SULIT
4531/1
Physics
Kertas 1
Mei
2009
1 ¼ jam

Nama: …… Tingkatan: ……

JABATAN PELAJARAN NEGERI MELAKA

UJIAN PENGESANAN PERTENGAHAN TAHUN
SIJIL PELAJARAN MALAYSIA
TAHUN 2009

PHYSICS

Kertas 1

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 3.

Kertas soalan ini mengandungi 37 halaman bercetak

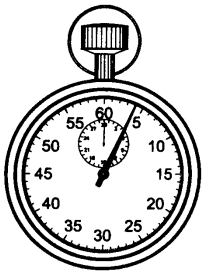
The following information may be useful. The symbols have their usual meaning.

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 $= mgh$
8. Elastic potential energy $= \frac{1}{2}Fx$
9. $\rho = \frac{m}{v}$
10. Pressure, $p = h\rho g$
11. Pressure, $p = \frac{F}{A}$
12. Heat, $Q = mc\theta$
13. Heat, $Q = ml$
14. $\frac{pV}{T}$ = constant
15. $E = mc^2$
16. $v = f\lambda$
17. Power, $P = \frac{energy}{time}$
18. $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$
19. linear magnification $= \frac{image\ size}{object\ size}$
20. $\lambda = \frac{ax}{D}$
21. $n = \frac{Sin\ i}{Sin\ r}$
22. n $= \frac{real\ depth}{apparent\ depth}$
23. $Q = It$
24. $V = IR$
25. Power, $P = IV$
26. $\frac{N_s}{N_p} = \frac{V_s}{V_p}$
27. Efficiency $= \frac{I_s V_s}{I_p V_p}$ x 100%
28. $g = 10\ ms^{-2}$
29. Density of water = $10^3\ kgm^{-3}$,
    gravitational field, g = 10 N kg^{-1}
    strengt
    atmospheric pressure = 10^5 Pa

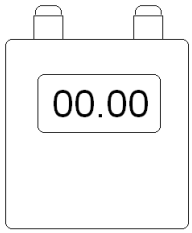
Maklumat berikut mungkin berfaedah. Simbol-simbol mempunyai makna yang biasa.

1. $a = \frac{v-u}{t}$
2. $v^2 = u^2 + as$
3. $s = ut + at^2$
4. Momentum $= mv$
5. $F = ma$
6. Tenaga kinetik $= \frac{1}{2}mv^2$
7. Tenaga keupayaan $= mgh$
8. Tenaga keupayaan kenyal $= \frac{1}{2}Fx$
9. $\rho = \frac{m}{v}$
10. Tekanan, $p = h\rho g$
11. Tekanan, $p = \frac{F}{A}$
12. Haba, $Q = mc\theta$
13. Haba, $Q = ml$
14. $\frac{pV}{T}$ = pemalar
15. $E = mc^2$
16. $v = f\lambda$
17. Kuasa, $P = \frac{tenaga}{masa}$
18. $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$
19. Pembesaran linear $= \frac{saiz\ imej}{saiz\ objek}$
20. $\lambda = \frac{ax}{D}$
21. $n = \frac{Sin\ i}{Sin\ r}$
22. n $= \frac{dalam\ nyata}{dalam\ ketara}$
23. $Q = It$
24. $V = IR$
25. Kuasa, $P = IV$
26. $\frac{N_s}{N_p} = \frac{V_s}{V_p}$
27. Kecekapan $= \frac{I_s V_s}{I_p V_p}$ x 100%
28. $g = 10\ ms^{-2}$
29. Ketumpatan air = $10^3\ kgm^{-3}$, kekuatan graviti , g = 10 N kg^{-1}, tekanan atmosfera = 10^5 Pa

1. Diagram 1 shows the scales on a pair of analogue stop watch and digital stop watch .
Rajah 1 di bawah menunjukkan skala pada jam randik analog dan jam randik digital



Analogue stop watch
Jam randik analog



Digital stop watch
Jam randik digital

Diagram 1
Rajah 1

Which comparison is correct about the sensitivity of the analogue stop watch and digital stop watch when measuring time?
Perbandingan yang manakah betul mengenai kepekaan jam randik analog dan jam randik digital apabila mengukur masa.

	Analogue stop watch *Jam randik analog*	Digital stop watch *Jam randik digital*
A.	Low sensitivity *Kepekaan rendah*	Low sensitivity *Kepekaan rendah*
B.	Low sensitivity *Kepekaan rendah*	High sensitivity *Kepekaan tinggi*
C.	High sensitivity *Kepekaan tinggi*	Low sensitivity *Kepekaan rendah*
D.	High sensitivity *Kepekaan tinggi*	High sensitivity *Kepekaan tinggi*

2. The equatorial diameter of earth is 12 760 000 m. Which is written with the correct prefix?
Diameter khatulistiwa bumi adalah 127 760 000 m. Manakah yang berikut ditulis dengan imbuhan yang betul?

A. 1.276 Mm.

B. 0.01276 Gm

C. 0.1276 Gm

D. 12.76 μm

3. Diagram 2 below shows a method of estimating the diameter of a wire using a ruler .
Rajah 2 di bawah menunjukkan kaedah menganggar diameter wayar menggunakan pembaris.

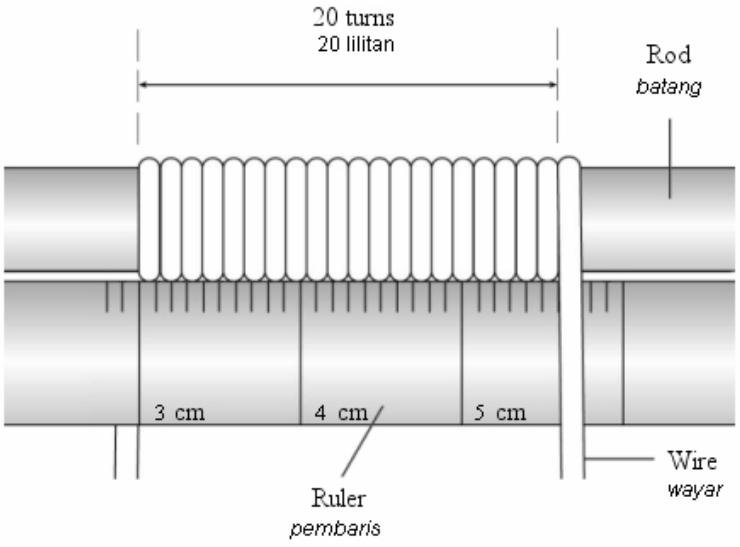


Diagram 2
Rajah 2

The diameter of the wire is
Diameter wayar adalah

A 0.12 cm

B 0.13 cm

C 0.27 cm

D 0.28 cm

4. Which statement refer to when object under the forces of equilibrium
Pernyataan manakah merujuk kepada objek apabila berada di bawah keseimbangan daya

A. be at rest.
berada dalam keadaan rehat

B. move with uniform acceleration.
bergerak dengan pecutan seragam

C. either stationary or moving with uniform velocity.
sama ada dalam keadaan pegun atau bergerak dengan halaju seragam

D. either moves with a increasing velocity or with a uniform acceleration.
sama ada bergerak dengan halaju bertambah atau pecutan seragam.

5. Diagram 3.1 shows the reading of a vernier caliper with their jaws tightly closed. Diagram 3.2 shows the reading of the vernier calipers when a metal plate is placed between their jaws.
Rajah 3.1 menunjukkan bacaan angkup vernier apabila rahangnya tertutup. Rajah 3.2 menunjukkan bacaan angkup vernier yang sama semasa kepingan logam diletakkan di antara rahangnya.

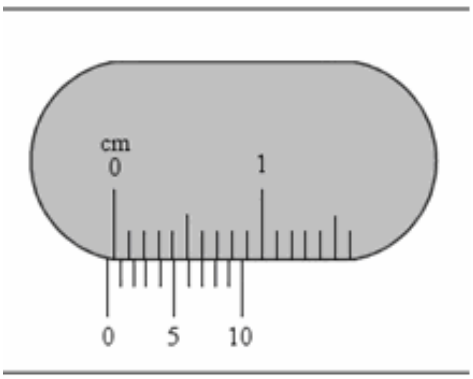


Diagram 3.1
Rajah 3.1

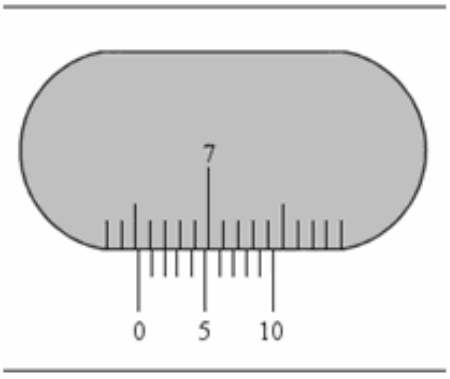


Diagram 3.2
Rajah 3.2

What is the thickness of the metal plate?
Berapakah ketebalan kepingan logam itu?

A 6.49 cm

B 6.52 cm

C 6.55 cm

D 6.59 cm

6. Diagram 4 shows a car is accelerating with a frictional force of 6000 N acting on it.
Rajah 4 menunjukkan sebuah kereta memecut dengan daya rintangan sebanyak 6000 N bertindak terhadap kereta itu

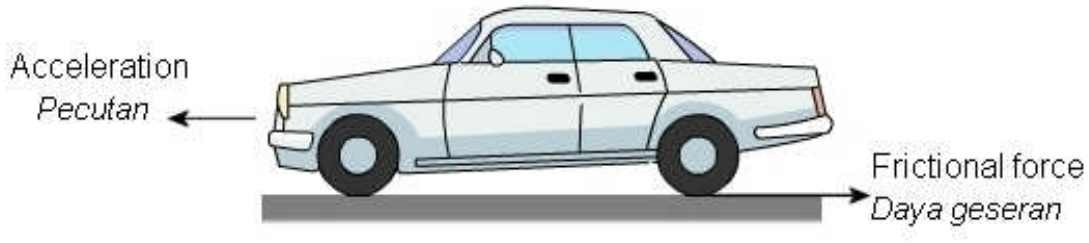


Diagram 4
Rajah 4

What is the force exerted by the engine of the car ?
Berapakah daya yang dikenakan oleh enjin kereta itu

A. equal to 6000 N
bersamaan 6000 N

B. greater than 6000 N
lebih besar daripada 6000 N

C. smaller than 6000 N
lebih kecil daripada 6000 N

D. *0* N
0 N

7. Diagram 5 is a velocity-time graph showing motion of a car.
Rajah 5 adalah graf halaju – masa menunjukkan pergerakan sebuah kereta

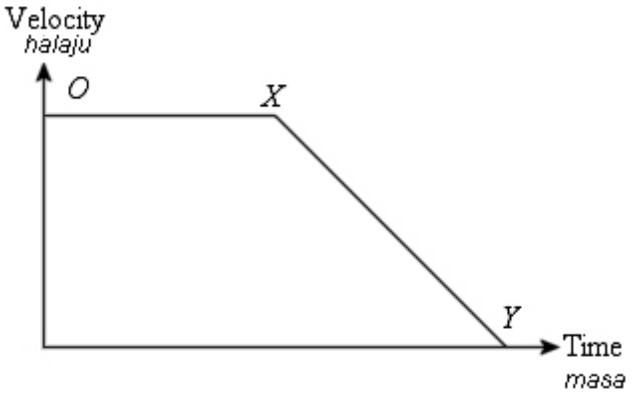


Diagram 5
Rajah 5

Which statement describes the motion of the car?
Pernyataan manakah yang menggambarkan pergerakan kereta itu?

	OX	***XY***
A	Uniform acceleration *Pecutan seragam*	Uniform deceleration *Nyahpecutan seragam*
B	Uniform velocity *Halaju seragam*	Uniform deceleration *Nyahpecutan seragam*
C	Uniform acceleration *Pecutan seragam*	Uniform velocity *Halaju seragam*
D	Uniform velocity *Halaju seragam*	Uniform acceleration *Pecutan seragam*

8. Diagram 6 shows two objects being dropped during the moon exploration.
Rajah 6 menunjukkan dua objek dijatuhkan semasa pengembaraan di bulan

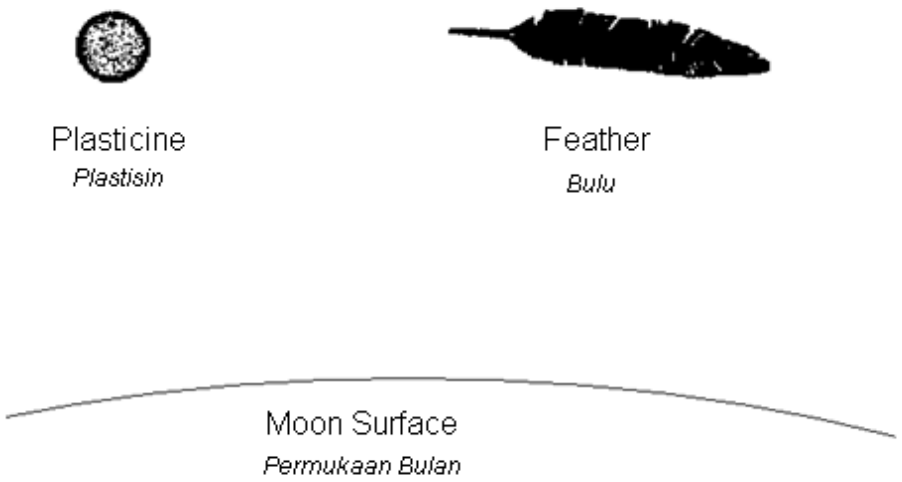


Diagram 6
Rajah 6

Which of the is true when both objects were dropped?
Manakah berikut benar apabila kedua objek dijatuhkan?

A. The velocity of plasticine and feather are constant.
Halaju plastisin dan bulu adalah malar

B. The rate of change of velocity of plasticine and feather are the same.
Kadar perubahan halaju bagi plastisin dan bulu adalah sama

C. The momentum of plasticine and feather are the same.
Momentum bagi plastisin dan bulu adalah sama

D. The plasticine dropped faster than the feather
Plastisin jatuh lebih laju berbanding dengan bulu

9 Diagram 7 shows two identical experiments carried out on the surface of the earth and then on the surface of the moon.
Diagram 7 menunjukkan dua eksperimen serupa yang dijalankan di atas permukaan bumi dan kemudiannya di permukaan bulan.

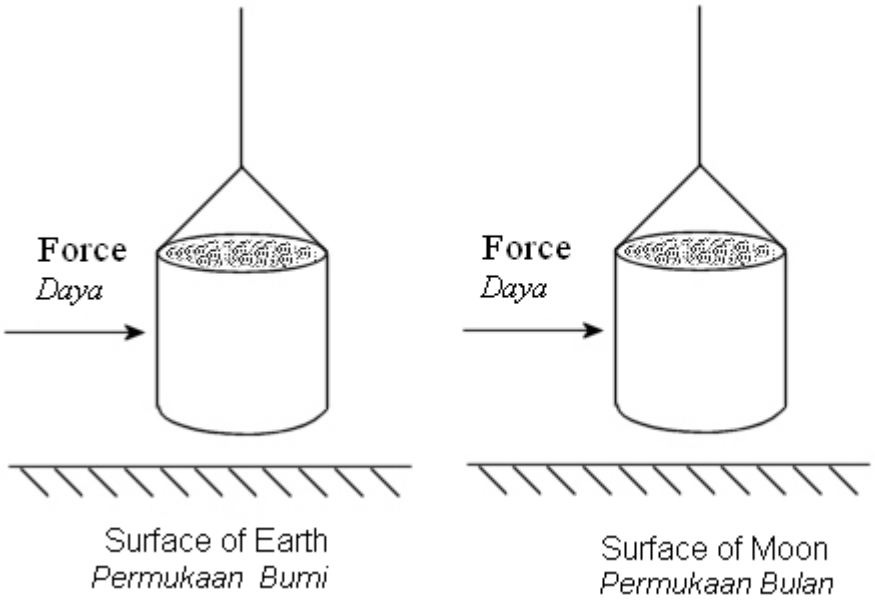


Diagram 7
Rajah 7

Which statement describes the comparison of the force to move the tin on the earth surface compare to the moon surface.
Pernyataan manakah yang menggambarkan perbandingan magnitud daya untuk menggerakkan tin di permukaan bumi berbanding di permukaan bulan.

A. Smaller since it has less mass.
Lebih kecil kerana jisimnya kurang.

B. Smaller since it has less weight.
Lebih kecil kerana beratnya kurang

C. Same magnitude used at the moon since it has the same mass.
Sama magnitud dengan di bulan kerana jisimnya adalah sama

D. Same magnitude used at the moon since has the same weight.
Sama magnitud dengan di bulan kerana beratnya adalah sama

10. Air bubbles in the hydraulic brake system has caused the brake to function inefficiently. Which statement explains this observation?
Buih udara di dalam sistem brek hidraulik menyebabkan ia tidak berfungsi dengan sempurna. Antara pernyataan berikut yang manakah menerangkan pemerhatian itu?

A. Air bubbles change the viscosity of the fluid.
Gelembung udara mengubah kelikatan cecair itu.

B. The air bubbles escape when the brake paddle is pressed.
Gelembung udara terbebas apabila brek ditekan.

C. The air bubble expand when the brake system becomes hot due to friction.
Gelembung udara mengembang apabila sistem brek menjadi panas disebabkan oleh tekanan.

D. The air bubbles are compressed when the brake is pressed
Gelembung udara termampat apabila brek ditekan.

11 Which statment is best describes for the existence of gas pressure
Pernyataan manakah yang terbaik menggambarkan keujudan tekanan gas

A. the momentum of the molecules
momentum molekul-molekul

B. the large number of molecules in the gas
bilangan molekul yang banyak dalam gas tersebut

C. the forces of attraction between molecules in the gas
daya tarikan antara molekul-molekul gas

D. the collisions between molecules and the walls of the container.
perlanggaran antara molekul-molekul dengan dinding bekas.

12. Diagram 8 shows an object at equilibrium state with three forces P, Q and R acting on it
Rajah 8 menunjukkan satu objek yang berada dalam keseimbangan tiga daya P,Q dan R.bertindak ke atasnya

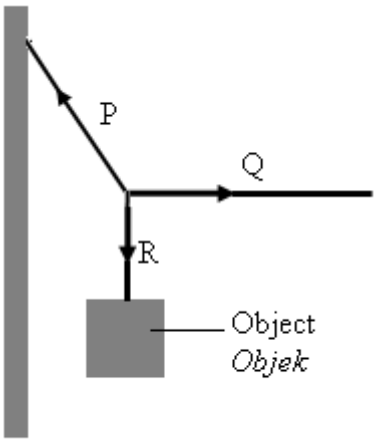
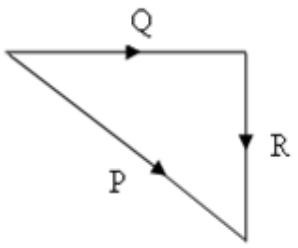


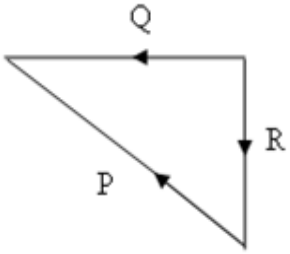
Diagram 8
Rajah 8

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

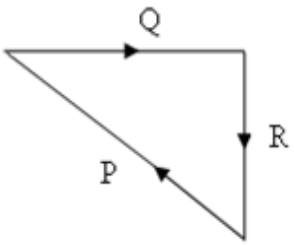
A



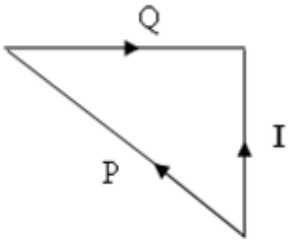
B



C



D



13. Diagram 9 shows a student blowing above a thin sheet of paper.
Rajah 9 menunjukkan seorang pelajar meniup di bahagian atas sehelai kertas yang nipis.

Which statement explain the observation
Pernyataan manakah menerang pemerhatian ini

Diagram 9
Rajah 9

A. the atmospheric pressure below the paper is higher than the air pressure above the paper.
tekanan atmosfera di bahagian bawah kertas itu lebih tinggi daripada tekanan udara di bahagian atas kertas itu.

B. the atmospheric pressure below the paper is lower than the air pressure above the paper.
tekanan atmosfera di bahagian bawah kertas itu lebih rendah daripada tekanan udara di bahagian atas kertas itu.

C. the atmospheric pressure above the paper is higher than the air pressure below the paper.
tekanan atmosfera di bahagian atas kertas itu lebih tinggi daripada tekanan udara di bahagian bawah kertas itu

D. the speed of air above the paper is lower than the speed of air below the paper.
tekanan atmosfera di bahagian atas kertas itu lebih rendah dari tekanan udara di bahagian bawah kertas itu.

14. A diver is at a position of 10 m underwater?
Seorang penyelam berada pada kedudukan 10 m di bawah permukaan air

What is the pressure acting on the diver?
Berapa tekanan yang bertindak terhadap penyelam?

A. 10^5 Pa

B. 2×10^5 Pa

C. 3×10^5 Pa

D. 4×10^5 Pa

15 Ships made of steel floats on water but a RM1 coin sinks in water. Which of the following is not a reason for the above observation?
Kapal yang diperbuat dari keluli boleh terapung dalam air tetapi sekeping duit syiling RM1 akan tenggelam. Di antara berikut yang manakah tidak menerangkan pemerhatian di atas?

A. The hollow shape of the ship
Bentuk kapal yang lompong

B. The weight of the coin is greater than the buoyant force
Berat duit syiling lebih besar dari daya julangan

C. The weight of the ship is equal to the buoyant force
Berat kapal adalah sama dengan daya julangan

D. The weight of the coin is less than the buoyant force.
Berat duit syiling adalah kecil daripada daya julangan

16. Diagram 10.1 shows a an object floating in air. Diagram 10.2 shows an object in water.
Rajah 10.1 menunjukkan objek apabila di udara. Rajah 10.2 menunjukkan objek terendam di dalam air.
Which statement explains the different in weight for both situation.
Pernyataan manakah menerangkan perbezaan berat antara kedua – dua situasi.

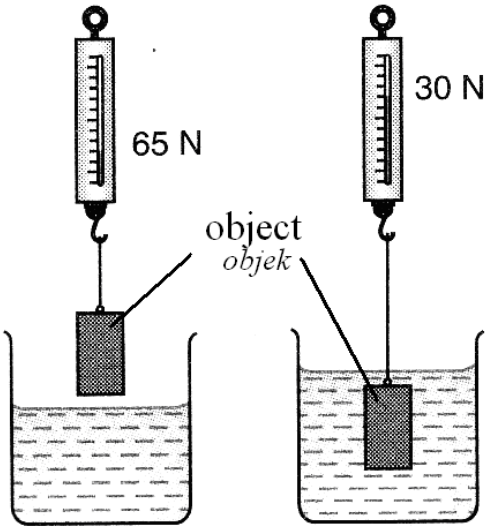


Diagram 10.1 *Rajah 10.1*

Diagram 10.2 *Rajah 10.2*

A. the weight of the object that is lost in water
objek kehilangan berat apabila berada di dalam air

B. the buoyant force acting on the object
daya julangan ke atas yang bertindak pada objek

C. the difference between the forces acting on the surfaces of the object
perbezaan daya yang bertindak ke atas permukaan objek

D. density of the object is greater than density of water
ketumpatan objek tersebut lebih besar daripada ketumpatan air

17. Diagram 11 shows a process when water is changed to steam
Rajah 11 menunjukkan proses di mana air bertukar kepada stim

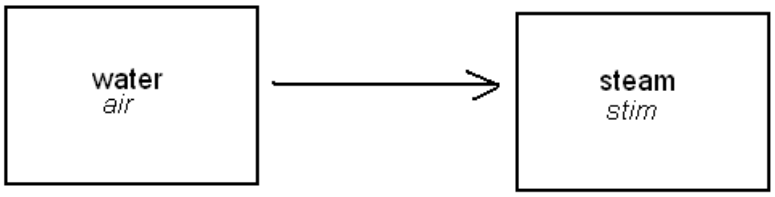


Diagram 11
Rajah 11

What is the name of heat absorbed during the process ?
Apakah nama haba yang diserap semasa proses ini ?

A. specific heat capacity
muatan haba tentu

B. latent heat of fusion
haba pendam pelakuran

C. latent heat of vaporisation.
haba pendam pengewapan

D. latent heat of condensation
haba pendam pelakuran

18. Which are the correct SI units of heat and temperature?
Yang manakah unit SI yang betul bagi haba dan suhu?

	Heat *Haba*	Temperature *Suhu*
A	Degree Celcius *Darjah Celcius*	Joule *Joule*
B	Joule *Joule*	Kelvin *Kelvin*
C	Degree Celcius *Darjah Celcius*	Kelvin *Kelvin*
D	Joule *Joule*	Degree Celcius *Darjah Celcius*

19. Diagram 12 shows a thermometer.
Rajah 12 menunjukkan sebuah termometer.

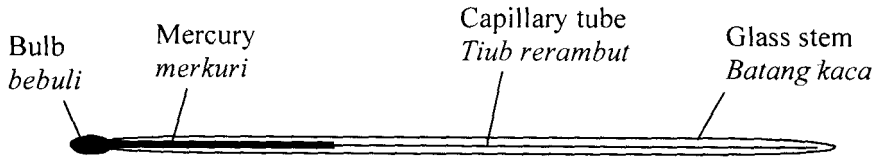


Diagram 12
Rajah 12

Which modification will increase the sensitivity of the thermometer?
Pengubahsuaian yang manakah akan menambah kepekaan termometer?

A Using a longer capillary tube
Menggunakan tiub rerambut yang lebih panjang

B Using a glass stem with a thicker wall
Menggunakan dinding batang kaca yang lebih tebal

C Using a bulb with thicker wall
Menggunakan dinding bebuli yang lebih tebal

D Using a narrower bore of capillary tube
Menggunakan liang tiub rerambut yang lebih halus

20. "Water takes a shorter time to boil when heated at high lands than at low lands, although the same amount of energy is used."
"Air lebih cepat mendidih apabila dipanaskan di kawasan tanah tinggi berbanding kawasan rendah walaupun jumlah tenaga yang sama digunakan"

Which statement explain this observation
Pernyataan manakah menerangkan pemerhatian ini

A the temperature is lower at high lands
suhu lebih rendah di kawasan tanah tinggi

B the atmospheric pressure is lower at high lands
tekanan atmosfera lebih rendah di kawasan tanah tinggi

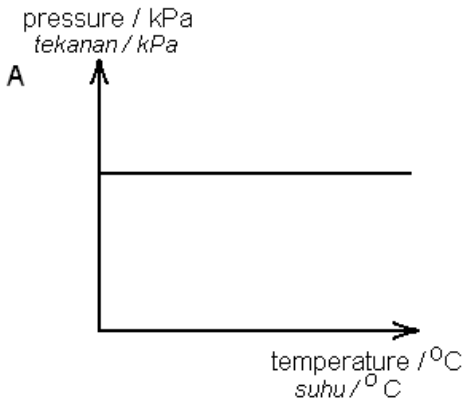
C the air is less damp at high lands
kelembapan udara lebih rendah di kawasan tanah tinggi

D the rate of heat lost is faster at high lands
kadar pembebasan haba lebih cepat di kawasan tinggi

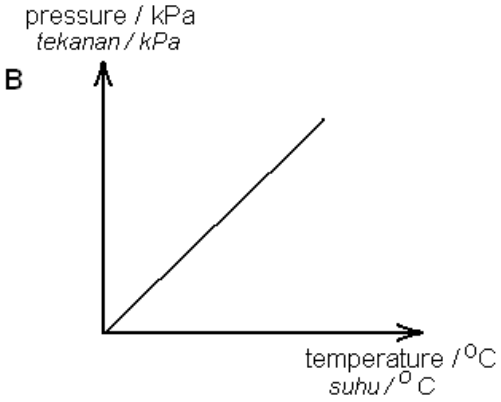
21. An experiment is carried out to investigate the change of pressure with temperature for a fixed mass of gas in a conical flask.
Satu eksperimen dijalankan untuk menyiasat perubahan tekanan dengan suhu bagi suatu jisim tetap suatu gas dalam sebuah kelalang.

Which graph shows the correct relationship between pressure and temperature?
Graf yang manakah menunjukkan dengan betul perubahan tekanan dengan suhu?

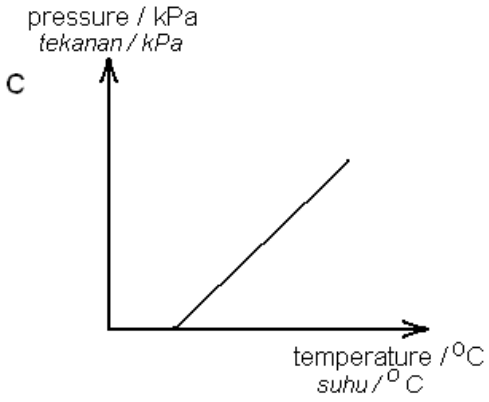
A



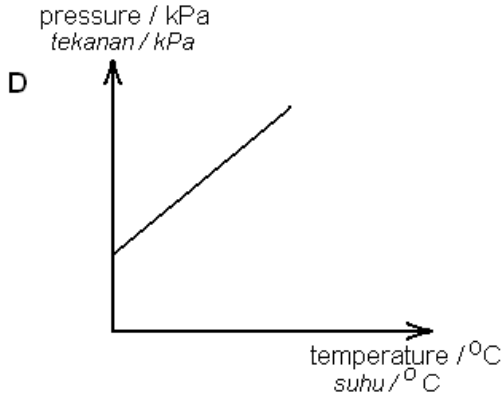
B



C



D



22. Diagram 13 shows a balloon which is placed in an air-tight container
Rajah 13 menunjukkan sebiji belon diletakkan di dalam sebuah bekas kedap udara.

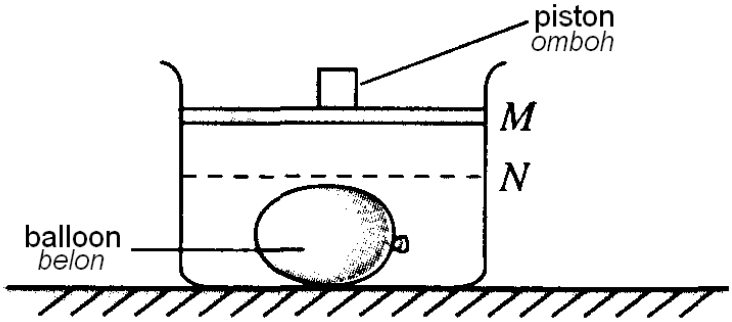


Diagram 13
Rajah 13

If the piston is moved from M to N, what will happen to the balloon?
Apakah yang akan berlaku kepada belon itu jika omboh digerakkan dari M ke N?

A. It break.
Ia pecah

B. It vibrates
Ia bergetar

C. It contracts
Ia mengecut

D. It expands
Ia mengembang

23 The focal length of a converging lens is 10 cm. What is the object distance to anable the lens as a magnifying lens?
Panjang fokus sebuah kanta cembung ialah 10 cm. Manakah jarak objek yang berikut membolehkan kanta itu berfungsi sebagai sebuah kanta pembesar ?

A 5 cm

B 10 cm

C 15 cm

D 20 cm

24. Diagram 14 shows the length of an air column trapped at 27^oC .
Rajah 14, menunjukkan panjang turus udara terperangkap pada 27 ^oC.

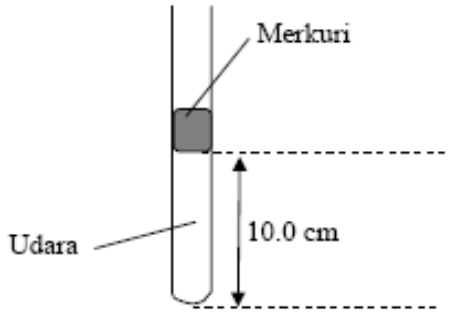


Diagram 14
Rajah 14

What is the length of the air column at 100^0C ?
Berapakah panjang turus udara pada 100^oC?

A 2.7 cm

B 8.0 cm

C 12.4 cm

D 37.0 cm

25 Which optical instrument is invented based on the total internal reflection?
Di antara peralatan optik berikut yang manakah berasaskan kepada pantulan dalam penuh?

A. Compound microscope.
Mikroskop majmuk.

B. Prism binocular.
Binokular berprisma

C. Slide projector.
Projektor slaid

D. Astronomical telescope.
Teleskop astronomi

26. Diagram 15 shows a set of apparatus which produce a blur image the image formed in front of a screen.
Rajah 15 menunjukkan set peralatan yang menghasilkan imej yang kabur di hadapan skrin.

Which of this action will produce a sharp image on the screen?
Perubahan yang manakah yang akan menghasilkan satu imej yang jelas pada skrin?

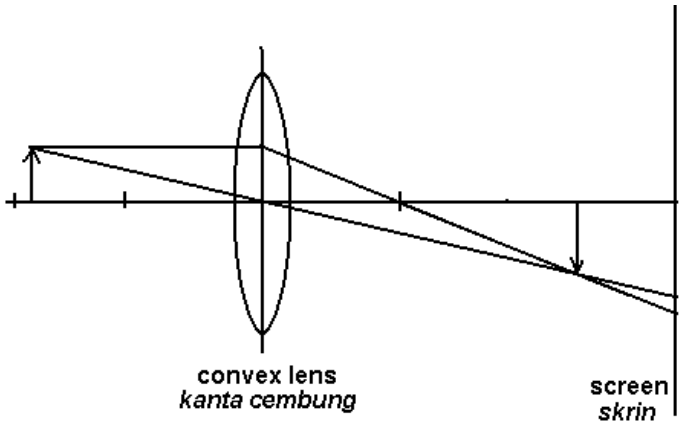


Diagram 15
Rajah 15

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

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

C Replace the lens with another thicker convex lens.
Gantikan kanta dengan sebuah kanta cembung yang lebih tebal.

D Move the object further from the lens
Gerakkan kanta itu lebih jauh daripada objek

27. Diagram 16 shows a light ray KLMN travels through three different medium.
Rajah 16 menunjukkan satu sinar cahaya KLMN merambat melalui tiga medium yang berbeza

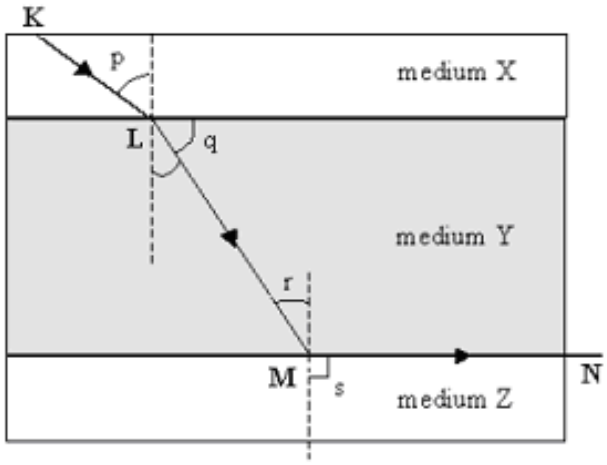


Diagram 16
Rajah 16

Which is the critical angle ?
Manakah yang merupakan sudut genting ?

A. p

B. q

C. r

D. s

28 A simple astronomy telescope consists of two lenses. If one of the lens is convex lens with 20 cm focal length, which of the this lens is of most suitable to pair with the lens?
Teleskop astronomi ringkas mengandungi dua kanta. Jika satu daripada kanta cembung adalah berjarak fokus 20 cm, manakah antara kanta berikut paling sesuai untuk dipasangkan denganya?

A. Concave lens with 20 cm focal length.
Kanta cekung dengan jarak fokus 20 cm.

B. Convex lens with 20 cm focal length.
Kanta cembung dengan jarak fokus 20 cm.

C. Concave lens with 100 cm focal length.
Kanta cekung dengan jarak fokus 100 cm

D. Convex lens with 100 cm focal length
Kanta cekung dengan jarak fokus 100 cm

29. Diagram 17 shows two cars, blue and red, travelling at the different directions and passing through a sharp bend.
Rajah 17 menunjukkan dua buah kereta, biru dan merah, sedang bergerak pada arah yang berlainan dan melalui selekoh tajam.

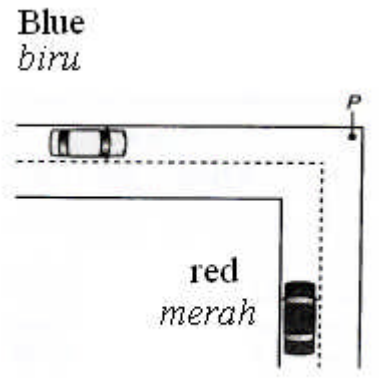


Diagram 17
Rajah 17

Which mirrors is the most suitable to be placed at point P so that the driver of the blue car Xcan see the red car?
Jenis cermin yang manakah paling sesuai untuk diletakkan pada kedudukan P supaya pemandu kereta biru boleh melihat kereta merah?

A Plane mirror
Cermin satah

B Concave mirror
Cermin cekung

C Convex mirror
Cermin cembung

D L- shape plane mirror
Cermin satah bentuk L

30. Diagram 18 shows a ray of light reflected by a plane mirror PQ. The mirror is then rotated 10º anticlockwise.
Rajah 18 menunjukkan satu sinar cahaya telah dipantulkan oleh sebuah cermin satah PQ. Cermin itu kemudiannya telah diputarkan sebanyak 10º melawan pusingan jam.

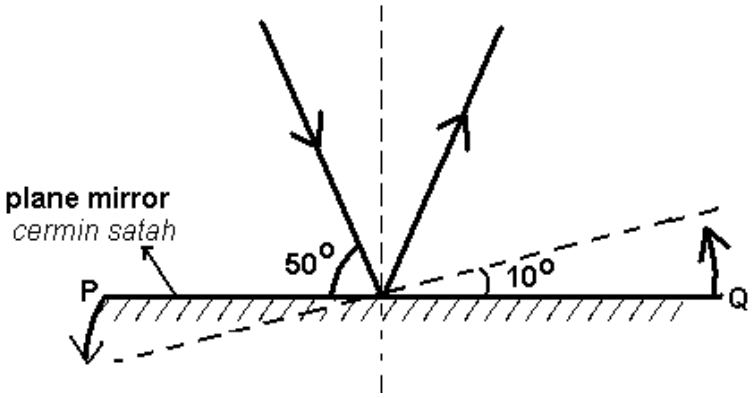


Diagram 18
Rajah 18

What is the new angle of reflection of the ray of light?
Apakah sudut pantulan baru untuk sinar cahaya tersebut?

A 20^0

B 30^0

C 40^0

D 50^0

31. An object is placed 50.0 cm in front of a convex lens. A sharp image is formed on the screen placed 12.5 cm behind the lens.
Satu objek diletakkan 50.0 cm di hadapan sebuah kanta cembung. Satu imej yang tajam dihasilkan di atas skrin yang terletak 12.5 cm di belakang kanta.

What is the focal length of the lens ?
Berapakah panjang fokus kanta tersebut ?

A 0.1 cm

B 10.0 cm

C 37.5 cm

D 52.5 cm

32. When the amplitude of a wave increases, which physical quantity is correctly change.
Apabila amplitud gelombang bertambah, kuantiti fizikal yang manakah berubah?

A. energy will increase
tenaga akan bertambah.

B. period will decrease
tempoh akan bertambah

C. speed will increase
laju akan bertambah

D. wavelength will increase
panjang gelombang akan bertambah

33. Which is **not** an electromagnetic wave?
Manakah yang bukan gelombang elektromagnet?

A. Ultraviolet waves
Gelombang ultraungu

B. *X*-rays
Sinar – X

C. Sound
Bunyi

D. Infrared radiation
Radiasi infra merah

34 A sound wave is reflected from a solid wall. Compared to the incident wave, which statement describe the speed of reflected wave
Gelombang bunyi dipantulkan daripada dinding konkrit. Berbanding dengan gelombang tuju, pernyataan manakah menerangkan laju golombang pantulan.

A. the same speed
laju yang sama

B. higher speed
laju yang lebih tinggi

C. lower speed
laju yang lebih rendah

D. higher amplitude
amplitud yang lebih tinggi

35. A hacksaw blade is oscillating horizontally as shown in Diagram 19
Sebilah gergaji berayun secara mendatar seperti dalam Rajah 19

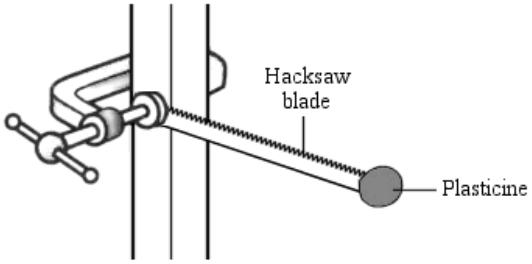
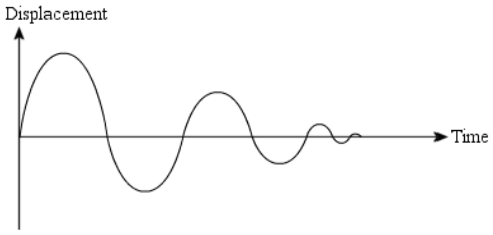
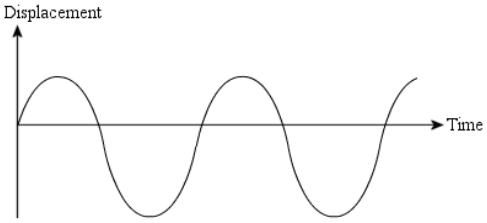
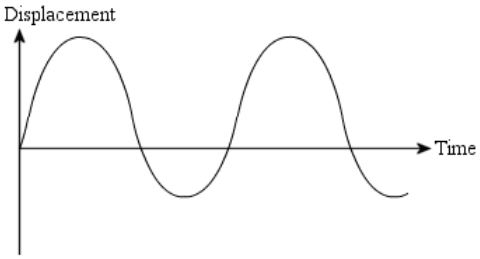


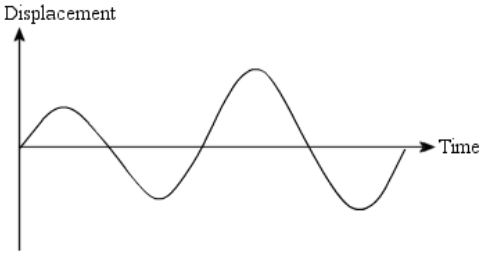
Diagram 19
Rajah 19

Which is the displacement-time graph of the hacksaw blade ?
Graf sesaran-masa bagi bilah gergaji ialah

A


B


C


D


36. The Diagram 20 shows a graph of displacement against time for a load oscillating at the end of a light spring.
Rajah 20 menunjukkan graf sesaran melawan masa bagi beban yang berayun di hujung spring.

At which point the load is having maximum kinetic energy?
Di titik mana beban itu mempunyai tenaga kinetik maksima?

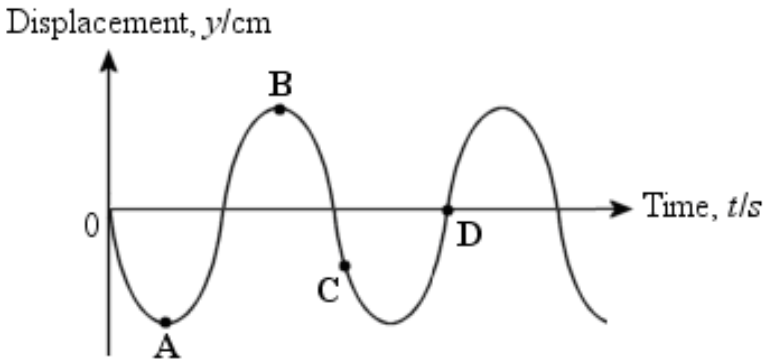


Diagram 20
Rajah 20

37 Which form of radiation is suitable to use for security inspection purpose to scan the content of luggage at the airport ?
Yang manakah sinaran berikut sesuai untuk mengimbas isi kandungan bagasi di lapangan terbang untuk tujuan pemeriksaan?

A. Infrared rays.
Sinar inframerah.

B. *X*-rays.
Sinar – X.

C. Radio Waves.
Gelombang radio.

D. Gamma rays.
Sinar gamma.

38. Ultrasonic waves are transmitted by a hydrophone from a boat to the seabed as shown in Diagram 21. The echoes of the ultrasonic waves are received by the detector on the boat 0.02 s after the transmission. The speed of ultrasonic waves in the sea water is 4200 m s^{-1}.
Gelombang ultrasonik dihantar menggunakan hidrofon dari sebuah kapal ke dasar laut seperti Rajah 21. Gema bagi gelombang ultrasonik diterima oleh pengesan pada kapal 0.02 saat selepas dihantar. Laju gelombang ultrasonik dalam air laut ialah 4200 ms^{-1}.

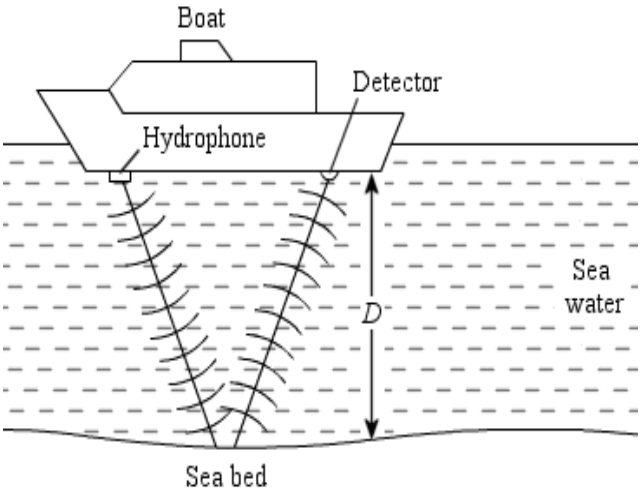


Diagram 21
Rajah 21

What is the depth, *D*, of the sea?
Apakah kedalaman ,D, laut tersebut?

A. 29 m

B. 42 m

C. 60 m

D. 84 m

39. Diagram 22 shows a ripple tank is used to investigate the properties of water waves. The water wave travels from the deep to the shallow region.
Rajah 22 menunjukkan tangki riak digunakan untuk mengkaji ciri gelombang. Gelombang air bergerak dari kawasan air dalam menuju ke kawasan air cetek.

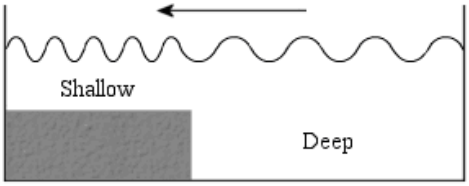


Diagram 22
Rajah 22

Which description about the wave motion from deep water to shallow water is correct?
Manakah yang berikut betul tentang gerakan gelombang dari kawasan dalam ke kawasan air cetek y?

A. Frequency remains unchanged. Speed and wavelength have changed
Frekuensi tidak berubah. Laju dan panjang gelombang berubah.

B. Frequency and speed remain unchanged. Wavelength has change
Frekuensi dan laju tidak berubah. Panjang gelombang berubah.

C. Speed remains unchanged. Wavelength and frequency have changed
Laju tidak berubah. Panjang gelombang dan frekuensi berubah.

D. Wavelength remains unchanged. Speed and frequency have changed.
Panjang gelombang tidak berubah. Laju dqn frekuensi berubah.

40 Diagram 23 shows the propagation of certain longitudinal waves.
Rajah 23 menunjukkan perambatan gelombang membujur.

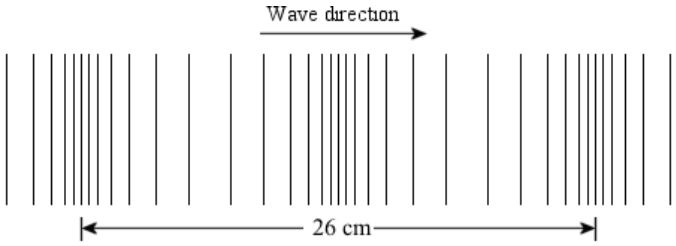


Diagram 23
Rajah 23

What is the wavelength of the waves?
Apakah panjang gelombang bagi gelombang tersebut?

A. 13 cm

B. 14 cm

C. 17 cm

D. 20 cm

41. Diagram 24 shows the wavefronts of three droplets on the surface of a water basin.
Rajah 24 menunjukkan muka gelombang tiga titisan air di atas permukaan air dalam besin.

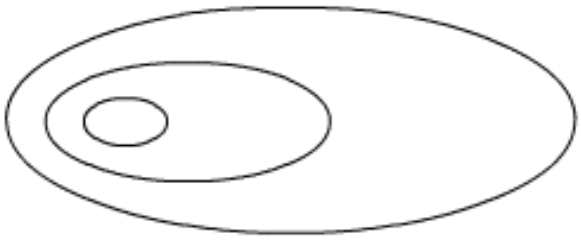
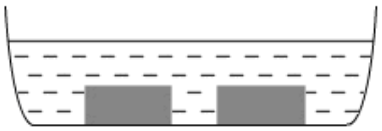


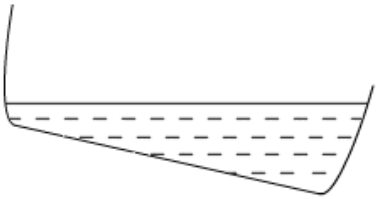
Diagram 24
Rajah 24

Which diagram is correct to show the wavefront of the water wave ?
Yang manakah rajah berikut adalah betul untuk menghasilkan muka gelombang air tersebut?

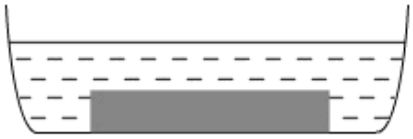
A.



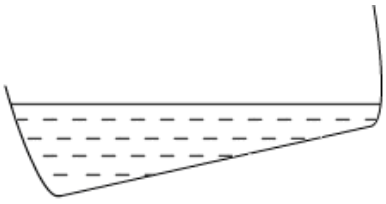
B.



C.



D.



42. Diagram 25 shows the interference pattern of water waves from two coherent sources P_1 and P_2 in a ripple tank.
Rajah 25 menunjukkan corak interferen bagi gelombang air daripada punca koheren P_1 dan P_2 dalam tangki riak.

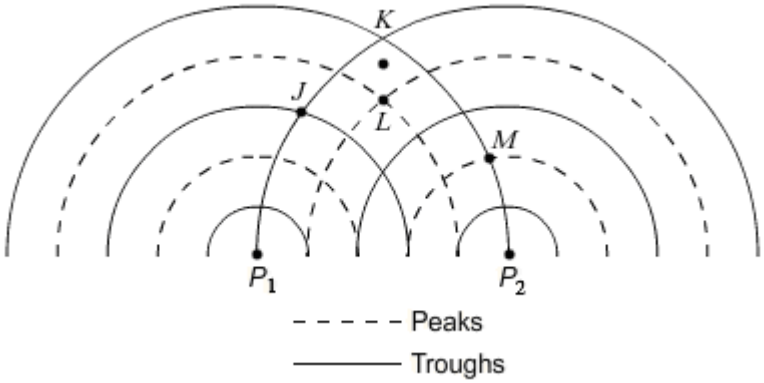


Diagram 25
Rajah 25

Which point among *J*, *K*, *L* and *M* has maximum amplitude?
Titik yang manakah yang berikut J, K, L dan M mempunyai amplitud maksimum?

A. *J* only
J sahaja

B. *J* and *L* only
J dan L sahaja

C. *L* and *M* only
L dan M sahaja

D. *J*, *L* and *M* only
J, L dan M sahaja

43 Volt is the unit of potential difference . Which is equivalent to the unit of volt?
Volt merupakan unit bagi beza keupayaan. Manakah yang bersamaan dengan unit volt?

A. A s

B. $J\ C^{-1}$

C. J

D. $J\ s^{-1}$

44. Diagram 26 shows an experiment conducted to investigate light diffraction.
Rajah 26 menunjukkan eksperimen untuk menyiasat belauan cahaya.

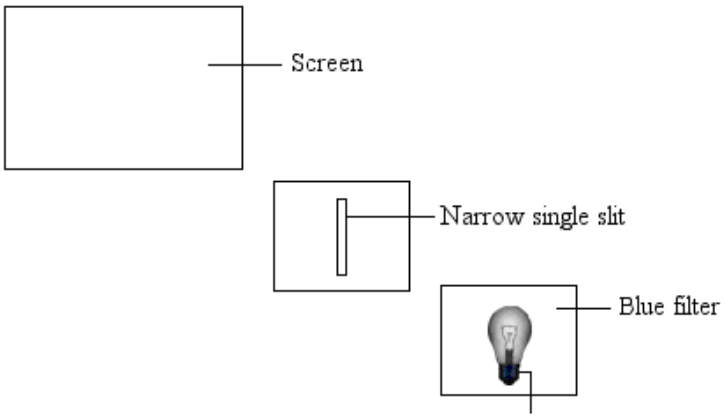


Diagram 26
Rajah 26

Which diagram below shows the fringe pattern seen on the screen?
Rajah yang manakah di bawah menunjukkan corak pinggir di atas skrin?

A. 

B. 

C. 

D. 

45. Diagram 27 shows the electric field lines for a pair of charged particles, Q_1 and Q_2.
Rajah 27 menunjukkan garis medan elektrik bagi sepasang zarah bercas Q_1 dan Q_2.

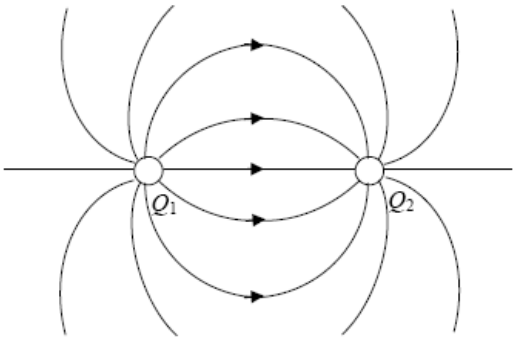


Diagram 27
Rajah 27

What are the charges for Q_1 and Q_2?
Apakah cas bagi Q_1 dan Q_2?

	$\underline{Q_1}$	$\underline{Q_2}$
A.	Positive *Positif*	Negative *Negatif*
B.	Positive *Positif*	Positive *Positif*
C.	Negative *Negatif*	Negative *Negatif*
D.	Negative *Negatif*	Positive *Positif*

46. Diagram 28 shows a charged conducting sphere is oscillating between two plates which are connected to an Extra High Tension (EHT) power supply.
Rajah 28 menunjukkan satu sfera konduktor bercas berayun di antara dua plat yang telah disambung ke satu bekalan voltan lampau tinggi (VLT).

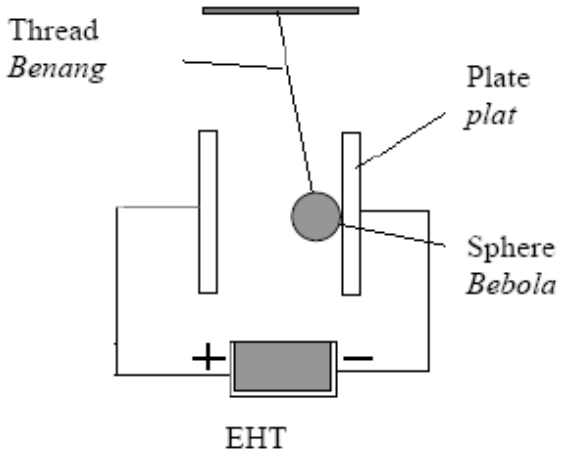


Diagram 28
Rajah 28

What factor has an effect to increase the frequency of the oscillation of the sphere.?
Apakah faktor yang mempunyai kesan untuk meningkatkan frekuensi ayunan bebola ?

A. The distance between the plates is increased.
Jarak antara dua plat ditambah

B. The size of the sphere is increased.
Saiz bebola ditambah

C. The length of the thread is increased
panjang tali benang ditambah

D. The voltage of the EHT is increased.
Voltan VLT ditambah

47. Diagram 29 is a graph shows the relationship between the potential difference and the current of four different conductors, P, Q, R and S.
Rajah 29 menunjukkan graf bagi hubungan antara beza keupayaan dan arus bagi empat konduktor yang berlainan, P, Q, R dan S.

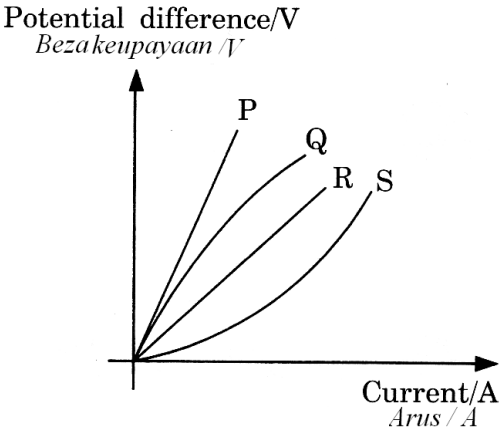


Diagram 29
Rajah 29

Which conductor has the highest resistance?
Konduktor yang manakah mempunyai rintangan yang paling tinggi ?

A. P

B. Q

C. R

D. S

48 Wire of length 0.4 m and cross-sectional area of 0.2 mm^2 has a resistance of 2 Ω. Which of this wire is made of the same material as P and have the same resistance of 2 Ω?
Seutas wayar yang panjang 0.4 m dan luas keratan rentas 0.2 mm^2 mempunyai rintangan sebanyak 2 Ω. *Manakah di antara wayar-wayar berikut, yang dibuat daripada bahan yang sama dengan wayar P, mempunyai rintangan yang sama dengan 2* Ω*?*

	Length / m *Panjang / m*	**Cross-sectional Area / mm^2** *Luas keratan rentas/ mm^2*
A	0.8	0.1
B	0.8	0.4
C	0.2	0.2
D	0.2	0.4

49. Diagram 30 shows a graph of voltage against current.
Rajah 30 menunjukkan graf beza keupayaan melawan arus.

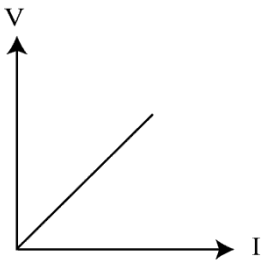
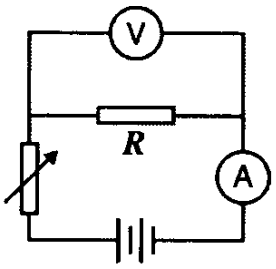


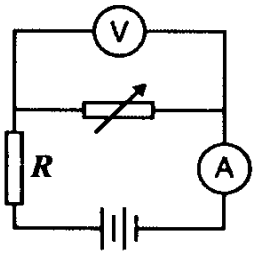
Diagram 30
Rajah 30

Which of this circuit diagram will give the result as the graph above?
Antara litar berikut, yang manakah boleh memberikan keputusan seperti graf di atas?

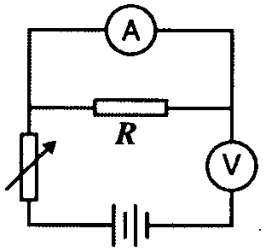
A



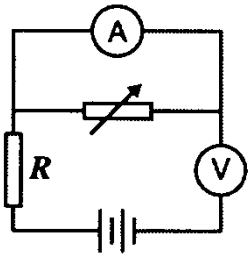
B



C



D



50. When the switch is on, the current that flows in an electronic advertisement board is 3.0×10^{-5} A. What is the number of electrons flowing in the advertisement board when it is switched on for 2 hours?
Apabila suis dihidupkan, arus yang mengalir dalam litar sebuah papan iklan elektronik ialah 3.0×10^{-5} A. Berapakah bilangan elektron 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}

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

4531/2
Physics
Kertas 2
Mei
2009

2 ½ jam

Nama: .....

Ting: .....

NO. KAD PENGENALAN

ANGKA GILIRAN

JABATAN PELAJARAN MELAKA

UJIAN PENGESANAN PERTENGAHAN TAHUN
SIJIL PELAJARAN MALAYSIA 2009

PHYSICS
Kertas 2
Dua jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Kertas ini mengandungi tiga bahagian,* **Bahagian A, Bahagian B dan Bahagian C**
2. *Jawab semua soalan dalam* **Bahagian A**, *satu soalan daripada* **Bahagian B** *dan satu soalan daripada* **Bahagian C.**
3. *Jawapan kepada ketiga-tiga bahagian ini hendaklah diserahkan bersama.*
4. *Jawapan bagi* **Bahagian A** *hendaklah ditulis dalam ruang yang disediakan dalam kertas soalan. Langkah penting dalam kira mengira hendaklah ditunjukkan.*
5. *Jawapan bagi* **Bahagian B** *dan* **BahagianC** *hendaklah ditulis pada kertas tulis yang disediakan. Anda diminta menjawab dengan lebih panjang untuk* **Bahagian B** *dan* **Bahagian C** *tetapi jawapannya mestilah jelas dan logik. Dalam jawapan anda, persamaan, gambar rajah, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda boleh digunakan.*
6. *Rajah tidak dilukis mengikut skala.*
7. *Markah maksimum yang diperuntukkan ditunjukkan dalam kurungan pada hujung tiap-tiap soalan atau bahagian soalan.*
8. *Penggunaan kalkulator saintifik yang* ***tidak*** *boleh diprogramkan adalah dibenarkan.*

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

Kertas soalan ini mengandungi 32 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* $= mgh$

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

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

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

11. $E = mc^2$

12. $v = f\lambda$

13. Power / *Kuasa* $= \frac{Energy}{time} = \frac{Tenaga}{masa}$

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

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

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

17. $Q = It$

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

19. $P = \rho gh$

20. $F = kx$

21. $e = 1.6 \times 10^{-19}\ C$

Bahagian A

[60 markah]
Jawab ***semua*** soalan dalam bahagian ini.
(Anda dinasihatkan untuk memperuntukkan 1½ jam untuk bahagian ini)

1. A boy cycling towards a beach. He takes 10 s cycling on the road and reducing his speed while approaching the beach.
Seorang budak lelaki mengayuh basikal menuju ke pantai. Beliau mengayuh di atas jalan raya selama 10 s dan mengurangkan halajunya ketika menghampiri pantai.

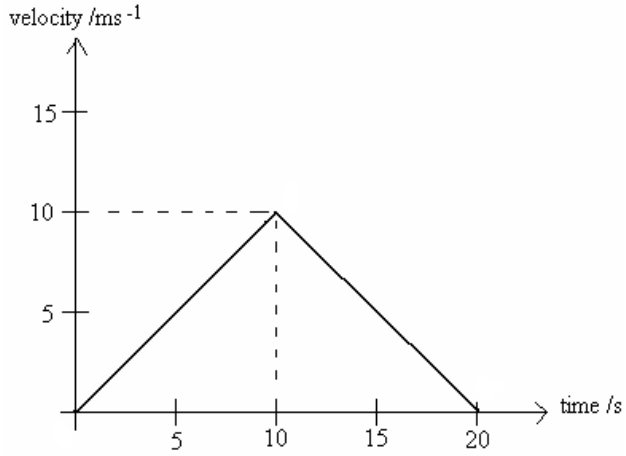


Diagram 1
Rajah 1

Diagram 1(b) shows the motion graph of his journey.
Rajah 1(b) menunjukkan graf gerakan perjalanannya.

1(a)

(a) Velocity can be define as ….. / Halaju boleh ditakrifkan sebagai….
Tick (√) the correct answer in the box below. /Tandakan (√) jawapan yang betul pada kotak di bawah

☐ Rate of change of distance / *Kadar perubahan jarak*

☐ Rate of change of displacement / *Kadar perubahan sesaran* [1 *mark*]
[1 *markah*]

(b) Base on the motion graph of Diagram 1(b),
Berdasarkan graf gerakan pada Rajah 1(b)

1(b)(i)

(i) State velocity of the motion after 20 seconds
Nyatakan halaju gerakan itu selepas 20 saat

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

1(b)(ii)

(ii) Mark with P , a region where the boy is accelerating
Tandakan dengan P, iaitu kawasan di mana budak itu memecut.

[1 mark]
[*1 markah*]

1(c)

(c) State the physical quantity presented by the area under the graph.
Nyatakan kuantiti fizikal yang diwakili oleh luas di bawah graf.

[1 mark]
[*1 markah*]

.....

Total A1

4

2 Diagram 2.1 shows a boy pulling a metal box with a force of 30 N.
Rajah 2.1 menunjukkan seorang budak sedang menarik sebuah blok kayu dengan daya 30 N.

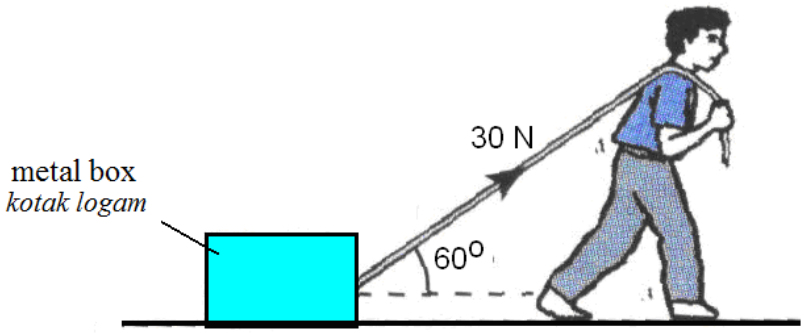


Diagram 2.1
Rajah 2.1

(a) The effective force that caused the metal box moves is……..
Daya berkesan yang menyebabkan kotak logam itu bergerak ialah……..

Tick (√) the correct answer in the box below.
Tandakan (√) pada jawapan yang betul dalam kotak di bawah.

☐ 30 cos 60

☐ 30 sin 60

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

2(a) 1

(b) Calculate the work done by the boy when he pulls the wooden block through a distance of 10 m.
Kira kerja yang dilakukan oleh budak tersebut untuk menarik blok kayu itu sejauh 10m.

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

2(b) 3

(c) Suggest one method to pull the wooden block with smaller force.
Cadangkan satu kaedah untuk menarik blok kayu itu dengan daya yang lebih kecil.

.....

.....

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

2(c) 1

Total A 2] 5

3. Diagram 3.1 shows a thermometer which has not been calibrated.
Rajah 3.1 menunjukkan sebatang termometer yang belum ditentukur

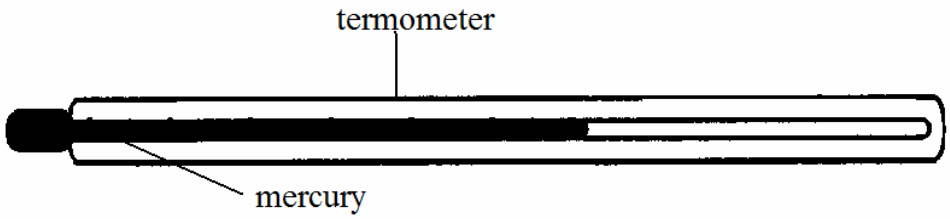


Diagram 3.1
Raiah 3.1

Diagram 3.2 shows a part of the calibrating process of the thermometer .
Rajah 3.2 menunjukkan sebahagian dari proses untuk menentukurkan termometer itu.

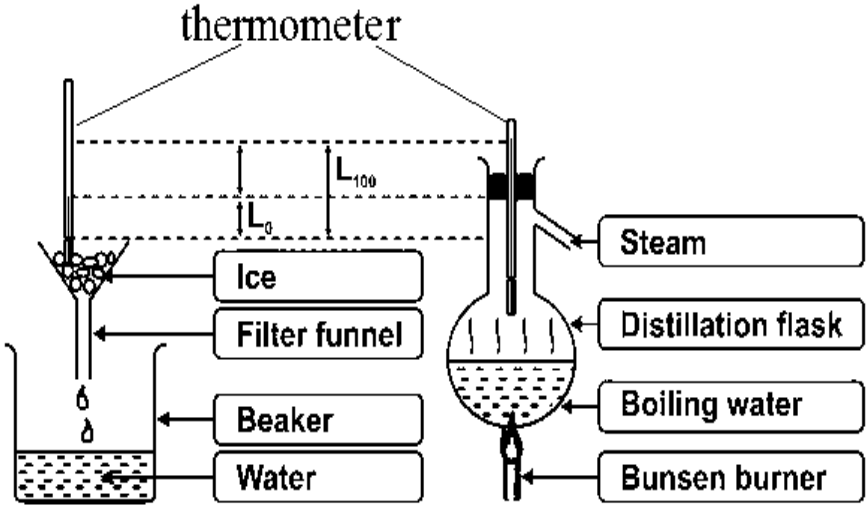


Diagram 3.2
Rajah 3.2

(a) (i) State the SI unit for the [illegible] sured by the thermometer?
Nyatakan unit SI bagi kuantiti fizikal yang diukur oleh termometer itu?

3(a)(i) 1

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

(ii) Give one reason for the termometer to placed in the ice and in the steam state.
Berikan satu sebab termometer itu diletakkan ke dalam ais dan kemudiannya ke dalam stim.

3(a)(ii) 1

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

(iii) Why mercury is used in the thermometer ?
Mengapakah merkuri digunakan dalam termometer itu?

3(a)(iii) 1

..... [1 mark]

[1 *markah*]

(b) The length of the mercury column in the thermometer is 2.6 cm at 0^oC and 22.6 cm at 100^oC.
Panjang turus merkuri di dalam termometer ialah 2.6 cm pada 0^oC dan 22.6 cm pada 100^oC.

(i) What is the length difference between the mercury columns at 0^oC and at 100^oC?
Berapakah perbezaan panjang turus merkuri antara 0^oC dan pada 100^oC?

.....

[1 mark]
[1 *markah*]

3(b)(i)
1

(ii) When the thermometer is placed in hot oil, the length of the mercury column is 16.9 cm
Apabila termometer itu diletakkan pada minyak panas, panjang turus merkuri adalah 16.9 cm

Calculate the temperature of the hot oil
Hitungkan suhu minyak panas

[2 marks]
[2 *markah*]

3(b)(ii)
2

Total
A3
6

4. Diagram 4 shows a wooden block placed on a trolley at a certain height on a runway. The system is let to slide down the runway at constant speed of 4 ms^{-1}.
Rajah 4 menunjukkan satu blok kayu di atas sebuah troli pada ketinggian tertentu di atas sebuah landasan. Sistem itu dibiarkan bergerak bersama-sama menuruni satu landasan dengan kelajuan tetap 4 ms^{-1}.

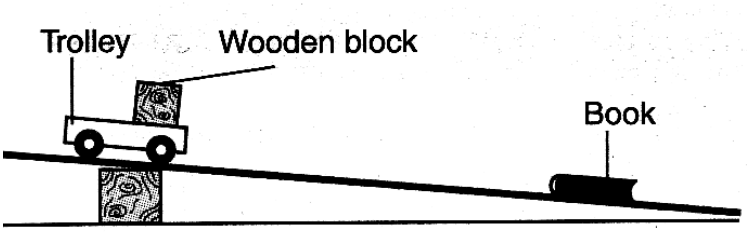


Diagram 4
Rajah 4

(a) On Diagram 4 label the direction of forces acting on the trolley at the stationary state.
Pada Rajah 4 labelkan arah daya-daya yang bertindak ke atas troli itu dalam keadaan pegun.

4(a) 1

[1 mark]
[1 *markah*]

(b) State energy changes experiences by the system as it moves down the runway
Nyatakan perubahan tenaga yang dialami oleh gerakan sistem itu ketika menuruni landasan

.....

4(b) 2

[2 marks]
[2 *markah*]

(c) The total mass of the wooden block and the trolley is 6 kg. As the system slide down the runway , the motion is blocked by a book as shown on the diagram.

Jumlah jisim blok kayu dan troli itu ialah 6 kg. Ketika menuruni landasan gerakan sistem itu ditahan oleh sebuah buku di atas landasan tersebut seperti yang ditunjukkan dalam Rajah 4.

Calculate the momentum of the wooden block and the trolley before they hit the book.
Hitung momentum blok kayu dan troli itu sebelum mengenai buku itu.

4(c) 2

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

(d) (i) What happens to the wooden block when the trolley hits the book?
Apakah yang berlaku kepada blok kayu apabila troli melanggar buku itu?

.....

.....

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

4(d)(i)

1

(ii) Explain answer in (d)(i) .
Terangkan jawapan dalam (d)(i)

.....

.....

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

4(d)(ii)

1

Total
A4

7

5 Diagram 5.1 shows three boxes with different density at stationary state.
Rajah 5.1 menunjukkan tiga kotak dengan ketumpatan yang berbeza berada dalam keadaan pegun.

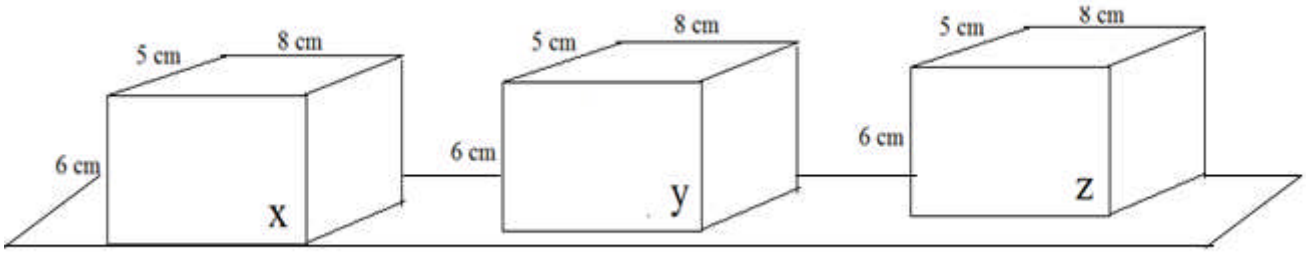


Diagram 5.1
Rajah 5.1

Diagram 5.2 shows the boxes float still when placed in a liquid.
Rajah 5.2 menunjukkan kotak-kotak itu terapung pegun apabila diletakkan dalam suatu cecair.

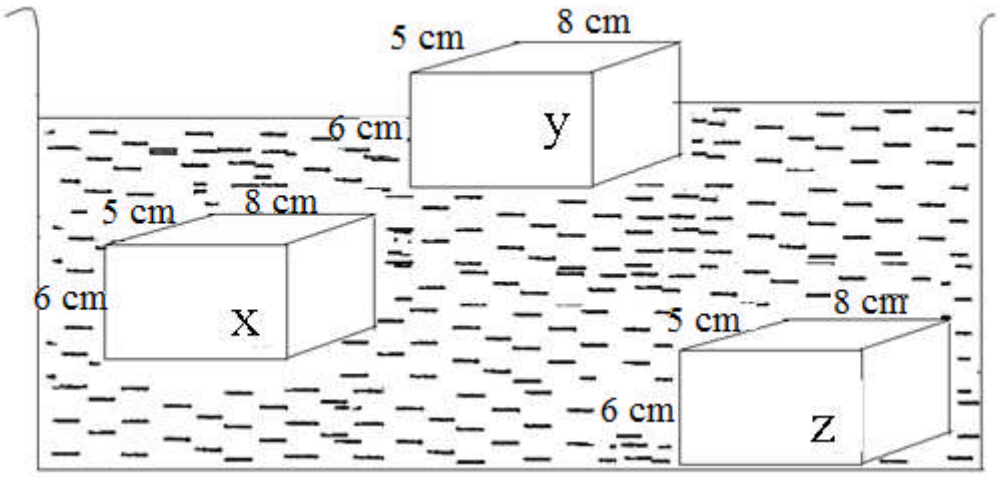


Diagram 5.2
Rajah 5.2

(a) Based on the situation in Diagram 5.1 and the situation in Diagram 5.2,
Berdasarkan situasi dalam Rajah 5.1 dan Rajah 5.2

(i) state similarities about the volume and the net force of the boxes
nyatakan kesamaan tentang isipadu dan daya bersih yang bertindak ke atas kotak-kotak itu.

Volume/ *isipadu*

.....

Net force of the boxes/ *daya bersih yang bertindak ke atas kotak-kotak itu*

.....

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

5(a)(i)
2

(ii) Compare the weight of the boxes in ascending order .
Bandingkan berat kotak-kotak itu dalam susunan menaik.

.....

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

5(a)(ii) 1

(b) Observe Diagram 5.2
Perhatikan Rajah 5.2

(i) Describe the position of the boxes in the liquid
Huraikan posisi kotak-kotak itu di dalam cecair tersebut.

.....

.....

.....

.....

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

5(b)(i) 2

(ii) Explain your answer in 5(b)(i),
Terangkan jawapan kamu dalam 5(b)(i)

.....

.....

.....

.....

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

5(b)(ii) 2

(c) Based on the answer in 5(b((ii), name the physics concept involved
Berdasarkan jawapan di 5(b((ii), namakan konsep fizik yang terlibat.

.....

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

5(b)(iii) 1

Total A5 8

6. Diagram 6.1 and Diagram 6.2 show light rays from two identical objects passing through the convex lenses, M and N. Both of the lenses produce virtual images. F is the focal point of each lens.
Rajah 6.1 dan Rajah 6.2 menunjukkan sinar cahaya daripada dua objek yang serupa melalui kanta cembung, M dan N. Kedua-dua kanta cembung tersebut menghasilkan imej maya. F ialah titik fokus bagi kanta tersebut.

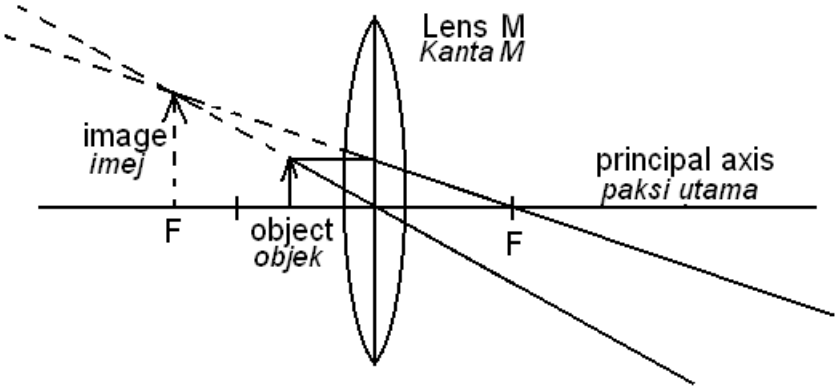


Diagram 6.1
Rajah 6.1

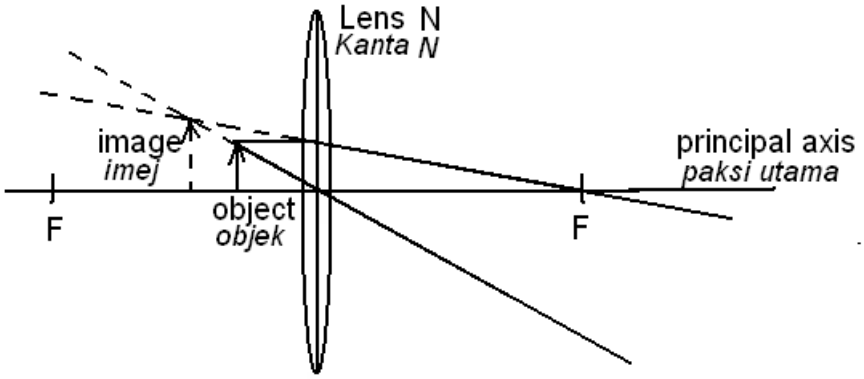


Diagram 6.2
Rajah 6.2

(a) What is meant by virtual image?
Apakah yang dimaksudkan dengan imej maya?

6(a)

.....

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

1

(b) Observe Diagram 6.1 and Diagram 6.2
Perhatikan Rajah 6.1 dan Rajah 6.2

State the difference between:
Nyatakan perbezaan di antara:

(i) size of image produced by the lenses.
saiz imej yang dihasilkan oleh kanta-kanta tersebut.

6(b)(i)

.....

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

1

(ii) the object distance ,u.
jarak objek dari kanta ,u

6(b)(iii)

.....

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

1

(iii) the image distance , v.
jarak imej dari kanta, v

6(b)(iv)

.....

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

1

(c) State the relationship between the image size and the image distance of the lens.
Nyatakan hubungan di antara saiz imej dan jarak imej kanta tersebut

6(c)

.....

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

1

(d) Based on the answers in 6 (b) and 6 (c)
Berdasarkan kepada jawapan anda di 6 (b) dan 6(c)

Write an equation to show the relationship between the magnification of the image, m , object distance, u and the image distance, v.
Tuliskan satu persamaan yang menghubungkan antara pembesaran imej, m , jarak objek, u dan jarak imej, v.

6(d)

1

.....

.....

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

(e) Half of lens M in Diagram 6.1 is covered with a piece of black paper.
Separuh daripada kanta M dalam Rajah 6.1 ditutup dengan sehelai kertas hitam.

(i) What happen to the image produced by lens M.
A*pakah yang berlaku kepada imej yang dihasilkan oleh kanta M*

6(e)(i)

1

.....

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

(ii) Explain your answer in 6 (e) (i).
Terangkan jawapan anda di 6((e)(i).

6(e)(ii)

1

.....

.....

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

Total
A6

8

7. Diagram 7 shows a fishing boat using a sonar system to detect a shoal of fish.
Rajah 7 menggunakan sebuah bot nelayan yang menggunakan sistem sonar untuk Mengesan kelompok ikan.

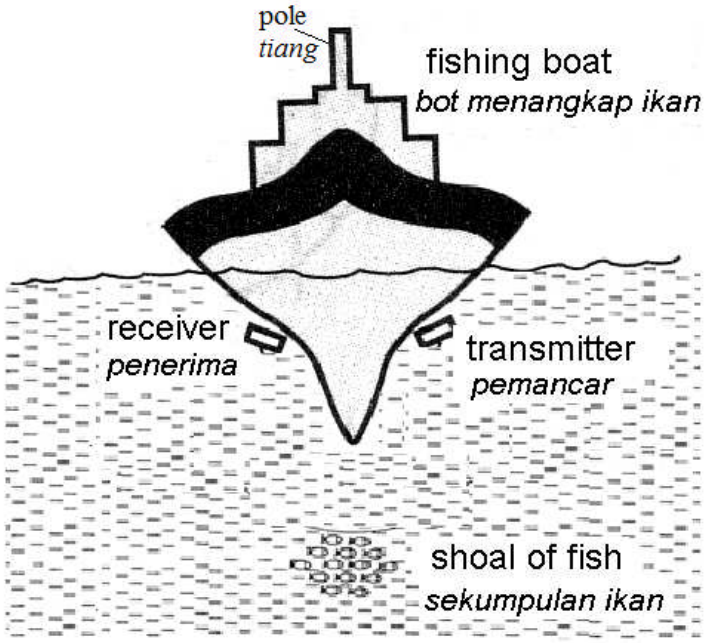


Diagram 7
Rajah 7

(a) Based on Diagram 7

(i) Name the wave phenomenon used to detect the fish.
Namakan fenomena gelombang yang digunakan untuk mengesan sekelompok ikan

.....

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

7(a)(i) 1

(ii) Compare the time taken for sending detective wave to the fish and the time taken for the receiver to receive the signal.
Bandingkan masa yang di ambil untuk menghantar gelombang pengesan kepada kumpulan itu dengan masa yang di ambil untuk penerima menerima semula isyarat tersebut

.....

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

7(a)(ii) 1

(b) Why did sonar system is used as a device to detect the fish?
Mengapakah sistem sonar digunakan sebagai alat untuk mengesan ikan?

.....

7(b) [1 *mark*]
[1 *markah*]

1

(c) The time to detect the shoal of fish is 0.05 seconds, the speed of the sound waves in water is 1500 ms^{-1}.
Masa untuk mengesan sekumpulan ikan adalah 0.05 saat, laju gelombang bunyi di dalam air adalah 1500 ms^{-1}.

Calculate the distance of the shoal of fish from the fishing boat
Hitung jarak sekumpulan itu dari bot nelayan itu

7(c)

2

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

(d) The fishing boat is to be upgraded with a better communication system such as a transmitter and a receiver and a radar system hence able to detect any air flight.
Bot nelayan itu hendak dinaik taraf kan dengan sistem komunikasi yang lebih baik seperti pemancar dan penerima serta sebuah sistem radar untuk membolehkan kapal nelayan itu mengesan sebarang pesawat udara.

(i) Explain the best location of the new detection device to work efficiently.
Terangkan lokasi terbaik alat pengesan baru itu supaya ia berfungsi dengan berkesan

.....

.....

.....

.....

7(d)(i)

2

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

(ii) State the type of wave produce by the new detection device.
Nyatakan jenis gelombang yang dihasilkan oleh alat pengesan yang baru itu.

_____

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

7(d)(ii)
2

(iii) Suggest one modification to the communication device to increase the effectiveness of the communication system
Cadangkan satu pengubahsuaian kepada alat komunikasi itu untuk meningkatkan kecekapan sistem komunikasi tersebut.

……..

……

……..

……..

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

7(d)(iii)
2

Total
A7
10

8 Diagram 8.1 shows an apparatus set up to observe a pattern of electric field.
Rajah 8.1 menunjukkan susunan radas untuk memerhatikan satu corak medan elektrik

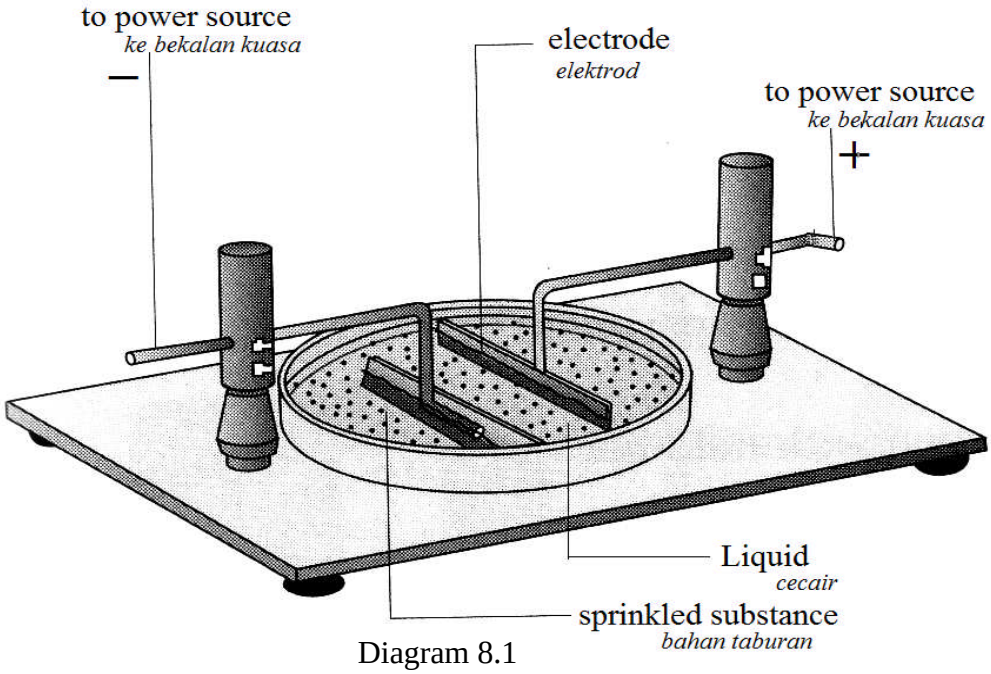


Diagram 8.1
Rajah 8.1

(a) (i) What is meant by electric field?
Apakah yang dimaksudkan dengan medan elektrik?

8(a)(i)

1

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

(ii) In the space below, draw electric field pattern formed by the apparatus arrangement on Diagram 8.1
Pada ruang di bawah, lukiskan corak medan elektrik yang dihasilkan oleh susunan radas seperti Rajah 8.1.

8(a)(ii)

2

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

(b) A current of 0.2 A is let to flow for 3 minutes.
Suatu arus elektrik 0.2 A dibiarkan mengalir selama 3 minit .

Calculate / *Hitung*

(i) Quantity of charge carried by the current
Kuantiti cas yang dibawa oleh arus elektrik itu

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

8(b)(i)
2

(ii) Number of electrons flow in 3 minutes
Bilangan elektron yang mengalir dalam masa 3 minit.

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

8(b)(ii)
1

(c) Q, R and S are three set of apparatus to observe electric field.
Table 8 shows the characteristics of each instrument used in the experiment.

Q,R dan S adalah tiga set radas untuk melihat corak medan elektrik .
Jadual 8 menunjukkan ciri-ciri bagi setiap alat yang digunakan dalam eksperimen itu.

Set of apparatus *Set radas*	Type of power supply *Jenis bekalan kuasa*	Type of electrode *Jenis elektrod*	Type of liquid *Jenis cecair*
Q	Dry cell *Sel kering*	Glass rod *Rod kaca*	Olive oil *Minyak zaitun*
R	Extra high tension *Voltan lampau tinggi*	Metal *Logam*	Olive oil *Minyak zaitun*
S	Low voltage supply *Bekalan kuasa rendah*	Carbon *karbon*	Olive oil *Minyak zaitun*

Table 8
Jadual 8

Based on Table 8, state the suitable properties for the set of apparatus to observe the pattern of the electric field.
Berdasarkan pada Jadual 8, nyatakan ciri –ciri yang sesuai bagi set radas untuk digunakan bagi melihat corak medan elektrik.

(i) Type of power supply
Jenis bekalan kuasa

…….

Reason
Sebab

…….

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

8(c)(i)
2

(ii) Types of electrodes
Jenis elektrod

……..

Reason
Sebab

……..

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

8(c)(ii)
2

(d) Based on the answers in 8(b), which set of apparatus is the most suitable to observe the electric field ?

Berdasarkan jawapan di 8(b), set radas yang manakah paling sesuai untuk melihat corak medan elektrik

.....

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

8(d) 1

(e) State one reason why olive oil is used as liquid for the experiment.
Nyatakan satu sebab mengapa minyak zaitun digunakan sebagai cecair dalam eksperimen itu.

.....

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

8(e) 1

Total A8 12

Section B
Bahagian B
[20 *marks*]
*Answer any **one** question from this section*
*Jawab mana-mana **satu** soalan daripada bahagian ini.*

9. Table 9.1 shows characteristics of a hydraulic system A. Table 9.2 shows characteristics of a hydraulic system B. The systems are the application of Pascal's principle.
Jadual 9.1 menunjukkan kriteria satu sistem hidraulik A. Jadual 9.2 menunjukkan kriteria satu sistem hidraulik B. Kedua-dua sistem itu menggunakan prinsip Pascal.

Physical quantity *Kuantiti fizik*	Hydraulic system A *Sistem hidraulik A*	
	Input *Input*	Output *output*
Force, F / N *Daya, F / N*	10	40
Surface area, A / cm ^{2} *Luas keratan, A / cm ^{2}*	50	200

Table 9.1
Jadual 9.1

Physical quantity *Kuantiti fizik*	Hydraulic system B *Sistem hidraulik B*	
	Input *Input*	Output *Output*
Force, F / N *Daya, F / N*	10	150
Surface area, A / cm ^{2} *Luas keratan, A / cm ^{2}*	10	150

Table 9.2
Jadual 9.2

(a) State Pascal's principle?
Nyatakan prinsip Pascal?

[1 mark]
[1 *markah*]

(b) Based on Table 9.1 and Table 9.2, */berdasarkan Jadual 9.1 dan 9.2*
compare the hydraulic systems in terms of / *bandingkan sistem hidraulik itu dari segi*

(i) the input forces /*daya input*
(ii) the surface areas /*luas keratan rentas*
(iii) the output forces */ daya output*
(iv) the pressure transmitted / *tekanan yang dipindahkan*

[5 marks]
[5 *markah*]

(c) With the aid of Diagram 9.1, describe the working principle of a hydraulic jack?
Merujuk kepada Rajah 9.1, terangkan bagaimana sebuah jek hydraulic berfungsi?
(4 marks)
(4 markah)

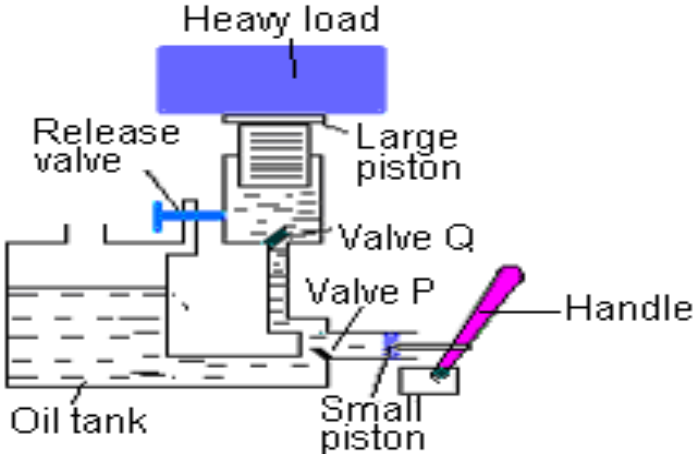


Diagram 9.1
Rajah 9.1

(d) Diagram 9.2 shows a model of hydraulic brake system of a car .
Rajah 9.2 menunjukkan satu model sistem brek hidraulik sebuah kereta.
Using your knowledge of Pascal's principle and Diagram 9.2, explain the following:
Berdasarkan pengetahuan anda tentang prinsip Pascal dan Rajah 9.2, terangkan perkara-perkara berikut:

(i) The suitable characteristics of the brake fluid and give an example of the brake fluid.
Ciri-ciri bendalir brek yang sesuai digunakan dan beri satu contoh bendalir brek .

(ii) Water is not used as fluid for the hydraulic brake
Berikan sebab air tidak digunakan sebagai bendalir untuk brek hidraulik.

(iii) The working of the hydraulic brake in a car.
Carakerja brek hidraulik kereta. [10 marks]
[10 *markah*]

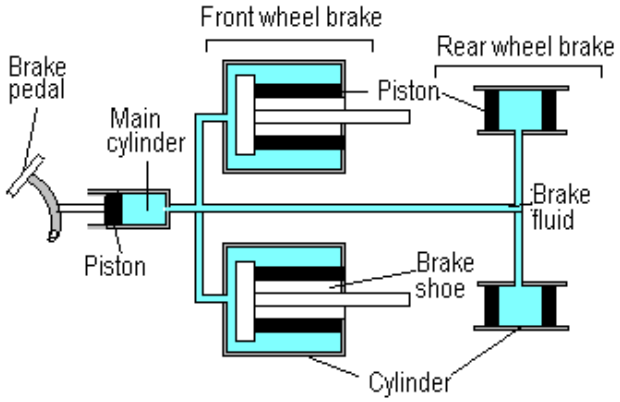


Diagram 9.2
Rajah 9.2

10. Diagram 10.1 and 10.2 show vib ing the string of guitar of different thickness.
Rajah 10.1 dan 10.2 menunjukkan getaran yang dihasilkan dengan memetik tali gitar yang mempunyai ketebalan yang berlainan .

A microphone is used to detect the sound waves of each guitar string. The traces displayed on the oscilloscopes are shown in diagrams 10.1 and 10.2.
Sebuah mikrofon digunakan untuk mengesan gelombang bunyi bagi setiap gitar. Bentuk gelombang yang ditayangkan pada osiloskop ditunjukkan dalam Rajah 10.1 dan 10.2.

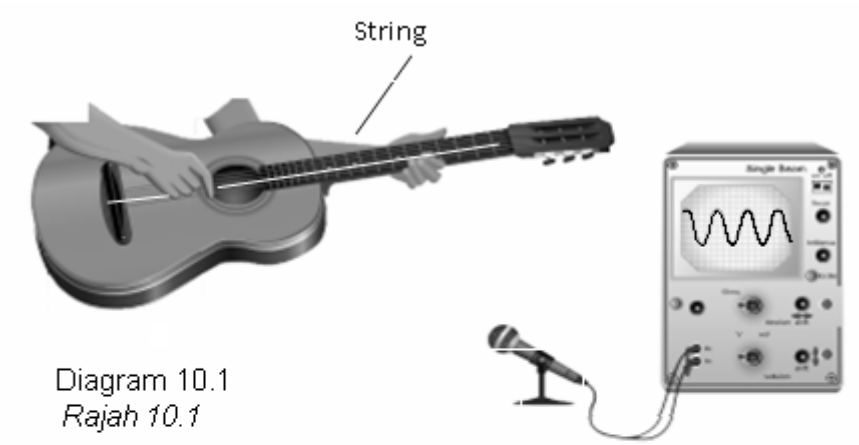


Diagram 10.1
Rajah 10.1

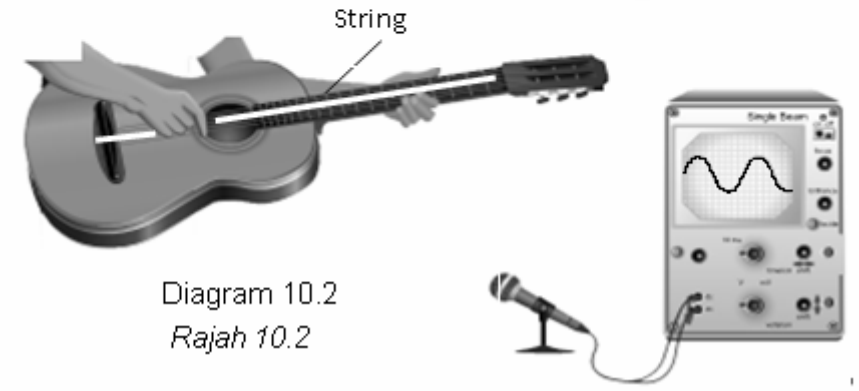


Diagram 10.2
Rajah 10.2

(a) State what type of wave is sound wave.
Nyatakan apakah jenis gelombang bunyi. [1 *markah*]
[*1 markah*]

(b) (i) Using Diagram 10.1 and 10.2, compare the diameter of guitar string, amplitude of wave and the number of oscillations.
Dengan menggunakan Rajah 10.1 dan 10.2, bandingkan diameter tali gitar, amplitud gelombang dan bilangan ayunan.

(ii) State the relationship between frequency of sound wave and diameter of the string.
Nyatakan hubungan antara frekuensi gelombang bunyi dan diameter tali gitar.

(iii) State the relationship between the frequency and the pitch of the sound wave
Nyatakan hubungan antara frekuensi gelombang bunyi dengan kelangsingan gelombang bunyi.

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

(c) Diagram 10.3 shows a sound wave produced by vibration of a tuning fork. The sound wave travels in air.
Rajah 10.3 menunjukkan gelombang bunyi dihasilkan oleh getaran tala bunyi. Gelombang bunyi itu bergerak di dalam udara.

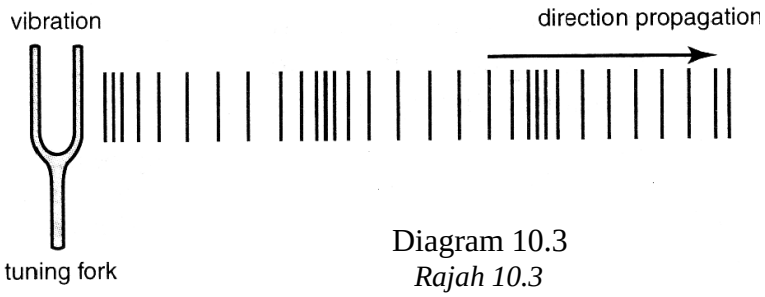
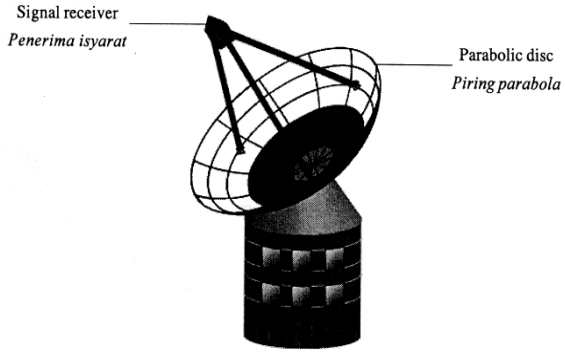


Diagram 10.3
Rajah 10.3

With the help of Diagram 10.3 explain how the sound wave is produced. [4 marks]
Dengan bantuan Rajah 10.3, terangkan bagaimana gelombang bunyi dihasilkan. [*4 markah*]

(d) Diagram 10.4 shows a radar system at an airport. Signals are transmitted from the radar system to determine the position of an airplane.
Rajah 10.4 menunjukkan satu sistem radar di sebuah lapangan terbang. Isyarat akan dipancarkan daripada sistem radar untuk menentukan kedudukan sebuah kapal terbang.



Suggest modifications that need to be done to improve the radar system. You should consider the following aspects in your explanation.
Cadangkan pengubahsuaian yang perlu dilakukan untuk memperbaiki sistem radar tersebut. Anda perlu mengambil kira aspek-aspek berikut di dalam penerangan anda.

(i) The diameter of the parabolic disc
Diameter piring parabola

(ii) The distance of the signal receiver from the centre of the parabolic disc.
Jarak penerima isyarat dari pusast piring parabola.

(iii) The types of wave transmitted
Jenis gelombang yang dipancarkan

(iv) The height of the parabolic disc from the ground.
Tinggi piring parabola daripada tanah.

(v) The material of the parabolic disc [10 marks]
Bahan piring parabola [10 *markah*]

Section C
Bahagian C

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

11 Diagram 11.1 shows a rheostat. Rheostat is a common device used in the laboratory
Rajah 11.1 menunjukkan sebuah reostat. Reostat adalah sebuah alat elektrik yang biasa digunakan dalam makmal .

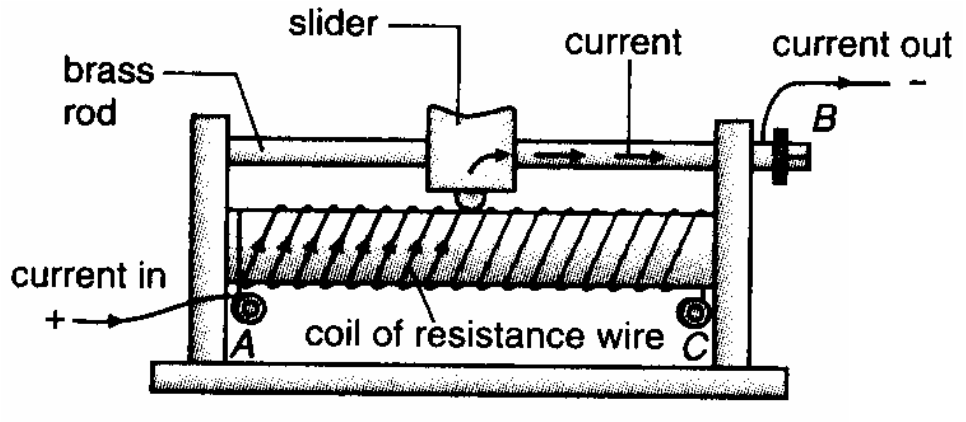


Diagram 11.1
Rajah 11.1

(a) What is the function of the rheostat?
Apakah fungsi rheostat?
[1 *mark*]
[1 *markah*]

(b) State one factor which effects the changes of the resistance in the rheostat.
Nyatakan satu faktor yang mempengaruhi perubahan rintangan reostat tersebut.
[1 *mark*]
[1 *markah*]

(c) Explain the working principle of the rheostat .
Terangkan prinsip kerja reostat .
[3 *marks*]
[3 markah]

(d) Diagram 11.2 shows an electric kettle used to boil water.
Rajah 11.2 menunjukkan sebuah cerek elektrik yang digunakan untuk memasak air.

Diagram 11.2
Rajah 11.2

Table 11.3 shows the specifications of four wires of the same diameter that can be used as a heating element of an electric kettle.
Jadual 11.3 menunjukkan spesifikasi empat dawai berdiameter sama yang boleh digunakan untuk membuat elemen pemanas sebuah cerek elektrik.

Type *Jenis*	J	K	L	M
Density/(kgm^{-3}) *Ketumpatan/(kgm^{-3})*	6500	7000	5000	2500
Melting point/^oC *Takat lebur/^oC*	7500	8050	8500	9000
Oxidation rate *Kadar pengoksidaan*	High *Tinggi*	High *Tinggi*	Low *Rendah*	Low *Rendah*
Resistivity/Ωm *Kerintangan/Ωm*	8.0×10^{-7}	7.0×10^{-7}	5.0×10^{-7}	8.0×10^{-7}

Table 12.3
Jadual 12.3

You are required to determine the most suitable wire and explain the suitability of the of the following aspects.

Anda diminta untuk mengenal pasti dawai yang paling sesuai dan terangkan kesesuaian aspek-aspek yang berikut.

- Density
  Ketumpatan
- Melting point
  Takat leburl
- Oxidation rate
  Kadar pengoksidaan
- Resistivity
  Kerintangan

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

(e) Diagram 12.3 shows a graph of current against voltage for wire A and wire B.
Rajah 12.3 menunjukkan graf arus melawan beza keupayaan bagi wayar A dan wayar B..

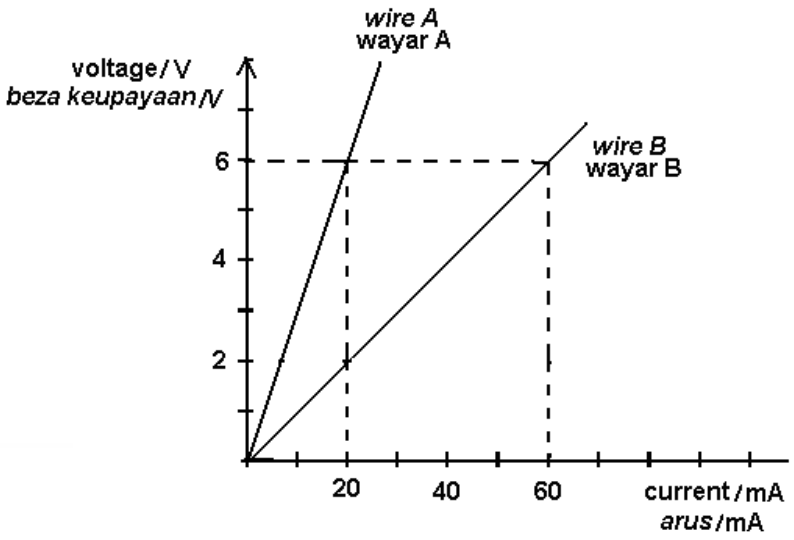


Diagram 12.3
Rajah 12.3

Based on Diagram 12.3
Berdasarkan kepada Rajah 12.3

(i) Name the wire with a bigger diameter.
Namakan satu wayar yang berdiameter besar [1 mark]
[1 *mark*]

(ii) If the resistance of wire A is R_1 and resistance of wire B is R_2, determine the ratio of $R_1 : R_2$.*Jika rintangan wayar A ialah R1 dan rintangan wayar B ialah R_2, tentukan nisbah $R_1:R_2$.* [4 *marks*]
[*4 markah*]

12 Diagram 12.1 shows air is blown steadily between two papers .
Rajah 12.1 menunjukkan udara ditiup di antara dua kertas.

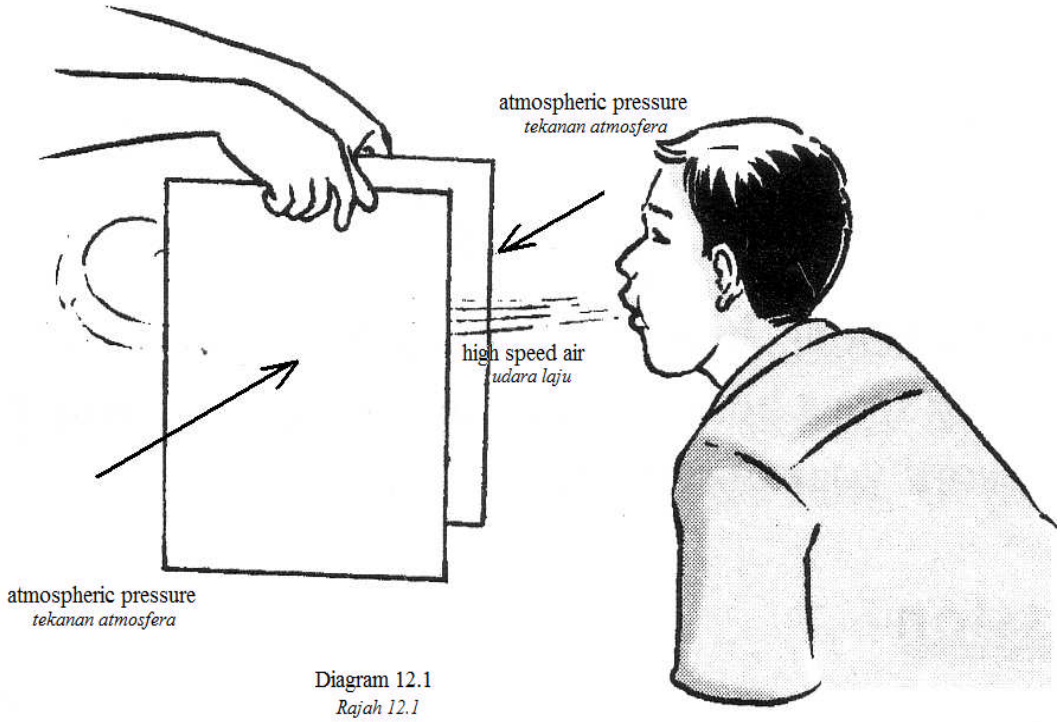


Diagram 12.1
Rajah 12.1

(a) (i) What is the meaning of pressure ? [1 *mark*]
Apakah maksud tekanan ? [1 *markah*]

(ii) Draw the shape of the papers when air is blown between them
Lukiskan bentuk kertas itu apabila udara ditiup melalui keduanya
[1 *mark*]
[1 *markah*]

(b) The distance between the paper is made wider. The air is still blown steadily between the two papers
Jarak di antara kedua kertas itu dilebarkan dan udara masih terus ditiup di antara dua kertas itu.

What is the effect on
Apakah kesan terhadap

(i) the speed and the pressure of air between the two papers [2 *marks*]
laju udara dan tekanan di antara kedua kertas itu [2 *markah*]

(ii) the shape of the paper [1 *mark*]
bentuk kertas itu [1 *markah*]

(c) Diagram 12.2 shows a motorcycle and a bus speeding on a highway track.

Rajah 12.2 menunjukkan sebuah motosikal dan sebuah bas bergerak dengan laju di sebuah lebuh raya.

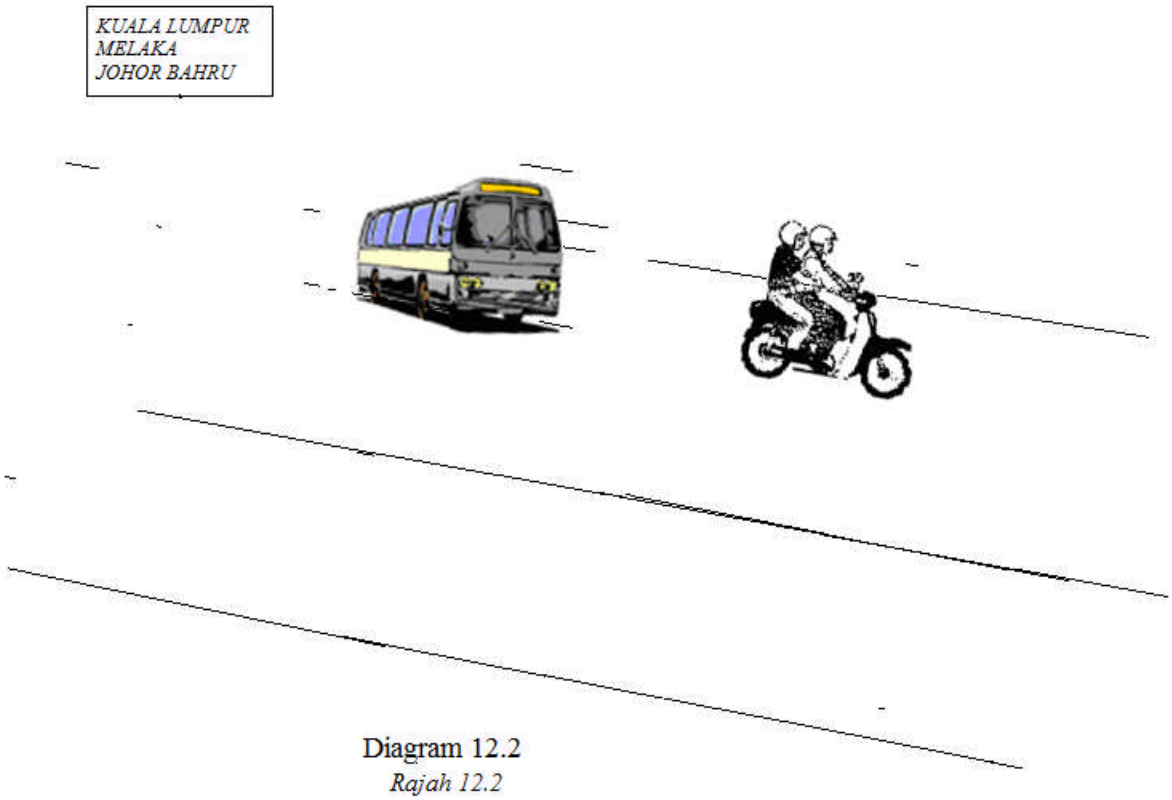


Diagram 12.2
Rajah 12.2

(i) What is the meaning of speed?
Apakah maksud laju?

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

(ii) Describe the possibilities of the movement of both vehicles when they are speeding side by side.
Explain your answer.

Huraikan kemungkinan gerakan kedua-dua kenderaan apabila mereka memecut sebelah menyebelah.
Terangkan jawapan anda.

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

(d) A new aircraft is designed to fit the purpose of transporting passengers and commercial goods. Four models for the suggested aircraft are given
Table 12 shows the structure and the features of the characteristics of the aircrafts.

Satu pesawat udara yang baru direka bentuk untuk tujuan membawa penumpang dan bahan-bahan dagangan. Empat model telah dicadangkan untuk pesawat baru itu.
Jadual 12 menunjukkan struktur dan ciri-ciri penting pesawat udara tersebut.

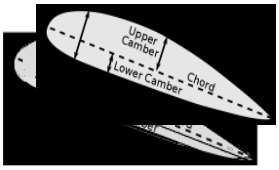
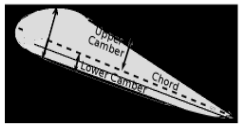
Aircraft models	T... *Sayap kapal terbang*	Engine capacity *Kapasiti e njin*	Aircraft fans *Kipas pesawat udara*	Cargo space *Ruang kargo*
W		Low *Rendah*	Large number of blades *Bilangan bilah yang besar*	Smaller *Lebih kecil*
X		Low *Rendah*	Small number of blades *Bilangan bilah yang kecil*	Smaller *Lebih kecil*
Y		High *Tinggi*	Large number of blades *Bilangan bilah yang besar*	Larger *Lebih besar*
Z		High *Tinggi*	Small number of blades *Bilangan bilah yang kecil*	Larger *Lebih besar*

Table 12
Jadual 12

Explain the best shape of the aircraft model and the suitability of each characteristic in Table 12. Determine the most suitable aircraft model to be used.

Give reasons for your choice. [10 *marks*]

Terangkan reka bentuk pesawat udara yang terbaik dan kesesuaian setiap ciri dalam Jadual 12. Tentukan model pesawat udara yang paling sesuai untuk digunakan.

Beri sebab untuk pilihan anda. [10 *markah*]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

I NAMA:_____ TINGKATAN:_____

4531/3
Physics
Kertas 3
2009
1 ½ jam

JABATAN PELAJARAN MELAKA

UJIAN PENGESANAN PERTENGAHAN TAHUN

SIJIL PELAJARAN MALAYSIA

TAHUN 2009

PHYSICS

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 .

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

Kertas soalan ini mengandungi 15 halaman bercetak

INFORMATION FOR CANDIDATES

1. This question paper consists of two sections : Section A and Section B.
2. Answer all questions in Section A. Write your answers for Section A in the spaces provided in the question paper.
3. Answer one question from Section B. Write your answers for Section B on the 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.
4. Show your working, it may help you to get marks.
5. If you wish to cancel any answer, neatly cross out the answer.
6. The diagrams in the questions are not drawn to scale unless stated.
7. Marks allocated for each question or part question are shown in brackets.
8. A booklet of four-figure mathematical tables is provided.
9. You may use a non-programable scientific calculator.
10. The time suggested to answer Sectin A is 60 minutes and Section B is 30 minutes.
11. Hand in this question paper at the end of the examination.

MAKLUMAT UNTUK CALON

1. *Kertas soalan ini mengandungi dua bahagian:* ***Bahagian A*** *dan* ***Bahagian B.***
2. *Jawab* ***semua*** *soalan dalam* ***Bahagian A.*** *Jawapan kepada* ***Bahagian A*** *hendaklah ditulis dalam ruang yang disediakan dalam kertas soalan.*
3. *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. *Tunjukkan kerja mengira,ini membantu anda mendapatkan markah.*
5. *Sekiranya anda hendak membetulkan sesuatu jawapan, buatkan garisan di atas jawapan itu.*
6. *Rajah yang mengiringi soalan tidak dilukiskan mengikut skala kecuali dinyatakan.*
7. *Markah yang diperuntukkan bagi setiap soalan atau ceraian soalan ditunjukkan dalam kurungan.*
8. *Buku sifir matematik empat angka disediakan.*
9. *Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.*
10. *Masa yang dicadangkan untuk menjawab* ***Bahagian A*** *ialah 60 minit dan* ***Bahagian B*** *ialah 30 minit.*
11. *Serah kertas soalan ini di akhir peperiksaan.*

Section A

Bahagian A

[28 marks]

[28 markah]

Answer **all** questions in this section.

*Jawab **semua** soalan dalam bahagian ini.*

1 A student carries out an experiment to investigate the relationship between the speed, *v*, of a trolley with the distance of compression, *e*, of the spring that pushed the trolley down a track

A piece of ticker tape is fixed to the trolley which is placed on a friction compensated track. The trolley is pushed back to compress the spring to a distance of compression , *e*, equal to 2.0 cm, as shown in Diagram 1.1. The trolley is then released and it moves down the track with speed ,*v*.

Seorang pelajar menjalankan eksperimen untuk mengkaji hubungan antara laju, v, sebuah troli dengan jarak mampatan, e, spring yang ditolak oleh troli menuruni landasan.

Pita detik dilekatkan pada troli yang berada di atas landasan terpampas geseran. Troli ditolak kebelakang untuk memampatkan spring pada jarak mampatan, e, bersamaan dengan 2.0 cm seperti dalam Rajah 1.1. Kemudian troli dilepaskan dan bergerak menuruni landasan dengan laju, v.

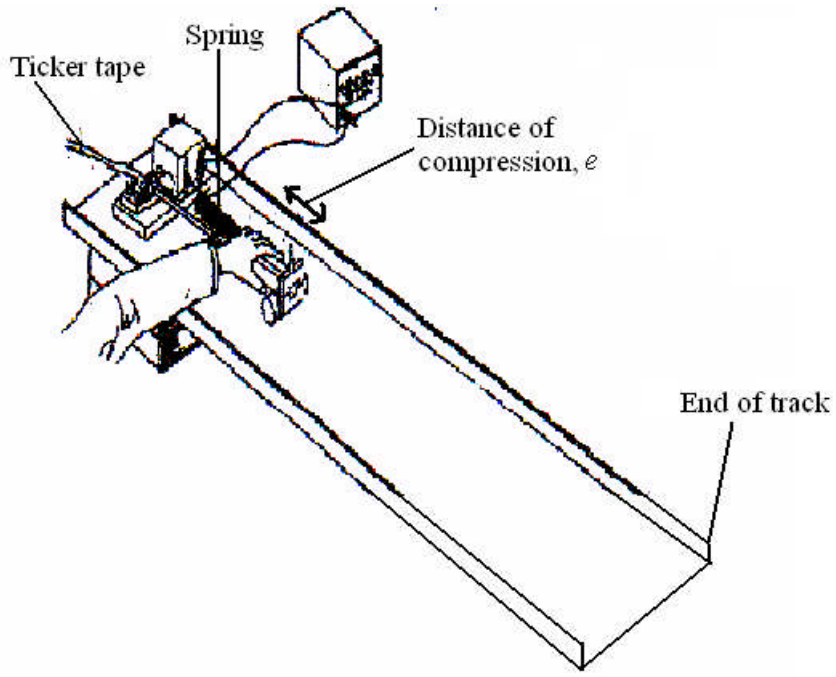


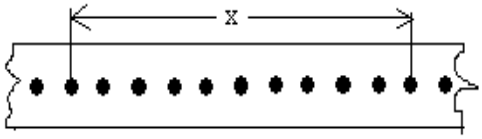
Diagram 1.1
Rajah 1.1

A section of the ticker tape which represents the movement of the trolley when it reached the end of the track is taken. The actual size of the ticker tape is shown in Diagram 1.2.
The above procedure is repeated by varying the values of *e*, to 3.0 cm, 4.0 cm, 5.0 cm and 6.0 cm. The actual size of the sections of the ticker tapes are shown in Diagram 1.3, 1.4, 1.5 and 1.6 on pages 3 and 4 respectively.
The speed, *v*, when the trolley reached the end of the track can be calculated using the formula below;
Sebahagian pita detik yang menunjukkan pergerakan troli apabila sampai ke penghujung landasan diambil. Saiz sebenar pita detik ditunjukkan dalam Rajah 1.2. Kaedah di atas diulang dengan mengubah nilai e, kepada 3.0 cm, 4.0 cm, 5.0 cm dan 6.0 cm. saiz sebenar sebahagian daripada pita detik ditunjukkan dalam Rajah 1.3, 1.4, 1.5 dan 1.6 pada muka surat 2 dan 3 masing-masing.
Laju,v, apabila troli sampai ke penghujung landasan boleh dihitung dengan formula di bawah;

$$v = \frac{x}{0.2} \text{ cm s}^{-1}$$

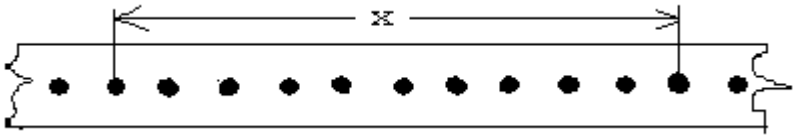
Where *x* is the length for 10 ticks as shown in Diagram 1.2. One tick is the time taken for the trolley to move between two consecutive dots.
Dimana x ialah panjang bagi 10 detik seperti yang ditunjukkan dalam Rajah 1.2. Satu detik adalah masa yang diambil oleh troli untuk bergerak diantara dua titik.

Diagrams 1.2, 1.3, 1.4, 1.5 and 1.6 show the actual lengths of the ticker tapes.
Rajah 1.2, 1.3, 1.4, 1.5 dan 1.6 menunjukkan panjang sebenar pita detik.



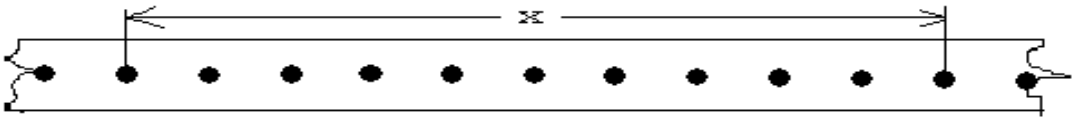
Distance of compression, *e* = 2.0 cm
Jarak mampatan, e = 2.0 cm

Diagram 1.2
Rajah 1.2



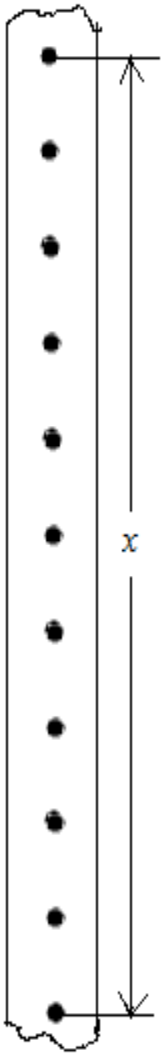
Distance of compression, *e* = 3.0 cm
Jarak mampatan, e = 3.0 cm

Diagram 1.3
Rajah 1.3



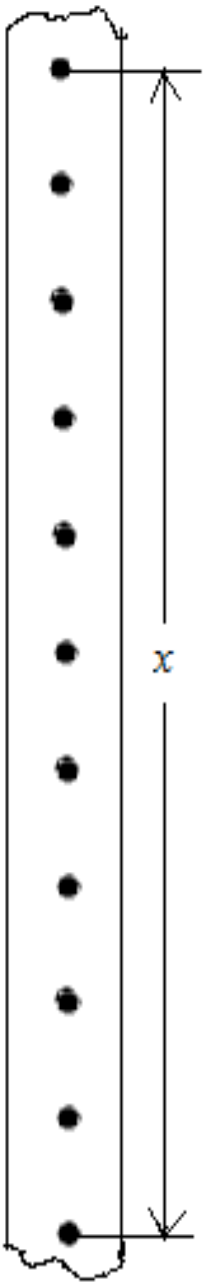
Distance of compression, e = 4.0 cm
Jarak mampatan, e = 4.0 cm

Diagram 1.4
Rajah 1.4



Distance of compression, e = 5.0 cm
Jarak mampatan, e = 5.0 cm

Diagram 1.5
Rajah 1.5



Distance of compression, e = 6.0 cm
Jarak mampatan, e = 6.0 cm

Diagram 1.6
Rajah 1.6

(a) For the experiment described on pages 3, 4 and 5, identify:
Bagi eksperimen yang diterangkan di halaman 3, 4 dan 5 kenal pasti:

(i) The manipulated variable
Pembolehubah dimanipilasikan

……
[1 mark]
[1 markah]

(ii) The responding variable
Pembolehubah bergerak balas

…….....
[1 mark]
[1 markah]

(iii)The constant variable
Pembolehubah dimalarkan

……..
[1 mark]
[1markah]

(b) Based on Diagrams 1.2, 1.3, 1.4, 1.5 and 1.6
Berdasarkan Rajah 1.2, 1.3, 1.4, 1.5 dan 1.6

Measure *x* for every ticker tape on pages 4 and 5
Ukur x bagi setiap pita detik pada muka surat 4 dan 5

Calculate the values for *v* for every ticker tape using the formula
Hitungkan nilai v bagi setiap pita detik menggunakan formula

$$v = \frac{x}{0.2} \text{ cm s}^{-1}$$

Tabulate your result for *x* and *v* for every value of *e* in the space below.
Jadualkan keputusan anda bagi x dan v bagi setiap nilai e dalam ruang di bawah.

[7 marks]
[7 markah]

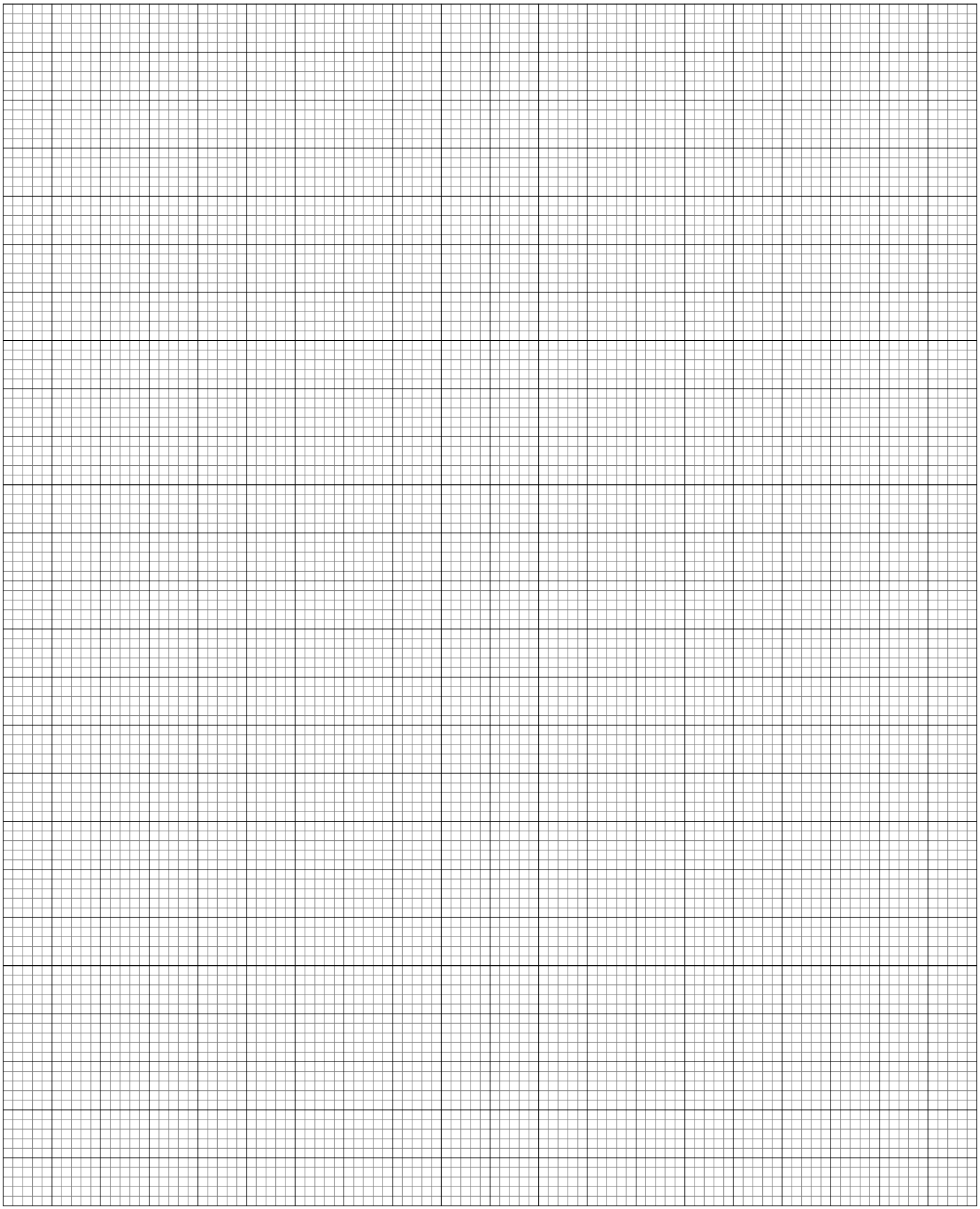
(c) On the graph paper provided on page 8 , draw a graph of *v* against *e*.
Pada kertas graf yang disediakan di muka surat 8 , lukis graf v melawan e.

[5 marks]
[5 markah]

(d) Use your graph in (c), to state the relationship between *v* and *e*.
Dengan menggunakan graf anda dalam (c) , nyatakan hubungan antara v dan e.

……..

[1 mark]
[1 markah]



2. A student carried out an experiment to determine the relationship between object distance, u, and image distance, v, of a convex lens. The student used various values of u to determine the corresponding values of v.
The results of the experiment are shown in the graph uv against u+v in Diagram 2
Seorang pelajar menjalankan eksperimen untuk menentukan hubungan antara jarak objek, u, dengan jarak imej, v, bagi sebuah kanta cembung. Pelajar tersebut menggunakan pelbagai nilai u untuk menentukan nilai v yang sepadan.
Keputusan eksperimen itu ditunjukkan oleh graf uv melawan u+v seperti pada Rajah 2.

(a) State the relationship between uv and u+v . [1 mark]
Nyatakan hubungan antara uv dan u+v *[1 markah]*

……..

(b) Calculate the gradient, m, of the graph uv against u+v.
Hitungkan kecerunan, m, bagi graf uv melawan u+v.

Show on the graph how you determined m. [3 marks]
Tunjukkan pada graf itu bagaimana anda menentukan m *[3 markah]*

.

Graph of uv (cm ^{2}) against u+v (cm)

Graf uv (cm ^{2}) melawan u+v (cm)

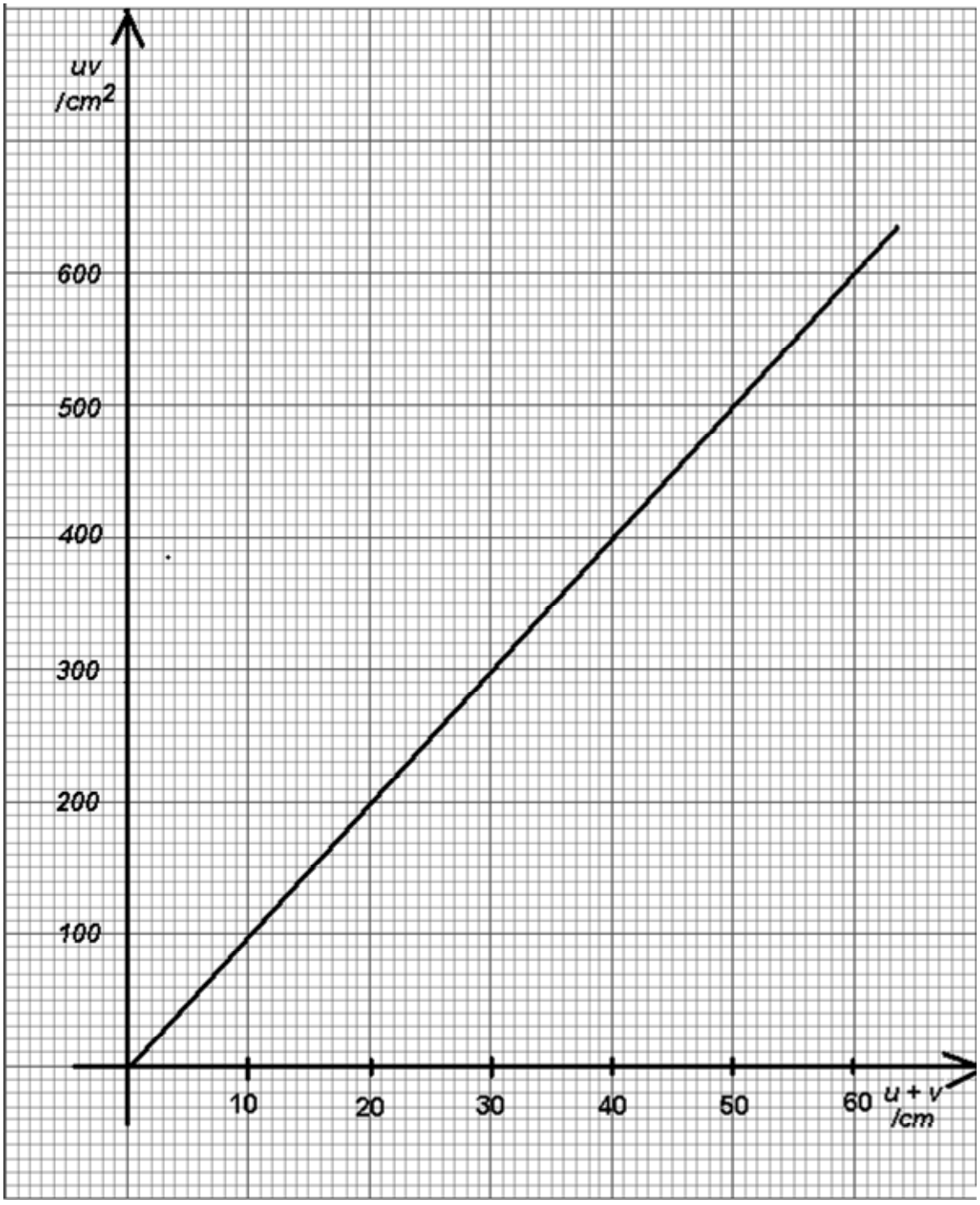


Diagram 2

Rajah 2

(c) u, v and the focal length, f of the convex lens can be related by the equation

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

Rearrange the equation to show the relationship between uv and u+v.

[3 marks]

u, v dan jarak focus, f bagi sebuah kanta cembung boleh dihubungkan seperti berikut ,

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

Susun semula persamaan tersebut untuk menunjukkan hubungan antara uv dengan u+v

[3 markah]

(d) From the equation in (c) and the value of the gradient of the graph, determine the focal length of the lens used. [4 marks]

Dari persamaan dalam (c) dan nilai kecerunan graf, tentukan jarak fokus kanta yang digunakan. *[4 markah]*

(e) State one precaution in the experiment. [1 mark]

Nyatakan satu langkah berjaga-jaga semasa menjalankan eksperimen. *[1 markah]*

3 Diagram 3.1 shows three balloons which were blown and tied to a string in the early morning for a sports day. Diagram 3.2 shows the appearance of the same balloons during the hot afternoon.

Rajah 3.1 menunjukkan tiga belon yang diisi dengan angin dan diikat pada awal pagi untuk hari sukan. Rajah 3.2 menunjukkan bentuk belon-belon tersebut semasa tengahari yang panas.

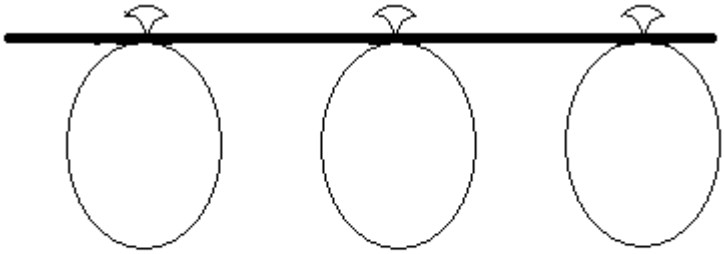


Diagram 3.1
Rajah 3.1

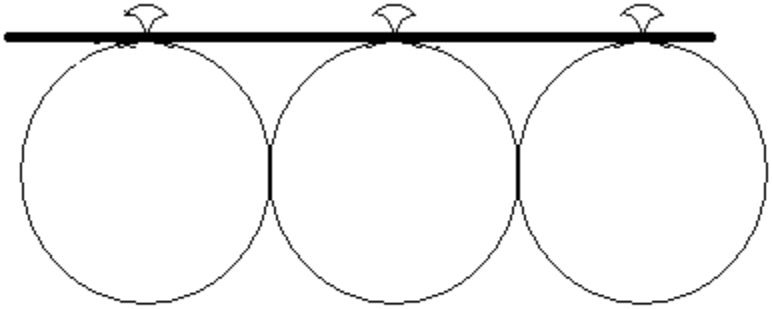


Diagram 3.2
Rajah 3.2

Observe the shape of the balloons in the morning and hot afternoon
Perhatikan bentuk belon-belon tersebut pada waktu pagi dan tengahari yang panas

Based on your observation,
Berdasarkan pemerhatian anda

(a) Make **one** suitable inference.
*Bina **sat**u inferens yang sesuai* [1 mark]

[1 markah]

(b) State **one** suitable hypothesis. [1 mark]
*Nyatakan **sat**u hipotesis yang sesuai.* *[1 markah]*

(c) With the use of apparatus such as a capillary tube closed at one end with some air trapped in it with a small column of oil, a tall beaker, a thermometer, a Bunsen burner, a tripod stand and gauze, a retort stand and clamp and other apparatus, describe an experimental framework to test your hypothesis.
Menggunakan peralatan seperti tiub kapilari yang tertutup di satu hujungnya dengan udara yang terperangkap oleh satu turus minyak, jangkasuhu, penunu Bunsen, tungku kaki tiga, dawai kasa, kaki retot dan pengepit dan peralatan,lain yang sesuai , jelaskan satu rangka ujikaji untuk menguji hipotesis anda

In your description, state clearly the following;
Didalam penjelasan anda, nyatakan dengan jelas yang berikut;

(i) The aim of the experiment,
Tujuan ujikaji.

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

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

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

(v) The procedure of the experiment, which includes the method of controlling the manipulated variable and the method of measuring the responding variable,
Prosedur ujikaji termasuk kaedah untuk mengawal pembolehubah manipulasi dan kaedah mengukur pembolehubah gerakbalas,

(vi) The way you tabulate the data,
Cara untuk menjadualkan data,

(vii) The way you analyze the data. [10 marks]
Cara untuk menganalisa data *[10 markah]*

4 Diagram 4.1 shows a light bulb which lights up when it is connected to a dry cell. Diagram 4.2 shows the same light bulb lights up with more brightness when it is connected to two dry cells.

Rajah 4.1 menunjukkan sebiji mentol menyala apabila disambungkan kepada sebiji sel kering. Rajah 4.2 menunjukkan mentol yang sama menyala dengan lebih cerah apabila disambungkan kepada dua biji sel kering.

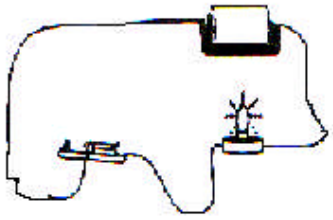


Diagram 4.1
Rajah 4.1

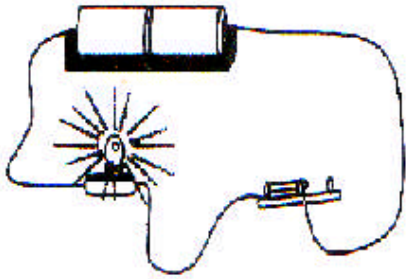


Diagram 4.2
Rajah 4.2

Based on the information and observation:

Berdasarkan maklumat dan pemerhatian di atas:

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

(b) State **one** suitable hypothesis.
*Nyatakan **satu** hipotesis yang sesuai.* [1 mark]
[1 markah]

(c) With the use of apparatus such as battery, bulb, ammeter, voltmeter and other apparatus, describe **one** experiment framework to investigate the hypothesis stated in 4(b).

In your description, state clearly the following:

Dengan menggunakan radas seperti sel kering, mentol, ammeter, voltmeter dan lain-lain radas, terangkan satu rangka kerja eksperimen untuk menyiasat hipotesis yang anda nyatakan dalam 4(b).

Dalam penerangan anda jelaskan perkara berikut:

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

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

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

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

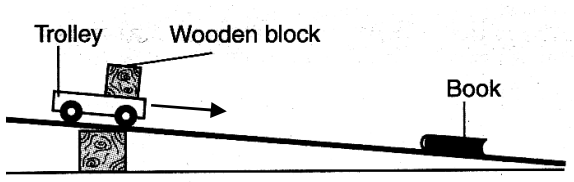
(v) The procedure of the experiment which should include **one** method of controlling the manipulated variable and **one** method of measuring the responding variable.
Prosedur eksperimen yang mesti termasuk satu kaedah mengawal pembolehubah dimanipulasikan dan satu kaedah mengukur pembolehubah bergerak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

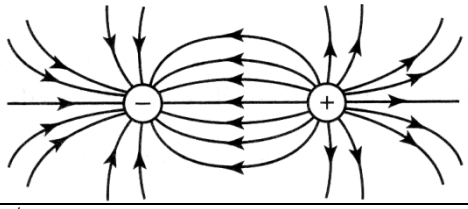
(vi) The way you tabulate the data.
Cara anda menjadualkan data.

(vii) The way you analyse the data.
Cara anda menganalisis data. [10 marks]
[10 markah]

END OF QUESTION PAPER

Marking Scheme Paper 2 Physics
Mid Year Melaka Form 5 2009

No	Marking Scheme	Mark
1(a)	Rate of change of displacement	1
(b)	The object stop	1
(c)	Line AB	1
(d)	Displacement / distance	1
	TOTAL	4
2(a)	A force is that which can cause an object with mass to change its velocity.	1
(b)	Show the correct value of horizontal force F_x = 30 cos 60° N = 15 N Show the correct substitution W = F x S = 15 x 10 = 150 J	 1 1 1
(c)	Place tyre under the box //wax the moving surface	1
	TOTAL	5
3(a)	Kelvin , K	1
(b)	To obtain two fix points high and low	1
(c)	Opaque / easy to see / does not stick	1
(d)	20.0 cm.	1
	1st : $\frac{16.9}{20.0} \times 100\%$ 2nd : = 84.5 °C	2
	TOTAL	6
4(a)		1
(b)(i)	1st Gravitational potential energy 2nd to kinetic energy	2
(b)(ii)	1st : momentum = 6 x 4 2nd : = 24 kg m s^{-1}	2
(c)(i)	Thrown forward	1
(c)(ii)	Inertia of the wooden block	1
	TOTAL	7
5(a)(i)	Same Volume Net force zero	1 1
(ii)	Y < X < Z	1
(b)(i)	Box Y floats and immersed partially / box X immersed fully and floats	1

	box Z sink	1
(ii)	Greater weight means greater mass and greater density The higher density object needs more volume to increase the buoyant force to support the weight .	1 1
(c)	Archimedes principle // equilibrium of forces	1
	TOTAL	8
6(a)	Image cannot be captured on the screen	1
(b)(i)	Image in Diagram 6.1 is > then Diagram 6.2	1
(b)(ii)	Equal // same	1
(b)(iii)	Image distance in Diagram 6.1 is further // > than in Diagram 5.2	1
(c)	The shorter the image distance the smaller the image //directly proportional	1
(d)	$m = \frac{v}{u}$	1
(e)(i) (ii)	blur not enough light	1 1
	TOTAL	8
7(a)(i)	Reflection	1
(a)(ii)	Equal	1
(b)	It has high frequency / high energy	1
(c)	1st : $s = \frac{vt}{2} = \frac{(1500)(0.05)}{2}$ 2nd : s = 37.5 m	2
(d)(i)	1st : At a higher place 2nd :Easier to receive the signal	2
(d)(ii)	Microwave	1
(d)(iii)	1st : increase the diameter of the device 2nd : receive more signals	2
	TOTAL	10
8(a)(i)	A region where a charge experiences electrical forces	1
(a)(ii)	 1st : Draw shape correctly 2nd : Mark direction correctly	1 1
(b)(i)	1st Q = It = 0.2 x 3 x 60 C 2nd : = 36 C	1 1
(b)(ii)	1st : n = Q/e = 36/1.9 x 10^{-19} = 1.89 x 10^{20}	1
(c)(i)	Extra high tension Produce higher strength of magnetic field	1 1
(c)(ii)	metal strong / good conductor	1 1
(d)	R	1

(e)	Non electrolyte	1
	TOTAL	12
9(a)	Pascal's principle states that pressure applied onto an enclosed liquid is transferred equally in all directions .	1
9(b)	1st : The input forces are equal 2nd : Surface area in table 9.1 is higher than in table 9.2 3rd : Output forces in table 9.1 is smaller than in table 9.2 4th : The pressure transmitted equally in both pistons and in all directions. 5th : The pressure transmitted in table 9.1 is higher than in table 9.2	5
(c)	1st : When the piston is pushed, valve P will close while valve Q will open. The pressure is transmitted to the big piston and a big force is produced. 2nd : When the piston is pulled up, valve P will open while valve Q will close. This will transmit the hydraulic liquid in the chamber to the space in the small cylinder. 3rd :When pushing and pulling is repeated, the load on the big piston is raised by using a small effort. 4th :The load is lowered by pressing on the release valve which allows the flow of the hydraulic fluid back into the chamber.	4
(d)	1st : the hydraulic brake fluid must not be compressible 2nd : the energy used to compress the brake fluid will make the brake system ineffective. 3rd : the hydraulic brake fluid must not evaporate easily 4th : so the user will not change the brake fluid frequently. 5th : example of brake fluid is oil 6th :Water cannot be used as a hydraulic brake fluid because water can evaporate easily and form water vapour bubbles. 7th : Air and water vapour can be compressed. 8th :Part of the force from the pressure is used to compress the water vapour. This will make the brake system ineffective. 9th :When the pedal is pressed, the pressure is transmitted through the hydraulic fluid to all the front and rear brakes. 10th : The surface area of the output piston is more than the surface area of the input system so that a big force is produced. 11th : The surface area of the pistons of the rear left and right brakes must be the same so that the pistons will produce the same force on the vehicles. 12th :The frictional forces between the brake shoe and the brake drum cause the vehicle to slow down or stop	10
	TOTAL	20
10(a)	Sound wave is a longitudinal waves.	1
10 (b)(i)	1st : The diameter of guitar string in Diagram 10.1 is smaller than diameter of the string in Diagram 10.2 2nd : The amplitude of the wave in Diagram 10.1 is the same as in Diagram 10.2	3

<table>
<tr><td></td><td>3rd : Number of oscillations in Diagram 10.1 is higher than in Diagram 10.2</td><td></td></tr>
<tr><td>10
(b)(ii)</td><td>When the diameter of the string increases , the frequency of the wave decreases</td><td>1</td></tr>
<tr><td>10
(b)(iii)</td><td>The higher the frequency , the higher the pitch of the sound</td><td>1</td></tr>
<tr><td>(c)</td><td>1st : When a tuning fork vibrates, air molecules will vibrate.
2nd : When the tuning fork moves forwards, the air is compressed.
3rd : When the tuning fork moves backwards, the air layers are pulled apart and cause a rarefraction.
4th : Therefore, a series of compression and rarefactions will produce sound.
5th : The sound energy is propagated through the air around it in the form of waves.</td><td>4</td></tr>
<tr><td>(d)</td><td>1st : Large diameter
2nd : receives more signal
3rd :The distance of signal receiver from the centre of the parabolic disc is same as the focal length
4th :Radar gives out parallel beam//signals focused to the receiver
5th :Use microwave wave
6th :High energy
7th :Short wavelength
8th :Easily reflected
9th :High frequency
10th :High energy / can travel at longer distance
11th :The position of the parabolic disc is high
12th :The signal is not blocked //much coverage//can detect signal
13th :Strong material
14th :Not easily broken</td><td>10</td></tr>
<tr><td></td><td>TOTAL</td><td>20</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>11(a)</td><td>To control the current</td><td>1</td></tr>
<tr><td>11(b)</td><td>Length of wire</td><td>1</td></tr>
<tr><td>11(c)</td><td>1st : current flows from A to B through the slider
2nd : slider is moved to change the length of wire
3rd : length of wire is directly proportional to current</td><td>3</td></tr>
<tr><td>11(d)</td><td><table>
<tr><td>Specification</td><td>explanation</td></tr>
<tr><td>1st : Density of wire is small</td><td>2nd : so it is lighter</td></tr>
<tr><td>3rd : Melting point is high</td><td>4th : so the wire will not melt at high temperature</td></tr>
<tr><td>5th : oxidation rate is low</td><td>6th : the wire can be used for a longer time</td></tr>
<tr><td>7th : resistivity is high</td><td>8th : more heat energy is produced</td></tr>
<tr><td>The best wire is M</td><td>Because the density is small, melting point is high, oxidation rate is low and resistivity is high.</td></tr>
</table></td><td>10</td></tr>
</table>

<table>
<tr><td></td><td></td><td></td></tr>
<tr><td>11(e)
(i)</td><td>Wire B</td><td>1</td></tr>
<tr><td>11(e)
(i)</td><td>1st : convert 60 mA to 60 x 10^{-3} A

2nd : $R_1 = \frac{6}{20 \times 10^{-3}} =$ 300 Ω

3rd : $R_2 = \frac{6}{60 \times 10^{-3}} = 100\,\Omega$

4th : 300 : 100
3 : 1</td><td>4</td></tr>
<tr><td></td><td>TOTAL</td><td>20</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>12(a)
(i)</td><td>Pressure is force per unit area</td><td>1</td></tr>
<tr><td>12(a)
(ii)</td><td>  </td><td>1</td></tr>
<tr><td>12(b)
(i)</td><td>1st : speed decreases
2nd : pressure increases</td><td>2</td></tr>
<tr><td>12(b)
(ii)</td><td>The shape of the paper is less curve</td><td>1</td></tr>
<tr><td>12(c)
(i)</td><td>Speed is the rate of change of distance</td><td>1</td></tr>
<tr><td>12(c)
(ii)</td><td>1st : The speed of air in the region between both vehicles is high.
2nd : According to Bernoulli’s principle, the pressure in the region between both vehicles will decrease.
3rd : The pressure on the rear sides of the vehicles is higher than the pressure in the region between both vehicles.
4th : Both vehicles will move closer to each other.</td><td>4</td></tr>
<tr><td>12(d)</td><td><table><tr><th>Specifications</th><th>Explanation</th></tr><tr><td>The aircraft’s wing has the shape of aerofoil.</td><td>To create a lift force</td></tr><tr><td>Engine capacity should be high</td><td>To give more power to the aircraft</td></tr><tr><td>Aircraft’s fan should have a large number of blades</td><td>To produce higher thrust force</td></tr><tr><td>Cargo space should be larger</td><td>Can carry more goods</td></tr></table></td><td>10</td></tr>
<tr><td></td><td>TOTAL</td><td>20</td></tr>
</table>

THE END OF MARKING SCHEME