NO KAD PENGENALAN

4531/1
Physics
Kertas 1
2012
1¼ jam

ANGKA GILIRAN

PEPERIKSAAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA 2012

FIZIK

Kertas 1

Satu jam lima belas minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Tulis nombor kad pengenalan dan angka giliran anda pada ruang yang disediakan.*
2. *Kertas soalan ini adalah dalam dwibahasa.*
3. *Soalan di bahagian atas dalam bahasa Inggeris. Soalan di bahagian bawah yang sepadan dalam bahasa Melayu.*
4. *Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam bahasa Inggeris atau bahasa Melayu.*

Kertas soalan ini mengandungi 31 halaman bercetak

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

Maklumat berikut mungkin berfaedah. Simbol-simbol mempunyai makna yang biasa.

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

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

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

4 Momentum $= mv$

5 $F = ma$

6 Kinetic energy $= \frac{1}{2}mv^2$

7 Gravitational potential energy $= mgh$

8 Elastic potential energy $= \frac{1}{2}Fx$

9 Power, $P = \frac{\text{energy}}{\text{time}}$

10 $\rho = \frac{m}{V}$

11 Pressure, $p = \frac{F}{A}$

12 Pressure, $p = h\rho g$

13 Heat, $Q = mc\theta$

14 Heat, $Q = ml$

15 $P_1V_1 = P_2V_2$

16 $\frac{V_1}{T_1} = \frac{V_2}{T_2}$

17 $\frac{P_1}{T_1} = \frac{P_2}{T_2}$

18 $\frac{pV}{T} = \text{constant}$

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

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

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

22 Linear magnification, $m = \frac{v}{u}$

23 $P = \frac{1}{f}$

24 $v = f\lambda$

25 $\lambda = \frac{ax}{D}$

26 $n\lambda = d\sin\theta_n$

27 $Q = It$

28 $E = VQ$

29 $V = IR$

30 $E = V + Ir$

31 Power, $P = IV$

32 $I_{rms} = \frac{I_{peak}}{\sqrt{2}}$

33 $V_{rms} = \frac{V_{peak}}{\sqrt{2}}$

34 $\frac{N_S}{N_P} = \frac{V_S}{V_P}$

35 Efficiency $= \frac{I_S V_S}{I_P V_P} \times 100\%$

36 $eV = \frac{1}{2}mv^2$

37 $E = mc^2$

38 $g = 10\ \text{m s}^{-2}$

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 values is equal to 500 MW?
Antara yang berikut yang manakah sama dengan 500 MW?

A 5.0×10^{8} W

B 5.0×10^{6} W

C 5.0×10^{-8} W

D 5.0×10^{-6} W

2. Two groups of students are asked to estimate the mass of a pendulum bob. The results of the two groups are shown in Diagram 1.
Dua kumpulan pelajar diminta menganggar jisim sebuah ladung bandul. Keputusan kedua-dua kumpulan itu adalah seperti yang ditunjukkan dalam Rajah 1.

45 g, 60 g, 50 g, 50 g	40 g, 55 g, 70 g, 60 g
Group 1 *Kumpulan 1*	Group 2 *Kumpulan 2*

Diagram 1 / *Rajah 1*

If the actual mass of the pendulum bob is 55 g, which of the following comments about the two groups' estimation is correct?
Jika jisim sebenar ladung bandul itu ialah 55 g, antara komen-komen berikut berkenaan dengan anggaran kedua-dua kumpulan itu, yang manakah betul?

A Group 1 is more accurate and more consistent compared to Group 2
Kumpulan 1 lebih jitu dan lebih konsisten berbanding dengan Kumpulan 2

B Group 1 is more accurate but less consistent compared to Group 2
Kumpulan 1 lebih jitu tetapi kurang konsisten berbanding dengan Kumpulan 2

C Group 2 is more accurate and more consistent compared to Group 1
Kumpulan 2 lebih jitu dan lebih konsisten berbanding dengan Kumpulan 1

D Group 2 is more accurate but less consistent compared to Group 1
Kumpulan 2 lebih jitu tetapi kurang konsisten berbanding dengan Kumpulan 1

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

A Work
Kerja

B Force
Daya

C Weight
Berat

D Momentum
Momentum

4. Diagram 2 shows four motion graphs, P, Q, R and S.
Rajah 2 menunjukkan empat graf gerakan, P, Q, R dan S.

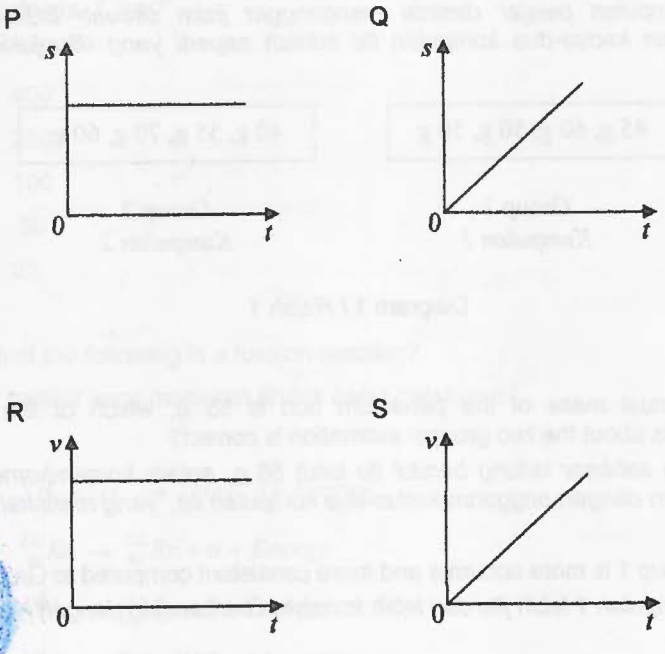


Diagram 2 / *Rajah 2*

Which of the graphs are for motion with constant velocity?
Graf yang manakah adalah untuk gerakan dengan halaju malar?

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

5. Diagram 3 shows a constant force F is applied to a box.
Rajah 3 menunjukkan satu daya tetap F dikenakan ke atas kotak.

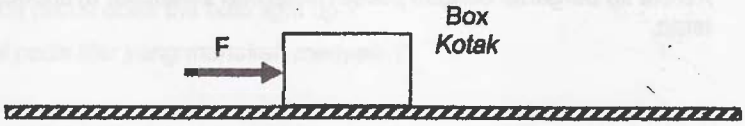


Diagram 3
Raiah 3

The force F exceed the frictional force between the box and the surface. What will be the motion of the box?
Daya F yang dikenakan melebihi daya geseran antara kotak dan permukaan. Apakah keadaan pergerakan kotak tersebut?

A. Remains stationary
Kekal pegun

B. Moves with constant velocity
Bergerak dengan halaju tetap

C. Moves with constant acceleration
Bergerak dengan pecutan tetap

D. Moves with increasing acceleration
Bergerak dengan pecutan bertambah

6. Diagram 4 shows a velocity-time graph for the motion of an object.
Rajah 4 menunjukkan satu graf halaju-masa bagi suatu objek bergerak. .

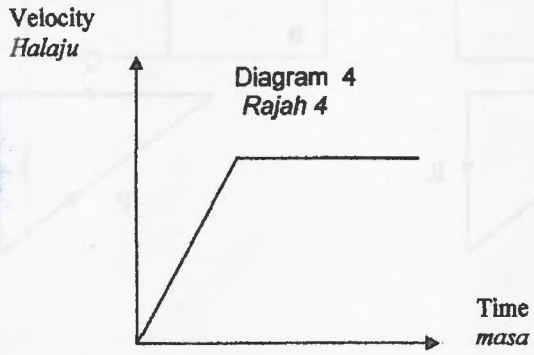


Diagram 4
Rajah 4

Based on the graph which of the following statement is true?
Berdasarkan graf , pernyataan berikut yang manakah adalah benar?

A. The car moves with constant acceleration and then stop.
Kereta itu bergerak dengan pecutan tetap dan kemudian berhenti.

B. The car moves with constant velocity and then stop.
Kereta itu bergerak dengan halaju tetap dan kemudian berhenti.

C. The car moves with constant acceleration and then constant velocity.
Kereta itu bergerak dengan pecutan tetap dan kemudian halaju tetap.

D. The car moves with constant acceleration and then constant deceleration.
Kereta itu bergerak dengan pecutn tetap dan kemudian nyahpecutan tetap.

7. Diagram 5 shows an object which is in equilibrium of three forces P, Q and R.
Rajah 5 menunjukkan satu objek yang berada dalam keseimbangan tiga daya P,Q dan R.

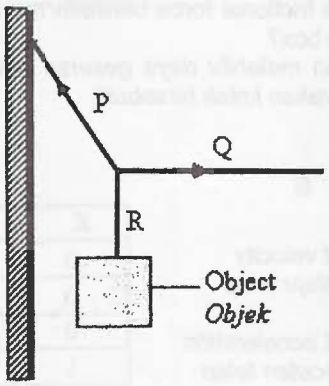
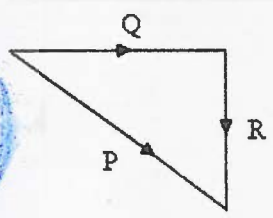


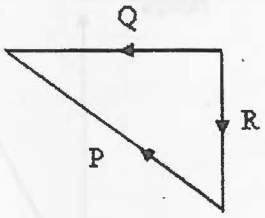
Diagram 5
Rajah 5

Which of the following vector diagram represents the three forces?
Antara rajah vektor berikut, yang manakah mewakili ketiga-tiga daya itu?

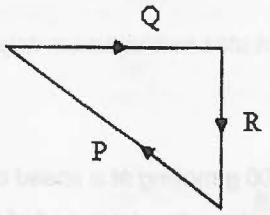
A



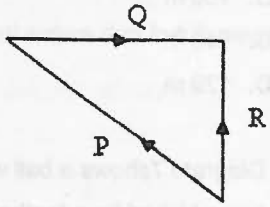
B



C



D



8. Ali kicks a ball of mass 1.5 kg with a force of 50 N and the time of impact between his boot and the ball is 0.2 s. What is the change in momentum of the ball?
Ali menendang sebiji bola berjisim 1.5 kg dengan daya 50 N dan masa pelanggaran di antara but dan bola ialah 0.2 s. Berapakah perubahan momentum bola itu?

A 10 Ns

B 15 Ns

C 250 Ns

D 375 Ns

9. Diagram 6 shows a motion graph of a body .
Rajah 6 menunjukkan graf gerakan satu jasad.

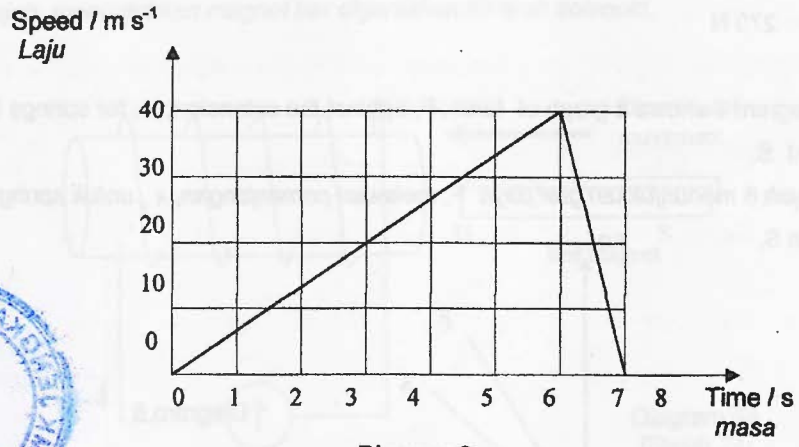


Diagram 6
Rajah 6

A. 220 m
B. 160 m
C. 140 m
D. 120 m

10. Diagram 7shows a ball with a mass of 1500 g moving at a speed of 4 m s $^{-1}$ being kicked by a football player. The ball rebounds at a speed of 5 m s $^{-1}$. The time of contact of the ball with the player is 0.05s. *Rajah 7 menunjukkan sebiji bola berjisim 500 g sedang bergerak dengan kelajuan 4 m s^{-1} di sepak oleh pemain bola. Bola itu melantun dengan kelajuan 5 m s^{-1}. Masa sentuhan bola dengan pemain itu ialah 0.05s.*

Diagram 7
Rajah 7

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

A 30 N
B 120 N
C 150 N
D 270 N

11. Diagram 8 shows a graph of force, F, against the extension, *x* , for springs R and S.
Rajah 8 menunjukkan graf daya F, *melawan pemanjangan, x , untuk spring* R *dan* S.

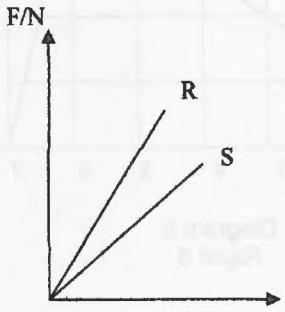


Diagram 8

What is the conclusion derived from the graph?
Apakah kesimpulan yang diperolehi daripada graf itu?

A Spring R is longer
Spring R *lebih panjang*

B The wire of the coils of spring R is thicker
Wayar gegelung spring R *lebih tebal*

C Both spring are made of the same material
Kedua-dua spring diperbuat daripada bahan yang sama

D The diameter of the coils of spring R is bigger
Diameter gegelung spring R *lebih besar*

12. Diagram 9.1 shows a box placed on a flat surface.
Rajah 9.1 menunjukkan satu kotak diletak di atas permukaan yang rata.

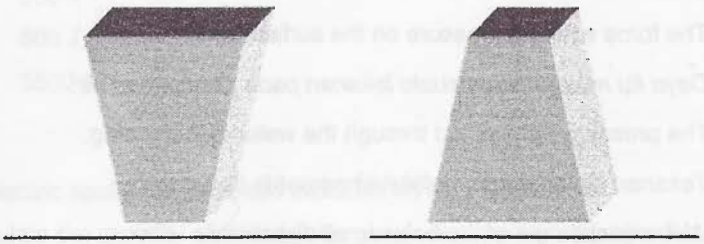


Diagram 9.1
Rajah 9.1

Diagram 9.2
Rajah 9.2

What happens to the pressure exerted on the surface if the box is inverted as shown in Diagram 9.2?
Apakah yang perubahan kepada tekanan yang dihasilkan jika kotak tersebut diterbalikkan seperti dalam Rajah 9.2?

A Increases *[bertambah]*
B Remains unchanged *[tetap]*
C Decreases *[berkurang]*

13. Diagram 10 shows the piston about to be pushed with the constant force into a flask with holes.

Rajah 10 menunjukkan omboh yang ditolak dengan daya yang tetap ke dalam kelalang yang berlubang.

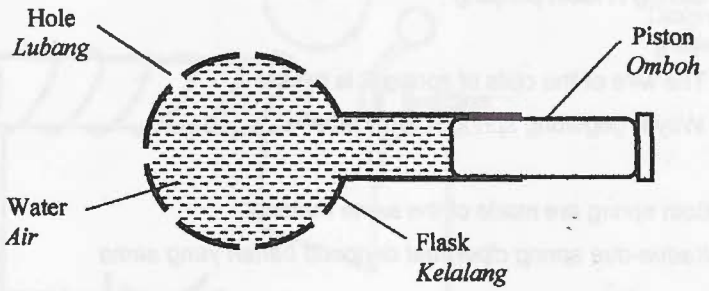


Diagram 10 / *Rajah 10*

Which of the following statements is **false** when the piston is pushed inwards?

*Antara pernyataan berikut, yang manakah **salah** apabila omboh ditolak ke dalam kelalang?*

A The force exerts a pressure on the surface of the water.
Daya itu mengenakan suatu tekanan pada permukaan air.

B The pressure transmitted through the water is increasing.
Tekanan dipindahkan melalui air semakin bertambah.

C Water gushes out of the holes in all directions.
Air terpancut keluar daripada lubang pada semua arah.

D Pressure is transmitted throughout the water.
Tekanan dipindahkan melalui air.

14. Diagram 9 shows a bottle contains mercury.
Rajah 9 menunjukkan sebuah botol mengandungi merkuri.

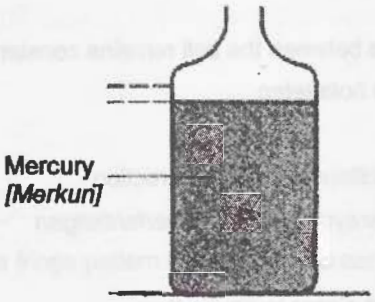


Diagram 9
[Rajah 9]

The pressure exerted by the mercury at point P is 8.16×10^4 N m^{-2}. What is the depth of P if the density of mercury is 1.36×10^4 kg m^{-3} ?

Tekanan yang dikenakan oleh merkuri ke atas titik P adalah 8.16×10^4 Nm^{-2}. Berapakah kedalaman P jika ketumpatan merkuri adalah 1.36×10^4 kg m^{-3}?

A 0.17 m
B 0.60 m
C 1.70 m
D 6.00 m

15. Diagram 12 shows two identical pingpong balls.
Rajah 12 menunjukkan dua bola pimpong yang serupa.

Diagram 12
Rajah 12

What happens when the air is blown in between the balls?
Apakah yang berlaku bila udara ditiup di antara kedua bola?

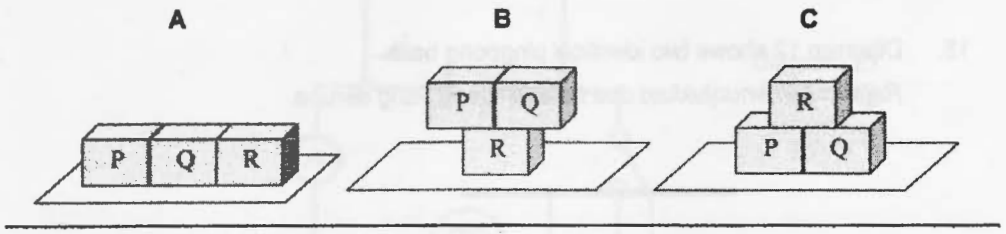
A. The distance between the ball remains constant
Jarak antara bola tetap

B. The balls oscillate in different direction
Bola akan berayun pada arah bertentangan

C. The balls get closer to each other
Bola akan menghampiri antara satu sama lain

D. The balls spin
Bola akan berpusing.

16. **A, B,** and **C** show 3 identical concrete blocks placed in different arrangement on the floor.Which arrangement exerts the biggest pressure on the floor?
***A, B,** dan **C** menunjukkan 3 blok konkrit yang serupa dalam susunan yang berbeza di atas lantai.*
Susunan yang manakah menghasilkan tekanan paling tinggi ke atas lantai?



17. Diagram 13 shows the air flows through a horizontal tube causing water columns to rise in three vertical glass tubes.
Rajah menunjukkan udara yang mengalir melalui tiub mendatar menyebabkan turus air dalam tiub kaca menegak meningkat.

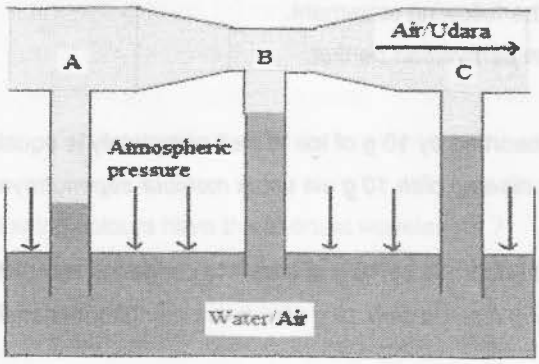


Diagram 13

Rajah 13

Which of the position has the highest air pressure?

Pada kedudukan manakah mempunyai tekanan udara yang paling tinggi?

18. In Diagram 14, P is in thermal equilibrium with Q and Q is in thermal equilibrium with R.

Dalam Rajah 14 , P adalah dalam keseimbangan terma dengan Q dan Q adalah dalam keseimbangan terma dengan R.

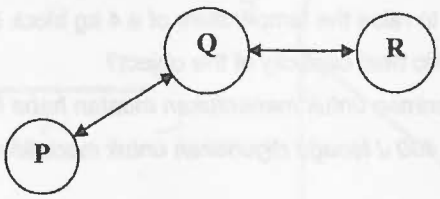


Diagram 14 / *Rajah 14*

If the temperature of P is θ_P and the temperature of R is θ_R, which of the following statements is correct?

Jika suhu P adalah θ_P dan suhu R adalah θ_R, pernyataan berikut yang manakah adalah benar?

A $\theta_P = \theta_R$

B $\theta_P > \theta_R$

C $\theta_P < \theta_R$

19. Complete the following statement.
Lengkapkan pernyataan berikut.

The heat absorbed by 10 g of ice to melt completely is equals to
Haba yang diserap oleh 10 g ais untuk melebur sepenuhnya sama dengan

A the heat absorbed by 10 g of steam to condense completely.
haba yang diserap oleh 10 g stim untuk mengkondensasi sepenuhnya.

B the heat released by 10 g of steam to condense completely.
haba yang dibebaskan oleh 10 g stim untuk mengkondensasi sepenuhnya.

C the heat absorbed by 10 g of water to evaporate completely.
haba yang diserap oleh 10 g air untuk menyejat sepenuhnya.

D the heat released by 10 g of water to solidify completely.
haba yang dibebaskan oleh 10 g air untuk memejal sepenuhnya.

20. In an experiment to find the specific heat capacity of an object, it is found that 10400 J is needed to raise the temperature of a 4 kg block by 20 °C.
Calculate the specific heat capacity of the object?
Dalam suatu eksperimen untuk menentukan muatan haba tentu sebuah logam, didapati 10 400 J tenaga digunakan untuk menaikkan 4 kg blok sebanyak 20 °C.
Hitungkan muatan haba tentu objek?

A 130 J kg^{-1} °C^{-1}

B 260 J kg^{-1} °C^{-1}

C 520 J kg^{-1} °C^{-1}

D 1040 J kg^{-1} °C^{-1}

21. Gas pressure in container is due to
Tekanan gas dalam bekas berdasarkan

A momentum of the gas particles
momentum bagi molekul gas

B change in the momentum of the gas particles
Perubahan momentum bagi molekul gas.

C rate of change in the momentum of the gas particles.
kadar perubahan momentum bagi molekul gas

D rate of change in the momentum of the gas particles per unit area.
kadar perubahan momentum bagi molekul gas per unit luas.

22. The same quantity of heat energy is applied to four different blocks P, Q, R and S with the same mass. Which block has the highest specific heat capacity?
Jumlah haba yang sama dikenakan pada empat jenis blok yang berbeza P, Q, R *dan* S *dengan jisim yang sama. Blok yang manakah mempunyai muatan haba tentu yang paling tinggi?*

A Temperature rise in block P is 3 °C
Kenaikan suhu dalam blok P ialah 3 °C

B Temperature rise in block Q is 6 °C
Kenaikan suhu dalam blok Q ialah 6 °C

C Temperature rise in block R is 9 °C
Kenaikan suhu dalam blok R ialah 9 °C

D Temperature rise in block S is 18 °C
Kenaikan suhu dalam blok S ialah 18 °C

23. What is the final temperature when 100 g of water at 25°C is mixed with 75 g of water at 50°C ?
Berapakah suhu akhir apabila 100 g air pada suhu 25 °C dicampurkan dengan 75 g air pada suhu 50°C ?

A 35.7 °C
B 37.5 °C
C 46.4 °C
D 48.0 °C

24. Diagram 15 below shows a boy standing in front of a mirror. The image of the boy observed in the mirror is magnified.
Rajah 15 menunjukkan seorang budak lelaki berdiri di depan suatu cermin. Imej budak lelaki yang diperhatikan dalam cermin tersebut adalah lebih besar.

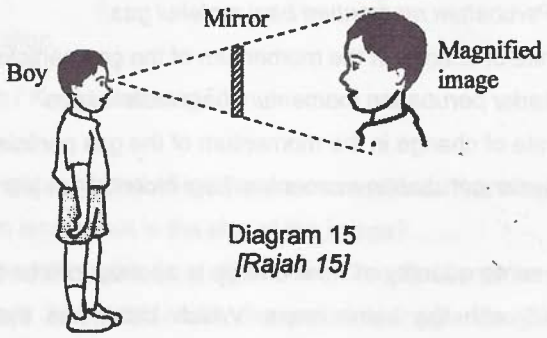


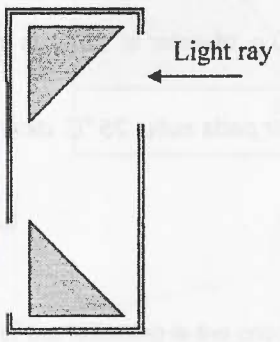
Diagram 15
[Rajah 15]

What is the type of the mirror?
Apakah jenis cermin tersebut

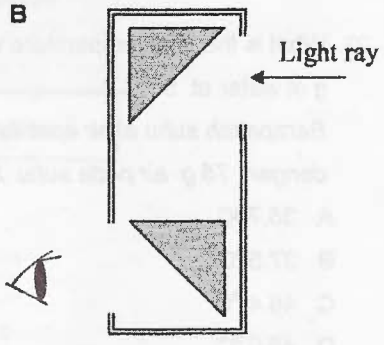
A Concave mirror *[Cermin cekung]*
B Convex mirror *[Cermin cembung]*
C Plane mirror *[Cermin satah]*

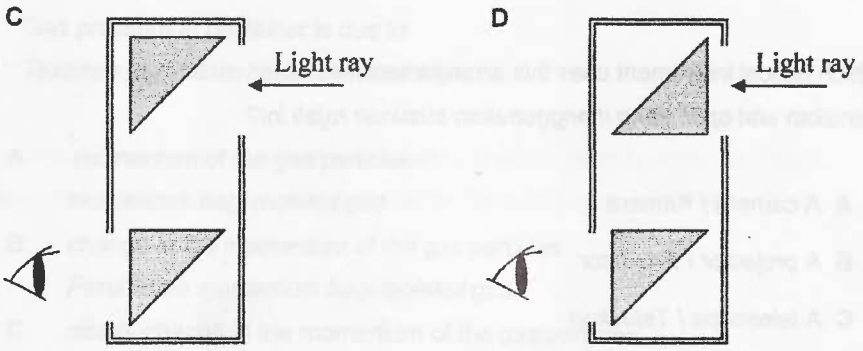
25. A periscope is made from two 45° - 90° - 45° prisms. Which of the following diagrams correctly represents the structure of the periscope?
Satu periskop diperbuat daripada dua prisma 45°- 90°- 45°.
Yang manakah gambarajah berikut dengan betulnya mewakili struktur periskop itu?

A



B





26. The diagram shows a ray, X, directed into a glass block. The critical angle of the glass is 42°. In which direction does the light move from point Y ?

Gambar rajah menunjukkan sinar X ditujukan ke dalam blok kaca. Sudut genting kaca ialah 42 °. Ke manakah arah sinar merambat dari titik Y?

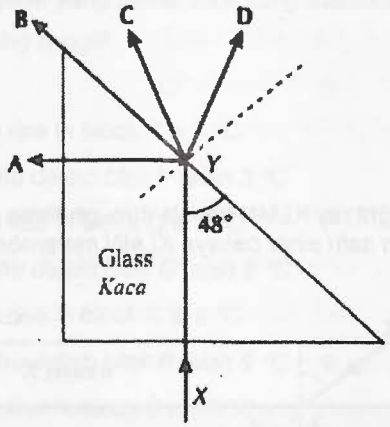


Diagram 16
[Rajah 16]

27. The diagram shows a converging lens producing an upright virtual image.

Gambar rajah menunjukkan kanta penumpu yang menghasilkan imej tegak dan maya.

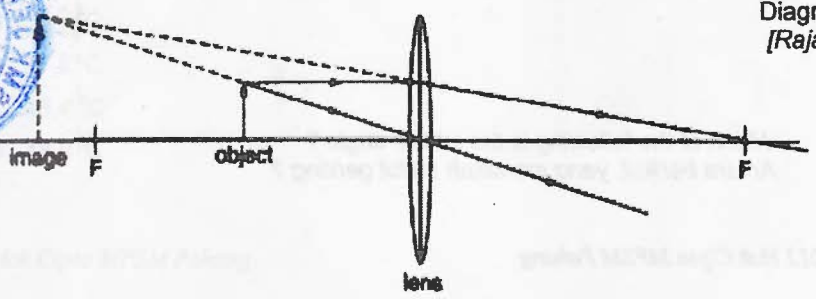


Diagram 17
[Rajah 17]

Which optical instrument uses this arrangement ?
Manakah alat optik yang menggunakan susunan rajah ini?

A A camera / *Kamera*

B A projector / *Projektor*

C A telescope / *Teleskop*

D A magnifying glass / *Kanta pembesar*

28. An object of 3 cm height is placed 15 cm from a convex lens. The image is formed at 30 cm from lens. What is the size of the image?
Sebuah objek yang berketinggian 3 cm diletakkan 15cm dari kanta cembung. Imejnya terbentuk pada 30 cm dari kanta. Berapakah ketinggian imej itu?

A 1.5 cm

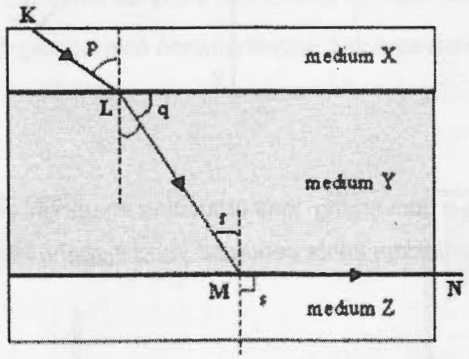
B 3.0 cm

C 4.5 cm

D 6.0 cm

E 7.5 cm

29. Diagram shows a light ray KLMN travels through three different medium.
Rajah menunjukkan satu sinar cahaya KLMN merambat melalui tiga medium yang berbeza.



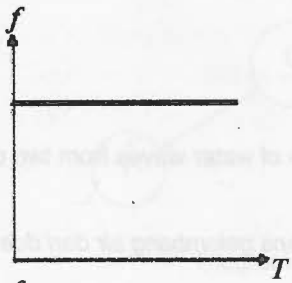
Which of the following is the critical angle ?
Antara berikut, yang manakah sudut genting ?

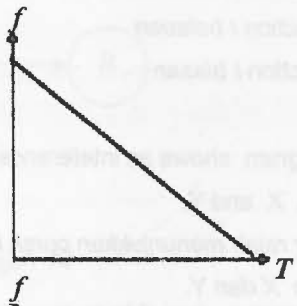
A p
B q
C r
D s

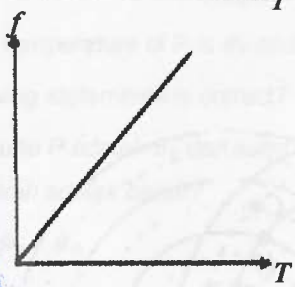
30. Which of the following colours have the shortest wavelength ?
Manakah di antara warna berikut mempunyai panjang gelombang yang terpendek ?

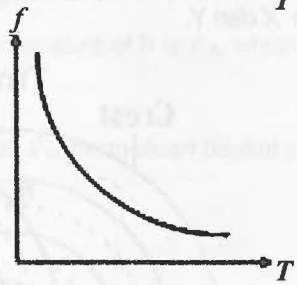
A Purple / *Ungu*
B Blue / *Biru*
C Green / *Hijau*
D Red / *Merah*

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

A


B


C


D


32. The diagram shows wave fronts that move towards the beach from the sea. that the sea is calmer at the bay than at the cape.

Gambar rajah menunjukkan muka gelombang merambat menuju pantai dari laut. adalah diperhatikan laut lebih tenang di teluk berbanding di tanjung.

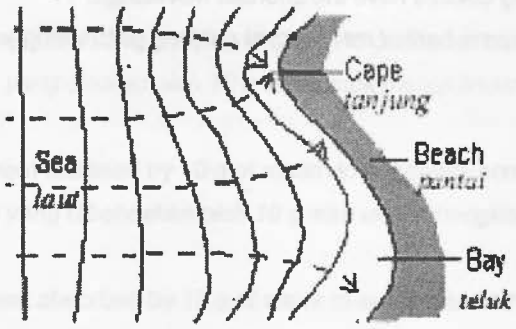


Diagram 18
[Rajah 18]

The phenomenom seen in diagram is

Fenomena yang kelihatan dalam gambar rajah ialah

A interference / *interferens*

B reflection / *Pantulan*

C diffraction / *belauan*

D refraction / *biasan*

33. The diagram shows an inteference pattern of water waves from two coherent sources X and Y.

Gambar rajah menunjukkan corak interferens gelombang air dari dua sumber koheren X dan Y.

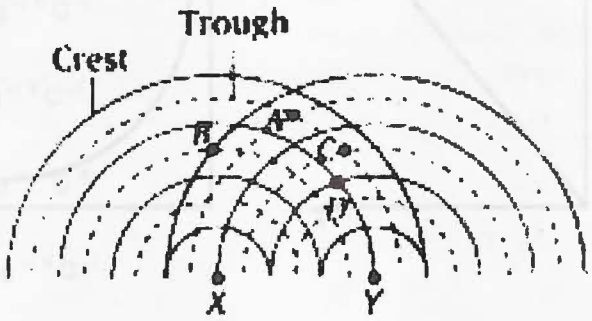


Diagram 19
[Rajah 19]

Which of the points, do costructive inteference occur ?
Manakah titik berlakunya interferens membina ?

A. A, B and C
B. A, B and D
C. A, C and D
D. B, C and D

34. Diagram 20 shows a fringe pattern formed on a screen in theYoung's double-slit experiment
Rajah 20 menunjukkan corak pinggir yang dihasilkan di atas skrin dalam eksperimen dwicelah Young.

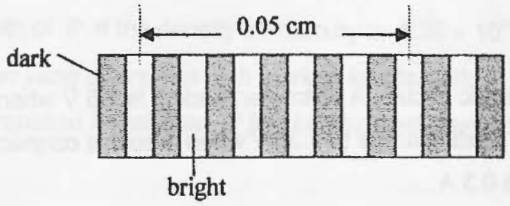
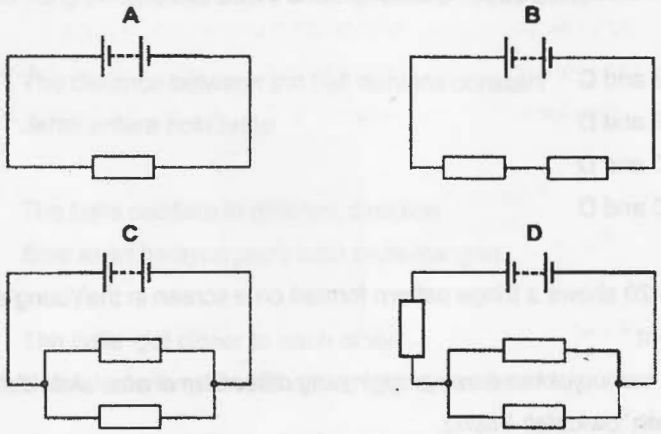


Diagram 20 / *Rajah 20*

The distance between double slit and screen is 1 m and the wavelength of light is 5 x 10^{-7} m. What is the distance between two slits?
Jarak diantara dwicelah dan skrin ialah 1 m dan panjang gelombang cahaya yang digunakan ialah 5 x 10^{-7}m. Apakah jarak di antara dua celah ?

A. 5.0 x 10^{-3} m
B. 1.0 x 10^{-4} m
C. 1.3 x 10^{-3} m
D. 1.0 x 10^{-3} m

35. In the circuits shown, all the resistors are identical. The curcuit which has the least resistance is ....
Perintang-perintang yang digunakan dalam litar di bawah adalah sama. Perintang yang manakah mempunyai nilai rintangan yang paling rendah ialah ....



36 Diagram shows the electric circuit . A voltmeter reading is 1.5 V when the switchis opened. The voltmeter reading drops to 1.35 V when a bulb is connected to the battery meter reading is 0.3 A .

Rajah menunjukkan litar elektrik. Bacaan voltmeter ialah 1.5 V apabila suis dibuka Bacaan meter voltan hilang pada 1.35 V apabila mentol disambung kepada bateri dan bacaan ammeter 0.3 A .

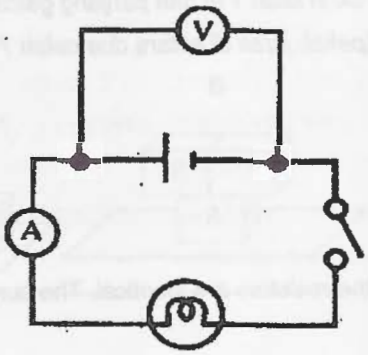


Diagram 21
[Rajah 21]

What is the internal resistance of the battery
Berapakah nilai rintangan dalam bagi bateri.

A 0.5 Ω
B 1.0 Ω
C 4.5 Ω
D 5.0 Ω

37. If the electrical energy consumption tariff is 22 cents per unit,what is the cost of using an 800 W air conditioner for 8 hours a day within 30 days ?
Jika tariff penggunaan tenaga elektrik adalah 22 sen dalam seunit,berapakah kos apabila menggunakan penyaman udara 800 W selama 8 jam bagi 30 hari.

A RM 20.13
B RM 26.08
C RM 35.21
D RM 42.24

38. An electric bulb is labeled "240V, 60W". How much energy is used by the bulb in one minute if the bulb is connected to a 240V power supply?
Satu mentol berlabel "240V, 60W". Berapakah tenaga yang digunakan oleh mentol tersebut dalam satu minit jika ia disambung kepada bekalan kuasa 240V?

A 60 J
B 360 J
C 600 J
D 3600 J

39. An electric appliance has been switched on for 2 hours.
Calculate the quantity of electric charge passing through the circuit in this time if the current is 2 A.
Sebuah alat elektrik dihidupkan selama 2 jam. Hitung kuantiti cas elektrik yang mengalir dalam litar itu pada tempoh masa ini jika arus ialah 2A.

A 4C
B 120 C
C 240 C
D 14 400 C

40. The diagram shows an electric bell circuit.
Rajah menunjukkan litar suatu loceng elektrik.

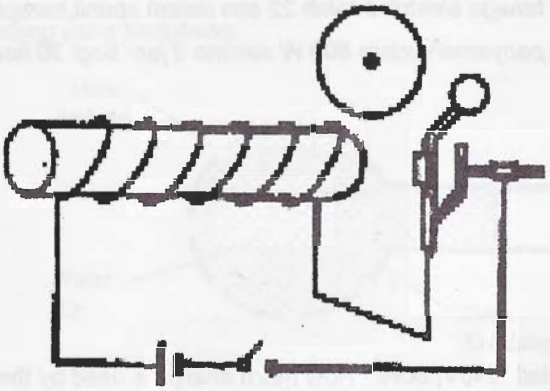


Diagram 22
[Rajah 22]

Which of the following does not effect the loudness sound of the bell when the switch is closed?
Manakah yang berikut tidak mempengaruhi kekuatan bunyi loceng apabila suis ditutup?

A Reverse the polarity of the dry cell
Menukarkan kekutuban sel kering.

B Increase the number of dry cells.
Menambahkan bilangan sel kering.

C Increase the number of turns in the coil.
Menambahkan bilangan lilitan gegelung.

D The presence of soft iron core.
Kehadiran teras besi lembut.

41. The diagram shows a current-carrying conductor placed between two magnetic poles.
Gambar rajah menunjukkan satu konduktor berarus di antara dua kutub magnet.

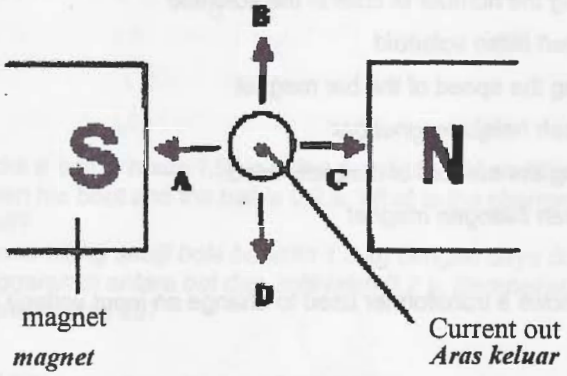


Diagram 23
[Rajah 23]

Of the marked directions A, B, C and D, which shows the direction of motion of the conductor?
Antara arah A, B, C and D, yang manakah adalah arah gerakan bagi konduktor tersebut?

42 The diagram shows a bar magnet moving towards a solenoid.
Rajah menunjukkan magnet bar digerakkan ke arah solenoid.

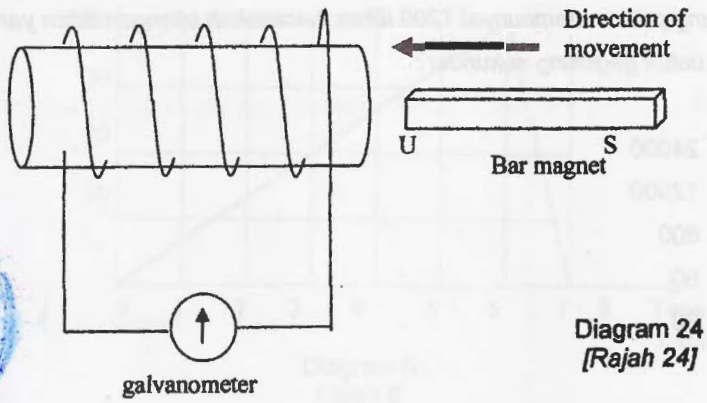


Diagram 24
[Rajah 24]

Which of these actions will **not** increase the deflection of the galvanometer pointer?
*Tindakan manakah yang **tidak** akan menambah pesongan jarum galvanometer?*

A Reversing the polarity of the magnet
Menukar kutub magnet
B Increasing the number of coils in the solenoid
Menambah lilitan solenoid
C increasing the speed of the bar magnet
Menambah halaju magnet bar
D increasing the number of magnets used
Menambah bilangan magnet

43. The diagram shows a transformer used to change an input voltage of 240 V to 12 V.
Gambar rajah menunjukkan sebuah transformer digunakan untuk menukarkan voltan input 240 V kepada 12 V.

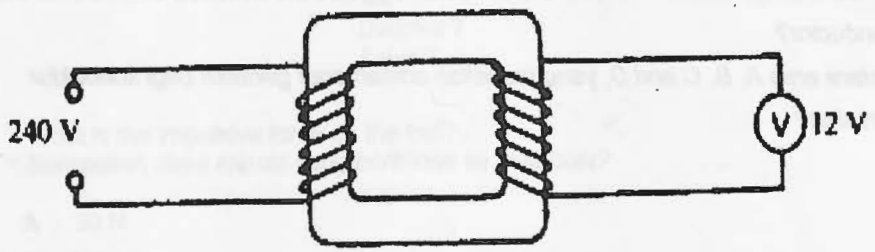


Diagram 25
[Rajah 25]

If the primary coil has 1200 turns, how many turns must the secondary coil have?
Jika gegelung primer mempunyai 1200 lilitan, berapakah bilangan lilitan yang diperlukan untuk gegelung sekunder?

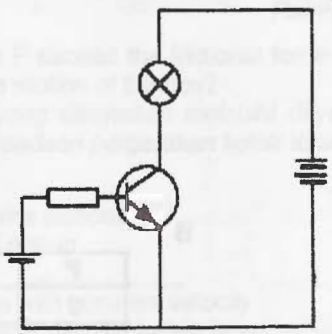
A 24000
B 12000
C 600
D 60
E 30

44. Which of the following electronic components can store charge and also smoothen the output current of a rectification circuit?
Manakah komponen elektronik yang berikut boleh menyimpan cas dan sebagai perata arus dalam litar rektifikasi?

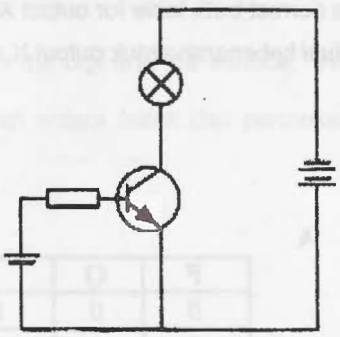
A Resistor / *Perintang*
B Diode / *Diod*
C Capacitor / *Kapasitor*
D Thermistor / *Termistor*

45. In which circuit does the bulb light up ?
Mentol pada litar yang manakah menyala ?

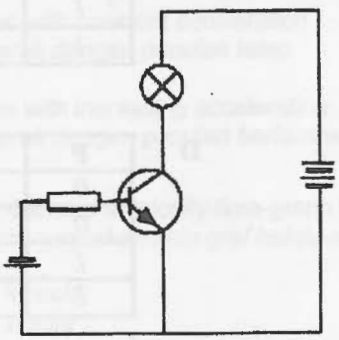
A



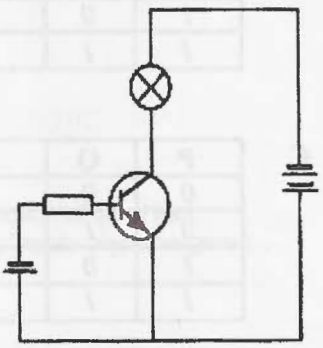
B



C



D



46. The diagram shows a combination circuit of four logic gates used for controlling the operation of an electronic device.
Gambar rajah menunjukkan kombinasi empat gate logik untuk mengawal sebuah operasi komponen elektronik

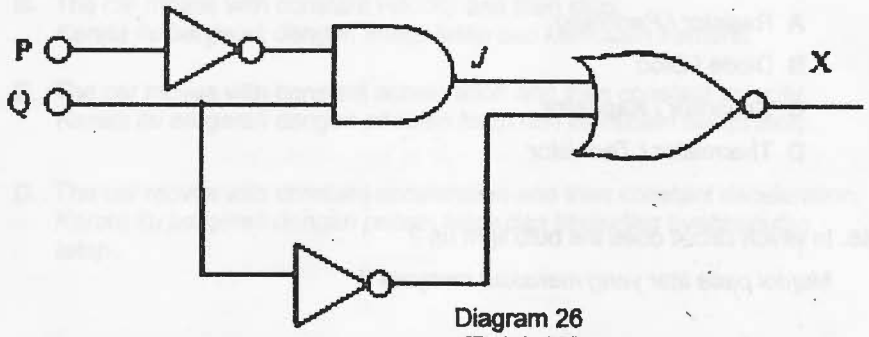


Diagram 26
[Rajah 26]

The correct truth table for output X is...
Jadual kebenaran untuk output X adalah...

A

P	Q	X
0	0	0
0	1	0
1	0	0
1	1	1

B

P	Q	X
0	0	0
0	1	1
1	0	0
1	1	1

C

P	Q	X
0	0	1
0	1	0
1	0	1
1	1	0

D

P	Q	X
0	0	1
0	1	0
1	0	0
1	1	1

47. Diagram 27 shows the symbol of a transistor. What are the names of the teminal P, Q and R?

Rajah 27 menunjukkan symbol bagi satu transistor. Apakah nama bagi terminal P, Q dan R?

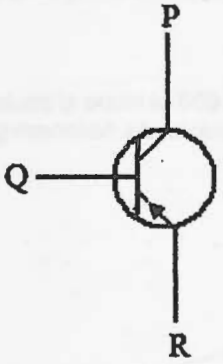


Diagram 27/ *Rajah 27*

	P	Q	R
A	Collector *Pengumpul*	Base *Papak*	Emitter *Pengeluar*
B	Collector *Pengumpul*	Emitter *Pengeluar*	Base *Tapak*
C	Base *Tapak*	Collector *Pengumpul*	Emitter *Pengeluar*
D	Emitter *Tengeluar*	Base *Tapak*	Collector *Pengumpul*

48. The graph shows the decay curve of a radioactive material .
Graf menunjukkan lengkungan penyusutan suatu bahan radioaktif.

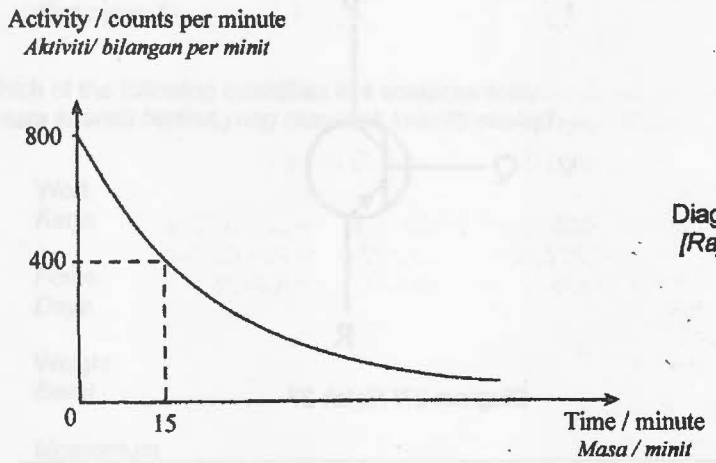


Diagram 28
[Rajah 28]

If the initial of the radioactive material is 800 counts per minute , what is the activity after 1 hour ?
Jika aktiviti awal bahan radioaktif itu ialah 800 bilangan per minit, berapakah aktivinya selepas 1 jam?

A 400
B 200
C 100
D 50
E 25

49. Which of the following is a fussion reaction?
Antara berikut yang manakah tindak balas pelakuran?

A $^{2}_{1}H + {}^{2}_{1}H \rightarrow {}^{3}_{2}He + {}^{1}_{0}n + Energy$

B $^{226}_{88}Ra \rightarrow {}^{222}_{86}Rn + \alpha + Energy$

C $^{21}_{11}Na \rightarrow {}^{21}_{12}Mg + \beta + Energy$

D $^{239}_{92}U \rightarrow {}^{95}_{38}Sr + {}^{141}_{54}Xe + 3{}^{1}_{0}n + Energy$.

50. The equation shows the decay of Uranium-235.

Persamaan berikut menunjukkan reputan Uranium-235.

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

What is the mass that is converted to energy?
Berapakah jisim yang ditukarkan kepada tenaga?

[Mass of Uranium-235 / *jisimUranium-235* = 235.0439 u,
mass of Thorium-231 / *jisim Thorium-231* = 231.0363 u,
mass of Alpha particle / *jisim zarah Alfa* = 4.0026 u .

A 0.0025 u

B 0.0050 u

C 0.0060 u

D 0.0075 u

4531/2

Fizik
Kertas 2
2012
2 ½ Jam

NO KAD PENGENALAN

ANGKA GILIRAN

PEPERIKSAAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA 2012

FIZIK

Kertas 2

Dua jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU.

1. *Tulis nombor kad pengenalan dan angka giliran anda pada ruang yang disediakan.*
2. *Kertas soalan ini adalah dalam dwibahasa.*
3. *Soalan di bahagian atas dalam Bahasa Inggeris. Soalan di bahagian bawah yang sepadan dalam bahasa Melayu.*
4. *Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam bahasa Inggeris atau bahasa Melayu.*

Untuk Kegunaan Pemeriksa			
Kod Pemeriksa:			
Bahagian	Soalan	Markah Penuh	Markah Diperoleh
	1	4	
	2	5	
	3	6	
	4	7	
	5	8	
	6	8	
	7	10	
	8	12	
B	9	20	
	10	20	
C	11	20	
	12	20	
Jumlah			

INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON

1. This question paper consists of three sections: Section A, Section B and Section C.
   Kertas soalan ini mengandungi tiga bahagian : Bahagian A, Bahagian B dan Bahagian C.

2. Answer all the questions in Section A. Write your answers for section A in the spaces provided in the questions paper.
   Jawab semua soalan pada Bahagian A. Tuliskan jawapan untuk bahagian A diruang jawapan yang disediakan di atas kertas soalan.

3. Answer one question from Section B and one question from Section C.
   Jawab satu soalan daripada Bahagian B dan satu soalan daripada Bahagian C.

4. Show your working, it may help you to get mark.
   Tunjukkan jalan kira, ini membantu anda mendapat markah.

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

6. A list of formulae is provided.
   Satu senarai formula disediakan.

7. The marks allocated for each questions or part question are shown in brackets.
   Markah yang diperuntukkan bagi setiap soalan atau ceraian soalan ditunjukkan dalam kurungan.

8. You are advised to spend 90 minutes to answer questions in Section A, 30 minutes for Section B and 30 minutes for Section C.
   Anda dinasihati supaya mengambil masa 90 minit untuk menjawab soalan dalam bahagian A, 30 minit untuk Bahagian B dan Bahagian C.

9. You may use a scientific calculator.
   Anda dibenarkan menggunakan kalkulator saintifik.

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

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

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

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

4. Momentum = mv

5. $F = ma$

6. Kinetic energy / *Tenaga kinetic*
   $= \frac{1}{2}mv^2$

7. Gravitational potential energy /
   Tenaga keupayaan graviti = mgh

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

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

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

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

12. Pressure / *Tekanan*, $p = h\rho g$

13. Heat / *Haba*, $Q = mc\theta$

14. Heat / *Haba*, $Q = ml$

15. $\frac{PV}{T}$ = constant / *pemalar*

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

17. $n = \frac{1}{\sin c}$

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

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

20. Linear magnification /
    Pembesaran linear, $m = \frac{v}{u}$

21. $v = f\lambda$

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

23. $Q = It$

24. $E = VQ$

25. $V = IR$

26. Power / *Kuasa*, $P = IV$

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

28. $\frac{N_S}{N_P} = \frac{V_S}{V_P}$

29. Efficiency / *Kecekapan*
    $= \frac{I_S V_S}{I_P V_P} \times 100\%$

30. $E = mc^2$

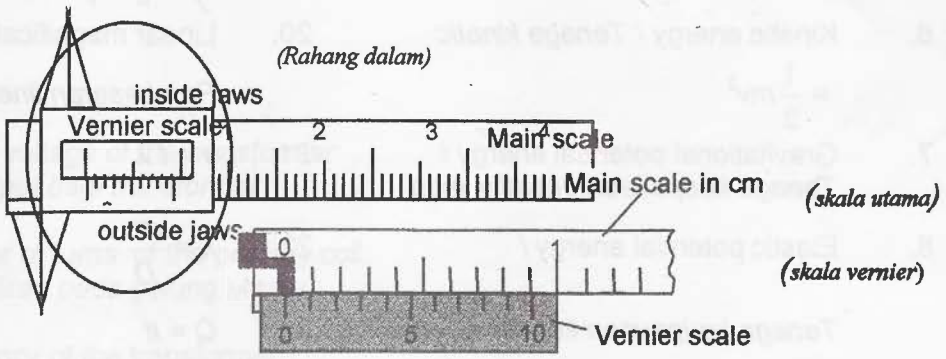
31. $c = 3.0 \times 10^8\ \text{m s}^{-1}$

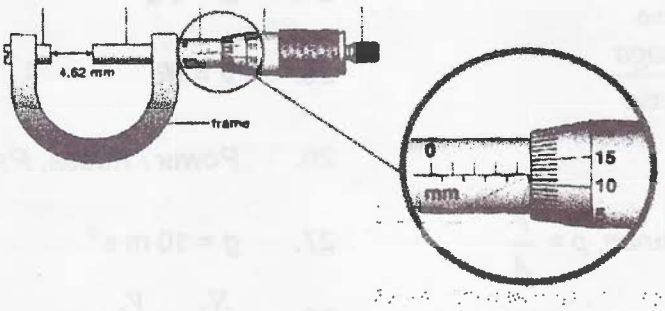
Section A
Bahagian A

[60 marks]
[*60 markah*]

Answer all questions.
Jawab semua soalan

1. Diagram 1(a) shows the vernier calipers and diagram 1(b) shows micrometer screw gauge.
Rajah 1(a) menunjukkan angkup vernier dan rajah 1(b) menunjukkan tolok skru mikrometer.





(a) Name the physical quantity measured by the diagram 1(a) and 1(b).
Namakan kuantiti fizikal yang diukur oleh rajah 1(a) dan 1(b).

.....

[1 mark]
[*1 markah*]

(b) Based on the answer in 1(a), state the accuracy either one of the measurement in diagram above.
Berdasarkan jawapan dalam 1(a), nyatakan kejituan salah satu daripada alat pengukur dalam rajah di atas.

.....

[1 mark]
[*1 markah*]

(c) Based on diagram 1(a) and 1(b), detemine which one of the diagram are more sensitive?
Berdasarkan rajah 1(a) dan rajah 1(b), tentukan alat pada rajah manakah yang lebih sensitif?

.....

[1 mark]
[*1 markah*]

(d) State the reading on the diagram 1(b)
Nyatakan bacaan pada rajah 1(b).

.....

[1 mark]
[*1 markah*]

2 .

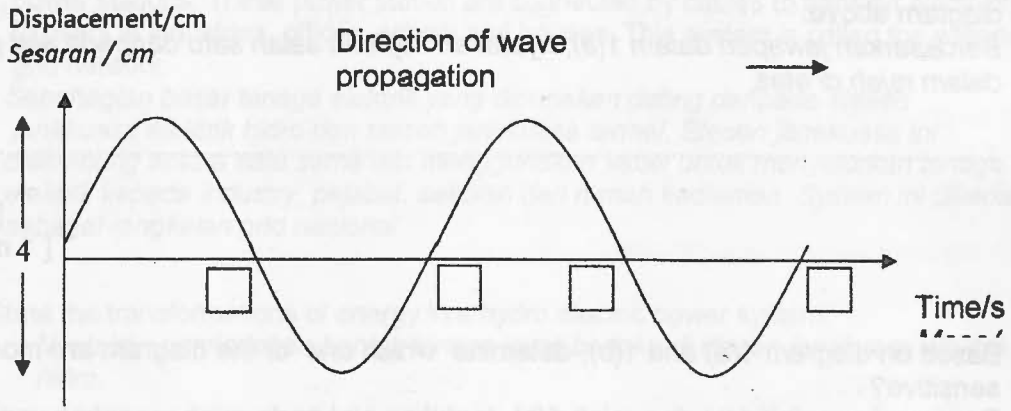


Diagram 2
Rajah 2

Diagram 2 shows a displacement-time graph for transverse waves.
Rajah 2 menunjukkan graf sesaran-masa bagi gelombang melintang.

(a) The transverse waves has a frequency of 10 Hz. What is meant bay frequency?
Gelombang melintang tersebut mempunyai frekuensi 10 Hz. Apakah maksud frekuensi?

.....

[1 mark]
[*1 markah*]

(b) State the amplitude of the transverse waves above.
Nyatakan amplitud gelombang melintang di atas.

.....

[1 mark]
[*1 markah*]

(c) Period is the time taken to make one complete oscillation. Complete diagram 2, by filling in the empty boxes for the time taken by the waves.
Tempoh ialah masa yang diambil untuk membuat satu kitaran lengkap. Lengkapkan rajah 2 dengan mengisi kotak kosong bagi masa yang diambil oleh gelombang tersebut.

[2 mark]
[*2 markah*]

(d) What will happen to the period of the oscillation when the frequency of the waves increases.
Apakah yang berlaku kepada tempoh ayunan apabila frekuensi gelombang bertambah.

.....

[1 mark]
[1 *markah*]

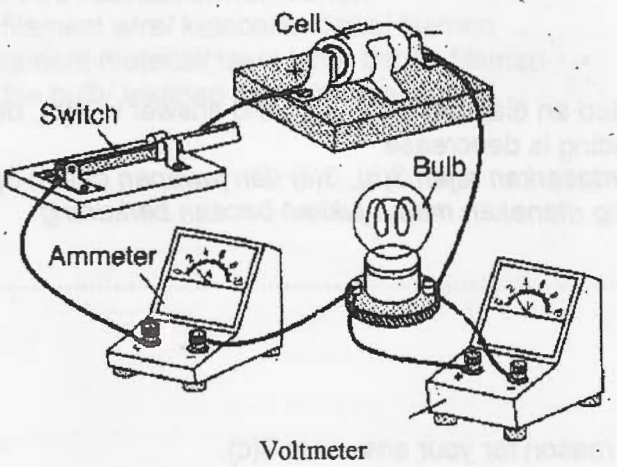


Diagram 3(a) Electrical circuit
Rajah 3(a) Litar elektrik

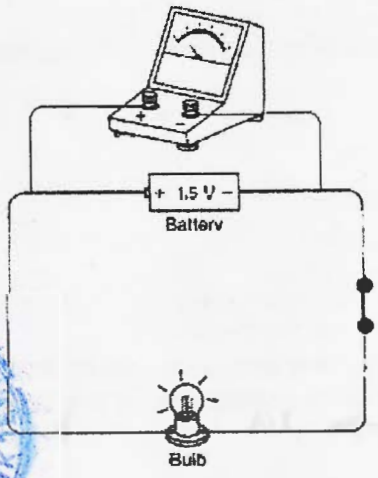


Diagram 3(b)
Rajah 3(b)

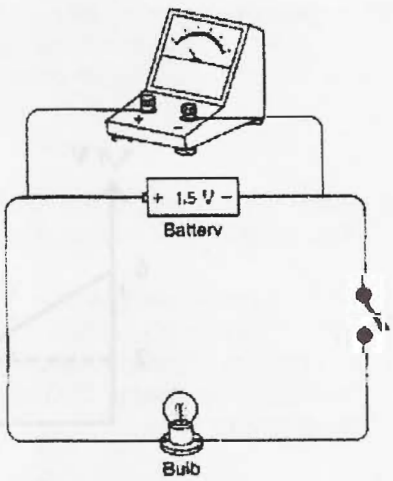


Diagram 3(c)
Rajah 3(c)

3 (a) What is meant by potential difference?
Apakah maksud beza keupayaan?

.....

[1 mark]
[*1 markah*]

(b) Based on diagram 3(a) , state the function of the voltmeter?
Berdasarkan rajah 3(a), nyatakan fungsi voltmeter?

.....

[1 mark]
[*1 markah*]

(c) (i) Based on diagram 3(b) , 3(c) and answer in 3(b), determine the voltmeter reading is deacrease.
Berdasarkan rajah 3(b), 3(c) dan jawapan dalam 3(b), tentukan voltmeter yang manakah menunjukkan bacaan berkurang.

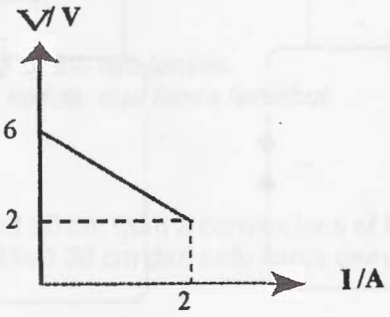
.....

[1 mark]
[*1 markah*]

(ii) Give a reason for your answer in 3(c).
Berikan sebab bagi jawapan anda di 3(c).

.....

[1 mark]
[*1 markah*]



Graph 3(i)
Graf 3(i)

(d) A cell of e.m.f, E and internal resistor, r is connected to a rheostat. The

ammeter reading, I and the voltmeter reading, V are recorded for different resistance, R of the rheostat.The graph of V against I is as shown. From the graph, 3(i) determine,

D.g.e, E sebuah sel dan rintangan dalam, r disambung dengan satu reostat. Bacaan ammeter,I dan bacaan voltmeter, V direkodkan untuk perintang, R yang berbeza. Graf V lawan I ditunjukkan . Daripada graf 3(i), tentukan,

(i) The value of the electromotif force, e.m.f, E.
Nilai daya gerak elektrik, d.g.e, E.

.....

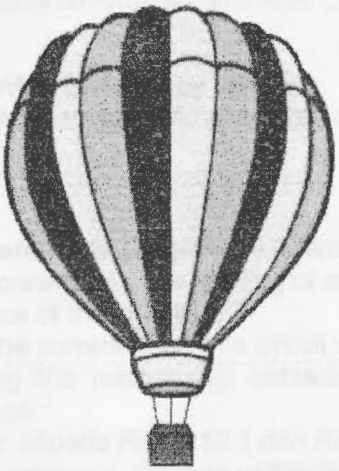
[1mark]
[*1 markah*]

(ii) Based on the diagram 3(i), state how you determine the internal resistor, r of the cell.
Berdasarkan rajah 3(i), nyatakan bagaimana anda menentukan rintangan dalam, r bagi sel.

.....

[1 mark]
[*1 markah*]

5.



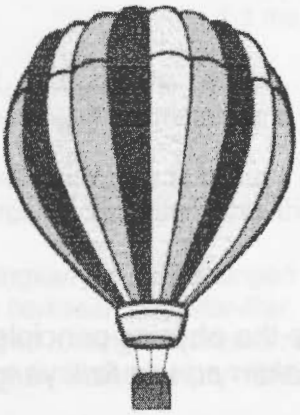


Diagram 4.1

Diagram 4.2

(a) What is meant by weight?
Apakah maksud berat?

.....

[1 mark]
[1 markah]

(b) Mark the forces acted on the ballon A on the diagram and name it.
Tandakan pada rajah daya-daya yang bertindak ke atas belon A dan namakan daya berkaitan.

.....

[2 marks]
[2 markah]

(c) What is the factor affected the difference height of the hot air balloon floating on the air on the diagram above .
Apakah faktor yang mempengaruhi perbezaan ketinggian belon udara panas terapung di udara di dalam rajah di atas.

.....

[1 mark]
[1 markah]

(d) Explain the answer in (c)
Terangkan jawapan di (c)

.....

.....

[2 marks]
[2 markah]

(e) State the physics principle involved in these questions.
Nyatakan prinsip fizik yang terlibat dalam situasi ini.

.....

[1 mark]
[1 markah]

5.

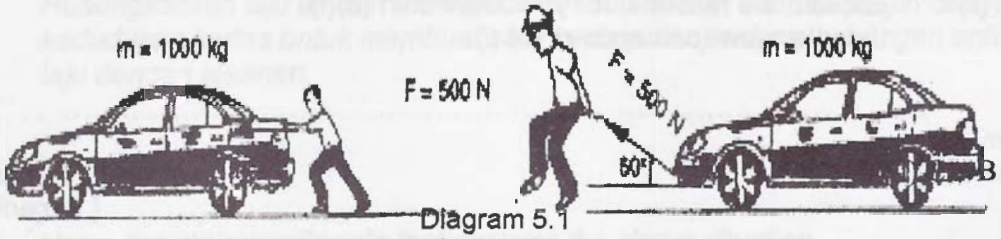


Diagram 5.1
Rajah 5.1

Diagram 5.1(i) and diagram 5.1(ii) show two methods used by the mechanic to move a breakdown car. A constant force, F = 500 N is used to push and pull the car in method A and B. The car is pushed and pulled at distance 5m.
Rajah 5.1(i) dan rajah 5.1(ii) menunjukkan dua kaedah yang digunakan oleh mekanik untuk menarik kereta rosak. Daya malar, F = 500 N digunakan bagi menarik dan menolak kereta dengan kaedah A dan kaedah B. Kereta ditolak dan ditarik sejauh 5 m.

(a) Using diagram 5.1(i) and diagram 5.1(ii)
Dengan menggunakan rajah 5.1(i) dan rajah 5.1(ii)

(i) Compare the method used by the mechanic in diagram 5.1(i) and diagram 5.1(ii).
Bandingkan kaedah yang digunakan oleh mekanik dalam rajah 5.1(i) dan rajah 5.1(ii).

.....

[1 mark]
[*1 markah*]

(ii) Compare the work done in diagram 5.1(i) and diagram 5.1(ii)
Bandingkan kerja yang dilakukan dalam rajah 5.1(i) dan rajah 5.1(ii).

.....

[1 mark]
[*1 markah*]

(b) (i) Based on the answer in (a) (ii) , which the method is easier to move the car.
Berdasarkan jawapan di (a) (ii), kaedah manakah yang lebih mudah untuk menggerakkan kereta.

.....

[1 mark]
[*1 markah*]

(ii) Explain the reasons for your answer in (b)(i).
Jelaskan jawapan anda di (b) (i).

.....

[2 marks]
[*2 markah*]

(c) Diagram 5.2 shows a student push an object running up a staircase.
Rajah 5.2 menunjukkan seorang budak sedang menolak suatu objek naik ke tingkat atas.

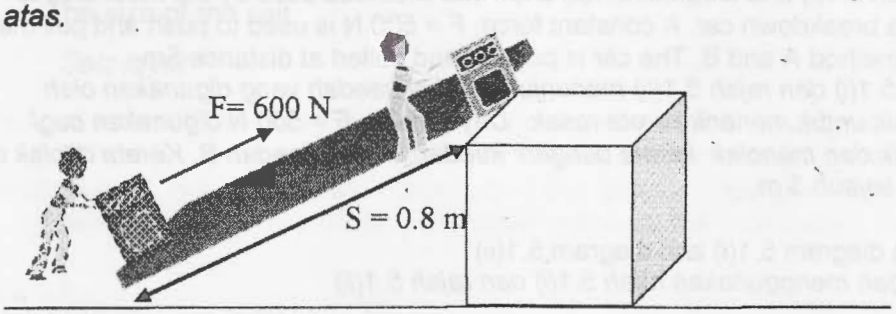


Diagram 5.2
Rajah 5.2

(i) State the energy is invovled in diagram 5.2 above.
Nyatakan tenaga yang terlibat dalam rajah 5.2 di atas.

.....

[1 mark]
[*1 markah*]

(ii) Based on the answer in(c) (i), mark the type of energy in diagram 5.2.
Berdasarkan jawapan dalam (c) (i), tandakan jenis tenaga pada rajah 5.2.

.....

[1 mark]
[*1 markah*]

(iii) Name the principle invovled in diagram 5.2.
Namakan satu prinsip yang terlibat pada rajah 5.2.

.....

[1 mark]
[*1 markah*]

6. Diagram 6.1 and 6.2 shows two identical pistons with a fixed mass of gas and a same mass of load on each of the pistons.
Diagram 6 .1 shows the positions of piston at room temperature.
Diagram 6.2 shows the positions of piston when heated until certain temperature.
Rajah 6.1 dan 6.2 menunjukkan dua silinder yang sama saiz mengandungi gas yang sama pada jisim tetap dan pemberat yang sama jisim diletakkan di atas setiap omboh.
Rajah 6.1 menunjukkan kedudukan omboh pada suhu bilik.
Rajah 6.2 menunjukkan kedudukan omboh bila dipanaskan sehingga suhu tertentu.

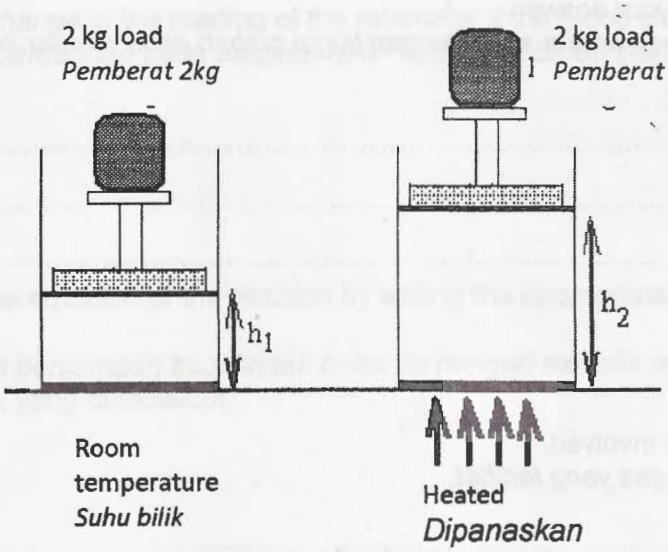


Diagram 6.1
Rajah 6.1

Diagram 6.2
Rajah 6.2

(a) (i) Observe diagram 6.1 and 6.2.
Perhatikan rajah 6.1 dan rajah 6.2.
Compare the height of the piston.
Bandingkan ketinggian piston

.....

[1mark]
[*1 markah*]

(ii) Compare the temperature of the gas.
Bandingkan suhu gas tersebut.

.....

[1 mark]
[*1 markah*]

(b) State the relationship between temperature and height of the piston for the cylinder. Explain your answer.
Nyatakan hubungan antara suhu dengan tinggi omboh pada silinder itu. Jelaskan jawapan anda.

.....

.....

.....

[3 marks]
[*3 markah*]

(c) Name the gas law involved.
Namakan hukum gas yang terlibat.

.....

[1 mark]
[*1 markah*]

(d) What will happen to the height of the piston, h_1 on diagram 6.1 if the mass of the load decreases?. Give a reason for your answer.
*Apakah yang berlaku kepada tinggi omboh h_1, pada Rajah 6.1 jika jisim pemberat dikurangkan ? Berikah **satu** sebab bagi jawapan.*

.....

[2 marks]
[*2 markah*]

7. Diagram 7.1 shows a transistor circuit with a bulb *L*.
Rajah 7.1 menunjukkan sebuah litar bertransistor dengan sebiji mentol L

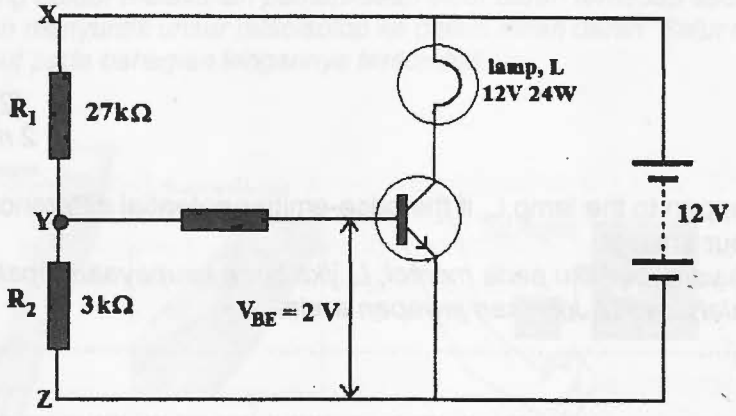


Diagram 7.1
Rajah 7.1

(a) Name the type of transistor shown in Diagram 7.1.
Namakan jenis transistor yang ditunjukkan pada Rajah 7.1

.....

[1 mark]
[*1 markah*]

(b) Based on Diagram 7.1

Berdasarkan pada Rajah 7.1:

(i) What is the potential difference across point X and point Z?
Berapakah beza keupayaan merentasi titik X dan titik Z?

.....

[1 mark]
[*1 markah*]

(ii) What is the total resistance between point X and point Z?
Berapakah jumlah rintangan di antara titik X dan titik Z?

.....

[1 mark]
[*1 markah*]

(iii) Using the answers from (b)(i) and b(ii), calculate the potential difference across YZ.
Menggunakan jawapan dari (b)(i) dan (b)(ii), hitungkan beza keupayaan merentasi YZ.

[2 marks]
[*2 markah*]

(c) State what will happen to the lamp,L, if the base-emitter potential difference, V_{BE} is 2 volts? Explain your answer.
Nyatakan apakah yang berlaku pada mentol, L, jika beza keupayaan tapak pengeluar, V_{BE} ialah 2 volt? Jelaskan jawapan anda.

.....

.....

.....

[2 marks]
[*2 markah*]

(d) Without adding any new component to Diagram 7.1, what modification is needed so that the opposite situation than the one in 7(c) occur at lamp *L*.
Tanpa menambah sebarang komponen baru kepada Rajah 7.1, apakah pengubahsuaian yang harus dilakukan untuk menghasilkan keadaan yang bertentangan dengan 7(c) pada mentol L.

.....

.....

[1 mark]
[*1 markah*]

(e) An automatic fire alarm is needed to emit sound in case of fire. Suggest **two** modifications that have to be made to the circuit in Diagram 7.1 by replacing the components with suitable electronic components.
*Suatu penggera automatic diperlukan bagi menghasilkan bunyi jika berlaku kebakaran. Cadangkan **dua** pengubahsuaian yang perlu dilakukan pada litar Rajah 7.1 dengan menggantikan komponen kepada komponen electronik yang sesuai.*

.....

.....

.....

[2 marks]
[2 markah]

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

.....

[1 marks]
[1 *markah*]

(a) Based on Table 8.2, state the suitable properties of the radioisotope to detect the blood clotting in the bloodstream.Give reason for the suitability of the properties.
Berdasarkan Jadual 8, nyatakan sifat-sifat radioisotope yang sesuai untuk mengesan darah beku di dalam salur darah. Beri sebab mengapa sifat-sifat itu sesuai.

(i) Half-life/ *Separuh hayat*

.....

Reason/*Sebab*

.....

[2 marks]
[2 *markah*]

(ii) Types of radiation/ *Jenis sinaran*

.....

Reason/ *Sebab*

.....

[2 marks]
[2 *markah*]

(iii) Physical state/ *Keadaan fizikal*

.....

Reason/*Sebab*

.....

[2 marks]
[2 *markah*]

(ii) Compare the temperature of the gas.
Bandingkan suhu gas tersebut.

.....

[1 mark]
[*1 markah*]

(b) State the relationship between temperature and height of the piston for the cylinder. Explain your answer.
Nyatakan hubungan antara suhu dengan tinggi omboh pada silinder itu. Jelaskan jawapan anda.

.....

.....

.....

[3 marks]
[*3 markah*]

(c) Name the gas law involved.
Namakan hukum gas yang terlibat.

.....

[1 mark]
[*1 markah*]

(d) What will happen to the height of the piston, h_1 on diagram 6.1 if the mass of the load decreases?. Give a reason for your answer.
Apakah yang berlaku kepada tinggi omboh h_1, *pada Rajah 6.1 jika jisim pemberat dikurangkan ? Berikah* ***satu*** *sebab bagi jawapan.*

.....

[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. Diagram 9.1 shows the situation of the levers of the water in the Venturi tube. Diagram 9.2 shows the situation of a sheet of paper when air is blown.
Rajah 9.1 menunjukkan paras air dalam tiub Venturi. Rajah 9.2 menunjukkan keadaan sehelai kertas selepas ditiub.

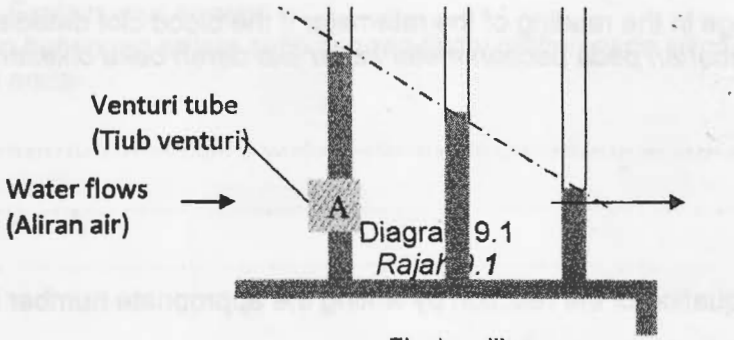


Diagram 9.1
Rajah 9.1

Diagram 9.2
Rajah 9.2

(a) (i) What is meant by speed?
Apakah maksud laju?

[1 mark]
[*1 markah*]

(ii) With reference to Diagram 9.1 and Diagram 9.2, compare the speed of water flows at point A and blowing air, the pressure at point A and the top of a sheet of paper, the position of the levers of the water in Venturi tube and the position of a sheet of paper when air is blown.
Relate the speed and the levers of water in the venturi tube and the position of a sheet of paper to make a deduction on the relationship between speed and the pressure.

Dengan merujuk kepada rajah 9.1 dan 9.2, bandingkan laju air di titik A dan laju tiupan angin, tekanan di titik A dan tekanan di bahagian atas kertas, kedudukan aras air dalam tiub venturi dan kedudukan kertas apabila ditiup.
Hubungkaitkan laju air dan aras air dalam tiub venturi dan laju angin dengan kedudukan kertas untuk membuat satu kesimpulan tentang hubungan antara laju dengan tekanan.

[5 marks]
[*1 markah*]

(iii) Name the physics principle that explains the above situation.
Namakan prinsip fizik yang menerangkan situasi di atas.

[1 mark]
[*1 markah*]

(b) When two speed bots move faster and closely to each other, an accident may be occured. Explain how does an accident occured.
Apabila dua bot laju bergerak laju dan menghampiri satu sama lain, kemungkinan kemalangan akan berlaku. Terangkan bagaimana kemalangan boleh berlaku.

[3 marks]
[*3 markah*]

(c) Diagram 9.3 shows a sailboat.
Rajah 9.3 menunjukkan sebuah perahu layar.

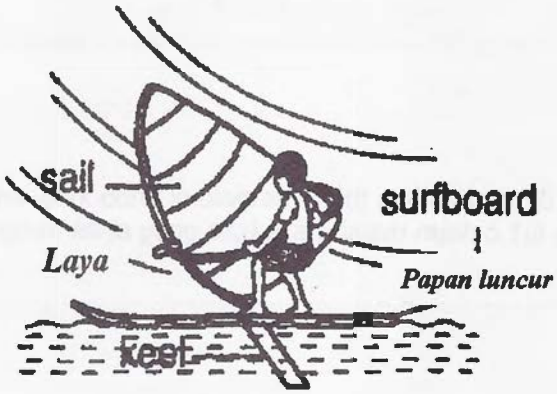


Diagram 9.3
Rajah 9.3

You are required to give some suggestions to design a sailboat which can travel faster.
Using the knowledge on motion , forces and the properties of materials, explain the suggestions based on the following aspects:

Anda dikehendaki memberi beberapa cadangan untuk mereka bentuk sebuah perahu layar yang boleh bergerak dengan lebih laju.
Menggunakan pengetahuan tentang gerakan , daya dan sifat-sifat bahan, terangkan cadangan itu yang merangkumi aspek-aspek berikut:

(i) The surface of the board
Permukaan papan luncur

(ii) The shape of the board
Bentuk papan luncur

(iii) Material used for the board
Bahan yang digunakan untuk papan luncur

(iv) Material used for the sail
Bahan yang digunakan untuk luncur

(v) The size of the sail
Saiz layar

[10 marks]
[*10 markah*]

10. Diagram 10.1 and Diagram 10.2 shows two identical resistors which has resistance *R* connected to the ammeters, voltmeters, switches and batteries with different ways.
Rajah 10.1 dan Rajah 10.2 menunjukkan dua perintang serupa yang mempunyai rintangan R disambungkan kepada ammeter, voltmeter, suis dan bateri dengan cara yang berbeza.

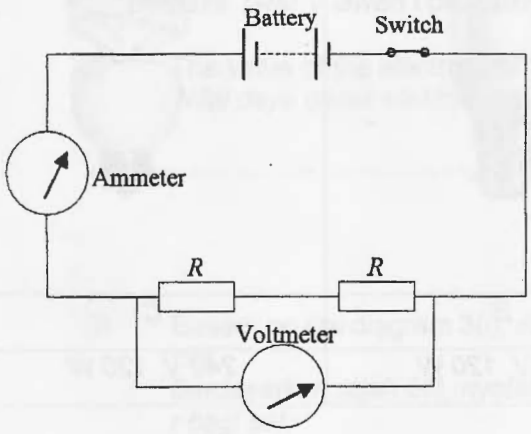


DIAGRAM 10.1
RAJAH 10.1

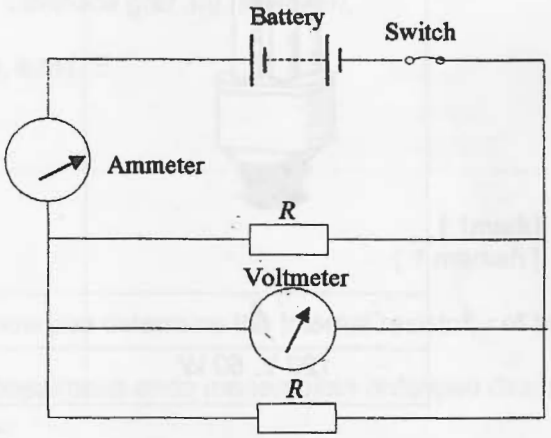


DIAGRAM 10.2
RAJAH 10.2

When the switch is on, the ammeters and the voltmeters show a reading.
Apabila suis dihidupkan, ammeter dan voltmeter menunjukkan bacaan.

(a) What is meant by current?
Apakah yang dimaksudkan dengan arus?

[1 mark]
[*1 markah*]

(b) With reference to Diagram 10.1 and Diagram 10.2, compare the type of circuit connections, the reading of ammeters, the reading of voltmeters and the effective resistance of the circuits.
Relate the current flows in a circuit with the effective resistance to make a deduction regarding the relationship between type of a circuit connection and the effective resistance.
Merujuk kepada Rajah 10.1 dan Rajah 10.2, bandingkan jenis sambungan litar, bacaan ammeter, bacaan voltmeter dan rintangan berkesan bagi litar-litar.
Hubungkaitkan arus yang mengalir dalam litar dengan rintangan berkesan untuk membuat satu kesimpulan tentang hubungan antara jenis sambungan litar dengan rintangan berkesan.

[6 marks]
[*6 markah*]

(c)

		
A	**B**	**C**
120 V, 60 W	*120 V, 120 W*	*240 V, 120 W*

Draw and label an electric circuit connecting all the three bulbs in which all the bulb should light up with normal brightness when connected to a power supply of 240 V alternating current. Add switches to the circuit.
Lukis dan label satu litar elektrik yang menyambungkan ketiga-tiga mentol di mana semua mentol menyala dengan kecerahan normal apabila disambungkan kepada bekalan kuasa 240 V arus ulang alik. Tambahkan suis pada litar anda.

[3 marks]

Diagram 10.3
Rajah 10.3

(c) Diagram 10.3 shows a filament light bulb which is use to produce light. Using the appropriate physics concepts, suggest and explain modification that can be made so that the filament light bulb will long lasting and can produce brighter light at the rate of 240V, 60 W.
Your answer should include following aspects :
Rajah 10.3 menunjukkan sebiji mentol berfilamen y*ang digunakan untuk*

menghasilkan cahaya. Dengan menggunakan konsep fizik yang bersesuaian,cadang dan jelaskan pengubahsuaian yang boleh dibuat supaya mentol berfilamen tahan lebih lama dan dapat menyala dengan cerah pada kadar 240 V, 60 W.

Jawapan anda hendaklah mengandungi aspek-aspek berikut :

- Types of filament wire / jenis dawai filamen
- Shape of the filament wire / bentuk dawai filamen
- The thickness of the filament wire/ ketebalan dawai filamen
- Melting point of the filament material/ takat lebur bahan filamen
- Gas pressure inside the bulb/ tekanan gas di dalam mentol

[10 marks]
[*10 markah*]

SECTION C
BAHAGIAN C

[20 marks]
[20 markah]

11. Diagram 11.1 shows an endoscope. At the two ends of the endoscope are two lenses. One is the objective lens, the other is the eye piece.
Rajah 11.1 menunjukkan satu endoskop. Di hujung endoskop tersebut terdapat dua kanta. Satu kanta objek dan satu lagi kanta mata.

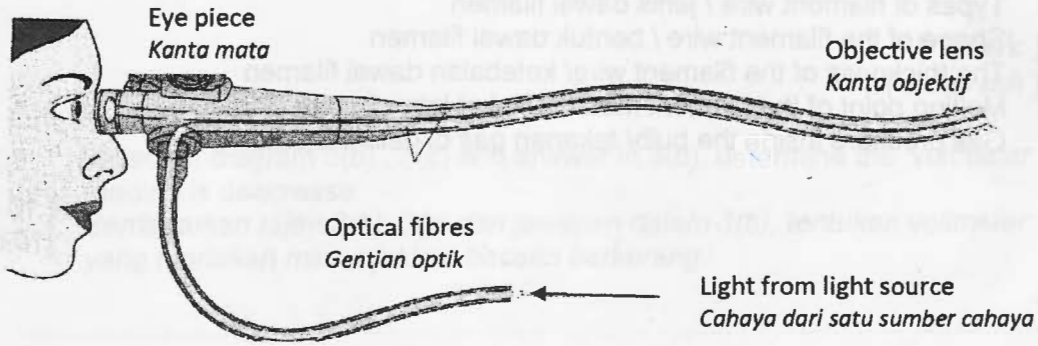


Diagram 11.1
Rajah 11.1

(a) (i) What is the meaning of total internal reflection?
Apakah yang dimaksudkan dengan pantulan dalam penuh?

[1 mark]
[1 markah]

(ii) Draw the ray diagram in optical fibres to show how the total internal reflection fenomenon occured.
Lukiskan lintasan sinar yang berlaku dalam gentian optik bagi menunjukkan fenomena pantulan dalam penuh.

[2 marks]
[2 markah]

(b) State the function of the two lenses.
Nyatakan fungsi kedua- dua kanta tersebut.

[2 marks]
[2 markah]

(c) An object is placed 30 cm from a convex lens of focal length 10 cm.
Satu objek diletakkan 30 cm dari satu kanta cembung yang mempunyai panjang fokus10 cm.

(i) Calculate the image distance.
Hitungkan jarak imej.

(ii) Calculate the linear magnification for the image.

Hitungkan pembesaran linear imej.

[5 marks]
[*5 markah*]

(d) You are asked to investigate the features of optical fibers for the design of an endoscope for medical imaging. Diagram 11.2 below shows the parts of an optical fibre.
Anda dikehendaki menyiasat ciri-ciri serabut optik dalam rekabentuk satu endoskop untuk 'imaging' atau penyurihan dalam perubatan.. Rajah 11.2 di bawah menunjukkan bahagian-bahagian gentian optik.

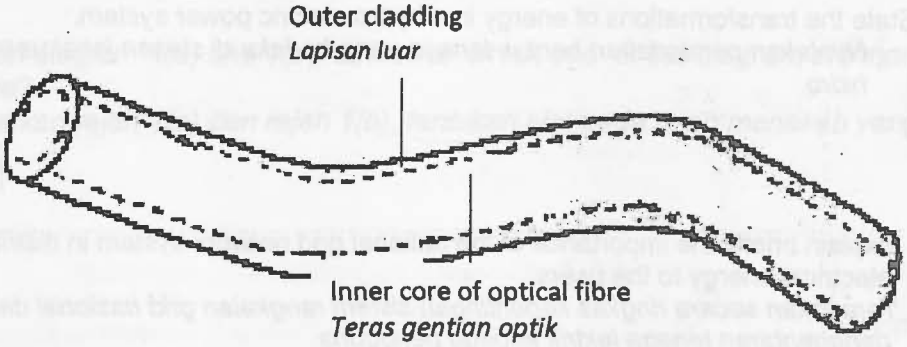


Diagram 11.2
Rajah 11.2

Optical Fibre *Serabut optik*	Refractive index of outer cladding *Indeks biasan lapisan luar*	Refractive index of inner core *Indeks biasan teras*	Flexibility *kelenturan*	Diameter of fibre (mm) *Diameter gentian (mm)*
P	1.5	1.6	High	1.00
Q	1.6	1.5	Low	1.00
R	1.5	1.6	High	0.01
S	1.6	1.5	Low	0.01

(i) Based on the Table above, explain the suitable features of the optical fibres and then determine the most suitable optical fibre that can be used to design the endoscope. Give reasons for your choice.
Berdasarkan Jadual di atas, terangkan ciri- ciri serabut optik dan tentukan serabut optik yang paling sesuai digunakan untuk mereka cipta sebuah endoskop.
Berikan sebab bagi pilihan anda.

[10 marks]
[*10 markah*]

12. (a) Most of our electrical energy comes from hydroelectric power stations and thermal power stations. These power station are connected by cables to transmit alectricity to users in industries, offices, school and houses. This system is called the national grid network.
Sebahagian besar tenaga elektrik yang digunakan dating daripada stesen janakuasa elektrik hidro dan stesen janakuasa termal. Stesen janakuasa ini disambung antara satu sama lain menggunakan kabel untuk menyalurkan tenaga elektrik kepada industry, pejabat, sekolah dan rumah kediaman. System ini dikenali sebagai rangkaian grid nasional.

(i) State the transformations of energy in a hydro electric power system.
Nyatakan pemindahan bentuk tenaga yang berlaku di stesen janakuasa elektrik hidro.

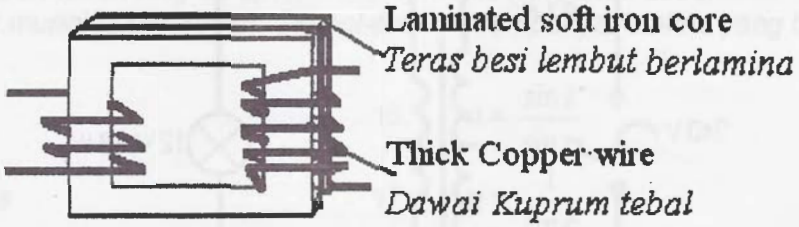
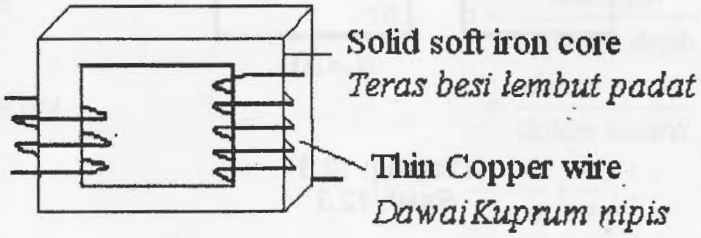
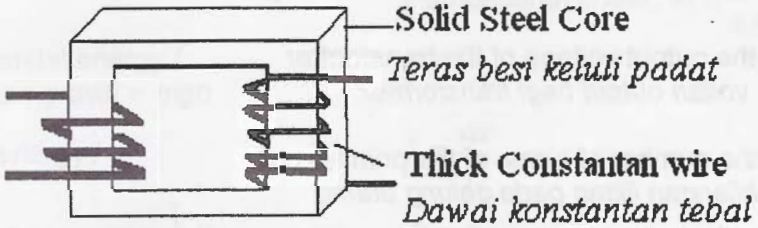
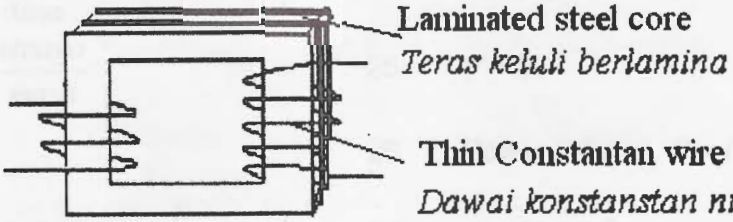
[1 mark]
[*1 markah*]

(b) Explain briefly the importance of the national grid network system in distributing electrical energy to the users.
Terangkan secara ringkas kepentingan sistem rangkaian grid nasional dalam penghantaran tenaga lektrik kepada pengguna.

[4 marks]
[*4 markah*]

(c) A transformer is very important during the transmission of electricy to step up and step down the voltage. As an engineer you are required to investigate the design and characteristic of four transformer shown in Diagram 12.2.
Explain the suitability of each characteristics of the transformer and determine the transformer which can be use as an ideal transformer.
Give reasons for your choice.

Transformer sangat penting semasa penghantaran tenaga elektrik untuk menaikkan dan menurunkan voltan. Sebagai seorang jurutera, anda ditugaskan untuk mengkaji rekabentuk dan ciri-ciri bagi empat transformer seperti yang ditunjukkan dalam rajah 12.2.
Terangkan kesesuaian setiap ciri dan seterusnya tentukan transformer mana yang boleh dijadikan transformer ideal. Beri sebab untuk pilihan anda.

P	
Q	
R	
S	

(d) Diagram 12.3 shows a 12V, 48W bulb lights up with normal brightness when it is connected to a 240V main supply through a transformer.
Rajah 12.3 menunjukkan sebuah mentol 12V, 48W menyala dengan kecerahan normal bila ia disambungkan pada 240V bekalan utama melalui satu transformer.

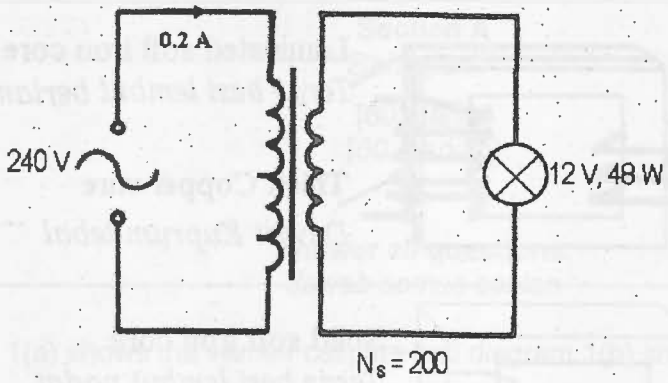


Diagram 12.3
Rajah 12.3

Calculate:
Hitung:

(i) the output voltage of the transformer
voltan output bagi transformer

(ii) the number of turns of the primary coil
bilangan lilitan pada gelung utama

(iii) the efficiency of the transformer .
kecekapan transformer itu .

[5 marks]
[*5 markah*]

4531/3
Fizik
Kertas 3
2012
1 ½ jam

NO KAD PENGENALAN

ANGKA GILIRAN

PEPERIKSAAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA 2012

FIZIK

Kertas 3

Satu jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Tulis nombor kad pengenalan dan angka giliran anda pada ruang yang disediakan.*
2. *Kertas soalan ini adalah dalam dwibahasa.*
3. *Soalan di bahagian atas dalam bahasa Inggeris. Soalan di bahagian bawah yang sepadan dalam bahasa Melayu.*
4. *Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam bahasa Inggeris atau bahasa Melayu.*
5. *Calon dikehendaki membaca maklumat di halaman 2 atau 3.*

Kod Pemeriksa			
Bahagian	Soalan	Markah Penuh	Markah Diperolehi
A	1	16	
	2	12	
B	1	12	
	2	12	
Jumlah			

Kertas soalan ini mengandungi 15 halaman bercetak.

INFORMATION FOR CANDIDATES

1. *This question paper consists of two sections :* **Section A** *and* **Section B**
2. *Answer* **all** *questions in* **Section A**. *Write your 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.** *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 diprogramkan.*
10. *Masa yang dicadangkan untuk menjawab* **Bahagian A** *ialah* 60 *minit.* **Bahagian B** *ialah* 30 *minit.*
11. *Serahkan semua kertas jawapan di akhir peperiksaan.*

Section A
[28 marks]

Answer **all** question
*Jawab **semua** soalan*

1. A student carries out an experiment to study the relationship between the speed of trolley, *v* and the height of the trolley on the inclined plane from the surface, *h*.

   The arrangement of apparatus is shown in Diagram 1.1.

   The frequency of the ticker timer is 50 Hz.

   The height of the trolley on the inclined plane from the surface, *h* = the height of the block.

   Seorang pelajar menjalankan satu eksperimen untuk mengkaji hubungan antara halaju troli, v dan ketinggian troli di atas landasan daripada permukaan lantai, h.
   Susunan radas eksperimen seperti yang ditunjukkan pada Rajah1.1.

   Frekuensi jangka masa ialah 50 Hz.

   Ketinggian troli di atas landasan daripada permukaan lantai, h = ketinggian tinggi bongkah.

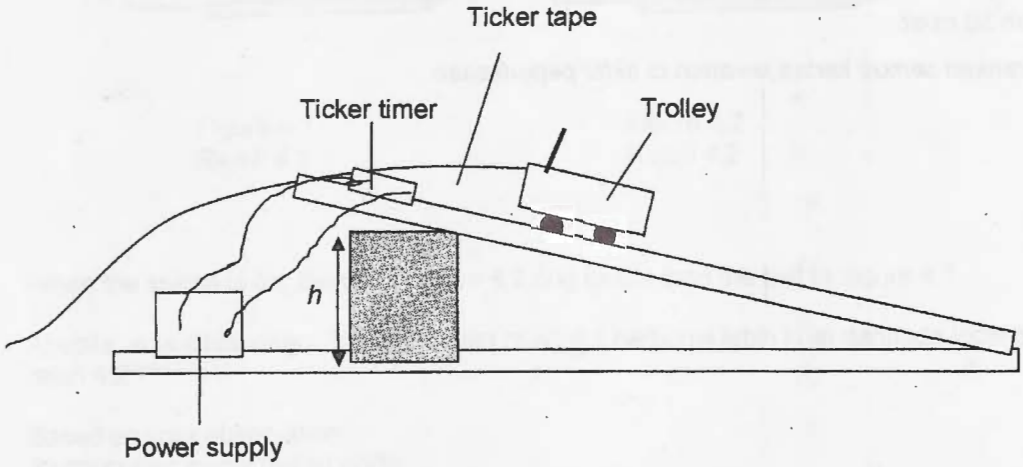


Diagram 1.1

At the beginning of the experiment, the height of the block is started with h = 20.0 cm. 10 ticks is chosen from the centre of the ticker tape to calculate the speed as shown in Diagram 1.2. The experiment is repeated by varying the values of *h* to be 30.0 cm, 40.0 cm, 50.0 cm and 60.0 cm. Every section of 10 ticks at the centre of ticker tape can be obtained as shown in Diagram 1.3, 1.4, 1.5 and 1.6.

[Lihat sebelah

Pada awal eksperimen tinggi bongkah h dimulai dengan 20.0 cm. 10 detik dipilih daripada bahagian tengah pita detik untuk menghitung halaju seperti yang ditunjukkan di Rajah 1.2. Eksperimen diulangi dengan menggunakan ketinggian bongkah 30.0 cm, 40.0 cm, 50.0 cm dan 60.0 cm. Keratan 10 detik pada bahagian tengah pita detik yang diperolehi ditunjukkan seperti pada Rajah 1.3, 1.4, 1.5 dan 1.6.

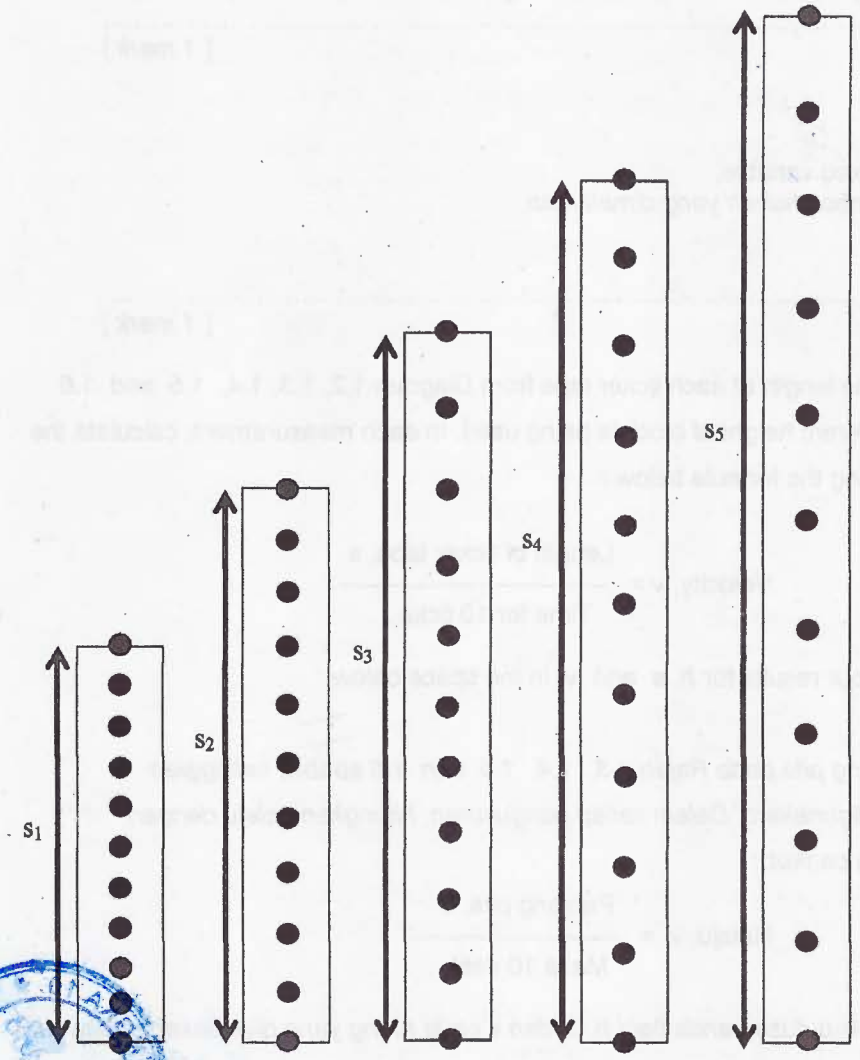


Diagram 1.2 h = 20.0 cm | Diagram 1.3 h = 30.0 cm | Diagram 1.4 h = 40.0 cm | Diagram 1.5 h = 50.0 cm | Diagram 1.6 h = 60.0 cm

(a) For the experiment described on page 3, identify,
Bagi eksperimen yang diterangkan di halaman 3, kenal pasti ;

(i) The manipulated variable,
pembolehubah yang dimanipulasikan,

.....
[*1 mark*]

(ii) The responding variable
pembolehubah bergerak balas,

.....
[*1 mark*]

(iii) A fixed variable,
pembolehubah yang dimalarkan,

.....
[*1 mark*]

(b) Measure the length of each ticker tape from Diagram 1.2, 1.3, 1.4, 1.5 and 1.6 when a different height of block is being used. In each measurement, calculate the velocity using the formula below :

$$\text{Velocity, } v = \frac{\text{Length of ticker tape, s}}{\text{Time for 10 ticks}}$$

Tabulate your results for ***h, s*** and ***v*** in the space below.

Ukur panjang pita pada Rajah 1.3, 1.4, 1.5 dan 1.6 apabila ketinggian berlainan digunakan. Dalam setiap pengukuran, hitungkan halaju dengan persamaan berikut:

$$\text{Halaju, } v = \frac{\text{Panjang pita, s}}{\text{Masa 10 detik}}$$

Jadualkan keputusan anda bagi h, s dan v pada ruang yang disediakan di bawah.

[6 marks]

(d) Based on your graph, state the relationship between velocity and height
Berdasarkan graf anda, nyatakan perhubungan di antara halaju dan ketinggian

.....

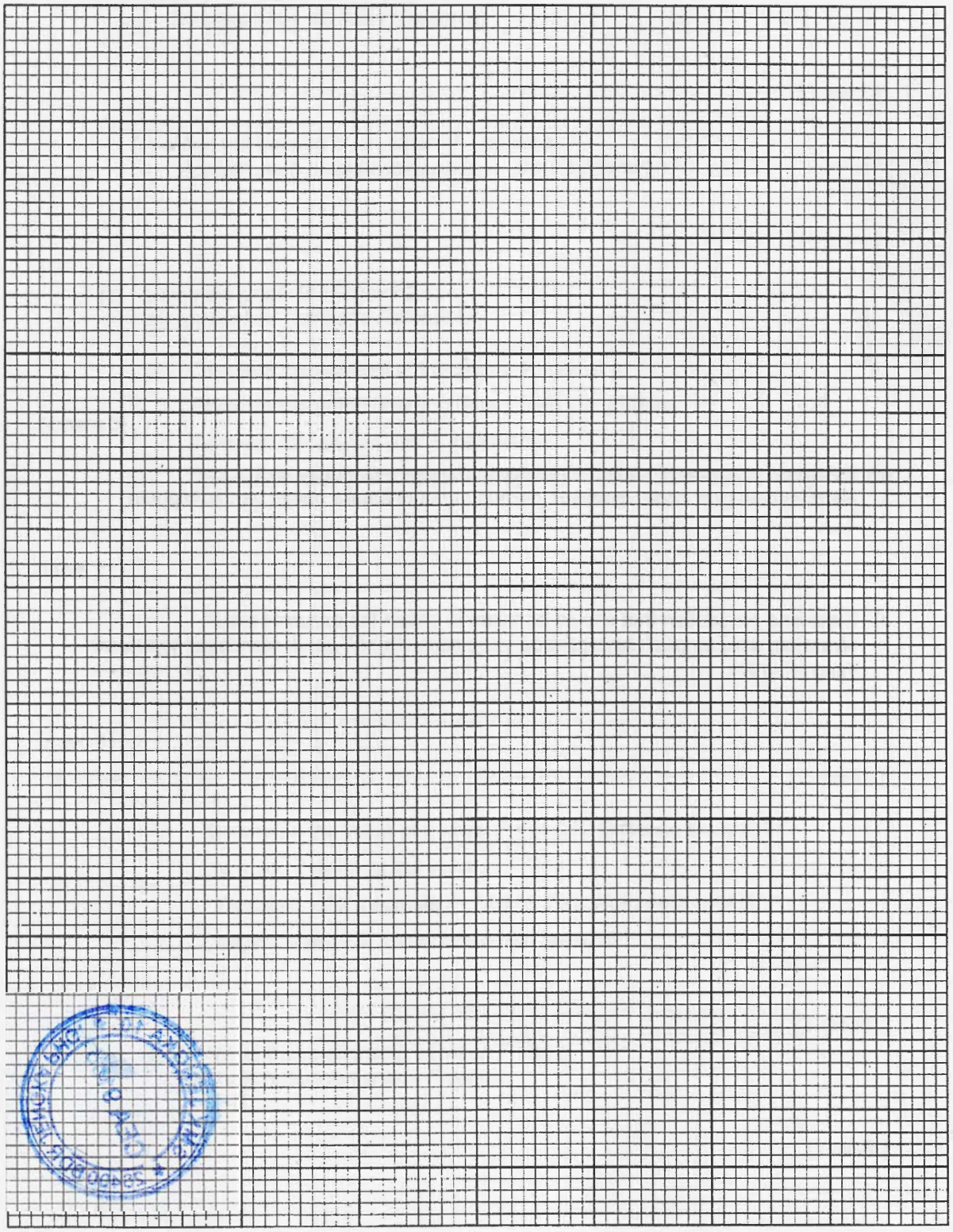
[1 mark]

e) State **one** precaution that should be taken to obtain the accurate result.
*Nyatakan **satu** langkah berjaga-jaga yang perlu diambil untuk mendapat keputusan yang lebih jitu.*

.....

[1 mark]

Graph v against h
Graf v melawan h



2 Graph on Diagram 2.1 shows an experiment results to identify the relationship between force, *F* and acceleration, *a*, for an object which moves on a rough surface runaway.

Graf pada Rajah 2.1 menunjukkan keputusan eksperimen untuk menentukan hubungan antara daya, F dan pecutan, a, untuk satu objek yang bergerak di atas satu permukaan landasan kasar.

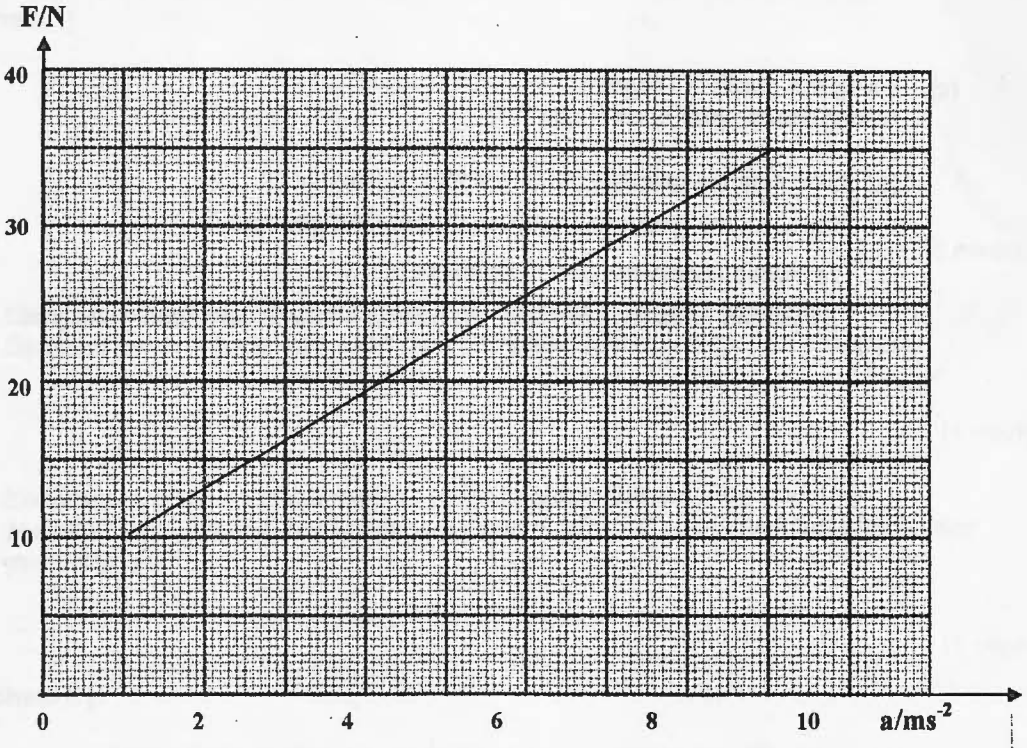


DIAGRAM 2.1
RAJAH 2.1

(a) On the graph,
Pada graf itu,

Show and determine the value of *F* when a = 0.0 ms^{-2}.
Tunjukkan dan tentukan nilai F apabila a = 0.0 ms^{-2}.

.....

[2 *marks*]

(b) (i) Name the physical quantity *F* in (a)
Namakan kuantiti fizik F dalam (a)

.....

[1 *mark*]

(ii) What will happen to, *a* , when *F* increases?
Apakah yang akan berlaku pada, a ,jika F bertambah?

.....

[1 *mark*]

(c) Using the graph in Diagram 2.1:
Menggunakan graf pada Rajah 2.1:

(i) Calculate the gradient of the graph, *F* against *a*.
Show on the graph how you determined the gradient
Tentukan kecerunan graf F melawan a.
Tunjukkan pada graf itu bagaimana anda menentukan kecerunan graf.

[3 *marks*]

(ii) Determine the value of *a* when *F* =14.0 N. Show on the graph how you determine the value.
Tentukan nilai a apabila F=14.0 N. Tunjukkan pada graf itu bagaimana anda menentukan nilai tersebut.

a = ...

[2 *marks*]

(iii) Write the relationship between *F* and *a*.
Tulis hubungan antara F dan a.

.....

[1 *mark*]

(d) Name the physical quantity that represents the value of the gradient in (c) (i).
Namakan kuantiti fizikal yang diwakili oleh nilai kecerunan di (c) (i).

.....

[1 *mark*]

(e) State **one** precaution that should be taken for this experiment.
*Nyatakan **satu** langkah berjaga-jaga yang patut di ambil dalam eksperimen ini.*

.....

[1 *mark*]

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 Diagram 3.1 shows a student holds a balloon which is tied to a string. When she releases the balloon, the balloon moves upward. She noticed that the balloon becomes bigger as it moves higher as shown in Diagram 3.2.
Rajah 3.1 menunjukkan seorang murid memegang sebiji belon yang diikat dengan benang. Tiba-tiba belon terlepas dan terbang ke atas. Dia mendapati saiz belon bertambah apabila ketinggiannya bertambah seperti yang ditunjukkan dalam Rajah 3.2.

DIAGRAM 3.1
RAJAH 3.1

DIAGRAM 3.2
RAJAH 3.2

Based on observation on the air pressure in the balloon;
Berdasarkan pemerhatian tentang tekanan udara dalam belon;

(*a*) Make **one** suitable inference.
Buat satu inferens yang sesuai

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

(*c*) Design an experiment to investigate the hypothesis in (b).
Reka bentuk satu eksperimen untuk menyiasat hipotesis yang anda nyatakan di (b)..

Choose suitable apparatus such as a syringe, a retort stand and others.
Pilih radas yang sesuai seperti picagari, kaki retort dan lain-lain.

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

[Lihat sebelah

(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 and 4.2 show the electric bell which are connected to the similar batteries.

Rajah 4.1 dan 4.2 menunjukkan dua loceng elektrik yang disambungkan kepada bateri yang mempunyai voltan yang sama.

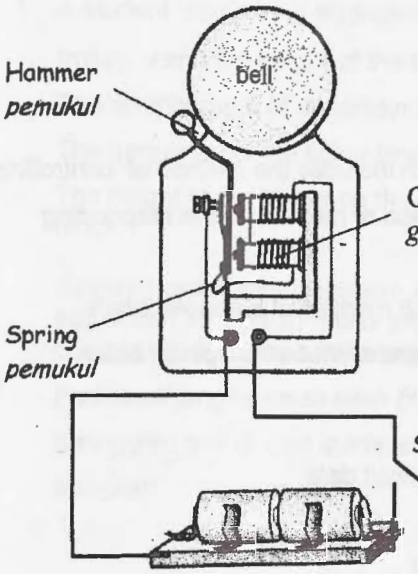


Figure 4.1
Rajah 4.1

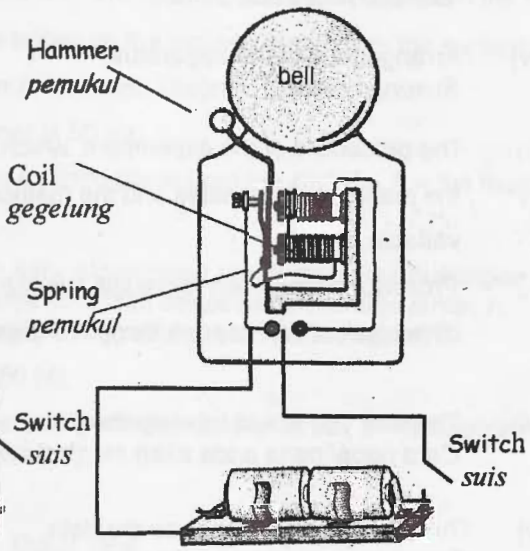


Figure 4.2
Rajah 4.2

When the switch is on, the bell in figure 4.2 ring loudly than the bell in figure 4.1 .

Apabila suis dihidupkan , loceng dalam rajah 4.1 berbunyi lebih kuat daripada loceng dalam rajah 4.2.

Based on your observation
Berdasarkan pemerhatian anda;

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

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

(c) With use of apparatus such as a insulated copper wire , small iron pins and other apparatus, describe an experiment to investigate the hypothesis stated in 3(b)

[Lihat sebelah

Dengan menggunakan radas seperti , dawai kuprum bersalut, pin besi kecil dan lain-lain radas yang sesuai, 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 an experiment
Tujuan eksperimen

(ii) The variable in experiment
Pembolehubah eksperimen

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

(iv) The arrangement of the apparatus
Susunan alat radas

(v) The procedure of the experiment.
Describes how to control and measure the manipulated variables and how to measure the responding variables.

Prosedur eksperimen.
Jelaskan bagaimana mengawal dan mengukur pembolehubah manipulasi dan Bagaimana mengukur pembolehubah bergerakbalas.

(vi) The way to tabulate tabulate the data
Kaedah menjadual data

(vii) The way to analyze the data
Kaedah menganalisa data

[10 marks]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

SKEMA JAWAPAN

SOALAN PEPERIKSAAN PERCUBAAN SPM 2012

MATA PELAJARAN : FIZIK

PHYSICS

Paper 1

1	A
2	D
3	A
4	C
5	C
6	C
7	C
8	A
9	C
10	D
11	B
12	C
13	B
14	B
15	C
16	B
17	A
18	A
19	D
20	A
21	D
22	A
23	A
24	A
25	D

26	B
27	D
28	D
29	C
30	A
31	B
32	D
33	C
34	A
35	C
36	A
37	D
38	D
39	D
40	A
41	B
42	A
43	D
44	C
45	A
46	A
47	A
48	D
49	A
50	B

MARKING SCHEME PHYSICS PAPER 2
SKEMA PEMARKAHAN FIZIK KERTAS 2
TRIAL YEAR 2012
PERCUBAAN 2012 .

SECTION A
BAHAGIAN A

QUESTION 1	Mark	Answer	Note
(a)	1	***State the correct name of the physical quantity*** ketebalan	
(b)	1	***State the correct accuracy*** Diagram 1(a) = 0.01cm and Diagram 1(b) = 0.01 mm	***Correct accuracy*** any one/*salah satu*
(c)	1	***State the correct instrument*** 1(b)	
(d)	1	***State the correct reading*** 4.5 + 0.12 = 4.62mm	Without unit /*tanpa unit* 0 mark/ *0 markah*
TOTAL MARKS = 4			

QUESTION 2	Mark	Answer	Note
(a)	1	Number of complete oscillation/ cycle in a second Bilangan ayunan/kitaran lengkap dalam masa satu saat	
(b)	1	2 cm (with unit)	
(c)	1 1	$T = \frac{1}{f}$; $T = \frac{1}{10}$ = 0.1 s All of the boxes mark with correct value of T 0.5 , 0.1, 1.5 and 2.0	
(d)	1	Decreases	
TOTAL MARKS = 5			

QUESTION 3	Mark	Answer	Note
(a)	1	***State the correct meaning of potential difference*** The work done in moving a unit charge from one point to the other. *Kerja yang dilakukan untuk memindahkan satu unit cas antara dua titik.*	
(b)	1	***Give the correct function*** To measure potential difference ./ voltage *Mengukur beza keupayaan./voltan*	
(c) (i)	1	***Give the correct diagram*** Diagram 3(b)/ *Rajah 3(b)*	

	1	***Give the correct reason*** Energy wastage inside the cell. *Tenaga digunakan untuk mengatasi rintangan dalam sel/ elekrolit.*	
(d) (i) (ii)	1 1	***Give the correct value of E*** E = 6 v ***Give the correct answer*** From gradient of the graph/ *Daripada kecerunan graf.*	
TOTAL MARKS = 6			

QUESTION 4	**Mark**	**Answer**	**Note**
(a)	1	Weight is the gravitational force that pulls a body to the centre of the earth	
(b)	1 1	↑ Buoyant force ↓ Weight	
(c)	1	Size of the balloon	
(d)	1 1	The bigger the size of the balloon the bigger the volume of air dsplaced The bigger the volume of air displaced the higher the buoyant force	
(e)	1	Archimedes Principle	
TOTAL MARKS = 7			

QUESTION 5	**Mark**	**Answer**	**Note**
(a) (i) (ii)	1 1	***5.1 (i) menolak 5.1 (ii) menarik*** Kerja 5.1 ‹ kerja 5.2	
(b) (i) (ii)	1 1 1	***Give the correct method*** Method 5.1 (i) / *kaedah 5.1(i)* ***State the explanation of the reason correctly*** The forces given parallel with the surface of motion. So, all the forces given used to move the car. *Daya yang dikenakan selari dengan permukaan gerakan, dengan itu semua daya digunakan untuk menggerakkan kereta.*	
(c)(i) (ii) (iii)	1 1 	***Give the correct answer*** Gravitational potential energy and kinetic energy ***Mark correctly in diagram 5.2*** At the ground (below) → kinetic energy At the top(staircase) → gravitational potential energy ***State the correct answer*** The conservation of energy principle.	***Mark two correctly- 1 mark*** ***Mark one correctly- 0 mark***

	1	*Prinsip keabadian tenaga*	

TOTAL MARKS = 8

QUESTION 6	Mark	Answer	Note
(a)(i)	1	The height of piston in diagram 6.2 is higher than 6.1 // $h_2 > h_1$	
(ii)	1	Temperature of the gas in diagram 6.2 is higher than 6.1	
(b)	1	The higher the temperature of the gas the higher the height of piston	
	1	When the temperature increases the kinetic energy of the gas molecules increases	
	1	The gas will move faster and collide with the container and will push the piston up	
(c)	1	Charles' Law	
(d)	1	The height of the piston increases	
	1	When the force or pressure decrease, the volume of the gas increase 9at constant temperature)	

TOTAL MARKS = 8

QUESTION 7	Mark	Answer	Note
(a)(i)	1	***State type of transistor correctly*** n-p-n transistor	
(b)(i)	1	***State the correct answer*** 12 v	**Without unit / *tanpa unit*** 0 mark / *0 markah*
(ii)	1	27 + 3 = 30 kΩ	
(iii)	1	$V_{YZ} = \frac{3}{3+27} \times 12$	
	1	= 1.2 V	
(c)	1	1- Lamp L will not glow / light up *Lampu tidak menyala*	
	1	2- because the voltage across YZ (i.e 1.2 V) is less than the base-emitter potential difference of 2V *Kerana voltan merentasi YZ (i.e 1.2 V) adalah kurang daripada beza upaya tapak-pengumpul 2V*	
(d)	**1**	***State the answer correctly*** Resistor R_1 and R_2 are swapped places. *Menukarkan kedudukan resistor R_1 dengan R_2 dan sebaliknya.*	
(e)	1	***State the answer correctly***	

	1	1-Resistor R_1 is replaced by a thermistor. *Resistor R_1 diganti dengan thermistor.* 2- Lamp L is replaced by an electric bell. *Lampu L diganti dengan loceng.*	Vice versa
TOTAL MARKS = 10			

QUESTION 8	**Mark**	**Answer**	**Note**
(a)	1	Isotope of an element which is not stable *Isotop unsur yang tidak stabil*	
(b)(i)	1 1	Short half life More safe	
(ii)	1 1	Beta Can penetrate through the skin	
(iii)	1 1	Liquid Easy to absorb by the blood	
(c)	1	increase	
(d)	1	Sodium-24	
(e)	1 1	$^{32}_{15}$ → $^{32}_{16}X^{+}$ + $^{0}_{-1}e$	
(f)	1 1	1 — $\frac{1}{2}$ — $\frac{1}{4}$ — $\frac{1}{8}$ — $\frac{1}{16}$ $4T^{1}/_{2}$ x 5 = 20 days	
TOTAL MARKS = 12			

SCHEME PAPER 2

SKEMA KERTAS 2

SECTION B

BAHAGIAN B

QUESTION 9	Mark	Answer	Note
(a)(i)	1	The rate of change of distance / the change of distance over time / *kadar perubahan jarak/perubahan jarak dengan masa* / $\frac{S}{t}$, *where S = distance , t = time*	**Only symbol no marks.** *Simbol sahaja tidak ada markah, 0 markah.*
(a)(ii)	1	The speed of water flows less than the speed of blowing air. *Laju air mengalir lebih rendah daripada laju angin yang ditiub*	
	1	The pressure at point A greater than, the pressure at the top of a sheet of paper. *Tekanan di titik A lebih tinggi daripada tekanan dibahagian atas kertas.*	
	1	The position of the levers of the water in venture tube is higher. Whereas the position of a sheet of paper lift up when air is blown. *Kedudukan aras air dalam tiub venturi adalah tinggi. Manakala kedudukan kertas terangkat ke atas apabila ditiup.*	
	1	If the speed of water is lower the position of water in venture tubes is higher. When the speed of blowing air is higher, the position of a sheet of paper lift up. If the speed is higher, the pressure is lower and vice versa. *Jika laju air rendah , kedudukan air dalam tiub venturi tinggi. Apabila laju angin yang ditiup tinggi, kedudukan kertas terangkat ke atas.*	
	1	The relationship between velocity and pressure is in accordance to Bernoulli's Principle. If the speed higher, the pressure is lower. *Hubungan antara halaju dan tekanan berdasarkan prinsip Bernoulli. Jika halaju tinggi , tekanan menjadi rendah.*	
(b)	1	When two speed bots move faster and closely to each other,an accident may be occurred. *Apabila dua bot laju bergerak pantas dan menghampiri antara satu sama lain kemungkinan kemalangan akan berlaku.*	
	1	It is because the water moved at a very high velocity between the boats. *Ini disebabkan oleh laju air yang tinggi diantara bot laju.*	
	1	According to Bernoulli's Principle , the pressure of the moving air decreases as the speed of the air increases . *Berdasarkan prinsip Bernoulli, tekanan udara berkurang dengan bertambah nya laju udara.*	
	1	. The higher water pressure on either sides of the boats caused its closer to each other.	

		Tekanan air yang tinggi bersebelahan dengan bot laju menyebabkan bot mendekati antara satu dengan lain.	
(c)	1,2 3,4 5,6 7,8 9,10	**Design** / **Reason** The surface of the boat must be smooth/ coated with wax. *Permukaan papan luncur harus licin / disadur dengan lilin* / Reduce water friction. *Mengurangkan geseran air.* The shape of the boat should be streamlined/ aerodynamic/aerofoil. *Bentuk papan luncur harus berbentuk larus/aerodinamik/aerofoil* / Reduce the water friction/increase the lift force. *Mengurangkan geseran air/ menambahkan daya angkat.* The material used for the boat should be of low density (light) and strong. *Bahan yang digunakan untuk papan luncur harus berketumpatan rendah (ringan) dan kuat.* / Easy to float/ not easy to break/ can travel faster. *Senang mengapung / tidak mudah pecah/ boleh bergerak dengan lebih laju.* Material used for the sail should be waterproof/ low density/ light and elastic. *Bahan yang digunakan untuk layar harus kalis air/ berketumpatan rendah/ ringan dan kenyal.* / So that the sail not absorb water/ sail faster/ not easy to tear off/ be able to withstand strong winds. *Supaya layar itu tidakmenyerap air/berlayar dengan lebih cepat/ tidak mudah koyak/ boleh menahan angin kencang.* The size of the sail should be wide and large. *Saiz layar harus lebar dan besar.* / Traps more wind/ causes a bigger lift force/ increases the resistance towards air. *Memerangkap lebih banyak angin /menghasilkan daya angkat yang lebih besar/menambah rintangan terhadap udara.*	
TOTAL MARKS = 20			

<table>
<tr><th>QUESTION 10</th><th>Mark</th><th>Answer</th><th>Note</th></tr>
<tr><td>(a)(i)</td><td>1</td><td>Charge per unit time</td><td>.</td></tr>
<tr><td>(a)(ii)</td><td>
1

1

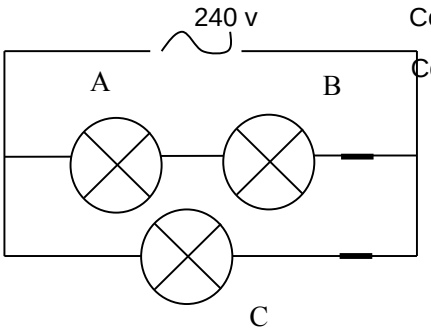
1

1

1</td><td>Diagram 9.1 is connected in series and diagram 9.2 connected in parallel
The reading of ammeter in diagram 9.2 is higher than 9.1// vice versa
The reading of voltmeter in diagram 9.1 is higher than 9.2// vice versa
The effective resistance in diagram 9.1 is higher than 9.2// vice versa
The higher the effective resistance the lower the current// vice versa
When the circuit connected in series the effective resistance is higher// vice versa</td><td></td></tr>
<tr><td>(b)</td><td>1

1

1

1</td><td>240 V Correct arrangement
Correct symbols
Add switches
240 v Correct arrangement
Correct symbols
 
</td><td></td></tr>
<tr><td>(c)</td><td>

1,2</td><td><table><tr><th>Design</th><th>Reason</th></tr><tr><td>Modification</td><td>Reason</td></tr><tr><td>Tungsten</td><td>Higher resistance// can withstand high</td></tr></table></td><td></td></tr>
</table>

	3,4 5,6 7,8 9,10		temperature// higher resistivity	
		Coil wire	Concentrate the heat and produce brighter light	
		Thin wire	Becomes hot easily	
		High melting point	Not melt easily//long lasting	
		Low pressure gas inside the bulb	Long lasting// not easily	
TOTAL MARKS = 20				

SCHEME PAPER 2

SKEMA KERTAS 2

SECTION C

BAHAGIAN C

QUESTION 11	Mark	Answer	Note
(a)(i)	1	***State the meaning correctly*** The total reflection of a beam of light at the interface of one medium and another medium of lower refractive index (optically less dense) , when the angle of incidence to the second medium exceeds a specific critical	
(a)(ii)	1 1	***Complete the ray diagram in optical fibres***	
(b)	1 1	***State the function correctly*** The objective lens of a optical fibres produces a real image of the distant object. *Kanta objektif gentian optik menghasilkan imej nyata pada jarak objek.* The eyepiece lens acts as a magnifying glass for looking at this small real image. *Kanta mata bertindak sebagai kanta pembesar untuk melihat imej nyata yang kecil.*	
(c)(i)	1	***State the subtuition correctly*** $\frac{1}{f} = \frac{1}{V} + \frac{1}{U}$ $\frac{1}{\quad} = \frac{1}{\quad} + \frac{1}{\quad}$	**Answer with unit**

(ii)	1 1 1 1	10 30 V $\frac{1}{V} = \frac{1}{10} - \frac{1}{30}$ V = 15cm Magnification = $\frac{V}{U}$ $= \frac{15}{30}$ $= \frac{1}{2}$	
(d)	1 1 1 1 1 1 1 1 1	An outer cladding with low *Lapisan luar yang mempunyai indeks biasan rendah.* Produced the angle of incidence of the light ray inside the fibre is always greater than the critical angle and no light escape. *Menghasilkan sudut tuju cahaya yang masuk dalam gentian optik sentiasa lebih besar daripada sudut genting dan tiada cahaya yang lesap.* An inner core with high *Teras dalam yang mempunyai ndeks biasan tinggi* Produces total internal reflection when light travels inside the optical fibre. *Menghasilkan pantulan dalam penuh apabila cahaya bergerak di dalam gentian optic.* High flexibility *Kemuluran tingi* Can be used for a longer distance *Boleh digunakan untuk jarak jauh* A diameter of fibre is small. *Diameter gentian optic adalah halus* Capable of carrying thousands of data signals simultaneously. *Berupaya membawa ribuan isyarat data secara serentak.* The suitable optical fibre can be used is R. *Gentian optik yang sesuai dipilih adalah R.* Refractive index of outer cladding is lower, refractive index of inner core is higher, flexibility high and diameter of fibre low. *Sebab R mempunyai indeks biasan lapisan luar rendah, indeks biasan teras tinggi, kelenturan tinggi dan diameter kecil.*	**Accept any reasonable modification**

TOTAL MARKS = 20

QUESTION 12	Mark	Answer	Note
(a)(i)	1	Potential energy ⟶ Kinetic energy ⟶ Electrical energy	
	1	The cost of generation of electricity is reduced because high voltage transmission of energy greatly reduces energy loss in the cables	
	1	Repair work and maintenance can be carried out at any power station at any time	
	1	To ensure the supply of the power is continuous	
	1	The generation of electricity by each station can be controlled and regulated according to the demand pattern	
(a)(ii)	1,2 3,4 5,6 7,8	Soft iron core – Easy magnetized and demagnetised Laminated – Less eddy current/ reduce energy loss Thick wire – Reduce resistance/ more current Copper wire – Low resistance/ reduce the lost of heat	
	9,10	Choose Q. Soft iron core, laminated, thick wire and copper wire.	
(b)	1	(i) 12 V	
	1	(ii) $\frac{Np}{Ns} = \frac{Vp}{Vs}$	
	1	$= \frac{240 \times 200}{12}$	
		$= 4000$	
	1	(iii) Efficiency $= \frac{Po}{Pi} \times 100$	
	1	$= \frac{240 \times 0.2 \times 100}{48}$	

		= 100 %	
TOTAL MARKS = 20			

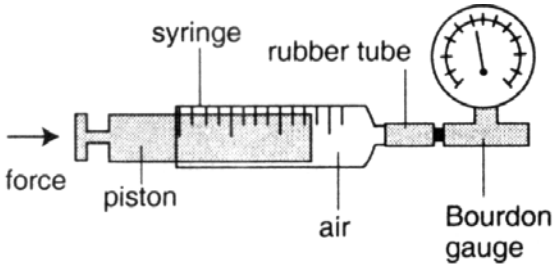
FIZIK KERTAS 3

BAHAGIAN A

<table>
<tr><th>Question</th><th>Marks</th><th>Marking Scheme</th></tr>
<tr><td>1(a)(i)</td><td>1</td><td>State the manipulated variable correctly ;
Height of inclined plane from the surface, h</td></tr>
<tr><td>(ii)</td><td>1</td><td>State the responding variable correctly ;
Velocity of the trolley, v</td></tr>
<tr><td>(iii)</td><td>1</td><td>State one fixed variable;
Mass of troley // No. of trolley // frequency of power supply, f</td></tr>
<tr><td>(b)</td><td>1
1
1
1
1
1</td><td>Tabulate h, s and v correctly in the table.
A Shows a table which have h, s and v.
B State the correct unit of h/cm, s/cm and v/cms^{-1}.
C All values of h are correct .
D Values of s are correct.
E Values of v are correct.
F All the values are consistent in 1 d.p or 2 d.p.
<table>
<tr><th>h/cm</th><th>s/cm
± 0.1</th><th>v/cms^{-1}</th></tr>
<tr><td>20.0</td><td>5.8</td><td>29.0</td></tr>
<tr><td>30.0</td><td>8.0</td><td>40.0</td></tr>
<tr><td>40.0</td><td>10.2</td><td>51.0</td></tr>
<tr><td>50.0</td><td>12.5</td><td>62.5</td></tr>
<tr><td>60.0</td><td>14.8</td><td>74.0</td></tr>
</table></td></tr>
<tr><td>(c)</td><td>5</td><td>Draw the graph of v against h.
A - Label y-axis and x-axis correctly
B - States the unit at both axis correctly
C - Both axes with the even and uniform scale
D - 5 points correctly plotted
E - a smooth best straight line
F - minimum size of the graph is 5 x 4
(Squares of 2 x 2 cm)
<table>
<tr><th>Number of √</th><th>Score</th></tr>
<tr><td>6</td><td>5</td></tr>
<tr><td>5</td><td>4</td></tr>
<tr><td>3-4</td><td>3</td></tr>
<tr><td>2</td><td>2</td></tr>
<tr><td>1</td><td>1</td></tr>
</table></td></tr>
<tr><td>d</td><td>1</td><td>State the correct relationship based on the candidate's graph
v increase linearly to h</td></tr>
<tr><td>e</td><td>1</td><td>State ONE correct precaution so as to produce an accurate result of the experiment
The position of the eye perpendicular to the scale when takes the reading to avoid errors due to parallax/systematic error.</td></tr>
<tr><td>Total</td><td colspan="2">16 Marks</td></tr>
</table>

2 (a)	Shows extrapolation on the graph , intercept y-axis 7 N	1 1
(b) (i) (ii)	Frictional force .a increased	1 1
(c) (i) (ii) (iii)	Shows on the graph appropriate right triangle (> 5 x 4) Gradient , m = $\frac{35 - 10}{9 - 1}$ = 3.125 N $m^{-1}s^2$ Marked on the graph a = 5.5 ms^{-2} – 6.0 ms^{-2} *F* increases linearly with a	1 1 1 1 1 1
(d)	Mass	1
(e)	1. Make sure elastic strings are stretched at constant length. 2. The position of the eye perpendicular to the scale of the metre rule when measuring the ticker tape to avoid errors due to parallax/systematic error	1
	TOTAL	**12**

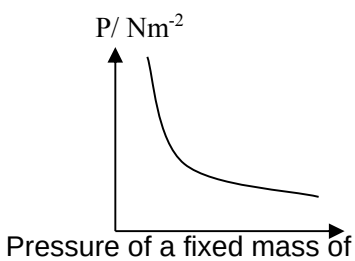
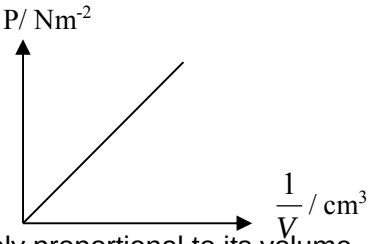
BAHAGIAN B

<table>
<tr><th>NO</th><th>ANSWER</th><th>Marks</th></tr>
<tr><td>3(a)</td><td>Inference :
The pressure of the gas depends on the volume which acts on it.</td><td>1</td></tr>
<tr><td>(b)</td><td>Hypothesis:
The smaller the pressure, the larger is the volume of a fixed mass of gas. / The volume of a gas varies inversely with its pressure.</td><td>1</td></tr>
<tr><td>(c)(i)</td><td>Aim : To investigate the relationship between the pressure and volume for a fixed mass of gas at a constant temperature.</td><td>1</td></tr>
<tr><td>(ii)</td><td>Variables : Manipulated : Gas volume, V
Responding : Gas pressure, P
Fixed : Gas temperature,T or mass of gas, m</td><td>
1
1</td></tr>
<tr><td>(iii)</td><td>Apparatus : Glass syringe, a short rubber tube and Bourdon gauge</td><td>1</td></tr>
<tr><td>(iv)</td><td>Arrangement of apparatus:
 
</td><td>1</td></tr>
<tr><td>(v)</td><td>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 100 cm^3 at atmospheric pressure.
3. The syringe is connected to a Bourdon gauge and the pressure of the air in the syringe is observed and recorded.
4. The piston is then pushed in so that the volume of air trapped is 90 cm^3. The pressure is again recorded, this procedure is repeated for enclosed volumes of 80cm^3, 70 cm^3 and 60 cm^3.</td><td>

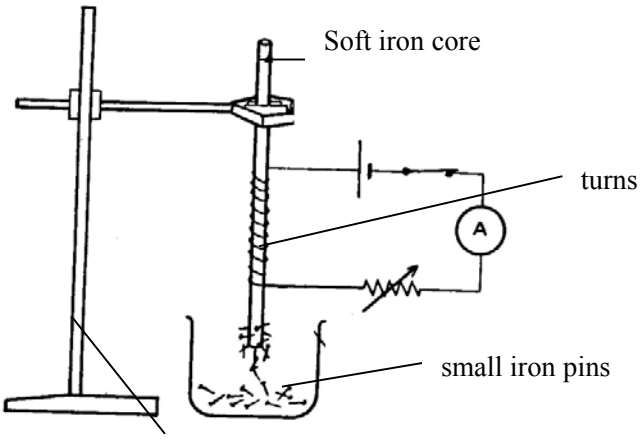
1

1

1</td></tr>
<tr><td>(vi)</td><td><table>
<tr><th>Volume V / cm^3</th><th>$\frac{1}{V}$ / cm^{-3}</th><th>Pressure P / Nm^{-2}</th></tr>
<tr><td>100</td><td></td><td></td></tr>
<tr><td>90</td><td></td><td></td></tr>
</table></td><td>1</td></tr>
</table>

	80			
	70			
	60			
	*colum PV or P (1/V)		
(vii)	  Pressure of a fixed mass of gas is inversely proportional to its volume.	1
	TOTAL	**12**

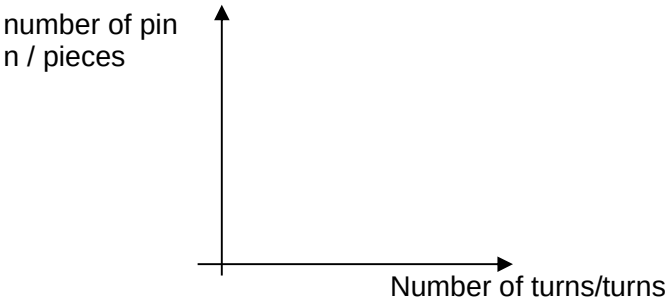
4(a)		1 Menyatakan inferens dengan betul Magnetic field strength depends on the number of turns	1
(b)		1 Menyatakan hipotesis dengan betul. The magnetic field strength will increase when the number of turns increase	1
(c)			
	(i)	1 menyatakan tujuan dengan betul To investigate the relationship between magnetic field strength and number of turn on the coil	
	(ii)	1 menyatakan pembolehubah manipulasi dan begerakbalas dengan betul manipulated : number of turns responding : magnetic field strength //number of small iron pin 1 menyatakan bembolehubahyang dimalarkan dengan betul Fixed : size of current// type of core	
	(iii)	1 menyatakan alat radas dan bahan Retort stand, soft iron core, connector wire, PVC insulated copper wire, small iron pin, ammeter, rheostat , battery/ power supply	

	(iv)	1 menyatakan atau melukis gambar rajah susuan radas berlabel.  	
	(v)	1 Menyatakan kaedah mengawal pembolehubah manipulasi The soft iron core is wound with **20 turns** of insulated copper wire and set up as shown in diagram above.	
	(vi)	1 Menyatakan kaedah mengawal pembolehubah bergerakbalas. The switch is turned on and the rheostat adjusted until the ammeter Reading is 1.0 A. The beaker containing small steel pin then brought near the iron core. **Count and record** the number of small iron pin attached to the soft Iron core. 1 Menyatakan ulangan eksperimen Repeat the experiment by winding the soft iron core with, 30 turns, 40 turns, 50 turns and 60 turns. 1 menyatakan kaedah menjadual data dengan betul tajuk//symbol dengan unit yang betul	

	(vii)			10

Number of turns, n, turns	Number of pins attached, n /pieces
20 / n_1	
30 / n_2	
40 / n_3	
50 / n_4	
60 / n_5	

(vii) 1 menyatakan kaedah menganalisa data dengan betul



JAWAPAN TAMAT