NO. KAD PENGENALAN

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Fizik
Kertas 1
Ogos

2008
1 1/4 jam

Nama : _____
Kelas : _____

LOGO DAN NAMA SEKOLAH

PEPERIKSAAN PERCUBAAN SPM TAHUN 2008

FIZIK

Kertas 1

Satu jam lima belas minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Kertas soalan ini adalah dalam dwibahasa.*

2. *Setiap soalan dimulakan dengan soalan bahasa Inggeris diikuti dengan soalan yang sama dalam bahasa Melayu yang dicetak condong.*

3. *Setiap pilihan jawapan dimulakan dengan pilihan jawapan bahasa Inggeris dan diikuti dengan pilihan yang sama dalam bahasa Melayu yang dicetak condong.*

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

Kertas soalan ini mengandungi **27** halaman bercetak termasuk muka hadapan

[Lihat sebelah

MAKLUMAT UNTUK CALON

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

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

3. *Jawab setiap soalan dengan menghitamkan ruangan yang betul pada kertas jawapan.*

4. *Hitamkan **satu** ruangan sahaja bagi setiap soalan.*

5. *Sekiranya anda hendak menukar jawapan, padamkan tanda yang telah dibuat. Kemudian hitamkan jawapan yang baru.*

6. *Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.*

7. *Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh di program.*

8. *Satu senarai rumus disediakan di halaman 4.*

INFORMATION FOR CANDIDATES

1. *This question paper consists of **50** questions.*

2. *Answer **all** questions.*

3. *Answer each question by blackening the correct space on the answer sheet.*

4. *Blacken only **one** space for each question.*

5. *If you wish to change your answer, erase the blackened mark that you have made. Then blacken the space for the new answer.*

6. *The diagrams in the questions provided are not drawn to scale unless stated.*

7. *You may use a non-programmable scientific calculator.*

8. *A list of formulae is provided on page 4.*

[Lihat sebelah

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

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

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

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

4. **momentum = mv**
momentum = mv

5. **F = ma**

6. **Kinetic energy = ½ mv²**
Tenaga kinetik = ½ mv²

7. **Potential energy = mgh**
Tenaga keupayaan = mgh

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

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

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

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

12. **Heat, Q = mcΘ**
Haba, Q = mcΘ

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

14 $E = mc^2$

15 $v = f\lambda$

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

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

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

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

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

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

21 **Q = It**

22 **V = IR**

23 **Power, P = IV**
Kuasa, P = IV

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

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

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

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

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

1. Which of the following is not a symbol of a base SI unit?
*Antara berikut yang manakah **bukan** simbol bagi unit asas* SI*?*

A kg **B** s **C** A **D** ^{o}C

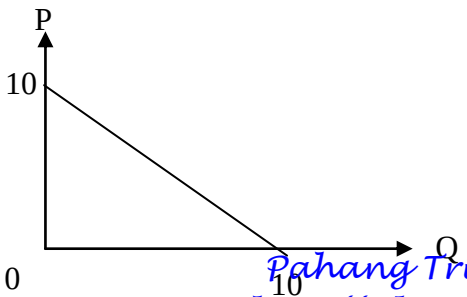
2. Which physical quantity has the correct S.I unit
Kuantiti fizik yang manakah mempunyai unit SI yang betul?

	Quantity / Kuantiti	**S.I Unit**
A	**Current** / Arus	mA
B	**Time** / Masa	µs
C	**Area** / Luas	cm^2
D	**Volume** / Isipadu	m^3

3 Which of the following is a vector quantity?
Yang manakah di bawah ini merupakan kuantiti vektor?

A **Mass of a ball**
Jisim sebiji bola
B **Age of the earth**
Usia bumi
C **Number of students in a class**
Bilangan pelajar dalam sebuah kelas
D **Earth's gravitational pull on our body**
Tarikan graviti bumi ke atas badan kita

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

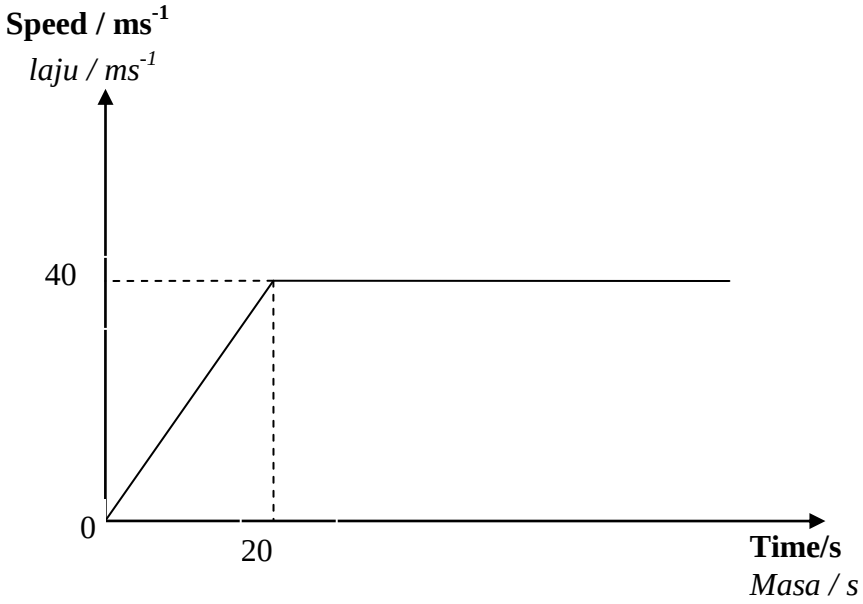


[Lihat sebelah

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

A **P = Q – 10**
B **P = -2Q + 10**
C **P = -Q + 10**
D **P = 2Q + 1**

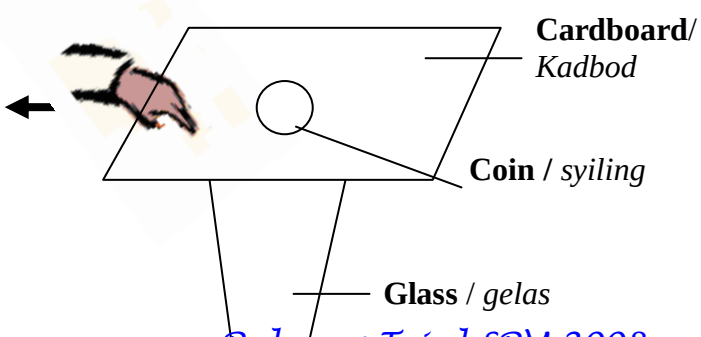
5 **A car accelerates from rest. The graph shows how the car's speed changes with time.**
Graf halaju-masa di bawah menunjukkan sebuah kereta bermula dari pegun



How far does the car travel before it reaches a steady speed?
Berapa jauhkan kereta itu bergerak sebelum ia mencapai kelajuan seragam?

A **100 m**
B **200 m**
C **300 m**
D **400 m**
E **800 m**

6. **Diagram shows a coin placed on a cardboard.**
Rajah menunjukkan s*ekeping syiling diletakkan di atas kadbod.*



What happens to the coin when the cardboard is jerked to the left?
Apakah yang berlaku pada syiling itu apabila kadbod disentap ke kiri?

A **The coin remains at rest on the cardboard**
Syiling itu kekal pegun di atas kadbod
B **The coin drops down into the glass**
Syiling jatuh ke dalam gelas
C **The coin drops outside the glass**
Syiling jatuh di luar gelas
D **The coin is momentarily pushed up from the cardboard.**
Syiling terangkat ke atas dari kadbod.

7 **Which object has the largest inertia?**
Objek manakah mempunyai inersia paling besar?

A

Mass / *Jisim* = 90 kg
Speed / *Laju* = 20 m s^{-1}

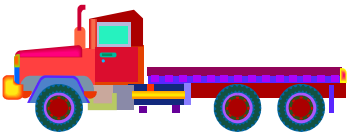
B

Mass / *Jisim* = 360 kg
Speed / *Laju* = 40 m s^{-1}

C

Mass / *Mass* = 1000 kg
Speed / *Laju* = 38 m s^{-1}

D



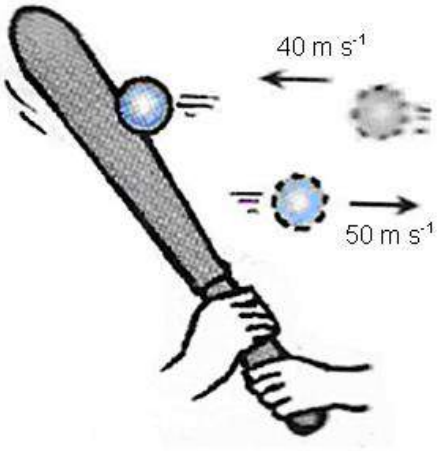
Mass / *Jisim* = 12000 kg
Speed / *Laju* = 3 m s^{-1}

8 **A force is applied to an object.**
Which of the following will not occur?
Daya dikenakan ke atas suatu objek.
Antara yang berikut, yang manakah ***tidak*** *akan berlaku?*

A **The object speeds up**
Jasad semakin laju
B **The shape of the object changed**
Bentuk jasad berubah
C **The mass of the object decreases**
Jisim jasad berkurang
D **The object changes its direction of motion**
Arah gerakan jasad berubah

[Lihat sebelah

9 **A 150 g ball is moving at a speed of 45 m s $^{-1}$ when it is hit by a baseball bat. The ball rebounds at a speed of 55 m s $^{-1}$ and its time of contact with the bat is 0.04 s.**
Sebiji bola dengan jisim 150 g sedang bergerak pada kelajuan 45 m s $^{-1}$ bila dipukul dengan kayu pemukul bola lisut. Bola melantun pada kelajuan 55 m s $^{-1}$ dan masa sentuhan dengan kayu pemukul ialah 0.04 s.



What is the impulsive force on the ball ?
Berapakah daya impuls yang bertindak ke atas bola?

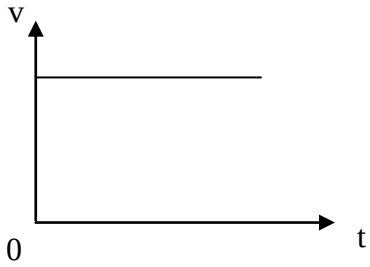
A **37.5 N**
B **60.0 N**
C **375.0 N**
D **540.0 N**
E **3 750 N**

10 **Which of the following safety features in a vehicle is not designed to protect the driver during collisions?**
*Antara ciri keselamatan kenderaan berikut, yang manakah **tidak** betujuan untuk melindungi pemandu semasa pelanggaran?*

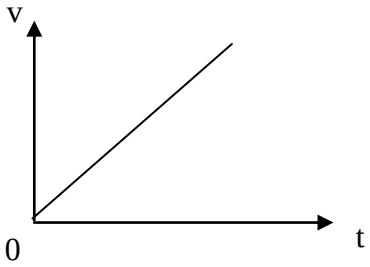
A **Reinforced passenger compartment**
Ruang/Sangkar penumpang yang tegar
B **Side bars in vehicle doors**
Galang/Bar sisi dalam pintu kenderaan
C **Shock absorbers**
Penyerap hentakan
D **Air bags**
Beg udara

11 Which of the following velocity –time graph represents the motion of a ball falling through vacuum?
Antara graf halaju-lawan masa berikut, yang manakah mewakili gerakan sebiji bola yang jatuh di dalam vakum?

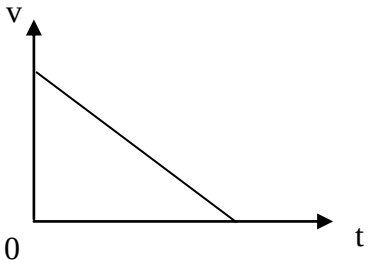
A



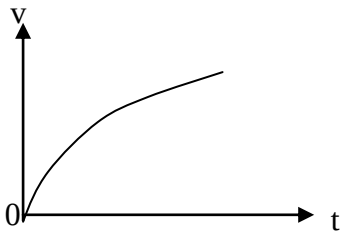
B



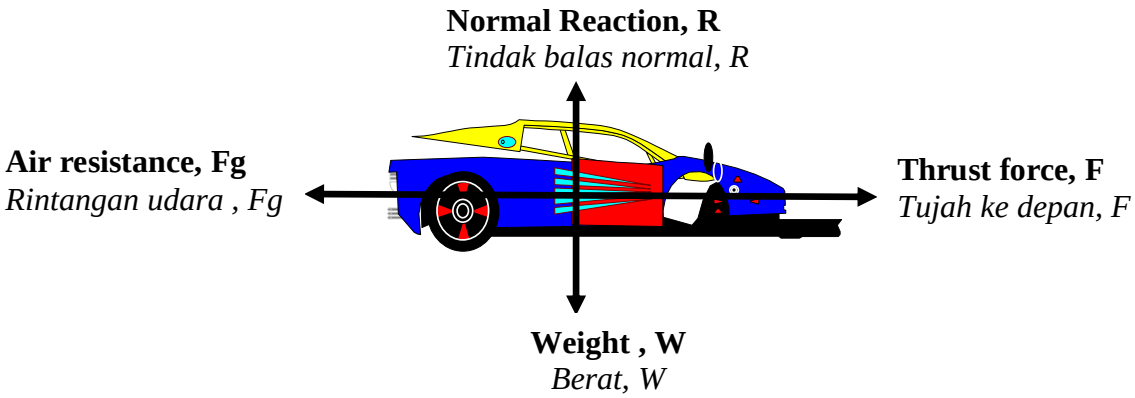
C



D



12 **Diagram shows a car is moving at constant velocity.**
Rajah menunjukkan sebuah kereta sedang bergerak dengan halaju seragam.

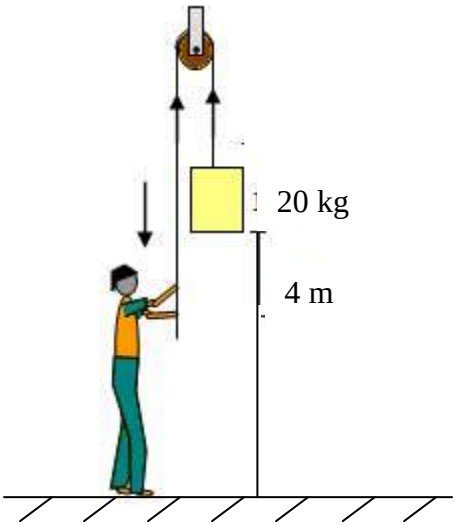


Which relationship of the forces is correct?
Hubungan daya yang manakah benar?

A **F > Fg**
B **F = Fg**
C **F < Fg**

[Lihat sebelah

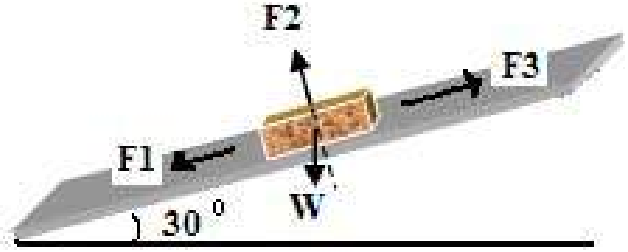
13 **Diagram shows a man is pilling a rope vertically downwards to lift a load of 20 kg on the other end through a vertical height of 4 m.**
Rajah menunjukkan seorang lelaki menarik tali ke bawah untuk mengangkat beban sebanyak 20 kg setinggi 4 m.



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

A **20 J**
B **40 J**
C **80 J**
D **800 J**

14 Diagram shows a box weighing 10 N resting inclined surface. The forces acting on the box are in equilibrium.
Rajah menunjukkan satu kotak yang beratnya 10 N di atas landasan condong. Daya-daya yang bertindak keatasnya dalam keseimbangan.



.

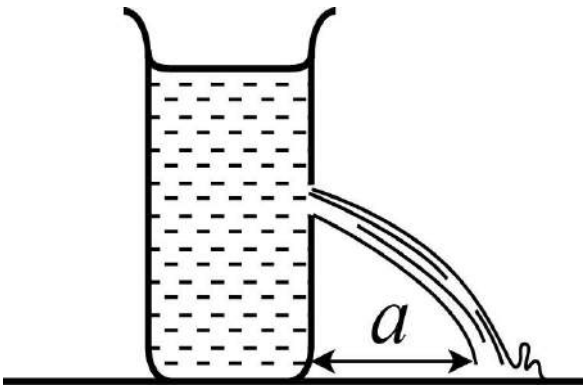
The value of F2 is
Nilai F2 adalah

A **10 N**
B **(10 sin 30^0) N**
C **(10 cos 30^0) N**
D **(10 sin 30^0 – F_3) N**

15 **A moving car has kinetic energy. When the car stops, its kinetic energy becomes zero. What becomes to its kinetic energy?**
Sebuah kereta yang sedang bergerak mempunyai tenaga kinetik. Bila kereta berhenti, tenaga kinetiknya menjadi sifar.
Apa terjadi kepada tenaga kinetik kereta?

A **Lost to the surroundings**
Hilang ke persekitaran
B **Transformed to potential energy**
Berubah menjadi tenaga keupayaan
C **Used to stop the car**
Telah digunakan untuk memberhentikan kereta
D **Transformed to heat**
Bertukar kepada tenaga haba

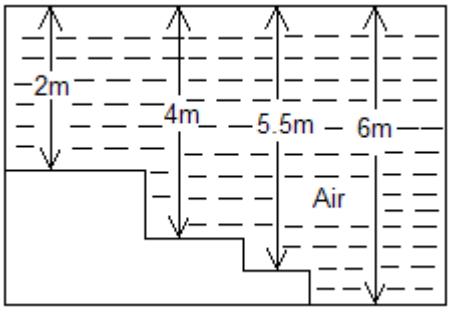
16 **The diagram shows water spurting out from a hole of a container at a distance of *a*.**
Gambar rajah menunjukkan air terpancut keluar dari lubang sebuah bekas pada jarak a.



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

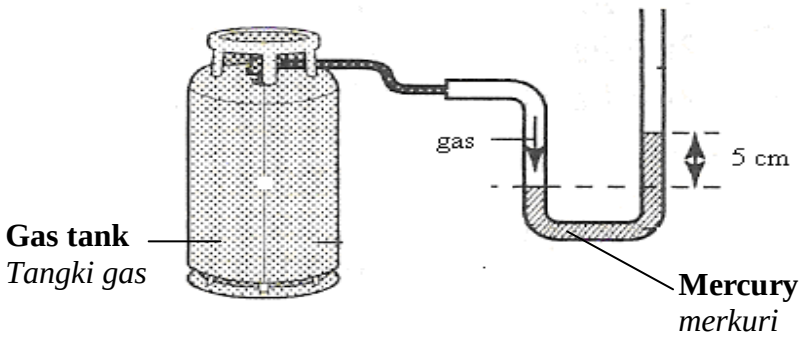
17 Diagram shows a cross section of swimming pool which has different depth
Rajah menunjukkan keratan rentas sebuah kolam renang yang mempunyai kedalaman yang berbeza.



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

A **2.0×10^4 Pa**
B **4.0×10^4 Pa**
C **5.5×10^4 Pa**
D **6.0×10^4 Pa**

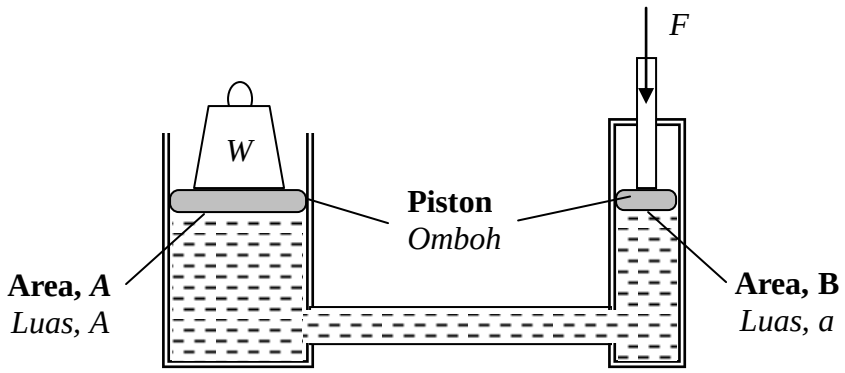
18 Diagram shows a U-tube manometer connected to a gas tank whose valve is then turned on.
Rajah menunjukkan satu tiub-U manometer disambungkan kepada satu tangki gas yang kemudian dibuka injapnya.



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

A **5 cm Hg**
B **70 cm Hg**
C **75 cm Hg**
D **80 cm Hg**
E **375 cm Hg**

19 **Diagram shows a hydraulic device. Given area A is 0.02 m and area B is 0.01 m. The force, *F*, 20 N is applied on a smaller piston.**
Rajah menunjukkan satu alat hidraulik. Diberi luas A ialah 0.02 m dan luas B ialah 0.01 m. Daya, F yang dikenakan ke atas omboh kecil ialah 20 N.
Hitungkan daya yang dikenakan pada omboh besar apabila pemberat W diletakkan .



Calculate force that exerted on a bigger piston when a load W is put on it.
Hitungkan daya yang dikenakan pada omboh besar apabila pemberat W diletakkan .

A **4 N**
B **10 N**
C **20 N**
D **40 N**

20 **A mixture of gas and air is produced by a bunsen burner.**
Principle involved here is
Satu campuran gas dan udara dihasilkan oleh sebuah penunu bunsen.
Prinsip yang terlibat ialah

A **Pascal's principle**
prinsip Pascal
B **Bernoulli's principle**
prinsip Bernoulli
C **Archimedes' principle**
prinsip Archimedes
D **the principle of conservation of momentum**
prinsip keabadian momentum

[Lihat sebelah

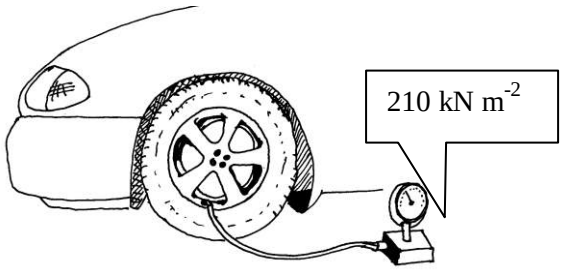
21 **A thermometer is inserted into a hole in an aluminium block which has a little oil in it. Oil is used**
Satu termometer dimasukkan ke dalam lubang bongkah aluminium yang diisikan dengan sedikit minyak.
Minyak digunakan untuk

A **To transfer heat by convection**
memindahkan haba secara perolakan
B **to insert the thermometer easily**
memudahkan termometer dimasukkan
C **to increase the conductivity of heat**
meningkatkan kekonduksian haba
D **To reduce lost of heat to the surrounding**
mengurangkan kehilangan haba ke persekitaran

22 **What is the heat energy released when a 2 kg object , P , if the rise in temperature is 30°C**
[Specific heat capacity for object P 900 J kg^{-1}°C^{-1}]
Berapakah jumlah tenaga haba yang di bebaskan bagi 2 kg objek P dengan kenaikan suhu ialah 30°C
[Muatan haba tentu bagi objek P ialah 900 J kg^{-1}°C^{-1}]

A **9 000 J**
B **18 000 J**
C **27 000 J**
D **54 000 J**

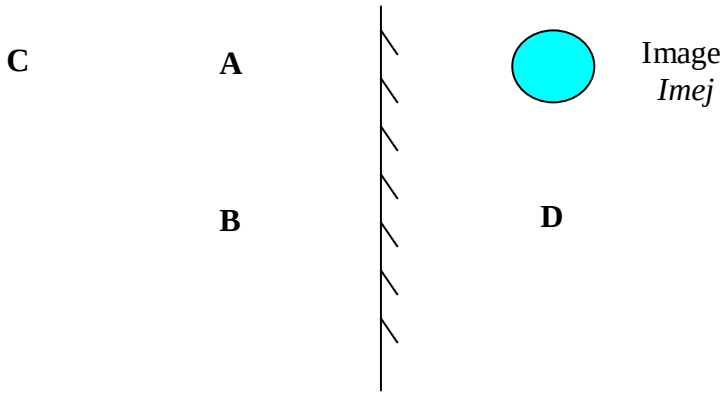
23 **Diagram shows pressure in a tyre before a car starts it's journey**
Rajah menunjukkan tekanan udara dalan sebuah tayar kereta sebelum memulakan perjalanan.



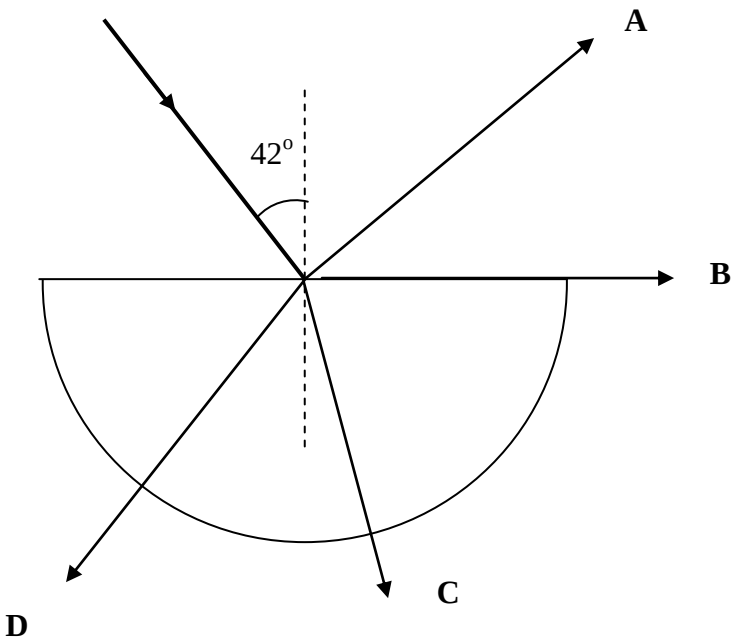
The pressure in the tyre increased to 212.0 kN m^{-2} after a long journey.
This is caused by
Selepas melalui satu perjalanan yang jauh tanpa henti, tekanan udara tayar itu menjadi 212.0 kNm^{-2}. Ini disebabkab oleh;

A **the density of air inside the tyre which has decreased**
ketumpatan udara dalam tayar berkurang
B **the mass of air inside the tyre which has increased**
jisim udara di dalam tayar semakin bertambah
C **the temperature inside the tyre which has increased**
suhu udara dalam tayar meningkat

24 **Diagram shows an image form by a plane mirror.**
Where is the object placed?
Rajah menunjukkan satu imej dihasilkan oleh satu cermin satah.
Di manakah objek itu mesti diletakkan?

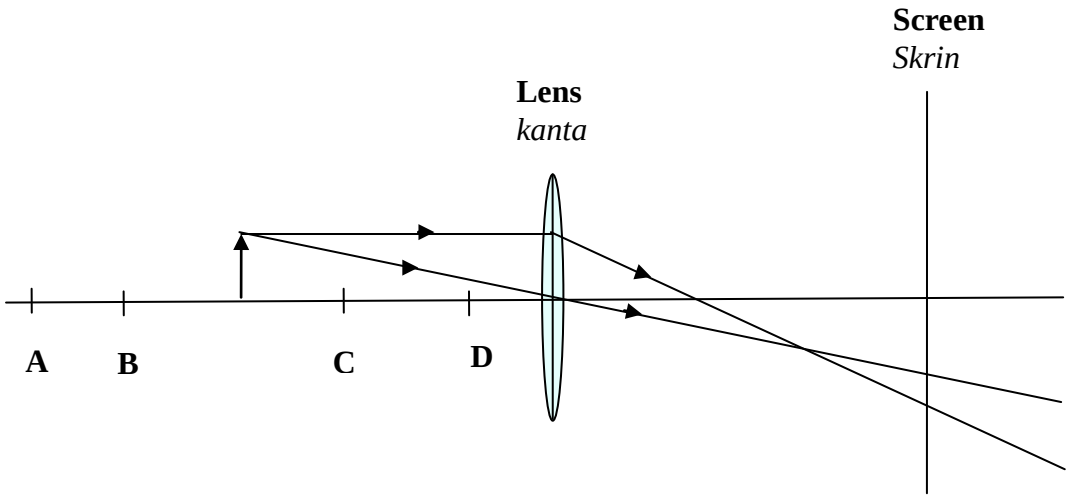


25 **Diagram shows a ray of light in air entering a semi-circular glass block at an angle of incidence 42°.**
Which diagram shows the correct path of the ray?
Rajah menunjukkan satu sinar cahaya dalam udara memasuki sebuah blok kaca semi bulatan pada sudut tuju 42°.
Rajah manakah yang betul menunjukkan lintasan sinar itu?



[Lihat sebelah

26 **In the following ray diagram, the image is formed in front of a screen.**
Which of the following changes will produce a sharp image on the screen?
Dalam rajah sinar berikut, imej dihasilkan di hadapan skrin.
Antara berikut, yang manakah perubahan yang akan menghasilkan satu imej yang jelas pada skrin?



A **Replace the lens with another convex lens of longer focal length.**
Gantikan kanta dengan sebuah kanta cembung yang mempunyai jarak fokus lebih panjang

B **Replace the lens with another concave lens of shorter focal length**
Gantikan kanta dengan sebuah kanta cekung yang mempunyai jarak fokus lebih pendek

C **Move the object further from the lens**
Gerakan objek itu lebih jauh daripada kanta

D **Move the lens closer to the object**
Gerakan kanta itu lebih dekat dengan objek

27. **A transverse wave and a longitudinal wave can only be differentiated by**
Gelombang melintang dan gelombang membujur hanya boleh dibezakan melalui

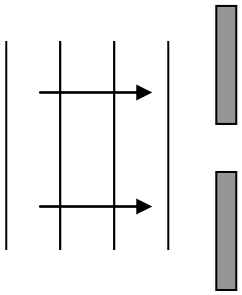
A **Amplitude**
Amplitud

B **Frequency**
Frekuensi

C **Wavelength**
Jarak gelombang

D **Direction of propagation**
Arah perambatan

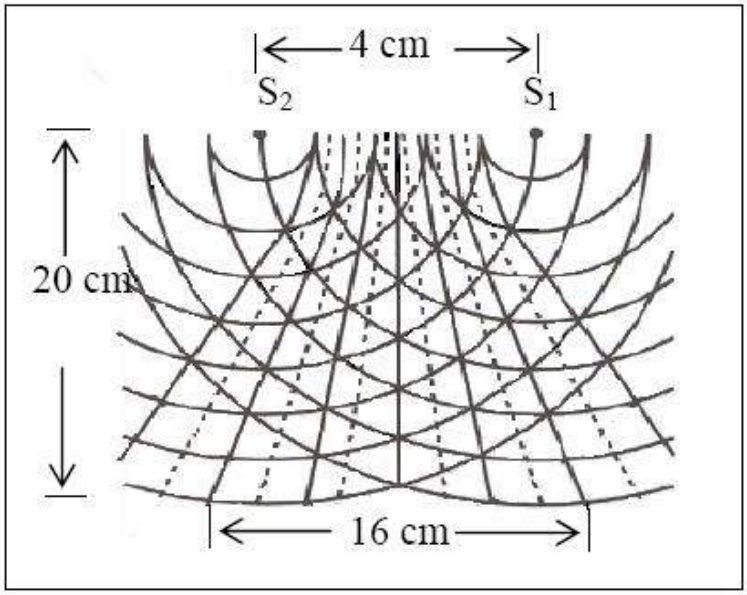
28 **Diagram shows plane waves moving towards a slit.**
Rajah menunjukkan gelombang satah bergerak menuju satu celah.



The motion of the waves through the slit will cause a change in the
Gerakan gelombang melalui celah itu akan menyebabkan perubahan pada

A **amplitude** / *amplitud*
B **wavelength** / *panjang gelombang*
C **wave speed** / *laju gelombang*
D **frequency** / *frekuensi*

29 **Diagram shows the phenomenon of interference of water waves.**
Rajah menunjukkan fenomena inteferens gelombang air.



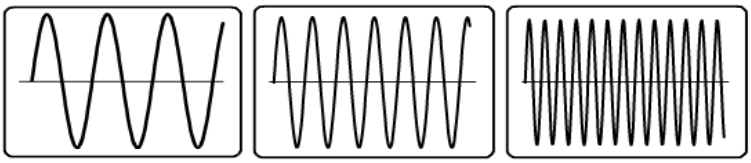
Key:
S1 : Wave source 1
S2 : Wave source 2

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

A **0.8 cm**
B **1.2 cm**
C **3.2 cm**
D **5.0 cm**
E **20.0 cm**

[Lihat sebelah

30 The diagrams show sound waves from a piano.
Rajah menunjukkan gelombang bunyi dari sebuah piano.

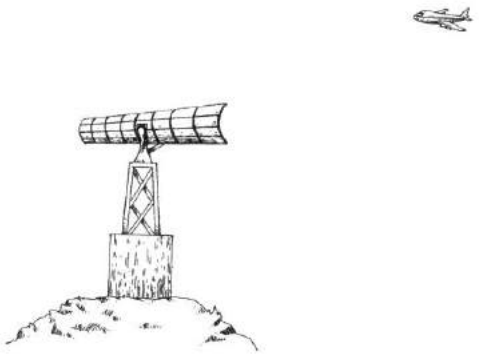


P **Q** **R**

Which of the following statements is true?
Pernyataan yang manakah benar?

A P has a higher pitch than Q
P lebih nyaring daripada Q
B Q has a higher pitch than R
Q lebih nyaring daripada R
C R has the highest pitch
R paling nyaring
D P, Q and R have the same pitch
P , Q dan R mempunyai kenyaringan yang sama

31 Diagram shows an airport radar transmitting wave signals to determine the position of an aeroplane.
Rajah menunjukkan radar lapangan terbang memancarkan isyarat gelombang untuk menentukan kedudukan kapal terbang.

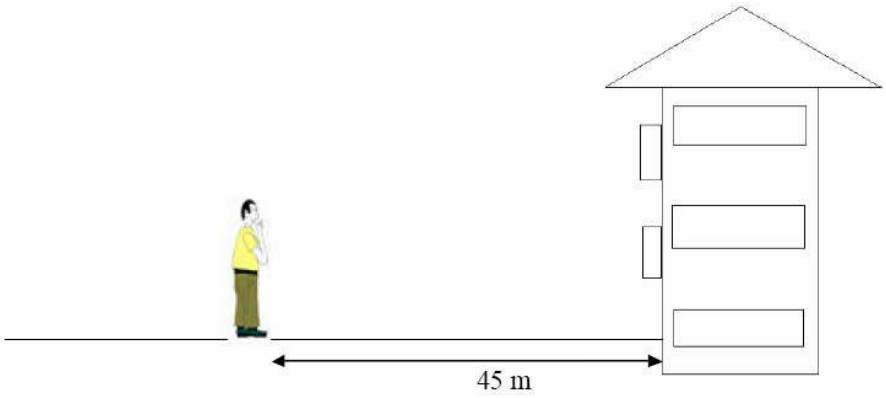


What type of wave is used by the radar?
Apakah jenis gelombang yang digunakan oleh radar?

A X-ray
Sinar X
B Infrared
Infra merah
C Radio wave
Gelombang radio
D Microwaves
Gelombang mikro

32 Diagram shows a boy shouting at a school building.

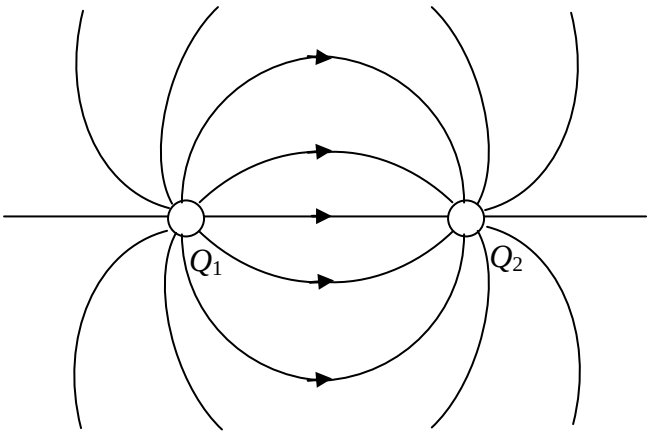
Rajah menunjukkan seorang budak lelaki menjerit ke arah bangunan sekolah



Calculate the time taken by the boy to hear the echo of his voice.
[The speed of sound in air is 340 m s^{-1}]
Hitung masa yang diambil oleh budak lelaki tersebut untuk mendengar gema suaranya.
[Laju bunyi di udara ialah 340 m s^{-1}]

A **0.07 s**
B **0.13 s**
C **0.26 s**
D **3.78 s**
E **7.26 s**

33 **Diagram shows the electric field lines for a pair of charged particles, Q_1 and Q_2.**
Rajah menunjukkan garis medan elektrik bagi sepasang zarah bercas, Q_1 dan Q_2.



What are the charges of Q_1 and Q_2?

[Lihat sebelah

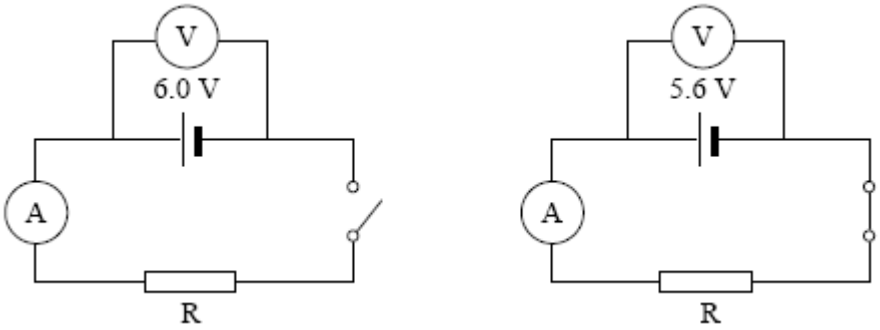
Apakah cas bagi Q_1 dan Q_2?

	Q_1	Q_2
A	**Positive** / *Positif*	**Negative** / *Negatif*
B	**Positive** / *Positif*	**Positive** / *Positif*
C	**Negative** / *Negatif*	**Positive** / Positif
D	**Negative** / *Negatif*	**Negative** / *Negatif*

34 **When the switch is on, the current that flows in an electronic advertisement board is 3.0×10^{-5} A.**
What is the number of electrons flowing in the advertisement board when it is switched on for 2 hours ?
Apabila suis dihidupkan, arus yang mengalir dalam litar sebuah papan iklan elektronik ialah 3.0×10^{-5} A.
Berapakah bilangan elekron yang mengalir dalam litar itu semasa suis dihidupkan selama 2 jam ?
[Charge of an electron / *cas setiap elektron* = 1.6×10^{-19} C]

A **3.84×10^{11}**
B **1.67×10^{14}**
C **1.35×10^{18}**
D **4.17×10^{23}**
E **1.50×10^{27}**

35 **Diagram shows a circuit before and after the switch is closed.**
Rajah menunjukkan litar sebelum dan litar selepas suis di tutup.

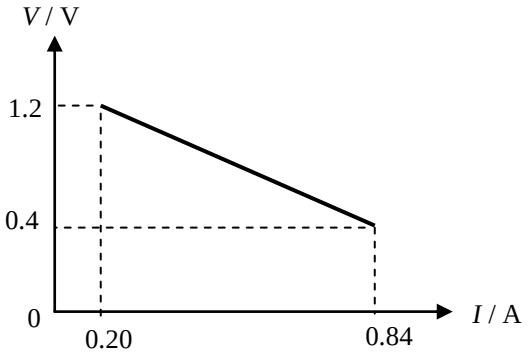


A drop in the voltmeter reading occurs because
Bacaan voltmeter yang menurun adalah disebabkan oleh

A **energy is needed to move charges in the circuit**
tenaga diperlukan untuk menggerakkan cas-cas di dalam litar
B **voltage is needed to accelerate charges in the circuit**
voltan diperlukan untuk memecutkan cas-cas di dalam litar
C **energy is needed to accumulate charges in the circuit**
tenaga diperlukan untuk mengumpukan cas-cas di dalam litar
D **voltage is lost across the internal resistance of the cell**
voltan hilang disebabkan oleh rintangan dalam sel

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

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



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

A **0.80 Ω**
B **1.16 Ω**
C **1.25 Ω**
D **1.43 Ω**
E **1.45 Ω**

37 **Diagram shows a toaster labelled " 240V, 60 W" that was used for 30 minutes.**
Rajah menunjukkan satu pembakar roti berlabel " 240V, 60 W" yang digunakan selama 30 minit.

Determine the energy used by the toaster.
Tentukan tenaga yang dihasilkan oleh pembakar roti

A 0.02 kWh

B 0.03 kWh

C 0.06 kWh

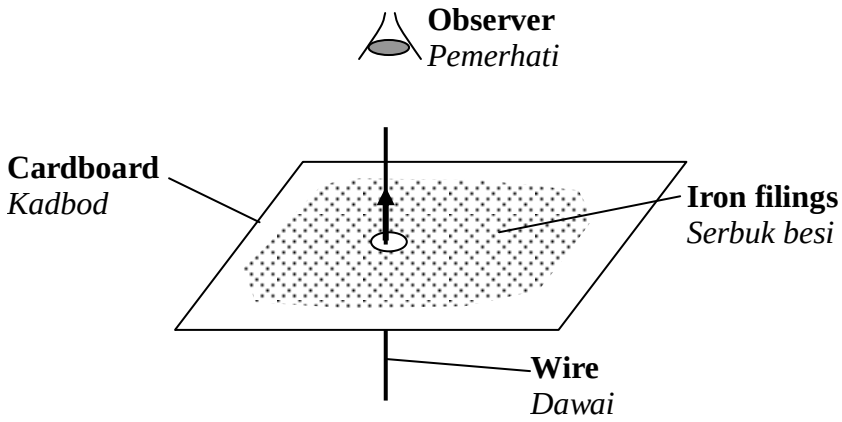
D 0.12 kWh

E 0.18 kWh

[Lihat sebelah

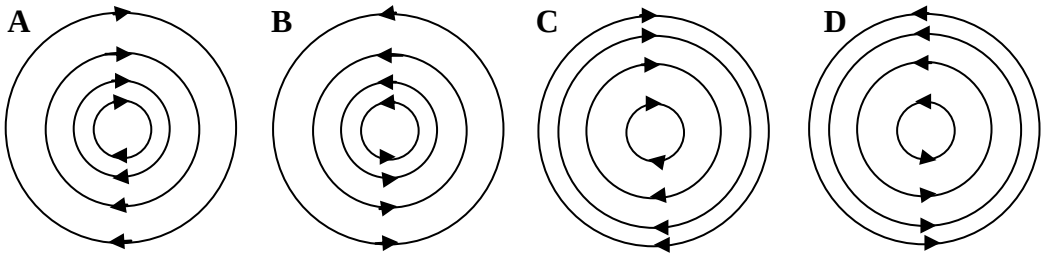
38 Diagram shows the set up of the apparatus to study the pattern of the magnetic field produced by the current in a straight wire.

Rajah menunjukkan susunan radas bagi mengkaji pola medan magnet yang dihasilkan oleh arus yang mengalir dalam satu dawai lurus.

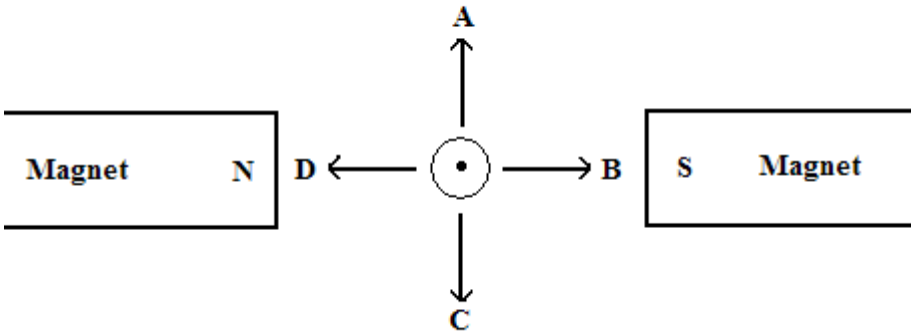


Which diagram shows the correct pattern and direction of the magnetic field that will be seen by the observer?

Rajah manakah menunjukkan pola serta arah yang betul bagi medan magnet yang akan dilihat oleh pemerhati itu?



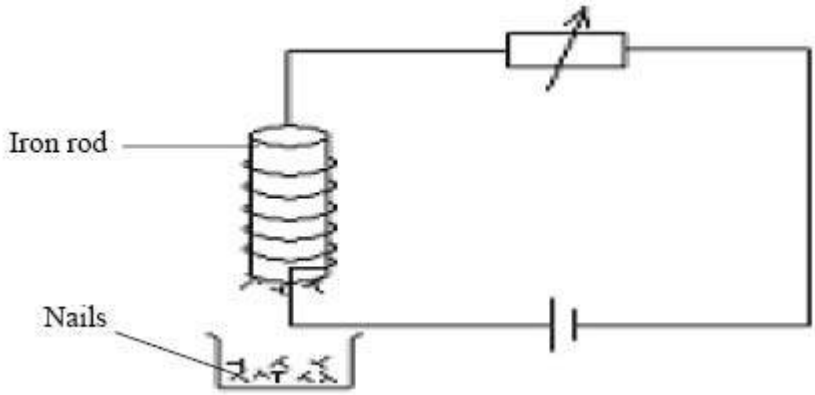
39 Diagram shows a current flowing in a conductor in a magnetic field.
Which is the direction of force acting on a conductor?
Rajah menunjukkan konduktor berarus dalam satu medan magnet.
Manakah arah daya yang terhasil dalam konduktor itu?



40 **Which rule can be used to determine the direction of the induced current in a solenoid?**
Peraturan yang manakah boleh digunakan untuk menunjukkan arah arus aruhan dalam satu solenoid?

A **Right-hand grip**
Genggaman tangan kanan
B **Fleming`s left-hand**
Tangan kiri Fleming
C **Fleming`s right-hand**
Tangan kanan Fleming

41 **Diagram shows a coil of wire wound around an iron rod is connected in a circuit.**
Rajah menunjukkan satu gegelung dawai yang mengelilingi satu rod besi disambungkan di dalam litar.

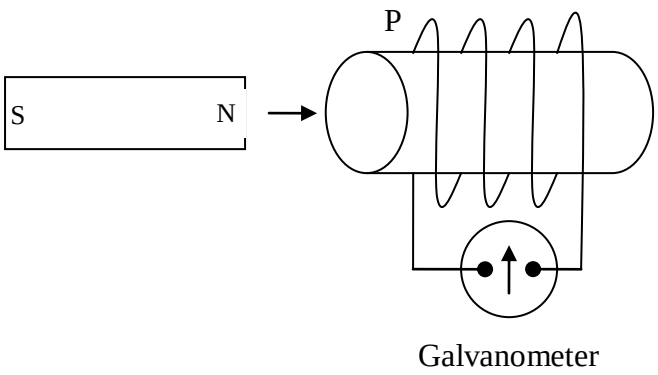


The number of nails attracted to the iron rod will increase if
Bilangan jarum-jarum yang ditarik oleh rod besi akan bertambah jika

A **a smaller current is used**
arus yang lebih kecil digunakan
B **the number of turns of the coil is increased**
bilangan gegelung ditambah
C **the distance between the coils is increased**
jarak antara gegelung- gegelung ditambah
D **an iron rod with a larger diameter is used**
satu rod besi yang lebih besar diameternya di gunakan

[Lihat sebelah

42 Diagram shows a bar magnet that is being moved into a solenoid.
Rajah menunjukkan sebuah magnet yang digerakkan masuk ke dalam suatu solenoid.



The polarity of the solenoid at P and the deflection of the galvanometer are
Kekutuban pada hujung P solenoid dan pesongan jarum galvanometer ialah

	Polarity of the solenoid at P *Kekutuban solenoid di* P	**Deflection of the Galvanometer** *Pesongan Galvanometer*
A	**North** *Utara*	**to the right** *ke kanan*
B	**North** *Utara*	**to the left** *ke kiri*
C	**South** *Selatan*	**to the right** *ke kanan*
D	**South** *Selatan*	**to the left** *ke kiri*

43 Which of the following statements is correct?
Pernyataan berikut yang manakah benar?

A In a step down transformer, the output voltage is higher than the input voltage.
Voltan output melebihi voltan input bagi sebuah transformer injak turun

B The output power of a transformer can be greater than the input power.
Kuasa output sebuah transformer boleh melebihi kuasa inputnya

C A transformer uses electromagnetic induction to produce e.m.f. in its secondary coil.
Sebuah transformer menggunakan aruhan elektromagnet untuk menghasilkan d.g.e. dalam gegelung sekunder

D Energy loss in a transformer due to eddy currents can be reduced by using a soft iron core.
Kehilangan tenaga dalam transfomer yang disebabkan oleh arus pusar dapat diatasi dengan menggunakan teras besi lembut.

44 Which of the following is not a property of cathode rays?
*Antara berikut yang manakah **bukan** sifat sinar katod?*

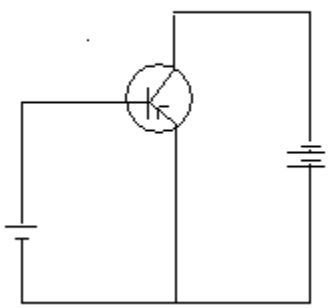
A **It is a type of electromagnetic radiation**
Ia adalah satu jenis sinaran radioaktif
B **It can be deflected by a magnetic field**
Ia boleh dipesong oleh medan magnet
C **It travels at high speed**
Ia bergerak pada laju tinggi
D **Its kinetic energy can be converted to light**
Tenaga kinetiknya boleh ditukar kepada cahaya

45 The adding of impurity into pure semiconductor material is known as
Penambahan bendasing ke dalam bahan semikonduktor tulen dikenali sebagai

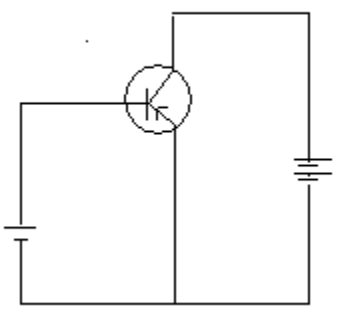
A **doping** / *pendopan*
B **rectification** / *rektifikasi*
C **amplification** / *amplifikasi*
D **thermionic emission** / *pancaran termion*

46 Which of the following circuits can function ?
Antara litar berikut, yang manakah boleh berfungsi ?

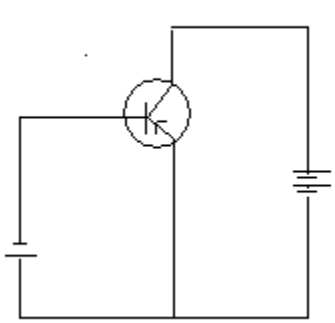
A



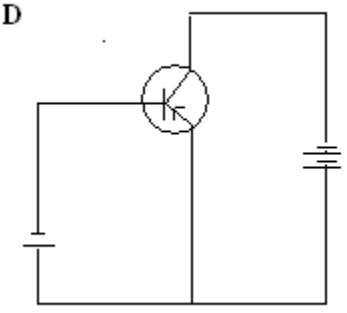
C



B



D



[Lihat sebelah

47 Diagram shows a combination of two logic gates.

Rajah menunjukkan gabungan dua get logik.

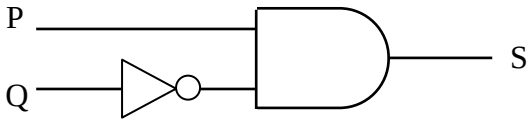
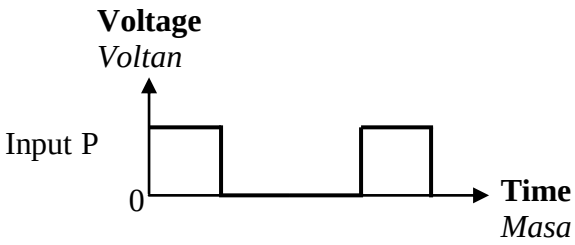
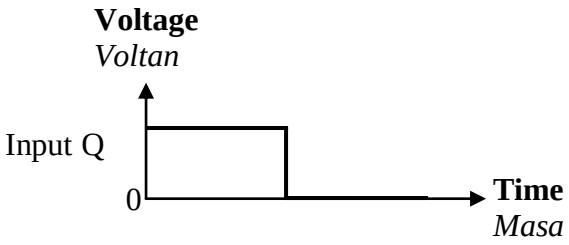


Diagram show the signals applied to the inputs P and Q.

Rajah menunjukkan isyarat-isyarat yang disambungkan ke input P *dan* Q.

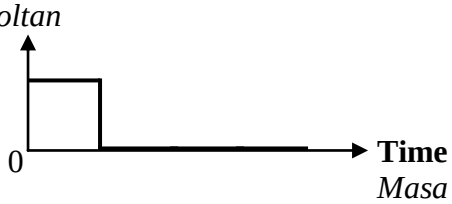




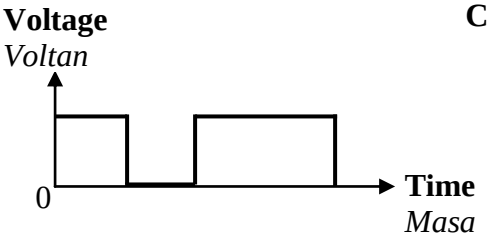
Which of the following shows the waveform from the output S?

Antara berikut yang manakah menunjukkan output bagi S?

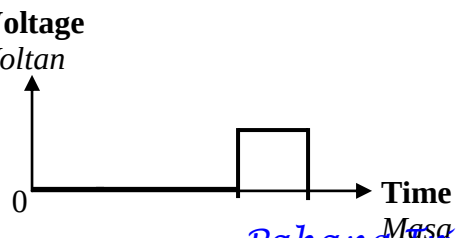
A



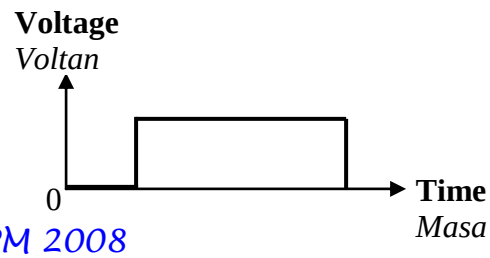
C



B



D



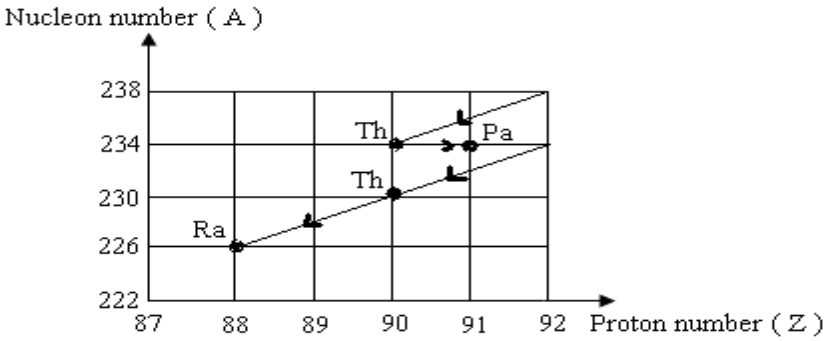
48 **An atom contains 17 protons, 18 neutrons and 17 electrons. What is the proton number and nucleon number of this atom?**
Satu atom mengandungi 17 proton, 18 neutron dan 17 elektron. Berapakan nombor proton dan nombor nukleon bagi atom ini?

	Proton number / *Nombor proton*	**Nucleon number** / *Nombor nukleon*
A	**17**	**34**
B	**17**	**35**
C	**18**	**34**
D	**18**	**35**

49 **What is the radioisotope that can be used to determine the age of a fossil ?**
Apakah radioisotope ynag boleh digunakan untuk menentukan usia suatu fosil ?

A **Radon – 222**
B **Uranium – 238**
C **Carbon – 14**
D **Iodine -131**

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



What is the number of the alpha particles and beta particles emitted during this process?
Berapakah bilangan zarah alfa dan zarah beta yang dihasilkan semasa proses ini ?

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

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

For Examiner's Use

Section A
Bahagian A

[60 *marks*]
[60 *markah*]

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

1. Diagram 1.1 shows the meniscus of mercury in a measuring cylinder. A, B and C are three eye positions while measuring the volume of the mercury..
Rajah 1.1 menunjukkan meniskus bagi merkuri dalam satu selinder penyukat. A, B dan C adalah tiga kedudukan mata semasa mengambil bacaan ispadu merkuri.

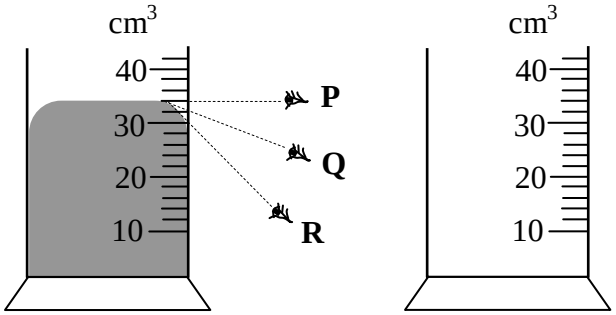


Diagram 1.1 Diagram 1.2

1(a)

(a) State the sensitivity of that measuring cylinder.
Nyatakan kepekaan bagi selinder penyukat tersebut.

……..
[1 *mark*] / [1 *markah*]

1(b)(i)

(*b*) (i) From the diagram, which position of the eye is correct whilst taking the reading?
Merujuk kepada rajah, kedudukan mata yang manakah adalah betul semasa mengambil bacaan?

……..
[1 *mark*] / [1 *markah*]

1(b)(ii)

(ii) What is the volume of the mercury?
Berapakah isipadu merkuri tersebut?

……..
[1 *mark*] / [1 *markah*]

1(c)

(*c*) Use a ruler to draw the meniscus if 32 cm^3 if the water is poured in the empty measuring cylinder.
Gunakan pembaris unutk melukis meniskus jika 32 cm^3 air dituang ke dalam selinder penyukat yang kosong.
[1 *mark*] / [1 *markah*]

For Examiner's Use

2. Diagram 2.1 shows an observer near a pool. Water wave is a transverse wave and from his observations, the pattern of the water wave is as shown as the diagram below.
Rajah 2.1 menunjukkan seorang pemerhati yang berada di tepi sebuah kolam renang. Gelombang air adalah sejenis gelombang melintang dan daripada pemerhatiannya, corak gelombang air adalah seperti yang ditunjukkan dalam rajah di bawah.

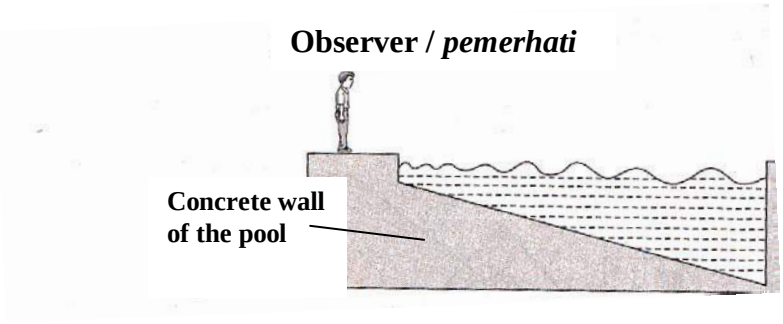


Diagram 2.1
Rajah 2.1

(*a*) What is meant by transverse wave?
Apakah yang dimaksudkan dengan gelombang melintang?

2 (a)

……

……
[1 *mark*] / [1 *markah*]

(*b*) (i) Name **one** type of transverse wave besides water wave?
*Namakan **satu** jenis gelombang yang merupakan gelombang melintang selain gelombang air.*

2 (b) (i)

……
[1 *mark*] / [1 *markah*]

(ii) What is the wave phenomenon that was observed by the observer above?
Apakah fenomena gelombang yang telah diperhatikan oleh pemerhati di atas?

2 (b) (ii)

……
[1 *mark*] / [1 *markah*]

For Examiner's Use

(*c*) Complete the water wave pattern that propagates from the shallow region to the deep region in a ripple tank as shown in the Diagram 2.2 below.
Lengkapkan corak gelombang air yang bergerak dari kawasan cetek ke kawasan dalam sebuah tangki riak seperti yang ditunjukkan dalam Rajah 2.2 di bawah.

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

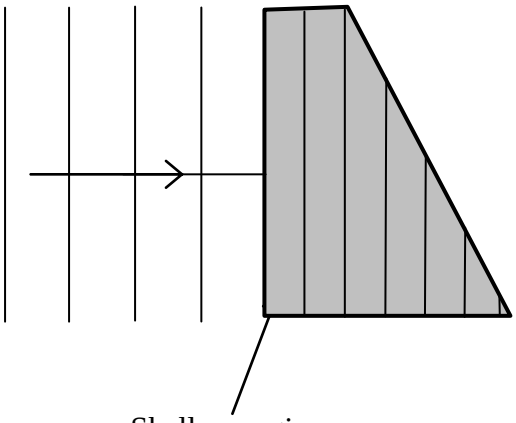


Diagram 2.2
Rajah 2.2

2 (c)

For Examiner's Use

3. Diagram 3.1 shows a motorcycle driven by a snatch thief overtaking a police car at 4.00 p.m. The police car pursued the motorcycle.
Graph from Diagram 3.2 shows velocity against time graph for both vehicles.
Rajah 3.1 menunjukkan sebuah motosikal yang ditunggang oleh seorang peragut telah memotong sebuah kereta polis pada pukul 4.00 petang. Kereta polis kemudiannya mengekori motosikal itu.
Rajah 3.2 menunjukkan graf halaju melawan masa bagi kedua-dua kenderaan tersebut.

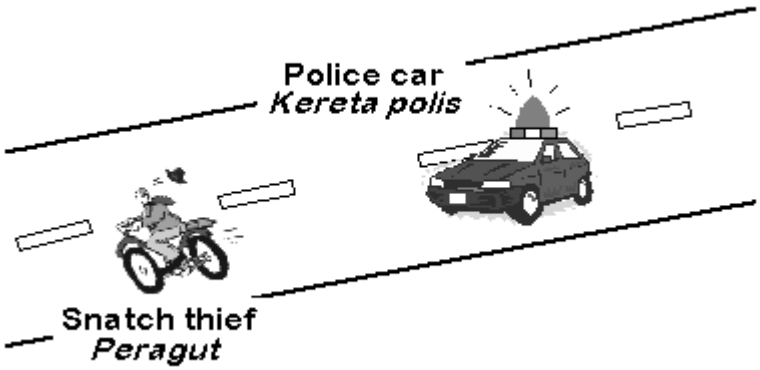


Diagram 3.1
Rajah 3.1

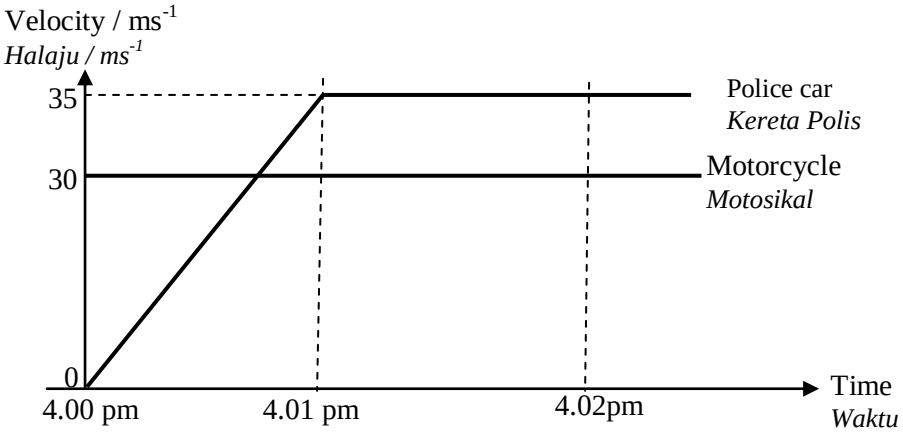


Diagram 3.2
Rajah 3.2

(*a*) Based on the graph in Diagram 3.2, state the type of motion for,
Berdasarkan graf dalam rajah 3.2, nyatakan jenis gerakan bagi,

3 (a) (i)

(i) Motorcycle
Motosikal

……

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

3 (a) (ii)

(ii) Police car
Kereta polis

……

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

For Examiner's Use

3 (b) (i)

(*b*) (i) What is the net force acting on the motorcycle?
Berapakah daya paduan yang bertindak ke atas motosikal?

.....

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

3 (b) (ii)

(ii) Give a reason for your answer in 3(b)(i).
Beri sebab bagi jawapan anda di 3(b)(i).

.....

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

(*c*) Based on the graph in Diagram 3.2, calculate the distance travelled by the police car from 4.00 pm to 4.02 pm.
Berdasarkan graf dalam Rajah 3.2, hitung jarak yang dilalui oleh kereta polis dari pukul 4.00 petang hingga 4.02 petang.

3 (c)

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

For Examiner's Use

4. A block of density 133 kg m^{-3} and dimensions 2 m × 2 m × 3 m is placed on a soft bed as shown in Diagram 4 below. The soft bed is compressed.
Satu bongkah dengan ketumpatan 133 kg m^{-3} dan berukuran 2 m × 2 m × 3 m *diletakkan di atas satu tilam lembut seperti Rajah 4 di bawah. Tilam lembut itu pula kelihatan termampat.*

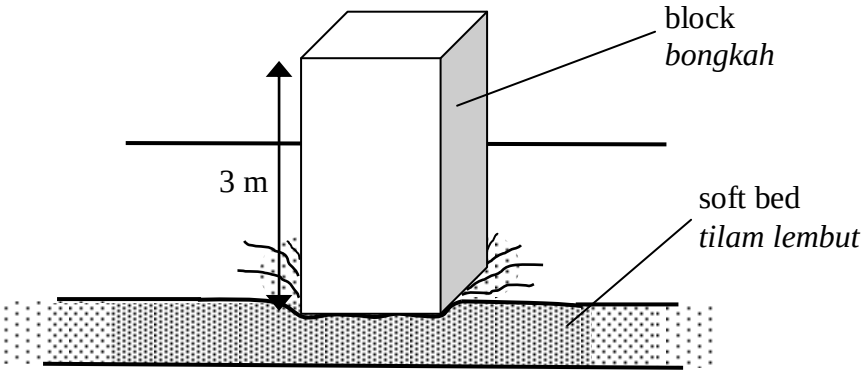


Diagram 4
Rajah 4

4 (a)

(*a*) Why is the soft bed compressed?
Mengapa tilam lembut itu kelihatan termampat?

……..
[1 *mark*] / [1 *markah*]

4 (b)

(*b*) Give a definition for the concept in your answer in (*a*) ?
Berikan definisi untuk konsep bagi jawapan anda di (a) ?

……..
[1 *mark*] / [1 *markah*]

(*c*) Calculate the //*Hitungkan,*

4 (c) (i)

(i) Berat bongkah
Weight of the block

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

4 (c) (ii)

(ii) Pressure acting on the soft bed
Tekanan yang bertindak ke atas tilam lembut

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

For Examiner's Use

5. Diagram 5 demonstrates the force acting on a current carrying conductor in a magnetic field.

Rajah 5 menunjukkan daya yang bertindak pada satu konduktor yang membawa arus dalam medan magnet.

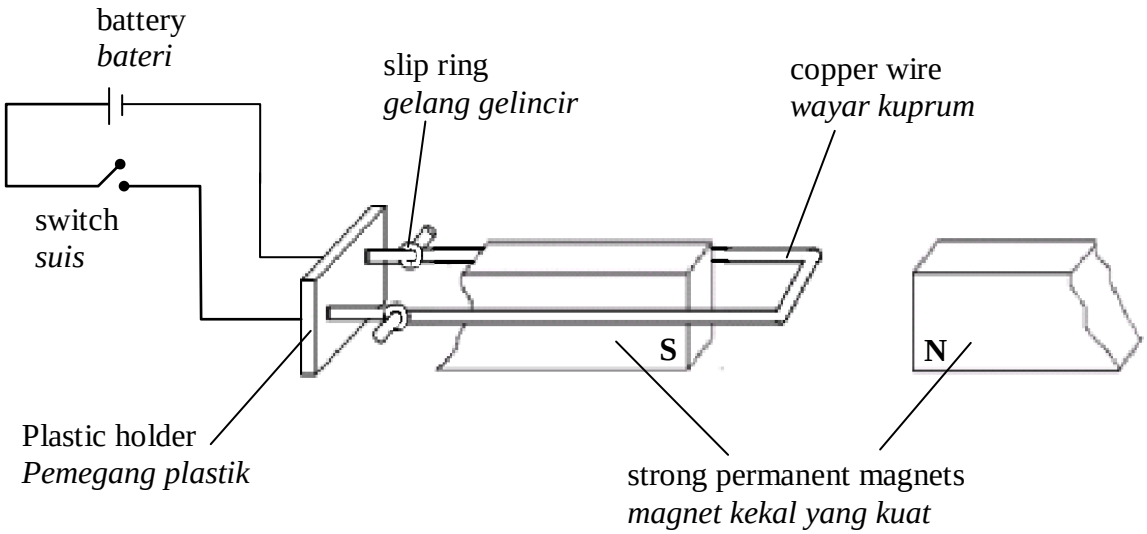


Diagram 5
Rajah 5

5 (a)

(*a*) When the switch is closed, what observation can you make?
Apabila suis ditutup, apakah permerhatian yang dapat anda buat?

……..
[1 *mark*] / [1 *markah*]

5 (b)

(*b*) State the rule which can be used to determine the direction of motion of the copper wire?
Berikan nama peraturan yang digunakan bagi menentukan arah gerakan wayar kuprum tersebut ?

……..
[1 *mark*] / [1 *markah*]

5 (c)(i)

(*c*) (i) If the direction of current is reversed, what different observation can be made?
Jika arah arus disonsangkan, apakah perbezaan pemerhatian yang anda dapat buat?

……..
[1 *mark*] / [1 *markah*]

For Examiner's Use

(ii) Draw the pattern of electromagnetic filed that produces the motion of the copper wire as in (*a*)?
Lukiskan corak medan elektromagnet yang menghasilkan daya terhadap wayar kuprum seperti di soalan (a)?

5 (c)(ii)

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

(iii) How can the magnitude of the force be increased?
Bagaimanakah magnitud daya tersebut boleh dipertingkatkan?

……..

……..

5 (c)(iii)

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

For Examiner's Use

6. Diagram 6 shows an electrical circuit to detect temperature of water whilst boiling an egg. When the egg is ready to serve, the siren will go off and the base voltage, V_b is at least 1.5 V.

Rajah 6 menunjukkan litar elektrik untuk mengesan suhu air semasa merebus telur. Apabila telur tersebut telah masak, siren akan berbunyi dan voltan tapak, V_b mestilah sekurang-kurangnya 1.5 V.

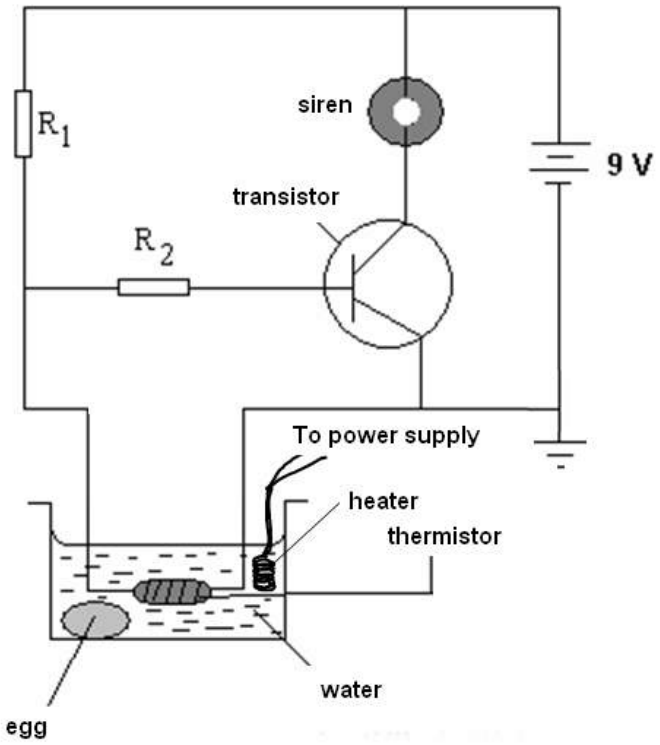


Diagram 6
Rajah 6

(*a*) In Diagram 6, complete the symbol of the transistor and name the type of transistor used in the circuit..
Dalam Rajah 6, lengkapkan simbol transistor dan namakan jenis transistor yang digunakan dalam litar itu.

6 (a)

……..

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

(*b*) (i) If the siren is functional, what is the maximum potential difference across R_1?
Jika siren berbunyi, berapakah beza keupayaan maksima yang merentasi R_1?

6 (b) (i)

……..

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

For Examiner's Use

(*b*) (ii) Then, calculate the resistance of the thermistor when the siren is functional. Given the value of R_1 is 600 Ω.
Seterusnya, hitung rintangan termistor apabila siren berbunyi. Diberi nilai rintangan R_1 ialah 600 Ω.

6 (b)(ii)

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

(*c*) Calculate the collector current, I_C, if the emitter current, I_E is 100 mA.
Hitung nilai arus pemungut, Ic jika arus pemancar, I_E adalah 100 mA.

6 (c)

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

(*d*) Give **one** other application in an electric circuit using a transistor.
*Beri **satu** aplikasi lain bagi transistor dalam litar elektrik.*

6 (d)

……..

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

For Examiner's Use

7. **α**-particles can be scattered by thin gold foil. Diagram 7 shows part of the paths of three **α**-particles.

*Zarah **α** boleh dipesongkan oleh kepingan emas yang nipis. Rajah 7 menunjukkan sebahagian daripada laluan bagi tiga zarah **α**.*

(a) Complete the paths.
Lengkap laluannya.

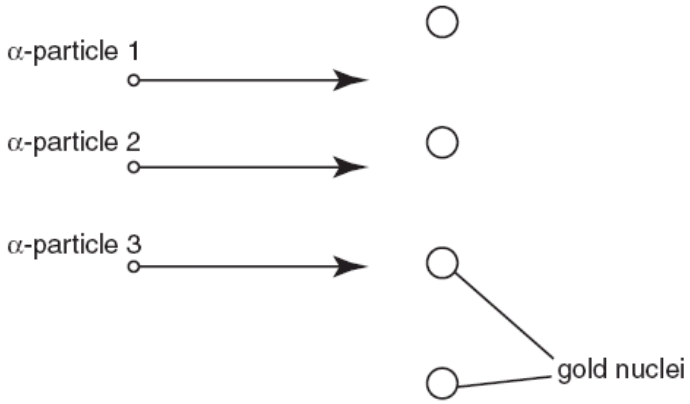


Diagram 7
Rajah 7

[3 *marks*]
/ [3 markah]

7 (a)

(*b*) Write the complete symbol for an α-particle.
Tuliskan simbol lengkap bagi satu zarah α.

7 (b)

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

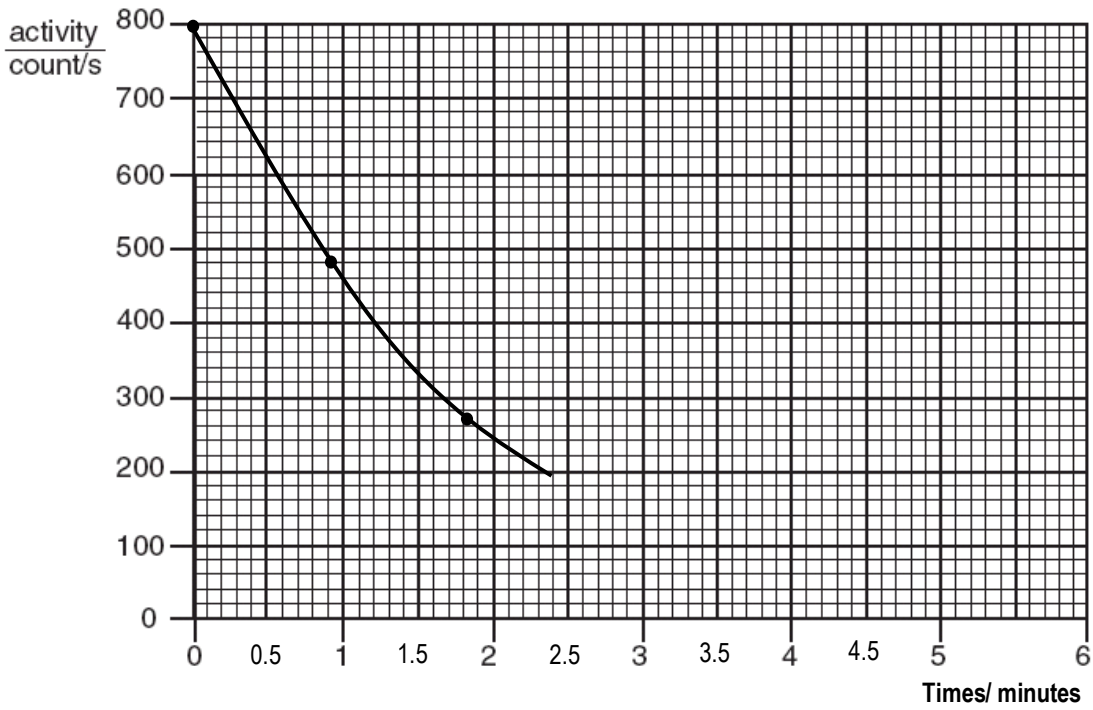
(*c*) State a conclusion for the scattering path that you have drawn for **α-particle 1**.
*Nyatakan satu kesimpulan bagi laluan pesongan seperti yang anda lukis untuk **zarah- α 1**.*

7 (c)

……..
[1 *mark*] / [1 *markah*]

For Examiner's Use

A small pond nearby a nuclear reactor becomes contaminated by the release of radioactive waste. The radioactivity of a sample of the contaminated water from the pond is tested for 5 minutes and the result is shown in the graph below.
Sebuah kolam kecil berhampiran sebuah reaktor nuklear telah tercemar dengan pelepasan bahan buangan radioaktif. Keradioaktifan bagi sampel air yang tercemar daripada kolam tersebut telah diuji selama 5 minit dan keputusannya adalah seperti dalam graf di bawah.



(*d*) (i) Use the graph to find the half-life of the radioactive material in the sample. Show clearly on the graph how you obtain your answer.
Gunakan graf untuk menentukan separuh hayat bahan radioaktif dalam sampel tersebut. Tunjukkan dengan jelas bagaimana anda mendapatkan jawapan tersebut.

7 (d)(i)

……..

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

For Examiner's Use

(ii) The radioactive source does not pose a danger if it has decayed to one-eighth of its original radioactivity. Calculate the time taken?
Bahan radioaktif ini tidak berbahaya jika ianya mereput kepada satu perlapan daripada keradioaktifan asalnya. Hitung masa yang diambil?

7 (d)(ii)

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

(iii) If the sample of contaminated water used in the test is of a smaller quantity, state what happens to the value of the half-life?
Jika sampel air tercemar yang digunakan dalam ujian ini dalam kuantiti yang lebih kecil, nyatakan apakah yang akan berlaku kepada nilai separuh hayat?

7 (d)(iii)

……..
[1 *mark*] / [1 *markah*]

For Examiner's Use

8. Diagram 8 shows an arrangement of logic gates in an electronic device.
Rajah 8 menunjukkan susunan bagi get-get logik dalam satu peranti elektronik.

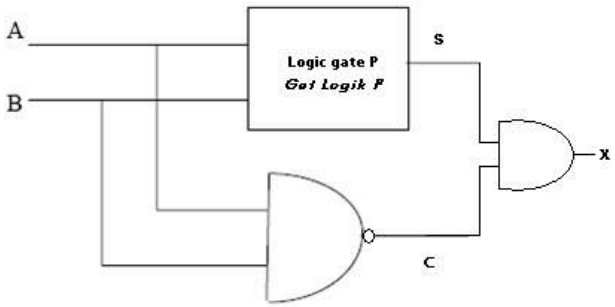


Diagram 8
Rajah 8

(*a*) Table 8.1 shows the truth table for P.
Jadual 8.1 menunjukkan jadual kebenaran bagi P.

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

8 (a)(i)

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

.....

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

8 (a)(ii)

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

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

(*b*) Complete the table 8.2 below for the output from the combination of the logic gates in Diagram 8.
Lengkapkan Jadual 8.2 di bawah bagi output kepada susunan get logik dalam Rajah 8.

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

8 (b)

[4 *mark*] / [4 *markah*]

For Examiner's Use

(c) Syafinaz wants to invent an alarm system using logic gates in her room. When someone opens the main door , the alarm will give out a siren if she activates the alarm switch whether she is inside or outside.
Syafinaz ingin mencipta satu sistem penggera di dalam biliknya. Apabila seseorang membuka pintu biliknya, penggera akan berbunyi jika dia mengaktifkan suis penggera dan tidak kira samada dia berada di dalam atau diluar biliknya.

The keys and the truth table for the systems as shown below.
Kekunci dan jadual kebenaran bagi sistem tersebut adalah seperti yang ditunjukkan di bawah.

Keys
Kekunci

She is inside	1	*Dia berada di dalam*	*1*
She is outside	0	*Dia berada di luar*	*0*
Switch activated	1	*Suis diaktifkan*	*1*
Switch unactivated	0	*Suis tidak diaktifkan*	*0*
Door opened	1	*Pintu dibuka*	*1*
Door closed	0	*Pintu ditutup*	*0*
Alarm siren on	1	*Penggera berbunyi*	*1*
Alarm siren off	0	*Penggera senyap*	*0*

(i) Based on the keys above, complete the truth table below if she is inside.
Berdasarkan kekunci yang diberikan, lengkapkan jadual kebenaran di bawah jika dia sedang berada didalam biliknya.

Switch	*Door*	*Alarm*
0	0	
0	1	
1	0	
1	1	

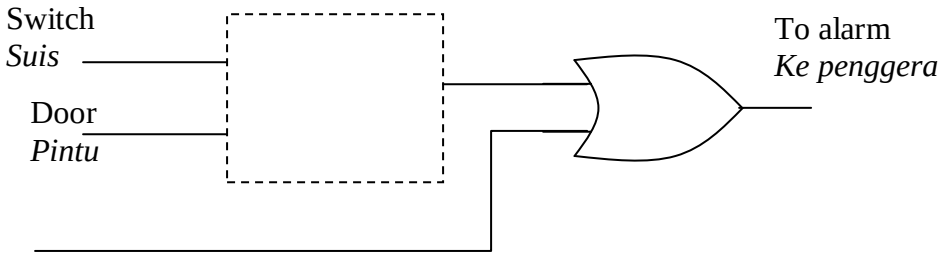
8 (c)(i)

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

For Examiner's Use

(ii) Using the truth table in (i), choose a suitable logic gate to fill in the diagram below.
Menggunakan jadual kebenaran di atas, pilih satu get logik yang sesuai untuk melengkapkan rajah di bawah..

8 (c)(ii)



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

(iii) What should Syafinaz do if she wants the alarm to function if she is inside and other conditions are the same?.
Nyatakan apakah yang Syafinaz patut lakukan jika dia mahu penggera tersebut berfungsi jika dia berada di dalam sahaja dan syarat-syarat lain adalah sama.

4 (c) (i)

……..

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

(iv) State two advantages of using digital circuit instead of analogue circuit.
Nyatakan dua kelebihan menggunakan litar digital berbanding litar analog.

8 (c)(iv)

……..

……..

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

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

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

9. The graph in Diagram 9(a) shows the cooling curve of 10 g of naphthalene
Graf pada Rajah 9(a) menunjukkan lengkung penyejukan 10 g naftalena.

The graph in Diagram 9(b) shows the cooling curve of 50 g of naphthalene
Graf pada Rajah 9(b) menunjukkan lengkung penyejukan 50 g naftalena.

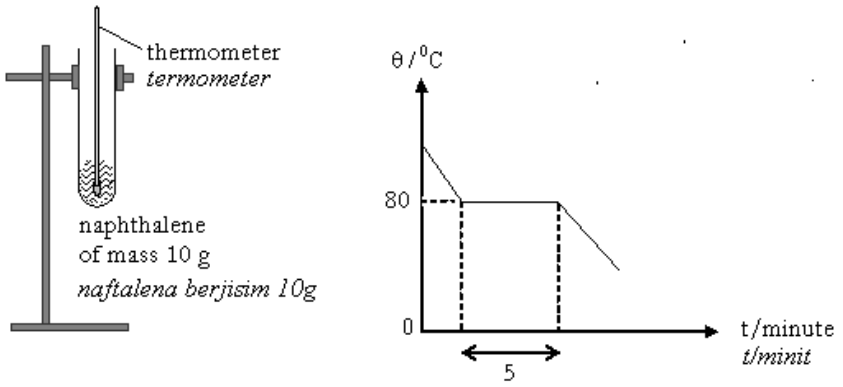


Figure 9(a)
Rajah 9(a)

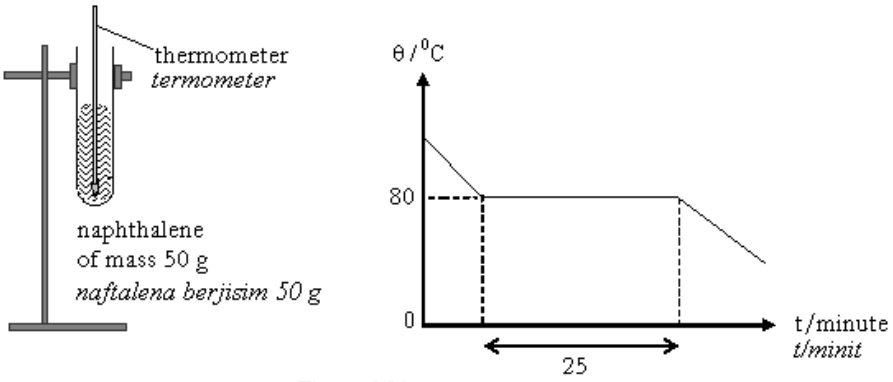


Figure 9(b)
Rajah 9(b)

(a) What is meant by *latent heat*?
Apakah yang dimaksudkan dengan haba pendam?

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

(b) Using Diagrams 9 (a) and 9 (b) compare the mass of naphthalene, the time taken for the naphthalene to solidify and the latent heat released.
Relating the mass of naphthalene and the heat released to deduce a relevant physics concept.

Menggunakan Rajah-rajah 9(a) dan 9(b) bandingkan jisim naftalena, masa untuk naftalena membeku dan haba pendam yang dibebaskan.
Hubungkaitkan antara jisim naftalena dan haba pendam yang dibebaskan untuk menyimpulkan satu konsep fizik yang sesuai.

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

(c) Referring to the graph in Diagram 9(a), explain the changes which occur in the liquid naphthalene when it is cooled until it changes from the liquid to the solid state.

Merujuk kepada graf dalam Rajah 9(a), jelaskan perubahan yang berlaku kepada cecair naftalena apabila ia disejukkan sehingga ia berubah dari cecair kepada pepejal.

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

(d) A chef has to cook for a banquet and he has to be able to prepare his food quickly, with the minimum cost yet without compromising on the quality of the food served.

Seorang chef diminta memasak untuk satu jamuan dan dia perlu menyediakan makanan dalam masa yang singkat, namun tidak mengurang kualiti makanan yang dihidangkan.

Using the appropriate physics concepts, suggest and explain suitable designs or ways to have a pot with the following features:
(i) long lasting and safe
(ii) portable
(iii) consume little fuel/cooking gas
(iv) versatile (adaptable for various purpose: cooking, steaming and etc)

Menggunakan konsep-konsep fizik yang sesuai, cadang dan terangkan rekabentuk atau kaedah yang sesuai dilakukan untuk menghasilkan periuk yang mempunyai ciri-ciri berikut:

(i) tahan lama dan selamat
(ii) mudahalih
(iii) menggunakan hanya sedikit bahan api / gas memasak
(iv) pelbagai (boleh diubah sesuai untuk pelbagai tujuan : memasak, mengukus dan lain-lain)

[10 marks] // *[10 markah]*

10 (a) Diagram 10.1 shows water waves moving towards the shore.
Rajah 10.1 menunjukkan gelombang air sedang menuju ke arah tanjung.

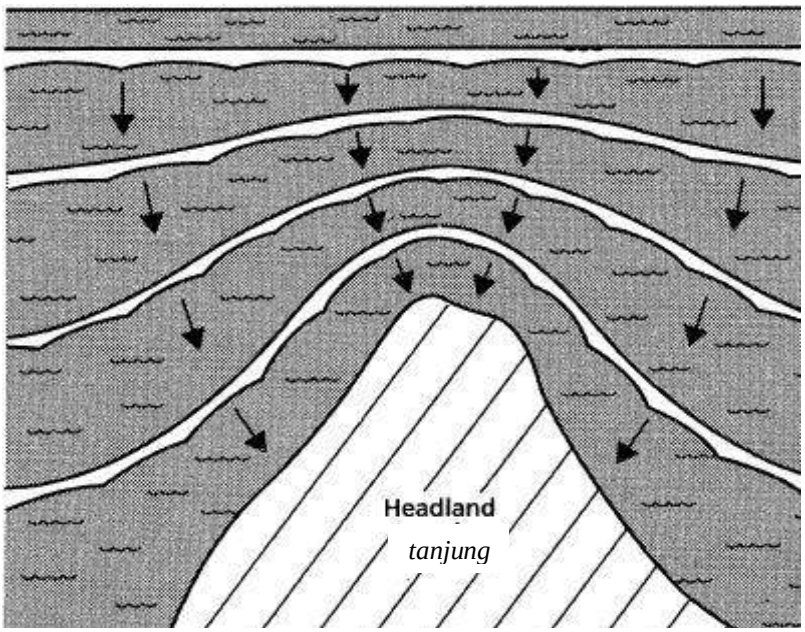


Diagram 10.1
Rajah 10.1

(i) Name the wave phenomena in Diagram 10.1.
Namakan fenomena gelombang yang ditunjukkan di rajah 10.1

[1 mark] [1 *markah*]

(ii) What happens to the waves as it approaches the headland ? Give reasons.
Apa berlaku kepada gelombang semasa menghampiri tanjung ? Berikan sebab.

[3 marks] [3 *markah*]

(b)

Situation 1
Situasi 1

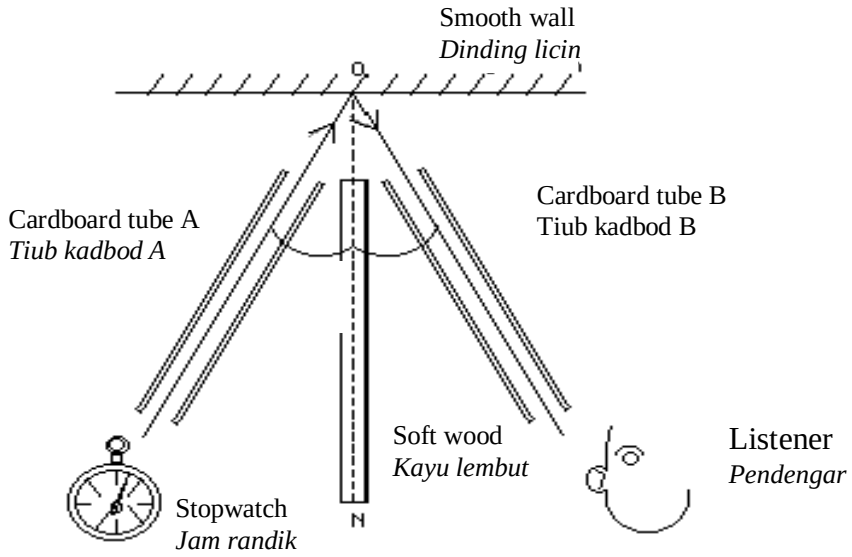


Diagram 10.2
Rajah 10.2

Situation 2
Situasi 2

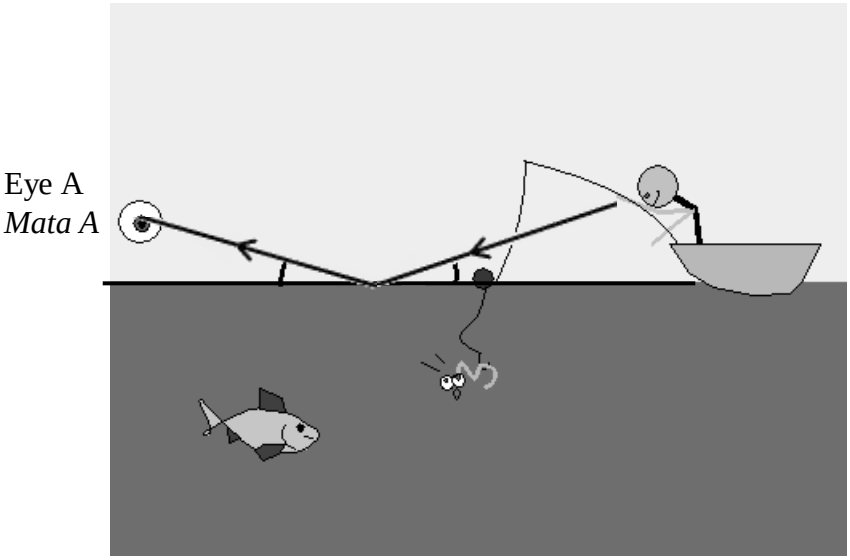


Diagram 10.3
Rajah 10.3

Situation 1
A student can hear the sound from the stopwatch at its loudest when cardboard tube B is at the position shown in Diagram 10.2.

Situasi 1
Seorang pelajar dapat mendengar bunyi dari jam randik paling kuat apabila kadbod tiub B berada di posisi seperti dalam Rajah 10.2.

Situation 2
Diagram 10.3 shows a man fishing. Eye A can see the man's image on the water's surface.

Situasi 2
Rajah 10.3 menunjukkan seseorang sedang memancing. Mata A dapat melihat imej pemancing di permukaan air.

(i) Name the types of waves in Situation 1 and Situation 2.
Namakan jenis- jenis gelombang dalam Situasi 1 dan Situasi 2.
[2 marks] / [2 *markah*]

(ii) Based on Diagrams 10.2 and 10.3, compare the directions of wave propagation.
Berdasarkan Rajah 10.2 dan 10.3 bandingkan arah- arah perambatan gelombang .
[1 mark] / [1 *markah*]

(iii) Based on Diagrams 10.2 and 10.3, compare the angles of wave propagation and the normal.
Berdasarkan Rajah 10.2 dan 10.3 bandingkan sudut - sudut perambatan gelombang dan normal. [1 mark] / [1 *markah*]

(iv) Based on Diagrams 10.2 and 10.3 ,relate the angles before and after the wave phenomena .
Merujuk kepada Rajah 10.2 dan 10.3 hubungkaitkan sudut – sudut sebelum dan selepas fenomena gelombang berkenaan..
[1 mark] / [1 *markah*]

(v) State the wave phenomena for Situation 1 and Situation 2.
Nyatakan fenomena gelombang dalam Situasi 1 dan Situasi 2
[1 mark] / [1 *markah*]

(c) To attract more tourist to the island in Diagram 10.4 , a contractor wants to build a beach resort .As a consultant you are asked to give suggestions on the proposed project based on the following aspects:

(i) The location of the resort
(ii) Features to reduce the erosion of the shore
(iii) Features to enable children to enjoy swimming in calm water.

Bagi menarik pelancong ke pulau yang di tunjukkan dalam Rajah 10.4, seorang kontraktor ingin membina sebuah pusat peranginan .
Sebagai seorang perunding anda ditugaskan untuk memberi beberapa cadangan mengenai projek yang merangkumi aspek – aspek berikut;

(i) lokasi pusat peranginan
(ii) pembinaan yang dapat mengurangkan hakisan pantai
(iii) pembinaan kawasan di mana air laut yang tenang dan kanak – kanak dapat berenang

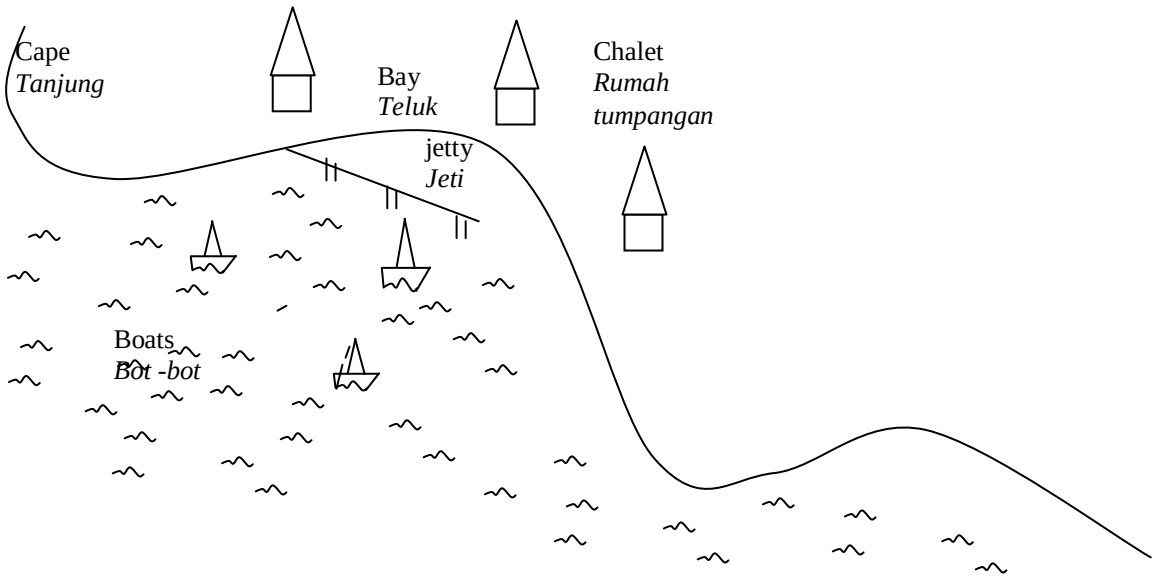


Diagram 10.4
Rajah 10.4

[10 mark] / [10 *markah*]

Section C
Bahagian C
[20 marks]
[20 *markah*]

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

11. (i) Diagram 11.1 shows the brake system of a car.
Rajah 11.1 menunjukkan sistem brek bagi sebuah kereta.

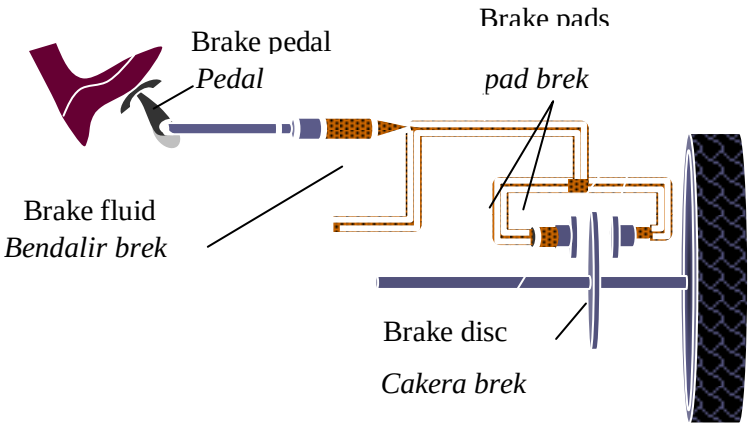


Diagram 11.1
Rajah 11.1

(a) State the physics principle involved in the the operation of the brake system.
Nyatakan prinsip fizik yang terlibat dalam kendalian satu sistem brek .
[1 mark] / [1 *markah*]

(b) Exlplain how the system operates when the car needs to slow down.
Terangkan bagaimana sistem brek beroperasi bila kereta hendak diperlahankan
[4 marks] / [4 markah]

(c) Table 11.2 shows the specifications of components that can be used in brake systems , P,Q,R,S andT..
Jadual 11.2 di bawah menunjukkan spesifikasi bagi komponen yang digunakan dalam sistem brek P, Q, R, S dan T.

Brake system *Sistem brek*	Specifications of components in a car brake system *Spesifikasi komponen sistem brek kereta*			
	Specific heat capacity of brake disc $J\ kg^{-1}\ ^0C^{-1}$ *Muatan haba tentu cakera brek* $J\ kg^{-1}\ ^0C^{-1}$	Melting point of brake disc ^0C *Takat lebur cakera brek* ^0C	Compression of brake fluid *Kemampatan bendalir brek*	Hardness of brake pads *Kekuatan pad brek*
P	360	930	Difficult *Sukar*	High *Tinggi*
Q	2400	1220	Difficult *Sukar*	Low *Rendah*
R	890	580	Easy *Mudah*	High *Tinggi*
S	2210	1940	Difficult *Sukar*	High *Tinggi*
T	1460	2070	Easy *Mudah*	Low *Rendah*

Table 11.2
Rajah 11.2

Based on Table 11.2
Berdasarkan Jadual 11.2 :

You are required to determine the most suitable brake system and explain the suitability of the aspects in Table 11.2
Anda diminta mengenalpasti system brek yang paling sesuai dan terangkan kesesuaian aspek - aspek yang tertera di Jadual 11.2

[10 markah] / [10 *markah*]

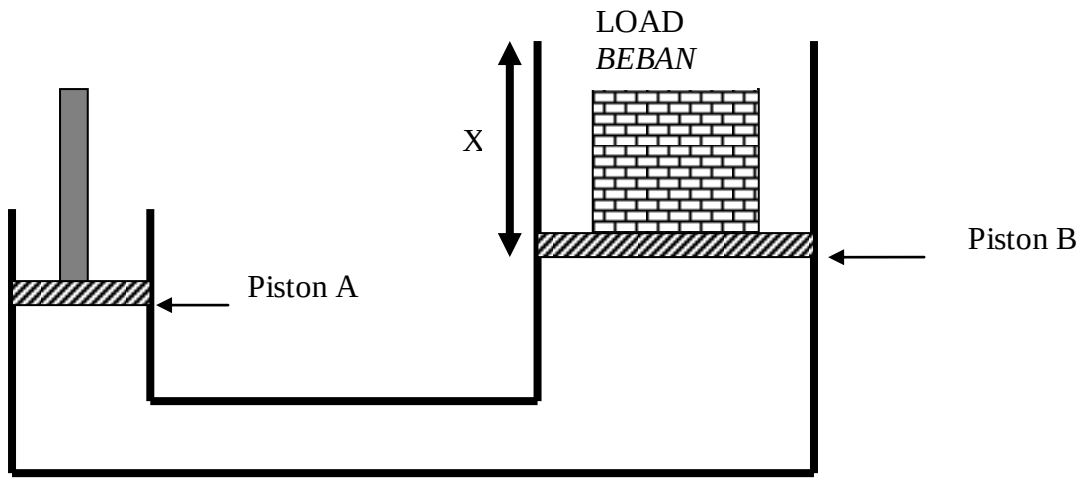


Diagram 11.3
Rajah 11.3

(d) Diagram 11.3 shows a hydraulic system used to raise a load by a distance of X m.
A force of 50 N is applied on piston A of cross –sectional area 2 cm^2.
Load is placed on piston B of cross –sectional area 15 cm^2.
Rajah 11.3 menunjukkan satu system hidraulik yang digunakan untuk menaikkan beban setinggi X m. Daya ,50 N *digunakan di omboh A berluas keratan rentas 2*cm^2. *Beban diletakkan di atas omboh B berluas keratan rentas 15* cm^2

(i) Calculate the force acting on piston B .
Hitungkan Daya pada omboh B.

(ii) Calculate the distance , X ,moved by piston B if the distance moved by piston A is 21 cm
Hitungkan ketinggian , X , yang dilalui oleh omboh B jika omboh A bergerak ke bawah sebanyak 21 cm.

[5 marks] / [5 *markah*]

12

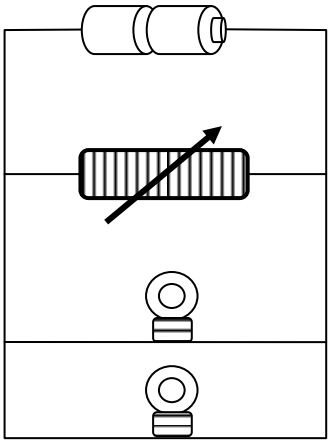


Diagram 12.1
Rajah 12.1

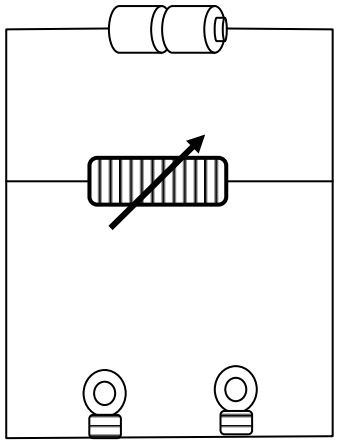


Diagram 12.2
Rajah 12.2

Diagram 12.1 and 12.2 shows two electrical circuits containing two bulbs 5 W , 4 Ω each and an adjustable rheostat (0 – 50 Ω)
Rajah 12.1 dan 12.2 menunjukkan dua buah litar elektrik ringkas yang mengandungi dua buah mentol masing – masing 5W, 4 Ω dan sebuah reostat yang boleh melaras rintangan dari 0 hingga 50 Ω.

(a) What is meant by resistance ?
Apakah yang dimaksudkan dengan rintangan ?

[1 mark] / [1 *markah*]

(b) (i) State the arrangement of the bulbs with the rheostat and relate it to the concept of effective resistance for both diagrams.
Nyatakan susunan mentol –mentol dengan reostat dan hubungkaitkan dengan konsep rintangan berkesan bagi kedua – dua Rajah.

(ii) If the rheostat has a resistance of 50Ω, calculate the effective resistance in Diagram 12.2
Jika reostat mempunyai rintangan 50 Ω , hitungkan rintangan berkesan dalam Rajah 12.2

[4 marks] / [4 *markah*]

(c) Diagram 12.3 shows an an electric jug used to boil water.
Rajah 12. 3 menunjukkan sebuah cerekk elektrik yang digunakan untuk memasak air.

Diagram 12.3
Rajah 12.3

Table 12.4 shows the specifications for four wires of the same diameter that can be used as a heating element of an electric kettle.
Jadual 12.4 menunjukkan spesifikasi empat dawai berdiameter sama yang boleh digunnakan untuk membuat elemen pemanas sebuah cerek elektrik.

Type *Jenis*	Density / (kg m^{-3}) *Ketumpatan/ (kg m^{-3})*	Melting point (^{0}C) *Takat Lebur (^0C)*	Oxidation rate *Kadar pengoxidaan*	Resistance (Ω / m) *Kerintangan (Ω/m)*
P	6500	7500	High *Tinggi*	8.0×10^{-7}
Q	7000	8050	High *Tinggi*	7.0×10^{-7}
R	5000	8500	Low *Rendah*	5.0×10^{-7}
S	2500	9000	Low *Rendah*	8.0×10^{-7}

Table 12.4
Jadual 12.4

You are required to determine the most suitable wire and explain the suitability of the aspects in Table 12.4
Anda diminta mengenalpasti dawai yang paling sesuai dan terangkan kesesuaian aspek-aspek yang tertera di Jadual 12.4

[10 markah] / [10 *markah*]

(d) An electric kettle labelled " 240V , 2000W " is used for 1 hour everyday for 30 days.
Sebuah alat pemanas air berlebel "240V, 2000W" digunakan selama 1 jam sehari selama 30 hari .

(i) Find the resistance of the heating element if the kettle is connected to a 240 V power supply.
Berapakah nilai rintangan pemanas itu jika disambungkan kepada bekalan kuasa 240V.

(ii) If the cost per unit is RM 0.22 / kWh , calculate the cost of the usage of the eletrical energy.
Jika kos seunit ialah RM 0.22 / kWj. Hitungkan kos penggunaan tenaga elektrik.

[5 marks] / [5 *markah*]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

Physics
4531/3
Paper 3
September. 2008
2½ hours

No. Kad Pengenalan : ……..…….…… Angka Giliran : ….....……

Nama : ……..……. Tingkatan : ……...……

PEPERIKSAAN PERCUBAAN SPM TAHUN 2008
TINGKATAN 5

PHYSICS

Paper 3

One hour and thirty minutes

DO NOT OPEN THE QUESTION PAPER UNTIL YOU ARE TOLD TO DO SO

1. *Write down your **identity card number** and **index number** at the space given.*
2. *This question paper is bilingually set.*
3. *The questions in Bahasa Melayu have same meaning to the questions in English Language.*
4. *Candidates are allowed to answer all or part of the questions either in English Language or Bahasa Melayu.*
5. *Candidates must read the information on page 2 and page 3.*

Examiner's Code			
Section	Question	Total mark	Marks obtained
A	1	16	
	2	12	
B	3	12	
	4	12	
Total			

This question paper consist of 17 printed pages

INFORMATION FOR CANDIDATES

1. *This question paper consists of two sections :* **Section A** *and* **Section B**
2. *Answer* **all** *questions in* **Section A**. *Write your answers for Section A in the spaces provided in the question paper.*
3. *Answer* **one** *question from* **Section B**

   Write your answers for **Section B** *on the ' helaian tambahan ' provided by the invigilators. Answer questions in* **Section B** *in detail.*

   You may use equations, diagrams, tables, graphs and other suitable methods to explain your answer.
4. *Show your working, it may help you to get marks.*
5. *If you wish to change your answer, neatly cross out the answer that you have done. Then write down the new answer.*
6. *The diagrams in the questions are not drawn to scale unless stated.*
7. *Marks allocated for each question or part question are shown in brackets.*
8. *A booklet of four-figure mathematical tables is provided.*
9. *You may use a non-programmable scientific calculator.*
10. *The time suggested to complete* **Section A** *is 60 minutes and* **Section B** *is 30 minutes.*
11. *Hand in your answer sheets at the end of the examination.*

MAKLUMAT UNTUK CALON

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 bagi* **Bahagian B** *pada halaman bergaris yang disediakan di bahagian akhir kertas soalan ini. Jawab* **Bahagian B** *dengan terperinci. Anda boleh menggunakan persamaan, gambar rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda.*
4. *Tunjukkan kerja mengira, ini membantu anda mendapatkan markah.*
5. *Sekiranya anda hendak membatalkan sesuatu jawapan, buat garisan di atas jawapan itu*
6. *Gambar rajah yang mengiringi soalan tidak dilukiskan mengikut skala kecuali dinyatakan*
7. *Markah yang diperuntukkan bagi setiap soalan atau ceraian soalan ditunjukkan dalam kurungan.*
8. *Buku sifir matematik empat angka disediakan*
9. *Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.*
10. *Masa yang dicadangkan untuk menjawab* **Bahagian A** *ialah 60 minit dan* **Bahagian B** *ialah 30 minit.*
11. *Serahkan kertas soalan ini di akhir peperiksaan*

Section A
Bahagian A

[28 marks]
[*28 markah*]

Answer **all** questions in this section.

1 A student carries out an experiment to investigate the relationship between object distance, ***u*** and image distance, ***v***, of a convex lens of focal length, ***f***,. The apparatus is set up as shown in Diagram 1.1
*Seorang pelajar menjalankan satu eksperimen untuk mengkaji hubungan antara jarak objek, **u** dan jarak imej, **v** bagi kanta cembung yang mempunyai panjang fokus, **f**. Radas disediakan seperti Rajah 1.1.*

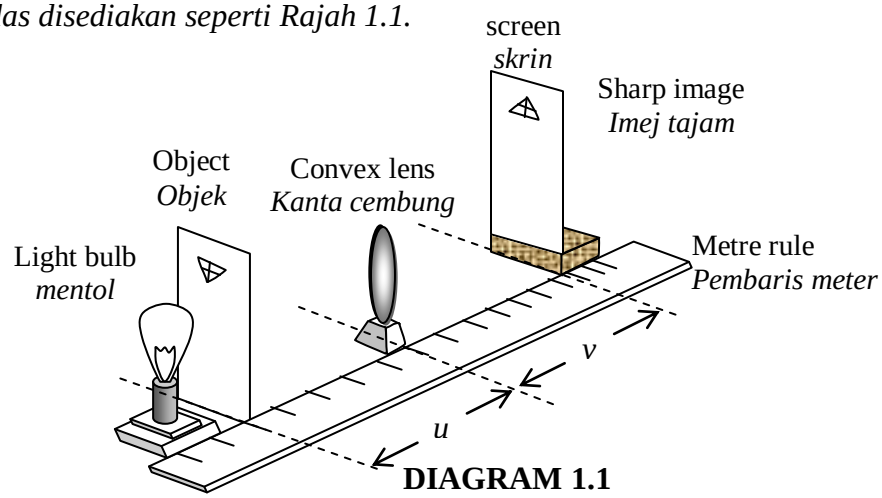


DIAGRAM 1.1
RAJAH 1.1

At first, an object is placed at an object distance, u = 20.0 cm. The bulb lights up. The screen is adjusted until a sharpeimage is formed.
Pada mulanya satu objek diletakkan pada jarak objek, u = 20.0 cm. Mentol kemudiannya menyala. Skrin dilaraskan sehingga satu imej yang tajam terbentuk.

The step is repeated using u = 25.0 cm, 30.0 cm, 35.0 cm and 40.0 cm. The image distance, v is determined by reading directly from the metre rule as shown in Diagram 1.2.

Langkah ini diulangi dengan u = 25.0 cm, 30.0 cm, 35.0 cm dan 40.0 cm. Jarak imej, v kemudiannya dibaca terus dari pembaris meter seperti dalam Rajah 1.2.

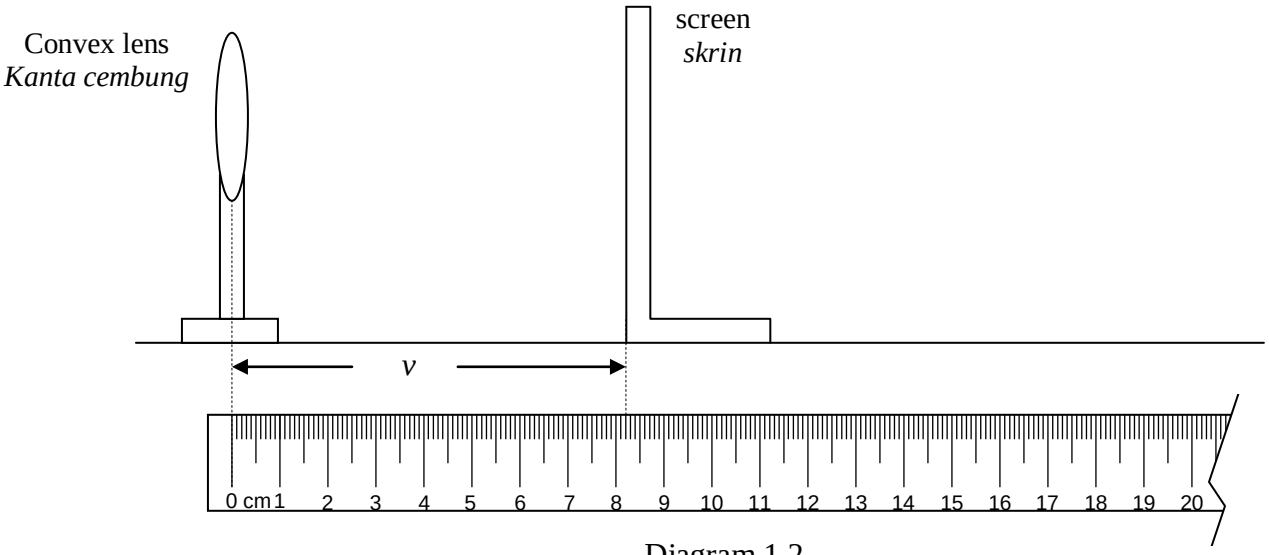
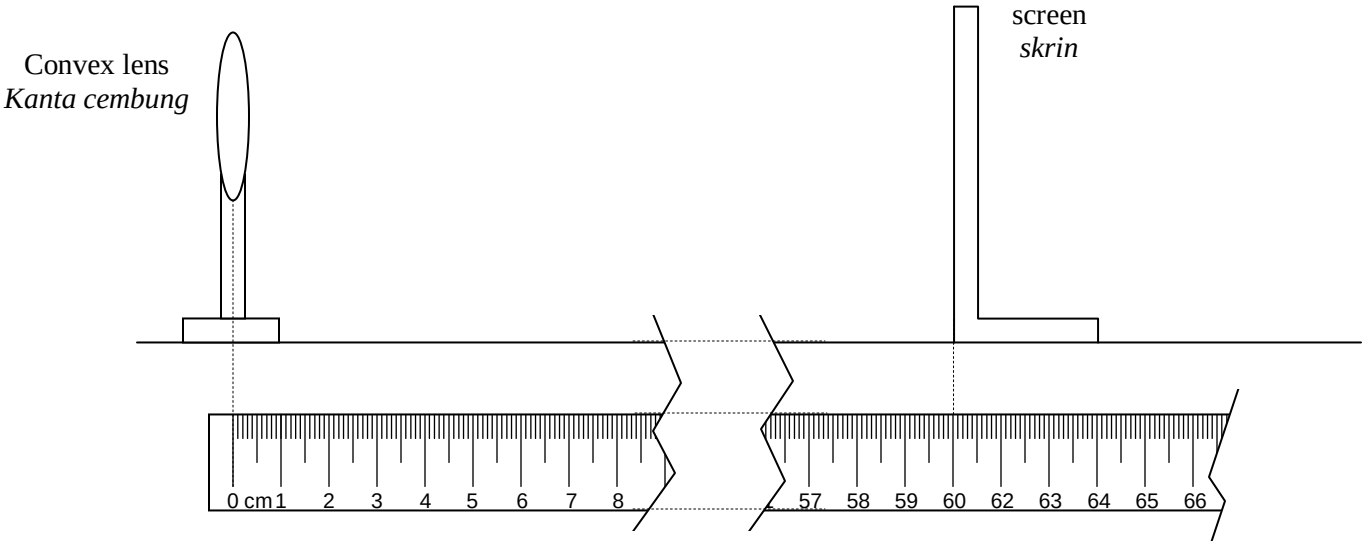


Diagram 1.2

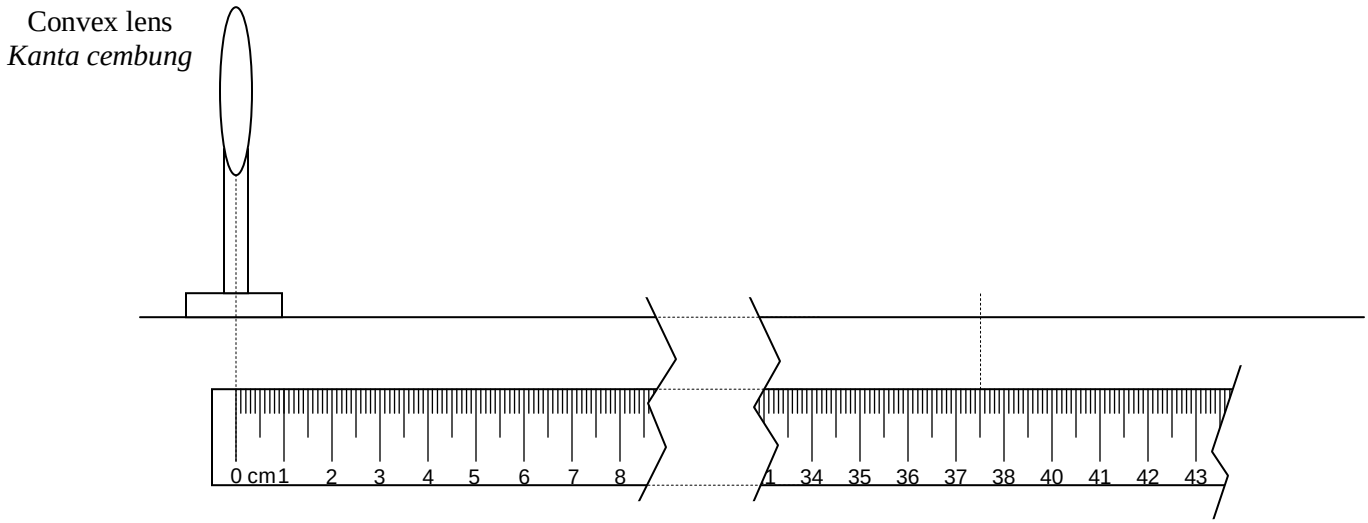
Image distance, *v* for different object distance, u is shown in the Diagrams 1.3, 1.4, 1.5 1.6 and 1.7.
Jarak imej pada jarak objek berlainan ditunjukkan pada Rajah 1.3, 1.4, 1.5, 1.6 dan 1.7.



Object distance, u = 20.0 cm
Jarak objek, u = 20.0 cm

Image distance, v = ……..
Jarak imej, v = ……

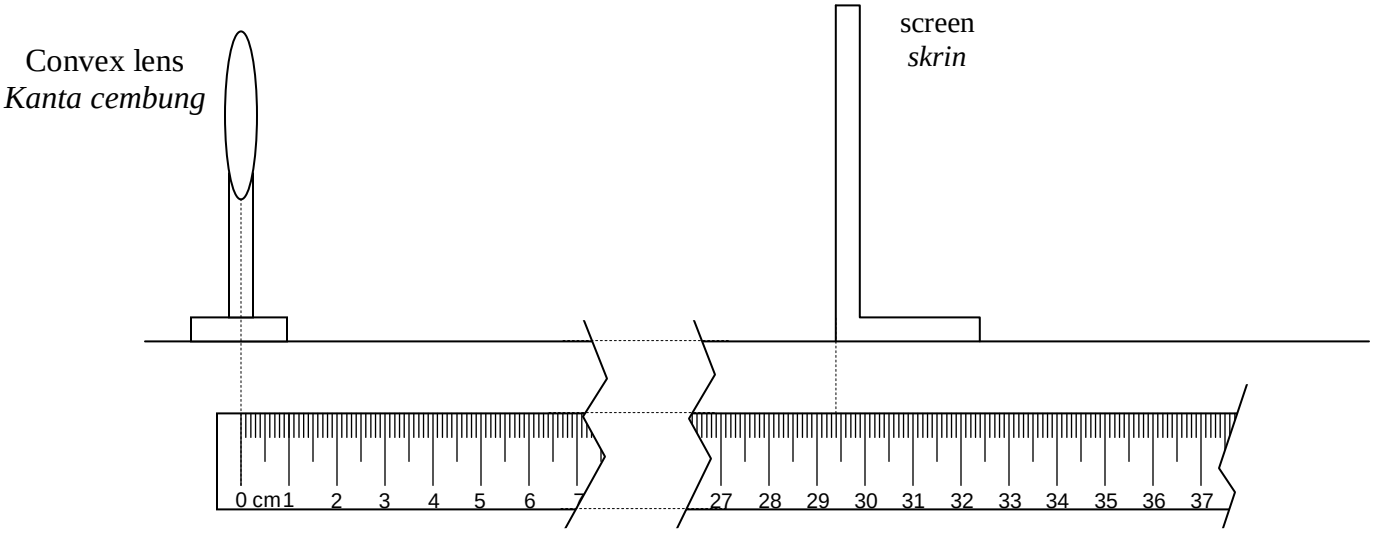
Diagram 1.3



Object distance, u = 25.0 cm
Jarak objek, u = 25.0 cm

Image distance, v = ……..
Jarak imej, v = ……

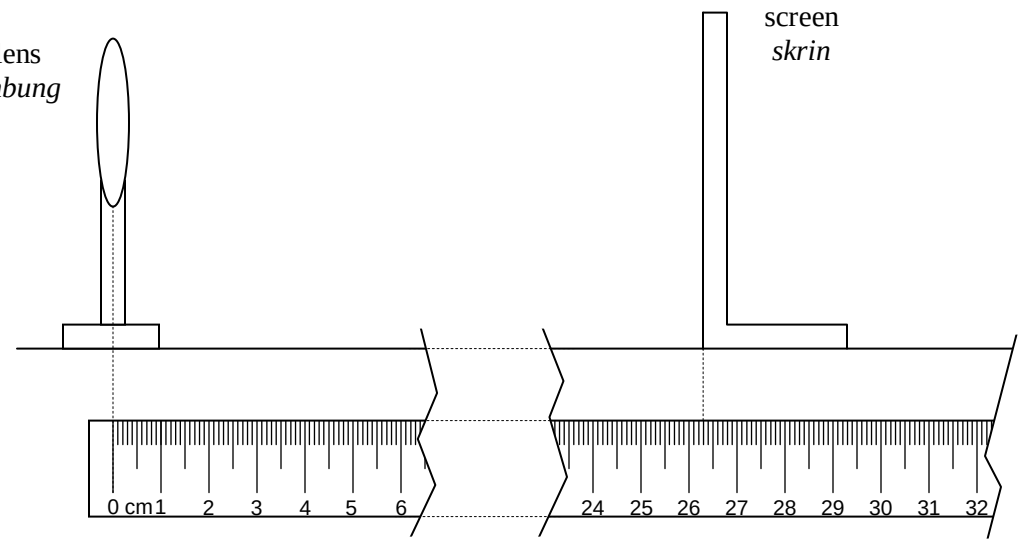
Diagram 1.4



Object distance, u = 30.0 cm
Jarak objek, u = 30.0 cm

Image distance, v = ……..
Jarak imej, v = ……

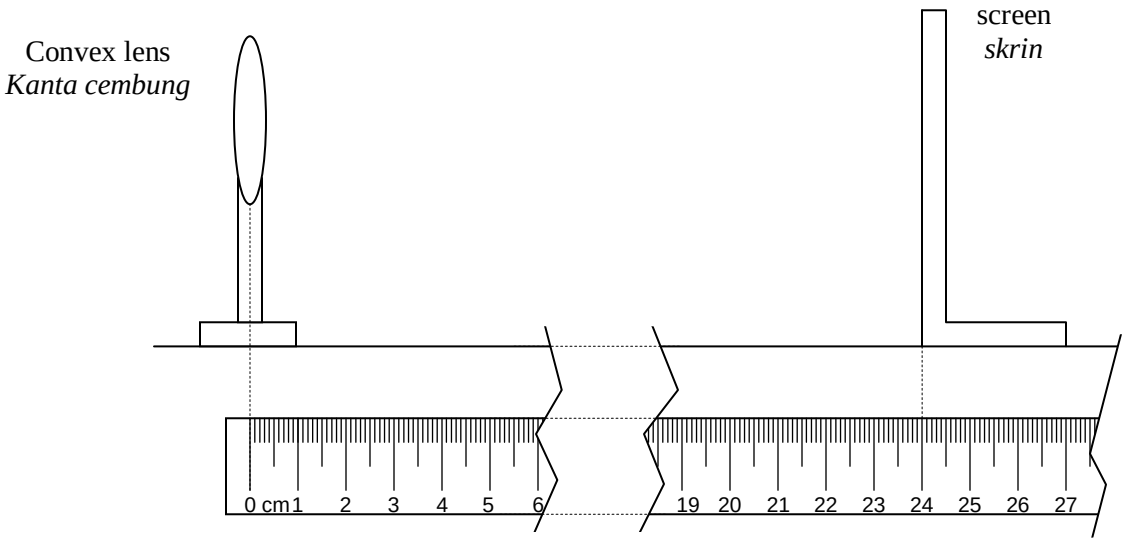
Diagram 1.5



Object distance, u = 35.0 cm
Jarak objek, u = 35.0 cm

Image distance, v = ……..
Jarak imej, v = ……

Diagram 1.6



Object distance, u = 40.0 cm
Jarak objek, u = 40.0 cm

Image distance, v = ……..
Jarak imej, v = ……

Diagram 1.7

(*a*) For the experiment described above, identify:
Daripada penerangan eksperimen di atas, kenalpasti:

(i) The manipulated variable
Pembolehubah manipulasi

……
[1 mark]

(ii) The responding variable
Pembolehubah bergerakbalas

……
[1 mark]

(a)(i)(ii)(iii)

(iii) The constant variable
Pembolehubah dimalarkan

……
[1 mark]

(b) Based on the methods shown in Diagram 1.2, determine the image distance, *v*, in Diagrams 1.3, 1.4, 1.5, 1.6 and 1.7.
Berdasarkan kaedah yang ditunjukkan pada Rajah 1.2, tentukan jarakimej, v, pada Rajah 1.3, 1.4, 1.5, 1.6 dan 1.7.

Tabulate your results for *u*, *v*, $\frac{1}{u}$ and $\frac{1}{v}$ in the space below.

Jadualkan keputusan anda bagi u, v, $\frac{1}{u}$ *dan* $\frac{1}{v}$ *pada ruang di bawah.*

(b)

[7 marks]

(c) On the graph paper, plot a graph of $\frac{1}{v}$ against $\frac{1}{u}$.

Pada kertas graf, lukiskan graf $\frac{1}{v}$ *melawan* $\frac{1}{u}$.

[5 marks]

(c)

(*d*) Based on your graph, state the relationship between $\frac{1}{\boldsymbol{v}}$ and $\frac{1}{\boldsymbol{u}}$.

Berdasarkan graf anda, nyatakan perhubungan di antara $\frac{1}{\boldsymbol{v}}$ *dan* $\frac{1}{\boldsymbol{u}}$.

.....

[1 mark]

(d)

Graph of $\frac{1}{v}$ against $\frac{1}{u}$ / *Graf* $\frac{1}{v}$ *lawan* $\frac{1}{u}$

2 A student carries out an experiment to study the interference of sound waves. He wants to investigate the relationship of the distance between two coherent sources of sound waves, a, and the distance between two consecutives of constructive interference, x. The distance between the location where the sound is detected, D, is 5 m. The results of the experiment is shown in the graph of x against $\frac{1}{a}$ as in Diagram 2.1.

Seorang pelajar menjalankan satu eksperimen untuk mengkaji fenomena interferens gelombang bunyi. Beliau ingin mengkaji hubungan antara jarak antara dua sumber gelombang bunyi yang koheren, a dan jarak pemisahan dua garis antinod yang bersebelahan, x. Jarak di antara dua sumber gelombang koheren ke tempat yang diukur, D ialah 5 m. Keputusan eksperimen ditunjukkan dalam graf x melawan $\frac{1}{a}$ *seperti ditunjukkan dalam Rajah 2.1.*

(a) Based on the graph in diagram 2.1.
Berdasarkan graf dalam Rajah 2.1
.

(i) State the relationship between x and a.
Nyatakan hubungan antara x dan a.

(a)(i)

.....
[1 mark]

(ii) Determine the value of x if a = 4 m.
Show on the graph, how you determined the value of x.

Tentukan nilai x jika a = 4 m.
Tunjukkan pada graf, bagaimana anda perolehi nilai x.

(a)(ii)

[3 marks]

(b) The wavelength of sound waves, λ, is given by the equation
Panjang gelombang, λ bagi gelombang bunyi yang digunakan, boleh diperolehi melalui persamaan

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

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

Show on the graph how you determine the gradient.

Kira nilai kecerunan graf x melawan $\frac{1}{a}$.

Tunjukkan pada graf bagaimana anda memperolehi nilai kecerunan.

(b)(i)

[3 marks]

(ii) By using equation $\lambda = \frac{ax}{D}$ and the value of the gradient obtained in b (i), calculate the wavelength of sound waves, λ, used in this experiment.

Dengan menggunakan persamaan dan nilai kecerunan yang diperolehi di b(i), kira panjang gelombang, λ *bagi gelombang bunyi yang digunakan dalam eksperimen.*

(b)(ii)

[3 marks]

(c) State **two** precaution steps that should be taken to improve the results of this experiment.

*Nyatakan **dua** langkah berjaga-jaga yang perlu diambil bagi meningkatkan kejituan keputusan eksperimen ini.*

……

……

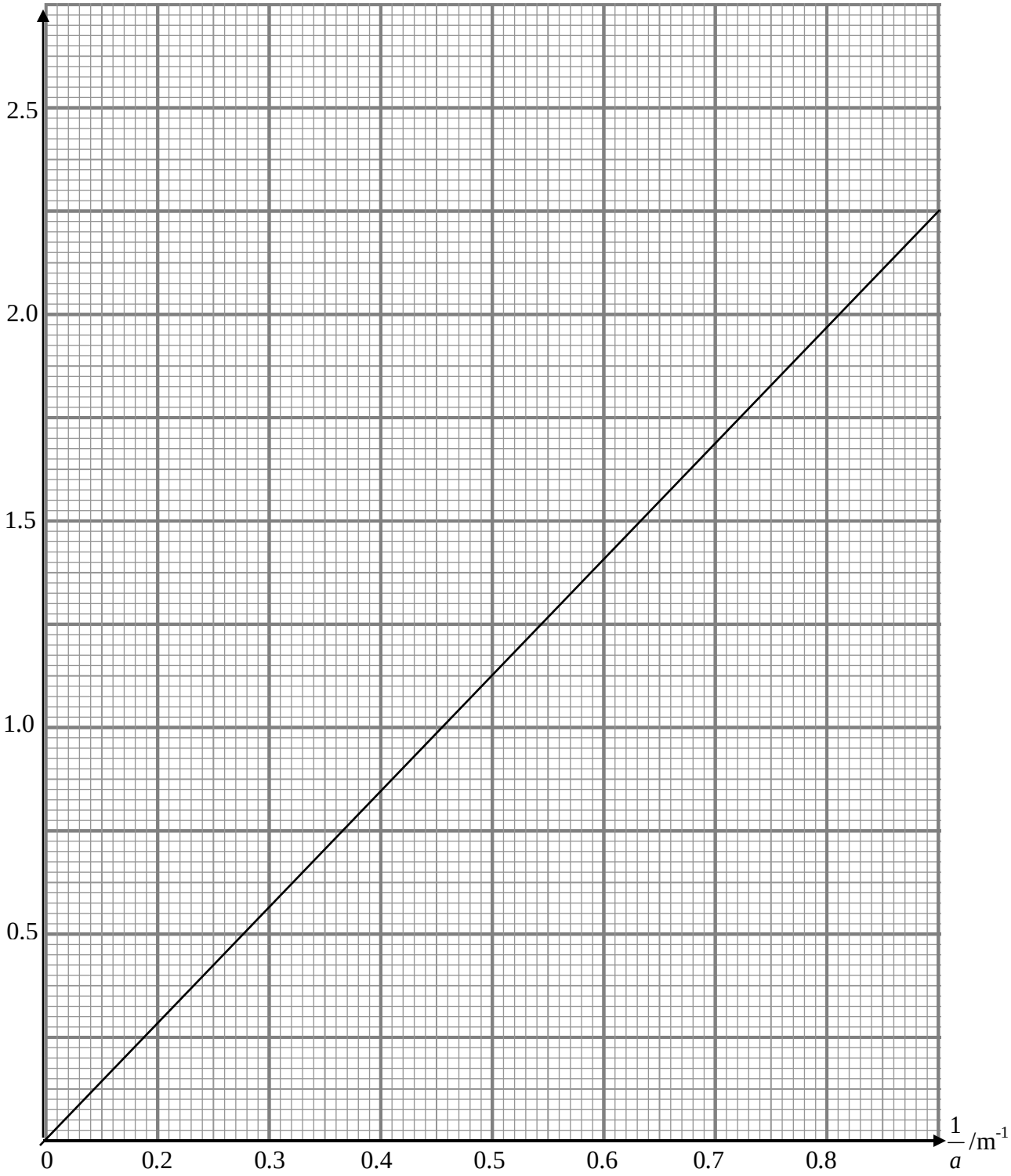
……

……

(c)

[2 marks]

Graph of x against $\frac{1}{a}$



Section B
[12 marks]

Answer any **one** question.
*Jawab mana-mana **satu** soalan.*

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

3 A customer at a pet shop was observing the bubbles of air coming out of an air stone. He noticed that the bubbles were smaller in size when they emerged from the stone but become larger as they approached the surface of the water as shown in Figure 3.

Seorang pelanggan di kedai menjual ikan hiasan memerhatikan gelembung-gelembung udara keluar daripada batu udara. Beliau mendapati, gelembung-gelembung udara tersebut bersaiz kecil semasa keluar daripada batu udara, tetapi semakin membesar apabila mendekati permukaan air ditunjukkan di dalam Rajah 3.

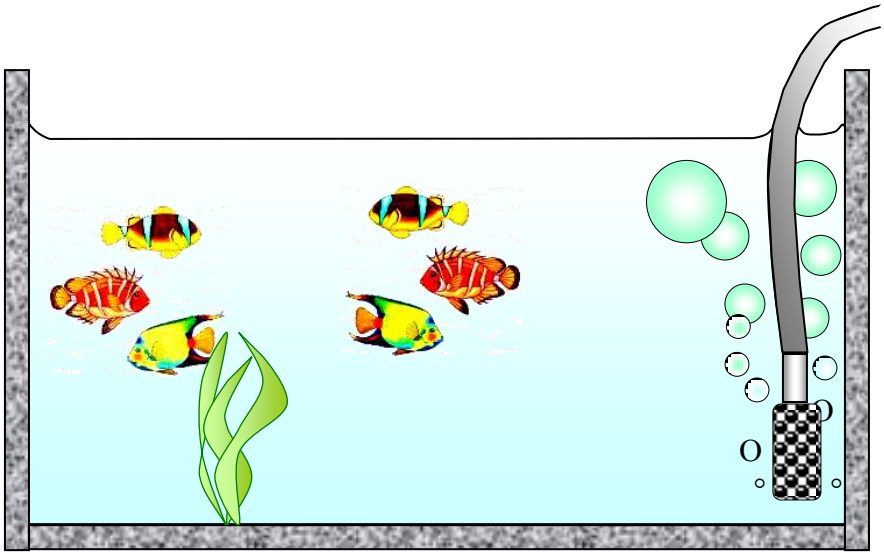


DIAGRAM 3.1

Based on observation on the observation above;
Berdasarkan pemerhatian di atas;

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

[1mark]

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

[1mark]

(c) With the use of apparatus such as a Bourdon gauge, syringe and other apparatus, describe an experiment framework to investigate the hypothesis stated in 3(b).

Dengan menggunakan radas seperti tolok Bourdon, picagari dan lain-lain radas, terangkan satu rangka eksperimen untuk menyiasat hipotesis yang dinyatakan di 3(b).
In your description, state clearly the following:
Dalam penerangan anda, jelaskan perkara berikut:

(i) Aim of the experiment,
Tujuan eksperimen,

(ii) Variables in the experiment,
Pembolehubah yang terlibat dalam eksperimen,

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

(iv) Arrangement of the apparatus,
Susunan radas,

(v) 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 dimanipulasi dan kaedah mengukur pembolehubah bergerak balas.

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

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

[10 marks]

4. Diagram 4.1 shows an electromagnet at the end of the arm of a crane lifting up some scrap iron. Diagram 4.2 shows some pieces of scrap iron dropping off when the current in the electromagnet is reduced.
Rajah 4.1 menunjukkan *sebuah elektromagnet di hujung lengan sebuah kren sedang mengangkat besi buruk. Rajah* 4.2 *menunjukkan beberapa keping besi buruk jatuh apabila arus dalam elektromagnet itu dikurangkan.*

DIAGRAM 4.1 / *RAJAH* 4.1

DIAGRAM 4.2 / *RAJAH* 4.2

Based on the observations on Diagram 4.1 and Diagram 4.2 and using your knowledge of the electromagnet:
Berdasarkan pemerhatian anda tentang Rajah 4.1 *dan Rajah* 4.2 *dan menggunakan pengetahuan anda tentang elektromagnet*:

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

(b) State **one** hypothesis that could be investigated. [1 *mark*]
Nyatakan **satu** *hipotesis yang boleh disiasat*. [1 *markah*]

(c) With the use of apparatus such as a solenoid, direct current power supply, paper clips and other apparatus, describe an experiment to investigate the hypothesis stated in **4**(*b*).
Dengan menggunakan radas seperti solenoid, bekalan kuasa arus terus, klip-klip kertas dan radas-radas lain, terangkan satu eksperimen untuk menyiasat hipotesis yang dinyatakan di **4**(*b*).

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

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

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

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

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

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

(vi) The way to tabulate the data.
Cara anda menjadualkan data.

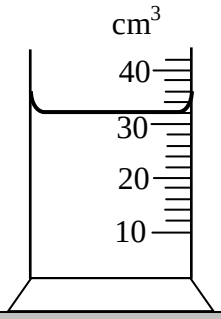
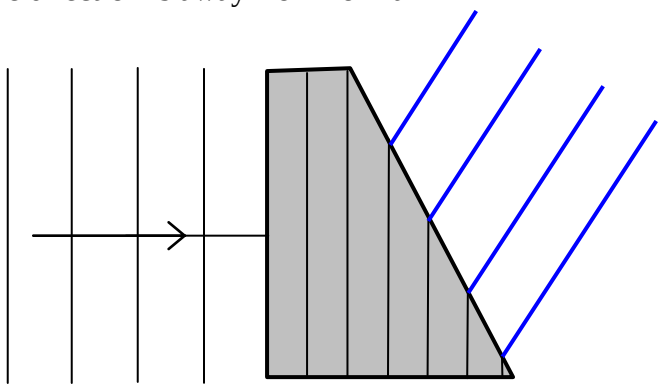
(vii) The way to analyse the data.
Cara untuk menganalisis data.

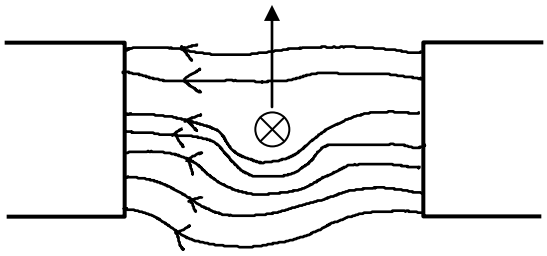
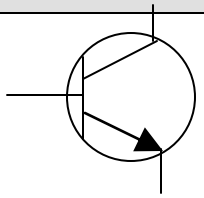
[10 *marks*]
[10 *markah*]

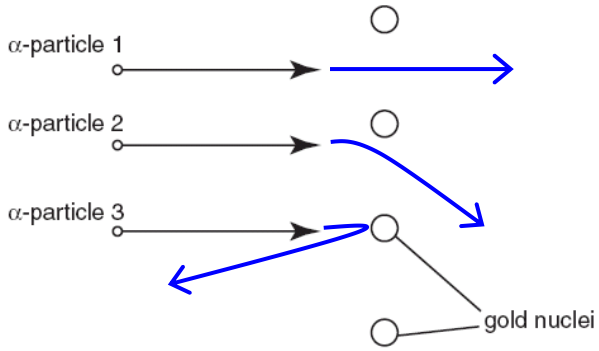
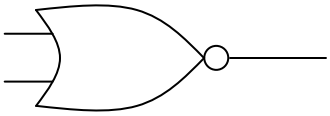
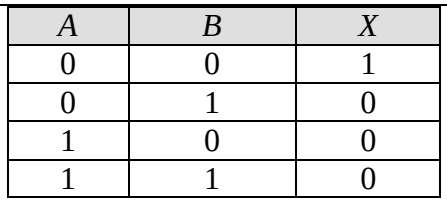
END OF QUESTION PAPER
KERTAS SOALAN TAMAT

ANSWER FOR PAPER 1- PHYSICS TRIAL 2008

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

1(a)	2 cm^3 (*with unit*)	**1**
(b) (i)	P	**1**
(ii)	34 cm^3 (*with unit*)	**1**
(c)		**1**
	Total	**4**
2(a)	When the direction of vibration of the particles of the waves vibrate perpendicular with the direction of propagation	**1**
(b) (i)	Light wave // Radio wave // Micro wave (*any EM waves*)	**1**
(ii)	Refraction of water wave	**1**
(c)	- Wave length become equal as before refraction - The direction is away from normal 	**1** **1**
	Total	**5**
3(a) (i)	Constant/ uniform velocity // acceleration is zero	**1**
(ii)	Increasing velocity uniformly followed by zero acceleration	**1**
(b) (i)	zero // F = 0	**1**
(ii)	constant / uniform velocity // acceleration is zero	**1**
(c)	Distance = area under graph $= \frac{1}{2}(2\times 60)(35) = 2100\,m$	**2**
	Total	**6**

4(a)	**Force acting on it**	**1**
(b)	**Force acting per unit area**	**1**
(c) (i)	**W = mg** $m = p \times v$ $= 133 \times (2 \times 2 \times 3)$ $= 1596\ kg$ $\because W = (1596)(10) = 15960\ N$	**1** **1** **1**
(ii)	$P = \dfrac{15960}{(2 \times 2)} = 7980\ Nm^{-2}$ / Pa	**2**
	Total	**7**
5(a)	**The copper wire will swing upward // to the West**	**1**
(b)	**Fleming's Left-Hand Rule**	**1**
(c) (i)	**The copper wire will swing downward // to the East**	**1**
(ii)	 **Pattern** **Direction** **Direction of motion**	**1** **1** **1**
(iii)	**Increase the magnitude of current** **Use a stronger magnet**	**1** **1**
	Total	**8**
6(a)	 **Transistor NPN**	**1** **1**
(b) (i)	**7.5 V**	**1**
(ii)	$1.5 = \dfrac{(Rt)9}{600 + Rt}$ **OR** $I_b = \dfrac{7.5}{600} = 0.0125\,A$ $Rt = 120\Omega$ $Rt = \dfrac{1.5}{0.0125} = 120\Omega$	**1** **1**

(c)	$Ic = 100 \times 10^{-3} - 12.5 \times 10^{-3}$ $= 87.5 \times 10^{-3} A$	**1** **1**
(d)	**Amplifier circuit**	**1**
	Total	**8**
7(a)		**1** **1** **1**
(b)	$^{4}_{2}He$	**1**
(c)	**An atom consist of large empty area // the nucleus of an atom is very small at the center**	**1**
(d) (i)	**Show straight line at 400 horizontally** **Show/write down the value of half-life = 1.2 minutes**	**1** **1**
(ii)	$\frac{1}{8} \times 800 = 100$ **counts** $100 = (\frac{1}{2})^{n} \times 800$ **,** $n = 3$ **Time taken =** $3 \times 1.2 = 3.6$ **minutes**	**1** **1**
(iii)	**unchange**	**1**
	Total	**10**
8(a) (i)	**NOR**	**1**
(ii)		**1**
(b)		**1** **1** **1** **1**

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

<table>
<tr><td>(c) (i)</td><td>
<table>
<tr><th>Switch</th><th>Door</th><th>Alarm</th></tr>
<tr><td>0</td><td>0</td><td>0</td></tr>
<tr><td>0</td><td>1</td><td>0</td></tr>
<tr><td>1</td><td>0</td><td>0</td></tr>
<tr><td>1</td><td>1</td><td>1</td></tr>
</table>
</td><td>1

1</td></tr>
<tr><td>(c) (ii)</td><td>AND gate</td><td>1</td></tr>
<tr><td>(c) (iii)</td><td>Replace OR gate with AND gate</td><td>1</td></tr>
<tr><td>(c) (iv)</td><td>- more accurate // less error
- using less power
- less noise
- less component use (IC)
(any two)</td><td>1
1</td></tr>
<tr><td></td><td>Total</td><td>12</td></tr>
</table>

<table>
<tr><td>9 (a)</td><td>The amount of heat required to change a state of matter without any change in temperature</td><td>1</td></tr>
<tr><td>(b)</td><td>- the mass of naphthalene in the Figure 9(a) is less than in the Figure 9(b)
- the time taken for the naphthalene in Figure 9(a) to solidify is shorter than in the Figure 9(b)
- the latent heat released in Figure 9(a) is smaller than in the Figure 9(b)
- Latent heat released depends on mass of naphthalene
- The smaller the mass, the smaller the latent heat released // Q = mL = Pt</td><td>5</td></tr>
<tr><td>(c)</td><td>- As liquid naphthalene cools, it loses energy to surroundings
- Its temperature begins to fall until it reaches freezing point 80^0C
- At its freezing point, naphthalene begins to solidify.
- Although it is losing its energy to surroundings, itstemperature remains constant because the average kinetic energy remains constant</td><td>4</td></tr>
<tr><td>(d)</td><td colspan="2"><table>
<tr><th>Designs or ways</th><th>Explanation</th></tr>
<tr><td>Made from material with low specific heat capacity</td><td>Temperature in the pot can be increased quickly when heated. This saves fuel / cooking gas.</td></tr>
<tr><td>Made from a low density material</td><td>Pot is light and more portable</td></tr>
<tr><td>Made from material that is not easily corroded or oxidized</td><td>Pot is more durable and will not contaminate the food with dangerous material</td></tr>
<tr><td>The handle of the pot is made from material with high specific heat capacity</td><td>The handle becomes hot slower and can be held without scorching the hand</td></tr>
<tr><td>The pot is designed to have vertical compartments which can be added or removed</td><td>This makes the pot versatile because different food can be cooked at the same time</td></tr>
</table>
[10 marks]</td></tr>
<tr><td colspan="2">Total marks</td><td>20</td></tr>
</table>

<table>
<tr><td>10(a)</td><td>(i)</td><td>Refraction of water waves</td><td>1</td></tr>
<tr><td></td><td>(ii)</td><td>Waves bend</td><td>1</td></tr>
<tr><td></td><td></td><td>Ocean – deep , shore – shallow</td><td>1</td></tr>
<tr><td></td><td></td><td>Velocity of waves decreases</td><td>1</td></tr>
<tr><td>(b)</td><td>(i)</td><td>Sound and light waves</td><td>2</td></tr>
<tr><td></td><td>(ii)</td><td>Changes at the boundary</td><td>1</td></tr>
<tr><td></td><td>(iii)</td><td>Angles and normal are on the same plane</td><td>1</td></tr>
<tr><td></td><td>(iv)</td><td>Angle of incidence = angle of reflection</td><td>1</td></tr>
<tr><td></td><td>(v)</td><td>reflection</td><td>1</td></tr>
<tr><td>.(c)</td><td>(i)</td><td>
<table>
<tr><th>Suggestion</th><th>Reason</th></tr>
<tr><td>Build near bay</td><td>Waves are calmer due to divergence of energy
Convergence of waves at the cape
The bay is shallower .
The speed of waves decreases.
The amplitude of waves at the bay is small.</td></tr>
<tr><td>Build retaining walls</td><td>Reduce direct impact of the waves on the shore.
To reflect the waves from the shore.
Protect the area from large waves</td></tr>
<tr><td>Build concrete structures with a gap in between at designated area for children</td><td>Waves passing through the gap will be diffracted in the children ‘s area .
Smaller amplitude of the diffracted waves causes the sea to be calmer there.
Energy of waves decreases.</td></tr>
</table>
</td><td>4
3
3
20</td></tr>
</table>

11 (a)		Pascal
(b)		When brake pedal is **pressed** , the **piston** of the control cylinder **applies a pressure** on the brake fluid. This **pressure is transmitted** to each cylinder at the wheels. The cylinders at the wheels cause a pair of pistons to push a pair of **friction pads to press** against the surface of the **brake discs** or brake drums. The **frictional forces** between the brake components cause the vehicle to slow down. Or, When the brake is pressed ,a force is applied to the piston and pressure is exerted. Pressure is transmitted uniformly throughout the brake fluid. Force is exerted on the piston of the brake pads Brake pads will press against the brake discs.
(c)		**High** specific heat capacity Friction between pads and discs will cause an increase in temperature but but the increase will be slow. **High** melting point Does not melt easily if there is an increase in temperature. **Difficult** to compress. Pressure will be transmited uniformly in all directions/ flows easily **High** degree of hardness Can withstand great force / does not break easily Choice of brake system ,**S** because it has (i) high specific heat capacity and high melting point for the brake discs (ii) the brake fluid is difficult to compress and (iii) the degree of hardness of the brake pads is high
		$F_B = (F_A A_B) \div (A_A)$ $= (50 \times 15) \div (2)$ $= 375$ N $A_A \times D_A = A_B \times D_B$ $2 \times 21 = 15 \times D_B$ $D_B = 28$ cm

<table>
<tr><td>12(a)</td><td></td><td>Ratio of potential difference to current</td><td>1</td></tr>
<tr><td>(b)</td><td>(i)</td><td>In both diagrams the bulbs are connected in parallel to the rheostat

In Diagram 12.1 the effective resistance is given by;

$1 / R_{effective} = 1 / R_{bulb} + 1 / R_{bulb} + 1 / R_{rheostat}$

In Diagram 12.2 the effective resistance is given by ;

$1 / R_{effective} = 1 / 2R_{bulb} + 1 / R_{rheostat}$</td><td>1

1

1</td></tr>
<tr><td></td><td>(ii)</td><td>$1 / R_{effective} = 1 / 2R_{bulb} + 1 / R_{rheostat}$

$1 / R_{effective} = 1 / 2(4) + 1 / 50$

$\mathbf{R_{effective} = 6.89\ \Omega}$</td><td>

1</td></tr>
<tr><td>(c)</td><td></td><td><table><tr><th>Specification</th><th>Reason</th></tr><tr><td>Low density</td><td>Lighweight / not heavy / portable</td></tr><tr><td>High melting point</td><td>Does not melt at high temperatures / does not melt easily</td></tr><tr><td>Low rate of oxidation</td><td>Does not oxidize easily / can be used for a longer period</td></tr><tr><td>Low resistance</td><td>Current will increase / more heat will be produced</td></tr></table>
R is my choice because it has a low density , high melting point , low rate of oxidation and it has a low resistance</td><td>

2

2

2

2

2</td></tr>
<tr><td>(d)</td><td>(i)</td><td>P = VI
2000 = 240 I
I = 8.33A
R = V / I
R = 240 / 8.333
= 28.81 Ω</td><td>
1
1

1</td></tr>
<tr><td></td><td>(ii)</td><td>Cost = 30 days x 2 kWh x RM0.22
= RM13.20 sen.</td><td>1
1</td></tr>
<tr><td></td><td></td><td></td><td>20</td></tr>
</table>

END OF MARKING SCHEME

JABATAN PELAJARAN NEGERI PAHANG

PEPERIKSAAN PERCUBAAN SIJIL PELAJARAN MALAYSIA 2008

FIZIK

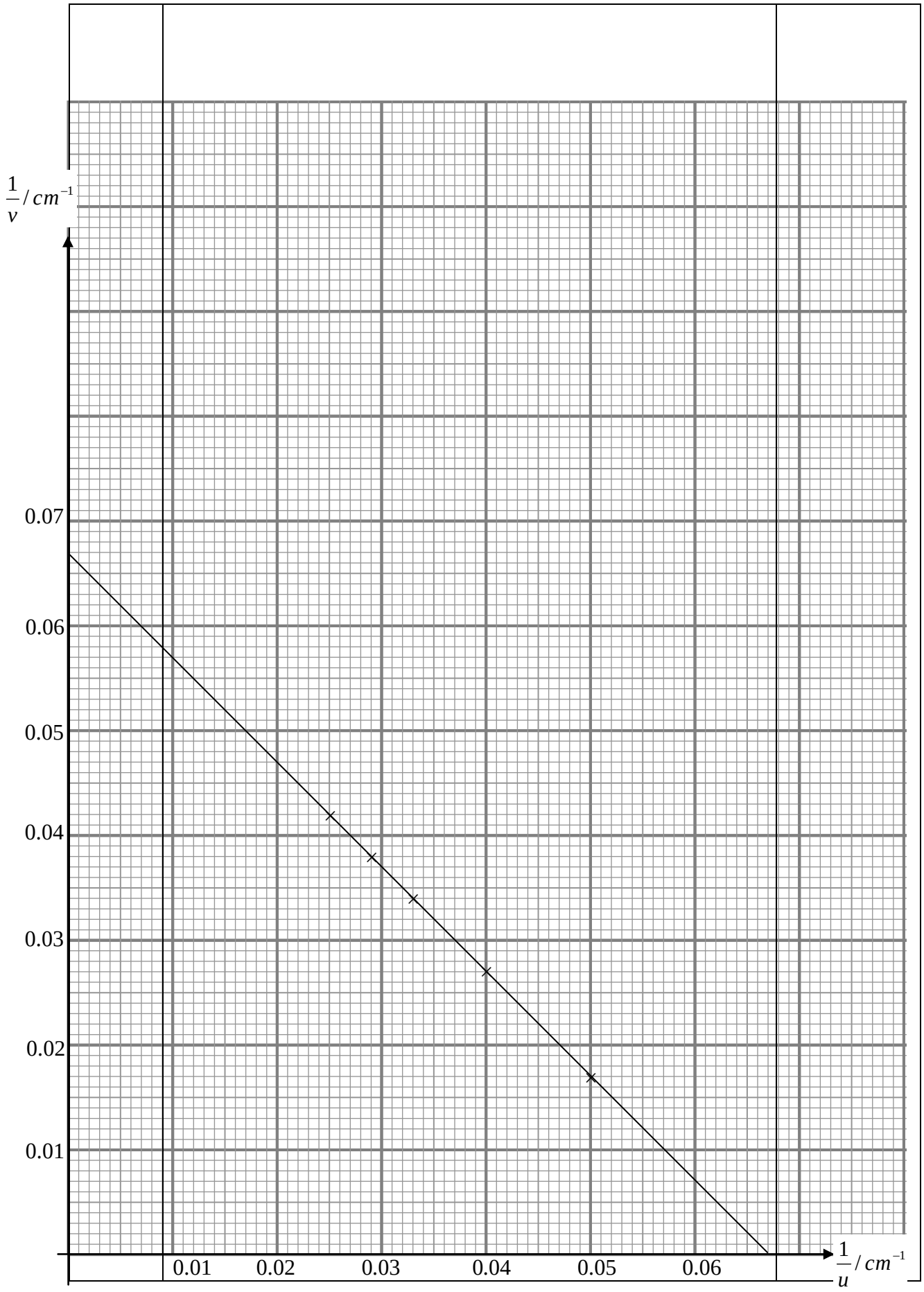
Kertas 3

PERATURAN PEMARKAHAN

Kertas soalan ini mengandungi 6 halaman bercetak .

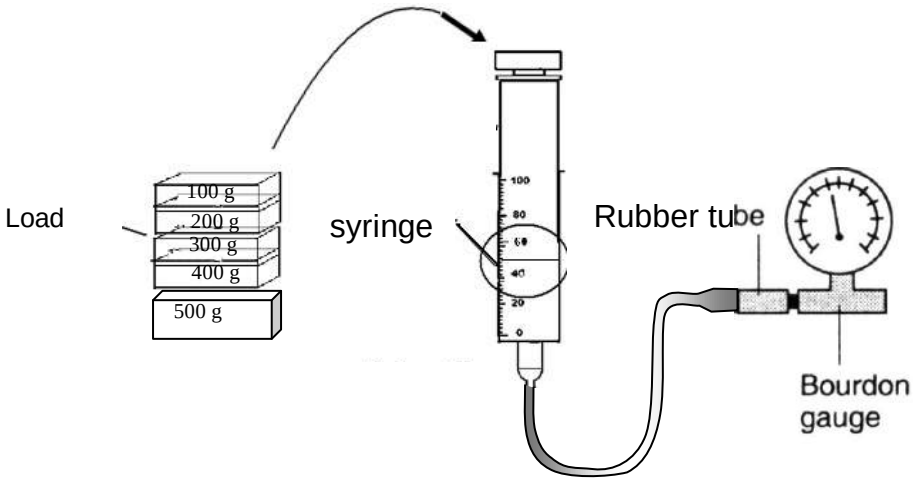
MARKING SCHEME PHYSICS PAPER 3 (2008)

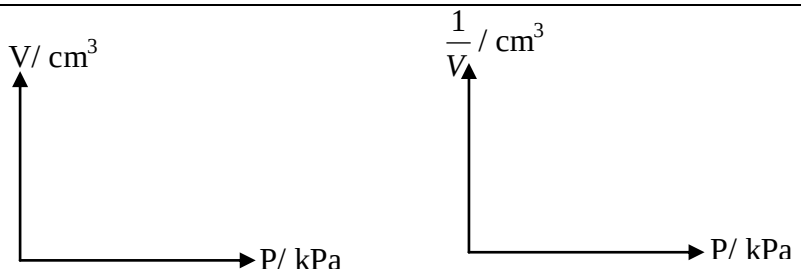
<table>
<tr><th>No.</th><th>Answer</th><th>Marks</th></tr>
<tr><td>1 (a) (i)</td><td>Object distance, u</td><td>1</td></tr>
<tr><td>(ii)</td><td>Image distance, v</td><td>1</td></tr>
<tr><td>(iii)</td><td>Focal length</td><td>1</td></tr>
<tr><td>(b)</td><td>
<table>
<tr><th>u /cm</th><th>v /cm</th><th>$\frac{1}{u}$ (cm^{-1})</th><th>$\frac{1}{v}$ (cm^{-1})</th></tr>
<tr><td>20.0</td><td>60.0</td><td>0.050</td><td>0.017</td></tr>
<tr><td>25.0</td><td>37.5</td><td>0.040</td><td>0.027</td></tr>
<tr><td>30.0</td><td>29.4</td><td>0.033</td><td>0.034</td></tr>
<tr><td>35.0</td><td>26.3</td><td>0.029</td><td>0.038</td></tr>
<tr><td>40.0</td><td>24.0</td><td>0.025</td><td>0.042</td></tr>
</table>
Tabulate data
1. Shows a table contain 4 quantities : u , v, $\frac{1}{u}$ and $\frac{1}{v}$
2. State the correct unit for u , v, $\frac{1}{u}$ and $\frac{1}{v}$
3. All values of v are correct and consistent to 1 decimal places.
4. Values of $\frac{1}{u}$ are consistent to 3 decimal places.
5. Values of $\frac{1}{v}$ are consistent to 3 decimal places.
</td><td>✓m1
✓m2
✓m3
✓m4, ✓m5
✓m6, ✓m7</td></tr>
<tr><td>(c)</td><td>Draw the graph of $\frac{1}{v}$ against $\frac{1}{u}$
1. The responding variable, $\frac{1}{v}$ at y axis,
the manipulated variable, $\frac{1}{u}$ at x axis
2. States the unit of the variable correctly
3. Both axis with the even and uniform scale
4. All of 5 points correctly plotted.
4-1 points correctly plotted
4. A smooth best fit straight line
5. Minimum size of the graph is 10 cm x 8 cm
<table>
<tr><th>No of ticks $\surd$</th><th>Marks</th></tr>
<tr><td>7</td><td>5</td></tr>
<tr><td>5,6</td><td>4</td></tr>
<tr><td>3,4</td><td>3</td></tr>
<tr><td>2</td><td>2</td></tr>
<tr><td>1</td><td>1</td></tr>
</table>
</td><td>✓1
✓2
✓3
✓4, ✓5
✓4
✓6
✓7</td></tr>
</table>



(d)	$\frac{1}{v}$ is decreases linearly to $\frac{1}{u}$ * If the graph that has been plotted does not cross axis-y. Cancel any answer in (d).	1
(e)	• Put on the curtain to avoid excess light from outside. • The position of the eyes must be perpendicular to the reading taken to avoid parallax error. • Repeat the reading and take average.	1
	TOTAL	**16**
2 (a) (i)	**State the relationship between x and $\frac{1}{a}$ correctly** **x** is directly propotional to $\frac{1}{a}$	1
(ii)	$\frac{1}{a}$ = 0.25 **Show horizontal line parallel to the axis with the $\frac{1}{a}$ axis** x = 0.425 m	1 1 1
(iii)	a = 2.22 m	1
(b)(i)	**Calculate the gradient of the graph and state the value within the acceptable range** Show the triangle with an acceptable size (4 x 4 squares of 2 cm) **Substitute correctly (according to the candidate's graph)** m = $\frac{2.25}{0.9}$ **State the correct value of the gradient with unit** = 2.5 m^2	1 1 1
(b)(ii)	State $\lambda = \frac{Gradient}{D}$ **Substitute the gradient from b (i) correctly** = $\frac{2.5}{5}$ **State the correct answer with unit** λ = 0.5 m	1 1 1
(d)	**State ONE correct precaution so as to produce an accurate result of the experiment** The experiment must be held on the field to avoid reflection of sound waves. Eyes at level with readings on the meter rule to avoid parallax error.	1 1
	TOTAL	**12**

SECTION B

NO	ANSWER	Marks
3(*a*)	Inference : The volume of the gas depends on the pressure which acts on it.	1
(*b*)	Hypothesis: The smaller the pressure on a fixed mass of gas, the larger is the volume of gas.	1
(*c*)(i)	Aim : To investigate the relationship between pressure and volume for a fixed mass of gas at a constant temperature.	1
(ii)	Variables : Manipulated : Gas pressure, P Responding : Gas volume, V Fixed : Temperature of gas, T // mass of gas, m	1 1
(iii)	Apparatus : 100cm^3 **glass syringe**, **load**, and a short rubber tube, and **Bourdon gauge**.	1
(iv)	Arrangement of apparatus:  	1
(v)	Procedure: 1. The apparatus is set up as shown in the diagram above. 2. The piston of the syringe is adjusted until the volume of air in the syringe is **50 cm^3**. 3. Put 100 g of load on the top of piston and the reading of the Bourdon gauge is taken. 4. The volume of the air trapped is measured from the syringe after slotted mass is put on the top of the piston.	 1 1

	5. The experiment is repeated by using different mass = 200g, 300g, 400g, and 500g.	1
(vi)	<table><tr><th>Mass of load/g</th><th>Pressure, P / kPa</th><th>Volume, V/ cm^3</th></tr><tr><td>100</td><td></td><td></td></tr><tr><td>200</td><td></td><td></td></tr><tr><td>300</td><td></td><td></td></tr><tr><td>400</td><td></td><td></td></tr><tr><td>500</td><td></td><td></td></tr></table>	1
(vii)	 Pressure of a fixed mass of gas is inversely proportional to its volume.	1
	TOTAL	**12**

1	**4**(a)		**1**	**Write a suitable inference** The current affects the strength of the magnetic field of an electromagnet
1	(b)		**1**	**Write a suitable hypothesis** The greater the current, the stronger the magnetic field
10	(c)	(i)	**1**	**Write the aim of the experiment** To investigate the relationship between the current and the strength of the magnetic field of an electromagnet.
		(ii)	**2**	**State the manipulated variable and responding variable** Manipulated variable : current, *I* Responding variable : number of paper clips, *N*
			3	**State the fixed variable** The number of turns of the coil
		(iii)	**4**	**State the complete list of apparatus and materials** D.c. power supply, ammeter, rheostat, petri dish, retort stand with clamp, paper clips, soft iron rod, insulated copper wire, and connecting wires.

(iv) **5 Draw a functional diagram of the apparatus**

(v) **6 State how the manipulated variable is controlled**

The current was switched on.

The rheostat was adjusted to obtain a current of 0.5 A

7 State how the responding variable is measured

The number of paper clips, *N* attracted to the soft iron rod was counted

8 State how the procedure is repeated to obtain at least 5 sets of results

The procedure was repeated for the values of current, *I* = 1.0 A, 1.5 A, 2.0 A, 2.5 A and 3.0 A

(vi) **9 State how the data is tabulated**

Current, *I* / A	Number of paper clips attracted, *N*
0.5	
1.0	
1.5	
2.0	
2.5	
3.0	

10 State how the data is analysed

A graph of *N* against *I* is drawn

12

END OF MAKING SCHEME