Nama: .....

NO. KAD PENGENALAN

ANGKA GILIRAN

PERSIDANGAN KEBANGSAAN PENGETUA
SEKOLAH MENENGAH MALAYSIA (CAWANGAN MELAKA)

PEPERIKSAAN PERCUBAAN SIJIL PELAJARAN MALAYSIA 2010 4531/1
PHYSICS

Kertas1
Ogos/Sept.
1 ¼ Jam Satu jam lima belas minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Kertas soalan ini adalah dalam dwibahasa.*
2. *Calon dikehendaki membaca maklumat di halaman bawah.*

INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON

1. *This question paper consists of **50** questions.*
   Kertas soalan ini mengandungi 50 soalan.
2. *Answer **all** questions.*
   *Jawab **semua** soalan.*
3. *Answer each question by blackening the correct space on the answer sheet.*
   Jawab setiap soalan dengan menghitamkan ruangan yang betul pada kertas jawapan.
4. *Blacken only **one** space for each question.*
   *Hitamkan **satu** ruangan sahaja bagi setiap soalan.*
5. *If you wish to change your answer, erase the blackened mark that you have made. Then blacken the space for the new answer.*
   Sekiranya anda hendak menukar jawapan, padamkan tanda yang telah dibuat. Kemudian hitamkan jawapan yang baru.
6. *The diagrams in the questions provided are not drawn to scale unless stated.*
   Rajah yang mengiringi soalan tidak dilukiskan mengikut skala kecuali dinyatakan.
7. *You may use a non-programmable scientific calculator.*
   Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogramkan.
8. *A list of formulae is provided on page 2.*
   Satu senarai rumus disediakan di halaman 2.

Kertas soalan ini mengandungi 28 halaman bercetak.

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

1. $a = \frac{v-u}{t}$
2. $v^2 = u^2 + as$
3. $s = ut + at^2$
4. Momentum $= mv$
5. $F = ma$
6. Kinetic energy $= \frac{1}{2}mv^2$
7. Potential energy/
   Tenaga keupayaan gravity $= mgh$
8. Elastic potential energy /
   Tenaga keupayaan kenyal $= \frac{1}{2}Fx$
9. $\rho = \frac{m}{v}$
10. Pressure, $p = h\rho g$
11. Pressure/*tekanan*, $P = \frac{F}{A}$
12. Heat/*haba*, $Q = mc\theta$
13. Heat/*haba*, $Q = ml$
14. $\frac{PV}{T}$ = constant/*pemalar*
15. $E = mc^2$
16. $v = f\lambda$
17. Power, $P = \frac{energy}{time}$
    kuasa, $P = \frac{tenaga}{masa}$
18. $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$
19. linear magnification $= \frac{image\ size}{object\ size}$
    Pembesaran linear $= \frac{saiz\ imej}{saiz\ objek}$
20. $\lambda = \frac{ax}{D}$
21. $n = \frac{Sin\ i}{Sin\ r}$
22. n $= \frac{real\ depth}{apparent\ depth}$
    n $= \frac{dalam\ nyata}{dalam\ ketara}$
23. $Q = It$
24. $V = IR$
25. Power/kuasa, $P = IV$
26. $\frac{N_s}{N_p} = \frac{V_s}{V_p}$
27. Efficiency/kecekapan $= \frac{I_s V_s}{I_p V_p}$ x 100%
28. $g = 10\ ms^{-2}$

1. Which of this is a unit for a base quantity?
Manakah antara yang berikut adalah unit bagi kuantiti asas

A. Joule/*Joule*
B. Minute/*Minit*
C. Newton/*Newton*
D. Ampere/*Ampere*

2. A technician needs to measure the internal diameter of a water pipe as accurately as possible. Which instrument should be used?
Seorang juruteknik hendak mengukur diameter dalam sebatang paip air seberapa jitu yang mungkin. Apakah alat yang patut digunakannya ?

A. Metre rule / *Pembaris meter*
B. Measuring tape /*Pita pengukur*
C. Vernier callipers / A*ngkup vernier*
D. Micrometer screw gauge / T*olok skru mikrometer*

3. A car accelerates from rest. The graph in Diagram 1 shows how the car's speed changes with time.
Rajah 1 menunjukkan graf halaju-masa sebuah kereta yang memecut bermula dari pegun

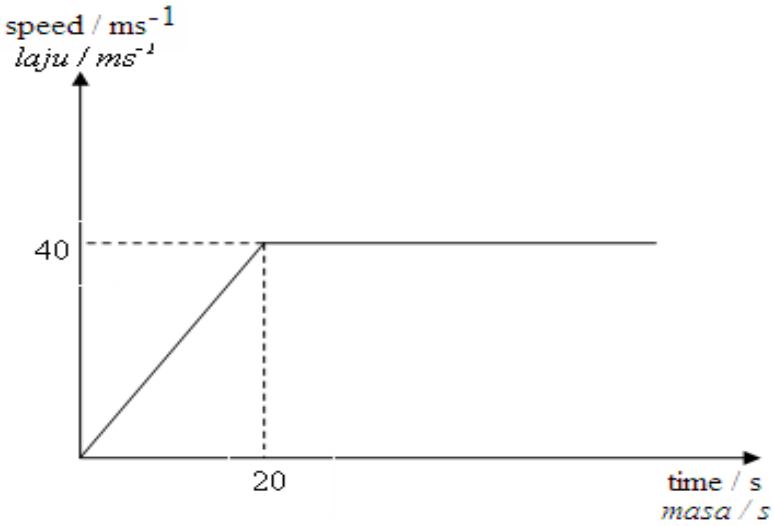


Diagram 1
Rajah 1

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

A 100 m
B 200 m
C 300 m
D 400 m

4. Diagram 2 shows a man falling from a motorcycle.
Rajah 2 menunjukkan seorang lelaki jatuh daripada motorsikal.

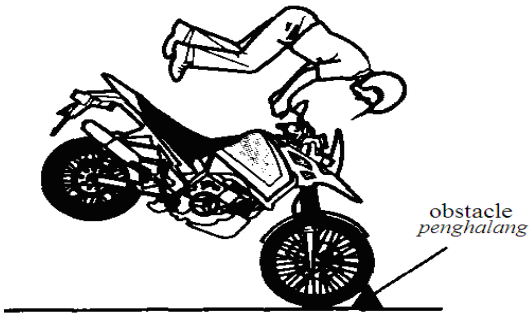


Diagram 2
Rajah 2

What property responsible for his fall?
Konsep fizik apakah yang menyebabkan dia terjatuh?

A Inertia / *Inersia*
B Principle of conservation of energy / *Prinsip Keabadiaan Tenaga*
C Principle of conservation of momentum / *Prinsip Keabadian Momentum*

5 Diagram 3 shows a tig-tag match between team A and Team B. Both teams are pulling in opposite direction on a rope.
Rajah 3 menunjukkan perlawanan tarik tali antara pasukan A *dan pasukan* B. Kedua pasukan *sedang menarik tali pada arah yang bertentangan.*

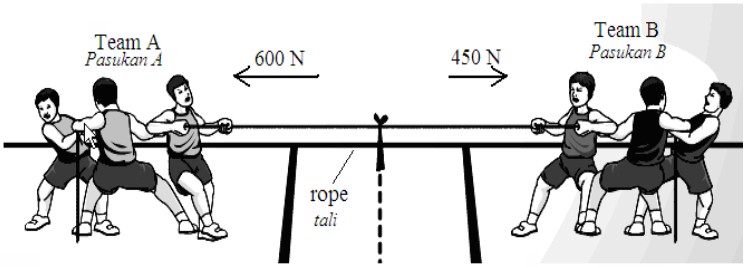


Diagram 3
Rajah 3

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

A 150 N acting to the left.
150 N bertindak ke arah kiri.
B 150 N acting to the right.
150 N bertindak ke arah kanan.
C 350 N acting to the left.
350N bertindak ke arah kiri.
D 350 N acting to the right.
350 N bertindak ke arah kanan.

6 A ball of mass 0.5 kg is being kicked by a force of 10 N. If the force is exerted in 0.2 s, what is the impulse experienced by the ball ?
Sebiji bola berjisim 0.5 kg *ditendang dengan daya 10* N. *Jika daya dikenakan dalam masa 0.2* s, *berapakah impuls yang dialami oleh bola?*

A 0.8 N s
B 2.0 N s
C 10.2 N s
D 30.0 N s

7 Diagram 4 shows the horizontal forces acting on the motorcycle when it is accelerating.
Rajah 4 di bawah menunjukkan daya-daya mendatar yang bertindak ke atas motosikal yang sedang memecut.

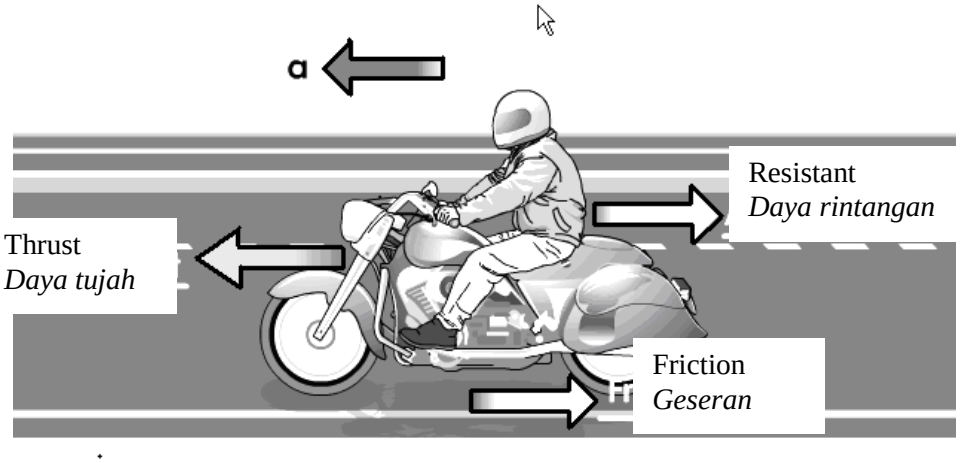


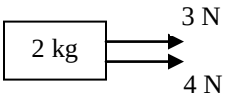
Diagram 4
Rajah 4

Which statement is true?
Pernyataan yang manakah benar?

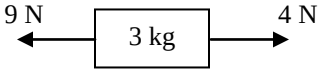
A A resultant force is equal to zero
Daya paduan sama dengan sifar
B A resultant force is not equal to zero
Daya paduan tidak sama dengan sifar
C Forward thrust is equal to resistant forces
Daya tujah ke hadapan sama dengan daya rintangan
D Forward thrust is less than resistant forces
Daya tujah ke hadapan kurang daripada daya rintangan.

8 Which object moves with the largest acceleration?
Objek yang manakah bergerak dengan pecutan paling besar?

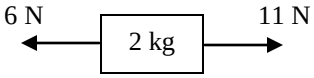
A



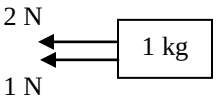
C.



B



D.

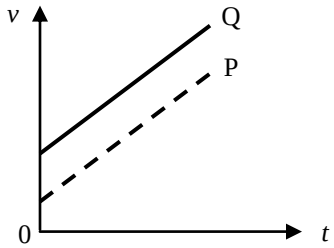


9 Diagram 5 shows two steel ball bearings, P and Q, being dropped near the surface of the earth.
Rajah 5 menunjukkan dua biji bebola keluli, P *dan* Q*, dijatuhkan berhampiran dengan permukaan bumi.*

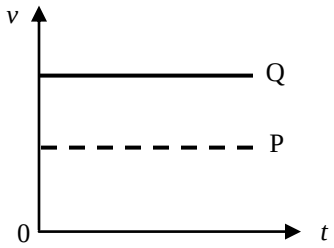
Diagram 5
Rajah 5

Which are the correct velocity-time graphs for the motion of P and Q?
Antara graf halaju-masa berikut, yang manakah betul bagi gerakan P *dan* Q*?*

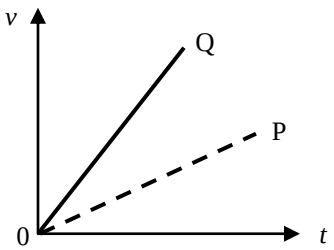
A



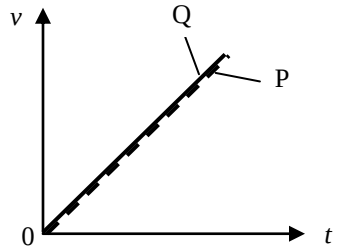
C



B



D



10. Diagram 6.1 shows a girl standing on a weighing scale with her hands on a table. The reading of the scale is *W*.

Rajah 6.1 menunjukkan seorang budak berdiri di atas sebuah alat penimbang dengan tangannya di atas sebuah meja. Bacaan penimbang itu ialah W.

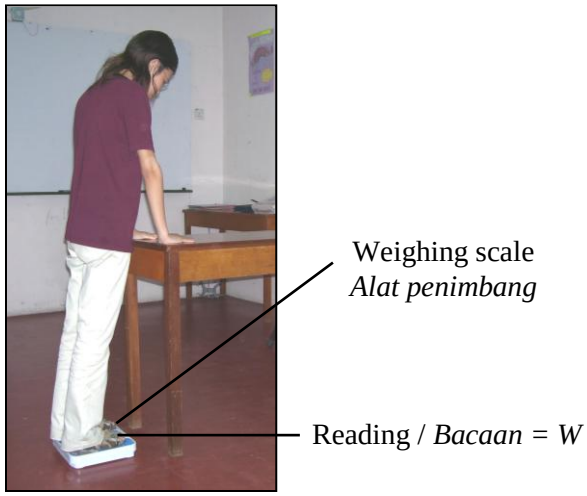


Diagram 6.1
Rajah 6.1

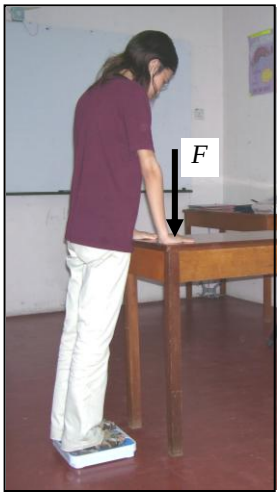


Diagram 6.2
Rajah 6.2

What would be the reading of the scale if she were to press the table with a force *F* downwards as shown in Diagram 6.2?

Apakah bacaan penimbang itu jika dia menekan meja dengan satu daya, F ke bawah seperti ditunjukkan dalam Rajah 6.2?

A *W*
B *F*
C *W* + *F*
D *W* - *F*

11 Diagram 7 shows a manometer is connected to a gas tank.
Rajah 7 menunjukkan sebuah manometer yang disambungkan kepada sebuah tangki gas.

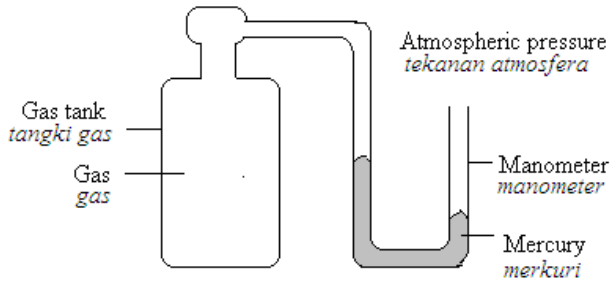


Diagram 7
Rajah 7

Based on the levels of the mercury, which statement is true ?
Berdasarkan pada aras merkuri, pernyataan yang manakah benar ?

A. Pressure in the gas tank = atmospheric pressure.
Tekanan dalam tangki gas = tekanan atmosfera.
B. Pressure in the gas tank > atmospheric pressure.
Tekanan dalam tangki > tekanan atmosfera.
C. Pressure in the gas tank < atmospheric pressure.
Tekanan dalam tangki gas < tekanan atmosfera.

12. Diagram 8 shows a cylinder containing water.
Rajah 8 menunjukkan satu silinder yang mengandugi air.

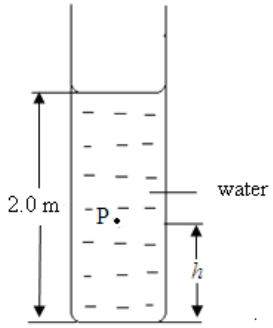


Diagram 8
Rajah 8

If the pressure at point P is 12 000 N m^{-2}, the height of h is
[the density of the water = 1000 kg m^{-3}]
Jika tekanan pada titik P ialah 12 000 N m^{-2} , tinggi h ialah
[ketumpatan air = 1000 kg m^{-3}]

A 0.8 m C 1.2 m
B 1.0 m D 2.0 m

13. A leaking rubber suction pump is pressed against a smooth wall as shown in Diagram 9(a).When released, the suction pump does not stick to the wall, as shown in Diagram 9(b).
Satu pam penyedut yang bocor ditekan kepada dinding yang licin seperti dirajah 9(a) bawah. Apabila dilepaskan ,didapati pam penyedut tersebut tidak melekat pada dinding seperti Rajah 9(b).

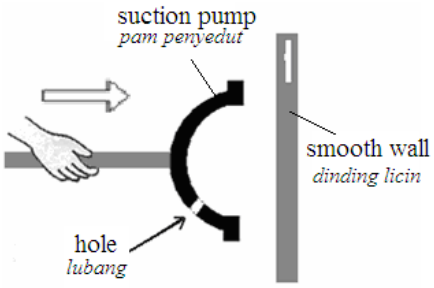


Diagram 9(a)
Rajah 9(a)

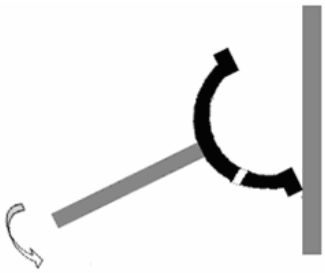


Diagram 9(b)
Rajah 9(b)

The suction pump does not stick to the wall because
Pam penyedut tidak melekat pada dinding kerana

A the atmospheric pressure is equal to the pressure inside the pump
tekanan atmosfera adalah sama dengan tekanan udara di dalam penyedut
B the atmospheric pressure is less than the pressure inside the pump
tekanan atmosfera adalah kurang daripada tekanan udara di dalam penyedut
C the atmospheric pressure is more than the pressure inside the pump
tekanan atmosfera adalah lebih tinggi daripada tekanan udara di dalam penyedut

14. Diagram 10 shows a school bag.
Rajah 10 menunjukkan sebuah beg sekolah

Diagram 10
Rajah 10

What is the function of x?
Apakah fungsi x?

A to increase weight and to increase pressure
Untuk menambahkan berat dan menambahkan tekanan
B to increase surface area and to decrease pressure
Untuk menambahkan luas permukaan dan mengurangkan tekanan
C to decrease weight and to decrease pressure
Untuk mengurangkan berat dan mengurangkan tekanan
D to decrease surface area and to increase weight
Untuk mengurangkan luas permukaan dan menambahkan berat

15. Diagram 11 shows an object floating on the surface of water. Which statements is true?
Rajah 11 menunjukkan satu objek terapung atas permukaan air. Pernyataan manakah adalah benar?

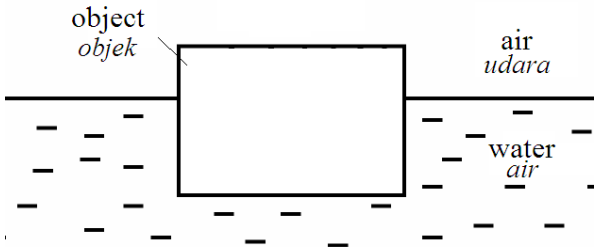


Diagram 11
Rajah 11

A The density of the object is greater than the density of the water.
Ketumpatan objek lebih besar dari ketumpatan air
B The volume of water displaced is equal to the volume of the object.
Isipadu air tersesar sama dengan isipadu objek
C The weight of water displaced is equal to the weight of the object.
Berat air tersesar sama dengan berat objek
D The mass of the object is equal to the buoyant force on the object.
Jisim objek sama dengan daya apungan objek.

16. The diagram 12 shows the ‘ Fantastic Submarine ‘ drifting along from a narrow region to a wider region because of
Rajah 12 menunjukkan ‘ Kapal selam Fantastic ‘ hanyut dari kawasan sempit ke yang kurang sempit kerana

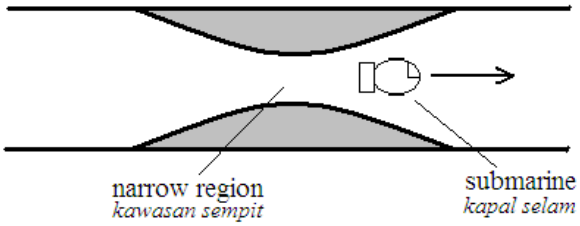


Diagram 12
Rajah 12

A Equilibrium of forces
Keseimbangan daya
B Bernoulli’s principle
Prinsip Bernoulli
C Archimede’s principle
Prinsip Archimedes
D Conservation of momentum
Prinsip keabadian momentum

17. Diagram 13 shows a water reservoir .
Rajah 13 menunjukkan sebuah empangan.

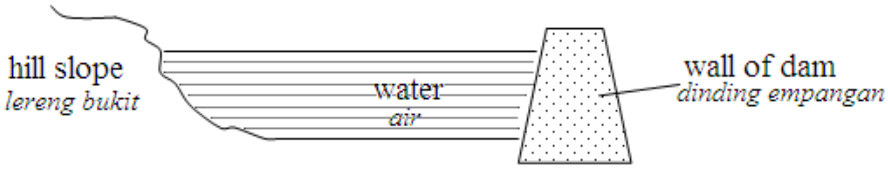


Diagram 13
Rajah 13

The base of the wall is thicker because
Bahagian bawah dinding lebih tebal kerana

A it will be more stable.
dinding akan lebih stabil
B the density of water is high
ketumpatan air tinggi
C Pressure of the water is highest at the surface
Tekanan paling tinggi di bahagian permukaan air
D Pressure of the water is highest at the base
Tekanan paling tinggi di bahagian bawah

18. Diagram 14 shows the graph of heating curve of a substance**.**
Rajah 14 menunjukkan graf lengkung pemanasan suatu bahan.

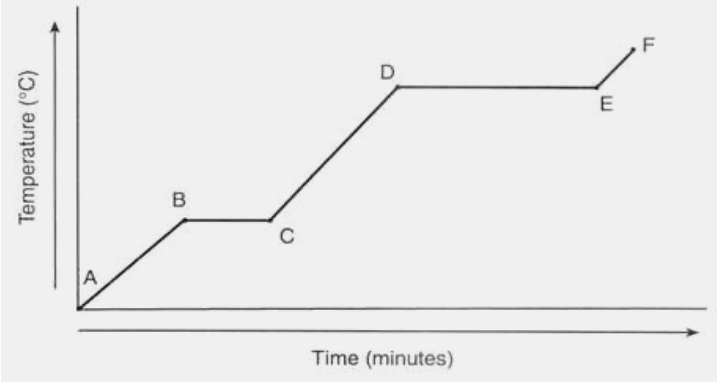


Diagram 14
Rajah 14

At which stage is the substance in a liquid and gas phase ?
Pada peringkat manakah bahan itu berada pada fasa cecair dan gas?

A AB
B BC
C CD
D DE

19. Diagram 15 shows two copper blocks touching each other.
Rajah 15 menunjukkan dua blok kuprum yang saling bersentuhan.

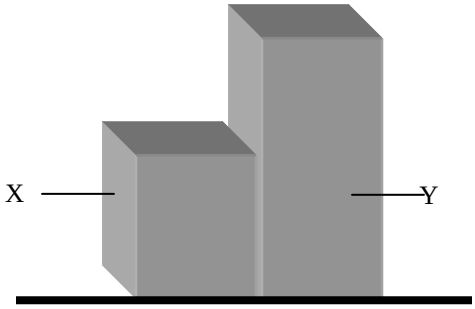


Diagram 15
Rajah 15

Which statement is correct when X and Y are at thermal equilibrium?
Pernyataan yang manakah betul semasa X dan Y berada dalam keseimbangan terma?

A Temperature of X is higher than Y.
Suhu X lebih tinggi daripada Y.
B The quantity of heat energy in X is the same as in the Y.
Kuantiti haba dalam X sama dengan Y.
C Rate of change of temperature of X is bigger than that of Y.
Kadar perubahan suhu X lebih besar daripada Y.
D Net rate of heat flow between X and Y is zero
Kadar bersih pengaliran haba antara X dan Y adalah sifar.

20. Some pure water is heated in a beaker until it boils at 100^{o}C. After a few seconds, the temperature will
Sedikit air tulen dipanaskan sehingga mendidih pada suhu 100^{o}C. Selepas beberapa saat suhu air akan

A. increase./*bertambah*
B. decrease. /*berkurang*
C. not change./*tidak berubah*

21. Based on diagram 16 which of the light ray below can produce a critical angle?
Berdasarkan rajah 16 sinar yang manakah menghasilkan sudut genting?

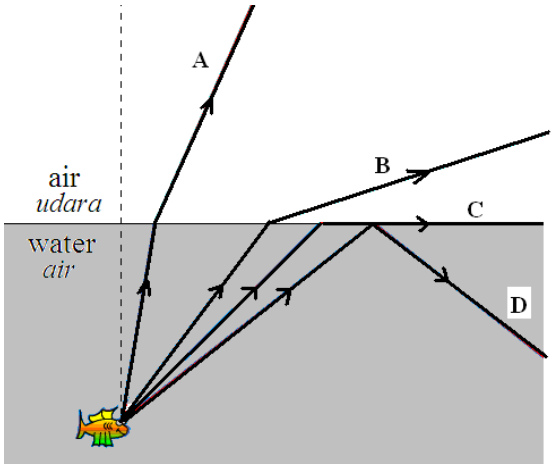


Diagram 16
Rajah 16

22. Diagram 17 shows light ray traveling from air to water.
Rajah 17 menunjukkan sinar cahaya merambat dari udara ke dalam air.

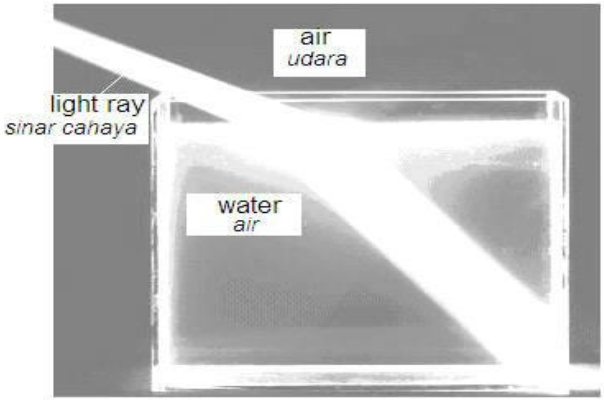


Diagram 17
Rajah 17

What is the phenomenon which causes the bending of light ray?
Apakah fenomena yang menyebabkan pembengkokkan sinar cahaya itu?

A Reflection
Pantulan
B Refraction
Pembiasan
C Difraction
Pembelauan
D Interference
Interferens

23. Diagram 18 shows the image of the fish is nearer to the surface of water than the actual of the fish.
Rajah 18 menunjukkan imej ikan adalah lebih hampir pada permukaan air berbanding ikan sebenar.

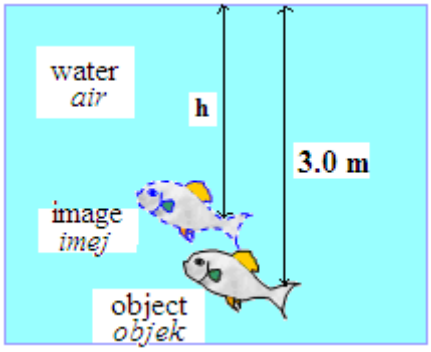


Diagram 18
Rajah 18

If the fish is at an actual depth of 3.0 m and the refractive index of water is 1.33, what is the apparent depth of image?
Jika dalam sebenar ikan ialah 3.0 m dan indek biasannya ialah 1.33, berapakah dalam ketara ikan itu?

A 1.50 m
B 1.67 m
C 2.26 m
D 3.99 m

24. Which characteristic of image is formed by a magnifying glass?
Ciri-ciri imej yang manakah dihasilkan oleh kanta pembesar?

A Magnified, virtual, inverted
Lebih besar, maya ,songsang
B Magnified, virtual, up right
Lebih besar, maya, tegak
C Diminished, real, inverted
Lebih kecil, nyata, songsang
D Diminished, real, up right
Lebih kecil, nyata , tegak

25. When a system oscillates at its natural frequency is slowing down because of damping, its amplitude will
Apabila suatu system bergetar pada frekuensi aslinya menjadi perlahan disebabkan oleh pelembapan, amplitudnya akan

A Decrease/ *berkurang*
B Increase/ *bertambah*
C Remains the same/ *tidak berubah*

26. Which of this is a correct example of a longitudinal wave and of a transverse wave ?
Pernyataan manakah contoh yang betul bagi gelombang membujur dan gelombang melintang ?

	Longitudinal Wave *Gelombang Membujur*	**Transverse Wave** *Gelombang Melintang*
A	Gamma Ray *Sinar Gamma*	Light *Cahaya*
B	Sound *Bunyi*	Gamma Ray *Sinar Gamma*
C	Light *Cahaya*	Radio *Radio*
D	Radio *Radio*	Sound *Bunyi*

27. Diagram 19 shows sound waves from a piano.
Rajah 19 menunjukkan gelombang bunyi dari sebuah piano.

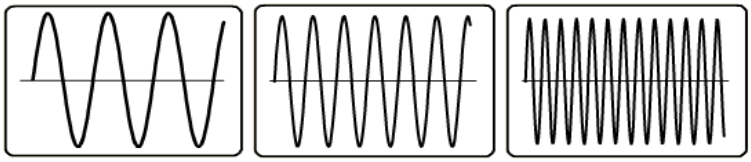


Diagram 19
Rajah 19

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

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

28. Diagram 20 shows a cooking utensil. Which type of wave is used by the cooking utensil to cook food?
Rajah 20 menunjukkan sebuah peralatan memasak. Gelombang yang manakah digunakan oleh peralatan tersebut untuk memasak makanan?

Diagram 20
Rajah 20

A Infrared / *inframerah*
B ultraviolet / *ultraungu*
C gamma rays / *sinaran gamma*
D microwaves /*gelombang mikro*

29. Diagram 21 shows the interference pattern of water waves from two coherent sources S_1 and S_2 in a ripple tank.

Rajah 21 menunjukkan corak interferen gelombang air dari dua sumber koheren S_1 dan S_2 dalam sebuah tangki riak.

Which of this point has minimum amplitude?

Titik yang manakah mempunyai amplitud minimum?

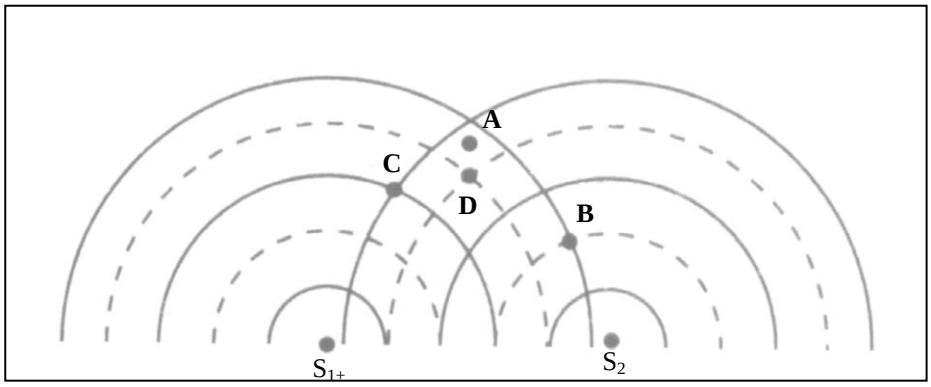


Diagram 21
Rajah 21

30. Diagram 22 shows a climber starting a stopwatch as he shouts. An echo is heard after 1.5 s. Velocity of sound is 340 m s^{-1}.

Rajah 22 menunjukkan seorang pendaki memulakan jam randik sambil menjerit. Gema terdengar selepas 1.5 s. Halaju bunyi ialah 340 m s^{-1}.

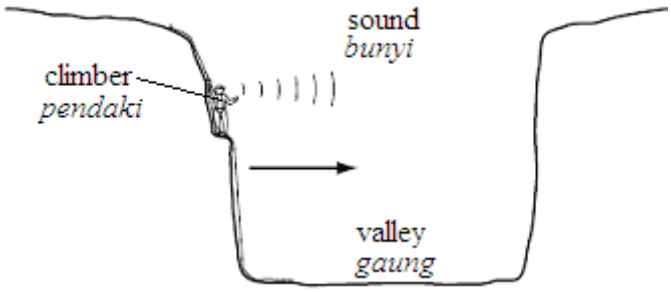


Diagram 22
Rajah 22

What is the width of the valley?
Berapakah lebar gaung itu?

A 170 m
B 255 m
C 340 m
D 510 m

31.

Radio wave	A	B	Visible light	C	D

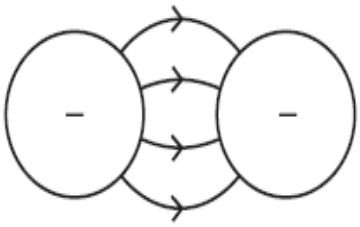
Diagram 23
Rajah 23

Diagram 23 shows an electromagnetic spectrum.
Which of the wave A, B, C or D has the longest wavelength?
Rajah 23 menunjukkan spektrum gelombang elektromagnet. Gelombang yang manakah antara berikut A, B, C atau D yang mempunyai panjang gelombang paling panjang?

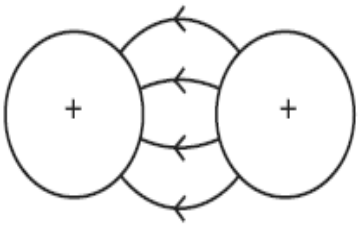
32. Which of the diagrams show the electric field correctly?

Antara rajah berikut, yang manakah menunjukkan dengan betul medan elektrik itu?

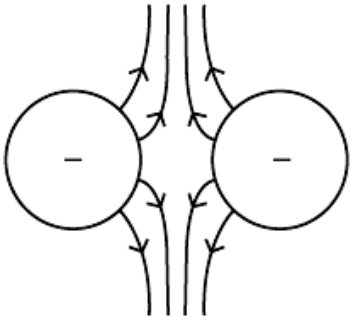
A



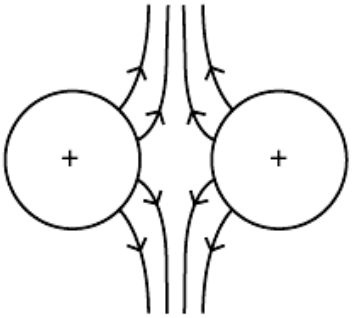
C



B



D



33. The diagram 24 shows a circuit with three similar resistors , R and two measuring instruments P and S.
Rajah 24 menunjukkan litar elektrik yang mengandungi tiga perintang yang serupa dan dua alat pengukur P dan S.

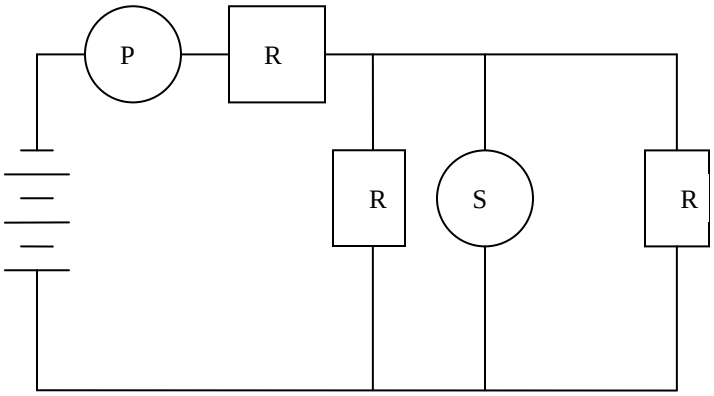


Diagram 24
Rajah 24

Which is the correct names for P and S?
Apakah P dan S?

	P	S
A	Ammeter	Ammeter
B	Voltmeter	Voltmeter
C	Ammeter	Voltmeter
D	Voltmeter	Ammeter

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

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

35. Diagram 25 shows an electrical circuit. Bulbs P,Q,R and S are identical.
Rajah 25 menunjukkan sebuah litar elektrik. Mentol-mentol P,Q,R,S adalah serupa.

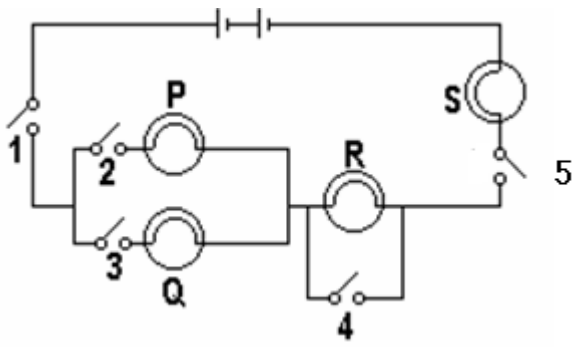


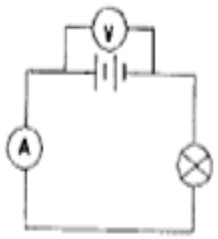
Diagram 25
Rajah 25

Which of the switches needs to switch on in order to light up Q, R and S?
Suis-suis yang manakah perlu dihidupkan supaya hanya mentol Q, R dan S sahaja menyala?

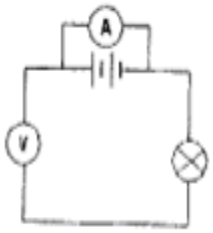
A 1,2,3
B 1,2,4
C 1,3,5
D 1,4,5

36. Which circuit can be used to determine the electromotive force of a battery?
Litar manakah digunakan untuk menentukan daya gerak elektrik suatu bateri?

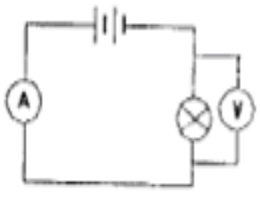
A



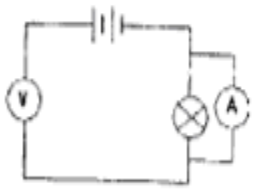
C



B



D



37. Diagram 26 shows the galvanometer pointer deflects when a magnet is pushed into a coil of wire.
Rajah 26 menunjukkan jarum penunjuk sebuah galvanometer terpesong apabila sebatang magnet ditolak memasuki satu gelung dawai.

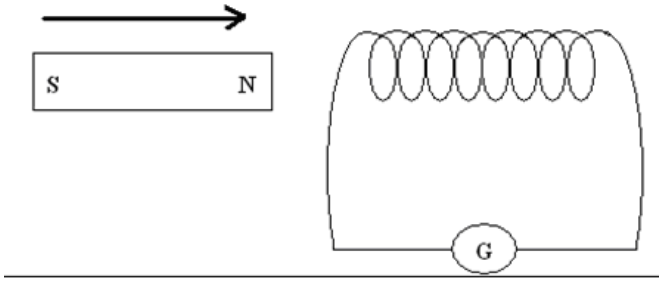


Diagram 26
Rajah 26

Which actions will cause the deflection of galvanometer increases?
Langkah yang manakah akan menyebabkan pesongan galvanometer bertambah?

A increase the number of coils
menambah bilangan lilitan

B push the magnet slower towards the coil
menolak magnet perlahan kearah gegelung.

C use coil that is made from insulated wire
menggunakan gegelung yang dibuat daripada wayar bertebat.

D reverse the magnetic pole of the magnet
menyongsangkan kekutuban magnet.

38. Diagram 27 show a lamp connected to a resistor and a battery.
Rajah 27 menunjukkan sebuah lampu disambung kepada perintang dan bateri.

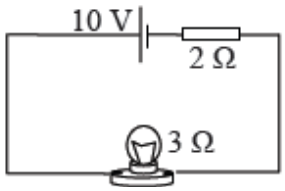


Diagram 27
Rajah 27

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

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

39. Diagram 28 shows an electromagnet in a magnetic relay.
Rajah 28 menunjukkan sebuah elektromagnet dalam sebuah suis geganti.

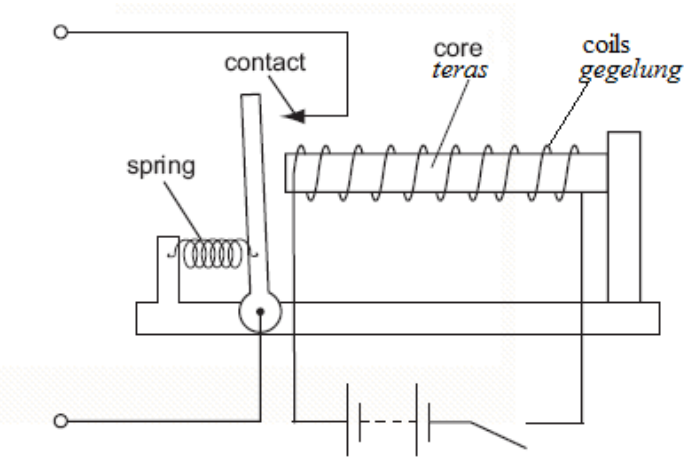


Diagram 28
Rajah 28

What change will decrease the strength of the electromagnet ?
Perubahan manakah yang akan mengurangkan kekuatan electromagnet ?

A Use a thicker wire to form the coils
Guna dawai yang lebih tebal untuk membentuk gegelung
B Increase the number of coils
Menambahkan *bilangan lilitan gegelung*
C decrease the magnitude of current
Kurang*kan magnitud arus*
D use the soft iron core
Gunakan teras besi lembut

40. Which electromagnetic wave has the highest frequency?
Gelombang elektromagnet manakah mempunyai frequensi tertinggi?

A Radio wave
Gelombang radio
B Microwave
Gelombang mikro
C Gamma ray
Sinar gama
D Ultraviolet
Ultra ungu

41. Diagram 29 below shows the arrangement of silicon atoms after an atom X is doped to form an extrinsic semiconductor.
Rajah 29 di bawah menunjukkan susunan atom-atom silicon selepas atom X didopkan untuk menghasilkan ektrinsik semikonduktor.

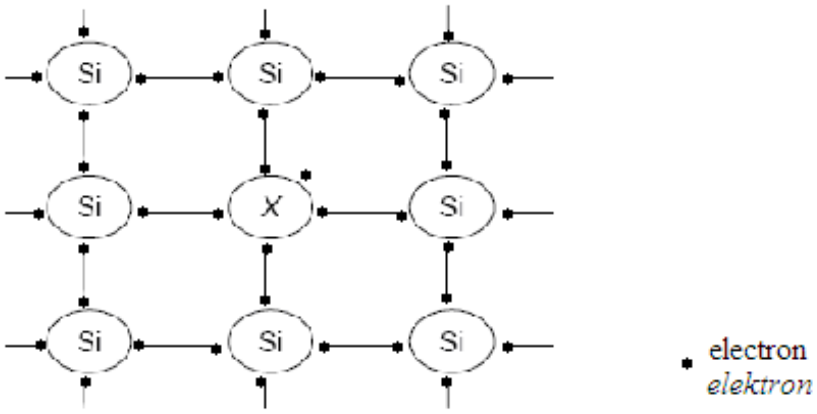


Diagram 29
Rajah 29

Which of the following is **not true?**
*Di antara pernyataan berikut, yang manakah **tidak benar**?*

A. The conductivity of the semiconductor increases.
Kekonduksian semikonduktor meningkat.

B. The semiconductor becomes an n-type.
Semikonduktor adalah jenis - n

C. The majority charge carrier is electron.
Majoriti cas pembawa adalah electron.

D. Atom X is a trivalent atom.
Atom X adalah atom trivalen.

42. Diagram 30 shows a circuit where the bulb does not light up.
Rajah 30 *menunjukkan litar di mana mentol tidak menyala.*

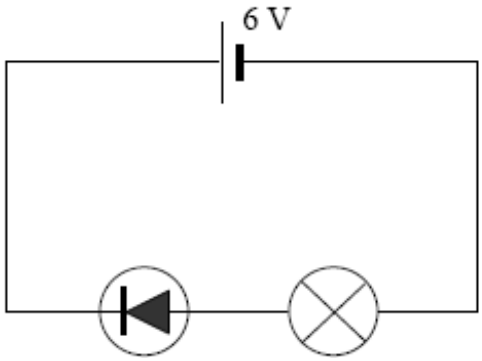
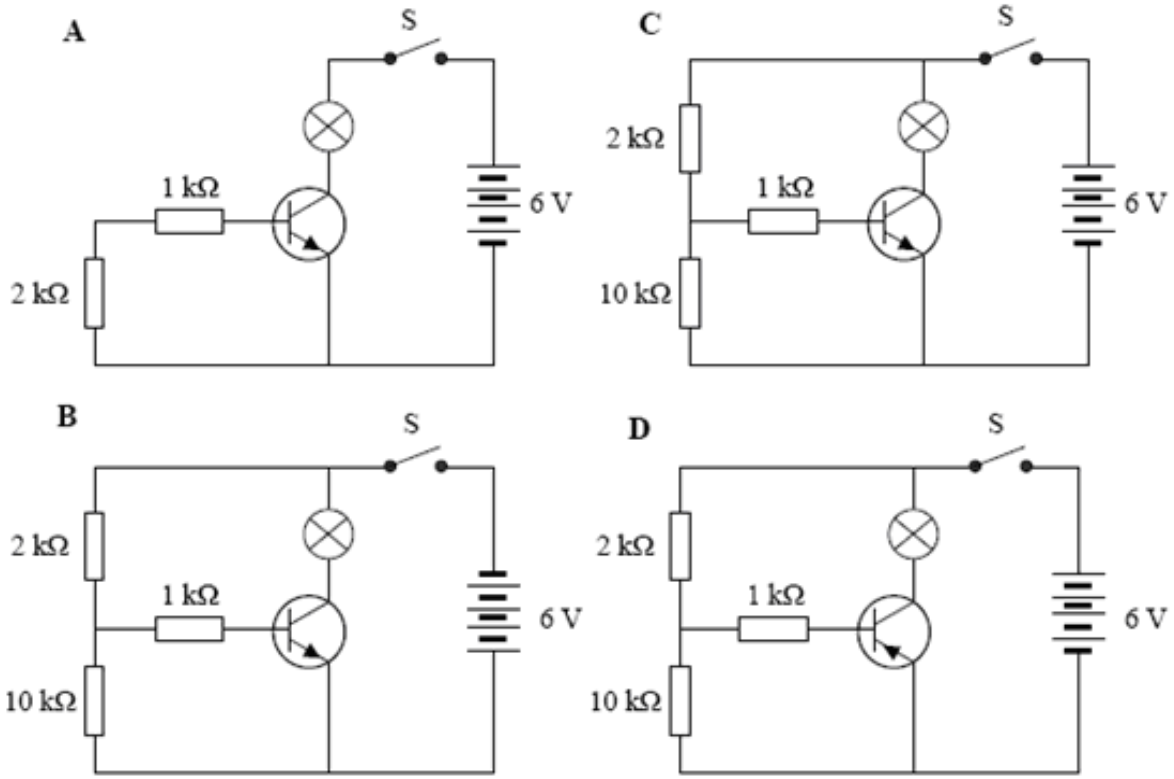


Diagram 30
Rajah 30

Which step will make the bulb light up?
Langkah manakah akan menyalakan mentol?

A Inserting a fuse in the circuit
Memasang fius
B Reversing the battery connection
Menyongsangkan sambungan bateri
C Changing the power supply to a 3 V battery
Menukar bekalan kuasa kepada bateri 3 V
D Reversing the bulb connection
Menyongsangkan sambungan mentol

43. In which circuit will the bulb light up when switch S is closed?
Dalam manakah mentol akan menyala apabila suis S *ditutup?*



44. Diagram 31 shows a logic gate circuit.
Rajah 31 menunjukkan litar get logik.

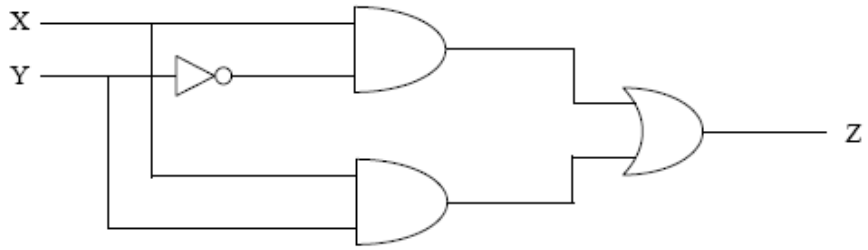


Diagram 31
Rajah 31

Which truth table is correct?
Jadual kebenaran yang manakah betul?

A

X	Y	Z
0	0	0
0	1	0
1	0	1
1	1	1

B

X	Y	Z
0	0	1
0	1	0
1	0	0
1	1	1

C

X	Y	Z
0	0	1
0	1	0
1	0	1
1	1	0

D

X	Y	Z
0	0	1
0	1	1
1	0	0
1	1	0

45. When electricity is transmitted over long distances, energy is wasted. How can the wasted energy be kept as small as possible?
Apabila elektrik dihantar melalui suatu jarak yang jauh, tenaga dibazirkan. Bagaimana cara supaya tenaga yang terbazir menjadi sangat kecil?

A. Keep the current in the transmission lines as large as possible
Menjadikan arus di kabel penghantaran sebesar yang boleh
B. Keep the power supplied to the transmission as large as possible
Menjadikan kuasa yang dibekalkan kepada kabel penghantaran sebesar yang boleh
C. Keep the resistance of the transmission as large as possible
Menjadikan rintangan kabel penghantaran sebesar yang boleh
D. Keep the voltage supplied to the transmission as large as possible
Menjadikan beza keupayaan yang dibekalkan kepada kabel penghantaran sebesar yang boleh.

46. Diagram 32 shows the symbol of an npn transistor.
Rajah 32 menunjukkan simbol transistor npn

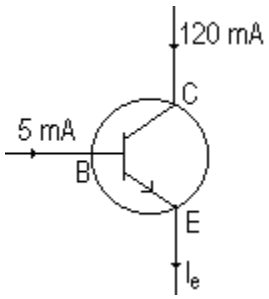


Diagram 32
Rajah 32

What is the value of I_e?
Berapakah nilai I_e?

A 24 mA
B 115 mA
C 125 mA
D 600 mA

47. Diagram 33 shows three nuclei X, Y and Z that have proton numbers and nucleon numbers.
Rajah 33 menunjukkan tiga nukleus X, Y dan Z mempunyai nombor proton and nukleon seperti jadual di bawah.

	Proton number *Nombor Proton*	Nucleon number *Nombor nukleon*
X	43	93
Y	43	94
Z	44	94

Diagram 33
Rajah 33

Which nuclei are isotopes of the same element?
Manakah nuklei adalah isotop dari unsur yang sama?

A X and Y only
X dan Y sahaja
B X and Z only
X dan Z sahaja
C Y and Z only
Y dan Z sahaja
D X, Y and Z
X, Y dan Z

48. In a nuclear reaction, the amount of energy equivalent to 10^{-12} kg of mass is released. The energy released is
Dalam satu tindakbalas nuclear, sejumlah tenaga yang bersamaan dengan jisim sebesar 10^{-12} kg dibebaskan. Kuantiti tenaga itu ialah

A. 4.5×10^{-7} J
B. 3.0×10^{-4} J
C. 4.5×10^{4} J
D. 9.0×10^{4} J

49. The thick tracks of alpha particles in a cloud chamber show that alpha particles have
Runut tebal yang dihasilkan oleh zarah alfa dalam kebuk awan menunjukkan bahawa zarah alfa mempunyai

A high penetrating power
kuasa penembusan yang tinggi
B high ionising power.
kuasa pengionan yang tinggi
C large mass
jisim yang besar
D high speed
kelajuan yang tinggi

50. What happens during nuclear fission?
Apakah terjadi semasa pembelahan nukleus?

A Heavy nucleus is split into 2 lighter nuclei
Satu nucleus berat dipecahkan kepada 2 nukleus yang lebih ringan
B High energy neutron is produced in the process
Satu neutron yang bertenaga tinggi dihasilkan semasa pembelahan nukleus
C The process does not lead to any mass defect
Pembelahan nukleus tidak menghasilkan satu cacat jisim
D It occur at a temperature of about 1000° C
Pembelahan nukleus berlaku pada suhu 1000° *C*

END OF QUESTION PAPER
KERTAS SOLAN TAMAT

Nama: .....

NO. KAD PENGENALAN

ANGKA GILIRAN

PERSIDANGAN KEBANGSAAN PENGETUA
SEKOLAH MENENGAH MALAYSIA
(CAWANGAN MELAKA)

PEPERIKSAAN PERCUBAAN SIJIL PELAJARAN MALAYSIA
2010 4531/2
PHYSICS
Kertas 2
Ogos/Sept.
2 1/2 Jam **Dua jam tiga puluh minit**

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1.*Tulis **nombor kad pengenalan** dan **angka giliran** anda pada ruangan yang disediakan.*

2. *Kertas soalan ini adalah dalam dwibahasa.*

3. *Soalan dalam bahasa Inggeris mendahului soalan yang sepadan dalam bahasa Melayu.*

4. *Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam bahasa Inggeris atau bahasa Melayu.*

5.*Calon dikehendaki membaca maklumat di halamanbelakang kertas soalan ini.*

Untuk Kegunaan Pemeriksa			
Bahagian	Soalan	Markah Penuh	Markah Diperolehi
A	1	4	
	2	5	
	3	7	
	4	7	
	5	7	
	6	8	
	7	10	
	8	12	
B	1	20	
	2	20	
C	3	20	
	4	20	
Jumlah			

Kertas soalan ini mengandungi 27 halaman bercetak

MAKLUMAT UNTUK CALON

1. *Kertas soalan mengandungi* **tiga** *bahagian :* **Bahagian A , Bahagian B** *dan* **Bahagian C.**

2. *Jawab semua soalan daripada* **Bahagian A.** *Jawapan kepada* **Bahagian A** *hendaklah ditulis dalam ruang yang disediakan dalam kertas soalan.*

3. *Jawab* **satu** *soalan daripada* **Bahagian B** *dan* **satu** *soalan daripada* **Bahagian C.** *Jawapan kepada* **Bahagian B** *dan* **Bahagian C** *hendaklah ditulis dalam kertas jawapan anda sendiri. Anda diminta menjawab dengan lebih terperinci untuk* **Bahagian B** *dan* **Bahagian C.** *Jawapan mestilah jelas dan logik. Persamaan, gambar rajah, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda boleh digunakan.*

4. *Rajah yang mengiringi soalan tidak dilukiskan mengikut skala kecuali dinyatakan.*

5. *Markah yang diperuntukkan bagi setiap soalan atau ceraian soalan ditunjukkan dalam kurungan di hujung setiap soalan atau ceraian soalan.*

6. *Sekiranya anda hendak membatalkan sesuatu jawapan, buat garisan di atas jawapan itu.*

7. *Satu senarai rumus disediakan di halaman 3.*

8. *Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.Walau bagaimanapun langkah mengira perlu ditunjukkan.*

9. *Masa yang dicadangkan untuk menjawab* **Bahagian A** *ialah 90 minit,* **Bahagian B** *ialah 30 minit dan* **Bahagian C** *ialah 30 minit.*

10. *Lekatkan semua kertas jawapan dan serahkan di akhir peperiksaan.*

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

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

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

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

4. Momentum = mv

5. $F = ma$

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

7. Gravitational potential energy /
   Tenaga keupayaan graviti = mgh

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

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

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

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

12. Pressure / *Tekanan*, $P = \rho gh$

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

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

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

17. n = $\frac{\text{Real depth}}{\text{apparent depth}}$
    = $\frac{dalam\ nyata}{dalam\ ketara}$

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

19 Linear magnification
   Pembesaran linear, $m = \frac{v}{u}$

20. $v = f\lambda$

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

22. $Q = It$

23. eV = ½ mv^2

24. $E = QV$

25. V = IR

26. Power / *Kuasa*, P = IV

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

28. $\frac{Ns}{Np} = \frac{Vs}{Vp}$

29. Efficiency / *kecekapan*
   $\frac{Is\ Vs}{Ip\ Vp}$ X 100 %

30. $E = mc^2$

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

1. Diagram 1 shows the instrument which is used to measure the outer diameter of a cylinder, S.
Diagram 2 shows pingpong ball attached on a filter funnel when water flows from the rubber hose of a water pipe

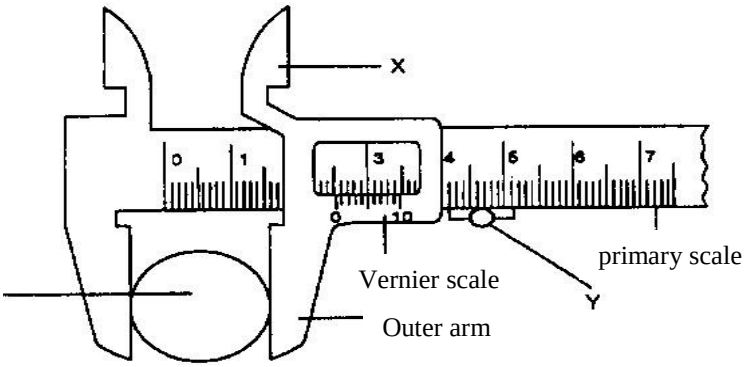


DIAGRAM 1

(a) Name the instrument used in Diagram 1.
Namakan alat pengukur pada Rajah 1.

……..... [1 *mark*]

(b) What is the function of X.
Apakah fungsi bahagian yang bertanda X.

…… [1 *mark*]

(c) (i) What is the sensitivity of this instrument?
Apakah kepekaan alat di atas ?

…… [1 *mark*]

(ii) What is the diameter of the object above?
Berapakah diameter objek di atas?

…….. [1 *mark*]

2 Diagram 2 shows ice melting in a glass. The initial mass of the ice is 0.20 kg.
Rajah 2 *menunjukkan ais melebur di dalam sebuah gelas. Jisim awal ais itu ialah* 0.20 kg.

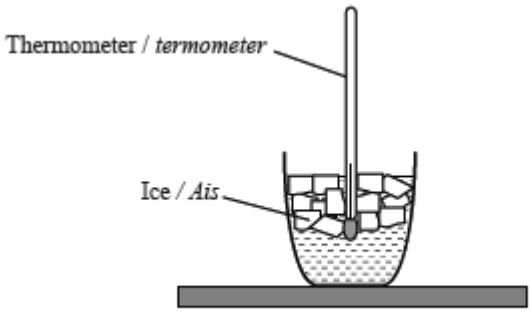


Diagram 2 / *Rajah* 2

(a) Explain in terms of energy why the reading of the thermometer,
Terangkan dalam sebutan tenaga mengapa bacaan termometer itu,

(i) remains constant for the first 20 minutes.
kekal malar untuk 20 *minit yang pertama.*

….....

[1 *mark*]

(ii) increases after 20 minutes.
meningkat selepas 20 *minit.*

….....

[1 *mark*]

(b) Calculate the heat absorbed by the ice during the first 20 minutes.
[Specific latent heat of fusion of ice = 3.36 x 10_5 J kg_{-1}]
Hitungkan haba yang diserap oleh ais itu semasa 20 *minit yang pertama.*
[Haba pendam tentu pelakuran ais = 3.36 x 105 J kg–1]

[2 *marks*]

(c) Which statement correctly describes the water in the glass after it is left for a few hours. Mark ( ) in the correct box.
Pernyataan manakah yang memerihalkan dengan betul tentang air dalam gelas itu selepas dibiarkan selama beberapa jam. Tanda ( ) pada kotak yang betul.

☐ There is no transfer of energy between the water and the surroundings
Tiada pemindahan tenaga antara air dan persekitaran

☐ There is no net transfer of energy between the water and the surroundings
Tiada pemindahan bersih tenaga antara air dan persekitaran

[1 *mark*]

3. Diagram 3.1 shows a simple electromagnet.
Rajah 3.1 menunjukkan satu elektromagnet ringkas.

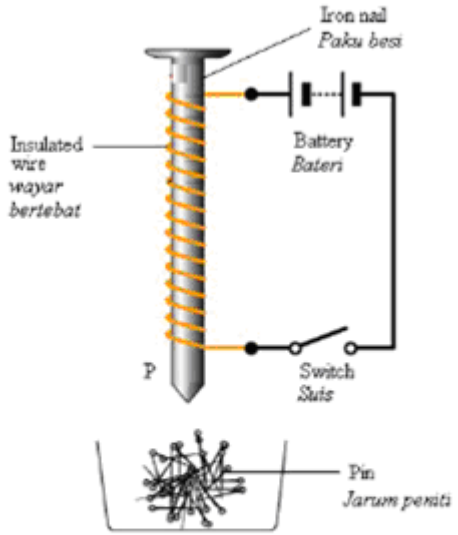


Diagram 3.1
Rajah 3.1

(a) What is the meaning of electromagnet?
Apakah maksud elektromagnet?

……..

[1 mark]

(b) When the switch is turned on ;
Bila suis dihidupkan ;
(i) draw the pattern of magnetic field on Diagram 3.1

lukis corak medan magnet pada Rajah 3.1

[1 mark]

(ii) state the magnetic pole at P
nyatakan kutub magnet pada P.

…….....

[1 mark]

(iii) state what happens to the pin.
nyatakan apa yang berlaku kepada pin itu.

….....

[1 mark]

(c) State one suggestion to increase the strength of electromagnet
Nyatakan satu cara untuk meningkatkan kekuatan electromagnet.

.....

[1 mark]

(d) State **one** application of electromagnet.
*Nyatakan **satu** kegunaan elektromagnet.*

……...

[1 mark]

4. Diagram 4.1 shows the use of a transistor in a circuit.
Rajah 4.1 menunjukkan kegunaan transistor dalam suatu litar.

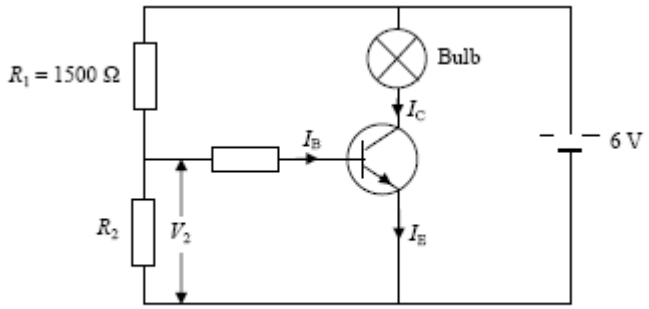


DIAGRAM 4.1 / *RAJAH 4.1*

(a) Name the type of transistor used.
Namakan jenis transistor yang digunakan.

…...……..……..……..……..

[1 *mark*]

(b) The transistor is switched on when the base voltage $V_2 \geq 2$ V.
Transistor itu dihidupkan apabila voltan tapak $V_2 \geq 2$ V

.

(i) Write an equation to show the relationship between I_B, I_C and I_E.
Tuliskan satu persamaan untuk menunjukkan hubungan antara I_B, I_C dan I_E.

.....……..……..

[1 *mark*]

(ii) Calculate the minimum value of R_2 when the transistor is switched on.
Hitungkan nilai minimum R_2 apabila transistor itu dihidupkan.

[2 *marks*]

(c) The resistor R_2 is then replaced with a light dependent resistor which has a high resistance when it is dark.
Perintang R_2 kemudian digantikan dengan perintang peka cahaya yang mempunyai rintangan tinggi apabila keadaan sekitar gelap.

(i) Explain whether the bulb will light up during the day.
Jelaskan sama ada mentol itu menyala pada waktu siang.

.....

.....

[2 *marks*]

(ii) Besides being used as a switch, state one other use of a transistor.
Nyatakan satu kegunaan transistor selain daripada digunakan sebagai satu suis.

.....

[1 *mark*]

5 Diagram 5.1 and Diagram 5.2 show two dams with different shapes.
Rajah 5.1 dan Rajah 5.2, menunjukkan dua jenis empangan yang berbeza bentuk.

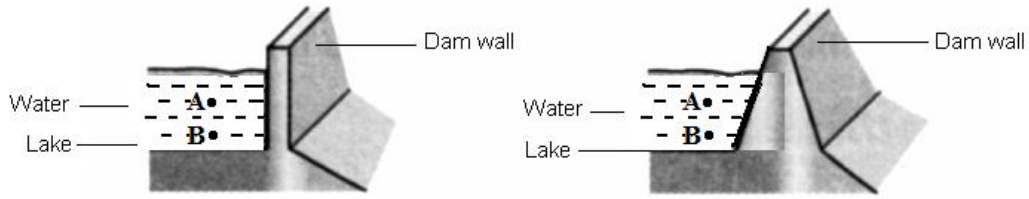


DIAGRAM 5.1 DIAGRAM 5.2

(a) Based on Diagram 5.1 and Diagram 5.2
Berdasarkan Rajah 5.1 dan Rajah 5.2

(i) Compare the dams in Diagram 5.1 and Diagram 5.2.
Bandingkan empangan pada Rajah 5.1 dan Rajah 5.2.

.....

.....

[1 *mark*]

(ii) Compare the pressure at point A and point B in the lake.
Bandingkan tekanan pada titik A dan titik B di dalam tasik.

.....

[1 *mark*]

(b) (i) Based on the answer in (a)(ii), which dam is stronger?
Berdasarkan jawapan di (a)(ii), empangan yang manakah lebih kuat?

.....

[1 *mark*]

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

.....

.....

.....

[2 *marks*]

(c) Diagram 5.3 shows an apparatus used to remove water from a beaker to a cylinder.
Rajah 5.3 menunjukkan suatu alat untuk mengalirkan air dari bikar ke silinder.

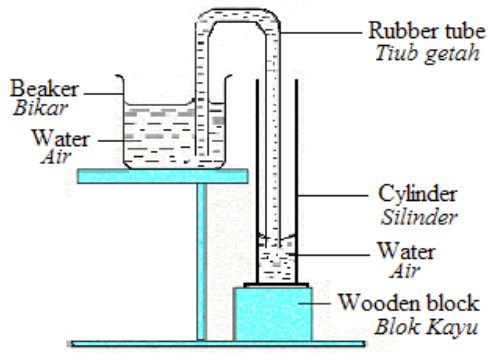


DIAGRAM 5.3

(i) Name the apparatus shown in diagram 5.3.
Namakan alat yang ditunjukkan pada Rajah 5.3.

……..…….....
...

[1 *mark*]

(ii) Give a reason why water flows from the beaker to the cylinder as shown in Diagram 5.3.
Berikan satu sebab mengapa air mengalir dari bikar ke silinder seperti yang ditunjukkan pada Rajah 5.3.

.....

.....

[1 *mark*]

(iii) In Diagram 5.4, mark the water level in the cylinder when water stops flowing from the beaker to the cylinder.
Pada Rajah 5.4 tandakan paras air dalam silinder apabila air berhenti mengalir dari bikar ke silinder.

[1 *mark*]

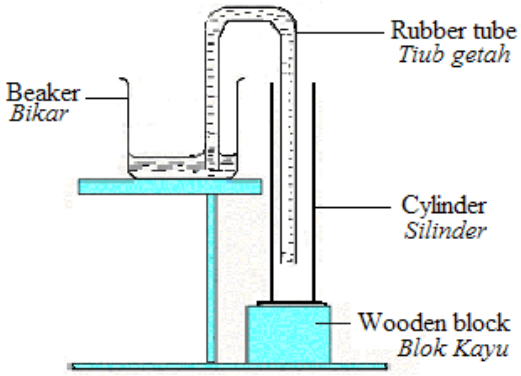


DIAGRAM 5.4

6

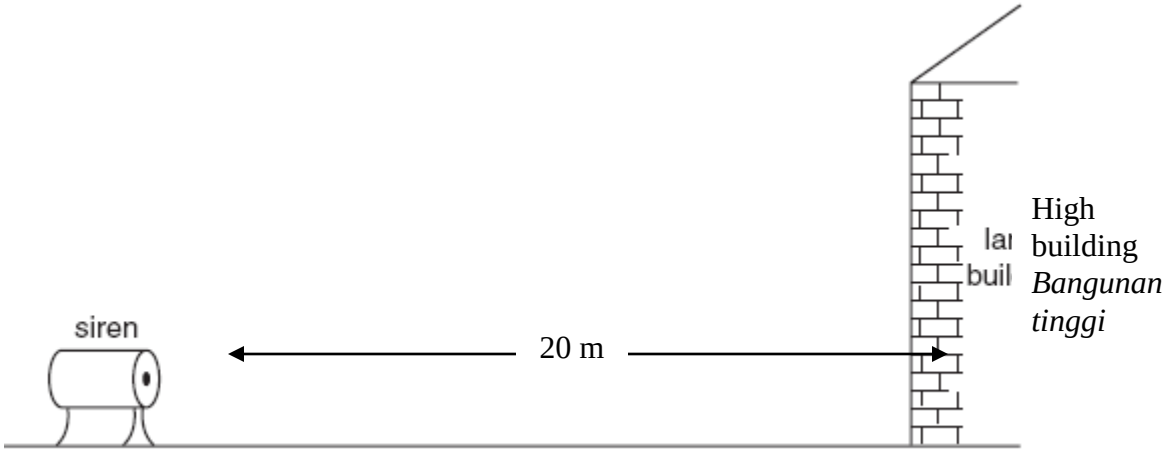


DIAGRAM 6.1
RAJAH 6.1

(*a*) The siren is located 20 m from a large building, as shown in Diagram 6.1. The siren with the frequency 1000 Hz, is briefly sounded once. A short time later, the sound is heard again.
Sebuah siren di letakkan pada jarak 20 m *dari bangunan yang besar seperti pada Rajah 6.1.Siren dengan frekuansi 1000* Hz, *berbunyi sekali dengan kuat. Selepas beberapa ketika, bunyi kedengaran sekali lagi.*

(i) Why is this second sound heard?
Mengapa kedengaran bunyi kali kedua?

….....

[1 *mark*]

(ii) What is the frequency of this second sound? Tick one box.
Apakah frekuansi bunyi kali kedua? *Tandakan pada petak.*

less than 1000 Hz
kurang daripada 1000 Hz ☐

1000 Hz ☐

more than 1000 Hz
lebih daripada 1000 Hz ☐

[1 *mark*]

(iii) What is the amplitude of this second sound? Tick one box.

Apakah amplitud bunyi kali kedua? *Tandakan pada petak.*

less than the original sound ☐
kurang dari bunyi asal

the same as the original sound ☐
sama dengan bunyi asal

more than the original sound ☐
lebih dari bunyi asal

[1 *mark*]

(iv) Why the second sound is soft than the original sound?
Mengapakah bunyi kali kedua kedengaran lebih perlahan dari bunyi asal?

….....

[1 *mark*]

(b) Diagram 6.2 shows the correct method used by a student to measure the speed of sound .
Rajah 6.2 menunjukkan kaedah yang lebih tepat digunakan untuk mengukur laju bunyi.

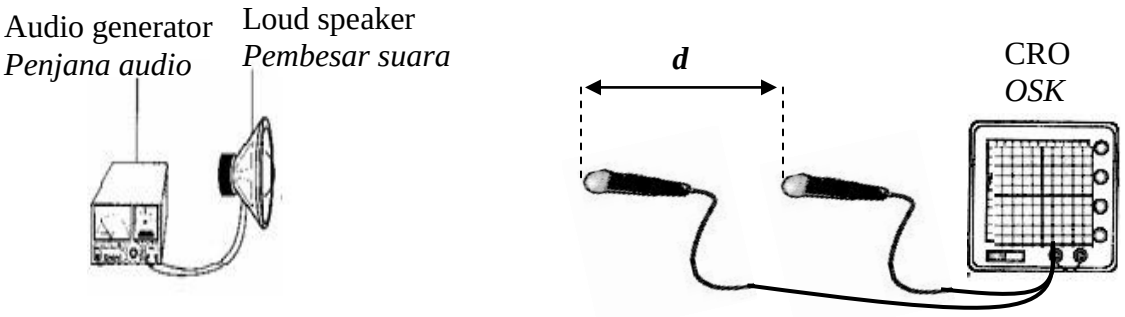


DIAGRAM 6.2
RAJAH 6.2

The sound is received by two microphones placed at different distance in front of the loud speaker. The separation between the two microphones is, ***d***. The time interval, ***t***, between the sounds received by the two microphones is recorded. The results of the experiment is shown in Diagram 6.3.
Bunyi diterima oleh kedua-dua mikrofon yang disusun di depan pembesar suara pada jarak yang berbeza. Jarak pemisahan di antara dua mikrofon ialah ***d.*** *Sela masa,* ***t****, di antara bunyi yang diterima oleh dua mikrofon dicatatkan. Keputusan eksperimen ditunjukkan pada Rajah 6.3.*

d against ***t***
d *melawan* ***t***

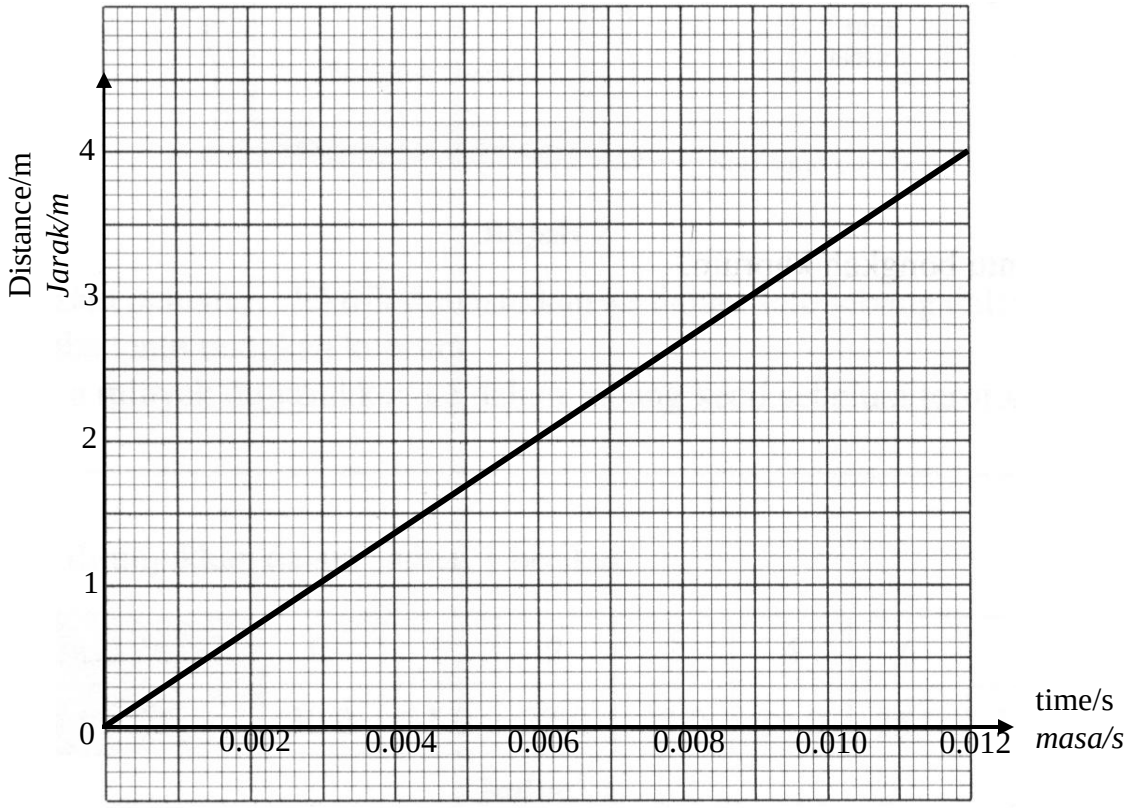


DIAGRAM 6.3
RAJAH 7.3

Diagram 6.4 shows the trace observed at the screen of CRO.
Rajah 6.4 menunjukkan surihan isyarat yang terbentuk pada skrin OSK.

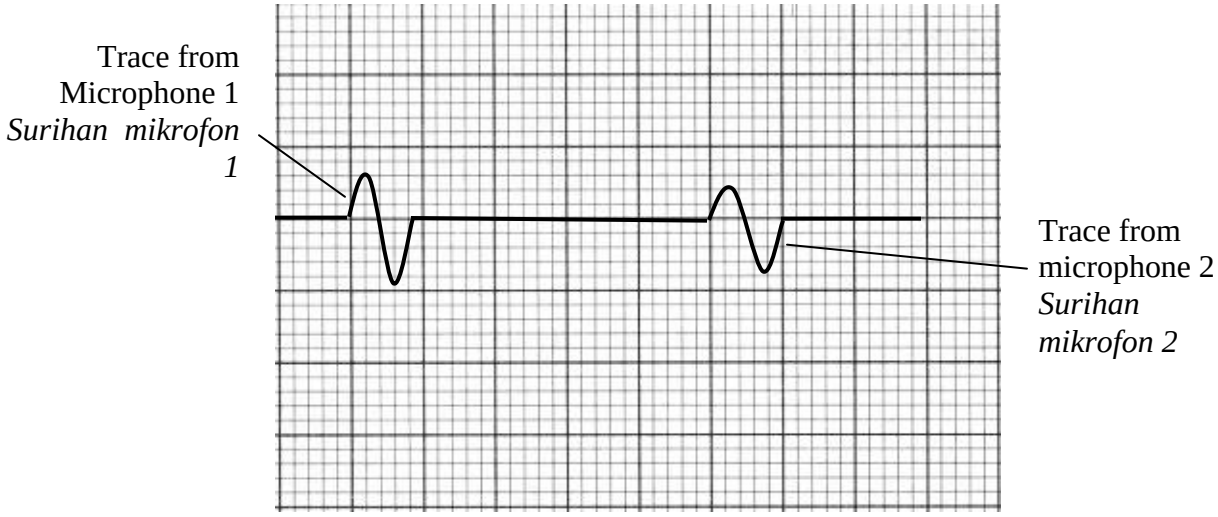


DIAGRAM 6.4
RAJAH 6..4

The time-base setting on the CRO is 1.0 ms/cm.
Dasar-masa ditetapkan pada OSK ialah 1.0 ms/cm.

(i) Determine the time interval, ***t***, from the trace in Diagram 7.4.
*Tentukan sela masa, **t**, daripada surihan di Rajah 7.4.*

[2 *marks*]

(ii) Using the answer in (*a*)(i), determine the distance, ***d***, from the graph.
Menggunakan jawapan (*a*)*(i), tentukan jarak,* ***d*** daripada graf.

[2 *marks*]

7. Diagram 7.1and Diagram 7.2 show a weightlifter is making trial to determine the suitable method to lift a load of mass 60 kg for longer time.
Rajah 7.1 dan Rajah 7.2 menunjukkan seorang ahli angkat berat sedang membuat percubaan bagi menentukan kaedah yang paling sesuai untuk menjulang beban berjisim 60 kg untuk masa yang lebih lama.

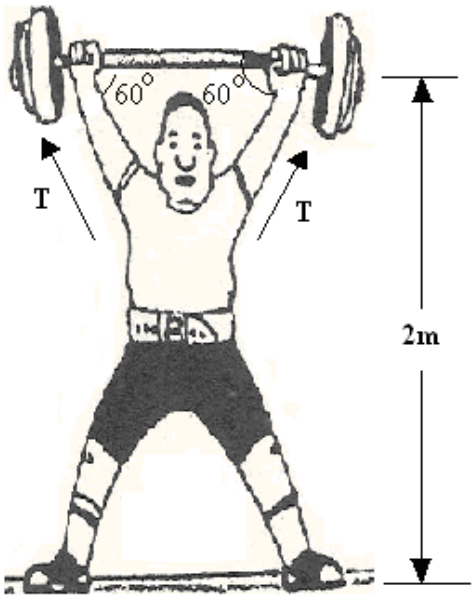


DIAGRAM 7.1
RAJAH 7.1

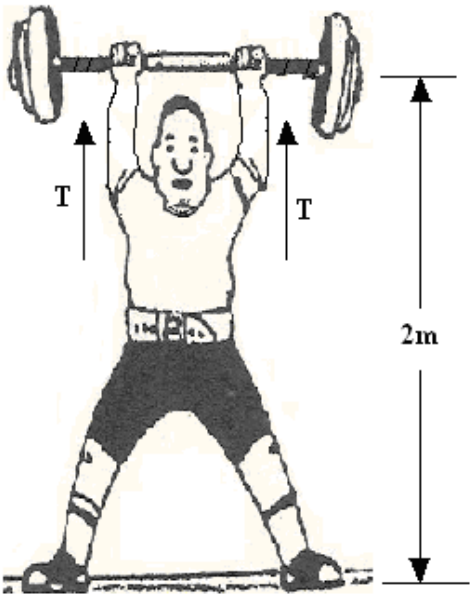


DIAGRAM 7.2
RAJAH 7.2.

(a) What is meant by equilibrium state?
Apakah maksud keadaan keseimbangan?

……

[1 *mark*]

(b). What is the weight of the load?
Berapakah berat beban itu?

[2 *marks*]

(c) In the space below, draw the scale drawing of the triangle of forces to determine the value of T_1. [Use the scale 1 cm : 10N]
Pada ruang di bawah, lukis lukisan berskala segitiga keseimbangan daya untuk menentukan nilai T_1. [Gunakan skala 1cm : 10N]

[3 *marks*]

(d) Calculate the tension T_2 in Diagram 7.2
Hitung ketegangan T_2 dalam Rajah 7.2

[2 *marks*]

(e) Based on the answer in (c) and (d), state the suitable way to lift the load for a long time. Give **one** reason for your answer.
*Berdasarkan jawapan anda pada (c) dan (d), nyatakan cara yang sesuai untuk menjulang beban itu untuk masa yang lama. Berikan **satu** sebab bagi jawapan anda.*

.....

.....

[2 *marks*]

8 Diagram 8.1 shows an electric iron with specification of 240 V, 1000 W.
Rajah 8.1 menunjukkan sebuah seterika elektrik dengan spesifikasi 240 V, *1000* W.

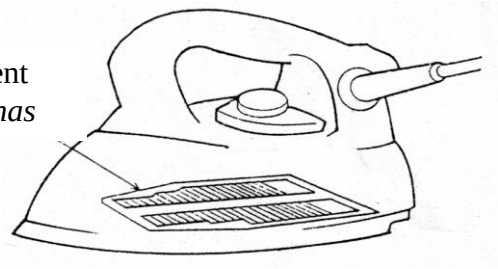


DIAGRAM 8.1
RAJAH 8.1

(*a*)What is meant by specification 240 V, 1000 W?
Apakah yang dimaksudkan dengan spesifikasi 240 V, *1000* W?

……...

[1 *mark*]

(*b*) The electric iron is connected to a 240 V supply and used to iron clothes for 30 minutes.
Seterika elektrik itu disambungkan kepada bekalan 240 V dan digunakan untuk menggosok pakaian selama 30 minit.

Calculate:
Hitungkan:

(i) the current that passes through the heating element in the iron.
arus yang mengalir melalui elemen pemanas di dalam seterika itu.

[2 *marks*]

(ii) the cost of using the electric iron in 30 days, if the cost of electricity by *Tenaga Nasional* is 23 cents per kW h for first 200 units.
kos menggunakan seterika elektrik itu selama 30 hari, jika kos tenaga oleh Tenaga Nasional ialah 23 sen per kW j *untuk setiap 200 unit yang pertama.*

[2 *marks*]

(*c*) A student conducts an experiment to compare the heating effect of bread toasters **P**, **Q** and **R**. Two slices of bread is toasted each time. Table 8.1 shows the result of the experiment.
Seorang pelajar menjalankan eksperimen untuk membandingkan kesan pemanasan pembakar roti, **P**, **Q** *dan* **R**. *Dua keping roti dibakar dalam satu masa. Jadual 8.1 menunjukkan keputusan eksperimen tersebut.*

Bread Toaster *Pembakar roti*	Potential Difference, ***V***/V *Beza Keupayaan* ***V***/V	Current, ***I***/A *Arus,* ***I***/A	Time to toast 2 slices of bread, ***t***/s *Masa untuk membakar 2 keping roti,* ***t***/s
P	240	6.0	90
Q	240	5.0	150
R	240	4.0	120

TABLE 8.1
JADUAL 8.1

(i) Calculate the energy supplied by each of bread toaster to toast the bread.
Hitungkan tenaga yang dibekalkan oleh setiap pembakar roti untuk membakar roti.

[4 *marks*]

(ii) Using your answer in (*c*)(i), state which bread toaster is most suitable. Give **two** reasons for your answer.
*Menggunakan jawapan di (c)(i,) nyatakan pembakar roti yang paling sesuai. Beri **dua** sebab bagi jawapan anda*.

…….....

…….....

[3 *marks*]

Section B
Bahagian B
[20 Marks]
[20 Markah]

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

9. Diagram 9.1 and Diagram 9.2 show the parallel rays of light directed towards the convex lenses J and K. Both the lenses produce real images. F is the focal point for each lens.
Rajah 9.1 dan Rajah 9.2 menunjukkan sinar cahaya selari di tuju ke kanta-kanta cembung J dan K. Kedua-dua kanta menghasilkan imej nyata. F ialah titik fokus untuk setiap kanta.

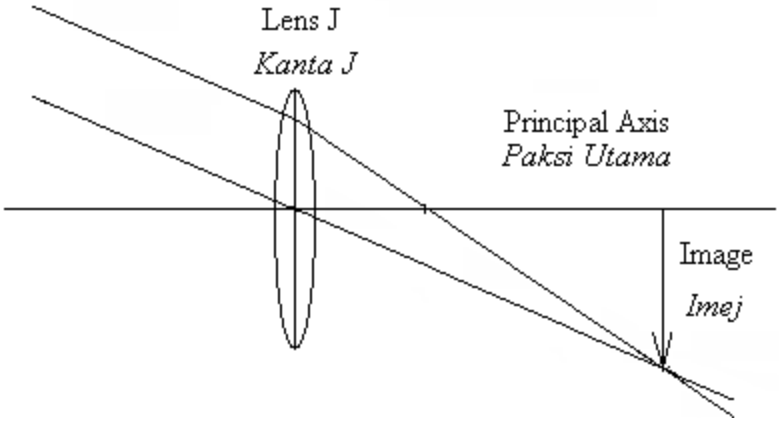
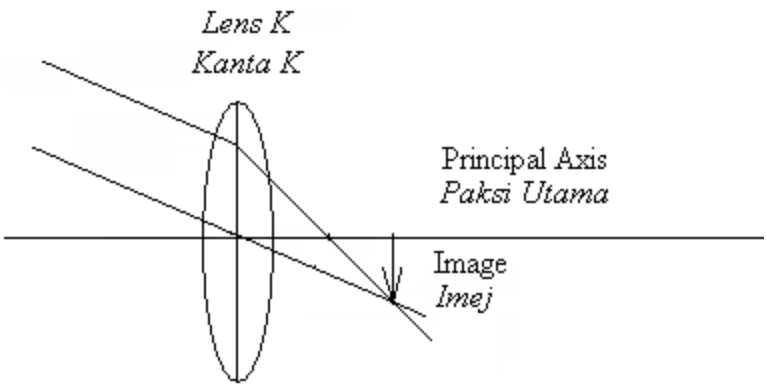


DIAGRAM 9.1
RAJAH 9.1

DIAGRAM 9.2



RAJAH 9.2

(a) (i) What is meant by focal length?
Apakah maksud panjang fokus? [1 *mark*]

(ii) With reference to Diagram 9.1 and Diagram 9.2, compare the thickness of the lenses and the effects it has on the refracted rays to make a deduction regarding the relationship between the thickness of the lenses and their focal length.

Merujuk kepada Rajah 9.1 dan Rajah 9.2, bandingkan ketebalan kanta dan kesan keatas pembiasan cahaya untuk membuat satu kesimpulan tentang hubungan antara ketebalan dengan panjang fokus.

[5 *marks*]

(b) Diagram 9.3 shows the ray diagram of a simple microscope.
Rajah 9.3 menunjukkan gambar sinar bagi satu mikroskop ringkas.

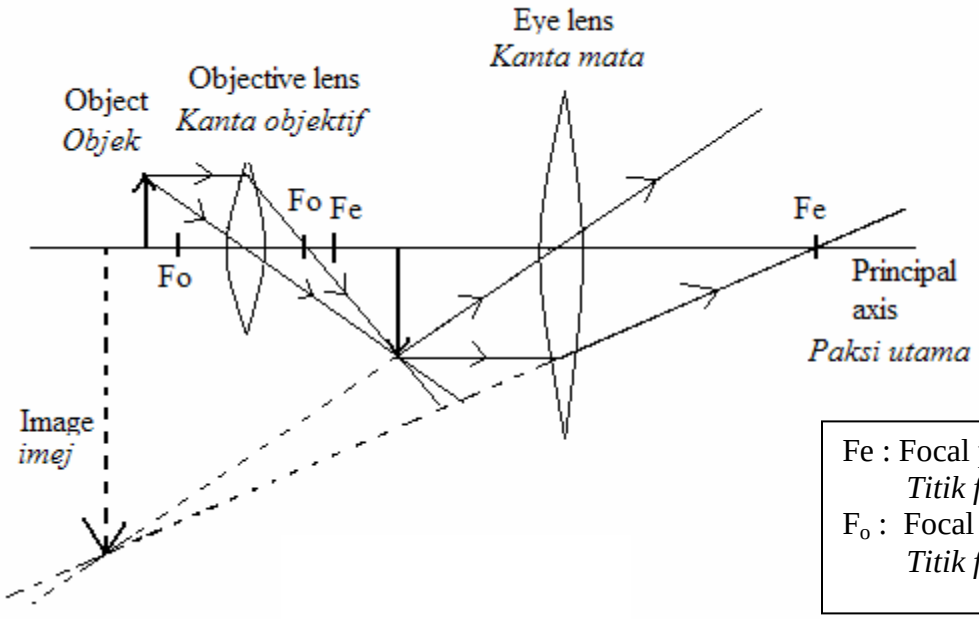


DIAGRAM 9.3
RAJAH 9.3

(i) State the function of the eyepiece.
Nyatakan fungsi kanta mata. [1 *mark*]

(ii) State the characteristics of the image formed by a microscope.
Nyatakan ciri-ciri imej yang dihasilkan oleh satu mikroskop.
[3 *marks*]

(c) You are given two convex lenses S and Q of different focal length. Lens S has a longer focal length than lens Q.

Anda dibekalkan dua kanta cembung S dan Q yang berlainan panjang fokus. Kanta S mempunyai panjang fous yang lebih panjang daripada kanta Q.

(i) Using the two lenses above explain how are you would make a simple astronomical telescope.
Dengan menggunakan dua kanta tersebut, terangkan bagaimana anda akan membina sebuah teleskop astronomi ringkas. [4 *marks*]

(ii) Suggest modification that need to be done on the telescope to produce clearer and bigger images.
Cadangkan pengubahsuaian yang perlu dilakukan terhadap teleskop itu untuk menghasilkan imej yang lebih jelas dan lebih besar.
[6 *marks*]

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

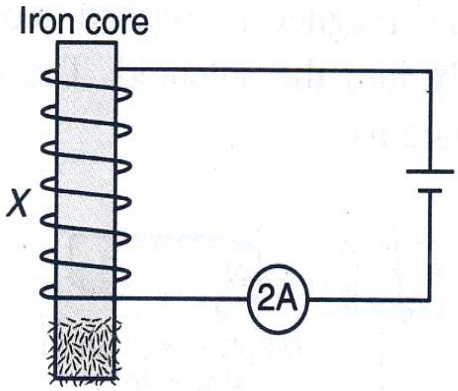


Diagram 10.1
Rajah 10.1

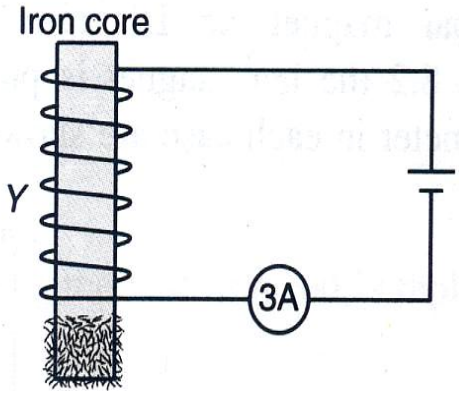


Diagram 10.2
Rajah 10.2

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

[*1 mark*]

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

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

[*5 marks*]

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

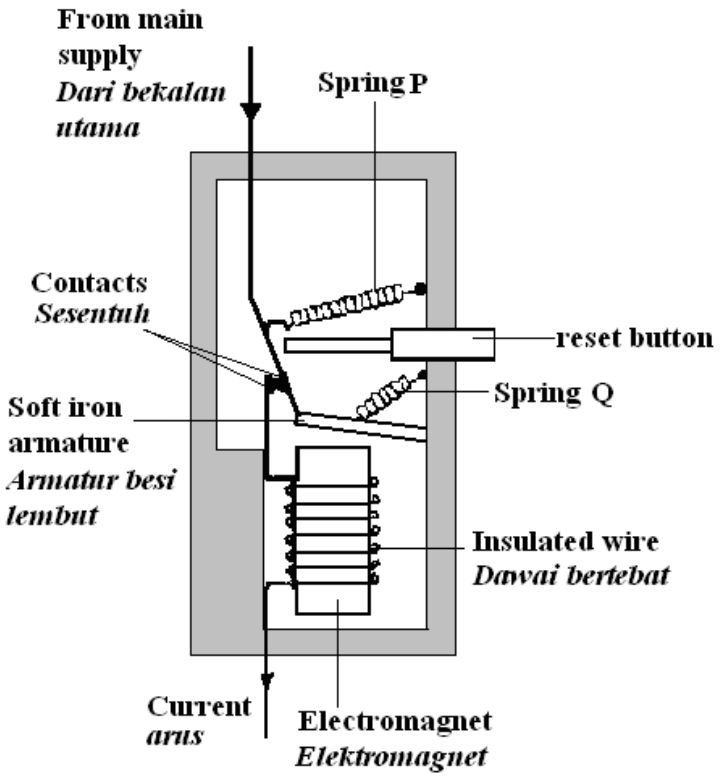


Diagram 10.3
Rajah 10.3

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

[*4 marks*]

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

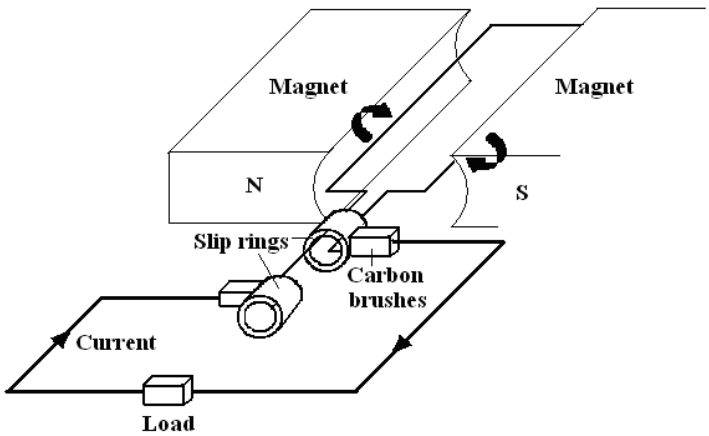
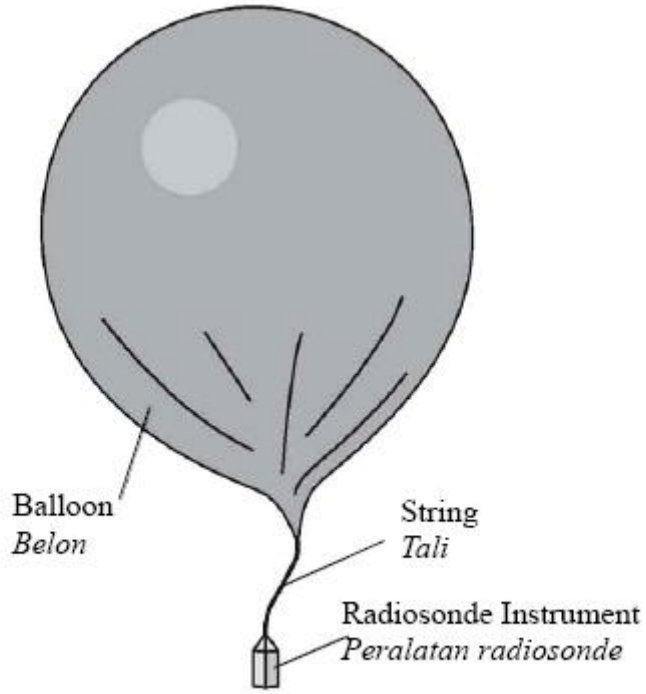


Diagram10.4
Rajah 10.4

11 Diagram 11.1 shows the air balloon which is used as a weather balloon to carry a radiosonde instrument for collecting data about the atmosphere. The weather balloon rises up in the air due to Archimedes principal
Rajah 11.1 menunjukkan belon udara yang digunakan sebagai belon kajicuaca untuk membawa peralatan radiosonde bagi mengumpul data mengenai atmosfera.Belon cuaca naik ke udara disebabkan oleh prinsip Archimedes.



(a) (i) State Archimedes' principle.
Nyatakan prinsip Archimedes. [1 m*ark*]

(ii) Explain why a weather balloon that is rising up in the air will stop at certain altitude.
Jelaskan mengapa sebuah belon yang sedang naik ke udara akan berhenti pada altitud tertentu. [4 *marks*]

(b) Table 11.2 shows the characteristics of four weather balloons, P, Q, R and S .
Jadual 11.2 menunjukkan ciri-ciri empat belon cuaca, P, Q, R dan S .

Balloons Belon	Characteristics of balloons Ciri-ciri belon			
	Size of balloon Saiz belon	Density of filled gas in the ballon Ketumpatan gas yang diisi dalam belon	Type of balloon fabric Jenis fabric belon	Mass of radiosonde Jisim radiosonde

		/ $kgcm^{-3}$		
P	Big *besar*	0.090	Canvas *Kanvas*	4.5
Q	Small *kecil*	0.178	Synthetic nylon *Nilon sintetik*	3.0
R	Big *besar*	0.178	Synthetic nylon *Nilon sintetik*	0.5
S	Medium *sederhana*	1.429	Canvas *Kanvas*	0.4

You are required to determine the most suitable weather balloons which is able to carry the instrument to a higher altitude in a shorter time.
Study the characteristics of all the four weather balloons from the following aspects:
Anda dikehendaki menentukan belon cuaca yang paling sesuai untuk membawa peralatan ke altitud yang lebih tinggi dalam masa yang lebih pendek.
Kaji ciri-ciri bagi kesemua empat belon kajicuaca itu dari aspek berikut:

- The size of the balloon
- *Saiz belon*
- The density of filled gas in the ballon
- *ketumpatan gas yang di isi ke dalam belon*
- Type of the fabric of the balloon
- *Jenis fabrik bagi belon*
- Mass of radiosonde instrument
- *jisim peralatan radiosonde*

Explain the suitability of the aspects.
Justify your choice.
Jelaskan kesesuaian aspek-aspek itu.
Beri sebab bagi pilihan anda. [10 *marks*]

(c) Diagram 11.3 shows a balloon which contains helium. The volume of the balloon is 1.2 m^3. Density of helium gas is 0.18 kg m^{-3}.
Rajah 11.3 menunjukkan sebuah belon yang mengandungi gas helium.Isipadunya ialah 1.2 m^3 . Ketumpatan gas helium ialah 0.18 kg m^{-3}

DIAGRAM 11.3

(i) By neglecting the mass of the balloon, calculate the mass of helium gas in the balloon.
Dengan mengabaikan jisim belon, kirakan jisim gas helium di dalam belon.
[2 *marks*]

(ii) Calculate the bouyant force which acts on the balloon.
(Density of air is 1.3 kg m^{-3})
Kirakan daya tujah ke atas yang bertindak pada belon .
(Ketumpatan udara ialah 1.3 kg m^{-3}) [3 *marks*]

(i) Explain how the generator works to produce alternating current.
Terangkan bagaimana penjana berfungsi untuk menghasilkan arus ulang alik.
[*4 marks*]

(ii) Explain the modification that needs to be done on the generator and the external circuit
to enable the generator to be a d.c generator and produce more current.
Terangkan pengubahsuain yang perlu dibuat kepada penjana dan litar luar untuk membolehkan penjana menjadi penjana a.t dan menghasilkan arus yang lebih tinggi.

[*6 marks*]

12. Diagram 12.1 shows a system used in a factory to ensure the volume of guava juice in a bottle is uniform.
Rajah 12.1 menunjukkan satu sistem yang digunakan di sebuah kilang untuk memastikan isipadu jus buah jambu yang diisi ke dalam botol adalah seragam.

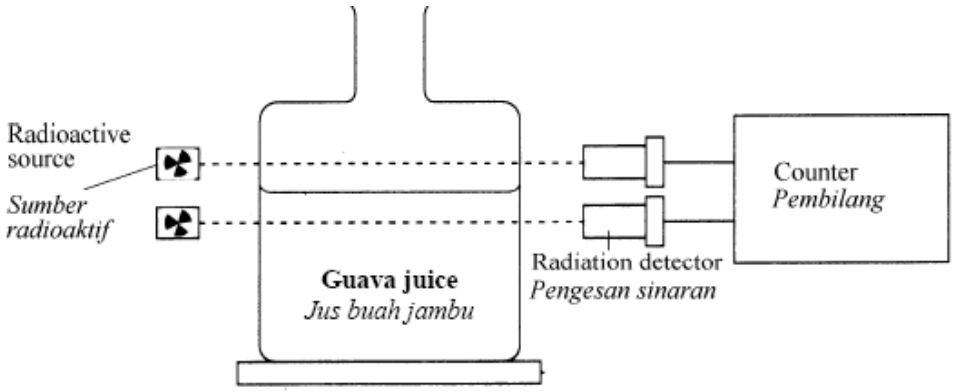


Diagram 12.1
Rajah 12.1

The radioactive source, radiation detector and counter are used to detect the volume of guava juice. The radioactive source contains a radioisotope.
Sumber radioaktif, pengesan sinaran dan pembilang digunakan untuk mengesan isipadu jus buah jambu. Sumber radioaktif itu mengandungi radioisotop.

(a) What is meant by a radioisotope?
Apakah yang dimaksudkan dengan radioisotop? [*1 mark*]

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

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

Table 12.2
Jadual 12.2

As a factory engineer, you are required to determine the most suitable radioisotope that can be used by the system to ensure the volume of guava juice is uniform.
Study the characteristics of all 5 radioisotopes and explain the suitability of the aspects.
Determine the most suitable radioisotope and give the reason for your choice.
Sebagai jurutera kilang, anda dikehendaki menentukan radioisotop yang paling sesuai yang boleh digunakan oleh sistem untuk memastikan isipadu jus buah jambu adalah seragam.
Kaji ciri-ciri kelima-lima radioisotop dan terangkan kesesuaian bagi setiap aspek. Tentukan radioisotop yang paling sesuai dan beri sebab bagi pilihan anda. [*10 marks*]

(c) Table 12.3 shows the reading of the rate meter for 6 bottles through detector and radioactive source .
Jadual 12.3 menunjukkan bacaan meter kadar bagi 6 botol yang melalui pengesan dan sumber radioaktif.

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

Table 12.3
Jadual 12.3

(i) State one detector that is suitable to be used for this purpose.
Nyatakan satu alat pengesan yang sesuai digunakan untuk tujuan ini. [*1 mark*]

(ii) Based on table 12.3, which bottle shows the least volume of juice and state the reason for your answer.
Berdasarkan jadual 12.3, botol yang manakah menunjukkan isipadu yang tidak cukup dan nyatakan sebab bagi jawapan anda. [*3 marks*]

(d) In a radioactive decay series, Uranium-238 decays to become Radium-226 by emitting alfa and beta.
Dalam siri reputan radioaktif, Uranium-238 mereput menjadi Radium-226 dengan menghasilkan alfa dan beta.

$$^{238}_{92}U \longrightarrow ^{226}_{88}Ra + \underline{X}\,\alpha + \underline{Y}\,\beta$$

Determine the values of X and Y?
Tentukan nilai X dan Y? [*5 marks*]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

NAMA:_____ TINGKATAN:_____

4531/3
Fizik
Kertas 3
2010
1 ½ jam

PERSIDANGAN KEBANGSAAN PENGETUA SEKOLAH MENENGAH MALAYSIA (CAWANGAN MELAKA)

PEPERIKSAAN PERCUBAAN SIJIL PELAJARAN MALAYSIA TAHUN 2010

FIZIK

Kertas 3

Satu jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. Tuliskan nama dan tingkatan anda pada ruang yang disediakan.

2. Calon dikehendaki membaca maklumat di halaman 2 .

Nama Pemeriksa			
Bahagian	Soalan	Markah Penuh	Markah diperolehi
A	1	16	
	2	12	
B	3	12	
	4	12	
Jumlah			

Kertas soalan ini mengandungi 17 halaman bercetak .

INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON

1. This question paper consists of two sections : Section A and Section B.
   Kertas soalan ini mengandungi dua bahagian: ***Bahagian A*** *dan* ***Bahagian B.***

2. Answer all questions in Section A. Write your answers for Section A in the spaces provided in the question paper.
   Jawab ***semua*** *soalan dalam* ***Bahagian A.*** *Jawapan kepada* ***Bahagian A*** *hendaklah ditulis dalam ruang yang disediakan dalam kertas soalan.*

3. Answer one question from Section B. Write your answers for Section B on the lined pages provided at the end of this question paper. Answer questions in Section B in detail. You may use equations, diagrams, tables, graphs and other suitable methods to explain your answer.
   Jawab ***satu*** *soalan daripada* ***Bahagian B.*** *Jawapan kepada* ***Bahagian B*** *hendaklah ditulis pada kertas jawapan sendiri. Anda diminta menjawab dengan lebih terperinci. Jawapan mestilah jelas dan logik. Persamaan , gambar rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda boleh digunakan.*

4. Show your working, it may help you to get marks.
   Tunjukkan kerja mengira,ini membantu anda mendapatkan markah.

5. If you wish to cancel any answer, neatly cross out the answer.
   Sekiranya anda hendak membetulkan sesuatu jawapan, buatkan garisan di atas jawapan itu.

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

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

8. A booklet of four-figure mathematical tables is provided.
   Buku sifir matematik empat angka disediakan.

9. You may use a non-programable scientific calculator.
   Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.

10. The time suggested to answer Sectin A is 60 minutes and Section B is 30 minutes.
    Masa yang dicadangkan untuk menjawab ***Bahagian A*** *ialah 60 minit dan* ***Bahagian B*** *ialah 30 minit.*

11. Hand in this question paper at the end of the examination.
    Serah kertas soalan ini di akhir peperiksaan.

Section A
[28 *marks*]

Answer **all** *questions.*

1 A student carries out an experiment to investigate the relationship between the resistance, *R*, of a wire and the length, *L*, of the wire.
Diagram 1.1 shows the circuit used in the experiment.

Seorang pelajar menjalankan satu eksperimen untuk mengkaji hubungan rintangan, R, bagi seutas dawai dengan panjang, L, bagi dawai itu.
Rajah 1.1 menunjukkan litar yang digunakan dalam eksperimen itu.

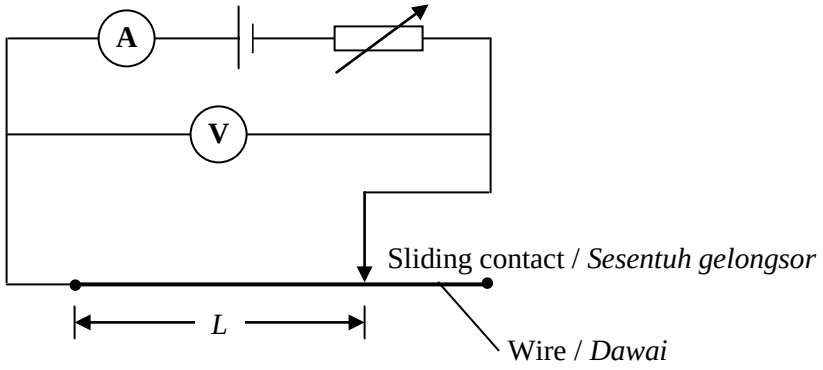


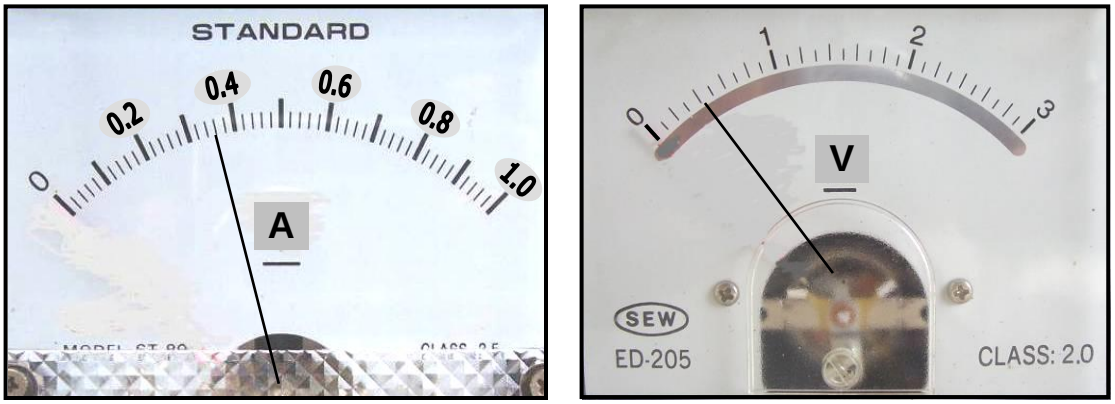
DIAGRAM 1.1 / *RAJAH 1.1*

The position of the sliding contact is adjusted until the length of the wire in the circuit is, *L* = 20.0 cm. The rheostat is adjusted to obtain a suitable current. The current, *I* and the potential difference, *V* across the wire are measured by an ammeter and voltmeter respectively. Diagram 1.2 shows the readings of the ammeter and voltmeter.

The procedure is repeated for lengths of the wire, *L* = 30.0 cm, 40.0 cm, 50.0 cm and 60.0 cm. The corresponding readings of the ammeter and voltmeter are shown in Diagrams 1.3, 1.4, 1.5 and 1.6.

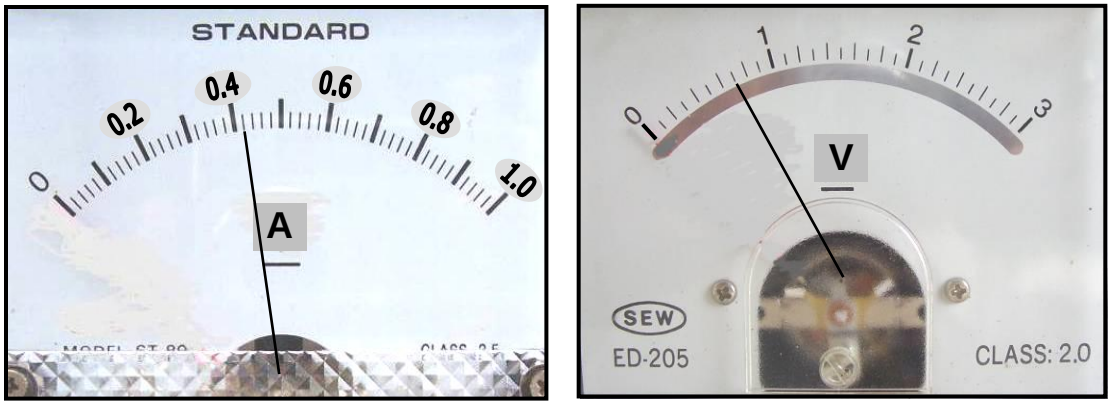
Kedudukan bagi sesentuh gelongsor dilaraskan sehingga panjang dawai dalam litar ialah L = 20.0 cm. *Reostat dilaraskan untuk memperoleh satu nilai arus yang sesuai. Arus, I dan beza keupayaan, V merentasi dawai itu masing-masing diukur oleh ammeter dan voltmeter. Rajah 1.2 menunjukkan bacaan ammeter dan voltmeter.*

Prosedur itu diulang bagi panjang dawai, L = 30.0 cm, 40.0 cm, 50.0 cm dan 60.0 cm. *Bacaan-bacaan sepadan bagi ammeter dan voltmeter ditunjukkan dalam Rajah 1.3, 1.4, 1.5 dan 1.6.*



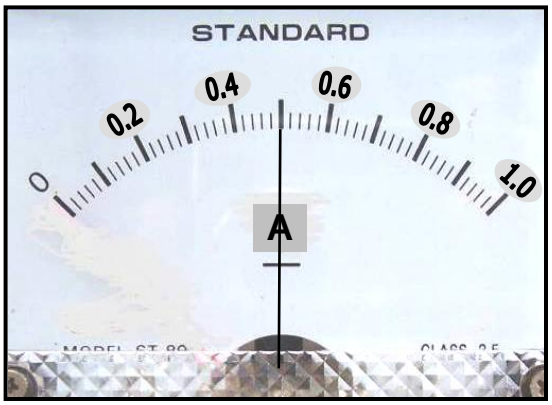
L = 20.0 cm

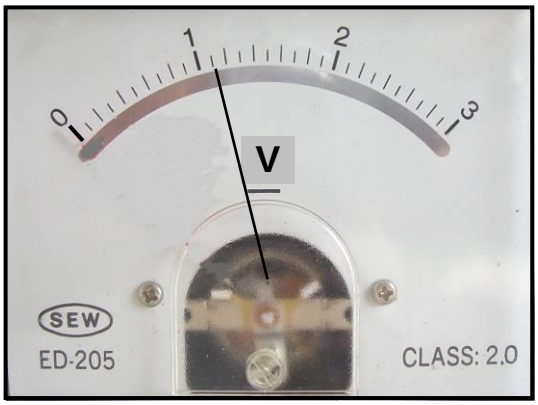
DIAGRAM 1.2 / *RAJAH 1.2*



L = 30.0 cm

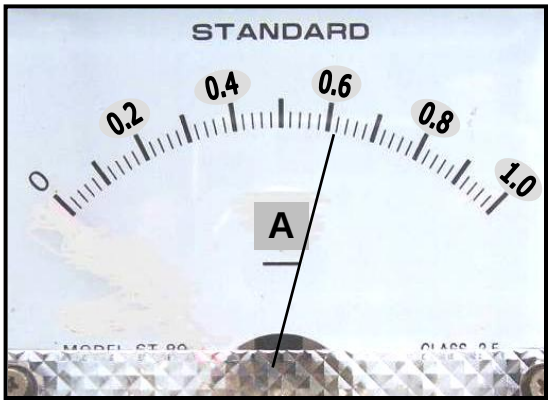
DIAGRAM 1.3 / *RAJAH 1.3*

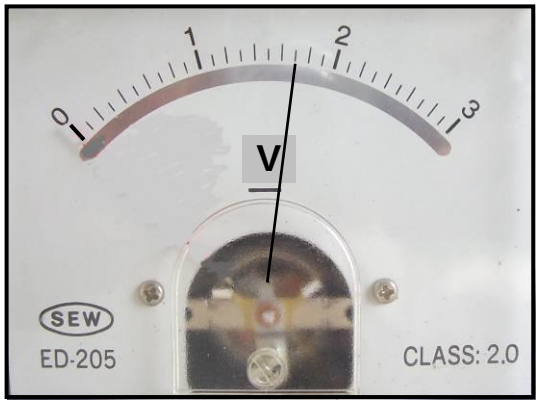




L = 40.0 cm

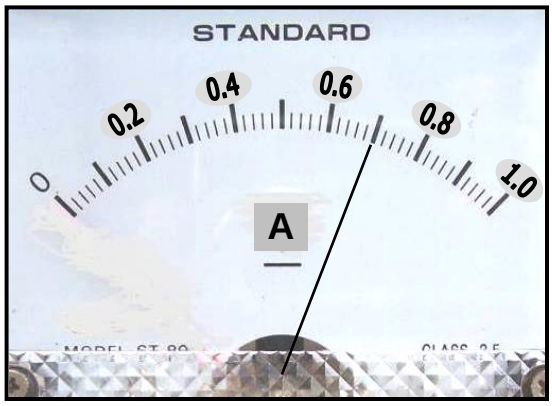
DIAGRAM 1.4 / *RAJAH 1.4*

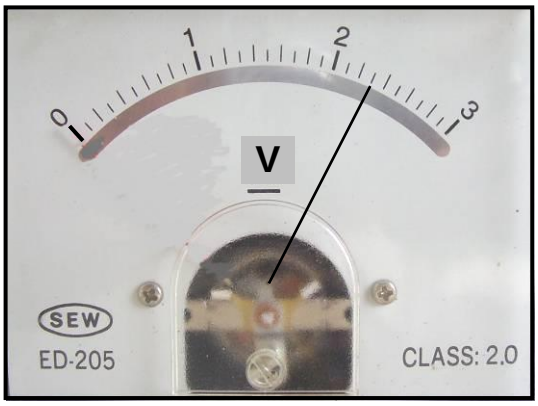




L = 50.0 cm

DIAGRAM 1.5 / *RAJAH 1.5*





L = 60.0 cm

DIAGRAM 1.6 / *RAJAH 1.6*

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

(i) the manipulated variable,
pembolehubah dimanipulasikan,

……
[1 *mark*]

(ii) the responding variable,
pembolehubah bergerak balas,

……
[1 *mark*]

(iii) a fixed variable.
satu pembolehubah dimalarkan.

……
[1 *mark*]

(b) What is the use of the strip of mirror next to the scale of the voltmeter?
Apakah kegunaan jalur cermin di sebelah skala voltmeter itu?

…….

[1 *mark*]

(c) Based on Diagrams 1.2, 1.3, 1.4, 1.5 and 1.6 on pages 4 and 5, determine the current, *I* and potential difference, *V* for the corresponding lengths of wire, *L*.
For each value of *L*, calculate the resistance, *R* of the wire.

The resistance, *R*, is calculated using the formula, $R = \frac{V}{I}$

Tabulate your results for *L*, *I*, *V* and *R* in the space below.

Berdasarkan Rajah 1.2, 1.3, 1.4, 1.5 dan 1.6 di halaman 4 dan 5, tentukan arus, I, beza keupayaan, V, yang sepadan dengan panjang dawai, L.

Rintangan, R, dihitung dengan menggunakan rumus, $R = \frac{V}{I}$

Jadualkan keputusan anda bagi L, I, V dan R pada ruang di bawah.

[5 *marks*]

(d) On the graph paper on Page 7, plot a graph of *R* against *L*.
Pada kertas graf di halaman 7, lukiskan graf R melawan L.

[5 *marks*]

(e) Based on your graph, state the relationship between *R* and *L*.
Berdasarkan graf anda, nyatakan hubungan antara R dan L.

…….

[1 *mark*]

(f) State one precaution that should be taken to obtain accurate readings of *V*.
Nyatakan satu langkah berjaga-jaga yang perlu diambil untuk mendapatkan bacaan V yang lebih jitu.

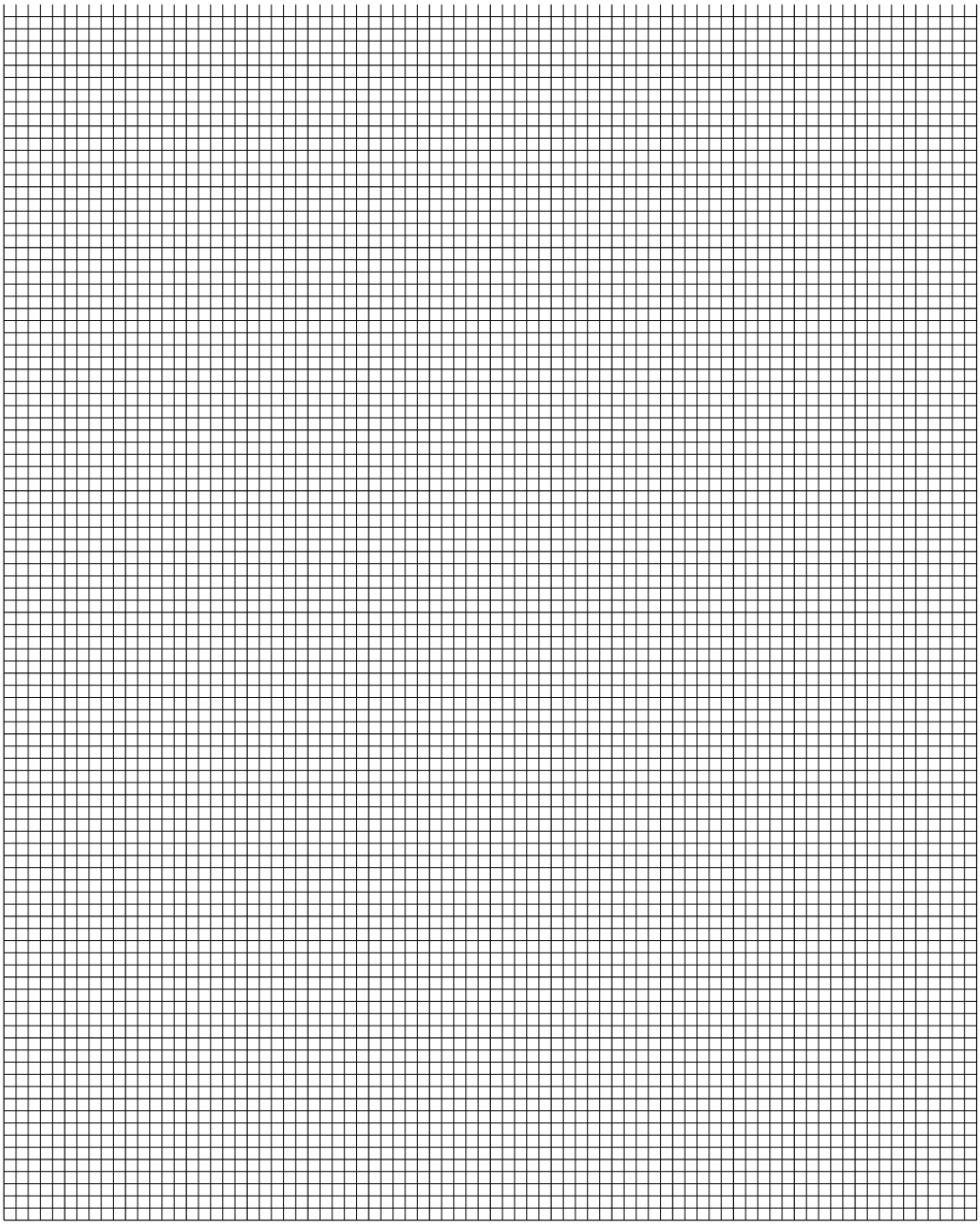
……

……

[1 *mark*]

Graph of *R* against *L*

Graf R melawan L



2. A student carried out an experiment to investigate the relationship between the velocity of sound wave, *v* and air temperature ,T.
Seorang pelajar menjalankan satu eksperimen untuk mengkaji hubungan diantara Halaju bunyi , dengan suhu udara T.

The results of the experiment are shown in the graph of *v 2* against *T* in Figure 2.1.
Keputusan eksperimen itu ditunjukkan oleh graf v 2 lawan T, pada Rajah 2.1

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

(i) State the relationship between *v* and T ?
Nyatakan hubungan antara v dengan T?

…….

[1 *mark*]

(ii) determine the value of *v* when T = 0° C
Show on the graph , how you determine the value of *v*
Tentukan nilai v apabila T =0 C
Tunjukkan pada graf itu bagaimana anda menentukan nilai v

v = …… [2 *marks*]

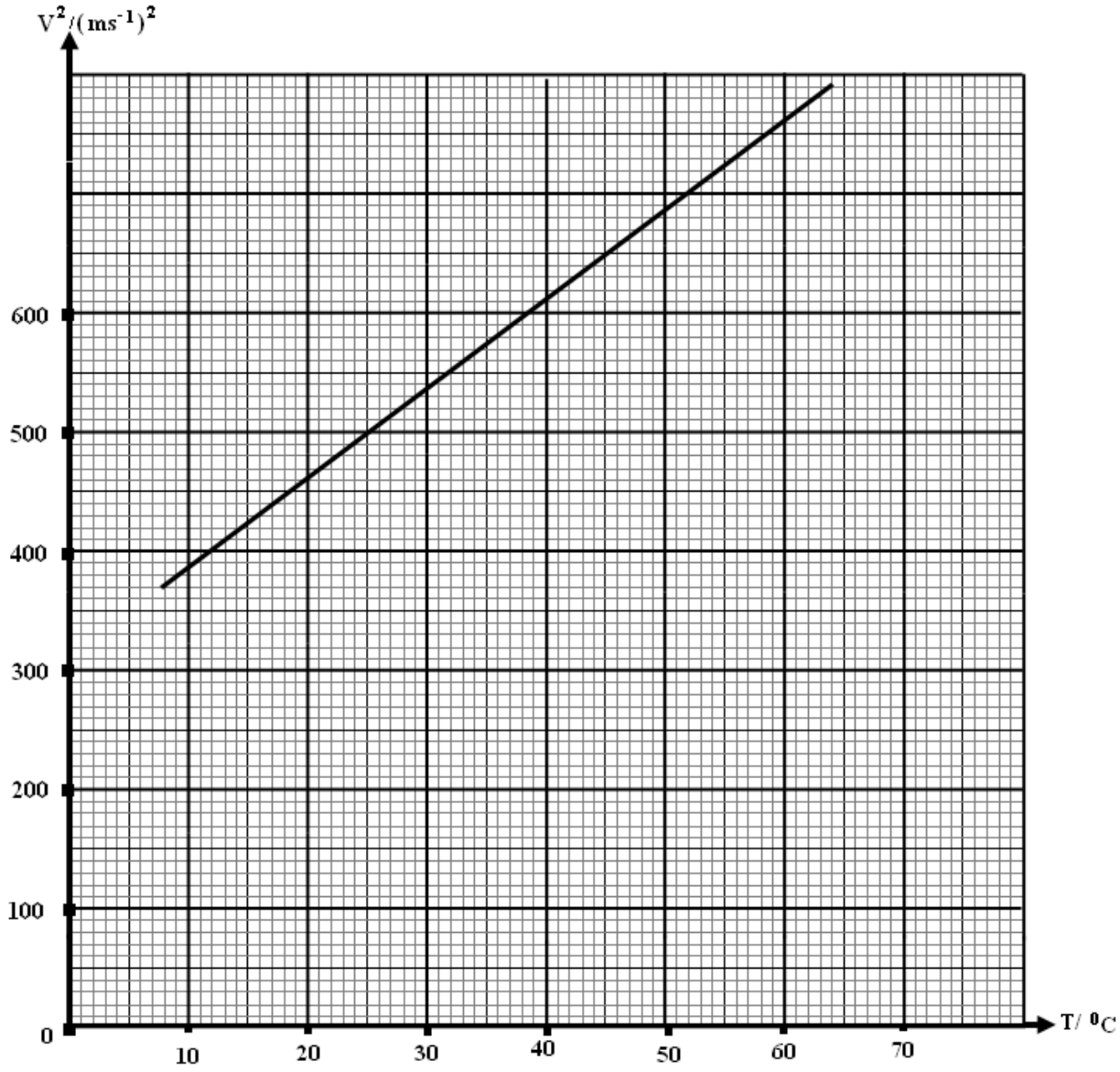


DIAGRAM 2.1

b) The specific heat capacity of air c , is given by the formula $c = \frac{1}{k}$

where *k* is the gradient of the graph.

Muatan haba tentu bagi udara,c diberi oleh rumus $c = \frac{1}{k}$

dimana k ialah kecerunan graf.

i) Calculate the gradient of the graph , k, of v^2 against T.
Show on the graph how you determine the gradient.
Hitungkan kecerunan bagi graf, k , v^2 *melawan M.*
Tunjukkan pada graf bagaimana anda menentukan kecerunan itu.

k = …….

[3 *marks*]

(ii) Determine the value, *c*, of the air
Tentukan nila c bagi udara.

c =…….. [2 *marks*]

(c) Determine the sound wave velocity in the air , *v*, if the temperature of air = 300C
Show on the graph , how you determine the value of *v.*
Tentukan halaju gelombang bunyi di udara , v, jika suhu udara = 300C
Tunjukkan di atas graf bagaimana anda menentukan nilai v.

[3 *marks*]

(c) Determine the sound wave velocity in the air , *v*, if the temperature of air = 300C
Show on the graph , how you determine the value of *v.*
Tentukan halaju gelombang bunyi di udara , v, jika suhu udara = 300C
Tunjukkan di atas graf bagaimana anda menentukan nilai v.

[3 *marks*]

(d) State one precaution that can be taken to improve the accuracy of the readings in this experiment.
Nyatakan satu langkah berjaga- jaga yang boleh diambil untuk memperbaiki ketepatan bacaan dalam ekperimen ini.

……

……

[1 *mark*]

Section B
Bahagian B

[12 *marks*]
[12 *markah*]

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

3. A boy pushes the boxes along a level walkway as shown in Diagram 3.1. The boy experiences that the boxes on trolley move slowly. When the boy removes two of the boxes as shown in Diagram 4.2, he experiences that the trolley move faster than before although the same force was applied, 8 N.

Seorang budak lelaki menolak beberapa buah kotak atas troli di sepanjang satu laluan seperti yang ditunjukkan dalam Rajah 3.1. Budak lelaki itu mendapati kotak-kotak bergerak sangat perlahan. Apabila budak lelaki itu mengeluarkan dua daripada kotak-kotak itu seperti ditunjukkan dalam Rajah 3.2, dia mendapati troli itu boleh digerakkan lebih laju, walaupun daya yang sama dikenaka, 8 N

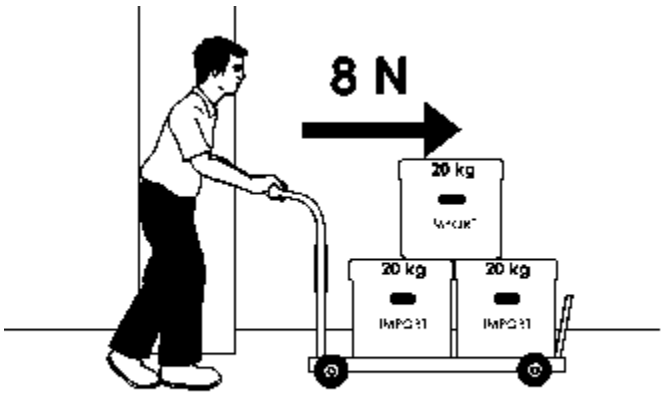


Diagram 3.1(Rajah 3.1)

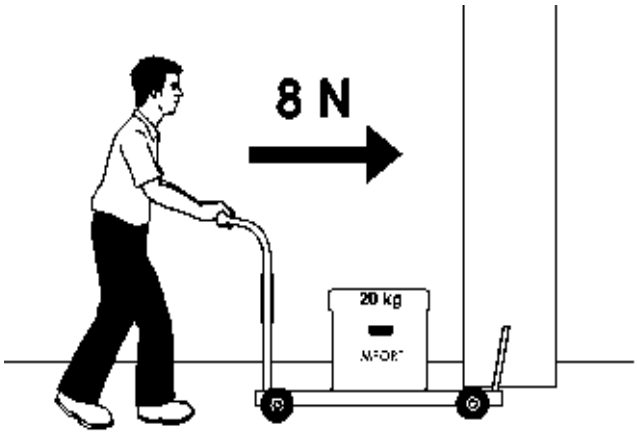


Diagram 3.2 (Rajah 3.2)

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

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

[1 mark]

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

[1 mark]

(c) With the use of apparatus such as a trolley, ticker timer, ticker tape, elastic cord and other apparatus, describe an experiment framework to investigate the hypothesis stated in 4(b). In your description, state slearly the following :

Dengan menggunakan radas seperti troli, jangkamasa detik, pita detik, tali kenyal dan lain-lain radas, terangkan satu rangka kerja ekperimen untuk menyiasat hipotesis yang anda nyatakan dalam 3(b) Dalam penerangan anda jelaskan perkara berikut :

(i) The aim of the experiment
Tujuan eksperimen

(ii) The variables in the experiment
Pembolehubah yang terlibat dalam eksperimen itu

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

(iv) The arrangement of the apparatus
Susunan radas

(v) The procedure of the experiment.
Describe how to control the manipulated variables and how to measure the responding variables.
Prosedur yang digunakan dalam eksperimen.
Terangkan bagaimana mengawal pembolehubah dimanipulasi, dan bagaimana mengukur pemboleh ubah bergerak balas.

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

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

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

4. Diagram 4.1 and diagram 4.2 shows the interferance patterns formed by two continuous coherent water waves with different distance between two spherical dippers.

Rajah 4.1 dan rajah 4.2 menunjukkan corak interferens yang terbentuk bagi 2 sumber gelombang air yang koheren dengan jarak yang berbeza bagi 2 pengetar membulat..

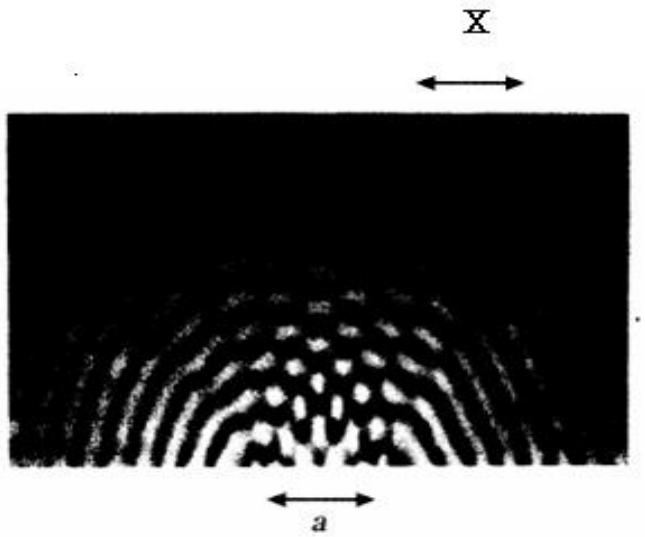


Diagram 4.1/*Rajah 4.1*

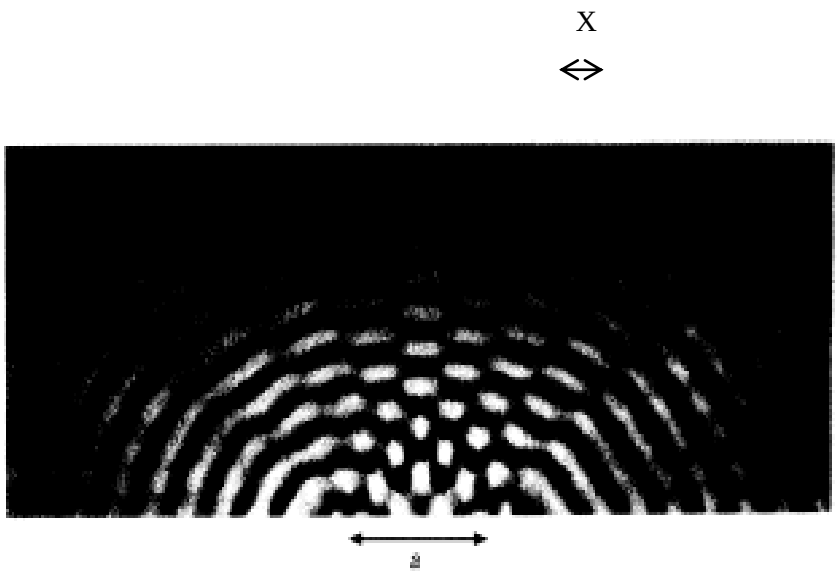


Diagram 4.2 / Rajah 4.2

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

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

[1 *mark*]

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

[1 *mark*]

(c) With the use of apparatus such as ripple tank, stroboscope and other suitable apparatus, describe an experiment framework to investigate the hypothesis stated in 4(b). In your description, state clearly the following :
Dengan menggunakan radas seperti tangki riak , stroboskop dan lain-lain radas yang sesuai, teangkan satu rangka kerja eksperimen untuk menyiasat hipotesis yang anda nyatakan di 4(b**)**.
Didalam penerangan anda, nyatakan dengan jelas yang berikut:

(i) Aim of the experiment
Tujuan eksperimen

(ii) Variables in the experiment
Pembolehubah dalam eksperimen

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

(iv) Arrangement of the apparatus
Susunan radas

(iv) The procedure of the experiment which includes the method of controlling the manipulated variable and the method of measuring the responding variable.
Prosedur eksperimen termasuk kaedah mengawal pembolehubah dimanipulasikan dan kaedah mengukur pemblehubah bergerak balas.

(v) The way you would tabulate the data
Cara anda akan menjadualkan data

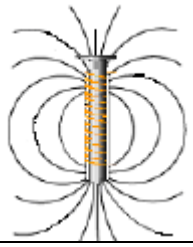
(vi) The way you would analyse the data.
Cara anda akan menganalisis data

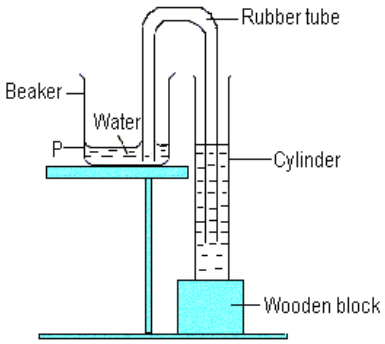
[10 *marks*]

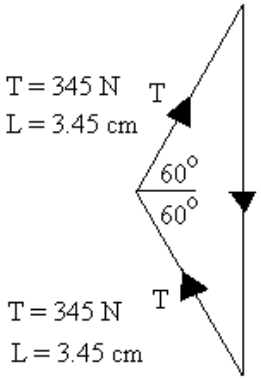
END OF QUESTION PAPER
KERTAS SOALAN TAMAT

Skema paper 1 set 2 trial 2010

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

SKEMA PAPER 2 SET 2 FIZIK TRIAL MELAKA 2010		
1	a) vernier calipers b) for measuring inner diameter c) 0.01 cm d) 2.55 cm	1 1 1 1
		4
2 (a) (i)	- energy is used to break the bonds//change the state of matter	1
(ii)	- energy is used to increase the kinetic energy of the molecules	1
(b)	- $0.2 \times 3.36 \times 10^5$ - 6.72×10^4 J	1 1
(c)	- There is no net transfer of energy between the water and the surroundings	1
		5
3 (a)	A temporary magnet when there is a flow of electric current	1
(b) (i)		1
(ii)	South / S	1
(iii)	Attracted to iron nail (electromagnet)	1
(c)	- increase the number of turn/increase the current	1
(d)	Magnetic lifting machine / circuit breaker / electric bell / electric relay / ticker timer / magnetic levitated train / electronic card /parking machine /tape recorder.	2
		7
4 (a)	Transistor NPN	1
B(i)	$I_B + I_C = I_E$	1
B (ii)	$\frac{V_2}{6} = \frac{R_2}{R_2 + 1500}$	1 1

	R_2= 750 Ω	
C(i)	The bulb will not light up Resistance R_2 is small // V_2 is small	1 1
C(ii)	Current amplifier	1
		7
5(a)(i)	The wall of a dam in Figure 4.2 is much thicker at the bottom than at the top and withstand the higher pressure at the bottom of the lake	1
(a)(ii)	Pressure at B is higher than at A // vice versa	1
(b)(i)	Dam in Diagram 5.2	1
(b)(ii)	When depth increases, pressure increases.// Thicker at the base can withstand high pressure	1
(c)(i)	Siphon system	1
(c)(ii)	**Diffrence in water level** will cause different in pressure	1
(c)(iii)		1
		8
6(a)(i)	Reflection	1
(ii)	1 000 Hz	1
(iii)	Less	1
(iv)	Less energy	1
(b)(i)	5 cm x 1 ms/cm 5 ms = 0.005	1 1
(b)(ii)	Show on the graph From graph, T = 0.005 s, d = 1.7 m	1 1
	TOTAL	**8**
7 (a)	Resultant force / net force is zero	1
(b)	W = mg = 60 x 10 = 600 N	 1 1
(c)		

(d)		3 1
(e)	2T = W 2T = 600 T = 300 N Method in Diagram 8.2 , tension is lower	1 2
		10
8(a)	It releases 1000 J of energy per second// 1000W power when 240 V is supplied to it	1
(b) (i)	Replacement into the formula $I = \frac{P}{V}$ $I = \frac{1000}{240}$ Answer with correct unit = 4.167 A	1 1
(b) (ii)	Calculating number of unit E = Pt $= \frac{1000}{1000} \times \frac{30}{60} \times 30$ // 15 units Cost = 15 X 0.23 // RM 3.45	1 1
(c)(i)	Calculate the energy by using $E = VIt$ P : 240 X 6 X 90 // 129 600 J Q : 240 X 5 X 150 // 180 000 J R : 240 X 4 X 120 // 115 200 J	1 + 1 1 1
(c) (ii)	R Uses the least energy // save energy Save cost // save time	1 1 1
	TOTAL	**12**

<table>
<tr><td>9(a) (i)</td><td>Distance from the optical centre to a focal point.</td><td>1</td></tr>
<tr><td>(ii)</td><td>Lens K is thicker than lens J
Light ray is refracted more in lens K than lens J.
Focal length of lens K is shorter than lens J.
Therefore the thicker the lens, the greater the refraction of light
and with that the shorter the focal length of a lens will be</td><td>5</td></tr>
<tr><td>(b) (i)</td><td>As a magnifying glass.</td><td>1</td></tr>
<tr><td>(ii)</td><td>Enlarge/magnified
Inverted/upside down
Virtual</td><td>3</td></tr>
<tr><td>(c)(i)</td><td>Choose lens S as objective lens
Choose lens Q as eyepiece
Lens S is placed in front of lens Q
The two lenses are adjusted so that they are in normal adjustment where distance between the two lenses is equal to (fo + fe)</td><td>4</td></tr>
<tr><td>(ii)</td><td><table><tr><th>Modification</th><th>Explanation</th></tr><tr><td>1. Use low power convex lens as the objective lens.</td><td>- Magnification of telescope = $\frac{f_o}{f_e}$,
$\therefore$ Low power lens has a longer focal length, fo $\uparrow$,
magnification $\uparrow$</td></tr><tr><td>2. Use high power convex lens as the eye lens</td><td>High power lens has a shorter focal length, fe $\downarrow$,
magnification</td></tr><tr><td>3.Use bigger diameter of objective lens</td><td>More light permitted to enter the telescope and a clearer image is seen</td></tr></table></td><td>6</td></tr>
<tr><td></td><td></td><td>20</td></tr>
<tr><td>10(a)(i)</td><td>Electromagnet is a device in which magnetism is produced by an electric current // temporary magnet made by winding a coil round a soft iron core and magnetic field produce when current flow.</td><td>1</td></tr>
<tr><td>(ii)</td><td>• Current flow in diagram 10.2 is more than 10.1 // vice versa.
• The amount of iron filing attracted by iron core in Diagram 10.2 is more than 10.1 // vice versa.
• The magnetic strength in diagram 10.2 is more than 10.1 // vice versa.
• Amount of iron filing attracted increase when current increase
• The magnetic field strength increase when current increase</td><td>1
1
1
1
1</td></tr>
<tr><td>(b)</td><td>• When too high current flow, magnetic field strength become very</td><td></td></tr>
</table>

	strong / wire expand • electromagnet pull the soft iron armature / pulled to the right by spring P. • release the catch, contact separate and current does not flow • When reset button is pressed, spring Q pulls the soft iron armature back to its original position	1 1 1 1
(c)(i)	• When the coil rotates the coil cut across the magnetic field lines • Induced current flow in the coil. • The current maximum when the coil cut the magnetic field at right angle // current decreased (become zero) when the coil move in parallel with magnetic field lines • The direction of current flow determine by using Fleming's right hand rule • After 90^o the direction of current in the external circuit reversed/ diagram	1 1 1 1 1 (Max : 4)
(c)(ii)	**Modification** / **Explanation** Change slip rings with commutator / To reverse contact with brushes so that the current flow in same direction in external circuit Use stronger magnet / To increase the magnetic field strength Use more number of turn for the coil/ Increase the speed of rotation / Increase the rate of change of magnetic field/increase the induced current	2 2 2
	Total	**20**
11(a)(i)	**State Archimedes principal as** Buoyant force equal to weight of fluid displaced	**1**
(ii)	Volume of air displaced equal to volume of a balloon Density of air decreased as a altitude increase Weight of displaced air become smaller At certain height weight of displaced air equal to weight of the balloon	**1** **1** **1** **1**
(iii)	Large balloon To produce bigger buoyant / up thrust // Increase the volume of the air displaced	**1** **1**

	Low density of gas filled in the balloon Lighter Synthetic nylon Light-weight, strong and air-proof material Low mass of radiosonde instrument To produce a bigger upward resultan force R is choosen Large ballon/low density of gas /synthetic nylon / low mass of radiosonde instrument	**\1** **1** **1** **1** **1** **1** **1** **1**
(b)(i)	**Giving a correct equation / Substitute the equation correctly** mass = density x volume **Correct answer with unit** m=0.216kg	**1** **1**
(b)(ii)	**show the volume of displaced air** V= 1.2m3 **Calculate mass of displaced air correctly** m= 1.56kg **Calculate weight of displaced air correctly and state that bouyant force equal to weight of displaced air** = 15.6N	**1** **1** **1**
		20
12(a)	Radioisotopes are isotopes which have unstable nuclei.	1
(b)	<table><tr><th>Characteristics</th><th>Explanation</th></tr><tr><td>Has a long half-life</td><td>Can be used for a long time hence save cost</td></tr><tr><td>Emits beta</td><td>Can penetrate box and liquid and is less dangerous than gamma</td></tr><tr><td>Solid form</td><td>Easy to handle and contain.</td></tr><tr><td>Low ionising power</td><td>Does not change the state and taste of juice.</td></tr><tr><td>Radioisotope T</td><td>It has long half life, emits beta, in solid form and has low ionising power.</td></tr></table>	2 2 2 2 2
(c)(i)	Geiger Muller Tube	1
(ii)	1. Bottle E 2. Rate meter reading is the highest 3. Most radiation can reach the detector without being block by	1 1

	juice	1
(d)	1. **Correctly stated** that **α** as $^{4}_{2}He$ 2. **Correctly stated** that **β** as $^{0}_{-1}e$ 3. Working is shown 4. X = 3 5. Y = 2	1 1 1 1 1
	Total	**20**

SKEMA PAPER 3 SET 2 TRIAL NEGERI MELAKA 2010

1 **1** (a) (i) **1** **State the correct manipulated variable**

Length / *L*/

1 (ii) **1** **State the correct responding variable**

Resistance / *R* // Potential difference / *V* // Current / *I*

1 (iii) **1** **State one fixed variable**

Diameter of the wire // Cross-sectional area of the wire // Type of wire

1 (b) **1** **State the correct use of the mirror**

Reduce parallax error

5 (c) **5** **Tabulate *L, I, V* and *R* correctly**

Give a tick (✓) based on the following:

A • *Columns L, I, V and R* ✓

B • *Correct units for I, V and R* ✓

C • *All values of I correct* ✓

D • *All values of I consistent to 2 d.p.* ✓

E • *All values of V correct* ✓

F • *All values of V consistent to 1 or 2 d.p.* ✓

G • *All values of R correct* ✓

H • *All values of R consistent to 2, 3 or 4 d.p.* ✓

L / cm	*I* / A	*V* / V	*R* / Ω
20.0	0.36	0.4	1.11
30.0	0.42	0.7	1.67
40.0	0.50	1.1	2.20
50.0	0.62	1.7	2.74
60.0	0.70	2.3	3.29

Note for **G** : Accept e.c.f. from **C** and **E**

Marks awarded :

Number of ✓	Marks
8 ✓	5
6 - 7 ✓	4
4 - 5 ✓	3
2 - 3 ✓	2
1 ✓	1

Total marks : 5

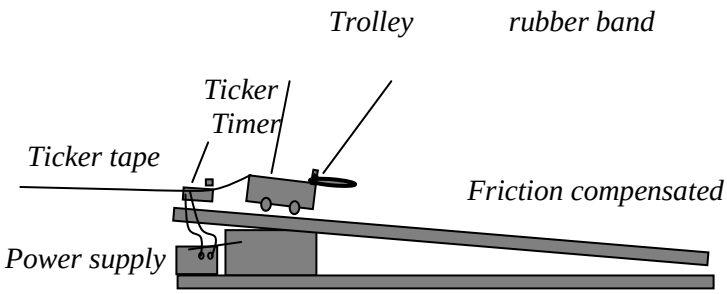
(d) **5** Draw correct axis and plot *R* against *I*

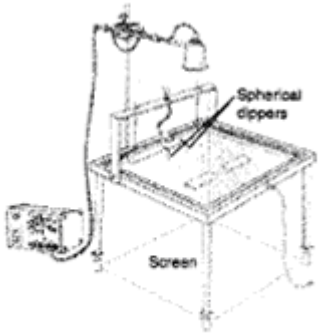
				Give a tick (✓) based on the following: **A** • *R* at the *y*-axis, *L* at the *x*-axis ✓ **B** • Correct units at both axes ✓ **C** • Uniform scale at both axes ✓ **D** • 5 points plotted correctly ✓✓ [**Note : 3 or 4 points plotted correctly** : ✓] **E** • Best straight line ✓ **F** • Minimum size of graph 5 x 4 big squares ✓ (Big square **:** 2 cm x 2 cm) (From the origin to the last point) **Marks awarded :** Number of ✓ / Marks 7 ✓ / 5 5-6 ✓ / 4 3-4 ✓ / 3 2 ✓ / 2 1 ✓ / 1 **Total marks** : 5
1	(e)		**1**	**States the correct relationship based on the straight line drawn** **For a straight line with positive gradient passing through the origin,** Resistance is directly proportional to length / *R* directly proportional to *L* / $R \propto L$ **For a straight line with positive gradient that does not pass through the origin,** Resistance increases linearly with length
1	(f)		**1**	**States one suitable precaution** Check the voltmeter for zero error and make zero adjustment // Position of the eye such that the image of the pointer in the mirror is blocked by the pointer to avoid parallax error
16				

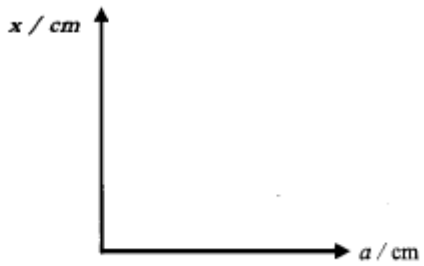
	Mark	**Answer**	
2 (a) (i)	1	**<u>State the change correctly</u>** Decrease	1
(a) (ii)	1 1	**<u>State the value of θ</u>** -shows graph exstrapolation -shows the corresponding arrow	

	1	-18.5 ^{0}C // 18.0^{0}C // 19.0^{0}C (reject without unit)	3
(a) (iii)		**Calculate the gradient of the graph, h and state the value of h with the acceptable range**	
	1	-Draw a suffiecienly large triangle to calculate the gradient of the graph.	
	1	-Correct substitution(follow candidate's triangle)	
	1	-State value of the gradient with correct unit.	
		The gradient of the graph is14.55 ^{0}C kg	3
(b)		**Correct substitution to the formula**	
	1	$c = \frac{Q}{gradient}$	
	1	$gradient = \frac{6.1\times10^4}{14.55}$	3
	1	4192.4 J kg^{-1} ^{0}C^{-1}	
(c)	1	Stir the water gently with the heater to ensure that heat is distributed uniformly to all part of the water.	
	1	Make sure the insulating jacket is covered all part of the beaker.	2
Total	**12**		12

3. (a)	**State a suitable inference** Acceleration is influenced by the mass	1
(b)	**State a relevant hypothesis** When the mass increased, the acceleration will be decreased.	1
(c) (i)	**State the aim of experiment** To investigate the relationship between the acceleration and the mass.	1
(ii)	**State the suitable manipulated variables and responding variable (Quantity that can be measured)** Manipulatd variable : mass Responding variable : acceleration	1
	State the constant variable Force applied	1
(iii)	**State the complete list of apparatus and materials** 5 Trolleys, ticker timer, ticker tape, a rubber band, a wooden runway, 12 V a.c power supply, ruler.	1

(iv)	**Draw the functional arrangement of the apparatus**  	1
(v)	**State the method to control the manipulated variable** The apparatus is set up as shown in the diagram. The ticker-timer is switched on and **a trolley (of 1 kg)** is pulled using a rubber band. The extension of the rubber band is ensured to be of the same length	1
	State the method to measure the responding variable Acceleration of the trolley is calculated using the ticker-tape. $a = (v-u) / t$	1
	Repeat the experiment at least 4 times with the values Procedure 2 and Procedure 3 are repeated using 2, 3, 4 and 5 trolleys. (Note : Based on SPM standard , at least five manipulated values required.)	1
(vi)	**State how the data tabulated with the title MV and RV** Mass / num. of trolley | acceleration / cm s^{-2} 1 2 3 4 5	1
(vii)	**State how the data is analysed, plot a graph RV against MV** acceleration / cm s^{-2} Mass / num. of trolley	1
Total		**12**
No 4.	**Making the right inference** The distance between two spherical dippers affects the distance	1

	between two constructive/destructive interference.	
	Hypótesis The distance between two constructive/destructive interferente decrease when the distance between 2 spherical dippers.	
i	**Aim** To investigate the relationship between the distance between 2 spherical dippers and the distance beteen 2 constructive /destructive interference.	
ii	**Mv :** The distance between 2 spherical dippers **Rv** : the distance between 2 constructive /destructive interference. **Fv:** Depth of the water// speed of the motor// the perpendicular distance between the 2 spherical dippers and the place where the interference pattern is observed.	
iii	**List apparatus and material** Ripple tank, power supl í white paper and ruler	
iv	**State a functional arrangement of apparatus**  	
v	**State how the MV is controlled** - Two spherical dippers are attached to the water - The distance between spherical dippers on the screen are adjusted to a = 5.0cm **State how RV is measured** -The distance between 2 constructive /destructive interference on the screen , x is measured with the ruler and recorded. **State how repeated the experiment** -Repeat the previous step by increasing the distance between 2 spherical dippers. a =6cm,7cm,8cm and 9cm.	
vi	**Tabulating data**	

	<table><tr><th>*a* / *cm*</th><th>*x* / cm</th></tr><tr><td>5.0</td><td></td></tr><tr><td>6.0</td><td></td></tr><tr><td>7.0</td><td></td></tr><tr><td>8.0</td><td></td></tr><tr><td>9.0</td><td></td></tr></table>	
vii	**Analysing data** 	
Total		**12**