	gamma	liquid <i>cecair</i>	high <i>tinggi</i>
T	30 years <i>30 tahun</i>	beta	solid <i>pepejal</i>	low <i>rendah</i>

Table 12.2
Jadual 12.2

As a factory engineer, you are required to determine the most suitable radioisotope that can be used by the system to ensure the volume of guava juice is uniform. Study the characteristics of all 5 radioisotopes and explain the suitability of the aspects. Determine the most suitable radioisotope and give the reason for your choice.

Sebagai jurutera kilang, anda dikehendaki menentukan radioisotop yang paling sesuai yang boleh digunakan oleh sistem untuk memastikan isipadu jus buah jambu adalah seragam. Kaji ciri-ciri kelima-lima radioisotop dan terangkan kesesuaian bagi setiap aspek. Tentukan radioisotop yang paling sesuai dan beri sebab bagi pilihan anda.

[10 marks]

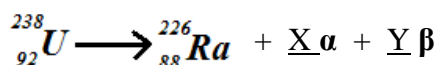
- (c) Table 12.3 shows the reading of the rate meter for 6 bottles through detector and radioactive source .

Jadual 12.3 menunjukkan bacaan meter kadar bagi 6 botol yang melalui pengesan dan sumber radioaktif.

Bottle/Botol	A	B	C	D	E	F
Rate meter reading/Bacaan meter kadar (count per minute/Bilangan per minit)	464	468	467	462	568	470

Table 12.3
Jadual 12.3

- (i) State one detector that is suitable to be used for this purpose.
Nyatakan satu alat pengesan yang sesuai digunakan untuk tujuan ini. [1 mark]
- (ii) Based on table 12.3, which bottle shows the least volume of juice and state the reason for your answer.
Berdasarkan jadual 12.3, botol yang manakah menunjukkan isipadu yang tidak cukup dan nyatakan sebab bagi jawapan anda. [3 marks]
- (d) In a radioactive decay series, Uranium-238 decays to become Radium-226 by emitting alfa and beta.
Dalam siri reputan radioaktif, Uranium-238 mereput menjadi Radium-226 dengan menghasilkan alfa dan beta.



Determine the values of X and Y?
Tentukan nilai X dan Y?

[5 marks]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

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

4531/3
Fizik
Kertas 3
Ogos
2009
1 ½ jam



**BAHAGIAN PENGURUSAN
SEKOLAH BERASRAMA PENUH DAN SEKOLAH KLUSTER
KEMENTERIAN PELAJARAN MALAYSIA**

PEPERIKSAAN PERCUBAAN SPM 2009

FIZIK

KERTAS 3

Satu jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

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

<i>Kegunaan Pemeriksa</i>			
Bahagian	Soalan	Markah Penuh	Markah
A	1	16	
	2	12	
B	3	12	
	4	12	
JUMLAH			

Kertas soalan ini mengandungi 15 halaman bercetak

Section A
[28 marks]

Answer **all** question
Jawab semua soalan

1. A student carries out an experiment to investigate the relationship between the length, ℓ of a piece of wire X placed at the cut A of cardboard strip and the angle, θ .

The apparatus set-up for this experiment is shown in Diagram 1.1 and 1.2.

Seorang murid menjalankan satu eksperimen untuk mengkaji hubungan antara panjang, ℓ seutas wayar X yang diletakkan pada sekeping potongan kadbod di A dengan sudut, θ . Susunan alat radas bagi eksperimen ini ditunjukkan pada rajah 1.1 dan 1.2.

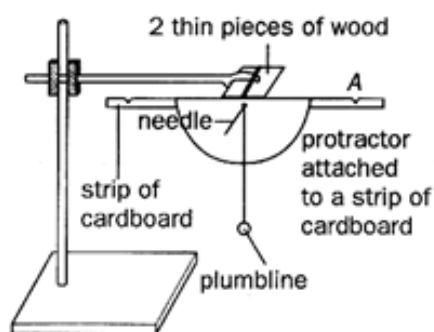


Diagram 1.1

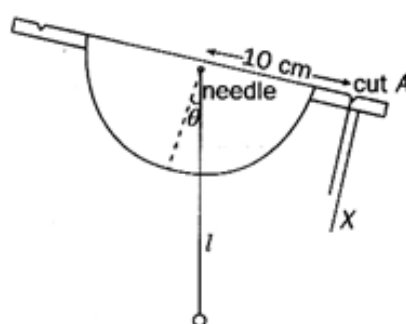


Diagram 1.2

The student starts the experiment with the length, ℓ of a piece of wire X that is 50.0 cm. The corresponding reading of protractor is shown in Diagram 1.3 on page 3. The experiment is repeated with length, ℓ of wire 40.0 cm, 30.0 cm, 20.0 cm and 10.0 cm. The corresponding readings of protractor are shown in Diagram 1.4, 1.5, 1.6 and 1.7 on pages 3, 4 and 5.

Murid itu memulakan eksperimen dengan panjang, ℓ seurat wayar X 50.0 cm. Bacaan jangkasadut yang sepadan yang sepadan ditunjukkan pada rajah 1.3 dihalaman 3. Eksperimen diulangi dengan menggunakan panjang, $\ell = 40.0$ cm, 30.0 cm, 20.0 cm dan 10.0 cm. Bacaan jangkasadut yang sepadan dihalaman 3, 4 dan 5.

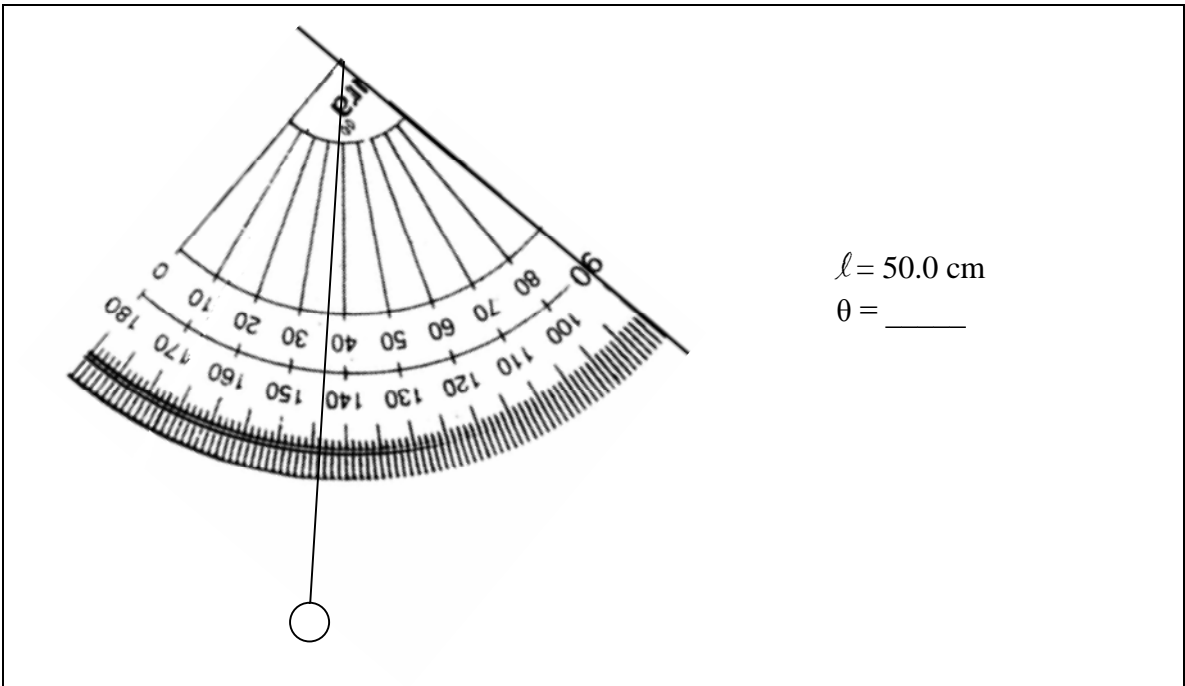


Diagram 1.3

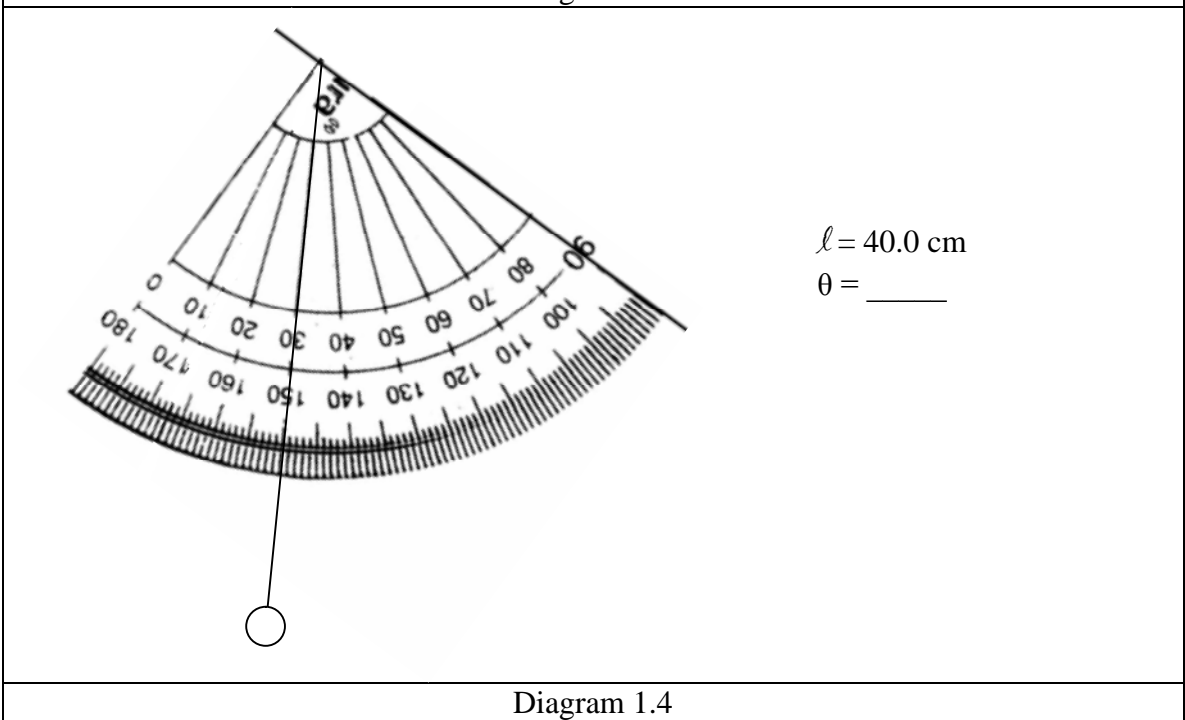


Diagram 1.4

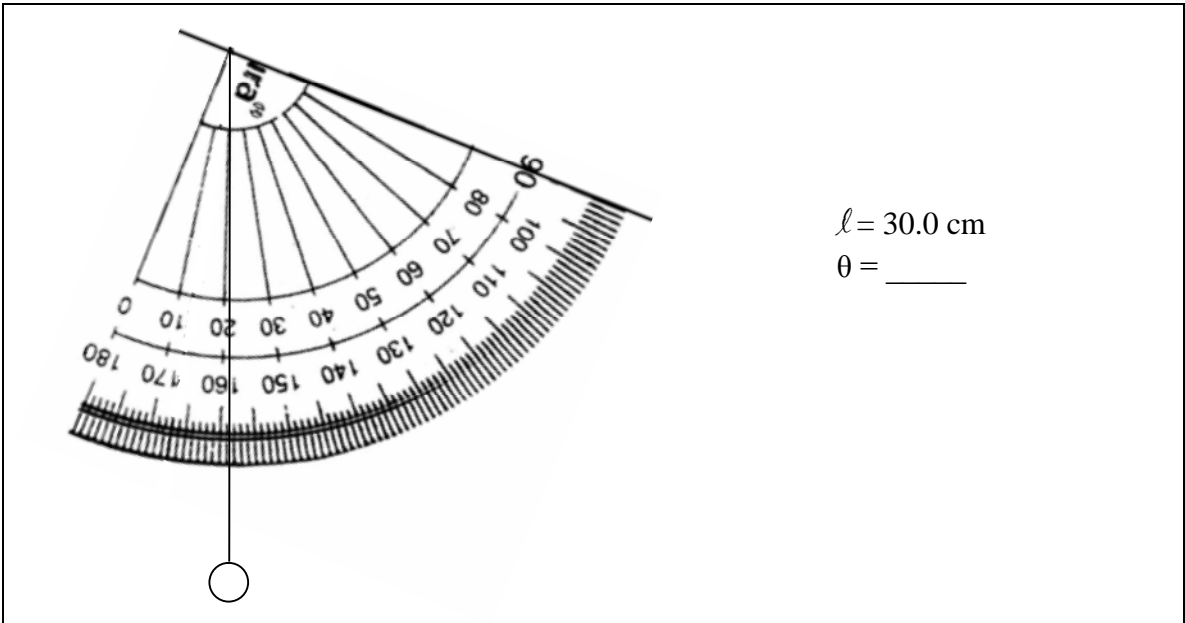


Diagram 1.5

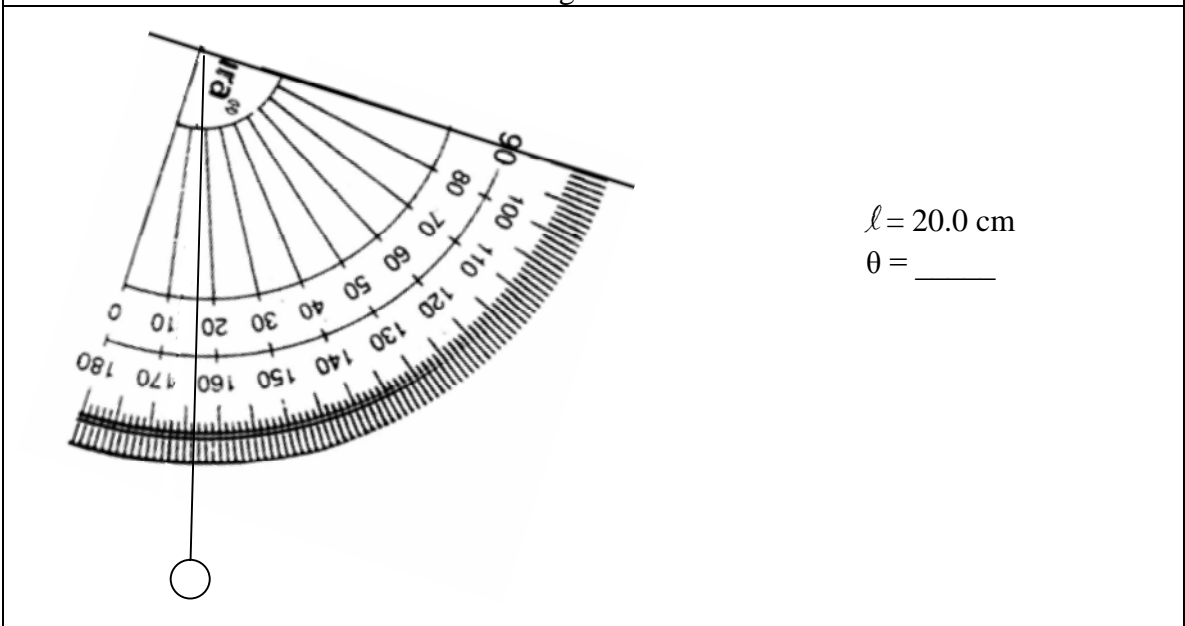
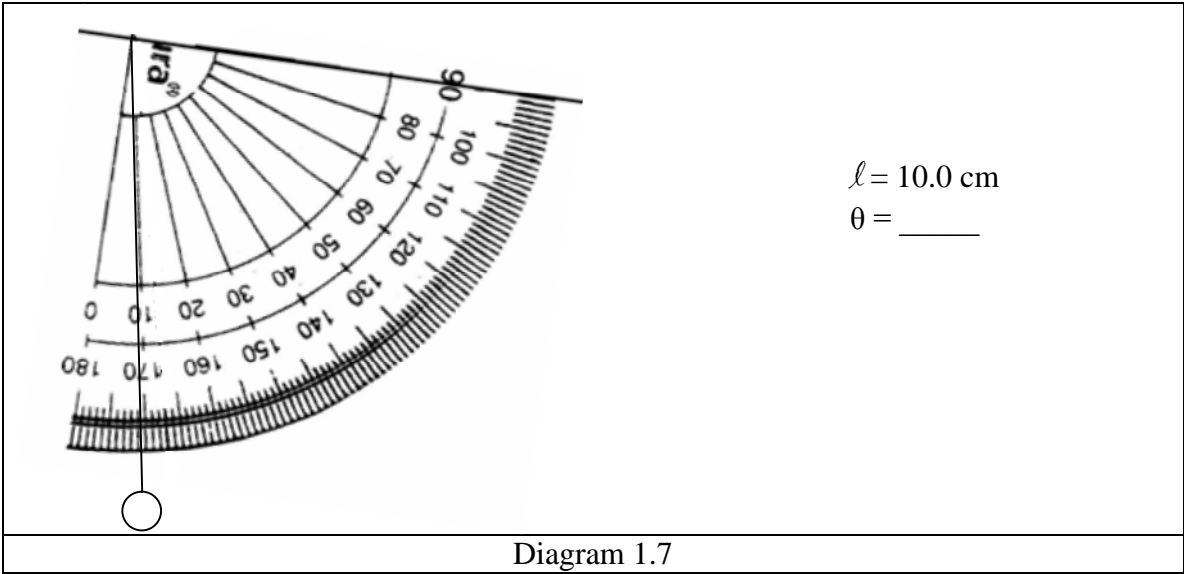


Diagram 1.6



For the experiment describe on page 2, identify
Bagi eksperimen yang diterangkan di halaman 2, kenalpasti

- (i) the manipulated variable
Pembolehubah dimanipulasi

.....
[1 mark]

- (ii) the responding variable
Pembolehubah bergerak balas

.....
[1 mark]

- (iii) the constant variable
Pembolehubah yang dimalarkan

.....
[1 mark]

- (b) For this part of question, write your answers in the spaces provided in the corresponding diagrams.

Untuk bahagian soalan ini, tulis jawapan anda diruang yang disediakan dalam rajah-rajah yang sepadan.

Based on Diagram 1.3, 1.4, 1.5, 1.6 and 1.7 on pages 3, 4 and 5.

Berdasarkan rajah 1.3, 1.4, 1.5, 1.6 dan 1.7 di halaman 3, 4 dan 5.

- (i) Record the reading of protractor in the space provided on pages 3, 4 and 5.
Catat bacaan bagi jangka sudut diruangan yang telah disediakan pada mukasurat 3, 4 dan 5.

[2 marks]

- (ii) Tabulate your results for all values of ℓ and θ in the space given below.
Jadualkan keputusan anda bagi semua nilai ℓ dan θ dalam ruang di bawah.

[4 marks]

- (c) On the graph paper on page 8, plot a graph of θ against ℓ .
Pada kertas graf di halaman 8, lukis graf θ melawan ℓ .

[5 marks]

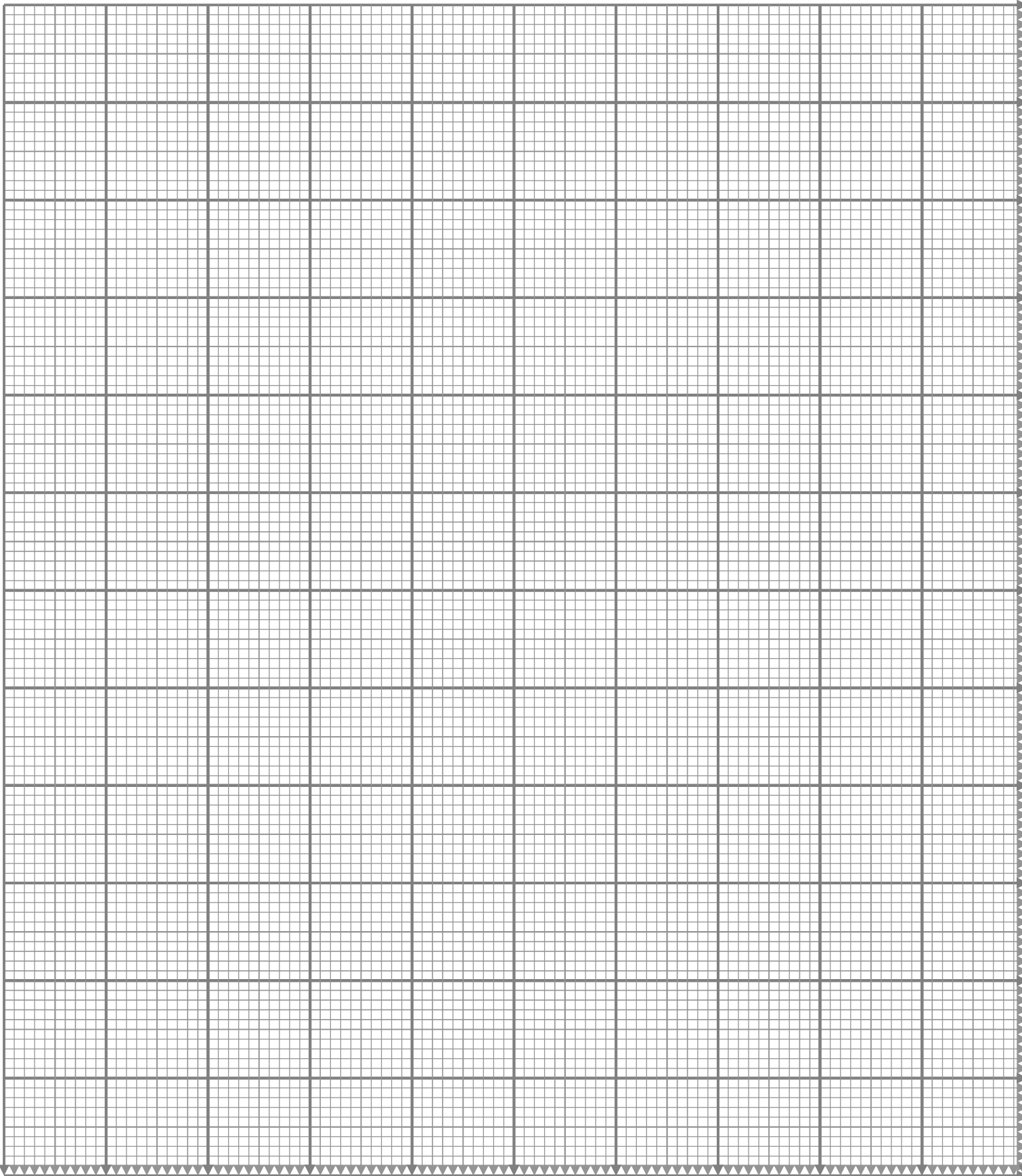
- (d) Based on your graph in 1 (c), state the relationship between θ and ℓ .
Berdasarkan graf di 1 (c), nyatakan hubungan diantara θ dan ℓ .

.....
[1 mark]

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

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

Graph of θ against ℓ



2. A student carries out an experiment to investigate the relationship between object distance, u , and the magnification, m , of a convex lens.

The student used different object distance and the corresponding magnification is determined. A graph of $\frac{1}{m}$ against u is plotted as shown in Diagram 2.1 on page 10.

Seorang pelajar menjalankan suatu eksperimen untuk mengkaji hubungan di antara jarak objek, u , dengan pembesaran linear, m , suatu kanta cembung.

Pelajar itu menggunakan jarak objek yang berbeza dan pembesaran yang sepadan ditentukan. Suatu graf $\frac{1}{m}$ melawan u diplotkan seperti yang ditunjukkan dalam Rajah dihalaman 10.

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

- (i) state the relationship between $\frac{1}{m}$ and u .

nyatakan hubungan di antara $\frac{1}{m}$ dan u .

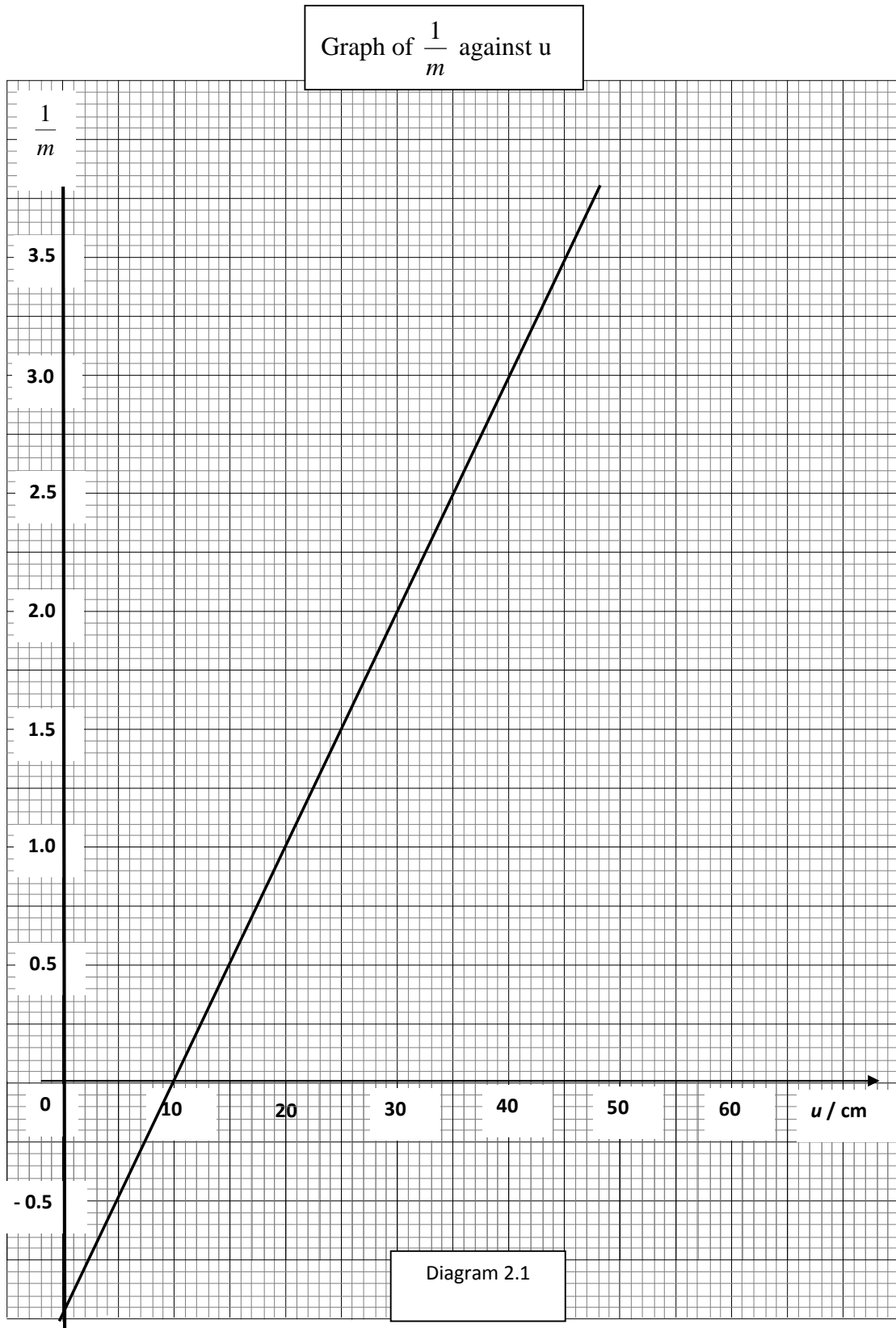
[1 mark]

- (ii) Calculate the image magnification, m , if the object distance, u , is 25 cm.
Hitungkan pembesaran imej jika jarak objek ialah 25 cm.

[3 marks]

- (iii) Calculate the gradient of the graph.
Hitungkan kecerunan graf.

[3 marks]



- (b) (i) Given that $1 + \frac{1}{m} = \frac{u}{f}$, where f = focal length of the lens

By using the the above equation and the equation of linear motion, $y = mx + c$, show the relationship between focal length, f , and the gradient of graph $\frac{1}{m}$ against u ?.

Diberikan $1 + \frac{1}{m} = \frac{u}{f}$, dimana f = panjang fokus kanta

Dengan menggunakan persamaan di atas dan persamaan gerakan linear $y = mx + c$, tunjukkan hubungan di antara panjang fokus, f , dengan kecerunan graf $\frac{1}{m}$ melawan u ?

[2 marks]

- (ii) Calculate the focal length of the lens used.
Hitungkan panjang fokus kanta yang digunakan.

[2 marks]

- (c) State **one** precaution that should be taken in this experiment.
*Nyatakan **satu** langkah berjaga-jaga yang perlu diambil di dalam eksperimen ini.*

.....
[1 mark]

Section B
Bahagian B

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

- 3 Diagram 3.1 shows a balloon during cool day. During hot day the balloon becomes bigger as shown in diagram 3.2.

Rajah 3.1 menunjukkan sebiji belon dihari yang sejuk. Semasa hari panas belon itu menjadi lebih besar ditunjukkan dalam rajah 3.2.

Cool balloon
Belon sejuk



Diagram 3.1
Rajah 3.1

Hot balloon
Belon panas



Diagram 3.2
Rajah 3.2

Based on the information and observation above:

Berdasarkan maklumat dan pemerhatian di atas:

- (a) State **one** suitable inference.

Nyatakan satu inferens yang sesuai.

[1 mark]

- (b) State **one** suitable hypothesis.

Nyatakan satu hipotesis yang sesuai.

[1 mark]

- (c) With the use of apparatus such as capillary tube, concentrated sulfuric acid and other apparatus, describe an experiment framework to investigate the hypothesis stated in 3(b).

Dengan menggunakan alat radas seperti tiub kapilari, asid sulfuric pekat dan lain-lain radas, terangkan satu rangka eksperimen untuk menyiasat hipotesis yang anda nyatakan di 3(b).

In your description, state clearly the following;

Dalam penerangan anda sila nyata dengan jelas perkara-perkara berikut;

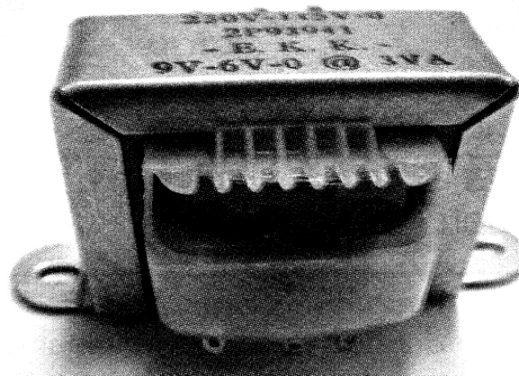
- (i) Aim of the experiment.
Tujuan eksperimen.
- (ii) Variables in the experiment.
Pembolehubah dalam eksperimen.
- (iii) List of apparatus and materials.

- (iv) Arrangement of the apparatus.
Susunan radas.
- (v) The procedure of the experiment which include the method of controlling the manipulated variable and the method of measuring the responding variable.
Prosedur eksperimen termasuk kaedah mengawal pemboleh ubah dimanipulasikan dan kaedah mengukur pemboleh ubah bergerak balas.
- (vi) The way you would tabulate the data.
Cara anda akan menjadualkan data.
- (vii) The way you would analyse the data.
Cara anda akan menganalisis data.

[10 marks]

4. Diagram shows a step down transformer. A primary coil is connected to the input supply 240V a.c. Diagram 4.1(a) and diagram 4.1(b) shows a bulb that is connected to a secondary coil. It is observed that the brightness of the bulb in diagram 4.1(b) is brighter than in diagram 4.1(a).

Rajah menunjukkan sebuah transformer injak turun. Gegeleung primer disambungkan kepada bekalan kuasa 240V a.u. Rajah 4.1(a) dan 4.1(b) menunjukkan mentol disambungkan kepada gegelung sekunder. Pemerhatian mendapati bahawa kecerahan mentol dalam rajah 4.1(b) adalah lebih terang berbanding dengan rajah 4.1(a).



Primer Coil

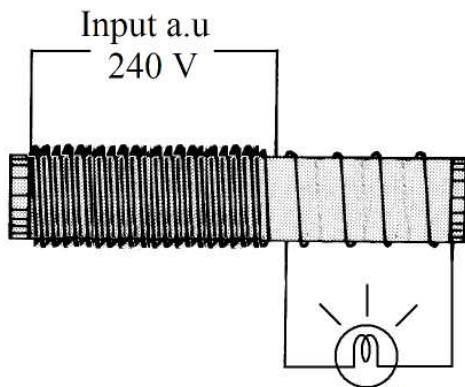


Diagram 4.1 (a)

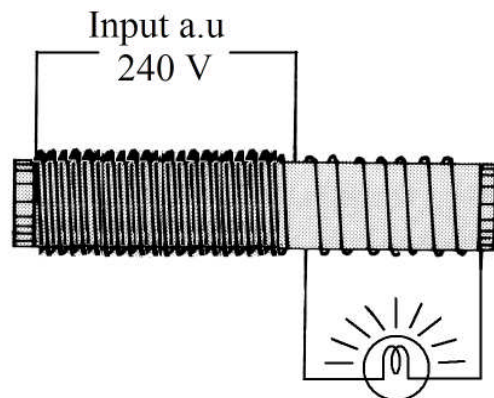


Diagram 4.1 (b)

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

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

[1 mark]

[1 mark]

- (c) With the use of apparatus such as coil, voltmeter, two pieces soft iron core and other suitable apparatus, describe an experiment framework to investigate the hypothesis stated in 4(b). In your description, state clearly the following :

Dengan menggunakan radas seperti wayar gelung, voltmeter, 2 batang teras besi lembut dan lain-lain radas yang sesuai, teangkan satu rangka kerja eksperimen untuk menyiasat hipotesis yang anda nyatakan di 4(b). Didalam penerangan anda, nyatakan dengan jelas yang 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
- (iv) The procedure of the experiment which includes the method of controlling the manipulated variable and the method of measuring the responding variable.
Prosedur eksperimen termasuk kaedah mengawal pembolehubah dimanipulasikan dan kaedah mengukur pembolehubah bergerak balas.
- (v) The way you would tabulate the data
Cara anda akan menjadualkan data
- (vi) The way you would analyse the data.
Cara anda akan menganalisis data

[10 marks]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT



**SEKOLAH BERASRAMA PENUH
BAHAGIAN PENGURUSAN
SEKOLAH BERASRAMA PENUH / KLUSTER
KEMENTERIAN PELAJARAN MALAYSIA**

PEPERIKSAAN PERCUBAAN SPM 2009

FIZIK

PERATURAN PERMARKAHAN

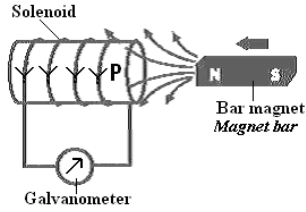
KERTAS 1, KERTAS 2 & KERTAS 3

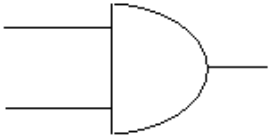
Physics Paper 1
Trial Examination SBP 2009
Marking Scheme

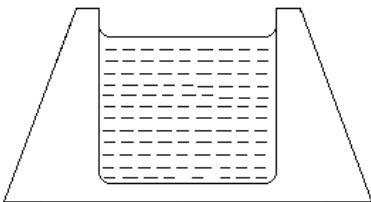
1	A	26	B
2	B	27	A
3	C	28	B
4	B	29	D
5	C	30	C
6	C	31	A
7	A	32	D
8	D	33	B
9	C	34	D
10	C	35	B
11	B	36	A
12	A	37	D
13	C	38	B
14	B	39	C
15	C	40	A
16	D	41	A
17	B	42	A
18	C	43	B
19	C	44	C
20	A	45	C
21	D	46	B
22	B	47	D
23	C	48	A
24	A	49	C
25	A	50	C

[50 marks]

MARK SCHEME PAPER 2

No			Answer	Mark															
1	(a)		Time	1															
	(b)		Seconds // minutes	1															
	(c)		Minutes // the pointer has pass 1 minutes /60 s	1															
	(d)		66.4 s // 1 min 6.4 sec	1															
			Total	4															
2	(a)	(i)	North	1															
	(b)	(i) & (ii)		1 1															
	(c)		Lenz's Law	1															
	(d)		Move the magnet faster // Use stronger magnet	1															
			Total	5															
3	(a)	(i)	- The rate of heat transfer between two bodies are the same - The temperature of the two bodies are the same	1 1															
		(ii)	40°C	1															
		(ii)	Prevent heat loss to surrounding	1															
	(b)	(i)	Heat supplied by hot metal = heat received by water $m_1 C_1 \theta_1 = m_2 C_2 \theta_2$ $0.4 \times C_1 \times (100-40) = 0.2 \times 4200 \times (40 - 28)$ $0.4 \times C_1 \times 60 = 0.2 \times 4200 \times 12$ $C_1 = 420 \text{ J kg}^{-1} \text{ } ^\circ\text{C}^{-1}$	1 1															
		(ii)	Heat released by water is absorb by the metal // no heat loss to surrounding	1															
			Total	6															
4	(a)		Logic gates are electronic switches with one or more inputs and one output	1															
	(b)	(i)	<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Detector 1 <i>Pengesan 1</i></th> <th style="text-align: center;">Detector 2 <i>Pengesan 2</i></th> <th style="text-align: center;">Air Conditioner <i>Penghawa dingin</i></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> </tr> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> </tr> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> </tr> </tbody> </table> <p>Row 1 and 2 correct – 1 mark Row 3 and 4 correct – 1 mark</p>	Detector 1 <i>Pengesan 1</i>	Detector 2 <i>Pengesan 2</i>	Air Conditioner <i>Penghawa dingin</i>	0	0	0	0	1	1	1	0	0	1	1	1	2
Detector 1 <i>Pengesan 1</i>	Detector 2 <i>Pengesan 2</i>	Air Conditioner <i>Penghawa dingin</i>																	
0	0	0																	
0	1	1																	
1	0	0																	
1	1	1																	
		(ii)	AND gate	1															

	(ii)	Symbol correctly drawn 	1	
	(c)	1. Detector 1 : LDR / light detecting resistor. 2. Detector 2 : Thermistor / heat detecting resistor	1 1	
		Total	7	
5	(a)	Weight is the gravitational force acts an object.	1	
	(b)	(i)	lift is equals to weight // lift = weight drag is equals to thrust // drag = thrust	1 1
		(ii)	<ul style="list-style-type: none"> Sum of the vertical components of the tensions in the string is equals in magnitude to the weight hanging // vertical components of the tension in the string (T_1 and T_2) are equal to W // $W = T_1 + T_2$ The tension of string pulling to he left is equals to the tension of string pulling to the right // horizontal components of the tension in the strings (T_1 and T_2) are equal and opposite 	1 1
	(c)	the airplane is moving at a constant speed while the object is at rest	1	
	(d)	any object at rest or moving at constant speed, the resultant force acting is equal to zero // both cases the resultant force is zero	1	
	(e)	Equilibrium of forces	1	
		Total	8	
6	(a)	one colour/wavelength/frequency of light.	1	
	(b)	<ul style="list-style-type: none"> Light the passes through the slits is diffracted and interfere resulting in constructive and destructive interference. 	1 1	
	(c)	(i)	the distance between the slits, a in Diagram 6.2 is bigger.	1
		(ii)	the wavelength of the light, λ , is the same in both diagrams	1
		(iii)	the distance between the double slits and the screen, D , is the same in both diagrams	1
		(iv)	the distance between the fringes, x in Diagram 6.2 is smaller.	1
	(d)	When a increases, x decreases // x is inversely proportional to a when λ and D are constant	1	
		Total	8	

7	(a)		Depth / density / acceleration due to gravity	1
	(b)	(i)	$P_Q > P_p$	1
		(ii)	$P_Q = h \rho g$ $= 5 \times 1000 \times 10$ $= 50000 \text{ Pa}$	1 1
	(c)	(i)	Different in pressure	1
		(ii)	<ul style="list-style-type: none"> Water level at P is same as the water level in the house water tank // pressure is the same between at P and inside the tank. No difference in pressure 	1 1
	(d)	(i)	<ul style="list-style-type: none"> Place the concrete tank at higher place // on top of hill Higher difference of pressure. <p style="text-align: center;">or</p> <ul style="list-style-type: none"> Use water pump Increase the difference of pressure. 	1 1
		(ii)		1
Total				10
8	(a)		When the voltage supplied is 6V the power produce is 12 W //	1
	(b)		<ul style="list-style-type: none"> Series Parallel 	1 1
	(c)		<ul style="list-style-type: none"> Voltage for each bulb in Diagram 8.2 more than Diagram 8.1 Total resistance in Diagram 8.2 less than Diagram 8.1 <p>// Current flow in each bulb in Diagram 8.2 is more than in Diagram 8.1</p>	1 1
	(d)	(i)	$R_1 = 4 + 4 + 4$ $= 12 \Omega$ $I = \frac{V}{R} = \frac{6.0}{12}$ (substitution) $= 0.5 \text{ A}$ (answer + correct unit)	1 1
		(ii)	$\frac{1}{R} = \frac{1}{4} + \frac{1}{4} + \frac{1}{4} = \frac{3}{4}$, $R_T = \frac{4}{3} = 1.33 \Omega$ $I_T = \frac{6.0}{1.33} = 4.5 \text{ A}$	1

		$I \text{ flow each bulb} = \frac{4.5}{3} \quad (\text{substitution})$ $= 1.5 \text{ A} \quad (\text{Answer} + \text{correct unit})$	1
--	--	--	---

(e)	(i)	Diagram 8.2	1
	(ii)	<ul style="list-style-type: none"> If one bulb blow another bulb can still function less effective resistance //more current flow 	1 1
Total			12

9	(a)	A phenomenon when light travel in different medium with different densities – change in speed and direction // the bending of light when travelling through different medium	1
	(b)	The refractive index of A < the refractive index of B The refracted angle of medium A > refracted angle of medium B The density of medium A < density of medium B The greater the refractive index the smaller the angle of refraction The greater the refractive index the greater the ratio of sin i to sin r	1 1 1 1 1

(c)		<p>Ray diagram of projector</p> <p>Mark 1 - parallel ray between the condenser lens Mark 2 - two rays from condenser lens touching the ends of the object Mark 3 - two rays comes out from the convex lens Mark 4 - Image form on the ceiling</p>	4
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	(d)		<table border="1"> <thead> <tr> <th>Modifications</th> <th>Explanation</th> <th></th> </tr> </thead> <tbody> <tr> <td>A plane mirror mounted on an adjustable arm</td> <td>Reflects light to the vertical screen, corrects lateral and vertical inversion</td> <td>2</td> </tr> <tr> <td>Use a converging mirror instead of plane mirror</td> <td>Focus the light directly to the lens // increase the intensity of light.</td> <td>2</td> </tr> <tr> <td>Place the filament at the centre of curvature of the converging mirror // use high powered lens</td> <td>Light goes directly from the lamp and reflect back on the same path // increase the intensity of light towards the transparency // to get brighter image</td> <td>2</td> </tr> <tr> <td>Electric fan operates during and after the lamp is switched on</td> <td>Cooling system to stabilize the temperature (heat energy produced by filament bulb)</td> <td>2</td> </tr> <tr> <td>Use heat filter</td> <td>To absorb excess heat to the transparency</td> <td>2</td> </tr> <tr> <td colspan="2" style="text-align: right;">Total</td> <td>20</td> </tr> </tbody> </table>	Modifications	Explanation		A plane mirror mounted on an adjustable arm	Reflects light to the vertical screen, corrects lateral and vertical inversion	2	Use a converging mirror instead of plane mirror	Focus the light directly to the lens // increase the intensity of light.	2	Place the filament at the centre of curvature of the converging mirror // use high powered lens	Light goes directly from the lamp and reflect back on the same path // increase the intensity of light towards the transparency // to get brighter image	2	Electric fan operates during and after the lamp is switched on	Cooling system to stabilize the temperature (heat energy produced by filament bulb)	2	Use heat filter	To absorb excess heat to the transparency	2	Total		20
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10	(a)	(i)	Electromagnet is a device in which magnetism is produced by an electric current // temporary magnet made by winding a coil round a soft iron core and magnetic field produce when current flow.	1																				
		(ii)	<ul style="list-style-type: none"> Current flow in diagram 10.2 is more than 10.1 // vice versa. The amount of iron filing attracted by iron core in Diagram 10.2 is more than 10.1 // vice versa. The magnetic strength in diagram 10.2 is more than 10.1 // vice versa. Amount of iron filing attracted increase when current increase The magnetic field strength increase when current increase 	1 1 1 1 1																				
	(b)		<ul style="list-style-type: none"> When too high current flow, magnetic field strength become very strong / wire expand electromagnet pull the soft iron armature / pulled to the right by spring P. release the catch, contact separate and current does not flow When reset button is pressed, spring Q pulls the soft iron armature back to its original position 	1 1 1 1																				
	(c)	(i)	<ul style="list-style-type: none"> When the coil rotates the coil cut across the magnetic field lines Induced current flow in the coil. The current maximum when the coil cut the magnetic field at right angle // current decreased (become zero) when the coil move in parallel with magnetic field lines 	1 1 1																				

		<ul style="list-style-type: none"> The direction of current flow determine by using Fleming’s right hand rule After 90° the direction of current in the external circuit reversed/ diagram 	1 1 (Max : 4)												
	(ii)	<table border="1"> <thead> <tr> <th>Modification</th> <th>Explanation</th> </tr> </thead> <tbody> <tr> <td>Change slip rings with commutator</td> <td>To reverse contact with brushes so that the current flow in same direction in external circuit</td> </tr> <tr> <td>Use stronger magnet</td> <td>To increase the magnetic field strength</td> </tr> <tr> <td>Use more number of turn for the coil/ Increase the speed of rotation</td> <td>Increase the rate of change of magnetic field/increase the induced current</td> </tr> </tbody> </table>	Modification	Explanation	Change slip rings with commutator	To reverse contact with brushes so that the current flow in same direction in external circuit	Use stronger magnet	To increase the magnetic field strength	Use more number of turn for the coil/ Increase the speed of rotation	Increase the rate of change of magnetic field/increase the induced current	2 2 2				
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Total			20												
11	(a)	Archimedes Principle	1												
	(b)	1. Total density of ship < density of water 2. Buoyant Force = Total weight of ship	1 1												
	(c) (i)	To ensure the ship will not be overload // ensure the safety of ship	1												
	(ii)	To enable the ship to travel safely in different densities of sea water	1												
	(d)	<table border="1"> <thead> <tr> <th>Characteristics</th> <th>Reason</th> </tr> </thead> <tbody> <tr> <td>Streamlined shape</td> <td>To reduce water resistance</td> </tr> <tr> <td>High strength of metal</td> <td>To withstand high water pressure</td> </tr> <tr> <td>Wide base cross section area</td> <td>So that ship can float//prevent from overturn // ship more stable // ship not sink deeper</td> </tr> <tr> <td>High volume of air space in the ship</td> <td>Produce air buoyant force// ship can float</td> </tr> <tr> <td>Structure P</td> <td>Streamlined shape, High strength of metal, Wide base cross section area, High volume of air space in the ship</td> </tr> </tbody> </table>	Characteristics	Reason	Streamlined shape	To reduce water resistance	High strength of metal	To withstand high water pressure	Wide base cross section area	So that ship can float//prevent from overturn // ship more stable // ship not sink deeper	High volume of air space in the ship	Produce air buoyant force// ship can float	Structure P	Streamlined shape, High strength of metal, Wide base cross section area, High volume of air space in the ship	10
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Structure P	Streamlined shape, High strength of metal, Wide base cross section area, High volume of air space in the ship														
	(e) (i)	Volume of water displaced = Volume of wooden block $= \frac{m}{\rho}$ $= \frac{3}{800}$ $= 3.75 \times 10^{-3} \text{ m}^3$	1 1												

		(ii)	Weight of load + Weight of wooden block = weight of water displaced Weight of load + Weight of wooden block = $\rho V g$ Weight of load + (3 x 10) = $1000 \times 3.75 \times 10^{-3} \times 10$ Weight of load + (3 x 10) = 37.5 Weight of load = 37.5 – 30 = 7.5 N Mass of load = 0.75 kg	1 1 1												
			Total	20												
12	(a)		Radioisotopes are isotopes which have unstable nuclei.	1												
	(b)		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Characteristics</th> <th style="text-align: left;">Explanation</th> </tr> </thead> <tbody> <tr> <td>Has a long half-life</td> <td>Can be used for a long time hence save cost</td> </tr> <tr> <td>Emits beta</td> <td>Can penetrate box and liquid and is less dangerous than gamma</td> </tr> <tr> <td>Solid form</td> <td>Easy to handle and contain.</td> </tr> <tr> <td>Low ionising power</td> <td>Does not change the state and taste of juice.</td> </tr> <tr> <td>Radioisotope T</td> <td>It has long half life, emits beta, in solid form and has low ionising power.</td> </tr> </tbody> </table>	Characteristics	Explanation	Has a long half-life	Can be used for a long time hence save cost	Emits beta	Can penetrate box and liquid and is less dangerous than gamma	Solid form	Easy to handle and contain.	Low ionising power	Does not change the state and taste of juice.	Radioisotope T	It has long half life, emits beta, in solid form and has low ionising power.	2 2 2 2 2
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Radioisotope T	It has long half life, emits beta, in solid form and has low ionising power.															
	(c)	(i)	Geiger Muller Tube	1												
		(ii)	1. Bottle E 2. Rate meter reading is the highest 3. Most radiation can reach the detector without being block by juice	1 1 1												
	(d)		1. Correctly stated that α as ${}^4_2\text{He}$ 2. Correctly stated that β as ${}^0_{-1}e$ 3. Working is shown 4. X = 3 5. Y = 2	1 1 1 1												
			Total	20												

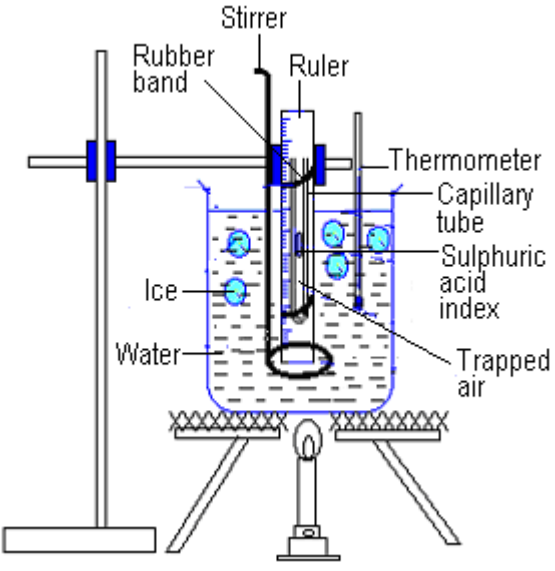
MARKING SCHEME FOR PAPER 3

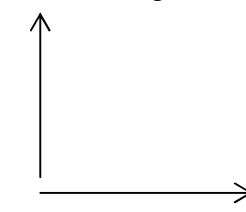
No. 1	Answer	Mark												
(a) (i)	Manipulated variable = The length, ℓ of the wire X	1												
(a)(ii)	Responding variable = The angle, θ	1												
(a)(iii)	Constant variable = The distance from A to the needle // the diameter of the wire //the material of wire X	1												
(b)(i) (ii)	<p>Values of θ are correct (All values are correct : 2M) (One value incorrect : 1M)</p> <p>Tabulate ℓ and θ correctly in the table.</p> <p>A Shows a table which have ℓ, and θ B State the correct unit of ℓ /cm and $\theta /^\circ$ C All values of ℓ are correct D Values of ℓ and θ are consistent</p> <table border="1" data-bbox="521 747 989 968"> <thead> <tr> <th>ℓ /cm</th> <th>$\theta /^\circ$</th> </tr> </thead> <tbody> <tr> <td>50.0</td> <td>36</td> </tr> <tr> <td>40.0</td> <td>30</td> </tr> <tr> <td>30.0</td> <td>21</td> </tr> <tr> <td>20.0</td> <td>16</td> </tr> <tr> <td>10.0</td> <td>9</td> </tr> </tbody> </table>	ℓ /cm	$\theta /^\circ$	50.0	36	40.0	30	30.0	21	20.0	16	10.0	9	<p>1+1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>
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(c)	<p>Draw the graph of θ against ℓ.</p> <p>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.</p> <table border="1" data-bbox="456 1308 1166 1535"> <thead> <tr> <th>Number of \surd</th> <th>Score</th> </tr> </thead> <tbody> <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> </tbody> </table>	Number of \surd	Score	6	5	5	4	3-4	3	2	2	1	1	5
Number of \surd	Score													
6	5													
5	4													
3-4	3													
2	2													
1	1													
(d)	<p>State the correct relationship based on the candidate's graph ℓ is directly proportional to θ // ℓ is increasing linearly to θ</p>	1												
(e)	<p>1- The eye's of observer must be perpendicular to the scale reading in order to avoid the parallax error. 2- Repeat the experiment and find the average.</p>	1												
TOTAL		16												

2(a)(i)	$\frac{1}{m}$ increases linearly with u .	1
(ii)	Show working on graph $\frac{1}{m} = 1.5$ $m = 0.67$	1 1 1
(iii)	$Gradient = \frac{3.5 - 0}{45 - 10}$ $= 0.1 \text{ cm}^{-1}$ Show working on graph	1 1 1
b(i)	$\frac{1}{m} = \left(\frac{1}{f}\right)u - 1$ $\frac{1}{f} = Gradient$	1 1
(ii)	$\frac{1}{f} = 0.1 \text{ cm}^{-1}$ $f = 10 \text{ cm}$	1 1
(c)	The object, the optical centre of the lens and the screen must lie on the principal axis of the lens.	1
TOTAL		12

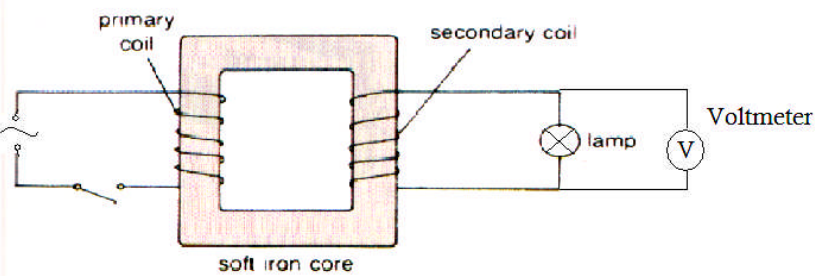
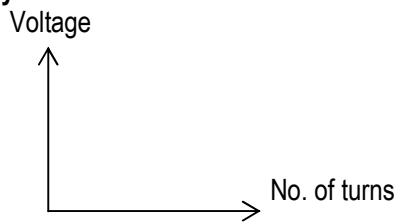
Marking Scheme
Section B

3 (a)	1	State a suitable inference The volume of gas depend on its temperature
(b)	1	State a relevant hypothesis .The volume of gas increases as its temperature increases
(c)	1	State the aim of experiment To investigate the relationship between the volume of gas and its temperature.
	1	State the manipulated variable and the responding variable Manipulated : Temperature Responding : The volume of gas
	1	State ONE variable that kept constant Mass of gas

	1	Complete list of apparatus and materials Thermometer, capillary tube, concentrated sulphuric acid, half metre rule, beaker, water, stirrer, Bunsen burner, tripod stand
	1	Arrangement of apparatus : 

	1 1 1	State the method of controlling the manipulated variable 1. Apparatus is set as shown in the above figure. 2. Water is heated to 30 ⁰ C. State the method of measuring the responding variable 3. The vertical column of trapped air is measured by using metre rule. Repeat the experiment at least 4 times 4. The experiment is repeated using the temperature 40 ⁰ C, 50 ⁰ C, 60 ⁰ C and 70 ⁰ C.												
	1	Tabulation of data: <table border="1" style="margin-left: 40px;"> <thead> <tr> <th style="width: 50%;">Temperature</th> <th style="width: 50%;">Volume of gas</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>	Temperature	Volume of gas										
Temperature	Volume of gas													
	1	Analyse the data . Volume of gas  Temperature												
	Total marks 12													

4 (a)	1	State a suitable inference The number of turns of wire in the secondary coil affects the output voltage
(b)	1	State a relevant hypothesis The greater the number of turns of wire in the secondary coil, the greater the output voltage
(c)	1	State the aim of experiment To investigate the relationship between number of turns of wire in the secondary coil and the output voltage
	1	State the manipulated variable and the responding variable Manipulated : number of turns of wire in secondary coil, N Responding : output voltage, V
	1	State ONE variable that kept constant The number of turns of wire in the primary coil
	1	Complete list of apparatus and materials Voltmeter, coil, soft iron core, au power supply

	1	<p>Arrangement of apparatus :</p>  <p>The diagram shows a rectangular soft iron core. On the left vertical limb, a primary coil is wound. This coil is connected to a circuit containing a switch and a power source. On the right vertical limb, a secondary coil is wound. This coil is connected to a circuit containing a lamp and a voltmeter.</p>												
	1 1 1	<p>State the method of controlling the manipulated variable</p> <ol style="list-style-type: none"> 1. The set up of the apparatus is as shown in figure above. 2. 100 turns of wire is wound on the secondary coil of a transformer. <p>State the method of measuring the responding variable</p> <ol style="list-style-type: none"> 3. The switch is on and the output voltage is measured by using a voltmeter. <p>Repeat the experiment at least 4 times</p> <p>The experiment is repeated by winding the wire on secondary coil with 200 turns, 300 turns, 400 turns and 500 turns.</p>												
	1	<p>Tabulation of data:</p> <table border="1" data-bbox="446 1050 1258 1291"> <thead> <tr> <th>Number of turns of wire in secondary coil, N</th> <th>Output voltage, V / V</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>	Number of turns of wire in secondary coil, N	Output voltage, V / V										
Number of turns of wire in secondary coil, N	Output voltage, V / V													
	1	<p>Analyse the data .</p>  <p>The graph shows a vertical axis labeled 'Voltage' and a horizontal axis labeled 'No. of turns'. Both axes have arrows at their ends, indicating they are to be plotted.</p>												
Total marks	12													

END OF MARKING SCHEME