SULIT
4531/1
Physics
Kertas 1
September
2011
1 jam 15 minit

Nama : .....

Tingkatan : .....

MAJLIS PENGETUA SEKOLAH - SEKOLAH MALAYSIA (MPSM)
CAWANGAN KELANTAN

PEPERIKSAAN PERCUBAAN SPM
TINGKATAN 5
2011

PHYSICS
KERTAS 1
Masa : 1 jam 15 minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

Arahan

1. *Kertas soalan ini adalah dalam dwibahasa*
2. *Soalan dalam Bahasa Inggeris mendahului soalan yang sepadan dalam Bahasa Melayu.*
3. *Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam Bahasa Inggeris atau Bahasa Melayu.*
4. *Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.*

Kertas soalan ini mengandungi 37 halaman bercetak.

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

1. Which of the following quantities is a base quantity?
Manakah antara kuantiti-kuantiti berikut adalah kuantiti asas?

A. Work
Kerja

B Power
Kuasa

C Momentum
Momentum

D Electric current
Arus elektrik

2. Which of the following is the S.I unit for power?
Manakah antara berikut adalah unit S.I bagi kuasa?

A Watt

B Kilowatt

C Megawatt

D Gigawatt

3. Diagram 1 shows a sign board at the side of a highway.
Rajah 1 menunjukkan satu papan tanda di tepi sebuah lebuh raya.

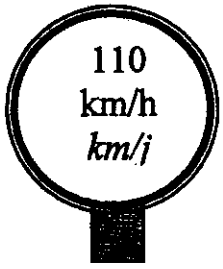


Diagram 1
Rajah 1

What does the sign board shown?
Apakah yang ditunjukkan oleh papan tanda tersebut?

A The distance of a place
Jarak bagi suatu tempat

B The speed limit of a vehicle
Had laju bagi sebuah kenderaan

C The acceleration limit of a vehicle
Had pecutan bagi sebuah kenderaan

D The load limit of a heavy vehicles
Had beban bagi sebuah kenderaan berat

4. Diagram 2 shows a watermelon on a lorry placed at P. When the lorry starts to move, the watermelon rolls from position P to Q. When the lorry suddenly stops, the watermelon rolls from position Q to P.
Rajah 2 menunjukkan sebiji tembikai di atas sebuah lori yang diletakkan di kedudukan P. Apabila lori itu bergerak, tembikai itu bergolek dari kedudukan P *ke* Q. *Apabila lori itu berhenti secara tiba-tiba, tembikai itu bergolek dari kedudukan* Q *ke* P.

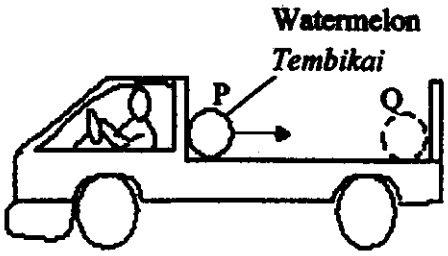


Diagram 2
Rajah 2

The movement of the watermelon is due to
Pergerakan buah tembikai itu adalah disebabkan oleh

A Inertia
Inersia

B Friction
Geseran

C Impulse
Impuls

D Momentum
Momentum

5 Diagram 3 shows two steel ball bearings, X and Y, of different masses is dropped near the surface of the earth from the same height.
Rajah 3 menunjukkan dua biji bebola keluli, X dan Y, yang berlainan jisim dijatuhkan berhampiran dengan permukaan bumi daripada ketinggian yang sama.

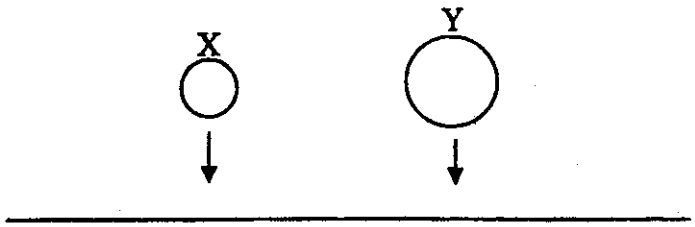
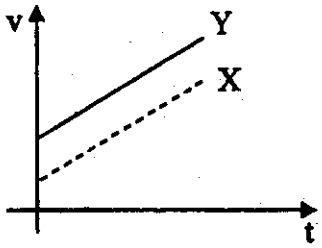
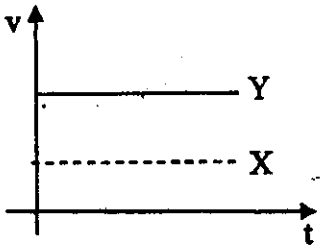
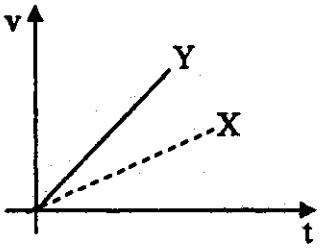


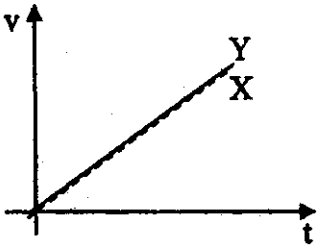
Diagram 3
Rajah 3

Which is the correct v - t graph for the motion of the ball bearings X and Y?
Antara graf v - t berikut, yang manakah betul bagi gerakan bebola keluli X dan Y?

A


B


C


D


6 Diagram 4 shows a tig-tag match between team A and team B.
Rajah 4 menunjukkan perlawanan tarik tali antara pasukan A *dan pasukan* B.

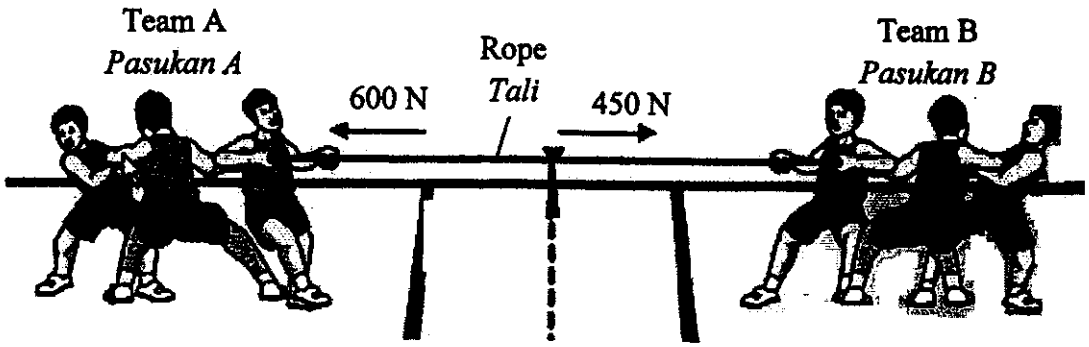


Diagram 4
Rajah 4

What is the resultant force acting on the rope?
Apakah daya paduan yang bertindak pada tali itu?

A 150 N acting towards the team A
150 N bertindak ke arah pasukan A

B 150 N acting towards the team B
150 N bertindak ke arah pasukan B

C 350 N acting towards the team A
350N bertindak ke arah pasukan A

D 350 N acting towards the team B
350 N bertindak ke arah pasukan B

7 A ball of mass 0.5 kg is being kicked by a force of 10 N.
If the time of impact is 0.2 s, what is the impulse experienced by the ball ?
Sebiji bola berjisim 0.5 kg *ditendang dengan daya 10* N.
Jika masa hentaman adalah 0.2 s, *berapakah impuls yang dialami oleh bola itu?*

A 0.8 N s

B 2.0 N s

C 25.0 N s

D 50.0 N s

8 Which of the following phenomena experiences forces in equilibrium?
Antara berikut, fenomena manakah mengalami daya-daya dalam keseimbangan?

A A rocket accelerates upwards
Sebuah roket memecut ke atas

B A ship floating at rest in the sea
Sebuah kapal terapung pegun di laut

C A durian falling from a tree
Sebiji buah durian jatuh dari sepohon pokok

D A car descending a hill at an increasing velocity
Sebuah kereta menuruni bukit dengan halaju bertambah

9 Diagram 5 shows a reading of a weighing machine during the lift is in stationary.
Rajah 5 menunjukkan bacaan suatu mesin penimbang ketika lif dalam keadaan pegun.

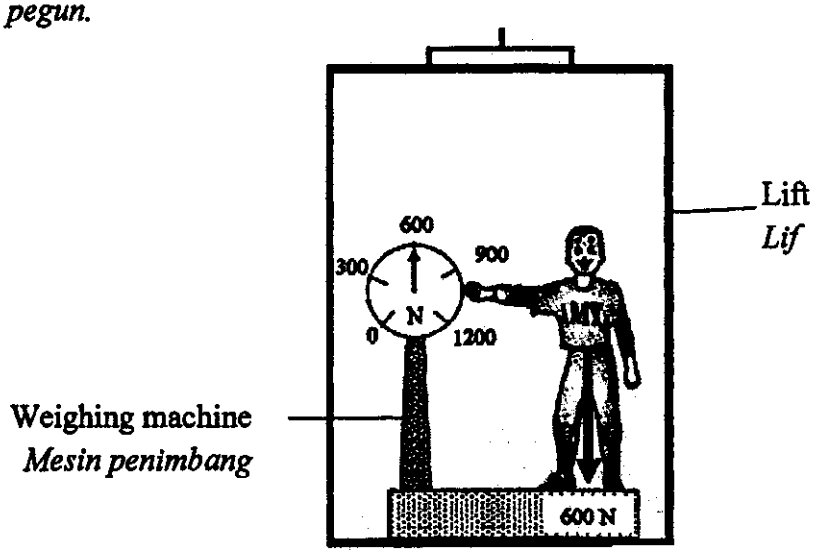
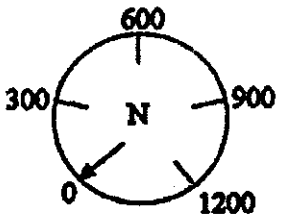


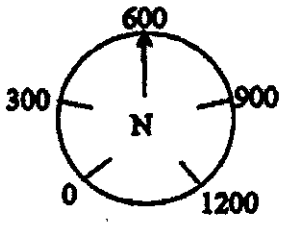
Diagram 5
Rajah 5

What is the reading of the weighing machine if the lift experiences a free fall?
Berapakah bacaan mesin penimbang jika lif mengalami jatuh bebas ?

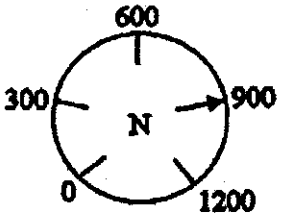
A



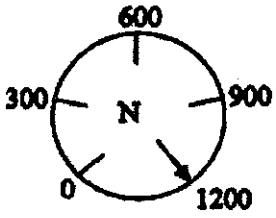
B



C



D



10 The power of a device increases when it does
Kuasa sebuah alat bertambah apabila ia melakukan

A less work in a short period of time.
kurang kerja dalam masa yang pendek.

B less work in a long period of time.
kurang kerja dalam masa yang panjang.

C more work in a short period of time.
lebih banyak kerja dalam masa yang pendek.

D more work in a long period of time
lebih banyak kerja dalam masa yang panjang

11. Diagram 6 shows a graph of stretching force, F against extension, x of spring R and S. Both springs are made of same material and have the same thickness.
Rajah 6 menunjukkan graf daya regangan, F melawan pemanjangan, x bagi spring R dan S. Kedua-dua spring adalah diperbuat daripada bahan yang sama dan mempunyai ketebalan yang sama.

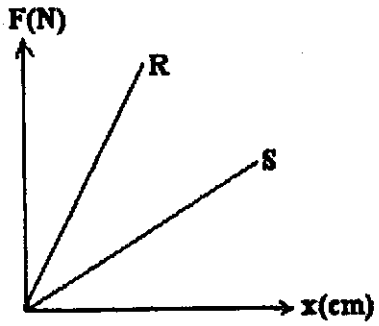


Diagram 6
Rajah 6

Which of the following statements about spring S and spring R is correct?
Pernyataan berikut yang manakah benar mengenai spring S dan spring R?

A Spring S has a smaller stiffness than spring R
Spring S mempunyai kekerasan lebih kecil daripada spring R

B Spring S has a larger force constant, k than spring R
Spring S mempunyai pemalar daya, k yang lebih besar daripada R

C Spring S has a smaller coil diameter than spring R
Spring S mempunyai diameter gelung yang lebih kecil daripada spring R

D Spring S has a greater diameter of wire of spring than spring R
Spring S mempunyai diameter dawai spring yang lebih besar daripada spring

12 Which of the following is a benefit of high pressure?
Manakah antara berikut merupakan kebaikan bagi tekanan tinggi?

A A tractor has broad tyres.
Sebuah traktor mempunyai tayar yang lebar.

B A hard object can be cut using the sharp edge of a knife.
Objek keras boleh dipotong menggunakan bahagian yang tajam pada pisau.

C A military tanks having special wheels called caterpillar tracks.
Kereta kebal mempunyai tayar khas yang dinamakan "caterpillar track".

D An elephant has big feet that contact on the ground.
Gajah mempunyai kaki yang besar yang bersentuhan dengan dengan tanah.

13 Diagram 7 shows two identical containers containing liquid R and liquid S.
The horizontal distance of the spurts for both liquids is the same.
Rajah 7 menunjukkan dua bekas yang serupa mengandungi cecair R dan cecair S.
Jarak ufuk pancutan bagi kedua-dua cecair itu adalah sama.

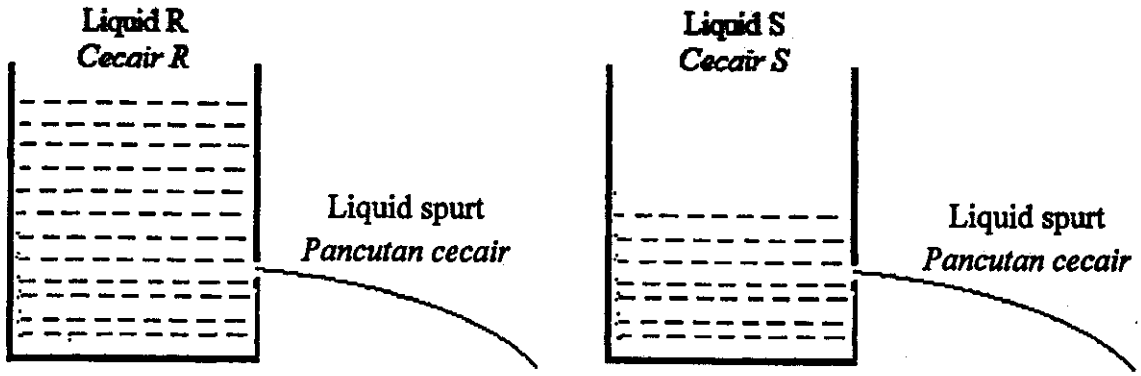


Diagram 7
Rajah 7

Which of the following is the correct comparison between the density of liquid R and liquid S?
Antara pernyataan berikut yang manakah benar mengenai perbandingan antara ketumpatan cecair R dan cecair S?

A Density of liquid R = density of liquid S
Ketumpatan cecair R = ketumpatan S

B Density of liquid R > density of liquid S
Ketumpatan cecair R > ketumpatan S

C Density of liquid R < density of liquid S
Ketumpatan cecair R < ketumpatan S

14 Diagram 8 shows an inverted glass that filled with water covered by a piece of light cardboard.
Rajah 8 menunjukkan sebuah gelas berisi air ditutup oleh sekeping kadbod yang ringan dalam keadaan terbalik.

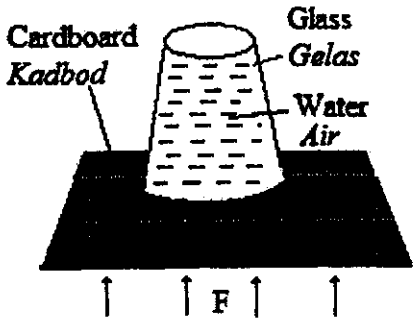


Diagram 8
Rajah 8

The water in the glass does not flowing out. This phenomenon occurs due to
Air didalam gelas tidak mengalir keluar. Fenomena ini berlaku adalah disebabkan oleh

A the surface area of the cardboard in contact with glass is big.
luas permukaan kadbod yang bersentuhan dengan gelas adalah besar.

B the weight of the cardboard is greater than the weight of the water.
berat kadbod lebih besar daripada berat air.

C the density of the water is higher than the density of the cardboard.
ketumpatan air adalah lebih tinggi daripada ketumpatan kadbod.

D the resultant force F acting on the cardboard is greater than the weight of the water.
daya paduan F yang bertindak ke atas kadbod lebih besar daripada berat air.

15 Diagram 9 shows a manometer connected to a gas supply.
Rajah 9 menunjukkan satu manometer yang disambung ke satu bekalan gas.

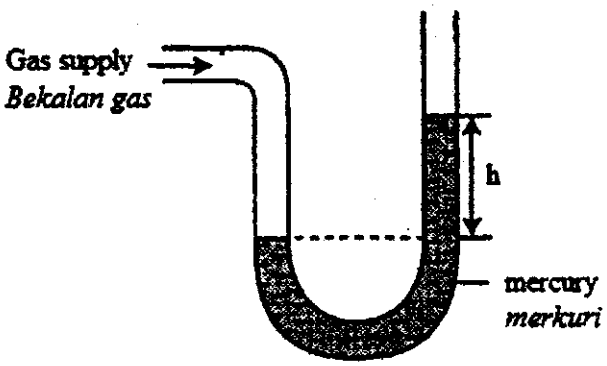


Diagram 9
Rajah 9

The pressure given by the gas supply is 96 cm Hg.
Tekanan yang diberikan oleh bekalan gas itu adalah 96 cm Hg.

What is the value of h?
Berapakah nilai h?
[Atmospheric pressure = 76 cmHg]
[Tekanan atmosfera = 76 cmHg]

A 20 cm

B 76 cm

C 96 cm

D 176 cm

16 Diagram 10 shows a hydraulic system.
Rajah 10 menunjukkan sebuah sistem hidraulik.

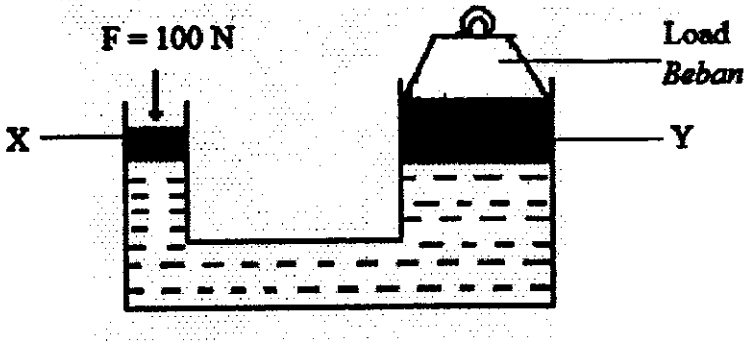


Diagram 10
Rajah 10

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

A The physics concept involved is Bernoulli's Principle.
Konsep fizik yang terlibat adalah prinsip Bernoulli.

B Piston Y has higher pressure than piston X.
Omboh Y mempunyai tekanan yang lebih tinggi daripada omboh X.

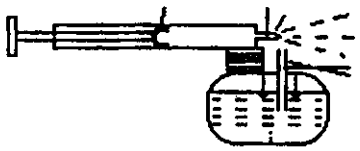
C The force exerted on piston X is equal to the force exerted on piston Y.
Daya yang bertindak ke atas omboh X sama dengan daya yang bertindak ke atas omboh Y.

D The force on piston Y is 200 N if the surface area of piston Y is two times bigger than surface area of piston X.
Daya yang bertindak ke atas omboh Y adalah 200 N jika luas permukaan omboh Y adalah dua kali ganda daripada luas permukaan omboh X.

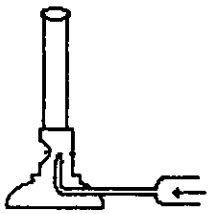
17 Which of the following, works using Archimedes' Principle?
Manakah yang berikut, bekerja menggunakan Prinsip Archimedes?

A

B



C



D

18 Diagram 11 shows the water flows through a Bernoulli's tube from point P to R.
In which vertical tube, A, B, C or D, the water level is the lowest?
Rajah 11 menunjukkan air sedang mengalir melalui satu tiub Bernoulli dari titik P ke titik R. Dalam tiub tegak yang manakah, A, B, C atau D aras air adalah paling rendah ?

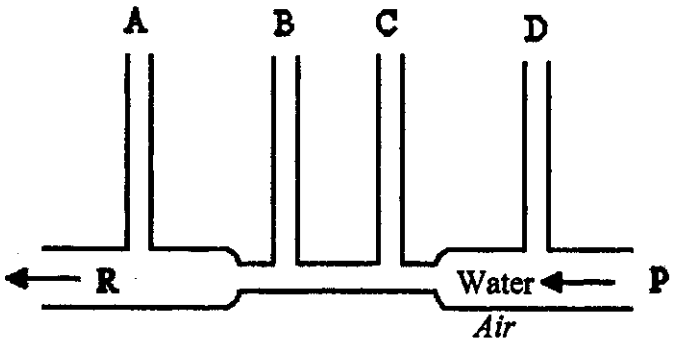


Diagram 11
Rajah 11

19. Heat is supplied to a substance, but its temperature does not rise.
Haba dibekalkan kepada suatu bahan, tetapi suhunya tidak bertambah.

Which of the following statements is true?
Antara pernyataan-pernyataan berikut, yang manakah adalah benar?

A The substance is in thermal equillibrium
Bahan itu berada dalam keseimbangan terma

B The substance undergoes a change of phase
Bahan itu sedang mengalami perubahan fasa

C The substance does not absorbed the heat supplied
Bahan itu tidak menyerap haba yang dibekalkan

D The substance is cooler than the environment
Bahan itu adalah lebih sejuk daripada persekitaran

20 Diagram 12 shows a temperature-time graph of solid substances P and Q. The quantity of heat supplied is the same.
Rajah 12 menunjukkan graf suhu-masa bagi bahan pepejal P dan Q. Kuantiti haba yang dibekalkan adalah sama.

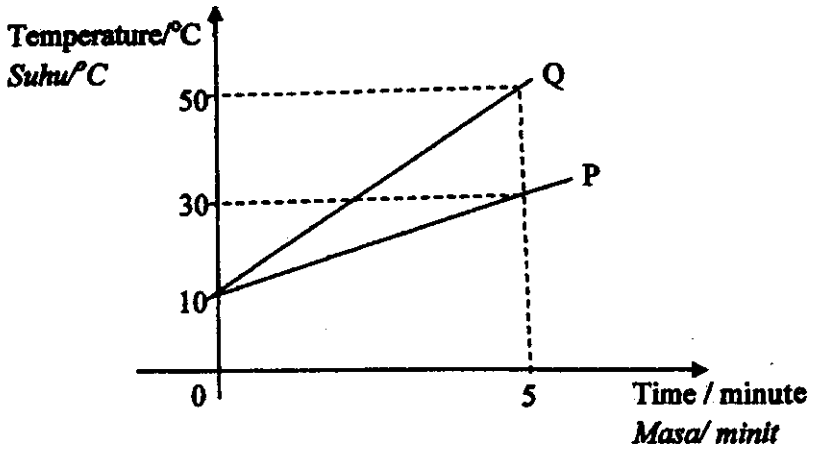


Diagram 12
Rajah 12

Which of the following statements describes the graph in Diagram 12?
Antara pernyataan-pernyataan berikut, yang manakah menerangkan graf dalam Rajah 12?

A Q absorbs more heat than P
Q menyerap lebih haba daripada P

B The melting point of Q is higher than P
Takat lebur Q adalah lebih tinggi daripada P

C The specfic heat capacity of Q is lower than P
Muatan haba tentu Q adalah lebih rendah datipada P

D The specific latent heat of fusion of Q is lower than P
Haba pendam tentu pelakuran Q adalah lebih rendah daripada P

21. Diagram 13 shows a trapped gas inside a glass tube at the temperature 25°C.
Rajah 13 menunjukkan suatu gas terperangkap dalam satu tiub kaca pada suhu 25°C

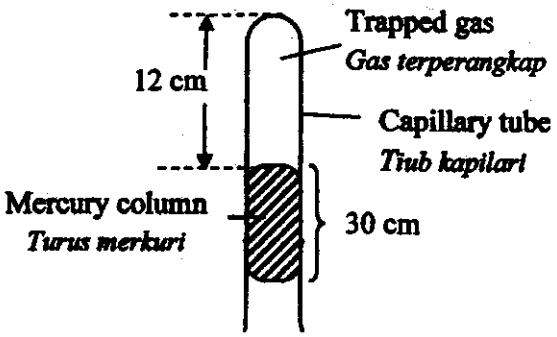


Diagram 13
Rajah 13

What is the length of the gas trapped if the temperature increases to 70°C ?
Apakah panjang turus gas terperangkap jika suhu bertambah kepada 70°C ?

A 4.3 cm
B 10.5 cm
C 13.8 cm
D 33.6 cm

22. 0.05 kg of liquid X at 20 °C is mixed with 0.10 kg of liquid Y at 70 °C.
0.05 kg air pada 20 °C dicampurkan dengan 0.10 kg air pada 70 °C.

The temperature of the liquid's mixture is
Suhu campuran cecair itu adalah

A equal to 70 °C
sama dengan 70 °C

B more than 70 °C
lebih daripada *70 °C*

C less than 20 °C
kurang daripada 20 °C

D between 20 °C and 70 °C
antara 20 °C dan 70 °C

23. Diagram 14 shows the state of a balloon which is in an air tight container before and when the piston is pulled upwards.
Rajah 14 menunjukkan keadaan belon yang berada dalam bekas kedap udara sebelum dan semasa omboh ditarik ke atas.

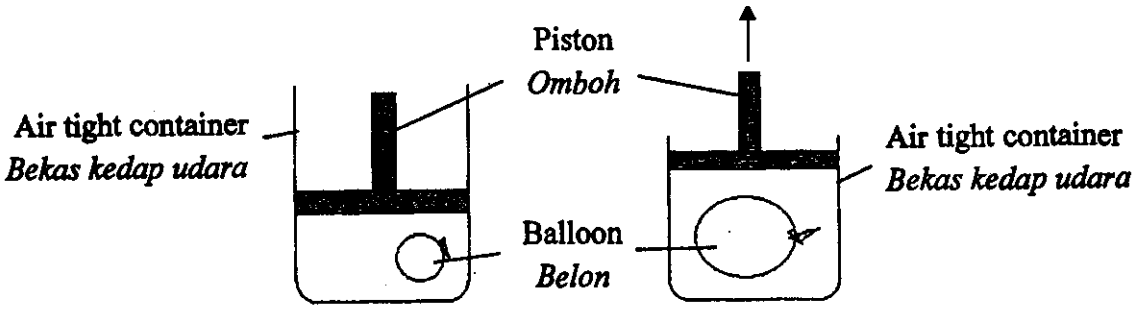


Diagram 14
Rajah 14

Which of the following physics laws is able to explain the situation in Diagram 14 ?
Yang manakah antara hukum-hukum fizik berikut yang boleh menerangkan situasi dalam Rajah 14 ?

A Pressure's law
Hukum Tekanan

B Charles' law
Hukum Charles

C Boyle's law
Hukum Boyle

D Lenz's law
Hukum Lenz

24. Diagram 15 shows the depth of an image of a coin seen when the coin is placed under a glass block.
Rajah 15 menunjukkan kedalaman bagi imej duit syiling yang diperhatikan apabila duit syiling itu diletak di bawah sekeping blok kaca.

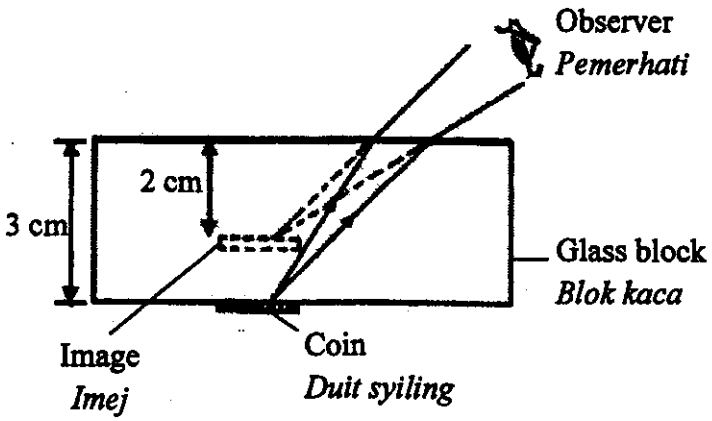


Diagram 15
Rajah 15

Calculate the refractive index of the glass block.
Hitungkan indeks blasan bongkah kaca itu.

A. 0.33
B. 0.66
C. 1.50
D. 3.00

25. Diagram 16 shows a fiber optic.
Rajah 16 menunjukkan satu serabut optik.

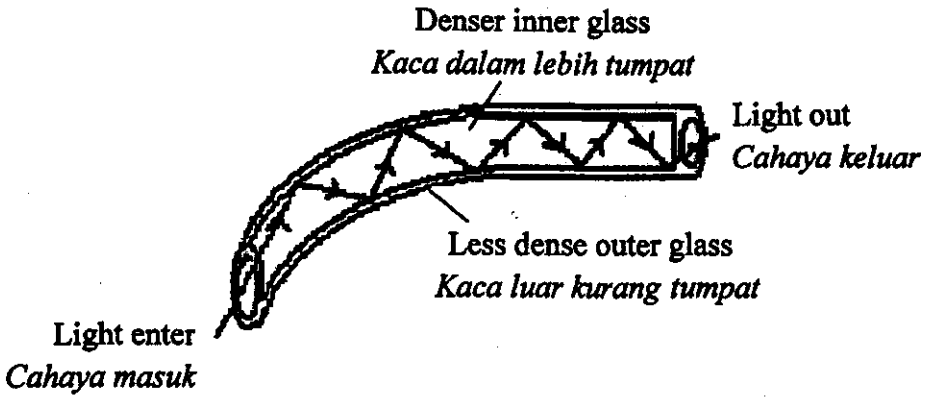


Diagram 16
Rajah 16

What is the wave's phenomenon occurs ?
Apakah fenomena gelombang yang berlaku?

A Refraction of light
Pem*biasan cahaya*

B Diffraction of light
Pembelauan cahaya

C Interference of light
Inteferens cahaya

D Total internal reflection
Pantulan dalam penuh

26 Diagram 17 shows an object placed 20 cm from the optical centre, O of a convex lens. An image was formed 80 cm from the object.
Rajah 17 menunjukkan satu objek diletakkan 20 cm daripada pusat optik sebuah kanta cembung. Satu imej terbentuk 80 cm daripada objek.

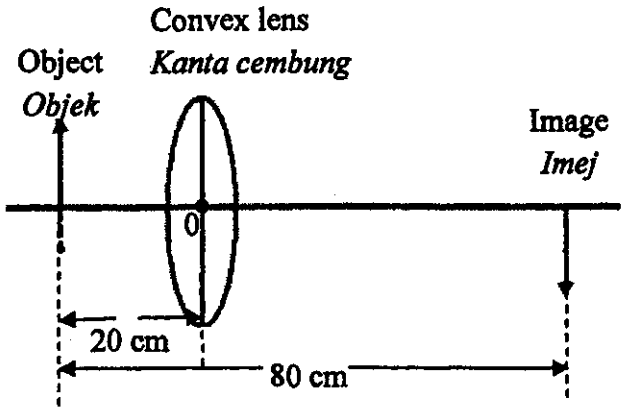


Diagram 17
Rajah17

Calculate the focal length of the lens.
Hitungkan panjang fokus kanta itu.

A 10 cm

B 15 cm

C 16 cm

D 60 cm

27 Diagram 18 shows a boy standing in front of a plane mirror.
Rajah 18 menunjukkan seorang budak berdiri di hadapan sebuah cermin satah.

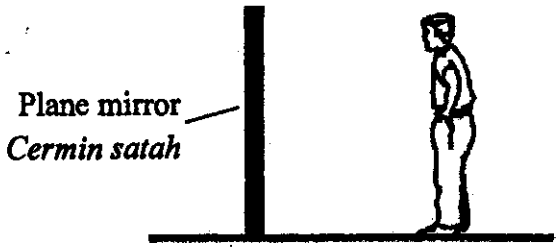


Diagram 18
Rajah18

Which of the following are the characteristics of the image formed in the mirror?
Antara berikut yang manakah merupakan sifat-sifat imej yang terbentuk di dalam cermin satah itu?

A Real, inverted and magnified
Nyata, terbalik dan diperbesarkan

B Real, upright and same size
Nyata, tegak dan sama saiz

C Virtual, inverted and magnified
Maya, terbalik dan diperbesarkan

D Virtual, upright, same size
Maya, tegak dan sama saiz

28 The focal length of the objective lens and the eyepiece of an astronomical telescope are f_o and f_e respectively. The distance between the two lenses is L.
Panjang fokus kanta objektif dan kanta mata bagi sebuah teleskop astronomi masing-masing adalah f_o dan f_e. Jarak antara kedua-dua kanta pula adalah L.

Which of the relationship between L, f_o and f_e is correct for the astronomical telescope at normal adjustment?
Manakah antara hubungan berikut antara L , f_o dan f_e adalah benar bagi teleskop astronomi pada pelarasan normal?

A. $L = f_o + f_e$

B. $L < f_o + f_e$

C. $L > f_o + f_e$

29. Diagram 19 shows an image of an unborn baby obtained by using an ultrasound.
Rajah 19 menunjukkan imej janin yang diperolehi dengan menggunakan ultrabunyi.

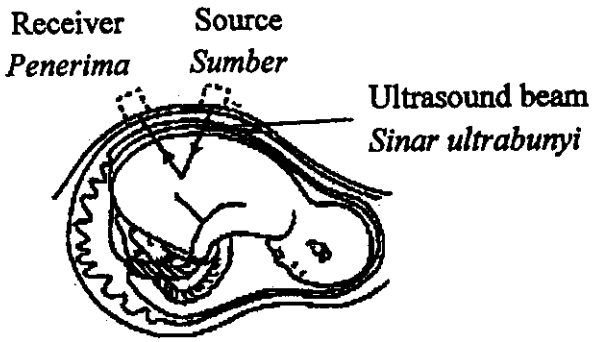


Diagram 19
Rajah19

What is the wave length of the ultrasound in mother's womb?
[The frequency of the ultrasound used is 2×10^6 Hz and the speed of the ultrasound in the body is 1 500 m s^{-1}]
Berapakah panjang gelombang ultrabunyi itu di dalam rahim ibu?
[Frekuensi ultrabunyi yang digunakan adalah 2×10^6 Hz dan laju ultrabunyi di dalam badan ialah 1 500 m s^{-1}]

A 7.5×10^{-6} m

B 7.5×10^{-4} m

C 7.5×10^{4} m

D 7.5×10^{5} m

30. Diagram 20 shows the propagation of water waves from region X to Y.
Rajah 20 menunjukkan perambatan gelombang air dari kawasan X ke Y.

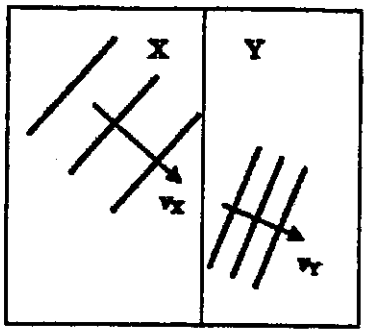


Diagram 20
Rajah 20

Which of the following statements about depthness, D and speed, v in region X and Y is true?
Yang manakah pernyataan-pernyataan mengenai kedalaman, D dan laju, v dalam kawasan X dan Y adalah benar?

	Depthness *Kedalaman*	Speed *Laju*
A	$D_X > D_Y$	$v_X > v_Y$
B	$D_X < D_Y$	$v_X > v_Y$
C	$D_X > D_Y$	$v_X < v_Y$
D	$D_X < D_Y$	$v_X < v_Y$

31 Diagram 21 shows a transverse wave propagating from P to Q.
Rajah 21 *menunjukkan suatu gelombang melintang yang merambat dari* P *ke* Q.

Diagram 21
Rajah 21

Which of the following is correct about the direction of vibration and the direction of energy transfered between P and Q?
Yang manakah arah getaran dan arah pemindahan tenaga yang betul antara P *dan* Q?

	Direction of vibration *Arah getaran*	Direction of energy transfer *Arah pemindahan tenaga*
A	↔	→
B	↔	←
C	↕	→
D	↕	←

32 Diagram 22 represents the fringe pattern obtained in a double-slit experiment using monochromatic light of red colour.
Rajah22 mewakili corak pinggir hasil eksperimen dwicelah dengan menggunakan cahaya monokromatik berwarna merah.

Diagram 22
Rajah 22

Which of the following is correct when the red light is replaced by green light?
Yang manakah berikut adalah betul jika cahaya merah diganti dengan cahaya hijau?

A 

B 

C 

D 

33 Diagram 23 shows the house at downhill can received the radio waves transmitted from a transmission station.
Rajah 23 menunjukkan rumah yang berada di kaki bukit boleh menerima gelombang radio daripada stesen pemancar.

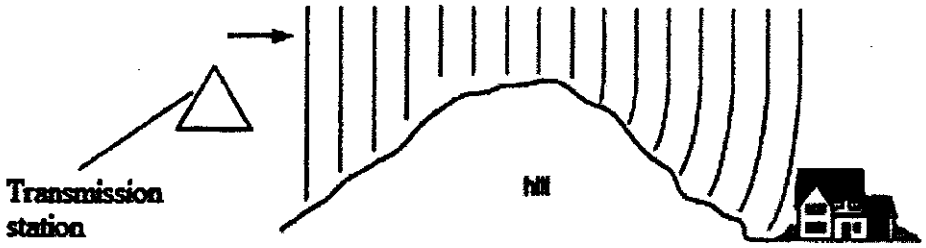


Diagram 23
Rajah 23

This situation occurs due to phenomenon of
Situasi ini berlaku disebabkan oleh fenomena

A diffraction
pembelauan

B interference
interferens

C reflection
pantulan

D refraction
biasan

34 Which of the following has longer wavelength than light wave?
Yang manakah berikut mempunyai panjang gelombang yang lebih panjang dari gelombang cahaya?

A Gamma ray
Sinar gamma

B Ultra voilet
Lampau ungu

C X – ray
Sinar X

D Infra red
Infra merah

35 Which of the following factors influence the resistance of a wire?
Antara faktor berikut yang manakah mempengaruhi rintangan bagi suatu dawai?

A. Hardness of the wire
Kekerasan dawai

B. Density of the wire
Ketumpatan dawai

C. Length of the wire
Panjang dawai

D. Mass of the wire
Jisim dawai

36. Diagram 25 shows a potential difference against current graph for four different conductors J, K, L and M.
Rajah 25 menunjukkan graf beza keupayaan melawan arus untuk empat konduktor yang berlainan.

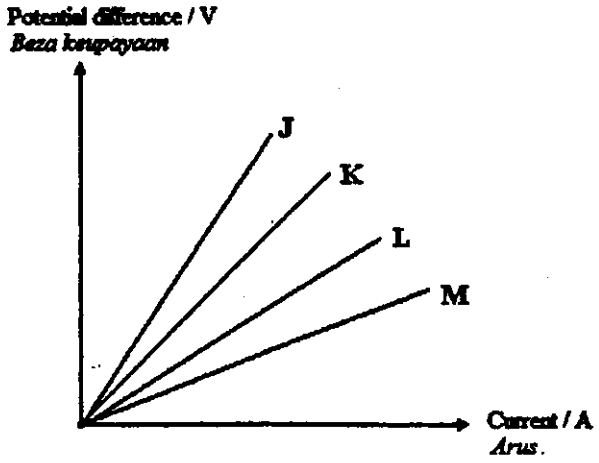


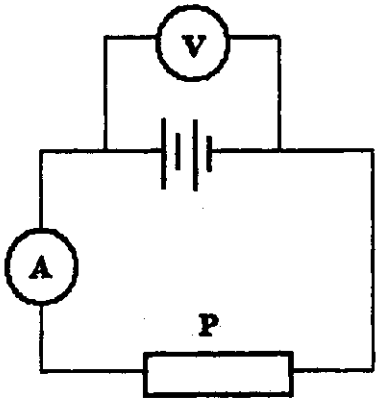
Diagram 25
Rajah 25

Which conductor has the least resistance?
Konduktor yang manakah mempunyai rintangan yang paling rendah?

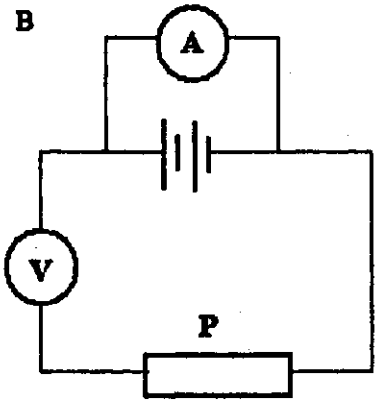
A. J
B. K
C. L
D. M

37 Which of the following circuit arrangement is correct to determine the electromotive force of a battery?
Antara susunan litar berikut yang manakah betul bagi menentukan daya gerak elektrik sebuah bateri?

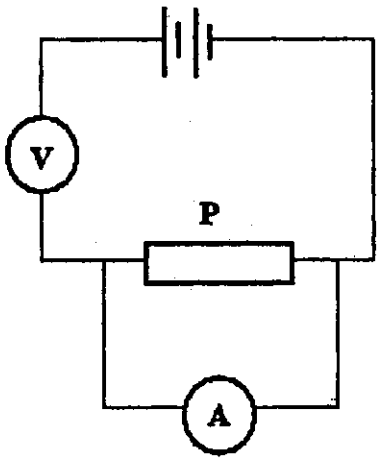
A



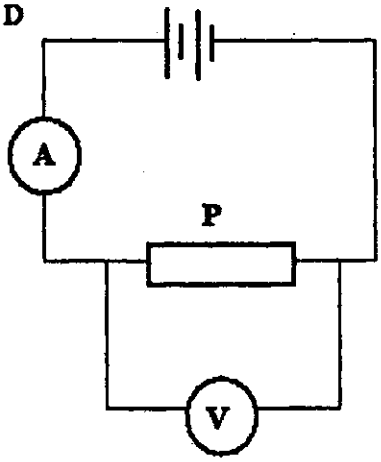
B



C



D



38. Diagram 26 shows an electric circuit.
Rajah 26 menunjukkan satu litar elektrik.

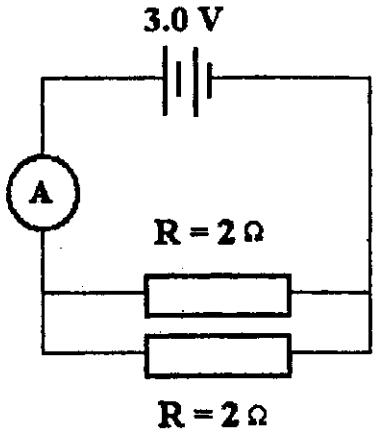


Diagram 26
Rajah 26

Calculate the total current flowing in the circuit.
Hitungkan jumlah arus yang mengalir dalam litar itu.

A. 0.3 A
B. 1.5 A
C. 3.0 A
D. 6.0 A

39 X and Y in Diagram 27 are the ends of a coil in which electric current flows.
X dan Y pada Rajah 27 adalah hujung sebuah gegelung yang membawa arus.

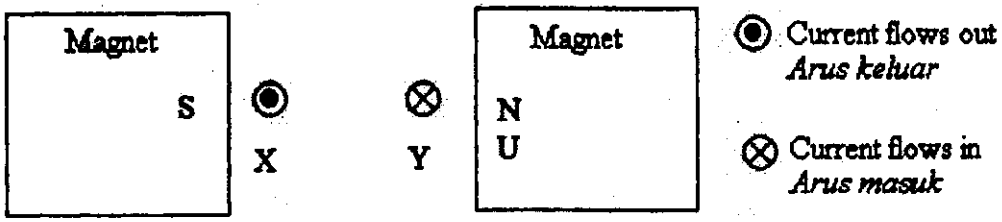


Diagram 27
Rajah 27

What is the direction of the force exerted on X and Y?
Apakah arah tindakan daya yang dikenakan ke atas X dan Y?

	X	Y
A	Upwards *Ke atas*	Upwards *Ke atas*
B	Upwards *Ke atas*	Downwards *Ke bawah*
C	Downwards *Ke bawah*	Upwards *Ke atas*
D	Downwards *Ke bawah*	Downwards *Ke bawah*

40 Diagram 28 shows a current carrying coil in a magnetic field.
Rajah 28 menunjukkan satu gelung membawa arus dalam medan magnet.

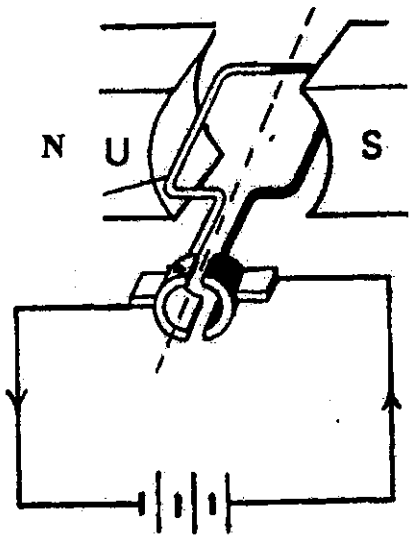


Diagram 28
Rajah 28

Which of the following will not affect the speed of rotation of the coil?
Antara berikut yang manakah tidak mempengaruhi kelajuan putaran gegelung?

A The current flowing in the coil
Arus yang mengalir dalam gegelung

B The number of turns of wire in the coil
Bilangan lilitan wayar dalam gegelung

C The direction of the current flowing in the coil
Arah arus mengalir dalam gegelung

D The strength of the magnetic field
Kekuatan medan magnet

41 Diagram 29 shows an electric circuit consisting of a solenoid, an iron core, a switch and two batteries.
Rajah 29 menunjukkan satu litar elektrik yang terdiri daripada satu solenoid, satu teras besi lembut, satu suis dan dua bateri.

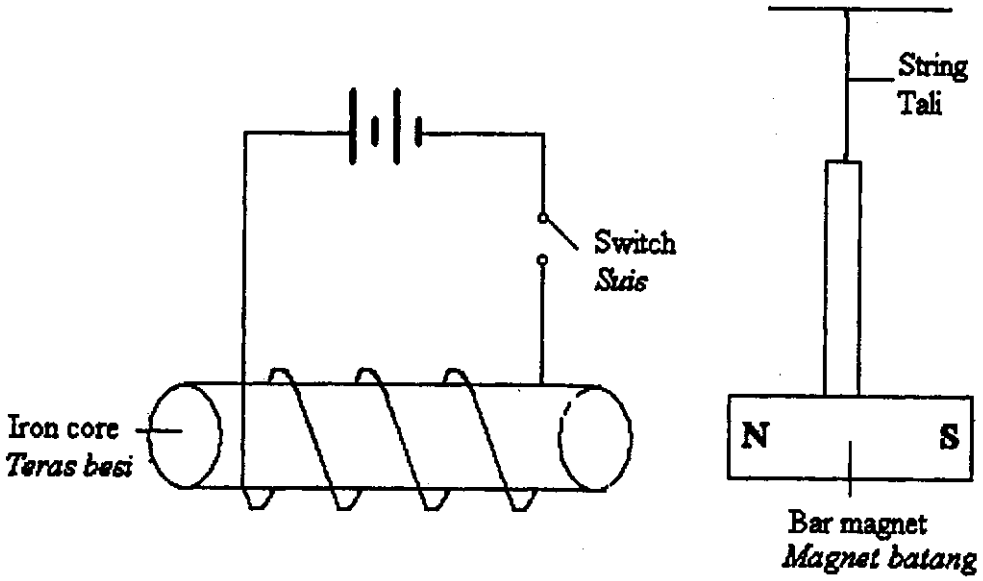


Diagram 29
Rajah 29

What happens to the bar magnet when the switch is on?
Apa yang berlaku kepada magnet batang bila suis dihidupkan?

A Does not move
Tidak bergerak

B Move away from the solenoid
Tertolak menjauhi solenoid

C Attract towards the solenoid
Tertarik mendekati solenoid.

D Oscillate to the right and to the left
Berayun kekanan dan kekiri.

42 Diagram 30 shows a transformer that is used to light up a bulb.
Rajah 30 menunjukkan sebuah transformer yang digunakan untuk menghidupkan sebiji mentol.

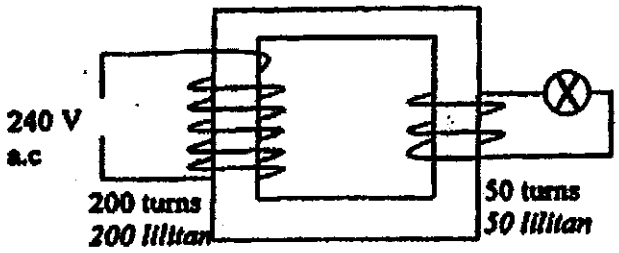


Diagram 30
Rajah 30

Which of the following statements is **true** about the transformer?
*Antara pernyataan-pernyataan yang berikut, yang manakah **benar** tentang transformer itu?*

	Type of transformer *Jenis transformer*	Voltage across the bulb *Voltan merentasi mentol*
A	Step-up *Injak naik*	480 V
B	Step-up *Injak naik*	960 V
C	Step-down *Injak turun*	50 V
D	Step-down *Injak turun*	60 V

43 Diagram 31 shows a model of transmission and distribution of electricity.
Rajah 31 menunjukkan sebuah model penghantaran dan penyebaran elektrik.

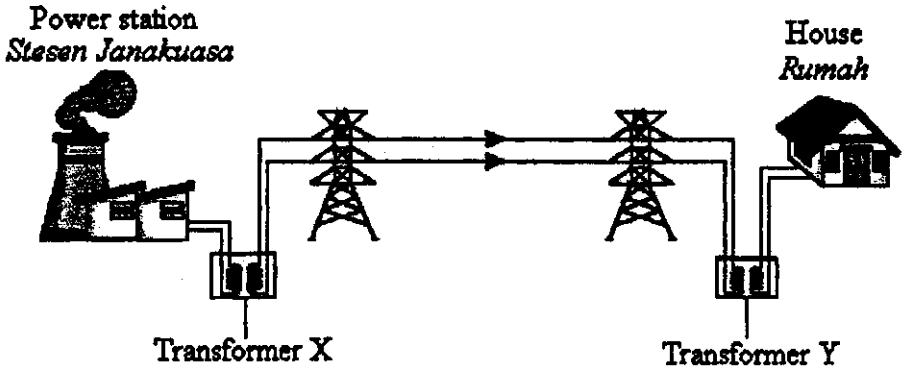


Diagram 31
Rajah 31

Name the type of transformer *X* and *Y*.
Namakan jenis transformer X dan Y.

	Transformer *X*	Transformer *Y*
A	Step-up Injak-naik	Step-up Injak-naik
B	Step-up Injak-naik	Step-down Injak-turun
C	Step-down Injak-turun	Step-up Injak-naik
D	Step-down Injak-turun	Step-down Injak-turun

44 Diagram 32 shows the trace of a signal displayed on the screen of cathode ray oscilloscope (CRO).
The control knob for time base is 2 ms/div and the Y- gain is set at 0.5 V/div.
Rajah 32 menunjukkan surih suatu isyarat ditayangkan di atas skrin osiloskop sinar katod (OSK).
Tombol kawalan tapak - masa adalah 2 ms/bahagian dan gandaan-Y dilaras pada 0.5 V/bahagian.

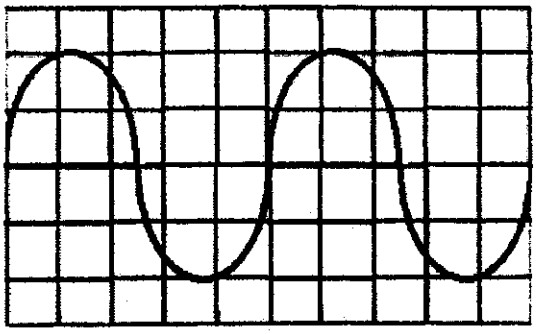


Diagram 32
Rajah 32

What is the frequency and peak voltage the wave form.
Berapakah frekuensi dan voltan puncak gelombang bagi ?

	Frequency/Hz *Frekuensi/Hz*	Peak Voltage /V *Voltan puncak /V*
A	100	2.0
B	100	1.0
C	50	2.0
D	50	1.0

45 Diagram 33 shows the symbol of a transistor.
Rajah 33 menunjukkan simbol bagi satu transistor.

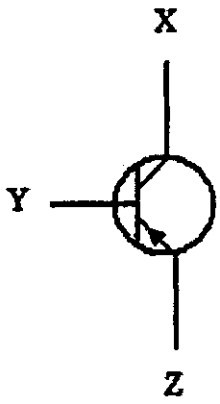


Diagram 33
Rajah 33

What are the names of the terminals X, Y and Z?
Apakah nama bagi terminal X, Y dan Z?

	X	Y	Z
A	Collector *Pengumpul*	Base *Tapak*	Emitter *Pengeluar*
B	Base *Tapak*	Collector *Pengumpul*	Emitter *Pengeluar*
C	Emitter *Pengeluar*	Base *Tapak*	Collector *Pengumpul*
D	Collector *Pengumpul*	Emitter *Pengeluar*	Base *Tapak*

46 Diagram 34 shows an automatic switch circuit to light up a bulb during the day time.
Rajah 34 menunjukkan litar suis automatik untuk menyalakan mentol pada waktu siang hari.

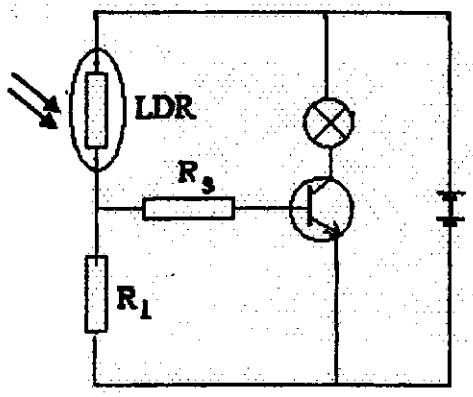


Diagram 34
Rajah 34

What changes should be done to light up the bulb at night?
Apakah perubahan yang perlu dilakukan untuk menyalakan mentol pada waktu malam?

A Interchange R_1 and LDR
Saling tukar antara R_1 and PPC

B Reverse the terminal of the battery
Songsangkan terminal bateri

C Replace the npn transistor with a pnp transistor
Ganti transistor npn dengan transistor pnp

D Interchange R_1 and R_3
Saling tukar antara R_1 and R_3

47 Diagram 35 shows a logic gate circuit which has two inputs, *A* and *B*.
Rajah 35 menunjukkan satu litar get logik yang menpunyai dua input, A dan B.

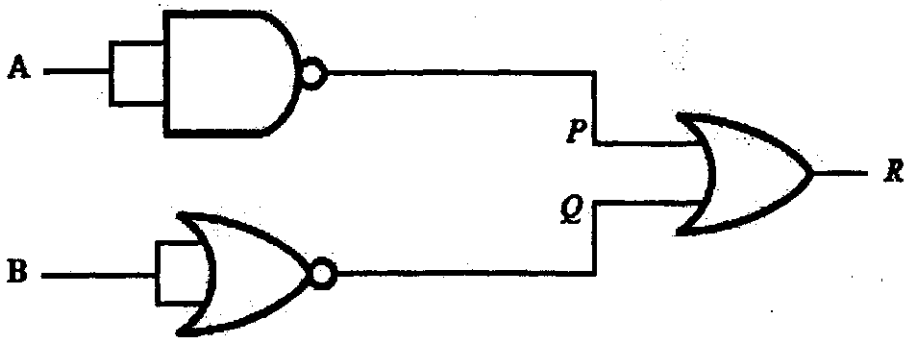


Diagram 35
Rajah 35

If the logic state of *A* is 0 and the logic state of *B* is 1, what are the logic states at *P*, *Q* and *R*?
Jika keadaan logik A ialah 0 dan keadaan logik B ialah 1, apakah keadaan logik bagi P, Q dan R?

	P	*Q*	*R*
A	1	0	0
B	1	0	1
C	0	1	1
D	0	0	1

48. A nucleus of an atom has 7 protons and 8 neutrons. What is the nucleon number of the atom?
Satu nukleus atom mempunyai 7 proton dan 8 neutron. Apakah nombor nukleon bagi atom itu ?

A 1
B 7
C 8
D 15

49. A rate meter of a G-M tube recorded a background reading 40 counts per minute. When a radioactive element is put in front of the G-M tube, the rate meter reads 160 counts per minute. After 6 hours, the rate meter become 55 counts per minute.
Meter kadar pada satu tiub G-M mencatatkan sinaran latar belakang 40 bilangan per minit. Apabila satu bahan radioaktif diletakkan di hadapan tiub G-M, meter kadar mencatatkan 160 bilangan per minit. Selepas 6 jam, bacaan meter kadar menjadi 55 bilangan per minit.

Determine the half life of the radioactive.
Tentukan separuh hayat bagi bahan radioaktif itu

A 2 hours
2 jam

B 4 hours
4 jam

C 6 hours
6 jam

D 12 hours
12 jam

50. The equation shows the nuclear fission of Uranium-235.
Persamaan menunjukkan pembelahan nukleus bagi Uranium-235.

$$^{235}_{92}U + {}^{1}_{0}n \rightarrow {}^{P}_{54}Xe + {}^{94}_{Q}Sr + 2\,{}^{1}_{0}n$$

What are the values of P and Q?
Apakah nilai bagi P dan Q?

A	142	36
B	141	38
C	140	38
D	139	36

END OF QUESTION
SOALAN TAMAT

SULIT
4531/2
Physics
Kertas 2
September
2011
2 1/2 Jam

Nama : .....

Tingkatan : .....

MAJLIS PENGETUA SEKOLAH - SEKOLAH MALAYSIA (MPSM)
CAWANGAN KELANTAN

PEPERIKSAAN PERCUBAAN SPM
TINGKATAN LIMA
2011

PHYSICS

KERTAS 2

Masa : Dua Jam Tiga Puluh Minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. Kertas soalan ini adalah dalam dwi bahasa.
2. Soalan dalam Bahasa Inggeris mendahului soalan yang sepadan dalam Bahasa Melayu.
3. Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam Bahasa Inggeris atau Bahasa Melayu.
4. Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.

Untuk Kegunaan Pemeriksa			
Bahagian	Soalan	Markah penuh	Markah diperolehi
A	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	

Section A
Bahagian A

[60 marks]

[60 *markah*]

Answer all questions in this section.

Jawab semua soalan dalam bahagian ini.

1. **Diagram 1.1 shows a vernier calipers.**
Rajah 1.1 menunjukkan sebuah angkup vernier.

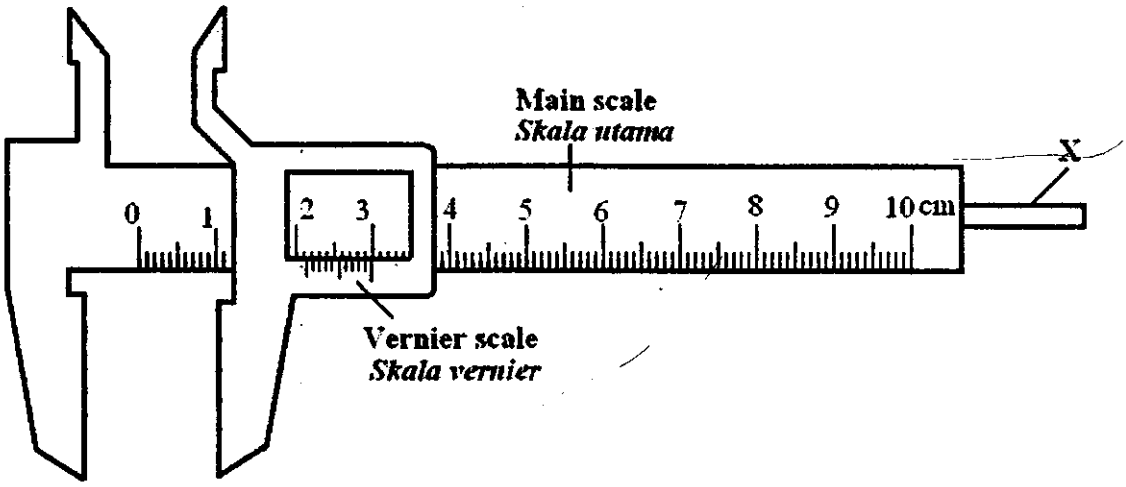


Diagram 1.1
Rajah 1.1

(a) **Name the part labeled X.**
Namakan bahagian berlabel X.

.....

[1 mark]
[1 *markah*]

(b) **State the function of X.**
Nyatakan fungsi X.

.....

[1 mark]
[1 *markah*]

(c) **Diagram 1.2 shows the reading of the vernier calipers when the jaws is closed.**
Rajah 1.2 menunjukkan bacaan pada angkup vernier bila rahang ditutup.

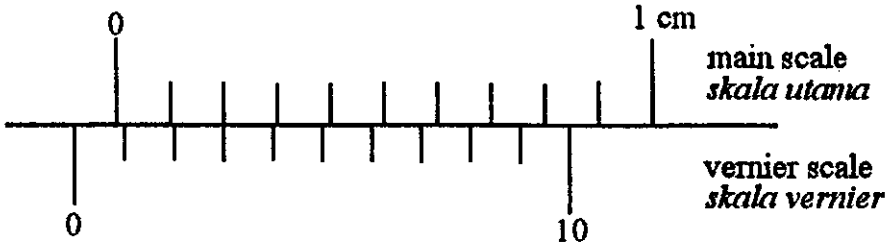


Diagram 1.2
Rajah 1.2

Based on Diagram 1.2 :
Berdasarkan Rajah 1.2:

(i) name the type of error occur.
namakan jenis ralat yang terjadi.

.....

[1 mark]
[1 *markah*]

(ii) state the value of the error.
nyatakan nilai ralat tersebut.

.....

[1 mark]
[1 *markah*]

2. Diagram 2 shows a boy is shouting infront of a building which is placed at a distance of 170 m. After 1 second, an echo is heard.
Rajah 2 menunjukkan seorang budak lelaki sedang menjerit dihadapan sebuah bangunan yang berjarak 170 m. Selepas 1 saat, kedengaran bunyi gema terhasil.

Diagram 2
Rajah 2

(a) What is the wave phenomenon involved in Diagram 2 above?
Apakah fenomena gelombang yang terlibat dalam Rajah 2 di atas?

.....

[1 mark]
[1 *markah*]

(b) Calculate the velocity of sound waves propagates.
Hitungkan halaju gelombang bunyi yang merambat.

[2 marks]
[2 *markah*]

(c) (i) What happens to the velocity of sound wave when it propagates in water?
Apakah yang berlaku kepada halaju bunyi apabila bunyi merambat di dalam air?

.....

[1 mark]
[1 *markah*]

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

.....

[1 mark]
[1 *markah*]

3. Diagram 3 shows a method used to detect leakage of water pipe laid underground. A little radioisotope substance is poured into the water that flows in the pipe. A detector is then used to detect the radioactive ray emits by the radioisotope substance.

Rajah 3 menunjukkan satu kaedah mengesan kebocoran paip air yang diletakkan di bawah tanah. Sedikit bahan radioisotop dimasukkan kedalam air yang mengalir di dalam paip itu. Satu alat pengesan digunakan untuk mengesan sinar radioaktif yang dikeluarkan oleh bahan radioisotop tersebut.

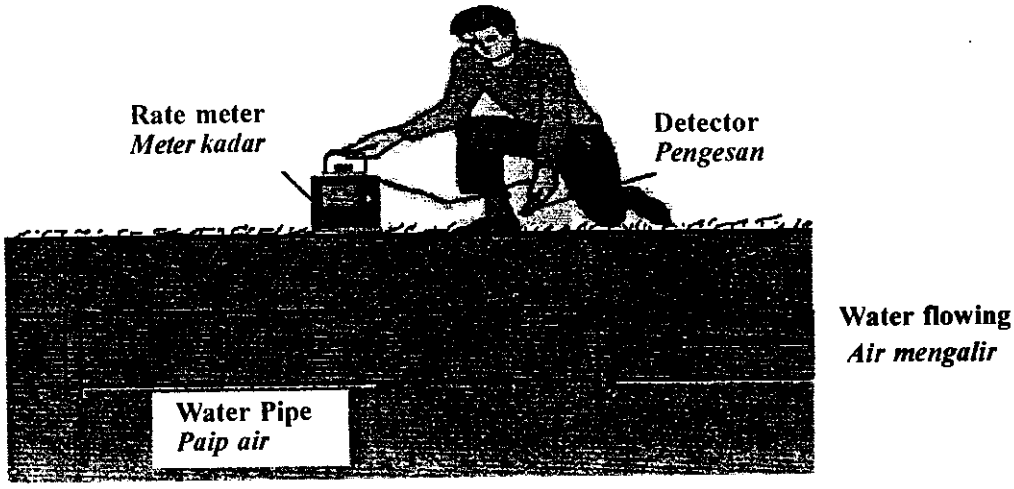


Diagram 3
Rajah 3

(a) What is the meaning of radioisotope?
Apakah yang dimaksudkan dengan radioisotop?

.....

[1 mark]
[1 *markah*]

(b) (i) Name the suitable detector used
Namakan alat pengesan yang sesuai digunakan.

.....

[1 mark]
[1 *markah*]

(ii) Give a reason for the answer in (b) (i)
Berikan satu sebab bagi jawapan di (b) (i).

.....

[1 mark]
[1 *markah*]

(c) The leakage of the water pipe is based on the reading of the rate meter connected to the detector used. The background reading is 50 count /min
Kebocoran paip air berdasarkan bacaan meter kadar yang disambung kepada alat pengesan yang digunakan. Bacaan latar adalah 50 bilangan / minit

(i) From the reading of the rate meter produced,state how to identify the position where the leakage occurs.

Daripada bacaan meter kadar yang diperolehi nyatakan bagaimana untuk mengenalpasti kedudukan di mana kebocoran itu berlaku.

.....

.....

[1 mark]
[*1 markah*]

(ii) One of the reading detected by the detector is 1250 count / min. What is the actual reading of the rate meter ?
Satu daripada bacaan yang dikesan oleh alat pengesan adalah 1250 bilangan / minit. Berapakah bacaan sebenar meter kadar itu?

[2 marks]
[*2 markah*]

4. Diagram 4.1 shows a Central Heating System (CHS) which consists of a heater, a switch , a temperature sensor and logic gate L.
Rajah 4.1 menunjukkan Sistem Pemanasan Sepusat (CHS) yang terdiri daripada pemanas, suis, pengesan suhu dan get logik L.

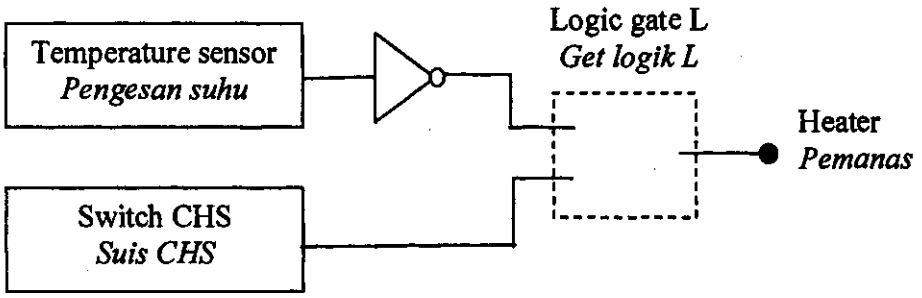


Diagram 4.1
Rajah 4.1

The logic circuit will turn on the heater when the house is cold and the CHS switch is turned ON.
Litar logik akan menghidupkan pam pemanas apabila rumah itu adalah sejuk dan suis CHS dihidupkan.

Keys :
Kekunci:

Temperature sensor :	When cold,	logic "0"
Pengesan suhu:	*Apabila sejuk,*	*logik "0"*
	When hot,	logic "1"
	Apabila panas,	*logik "1"*
Switch CHS :	When ON,	logic "1"
Suis CHS:	*Apabila dihidupkan,*	*logik "1"*
	When OFF,	logic "0"
	Apabila dimatikan,	*logik "0"*
Heater :	Heater is activated,	logic "1"
Pemanas :	*Pemanas dihidupkan,*	*logik "1"*

(a) What is the meaning of logic gate?
Apakah yang dimaksudkan dengan get logik?

.....

[1 mark]
[*1 markah*]

(b) Table 4.1 is a truth table of the Central Heating System (CHS).
Jadual 4.1 adalah jadual kebenaran bagi Sistem Pemanasan Sepusat (CHS).

Temperature sensor *Pengesan suhu*	Switch CHS *Suis CHS*	Heater *Pemanas*
0	0	0
0	1	1
1	0	0
1	1	0

Table 4.1
Jadual 4.1

(i) Name the logic gate L in Diagram 4.1.
Namakan get logik L dalam Rajah 4.1.

.....

[1 mark]
[*1 markah*]

(ii) Complete the circuit in Diagram 4.1 by drawing the logic gate L symbol.
Lengkapkan litar dalam Rajah 4.1 dengan melukis simbol get logik L .

[1 mark]
[*1 markah*]

(c) Diagram 4.2 shows how logic gate L is used in a fire alarm system circuit.
Rajah 4.2 menunjukkan bagaimana get logik L digunakan dalam litar sistem amaran kebakaran.

Keys :
Kekunci:

Temperature sensor :	When cold,	logic "0"
Pengesan suhu:	*Apabila sejuk,*	*logik "0"*
	When hot,	logic "1"
	Apabila panas,	*logik "1"*
Light sensor :	When bright,	logic "1"
Pengesan cahaya:	*Apabila cerah,*	*logik "1"*
	When dark,	logic "0"
	Apabila gelap,	*logik "0"*
Alarm :	Alarm is activated,	logic "1"
Amaran :	*Amaran dihidupkan,*	*logik "1"*

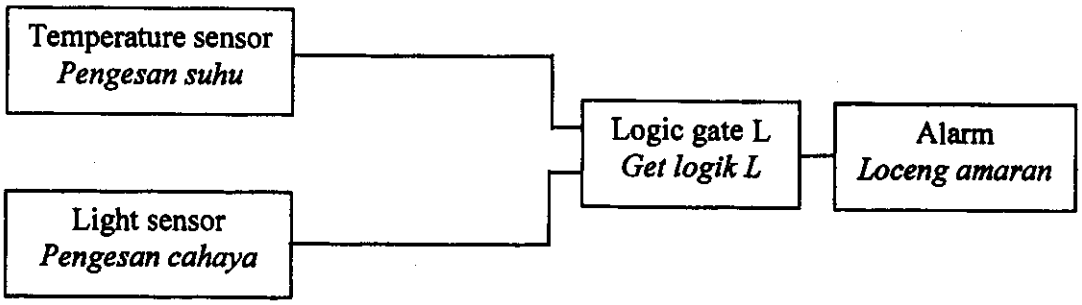


Diagram 4.2
Rajah 4.2

(i) Under which condition, the alarm will be activated
Di bawah keadaan manakah, loceng amaran akan dihidupkan.

Temperature : .....
Suhu :

Light : .....
Cahaya :

[2 marks]
[*2 markah*]

(ii) Table 4.2 is a truth table for the alarm system.
Jadual 4.2 adalah jadual kebenaran bagi sistem amaran ini.

Temperature sensor *Pengesan suhu*	Light sensor *Pengesan cahaya*	Alarm *Amaran*
0	0	
0	1	
1	0	
1	1	

Table 4.2
Jadual 4.2

Complete Table 4.2.
Lengkapkan Jadual 4.2.

[2 marks]
[*2 markah*]

5. Diagram 5.1 (a) shows a spring is compressed by a steel ball using a force F_1 N.
Diagram 5.1 (b) shows the distance traveled by the steel ball 2 seconds after the force, F_1 is released.

Rajah 5.1(a) menunjukkan suatu spring dimampatkan oleh sebiji bola keluli dengan daya F_1 N.
Rajah 5.1 (b) menunjukkan jarak bola keluli itu bergerak 2 saat selepas daya, F_1 di lepaskan.

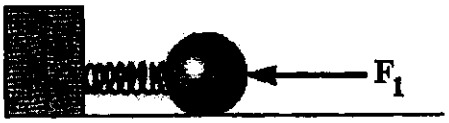


Diagram 5.1 (a)
Rajah 5.1 (a)

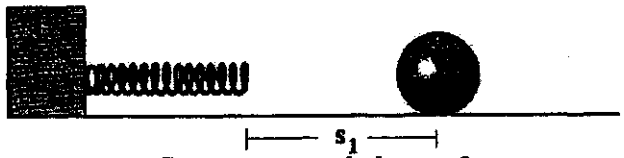


Diagram 5.1(b)
Rajah 5.1 (b)

Diagram 5.2 (a) shows the same spring is compress by the same steel ball using a force F_2 N.
Diagram 5.2 (b) shows the distance traveled by the steel ball 2 seconds after the force, F_2 is released.

Rajah 5.2(a) menunjukkan suatu spring dimampatkan oleh sebiji bola keluli yang sama dengan daya F_2 N.
Rajah 5.2 (b) menunjukkan jarak bola keluli itu bergerak 2 saat selepas daya, F_2 di lepaskan.

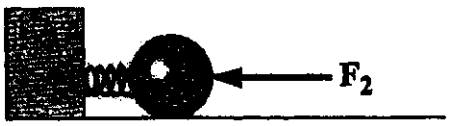


Diagram 5.2 (a)
Rajah 5.2 (a)

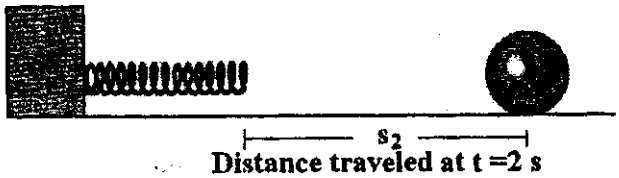


Diagram 5.2 (b)
Rajah 5.2 (b)

(a) Name the type of energy possess by the spring when it is being compressed.
Namakan jenis tenaga yang dimiliki oleh spring itu semasa dimampatkan.

.....

[1 mark]
[1 *markah*]

(b) Observe Diagram 5.1 (a) and Diagram 5.2 (a).
Perhatikan Rajah 5.1 (a) dan Rajah 5.2 (a).

(i) Compare the compression force F_1 and F_2
Bandingkan daya mampatan F_1 dan F_2.

.....

[1 mark]
[1 *markah*]

(ii) Compare the compressions distance of the springs.
Bandingkan jarak mampatan spring-spring itu.

.....

[1 mark]
[1 *markah*]

(c) Observe Diagram 5.1 (b) and Diagram 5.2 (b).
Perhatikan Rajah 5.1 (b) dan Rajah 5.2 (b).

(i) Compare the velocity of the steel ball at time, t = 2 s.
Bandingkan halaju bola keluli pada masa, t = 2s.

.....

[1 mark]
[1 *markah*]

(ii) Compare the kinetic energy of the steel balls
Bandingkan tenaga kinetik bola-bola keluli itu.

.....

[1 mark]
[1 *markah*]

(d) Based on the answers in 5 (b) and 5 (c), state the relationship between the elastic potential energy of the spring and the kinetic energy of the steel ball.
Berdasarkan jawapan dalam 5 (b) dan 5 (c), nyatakan hubungan antara tenaga keupayaan elastik spring dengan tenaga kinetik bagi bola keluli itu.

.....

.....

[1 mark]
[1 *markah*]

(e) (i) Based on Diagram 5.1 (a), what happens to the kinetic energy of steel ball when the spring is replaced by a thicker spring but other physical properties are the same.
Berdasarkan Rajah 5.1(a), apakah yang berlaku kepada tenaga kinetik bola keluli itu apabila spring itu digantikan dengan spring yang lebih tebal tetapi sifat- sifat fizikal yang lainnya adalah sama.

.....

[1 mark]
[1 *markah*]

(ii) Give one reason for the answer in 5 (e) (i).
Berikan satu sebab kepada jawapan di 5 (e) (i).

.....

[1 mark]
[1 *markah*]

6. Diagram 6.1 shows a ripple tank with two spherical dippers attached to the vibrating bar as source of two coherent waves.
Rajah 6.1 menunjukkan satu tangki riak dengan dua pencelup bulat dilekatkan pada batang penggetar sebagai dua sumber gelombang koheren.

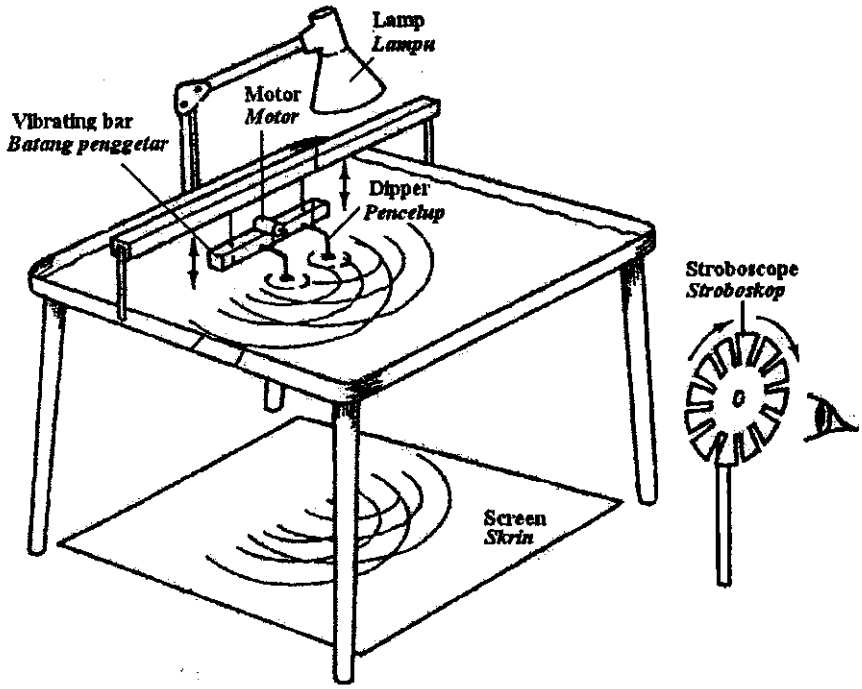
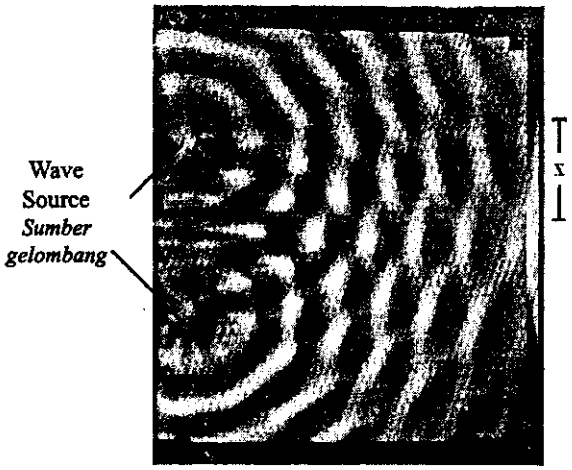
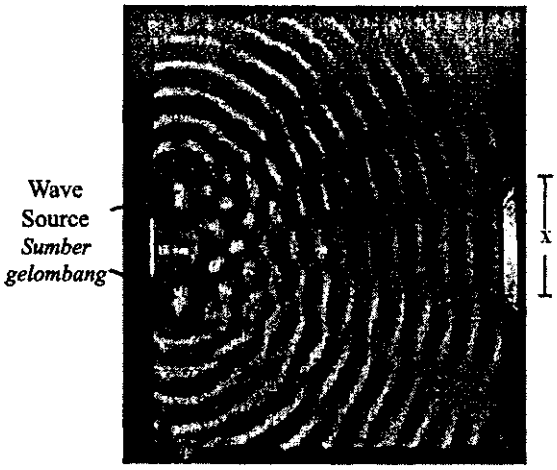


Diagram 6.1
Rajah 6.1

Diagram 6.2 and Diagram 6.3 show the wave pattern produced on screen when the distance between two source of wave are different.
Rajah 6.2 dan 6.3 menunjukkan corak gelombang terhasil di atas skrin apabila jarak antara dua sumber gelombang adalah berbeza





Key : x = distance between two nodal lines
Jarak antara dua garis nodal

Diagram 6.2
Rajah 6.2

Diagram 6.3
Rajah 6.3

(a). What is the meaning of coherent source ?
Apakah yang dimaksudkan dengan sumber koheren ?

.....

[1 mark]
[1 *markah*]

(b) Describe how dark and bright bands are formed on the screen when there is a wave in ripple tank.
Jelaskan bagaimana jalur terang dan gelap terbentuk di atas skrin apabila gelombang terhasil di dalam tangki riak.

.....

.....

.....

[3marks]
[3 *markah*]

(c) Observe Diagram 6.2 and Diagram 6.3
Perhatikan Rajah 6.2 dan Rajah 6.3

(i) compare the distance between two sources of wave.
bandingkan jarak antara dua punca gelombang .

.....

[1 mark]
[1 *markah*]

(ii) compare the distance between two consecutive antinodal lines.
bandingkan jarak antara dua garis antinodal berturutan.

.....

[1 mark]
[1 *markah*]

(d) Based on the answers in 6(c),
Berdasarkan kepada jawapan dalam 6 (c),

(i) State the relationship between the distance of two sources of wave and distance of two consecutive antinodal lines.
Nyatakan hubungan antara jarak antara dua sumber gelombang dan jarak antara dua garis antinodal yang berturutan.

.....

[1 mark]
[1 *markah*]

(ii) name the wave phenomenon involves.
namakan fenomena gelombang yang terlibat.

.....

[1 mark]
[1 *markah*]

7. Diagram 7.1 shows a candle is placed infront of a plane mirror. A virtual image is formed in the mirror.
Rajah 7.1 menunjukkan sebatang lilin diletakkan dihadapan sebuah cermin satah. Satu imej maya terbentuk di dalam cermin tersebut.

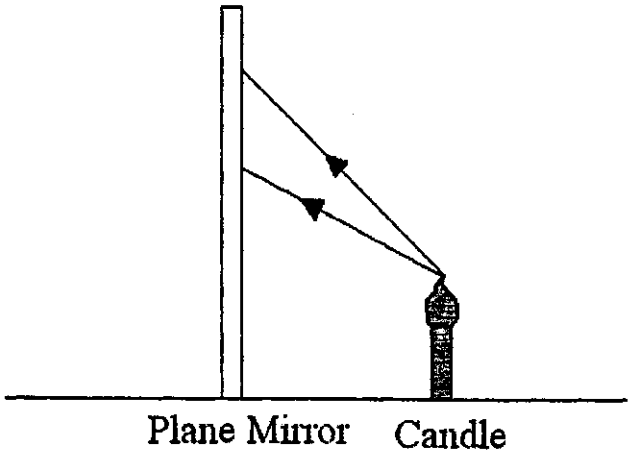


Diagram 7.1
Rajah 7.1

(a). What is the meaning of virtual image?
Apakah yang dimaksudkan dengan imej maya?

.....

[1 mark]
[1 *markah*]

(b) In Diagram 7.1 complete the path of rays to show the formation of image in the plane mirror.
Pada Rajah 7.1 lengkapkan lintasan cahaya untuk menunjukkan pembentukan imej di dalam cermin.

[2 marks]
[2 *markah*]

(c) State two other characteristics of the image formed in the plane mirror.
Nyatakan dua lagi ciri-ciri imej yang terbentuk di dalam cermin satah tersebut.

.....

.....

[2 marks]
[2 *markah*

(d) Based on Diagram 7.1, calculate the distance between the candle and the image form when the candle is moved to a distance of 2.0 m away from the plane mirror.
Berdasarkan Rajah 7.1, hitungkan jarak antara lilin dengan imej yang terbentuk apabila lilin di gerakkan kepada jarak 2.0 m dari cermin satah tersebut.

[1 mark]
[1 *markah*]

(e) Diagram 7.2 shows the plane mirrors are used in a construction of a periscope.
Rajah 7.2 menunjukkan cermin satah digunakan dalam pembinaan sebuah periskop.

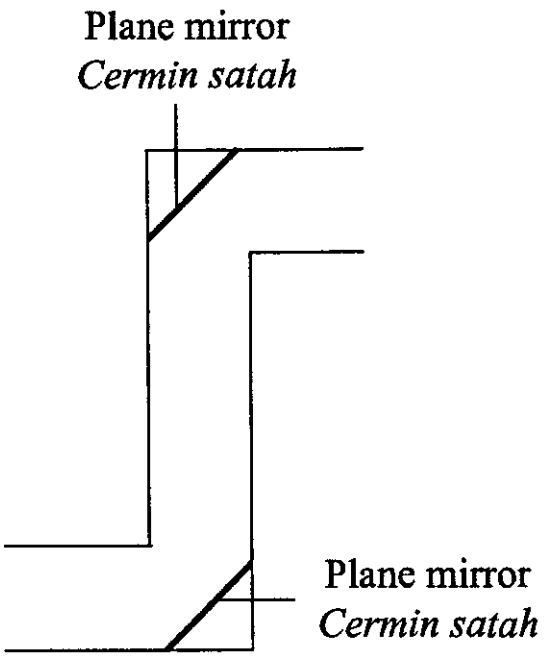


Diagram 7.2
Rajah 7.2

The image produced by the periscope is not sharp.
Imej periskop yang dihasil adalah tidak tajam.

Suggest a modification that can be made to produce a shaper image through these aspects:
Cadangkan pengubahsuaian yang boleh dilakukan untuk menghasilkan imej yang lebih tajam melalui aspek-aspek berikut:

(i) The apparatus used to replaced the plane mirror.
Alat radas yang digunakan untuk menggantikan cermin satah.

.....

Reason
Sebab

.....

[2 marks]
[2 *markah*]

(ii) The arrangement of the apparatus used in 7 (e) (i).
Susunan alat radas yang digunakan dalam 7 (e) (i).

.....

Reason
Sebab

.....

[2 marks]
[2 *markah*]

8. Diagram 8.1 and Diagram 8.2 show two arrangements of the apparatus to determine the specific heat capacity of aluminium block.
Rajah 8.1 dan Rajah 8.2 menunjukkan dua susunan radas untuk menentukan muatan haba tentu bagi bongkah aluminium.

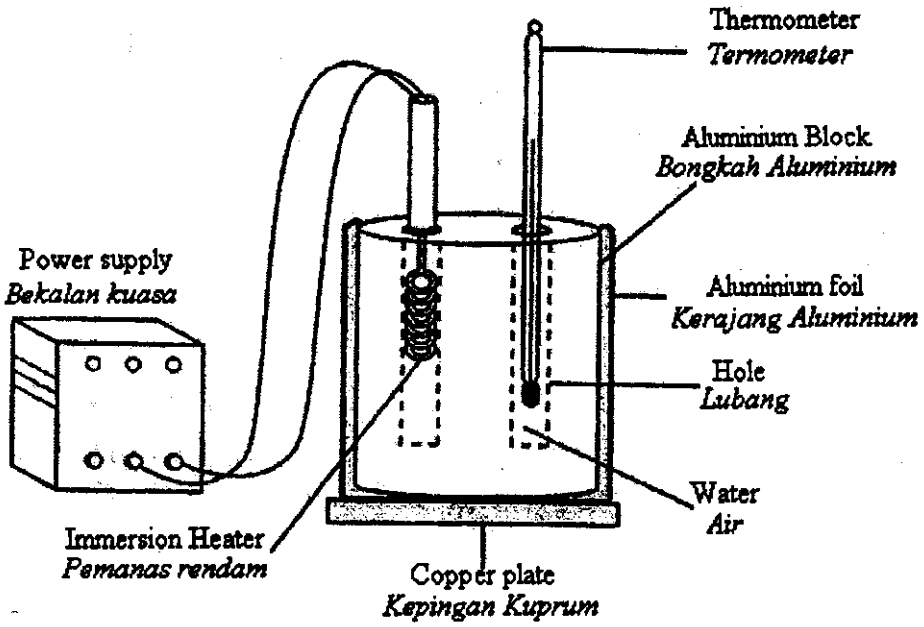


Diagram 8.1
Rajah 8.1

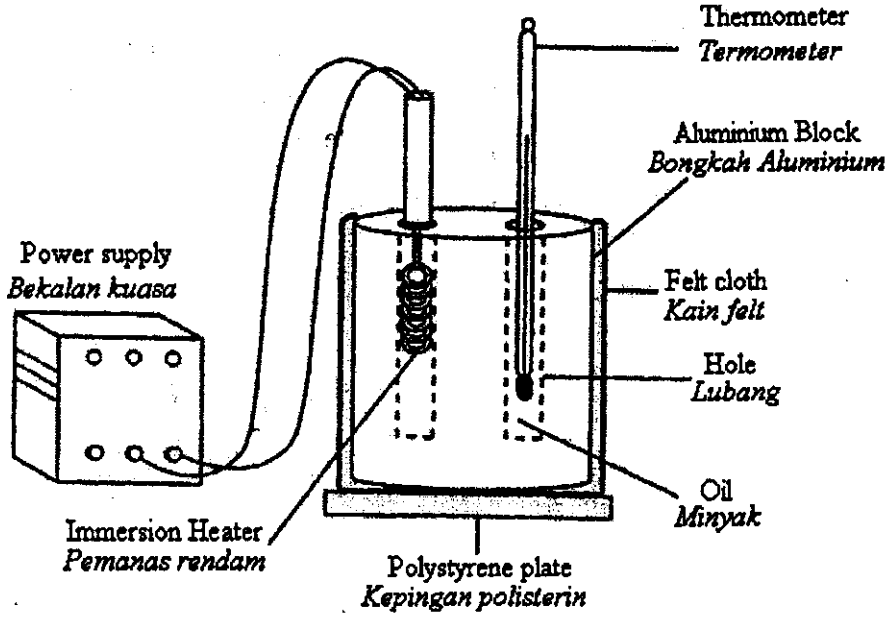


Diagram 8.2
Rajah 8.2

(a) What is the meaning of specific heat capacity?
Apakah maksud muatan haba tentu?

.....

[1 mark]
[1 *markah*]

(b) Based on Diagram 8.1 and Diagram 8.2, state the suitable characteristics of the arrangement of the apparatus to determine the specific heat capacity of aluminium block.
Berdasarkan Rajah 8.1 dan rajah 8.2, nyatakan ciri-ciri yang sesuai bagi susunan radas untuk menentukan muatan haba tentu bagi blok aluminium.

Give reason for the suitability of the characteristics.
Berikan sebab untuk kesesuaian ciri-ciri itu.

(i) The type of plate to be used as the base.
Jenis plat yang digunakan sebagai tapak.

.....

Reason
Sebab

.....

[2 marks]
[2 *markah*]

(ii) The type of liquid poured in the hole
Jenis cecair yang dituang ke dalam lubang.

.....

Reason
Sebab.

.....

[2 marks]
[2 *markah*]

(iii) Material used to wrap the aluminium block.
Bahan yang digunakan untuk membalut blok aluminium.

.....

Reason
Sebab

.....

[2 marks]
[2 *markah*]

(c) The aluminium blocks in both diagrams have 1 kg mass and being heated by using the electric heater of power 200 W within 4 minutes. The increasing of temperature in Diagram 8.1 is 30 ^{0}C whereas in Diagram 8.2 is 50 ^{0}C.

Blok aluminium dalam kedua-dua rajah berjisim 1 kg dan dipanaskan dengan menggunakan pemanas elektrik berkuasa 200 W selama 4 minit. Peningkatan suhu dalam Rajah 8.1 ialah 30 ^{0}C manakala dalam Rajah 8.2 ialah 50 ^{0}C.

Calculate the specific heat capacity of the aluminium blocks in:
Hitungkan muatan haba tentu bagi blok aluminium dalam:

(i) Diagram 8.1.
Rajah 8.1

[2 marks]
[2 *markah*]

(ii) Diagram 8.2.
Rajah 8.2

[2 marks]
[2 *markah*]

(d) Determine the most suitable apparatus that can give an accurate result to determine the specific heat capacity of the aluminium block.
Tentukan radas yang paling sesuai yang boleh memberi keputusan yang lebih tepat untuk menentukan muatan haba tentu blok aluminium.

.....

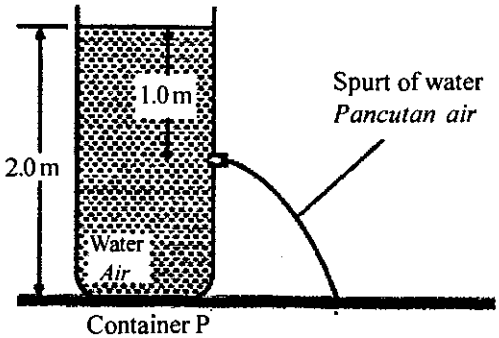
[1 mark]
[1 *markah*]

Section B
Bahagian B

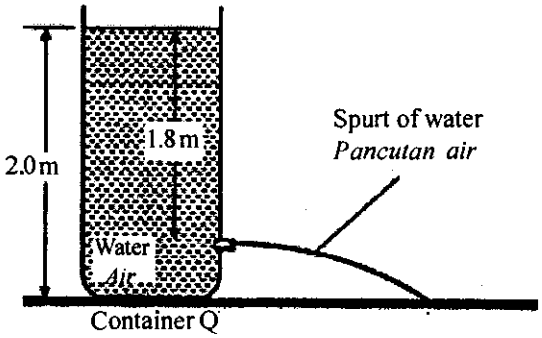
[20 marks]
[*20 markah*]

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

9. Diagram 9.1 and Diagram 9.2 show the water spurt from two identical containers P and Q.
Rajah 9.1 dan Rajah 9.2 menunjukkan pancutan air daripada dua bekas P dan Q yang serupa.



Container P
Bekas P
Diagram 9.1
Rajah 9.1



Container Q
Bekas Q
Diagram 9.2
Rajah 9.2

The density of water in container P and container Q is equal.
Ketumpatan air dalam bekas P dan bekas Q adalah sama.

(a) What is the meaning of density?
Apakah maksud ketumpatan?

[1 mark]
[*1 markah*]

(b) (i) Using Diagram 9.1 and Diagram 9.2, compare the depths of the hole, the distances of spurt of water and the pressure exerted on the holes.
Menggunakan Rajah 9.1 dan Rajah 9.2, bandingkan kedalaman lubang, jarak pancutan air dan tekanan yang bertindak ke atas lubang.

[3 marks]
[*3 markah*]

(ii) State the relationship between the pressure and
Nyatakan hubungan antara tekanan dan

(a) the depth of the hole.
Kedalaman lubang

(b) the distance of spurt of water.
Jarak pancutan air.

[2 marks]
[*2 markah*]

(c) Diagram 9.3 shows a Bunsen burner.
***Rajah 9.3** menunjukkan sebuah penunu Bunsen.*

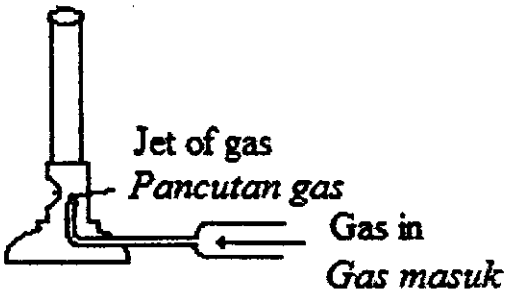


Diagram 9.3
Rajah 9.3

Explain how the Bunsen burner can produce a blue flame.
Terangkan bagaimana penunu Bunsen itu boleh menghasilkan nyalaan api yang biru.

[4 marks]
[*4 markah*]

(d) An efficient hydraulic brake system is very important in a car for safety purposes.
Diagram 9.4 shows a car hydraulic brake system.
Sistem brek hidraulik yang efisien adalah sangat penting bagi sesebuah kereta untuk tujuan keselamatan.
Rajah 9.4 menunjukkan sebuah sistem brek hidraulik.

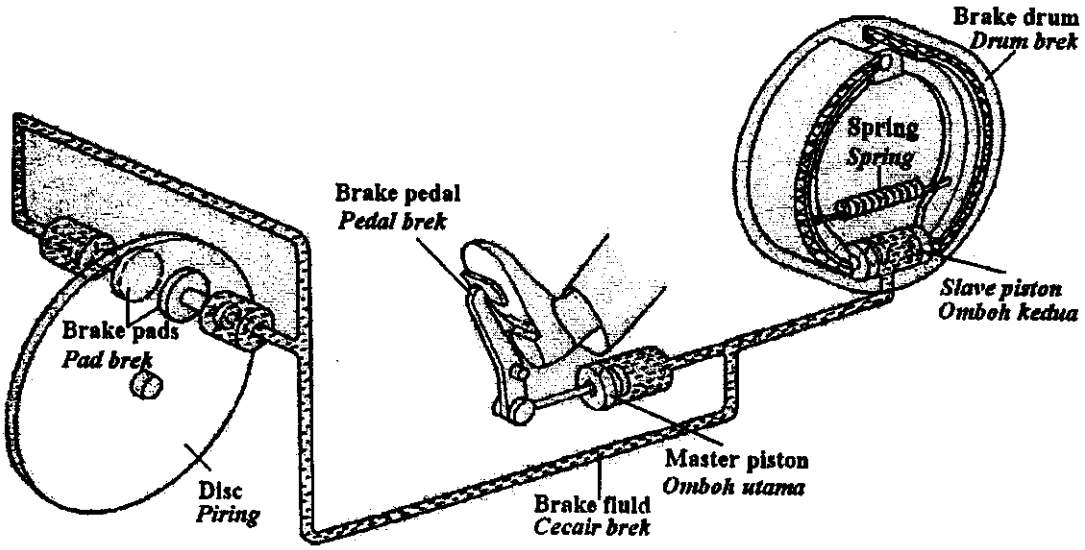


Diagram 9.4
Rajah 9.4

Suggest and explain the modification should be done on the system so that it can function effectively based on the following aspect :
Cadang dan terangkan pengubahsuaian yang perlu dibuat kepada sistem ini supaya ia dapat berfungsi dengan lebih berkesan berdasarkan aspek-aspek berikut:

(i) The type material of brake fluid. [2 marks]
Jenis bahan bendalir brek. [*2 markah*]

(ii) The characteristic of brake fluid. [2 marks]
Sifat bendalir brek. [*2 markah*]

(iii) The size of master piston [2 marks]
Saiz omboh utama [*2 markah*]

(iv) The size of slave piston. [2 marks]
Saiz omboh kedua. [*2 markah*]

(v) The type material of the fluid transmission pipe. [2 marks]
Jenis bahan yang digunakan untuk paip penghantaran bendalir. [*2 markah*]

10. Diagram 10.1 and Diagram 10.2 show two coils of identical wire wound around an iron core. The primary coil is connected to 12V a.c power supply, while the secondary coil is connected to a bulb labeled '24V, 36W'.
Rajah 10.1 dan Rajah 10.2 menunjukkan dua gegelung dengan dawai yang serupa dililitkan pada sebatang teras besi. Gegelung primer disambungkan kepada 12V bekalan kuasa a.u, manakala gegelung sekunder kepada mentol berlabel '24V, 36W'.

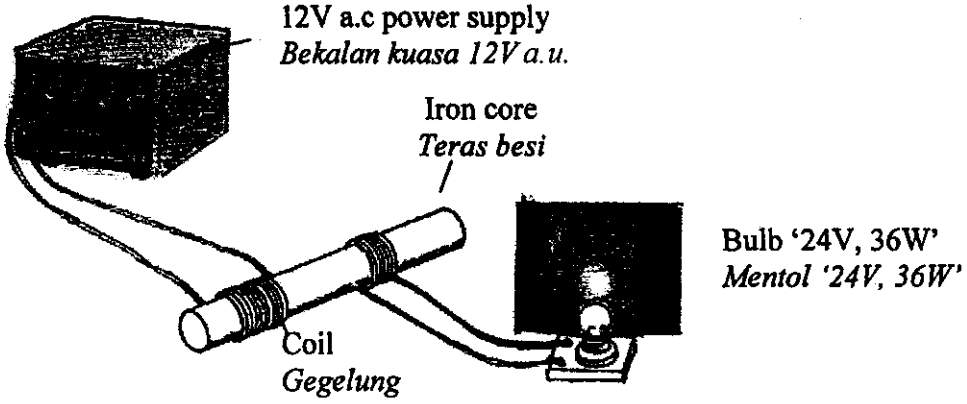


Diagram 10.1
Rajah 10.1

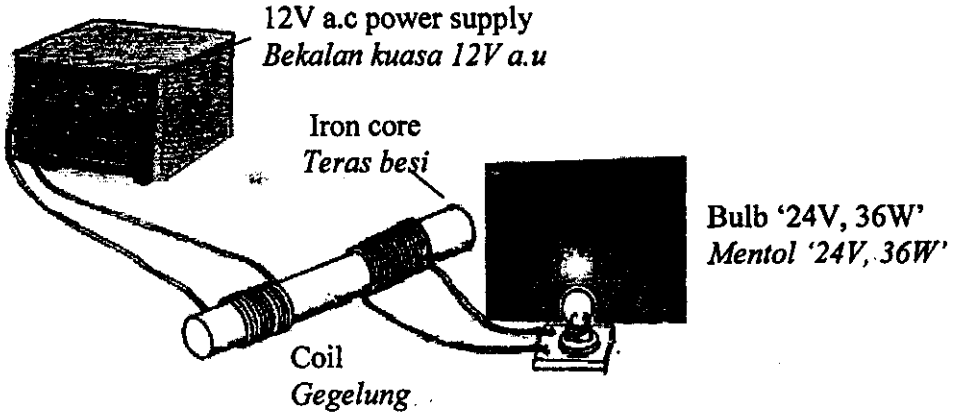


Diagram 10.2
Rajah 10.2

(a) What is the meaning of '24V, 36W' ? [1 mark]
Apakah yang dimaksudkan dengan '24V, 36W' ? [*1 markah*]

(b) Observe Diagram 10.1 and Diagram 10.2, compare;
Perhatikan Rajah 10.1 dan Rajah 10.2, bandingkan;

(i) The brightness of bulb
Kecerahan mentol

(ii) The number of turns in the primary coil and secondary coil
Bilangan lilitan pada gegelung primer dan gegelung sekunder
[3 marks]
[3 *markah*]

(c) Relate the brightness of bulb with:
Hubungkaitkan kecerahan mentol dengan:

(i) The number of turns in secondary coil.
Bilangan lilitan pada gegelung sekunder.

(ii) The induced current produced in the secondary coil.
Arus teraruh yang dihasilkan pada gegelung sekunder.
[2 marks]
[*2 markah*]

(d) (i) Explain how induced current is produced at secondary circuit.
[3 marks]
Terangkan bagaimana arus aruhan terhasil pada litar sekunder.
[3 *markah*]

(iii) State one way to increase the efficiency of a transformer.
[1 mark]
Nyata satu cara untuk meningkatkan kecekapan transformer tersebut.
[*1 markah*]

(e) Diagram 10.4 shows a cross section of a moving coil microphone.
Rajah 10.4 menunjukkan keratan rentas sebuah mikrofon gegelung bergerak.

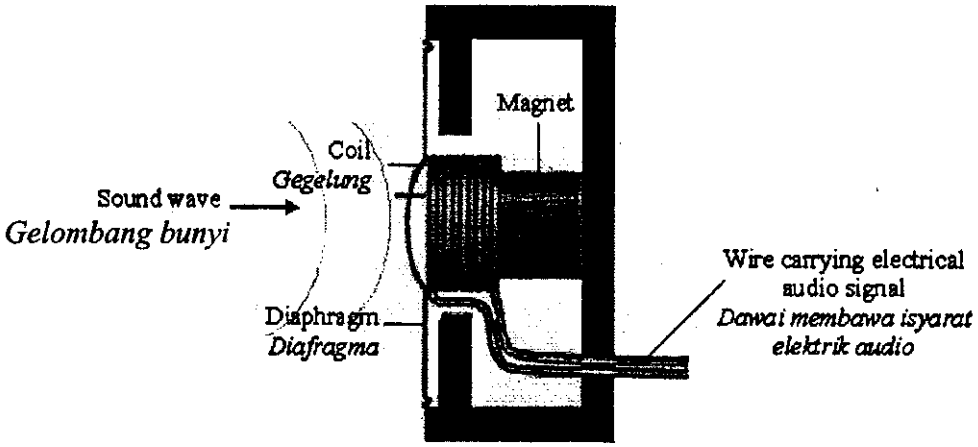


Diagram 10.4
Rajah 10.4

When the diaphragm moves in response to sound, the attached coil moves in the magnetic field and generates a very small current in the wire of the coil.
Apabila diafragma bergerak disebabkan oleh bunyi, gegelung yang bersambung kepadanya bergerak di dalam medan magnet dan menghasilkan arus yang kecil di dalam gegelung.
Using an appropriate concept in physics, suggest and explain suitable modifications or ways to enable the microphone to detect sound more effectively and generate a bigger current based on the following aspect:
Menggunakan konsep fizik yang sesuai, cadang dan terangkan pengubahsuaian atau cara yang boleh dilakukan untuk membolehkan mikrofon mengesan gelombang bunyi secara berkesan dan menghasilkan arus yang lebih besar berdasarkan aspek-aspek berikut:

(i) thickness of diaphragm
ketebalan diafragma
(ii) strength of the material for diaphragm
kekuatan bahan untuk diafragma
(iii) number of turns of coil
bilangan lilitan gegelung
(iv) diameter of the wire of coil
diameter dawai gegelung
(v) strength of magnet
kekuatan magnet

[10 marks]
[*10 markah*]

Section C
Bahagian C

[20 marks]
[*20 markah*]

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

11. Diagram 11.1 shows a cargo ship is being towed by two towing boats using the same force 1200N each. The resultant force from the two boats causes the cargo ship to move forward.
Rajah 11.1 menunjukkan sebuah kapal kargo ditunda oleh dua buah bot penunda masing-masing menggunakan daya-daya yang sama 1200N. Daya paduan daripada kedua-dua bot menyebabkan kapal kargo itu bergerak kedepan.

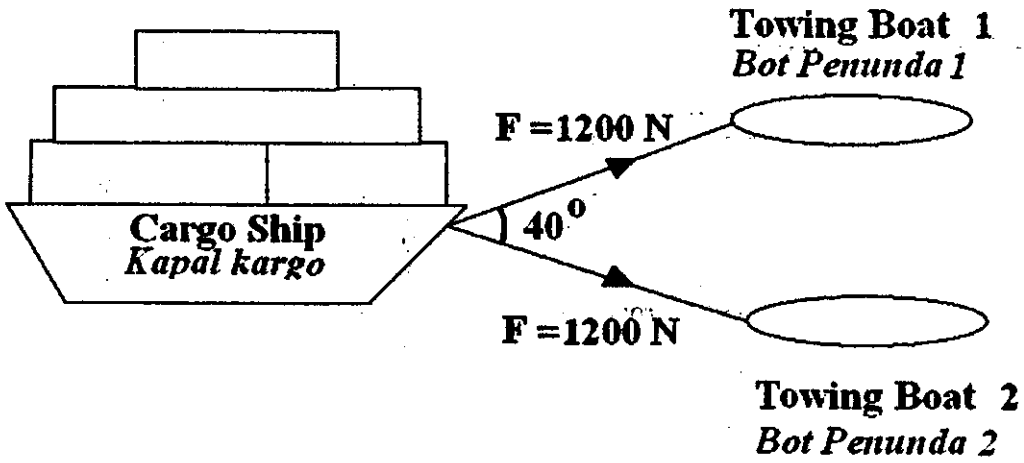


Diagram 11.1
Rajah 11.1

(a) What is the meaning of resultant force? **[1 mark]**
Apakah yang dimaksudkan dengan daya paduan? **[1 *markah*]**

(b) Based on Diagram 11.1:
Berdasarkan Rajah 11.1:

(i) Sketch the resolution of force 1200N for towing boat 1 to its components .

[1 mark]

Lakarkan leraian daya 1200N untuk bot penunda 1 kepada komponennya.

[1 *markah*]

(ii) Calculate the horizontal component of force acting on towing boat 1.

[2 marks]

Hitungkan komponen ufuk daya bertindak pada bot penunda 1.

[2 *markah*]

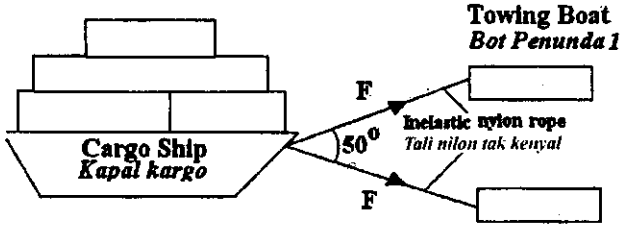
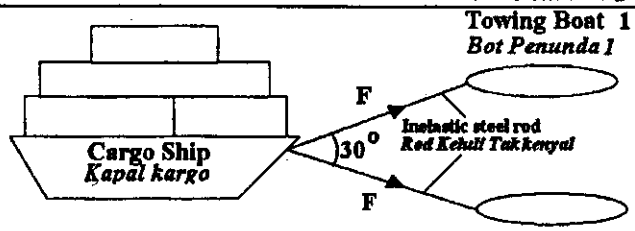
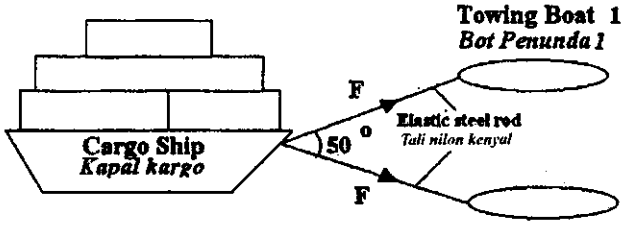
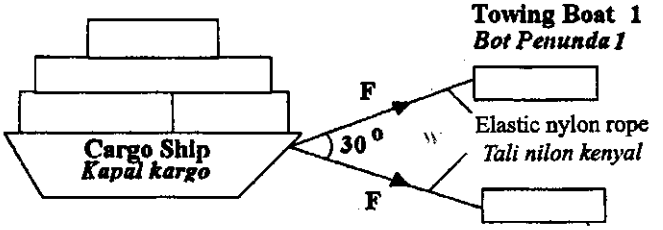
(iii) Calculate the resultant force acting on the cargo ship [2 marks]
Hitungkan daya paduan yang bertindak keatas kapal kargo itu. [2 *markah*]

(c) Explain why a cargo ship has to switch off its engine a few kilometers from the harbour and has to be towed to the harbour.
Terangkan mengapa sebuah kapal kargo terpaksa dimatikan enjinnya beberapa kilometer dari pelabuhan dan kemudiannya terpaksa ditunda ke pelabuhan.

[4 marks]
[4 *markah*]

(d) Diagram 11 .2 shows four methods of towing a cargo ship to a harbour.
You are required to determine the most suitable methods and the characteristics of the cable rope to tow the ship effectively.

Rajah 11.2 menunjukkan empat kaedah menunda sebuah kapal kargo kepada pelabuhannya.
Anda di kehendaki untuk menentukan kaedah dan ciri-ciri tali kabel yang paling sesuai untuk menunda kapal tersebut.

Method J *Kaedah J*	
Method K *Kaedah K*	
Method L *Kaedah L*	
Method M *Kaedah M*	

Study the specification of the four arrangements based on the following aspects:
Kaji spesifikasi keempat-empat susunan berdasarkan aspek-aspek berikut:

(i) the angle of the two towing boats. [2 marks]
sudut antara kedua-dua bot penunda. [2 *markah*]

(ii) the shape of the towing boats [2 marks]
bentuk bot penunda [2 *markah*]

(iii) type of cable rope used. [2 marks]
jenis tali kabel yang digunakan [2 *markah*]

(iv) the elasticity of cable used. [2 marks]
kekenyalan kabel yang digunakan. [2 *markah*]

Explain the suitability of each aspect and then determine the most suitable arrangement.
Give a reason for your choice. [2 marks]

Terangkan kesesuaian setiap aspek dan seterusnya tentukan susunan yang paling sesuai.
Beri sebab untuk pilihan anda.

[2 *markah*]

12. Diagram 12.1 shows an electrical circuit.
Rajah 12.1 menunjukkan satu litar elektrik .

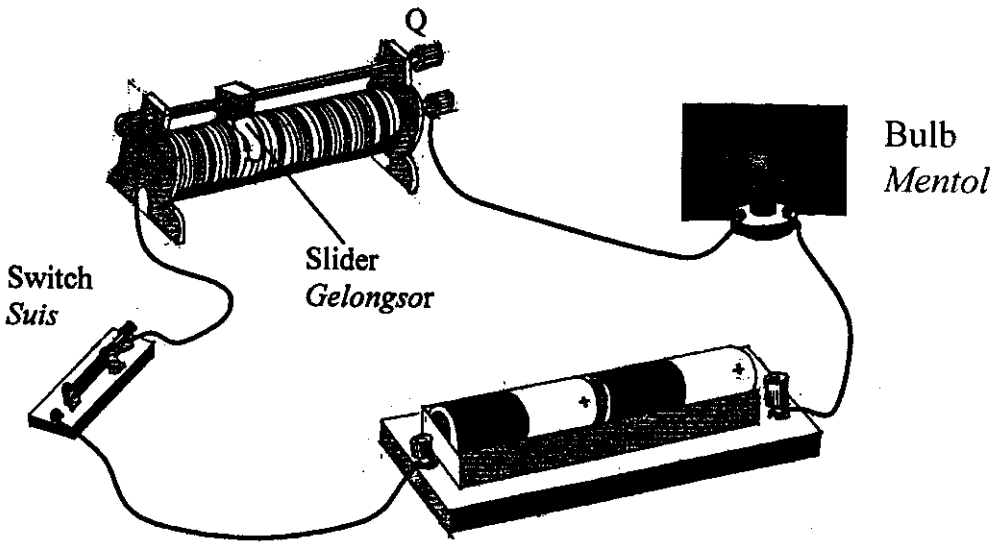


Diagram 12.1
Rajah 12.1

(a) (i) What is the function of rheostat in the circuit ? [1 mark]
Apakah fungsi rheostat dalam litar itu? [1 *markah*]

(ii) State the energy transformation occurs at the bulb in the circuit .
Nyatakan perubahan tenaga yang berlaku pada mentol dalam litar itu.

[1 mark]
[1 *markah*]

(iii) Based on Diagram 12.1, draw a circuit diagram using symbols. [1 Mark]
Berdasarkan Rajah 12.1, lukiskan satu gambarajah litar menggunakan simbol. [*1 Markah*]

(b). Explain why the brightness of the bulb increases when the slider is adjusted close to Q.
Terangkan mengapa kecerahan mentol bertambah apabila gelongsor dilaraskan mendekati Q.

[2 marks]
[*2 markah*]

(c) Diagram 12.2 shows an electric circuit consist of two bulbs R and S labeled 6V, 3W and 6V, 12W respectively connected to a 6V battery.
Rajah 12.2 menunjukkan satu litar elektrik terdiri dari dua mentol, R dan S yang masing-masing berlabel 6V, 3W dan 6V, 12W disambungkan pada sebuah bateri 6V.

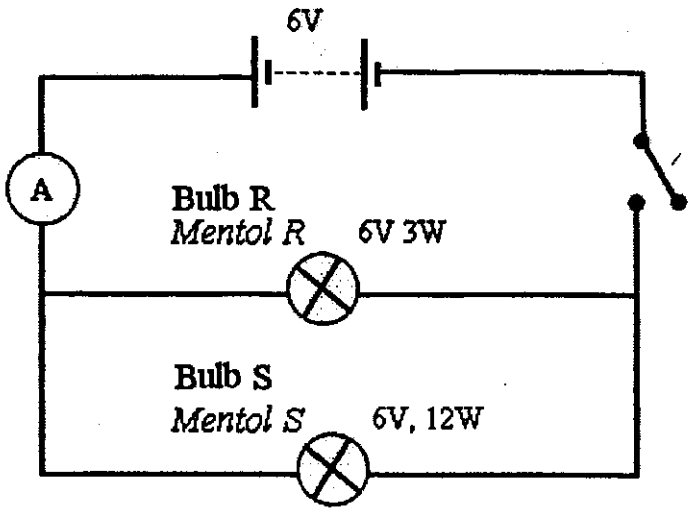


Diagram 12.2
Rajah 12.2

When the switch is turned on, calculate:
Apabila suis dihidupkan , hitungkan :

(i) the total current flows in the circuit .
Jumlah arus yang mengalir didalam litar.

[3 marks]
[3 *markah*]

(ii) the energy used by a bulb , R in one minute.
tenaga yang digunakan oleh mentol R dalam satu minit.

[2 marks]
[2 *markah*]

(d) National Grid Network is a system of electric transmission from power station to the consumer in our country. Diagram 12.3 shows a block diagram of the system.
Rangkaian Grid Nasional ialah satu sistem penghantaran tenaga elektrik daripada stesen janakuasa ke kawasan pengguna di negara kita. Rajah 12.3 menunjukkan gambarajah blok sistem tersebut.

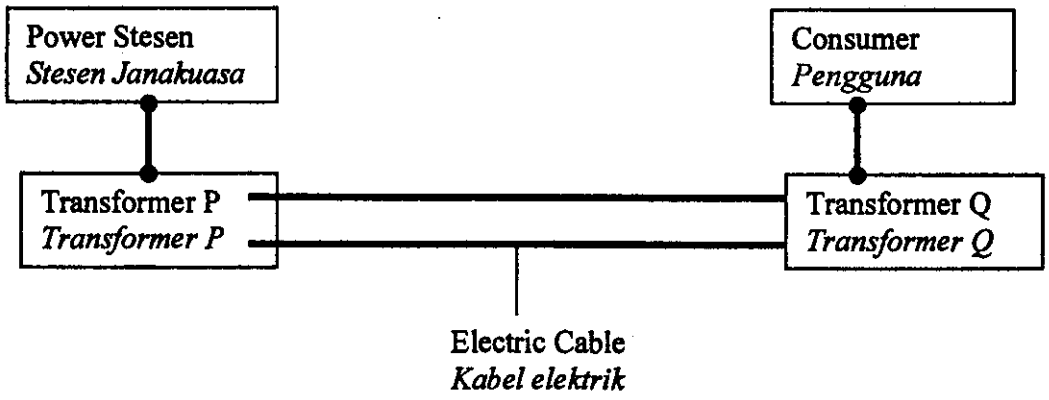


Diagram 12.3
Rajah 12.3

Using your knowledge about electrical and Diagram 12.3 , you are asked to determine the most suitable item used in the system J, K, L, M and N for a National Grid Network system in Diagram 12.4.
Menggunakan pengetahuan anda mengenai elektrik dan Rajah 12.3 , anda dikehendaki mengenalpasti ciri-ciri yang digunakan dalam system J, K, L, M dan N untuk Rangkaian Grid Nasional dalam Rajah 12.4.

System *Sistem*	Type of Transformer *Jenis transformer*	Diameter of conductor cable *Diameter konduktor kabel*	Transmission voltage *Voltan Penghantaran*	Cable Position *Kedudukan kabel*
J	P is step up Q is step down *P injak naik* *Q injak turun*	Big diameter conductor *Diameter konduktor besar*	Curent with low voltage *Arus dengan voltan rendah*	On the pylon *Di atas pilon*
K	Q is step up P is step down *Q injak naik* *P injak turun*	Small diameter conductor *Diameter konduktor kecil*	Current with high voltage *Arus dengan voltan tinggi*	On concrete piller *Di atas tiang konkrit*
L	P is step up Q is step down *P injak naik* *Q injak turun*	Big diameter conductor *Diameter konduktor besar*	Current with high voltage *Arus dengan voltan tinggi*	On the pylon *Di atas pilon*
M	Q is step up P is step down *Q injak naik* *P injak turun*	Small diameter conductor *Diameter konduktor kecil*	Curent with low voltage *Arus dengan voltan rendah*	On concrete *piller* *Di atas tiang konkrit*
N	P is step up Q is step up *P injak naik* *Q injak naik*	Small diameter conductor *Diameter konduktor kecil*	Current with high voltage *Arus dengan voltan tinggi*	On concrete piller *Di atas tiang konkrit*

Diagram 12.4
Rajah 12.4

Study the specification of the five systems and explain the suitability of each system based on following aspects :

Kaji spesifikasi kelima-lima sistem itu dan terangkan kesesuaian setiap satunya berdasarkan aspek berikut:

(i) type of transformer P and Q
jenis transformer P dan Q

(ii) characteristics; of cable used
ciri-ciri kabel yang digunakan

(iii) *electrical potential difference trasmitted.*
beza keupayaan elektrik yang dihantar

(iv) The position of cable
kedudukan kabel

Explain the suitability of each aspects and determine the most suitable system. Give your reason for your choice.

Terangkan kesesuaian setiap aspek dan tentukan sistem yang paling sesuai. Beri sebab bagi jawapan anda.

[10 marks]
[10 *markah*]

ENDS OF QUESTION PAPER

KERTAS SOALAN TAMAT

SULIT
4531/3
Physics
Kertas 3
September
2011
1 $\frac{1}{2}$ jam

Nama : .....

Tingkatan : .....

MAJLIS PENGETUA SEKOLAH - SEKOLAH MALAYSIA (MPSM)
CAWANGAN KELANTAN

PEPERIKSAAN PERCUBAAN SPM
TINGKATAN LIMA
20II

PHYSICS

KERTAS 3

Masa : 1 jam 30 minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. Kertas soalan ini adalah dalam dwibahasa.
2. Soalan dalam bahasa Inggeris mendahului soalan sepadan dalam bahasa Melayu.
3. Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam bahasa Inggeris atau bahasa Melayu.
4. Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.

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

Kertas soalan ini mengandungi 16 halaman bercetak.

Section A
Bahagian A

[28 marks]
[*28 markah*]

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

1. A student carries out an experiment to investigate the relationship between the length of air column ,*l*, and the temperature in Kelvin ,T ,for a fixed mass of air. The air is trapped by mercury column in a capillary tube.
Diagram 1.1 shows the thermometer and capillary tube tied on meter rule.
The sealed end of the capillary tube is placed at the zero mark on the scale of the ruler.

Seorang murid menjalankan satu eksperimen untuk mengkaji hubungan antara panjang turus udara , l, dengan suhu dalam kelvin ,T, bagi satu jisim udara tertentu. Udara tersebut terperangkap dalam tiub rerambut oleh satu turus raksa. Rajah 1.1 menunjukkan termometer dan tiub rerambut diikat pada pembaris meter. Hujung tertutup tiub rerambut diletakkan pada tanda sifar skala pembaris.

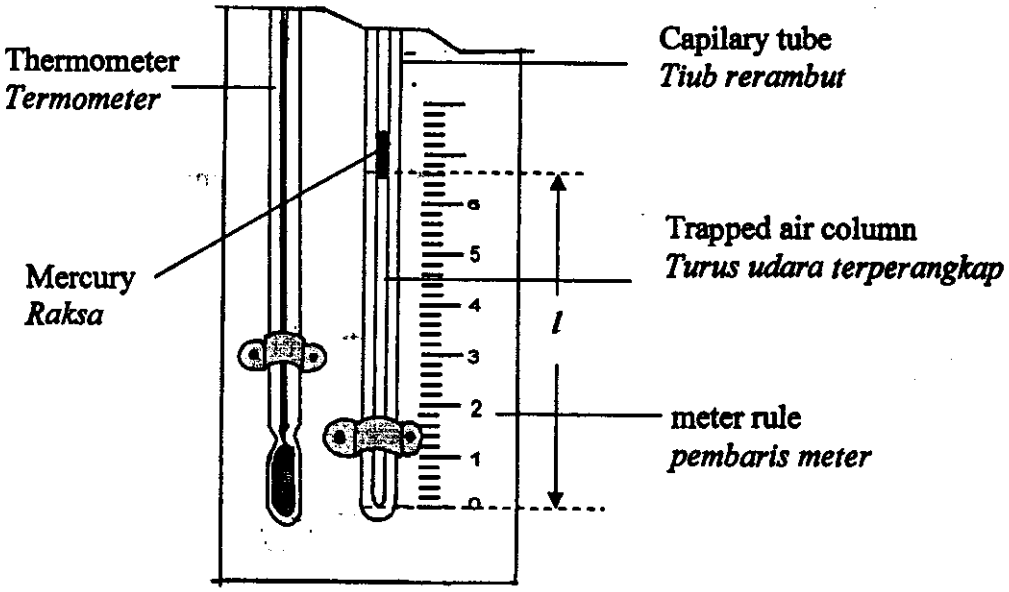


Diagram 1.1
Rajah 1.1

The thermometer and capillary tube are placed into a beaker filled with water.
The arrangement of the apparatus is shown in Diagram 1.2.

Termometer dan tiub rerambut dimasukkan ke dalam bikar yang berisi air. Susunan radas ditunjukkan dalam Rajah 1.2.

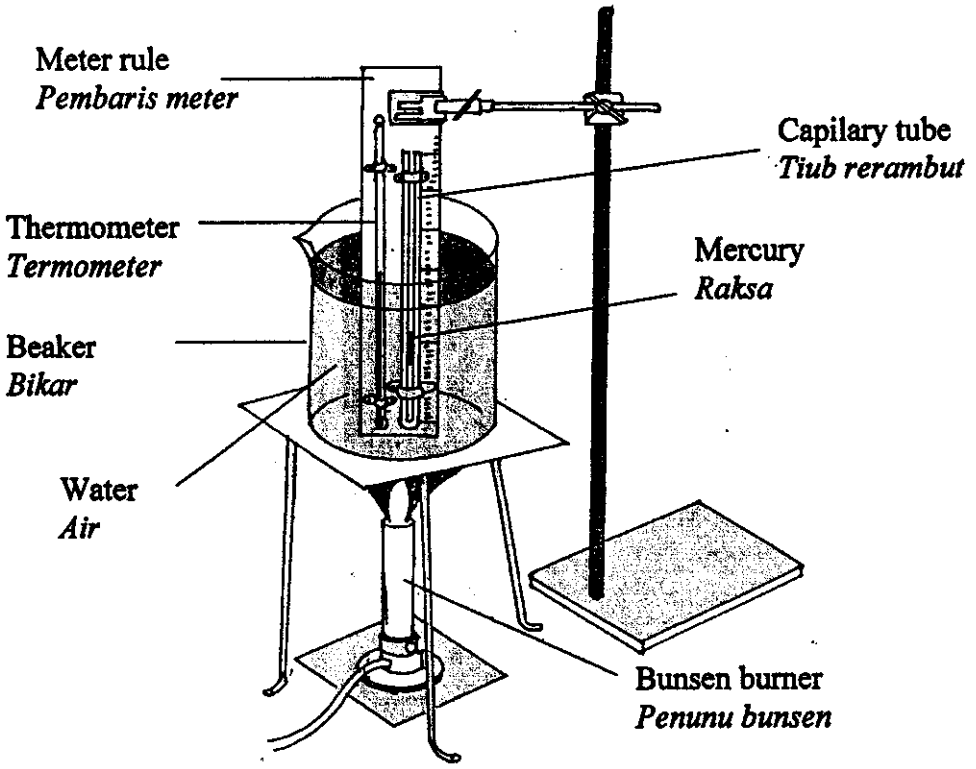


Diagram 1.2
Rajah 1.2

Ice cubes are put into the beaker and the water is stirred until the temperature, θ reached at 0 °C .The actual reading of the length of the air column ,*l*, is shown in Diagram 1.4 on page 5 .
Ketulan ais dimasukkan ke dalam bikar itu dan air dikacau sehingga suhu , θ, mencapai 0 °C.
Bacaan sebenar panjang turus udara, l , ditunjukkan pada Rajah 1.4 di halaman 5.

Then the water is heated and stirred until the temperature , θ, become 10°C.
The actual corresponding reading of the length of the air column,*l*, is shown in Diagram 1.5 on page 5.
Kemudian bikar itu dipanaskan sehingga suhu , θ, menjadi 10 °C.
Bacaan sebenar bagi panjang turus udara, l , ditunjukkan pada Rajah 1.5 di halaman 5.

The procedure of the heating process is repeated with temperatures, 30°C, 50°C, 70°C, and 90°C. The actual corresponding readings of the lengths of the air column, are shown in Diagram 1.6,1.7,1.8 and 1.9 on page 5 and 6.

Kaedah proses pemanasan diulangi dengan suhu θ = 30°C , 50°C, 70°C,dan 90°C
Bacaan sebenar panjang turus udara, l, yang sepadan masing-masing ditunjukkan pada rajah 1.6, 1.7, 1.8 dan 1.9 di halaman 5 dan 6.

(a)For the experiment described on page 2 and 3, identify :
Bagi eksperimen yang diterangkan di halaman 2 dan 3 kenalpasti :

(i) the manipulated variable
pembolehubah dimanipulasikan

.....

[1 mark]
[*1 markah*]

(ii) the responding variable
pembolehubah bergerak balas

.....

[1 mark]
[*1 markah*]

(iii) the constant variable
pembolehubah dimalarkan

.....

[1 mark]
[*1 markah*]

(b) (i) Diagram 1.3 shows the meniscus of the mercury inside the capillary tube.
Rajah 1.3 menunjukkan meniskus raksa di dalam tiub rerambut.

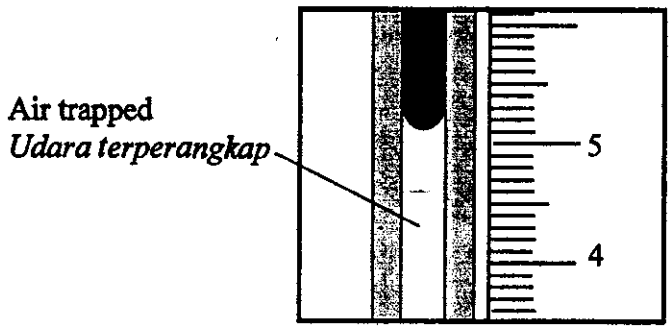
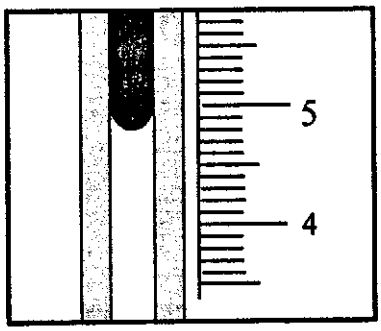


Diagram 1.3
Rajah 1.3

In Diagram 1.3 mark the correct position of the eye while taking the reading of the length of the air column. (You may draw a straight line and symbol of eye at the diagram)

Pada Rajah 1.3 tandakan kedudukan mata yang betul semasa mengambil bacaan panjang turus udara. (Anda boleh melukis garisan lurus dan simbol mata pada rajah)

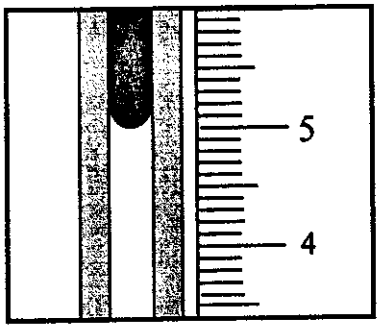
[1 mark]
[*1 markah*]



Reading of air column at θ = 0 °C
Bacaan panjang turus udara pada θ = 0°C

l = ... cm
T = ...K

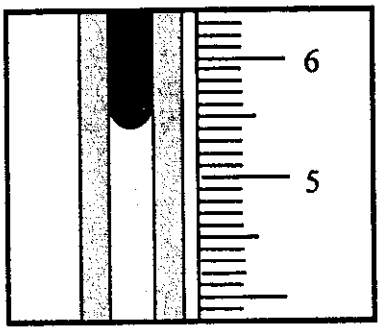
Diagram 1.4
Rajah 1.4



Reading of air column at θ = 10 °C
Bacaan panjang turus udara pada θ =10°C

l = ...cm
T= .....K

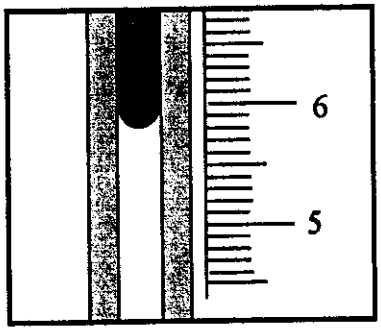
Diagram 1.5
Rajah 1.5



Reading of air column at θ = 30 °C
Bacaan panjang turus udara pada θ = 30°C

l = ...cm
T = ...K

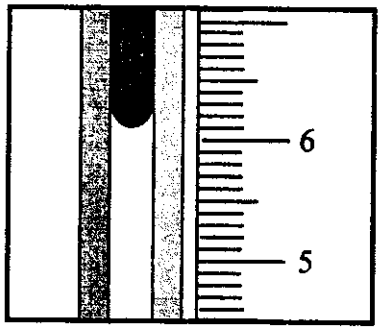
Diagram 1.6
Rajah 1.6



Reading of air column at θ=50 °C
Bacaan panjang turus udara pada θ= 50°C

l = ...cm
T=.....K

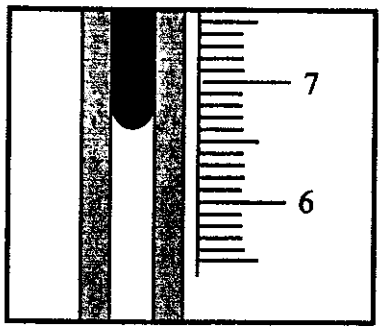
Diagram 1.7
Rajah 1.7



Reading of air column at θ = 70 °C
Bacaan panjang turus udara pada, θ =70°C

l = ...cm
T=.....K

Diagram 1.8
Rajah 1.8



Reading of air column at θ = 90 °C
Bacaan panjang turus udara pada, θ = 90°C

l = ...cm
T= .....K

Diagram 1.9
Rajah 1.9

(ii) Based on Diagrams 1.4, 1.5, 1.6, 1.7, 1.8 and 1.9, on page 5 and 6, determine the length of air column, *l*, and their corresponding temperatures, *θ*. Calculate the temperature in Kelvin, T , for each θ using the equation;

$$T = \theta + 273$$

Berdasarkan Rajah 1.4, 1.5, 1.6,1.7,1.8,dan 1.9 di halaman 5 dan 6, tentukan panjang turus udara , l , yang sepadan dengan suhu, θ .Kirakan suhu dalam Kelvin, T menggunakan persamaan;

$$T = \theta + 273$$

Tabulate your result for *θ*, T and *l* in the space below.
Jadualkan keputusan anda bagi θ, T dan l pada ruang di bawah.

[5 marks]
[5 *markah*]

(c) On the graph paper on page 8, plot a graph of , *l* against T
Pada kertas graf di halaman 8 lukiskan graf , l melawan T.

.....

[1 mark]
[*1 markah*]

(d) Based on your graph, state the relationship between *l* and T.
Berdasarkan graf anda , tentukan hubungan antara l dengan T.

.....

[1 mark]
[*1 markah*]

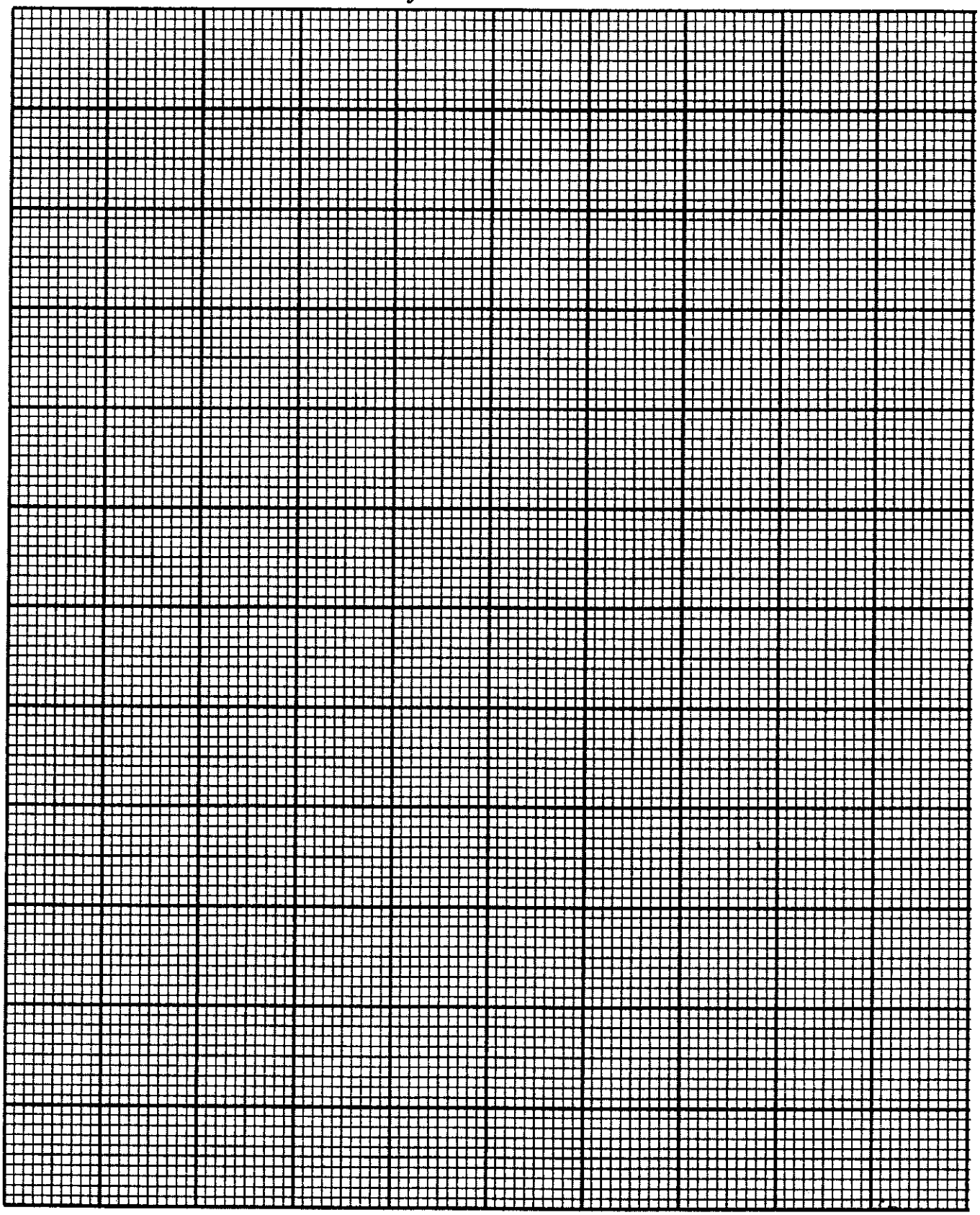
(e) State one precaution that should be taken to obtained the accurate readings of *l* .
Nyatakan satu langkah berjaga-jaga yang perlu diambil untuk mendapatkan bacaan l yang jitu.

.....

[1 mark]
[*1 markah*]

Graph of l against T

Graf l melawan T



2. A student carries out an experiment to determine the internal resistance, r, of a dry cell. The result of this experiment is shown in the graph of potential difference, V, against current, I, in Diagram 2.1.

Seorang murid menjalankan satu eksperimen untuk menentukan rintangan dalam, r, sebuah sel kering. Keputusan eksperimen ini ditunjukkan oleh graf V melawan I pada Rajah 2.1.

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

(i) What happens to V as I increases?
Apakah yang berlaku pada V apabila I bertambah?

.....

[1 mark]
[1 *markah*]

(ii) Determine the value of V when $I = 0$ A.
Show on the graph, how you determine the value of V.
Tentukan nilai V apabila I = 0 A.
Tunjukkan pada graf itu bagaimana anda menentukan nilai V.

V = ...

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

(iii) Name the physical quantity that represents the value in (a)(ii).
Namakan kuantiti fizik yang diwakili oleh nilai dalam (a)(ii)

.....

[1 mark]
[1 *markah*]

Graph of V against I
Graf V melawan I

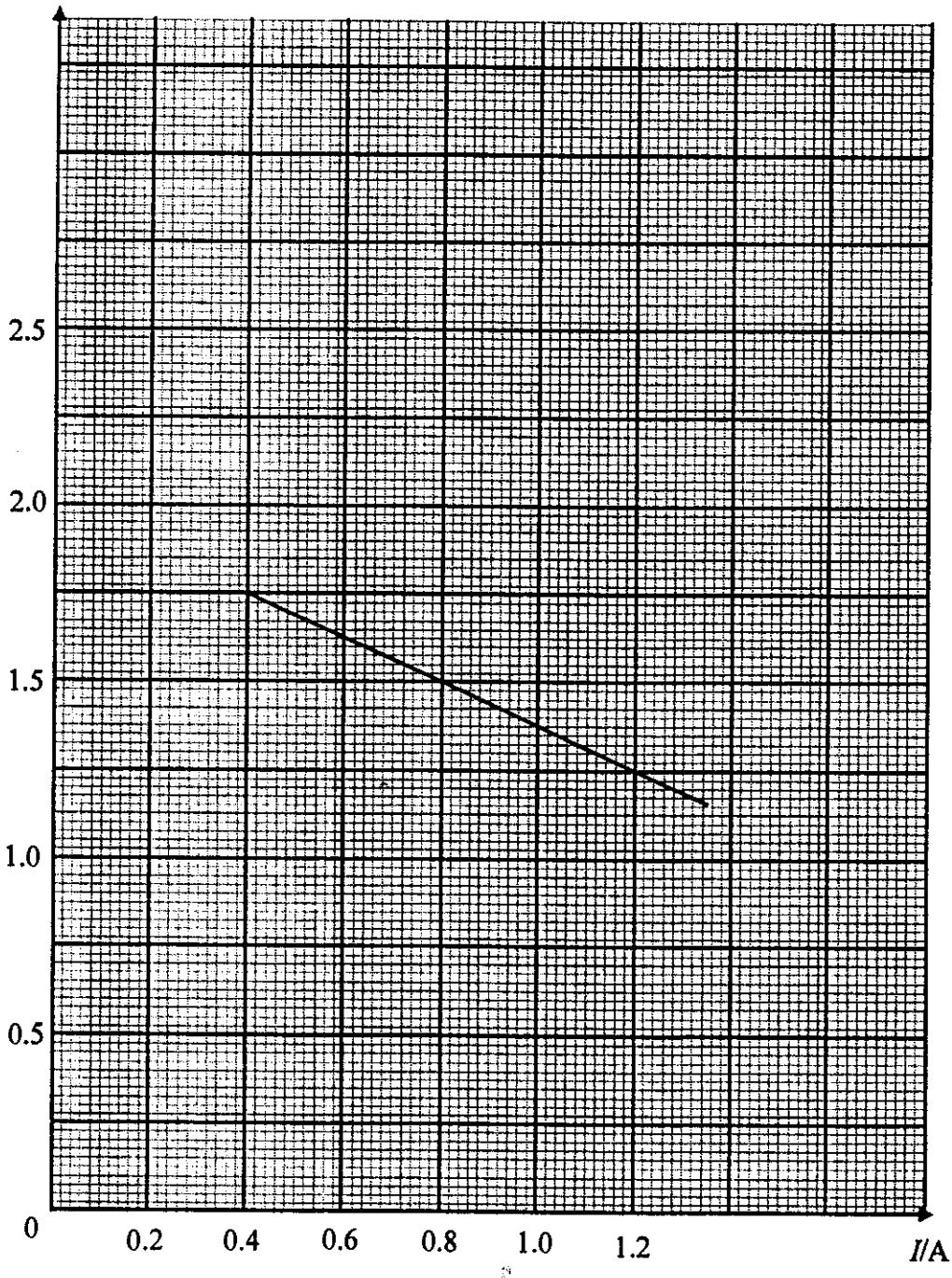


Diagram 2.1
Rajah 2.1

(b) The internal resistance, r, of the dry cell is given by the formula $r = -m$, where m is the gradient of the graph.
Rintangan dalam sel kering, r, diberi oleh formula r = -m, dengan m ialah kecerunan graf.

(i) Calculate the value of m.
Show on the graph how you calculate m.
Hitung kecerunan, m, bagi graf itu.
Tunjukkan pada graf itu bagaimana anda menghitung m.

m = ...

[3 marks]
[3 *markah*]

(ii) Determine the value of r.
Tentukan nilai r.

r = ...

[1 mark]
[1 *markah*]

(c) From the graph, state the value of V when $I = 0.6$ A.
Show on the graph how you determine the value of V.
Daripada graf, nyatakan nilai V apabila I = 0.6 A.
Tunjukkan pada graf bagaimana anda menentukan nilai V.

V = ...

[2 marks]
[2 *markah*]

(d) State **two** precautions that can be taken to improve the accuracy of the readings in this experiment.
Nyatakan dua langkah berjaga-jaga yang boleh diambil untuk memperbaiki ketepatan bacaan dalam eksperimen ini.

1.....

2.....

[2 marks]
[2 *markah*]

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

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

3 Diagram 3.1 shows the water flows through the penstock of a dam. The turbine rotates faster due to the pressure of water which flows with high speed.
Rajah 3.1 menunjukkan air mengalir melalui terowong sebuah empangan. Turbin berputar dengan laju disebabkan tekanan aliran air mengalir dengan laju.

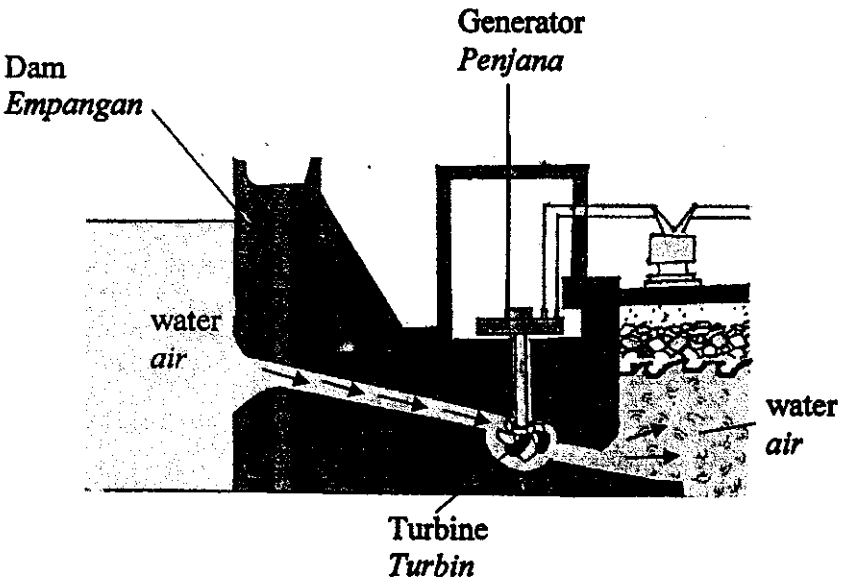


Diagram 3.1
Rajah 3.1

Diagram 3.2 shows the water flows through the penstock when the water level is decreased. The turbine rotates slowly due to the low pressure of water which flows with low speed.
Rajah 3.2 menunjukkan air mengalir melalui terowong apabila paras air di empangan berkurang.Turbin berputar perlahan disebabkan tekanan air yang rendah mengalir dengan perlahan.

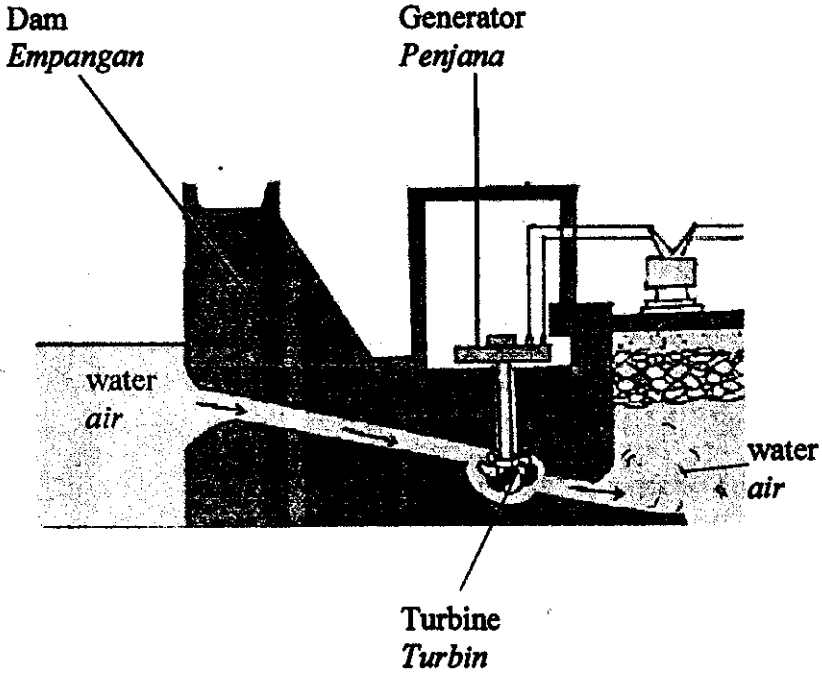


Diagram 3.2
Rajah 3.2

Based on obsservation and information:
Berdasarkan maklumat dan pemerhatian :

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

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

(b) State **one** suitable hypothesis.
*Nyatakan **satu** hipotesis yang sesuai.*

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

(c) With the use of apparatus such as a tall beaker, thistle funnel, rubber tube and other apparatus, describe one experiment to investigate the hypothesis stated in 3(b).
Dengan menggunakan radas seperti sebuah bikar tinggi , corong tisel, tiub getah dan lain-lain radas, terangkan satu eksperimen untuk menyiasat hipotesis yang anda nyatakan di 3(b).

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

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

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

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

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

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

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

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

[10 marks]
[10 *markah*]

4. Diagram 4.1 and Diagram 4.2 show a cross sectional of bicycle dynamo which has a magnet and a coil of insulated copper wire. The output of dynamo is connected to a bicycle lamp. When the magnet is rotated by turning the wheel with same speed, the lamp in Diagram 4.2 is light up brighter than in Diagram 4.1.
Rajah 4.1 dan 4.2 menunjukkan keratan rentas sebuah dinamo basikal yang mempunyai satu magnet dan gegelung dawai kuprum bertebat. Output dinamo disambungkan kepada lampu basikal. Apabila magnet berputar dengan memutarkan tayar pada halaju yang sama didapati nyalaan lampu dalam Rajah 4.2 lebih terang dari lampu dalam Rajah 4.1.

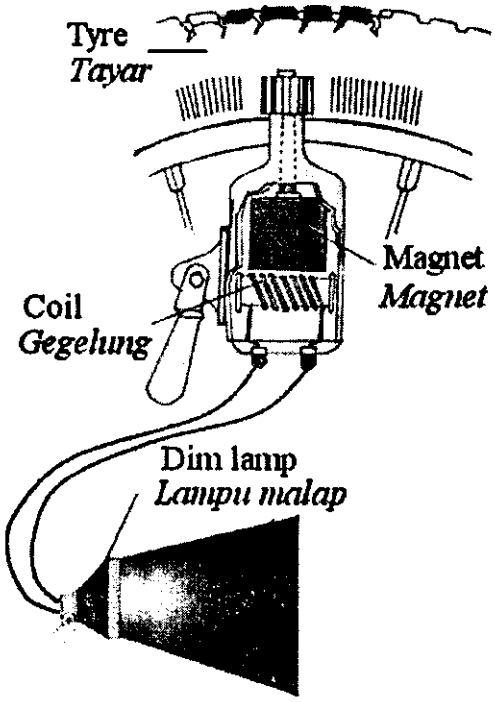


Diagram 4.1
Rajah 4.1

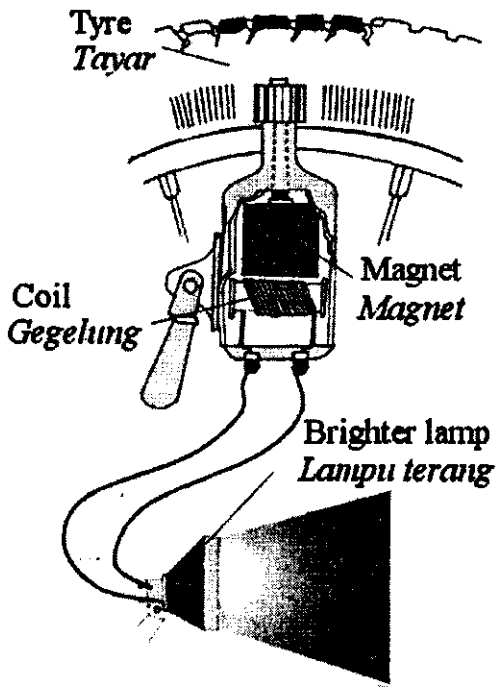


Diagram 4.2
Rajah 4.2

Based on the information and observation:
Berdasarkan maklumat dan pemerhatian:

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

[1 mark]
[*1 markah*]

(b) State **one** suitable hypothesis.
*Nyatakan **satu** hipotesis yang sesuai.*

[1 mark]
[*1 markah*]

(c) With the use of apparatus such as a d.c. power supply, magnets, C-shaped iron yoke, bare copper wire, connecting wires and other apparatus, describe **one** experiment to investigate the hypothesis stated in **4(b)**.
*Dengan menggunakan radas seperti bekalan arus a.t, magnet, dening besi berbentuk C, dawai kuprum tidak bertebat, wayar penyambung dan radas lain, terangkan **satu** eksperimen untuk menyiasat hipotesis yang dinyatakan di **4(b)**.*

In your description, state clearly the following:
Dalam penerangan anda, nyatakan dengan jelas perkara berikut:

(i) The aim of the experiment
Tujuan eksperimen

(ii) The variables in the experiment
Pembolehubah dalam eksperimen

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

(iv) The arrangement of the apparatus
Susunan radas

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

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

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

[10 marks]
[*10 markah*]

END OF QUESTION
KERTAS SOALAN TAMAT

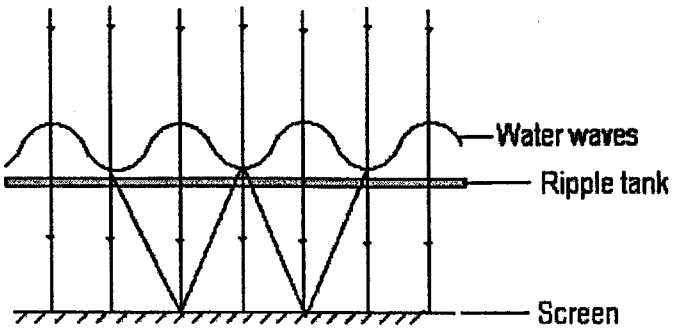
Physics

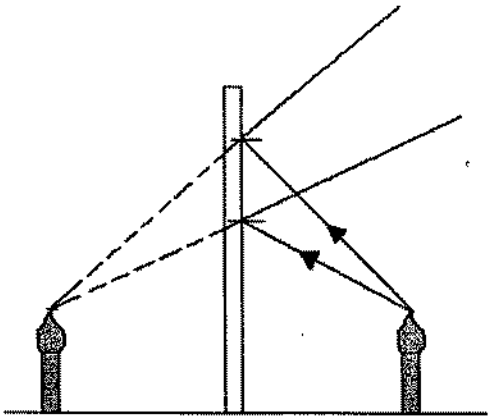
SCHEME PAPER 1 : TRIAL SPM KELANTAN 2011

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

PEPERIKSAAN PERCUBAAN
KELANTAN 2011
MARKING SCHEME FOR PHYSICS PAPER 2

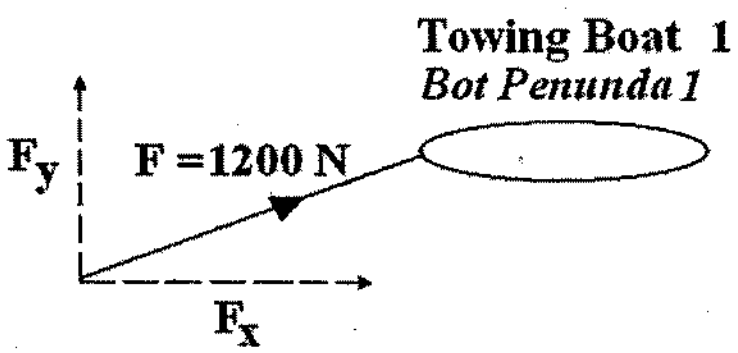
1	(a)		Tail	1
	(b)		Measure depth	1
		(i)	Negative Zero error	1
		(ii)	- 0.07 cm	1
2	(a)		Reflection of sound waves	1
	(b)		$v = \frac{s}{t}$ $v = \frac{170}{0.5}$ $= 340\ ms^{-1}$	1 1
	(c)	(i)	decreases	1
		(ii)	The density of water is higher	1
3.	(a)		Unstable isotope which decay and give out radioactive emission	1
	(b)	(i)	GM tube	1
		(ii)	Portable // can detect beta particle	1
	(c)	(i)	Location that shows highest reading	1
		(ii)	Actual reading = 1250 – 50 = 1200 count / min	1 1
4.	(a)		An electronic device that has one or more inputs and one output	1
	(b)	(i)	AND gate	1
		(ii)		1
	(c)	(i)	Warm Bright	1 1
		(ii)	0 0 0 1 All correct 2 M 1incorrect 1M 2 incorrect 0M	2

5.	(a)		Elastic potential energy	1
	(b)	(i)	$F_2 > F_1$	1
		(ii)	Compression distance in Diagram 5.2 (a) > Diagram 5.1 (a)	1
	(c)	(i)	Velocity in Diagram 5.2 (b) > Diagram 5.1 (b)	1
		(ii)	Kinetic energy in Diagram 5.2 (b) > Diagram 5.1 (b)	1
	(d)		Elastic Potential energy increase, Kinetic energy increases // directly proportional	1
	(e)	(i)	Kinetic energy increases	1
		(ii)	Kinetic energy directly proportional to the thickness of spring	1
6	(a)		Sources that have the same frequency /same amplitude and in phase (same phase)	1
	(b)		• The bright and dark bands of the wave pattern formed on the screen because the surface of water acts as lenses. • The crest of water waves similar with convex lens to focus the light, hence the bright bands occur, • the trough of water waves similar with concave lens diverges the light, hence the dark banks occur. • OR Diagram 	1 1 1
	(c)	(i)	Distance between 2 sources in Diagram 6.2 is bigger	1
		(ii)	Distance between 2 consecutive antinodal lines in Diagram 6.3 is bigger	1
	(d)	(i)	The bigger the distance between 2 sources,the smaller the distance between 2 consecutive antinodal lines	1
		(ii)	Interference	1

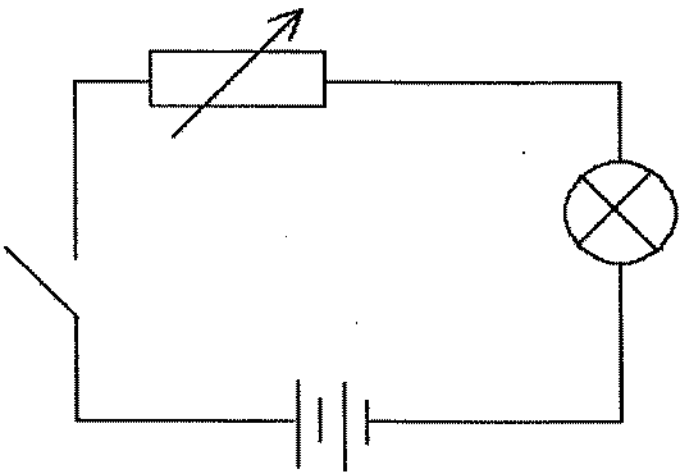
7	(a)		Image that cannot be formed on screen	1
	(b)			2
	(c)		1. Upright 2. Same size 3. Laterally inverted (any two)	2
	(d)		Distance between candle and image = 2 + 2 = 4 m	1
	(e)	(i)	• Prism • Avoid multiple image // not affected by weather // less likely to be damaged // are the light are totally reflected	1 1
		(ii)	• One prism is on the top and other one is at the bottom // diagram • Produce total internal reflection	1 1
8.	(a)		The quantity of beat required to increase the temperature of I kg of substance by 1 ^{0}C.	1
	(b)	(i)	Type of plate :Polystyrene Reason: Avoid beat loss to surrounding	1 1
		(ii)	Type of liquid : oil Reason: to produce good thermal contact between Aluminium block and thermometer.	1 1
		(iii)	Material used to wrap the Aluminium block : felt cloth Reason: Avoid heat loss to surrounding	1 1
	(c)	(i)	Diagram 8.1: $P \times t = m \times c \times \Theta$ $c = \frac{P \times t}{m \times \Theta}$ $c = \frac{200 \times 240}{1 \times 30}$ $= 1600 \text{ J kg}^{-1} {}^0\text{C}^{-1}$	 1 1

		(ii)	Diagram 8.2: $P \times t = m \times c \times \Theta$ $c = \frac{P \times t}{m \times \Theta}$ $c = \frac{200 \times 240}{1 \times 50}$ $= 960 \text{ J kg}^{-1} {}^{0}\text{C}^{-1}$	1 1
	(d)		Diagram 8.2	1
9	(a)		Mass per unit volume	1
	(b)	(i)	1.The depth of hole in Diagram 9.2 > Diagram 9.1 2. The distance of spurt of water in Diagram 9.2 > Diagram 9.1 3. The water pressure in Diagram 9.2 > Diagram 9.1	1 1 1
		(ii)	(a) The deeper the hole the higher the pressure (b) The higher the pressure the further the spurt of water.	1 1
	(c)		1. The speed of jet of gas is high 2. As the speed of gas high the pressure is low 3. The atmospheric pressure is higher than pressure inside // there is difference in pressure. 4. Complete combustion occurs.	1 1 1 1
	(d)		**Modification/suggestion** / **Explanation** Oil / Incompressible/ No air bubble High boiling point/ Low density/ High viscosity / Does not change to gas s; Lighter/ Less friction/ Does not evaporate easily Small master piston / High pressure produced/ Small force used Big slave piston / Produce big force Aluminium/ Steel / Strong/ Does not break easily/ Non corrosive/ Prevent leakage/ Withstand temperature/ Does not rust easily	2 2 2 2
10.	(a)		36 J of energy is consumed in 1 s if connected to a 24 V power supply	1
	(b)	(i)	(The brightness of bulb) in D10.2 is brighter than D10.1	1
		(ii)	The number of turns of the primary coil is equal	1

<table>
<tr><td></td><td></td><td></td><td>The number of turns of the secondary coil in D10.2 is bigger than D10.1</td><td>1</td></tr>
<tr><td></td><td>(c)</td><td>(i)</td><td>When the number of turns in secondary coil is bigger (than primary coil), the bulb is brighter</td><td>1</td></tr>
<tr><td></td><td></td><td>(ii)</td><td>When the induced current (produced) is increases, the brightness of bulb increases</td><td>1</td></tr>
<tr><td></td><td>(d)</td><td>(i)</td><td>• When an ac current flows in the primary coil, an alternating magnetic field to be set up inside the iron core
• The alternating magnetic field lines in the primary coil cut the secondary coil, an e.m.f is induced in it as to oppose the change of the magnetic flux which causing it
• The induced e.m.f will produce an induced current at the secondary coil</td><td>1
1
1</td></tr>
<tr><td></td><td></td><td>(ii)</td><td>Use soft iron core // Use thicker wire of conductor// Use laminated core // Winding the secondary and primary on top of each other</td><td>1</td></tr>
<tr><td></td><td>(e)</td><td></td><td>
<table>
<tr><td>ASPECT</td><td>REASONING</td></tr>
<tr><td>use thin diaphragm</td><td>Easy to vibrate</td></tr>
<tr><td>Use strong material</td><td>Not easy to break</td></tr>
<tr><td>More number of turns of coil</td><td>Increase the rate of change of magnetic flux linkage // The magnitude of the induced current or is also increased</td></tr>
<tr><td>Thicker diameter of wire of coil</td><td>Reduce the resistance of the coil</td></tr>
<tr><td>Using more powerful magnet to increase the strength of the magnetic field</td><td>Increase the rate of change of magnetic flux linkage //The magnitude of the induced current is also increased</td></tr>
</table>
</td><td>2
2
2
2
2</td></tr>
</table>

11.	(a)		Sum of two or more forces to produce a single force	1
	(b)	(i)		1
		(ii)	Fx = F Cos 20 = 1200 x 0.9397 = 1127.63 N	I 1
		(iii)	Resultant force = 2 F Cos 20 = 2 x 1127.63 = 2255.26 N	1 1
	(c)		• friction in water is minimum • ship still moves forward although the engine stops • due to the inertia of momentum • ship has to be towed to its location when it has come to a complete shop	4
	(d)			

ASPECT	REASONING	
Small angle	Produce bigger resultant force	2
Streamlined	Reduce resistance	2
Steel Rod	Strong// able to withstand high tension	2
Inelastic	Produce uniform force during the towing.	2
Arrangement K is chosen	Big angle, Streamlined, Steel Rod, Inelastic	2

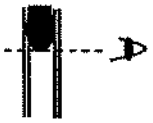
<table>
<tr><td>12</td><td>(a)</td><td>(i)</td><td>To control resistance / electric current</td><td>1</td></tr>
<tr><td></td><td></td><td>(ii)</td><td>Electrical energy to heat energy to light energy</td><td>1</td></tr>
<tr><td></td><td></td><td>(iii)</td><td>  </td><td></td></tr>
<tr><td></td><td>(b)</td><td></td><td>Length of wire decreases
Resistance decreases
Current increase</td><td>1
1
1</td></tr>
<tr><td></td><td>(c)</td><td>(j)</td><td>P = VI
$I = \frac{P}{V}$
$= \frac{3}{6}$
= 0.5 A

Total I = 0.5 x 2 = 1 A</td><td>

1
1

1</td></tr>
<tr><td></td><td></td><td>(ii)</td><td>E = VIt
= 6 x 0.5 x 60
= 180 J</td><td>
1
1</td></tr>
<tr><td></td><td>(d)</td><td></td><td><table><tr><td>Aspect</td><td>Reasoning</td></tr><tr><td>P step up, Q step down</td><td>P to increase voltage, Q to decrease voltage to consumer</td></tr><tr><td>Big Diameter</td><td>Reduce resistance</td></tr><tr><td>Current with high voltage</td><td>Small current flows // Reduced power/ heat loss</td></tr><tr><td>Cable on pylon</td><td>Safety reason</td></tr><tr><td>L is chosen</td><td>P step up Q step down, Big Diameter, Current with high voltage, Cable on pylon</td></tr></table></td><td>10</td></tr>
</table>

Skema Pemarkahan Trial SPM Negeri Kelantan 2011

NO	MARKING CRITERIA	MARK
1(a) (i)	- temperature/ θ/T	1
(ii)	-Valume (air trapped) /Length af air trapped/ /	1
(iii)	- pressure af the trapped air/ diameter of capillary tube/ Mass af the air	1
(b) i)		1
(ii)	All values af , / , correct (2m) - at least three carrect (1m)	2
	All values af T are carrect	1

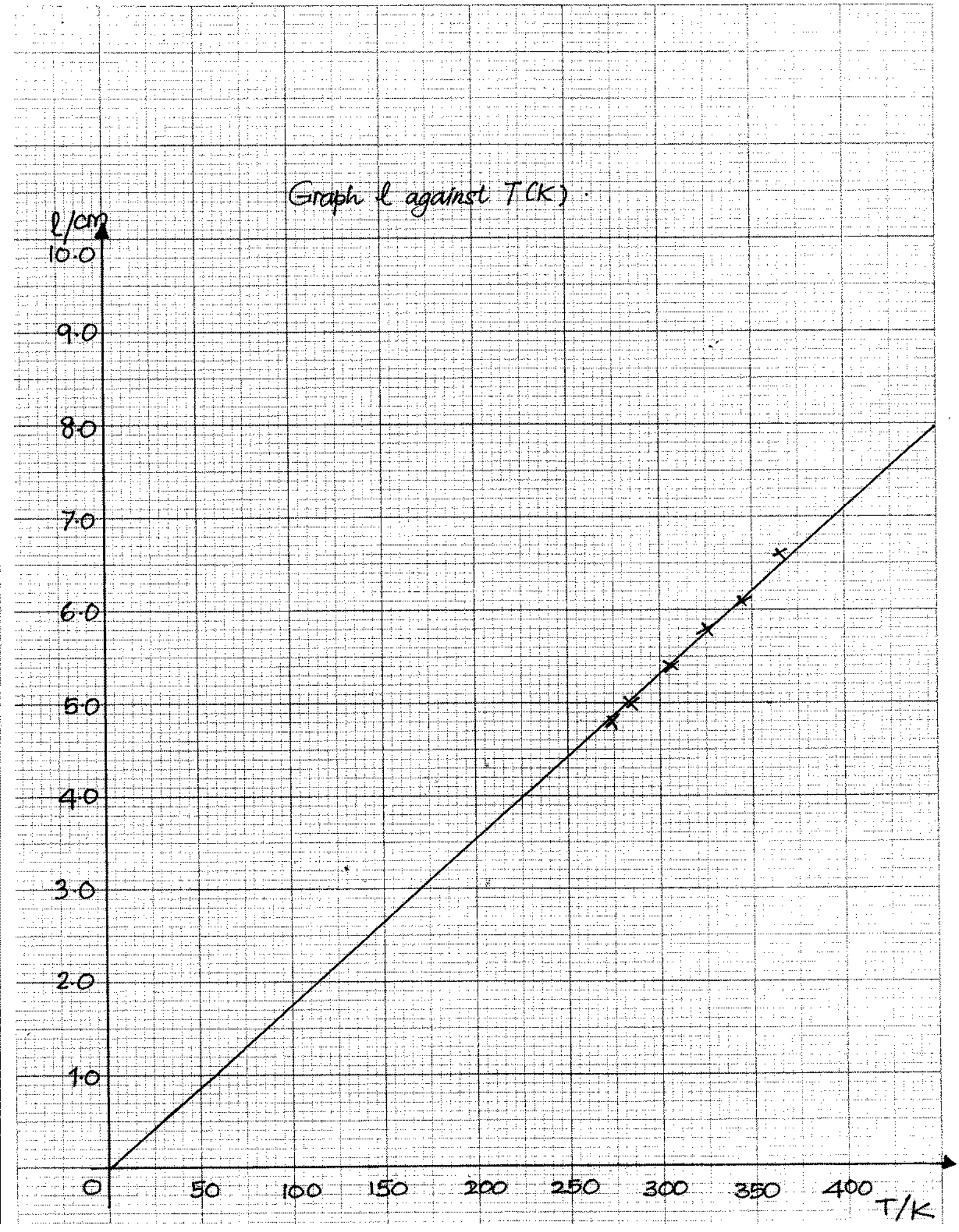
Θ /°C	l / cm
0	4.8
10	5.0
30	5.4
50	5.8
70	6.1
90	6.6

Tabulate θ ,T and *l* correctly
- θ , T and *l* shown in the table ✓
- State the units of θ ,T and l ✓
- All values of T (no dec. places) and , *l* (one dec. places) are consistent. ✓

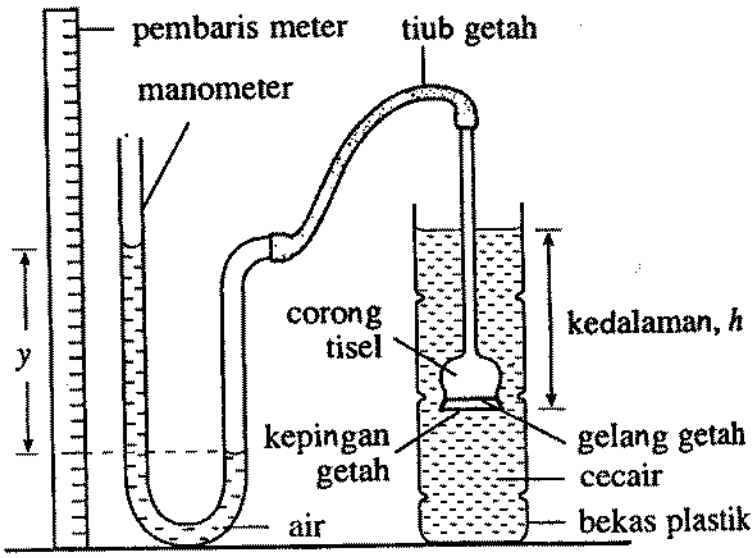
Temperature,θ / °C	*Temperature, T/K*	*Length, l* / cm
0	273	4.8
10	283	5.0
30	303	5.4
50	323	5.8
70	343	6.1
90	363	6.6

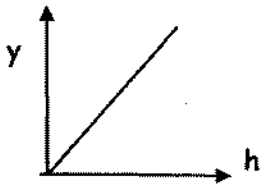
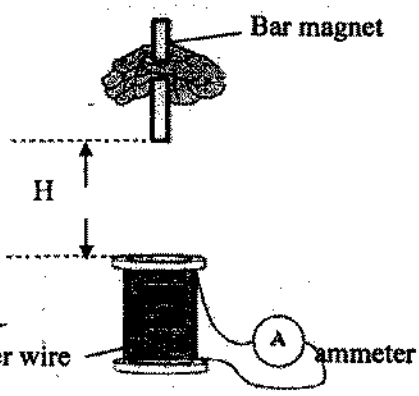
2

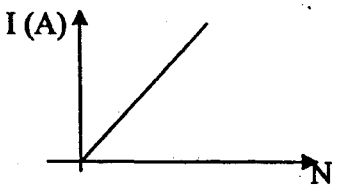
Score	Mark
3	2
2	1
1	1



1 (c)	Tick √ based on the following aspect A. Show on Y axis and T on X axis ✓ B. State the units of the variable correctly ✓ C. Both axes are marked with uniform scale ✓ D. All six points are plotted correctly ✓✓ five point are correctly plotted ✓ E. Best straight line is drawn ✓ F. Show the minimum size of graph ot least ✓ (Y-16cm x X-12 cm) Score: Score of ticks / Mark 7 / 5 5-6 / 4 3-4 / 3 2 / 2 1 / 1	5
1(d)	*I* directly proportional to T	1
1(e)	Position of eye is (same level / perpendicular) to the scale of thermometer Repeat reading I (two/three/several) times for each Θ and calculate the average.	1
2(o)(i)	V decreases linearly with I.	1
(ii)	Extrapolote the graph to cut the y-axis 2.0 V	1 1
(iii)	Electromotive force	1
2(b)(i)	Suitable Δ (at least 8cm x 8 cm) Correct $\frac{y_2 - y_1}{x_2 - x_1}$ = (2.0 - 1.0) (1.6-0) m = -0.625 (V A^{-1}) or Ω with correct unit	1 1 1
(ii)	r = 0.625 Ω	1
(c)	Lines shown on graph 1.625 V	1 1
(d)	All the connecting points must be tight. (1m) When reading the voltmeter and ammeter the pointer is overlap with it image in mirror. (1m)	2

	After taking a reading of voltmeter and ammeter the switch is turned off before repeating the experiment. (1m)	
3 (a)	The pressure of liquid depend on its depth.	1
(b)	When the the depth increases the pressure increases.	1
(c)	Aim: To investigate the relationship between the depth and pressure	1
	Variables: Manipulated variable : Depth Responding variable : Pressure Fixed variable : Density	 1 1 1
	Apparatus and materials : Thistle funnel, manometer, rubber tube, water, coloured water,retort stand , rubber membrane and meter rule	1
	Aranggement of apparatus:  	1
	Procedure : The mouth of thistle funnel is lowered into water in the measuring cylinder at h=5.0 cm (1m) The difference level of coloured water, y , in manometer or U-tube is recorded. (1m) Repeat the experiment with , h =10cm, 15 cm 20cm and 25cm. (1m)	3

<table>
<tr><td></td><td>Tabulated the data :
<table><tr><th>Depth, h /cm</th><th>Different height of water level, y/cm</th></tr><tr><td>5.0</td><td></td></tr><tr><td>10.0</td><td></td></tr><tr><td>15.0</td><td></td></tr><tr><td>20.0</td><td></td></tr><tr><td>25.0</td><td></td></tr></table></td><td></td></tr>
<tr><td></td><td>Analysing data: The graph af y// P, against depth, h , is plotted.
 
</td><td></td></tr>
<tr><td>4 (a)</td><td>The magnitude of (induced) current depends on number of turns.</td><td>1</td></tr>
<tr><td>(b)</td><td>When number of turns increases, the (magnitude of induced) current increases</td><td>1</td></tr>
<tr><td>(c)</td><td>Aim:
Ta investigate the relationship between number of turns and (magnitude af induced) current</td><td>1</td></tr>
<tr><td></td><td>Variable;
Manipulated : Number of turns, N (1m)
Responding : Current, I (1m)
Fixed : speed, v (1m)</td><td>3</td></tr>
<tr><td></td><td>Apparotus:
(list given), metre rule, ammeter, insulated copper wire, retort stand, cardboard tube</td><td>1</td></tr>
<tr><td></td><td>SET UP
 
</td><td>1</td></tr>
<tr><td></td><td>Procedure:
The insulated copper wire is wound around a cardboard tube with number of turns, N = 20 turns. (1m)</td><td>1</td></tr>
</table>

<table>
<tr><td></td><td>The height of a bar magnet from the above of top end of the solenoid, H = 30.cm is measured</td><td></td></tr>
<tr><td></td><td>The bar magnet is dropped into the solenoid.
The reading of the ammeter (Current), I is measured.(1m)</td><td>1</td></tr>
<tr><td></td><td>The experiment is repeated with number of turns, N = 40 turns, 60 turns, 80 turns and 100 turns.</td><td>1</td></tr>
<tr><td></td><td>Tabulating data
<table><tr><th>Number of turns, N</th><th>Induced Current, I (A)</th></tr><tr><td>20</td><td></td></tr><tr><td>40</td><td></td></tr><tr><td>60</td><td></td></tr><tr><td>80</td><td></td></tr><tr><td>100</td><td></td></tr></table></td><td>1</td></tr>
<tr><td></td><td>Analysing data
 

OR
stated : draw a graph I against N</td><td></td></tr>
<tr><td></td><td>total:
Catatan : skor 13 M beri 12 M
12M beri 12 M
lain beri ikut markah dia dapat</td><td>13/12</td></tr>
</table>