4531/1
Fizik
Kertas 1
Ogos
2019
$1\frac{1}{4}$ jam

MAJLIS PENGETUA SEKOLAH MENENGAH MALAYSIA
NEGERI SEMBILAN

PROGRAM PENINGKATAN AKADEMIK TINGKATAN 5
SEKOLAH-SEKOLAH NEGERI SEMBILAN 2019

PHYSICS (*FIZIK*)

Paper 1 (*Kertas* 1)

One hour and fifteen minutes (*Satu jam lima belas minit*)

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Kertas soalan ini adalah dalam dwibahasa.*

2. *Soalan dalam Bahasa Inggeris mendahului soalan yang sepadan dalam Bahasa Melayu.*

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

Kertas soalan ini mengandungi 35 halaman bercetak

[*Lihat halaman sebelah*

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. Each question is followed by **three** or **four** options. Choose the best option for each question then blacken the correct space on the answer sheet.
*Setiap soalan diikuti dengan **tiga** atau **empat** pilihan jawapan. Pilih satu jawapan terbaik untuk setiap soalan dan hitamkan ruang 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 dilukis mengikut skala kecuali dinyatakan.

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

8. A list of formulae is provided on page 3.
Satu senarai formula disediakan di halaman 3.

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

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

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

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

4 Momentum $= mv$

5 $F = ma$

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

7 Gravitational potential energy /
Tenaga keupayaan graviti $= mgh$

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

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

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

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

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

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

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

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

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

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

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

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

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

21 $v = f\lambda$

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

23 $Q = It$

24 $E = VQ$

25 $V = IR$

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

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

28 $\frac{N_p}{N_s} = \frac{V_p}{V_s}$

29 Efficiency / *Kecekapan* $= \frac{V_s I_s}{V_p I_p} \times 100\%$

30 $E = mc^2$

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

32 1 a.m.u./ 1 u.j.a = 1.66×10^{-27} kg

1. Which of these quantities is a scalar quantity?
Kuantiti manakah antara berikut adalah kuantiti skalar?

A Weight
Berat

B Impulsive force
Daya impuls

C Speed of light
Laju cahaya

D Gravitational acceleration
Pecutan graviti

2. Diagram 2 shows the data analysis of a scientific investigation.
Rajah 2 menunjukkan analisis data bagi satu penyiasatan saintifik.

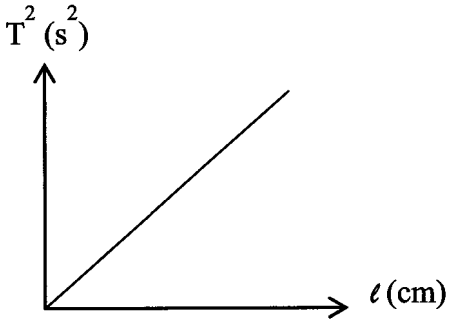


Diagram 2
Rajah 2

Which of the following are the correct variables for the investigation?
Manakah antara berikut adalah pemboleh ubah yang betul untuk penyiasatan tersebut?

	Manipulated variable ***Pemboleh ubah dimanipulasikan***	**Responding variable** ***Pemboleh ubah bergerak balas***	**Constant variable** ***Pemboleh ubah dimalarkan***
A	Mass of pendulum bob *Jisim ladung*	Period of oscillation *Tempoh ayunan*	Length of pendulum *Panjang bandul*
B	Length of pendulum *Panjang bandul*	Period of oscillation *Tempoh ayunan*	Mass of pendulum bob *Jisim ladung*
C	Mass of pendulum bob *Jisim ladung*	Time for 10 oscillation *Masa untuk untuk* 10 *ayunan*	Length of pendulum *Panjang bandul*
D	Length of pendulum *Panjang bandul*	Time for 10 oscillation *Masa untuk untuk* 10 *ayunan*	Mass of pendulum bob *Jisim ladung*

3. Diagram 3 shows a diamond. The density of the diamond is 3.51 g cm^{-3}.
What is its density in kg m^{-3}?
Rajah 3 menunjukkan satu berlian. Ketumpatan berlian itu ialah 3.51 g cm^{-3}.
Berapakah ketumpatannya dalam kg m^{-3}?

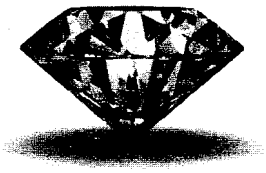


Diagram 3
Rajah 3

A 3.51 x 10^{6} kg m^{-3}
B 3.51 x 10^{3} kg m^{-3}
C 0.351 kg m^{-3}
D 3.51 x 10^{-3} kg m^{-3}

4. Diagram 4 shows a ball hung to a string.
Rajah 4 menunjukkan sebiji bola digantung pada tali.

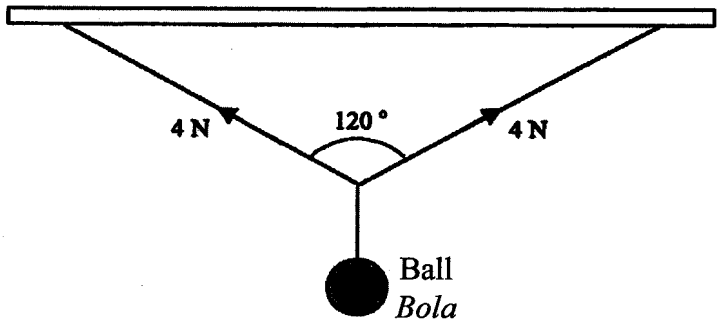


Diagram 4
Rajah 4

What is the mass of the ball?
Berapakah jisim bola itu?

A 0.2 kg
B 0.4 kg
C 2.0 kg
D 4.0 kg

5. Diagram 5 shows a track for 200 m event. An athlete has finished the race in 25 s.
Rajah 5 menunjukkan trek bagi acara larian 200 m. Seorang atlit telah menamatkan larian dalam acara tersebut dalam masa 25 s.

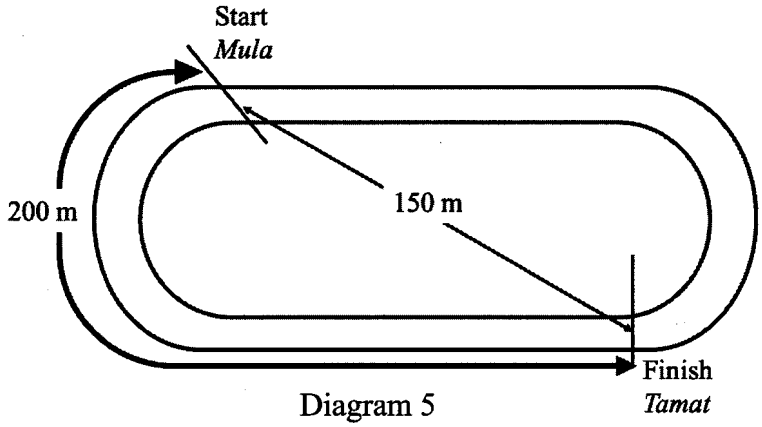


Diagram 5
Rajah 5

What is the velocity of the athlete?
Berapakah halaju atlit itu?

A 14 ms^{-1} **B** 8 ms^{-1}
C 6 ms^{-1} **D** 0.167 ms^{-1}

6. Diagram 6 shows a tape chart which is produced by a moving trolley. The frequency of the ticker-tape timer is 50 Hz and each strip of ticker tape contains 5 ticks.
Rajah 6 menunjukkan satu carta pita yang dihasilkan oleh sebuah troli yang bergerak. Frekuensi jangkamasa detik ialah 50 Hz dan setiap keratan pita detik mengandungi 5 detik.

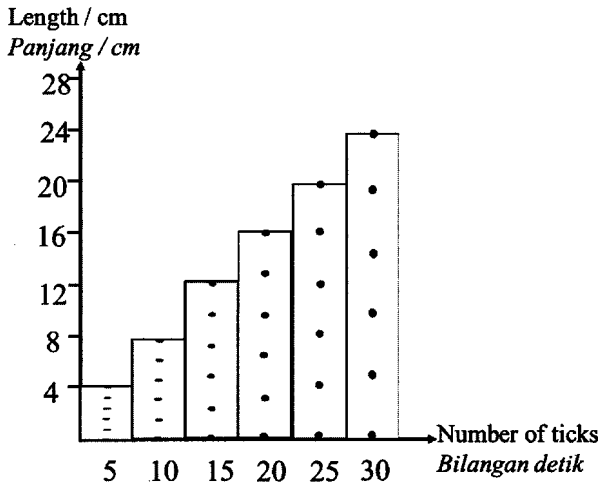


Diagram 6
Rajah 6

What is the acceleration of the trolley?
Berapakah pecutan troli tersebut?

A 40.00 cm s^{-2} **B** 333.33 cm s^{-2}
C 240.00 cm s^{-2} **D** 400.00 cm s^{-2}

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

A The object speeds up
Objek semakin laju
B The shape of the object changed
Bentuk objek berubah
C The mass of the object decreased
Jisim objek berkurang
D Direction of the object motion changed
Arah gerakan objek berubah

8. Diagram 9 shows a plasticine and a feather being dropped during the moon exploration.
Rajah 9 menunjukkan sebiji plastisin dan sehelai bulu pelepah dijatuhkan semasa penjelajahan bulan.

Golf ball
Bola golf

Feather
Bulu pelepah

Diagram 9
Rajah 9

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

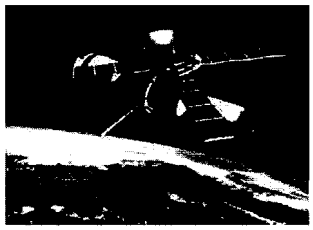
A The velocity of the plasticine and the feather are constant
Halaju plastisin dan bulu pelepah adalah malar
B The rate of change of velocity of the plasticine and the feather are the same
Kadar perubahan halaju bagi plastisin dan bulu pelepah adalah sama
C The momentum of the plasticine and the feather are the same
Momentum bagi plastisin dan bulu pelepah adalah sama
D The plasticine fell faster than the feather
Plastisin jatuh lebih laju berbanding dengan bulu pelepah

9. Which of the following situations shows the greatest kinetic energy of the object?
Situasi manakah yang menunjukkan tenaga kinetik objek yang paling besar?

A

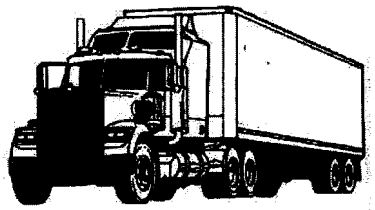
Mass of car = 800 kg
Jisim kereta = 800 *kg*
Speed = 70 ms^{-1}
Laju = 70 ms^{-1}

B



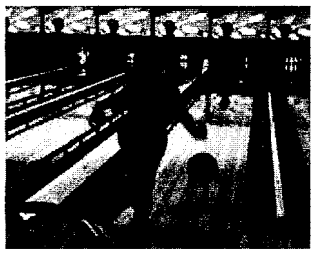
Mass of satellite = 50 kg
Jisim satelit = 50 *kg*
Speed = 100 ms^{-1}
Laju = 100 ms^{-1}

C



Mass of lorry = 5000 kg
Jisim lori = 5000 *kg*
Speed = 50 ms^{-1}
Laju = 50 ms^{-1}

D



Mass of bowling ball = 6 kg
Jisim bola boling = 6 *kg*
Speed = 10 ms^{-1}
Laju = 10 ms^{-1}

10. Diagram 10 shows a method to determine the resultant force of the two forces, P and Q.
Rajah 10 *menunjukkan kaedah untuk menentukan daya paduan bagi dua daya,* P *dan* Q.

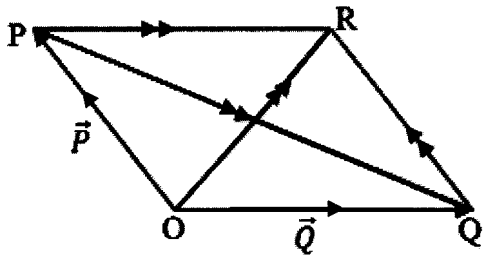


Diagram 10
Rajah 10

Which of the following represents the magnitude of the resultant force?
Yang manakah antara berikut mewakili magnitud daya paduan tersebut?

A PR
B RQ
C PQ
D OR

11. Diagram 11 shows a bird cage placed on three different arrangement of springs, P, Q and R consisting of identical springs.
Rajah 11 *menunjukkan satu sangkar burung diletakkan pada tiga susunan spring yang berbeza,* P, Q *dan* R *yang mengandungi spring-spring serupa.*

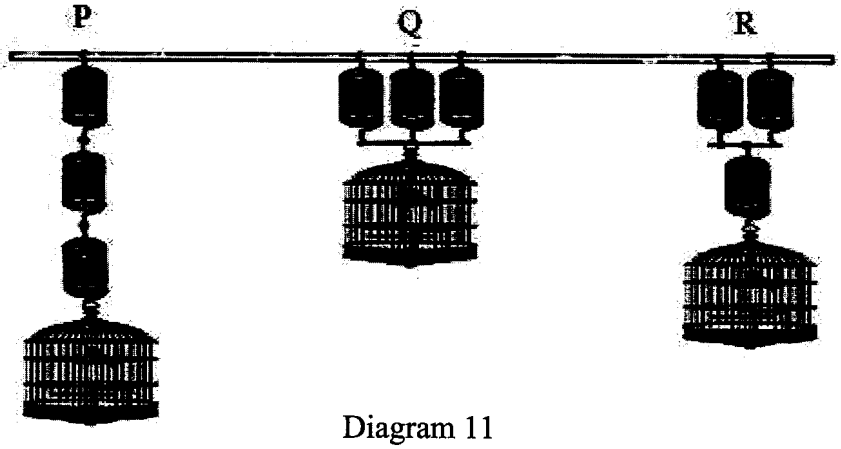


Diagram 11
Rajah 11

Which comparison is correct about the extension, x, of P, Q and R?
Perbandingan manakah yang betul tentang pemanjangan, x, *bagi* P, Q dan R?

A $x_P > x_R > x_Q$ **B** $x_Q > x_R > x_P$
C $x_R > x_Q > x_P$ **D** $x_P > x_Q > x_R$

12. Diagram 12 shows a closed end J-tube containing trapped gas. The pressure of the gas supports a column of mercury.
Rajah 12 *menunjukkan satu tiub-J hujung tertutup yang mengandungi udara terperangkap. Tekanan gas menyokong turus merkuri.*

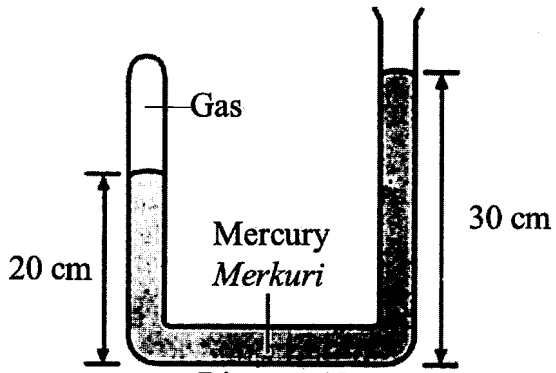


Diagram 12
Rajah 12

If the atmospheric pressure is 76 cm Hg, what is the pressure of the gas?
Jika tekanan atmosfera adalah 76 *cm Hg, berapakah tekanan gas?*

A 66 cm Hg **B** 86 cm Hg
C 96 cm Hg **D** 106 cm Hg

13. Diagram 13 shows a hydraulic brake system.
Rajah 13 *menunjukkan satu sistem brek hidraulik.*

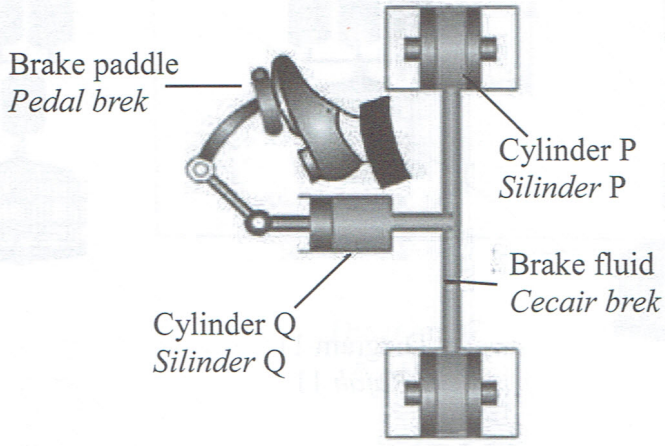


Diagram 13
Rajah 13

Which of the following is true when a force is applied to the brake paddle?
Yang manakah antara berikut adalah benar apabila suatu daya dikenakan ke atas pedal brek?

A Force acted on Q < Force acted on P
Daya yang bertindak ke atas Q < Daya yang bertindak ke atas P

B Force acted on Q > Force acted on P
Daya yang bertindak ke atas Q > Daya yang bertindak ke atas P

C Force acted on Q = Force acted on P
Daya yang bertindak ke atas Q = Daya yang bertindak ke atas P

14. Diagram 14 shows the apparatus is connected to a gas tap in order to measure the pressure of the gas. Tube R contains water and tube S contains some other liquid. The liquid levels in the tubes being originally at X.
Rajah 14 *menunjukkan radas yang disambung kepada satu pili gas bagi mengukur tekanan gas. Tiub R mengandungi air dan tiub S mengandungi cecair lain. Aras cecair di dalam kedua-dua tiub pada mulanya adalah di X.*

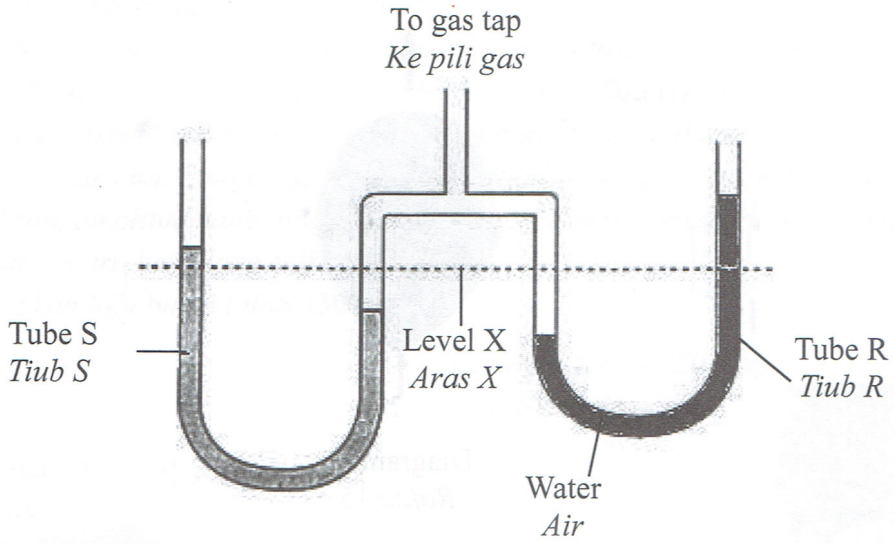


Diagram 14
Rajah 14

When the gas flows in, the water in the open tube of R rises to a higher level than the liquid in the open tube of S as shown in Diagram 14. This is because
Apabila gas dialirkan, air di dalam tiub terbuka R naik pada paras lebih tinggi daripada cecair di dalam tiub terbuka S seperti dalam Rajah 14. Ini disebabkan

A the liquid in S is denser than water.
cecair di S lebih tumpat daripada air

B tube R is closer to the gas inlet than tube S
tiub R lebih hampir dengan salur masuk gas daripada tiub S

C there is more liquid in tube S than in tube R.
terdapat lebih banyak cecair dalam tiub S daripada dalam tiub R.

D the pressure of the gas exerted on R is higher than the pressure of the gas exerted on S.
tekanan yang dikenakan ke atas R lebih tinggi daripada tekanan yang dikenakan ke atas S.

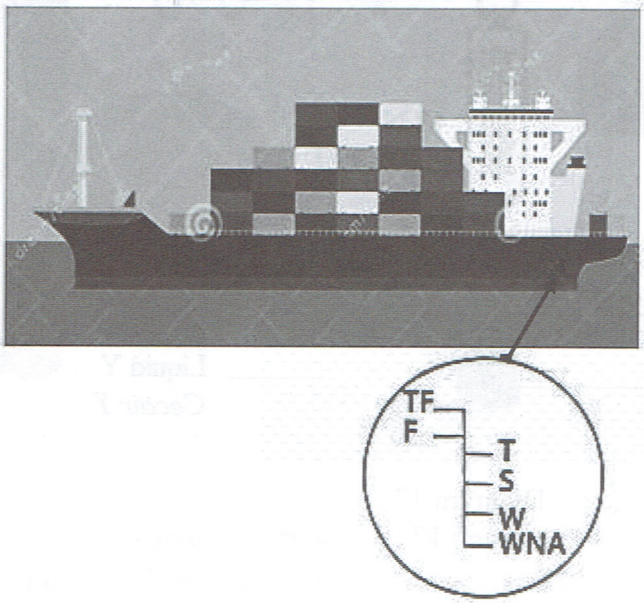
15. Diagram 15 shows, as a hydrogen balloon rises from ground level to an altitude of 300 m, its volume increases.
Rajah 15 *menunjukkan apabila sebuah belon hidrogen naik ke atas dari aras tanah kepada altitud* 300 *m, isipadunya bertambah.*

Diagram 15
Rajah 15

Which comparison is correct between the air pressure change that occur inside and outside the balloon?
Perbandingan yang manakah betul di antara perubahan tekanan udara yang berlaku di dalam belon dan udara di luar belon?

	Pressure changes in the balloon ***Perubahan tekanan gas dalam belon***	**Pressure change of air outside** ***Perubahan tekanan di luar belon***
A	Increase *Bertambah*	Decrease *Berkurang*
B	Decrease *Berkurang*	Increase Bertambah
C	No change *Tiada perubahan*	Decrease *Berkurang*
D	Decrease *Berkurang*	Decrease *Berkurang*

16. Diagram 16 shows a ship that sails on tropical water and the key for Plimsoll line. The Plimsoll line is a reference mark located on the ship's hull that indicates the maximum depth to which the vessel may be safely immersed when loaded with cargo.
Rajah 16 *menunjukkan sebuah kapal yang berlayar di perairan air tropika dan petunjuk garis Plimsoll. Garis Plimsoll adalah satu tanda rujukan pada badan kapal yang menunjukkan aras kedalaman maksimum untuk kapal terendam dengan selamat apabila ada muatan kargo.*



Key for Plimsoll line
Petunjuk Garis Plimsoll
TF = Tropical fresh
Air tawar tropika
F = Fresh water
Air tawar
T = Tropical water
Air tropika
S = Summer
Musim panas
W = Winter
Musim sejuk
WNA = Winter North Atlantic
Musim Sejuk Atlantik Utara

Diagram 16
Rajah 16

When this ship sails in tropical fresh water, the water level will rise to the level TF. Which of the following statements is true?
Apabila kapal ini berlayar di perairan air tawar tropika, aras air pada kapal akan meningkat ke paras TF. Pernyataan berikut yang manakah benar?

A Buoyant force in tropical fresh water > buoyant force in tropical water
Daya apungan di air tawar tropika > daya apungan air tropika.

B Buoyant force in tropical fresh water = buoyant force in tropical water
Daya apungan di air tawar tropika = daya apungan di air tropika.

C Volume of the tropical fresh water displaced < volume of tropical water displaced.
Isipadu air tawar tropika yang disesarkan < isipadu air tropika yang disesarkan

D Volume of the tropical fresh water displaced = volume of tropical water displaced.
Isipadu air tawar tropika yang disesarkan = isipadu air tropika yang disesarkan.

17. Diagram 17 shows a stone of weight 50 N is completely immersed in liquid Y. The weight of the stone shown on the spring balance is 48 N.
Rajah 17 *menunjukkan seketul batu yang beratnya* 50 N *direndamkan sepenuhnya ke dalam cecair Y. Berat batu yang ditunjukkan pada neraca spring ialah* 48 N.

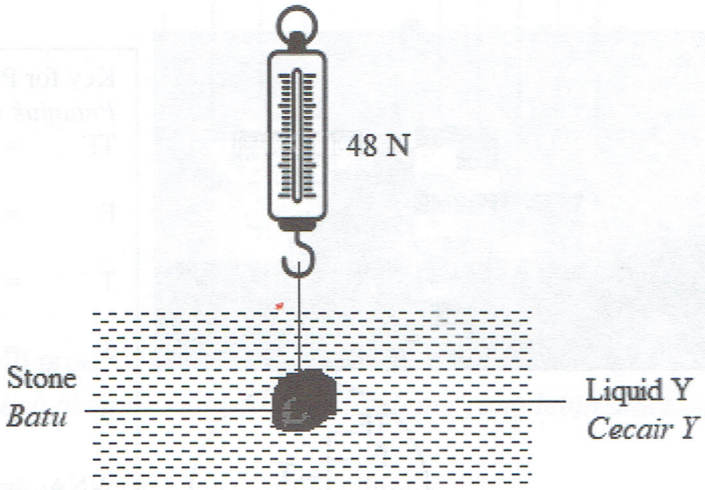


Diagram 17
Rajah 17

Calculate the volume of the stone that immersed in liquid Y.
[Density of the liquid Y = 2100 kg m^{-3}]
Hitung isi padu batu tersebut yang tenggelam dalam cecair Y.
[*Ketumpatan cecair Y* = 2100 kg m^{-3}]

A 95 cm^3 **B** 125 cm^3
C 2290 cm^3 **D** 2380 cm^3

18. Diagram 18 shows a liquid flows through a tube.
Rajah 18 *menunjukkan cecair mengalir melalui sebatang tiub.*

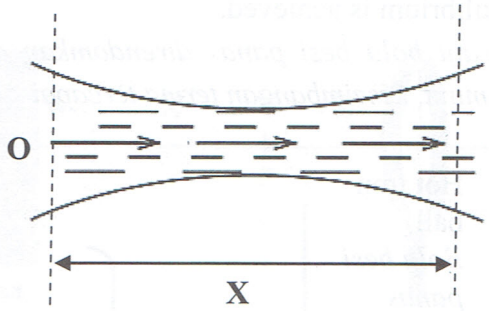
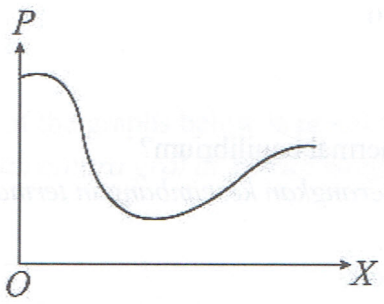


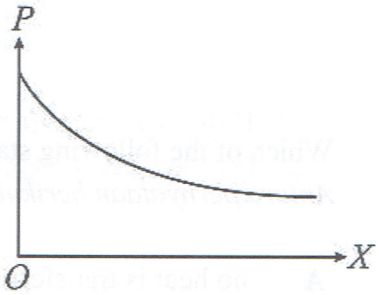
Diagram 18
Rajah 18

Which of the following graphs shows the variation of the liquid pressure, *P* flowing along the tube with distance, *X* from point *O*?
Antara graf yang berikut, manakah menunjukkan perubahan tekanan cecair, P yang mengalir sepanjang tiub dengan jarak, X dari titik O?

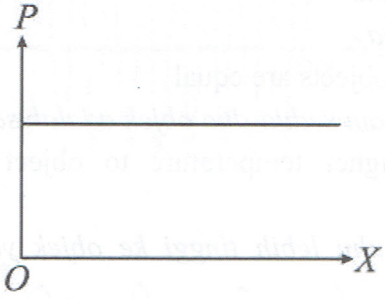
A



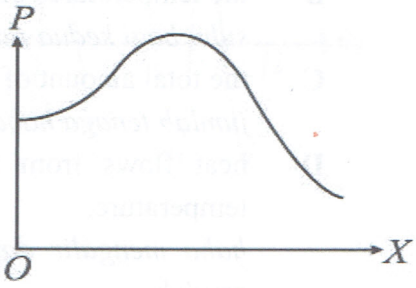
B



C



D



19. Diagram 19 shows a hot iron ball is immersed in water at temperature of 35 °C. After a few minutes, thermal equilibrium is achieved.
Rajah 19 *menunjukkan satu bola besi panas direndamkan dalam air yang bersuhu* 35 °C. *Selepas beberapa minit, keseimbangan terma tercapai .*

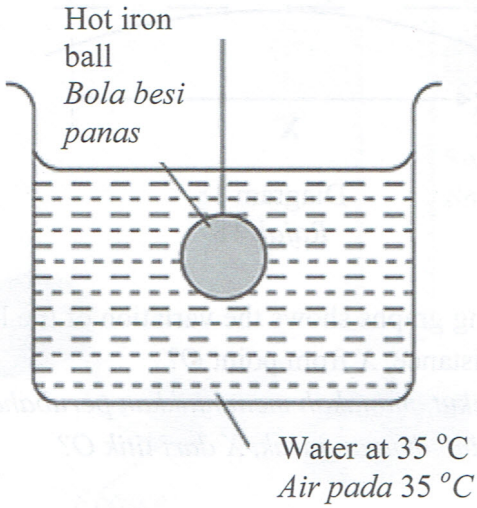


Diagram 19
Rajah 19

Which of the following statements describes thermal equilibrium?
Antara pernyataan berikut yang manakah menerangkan keseimbangan terma?

A no heat is transferred between two objects
tiada haba dipindahkan antara dua objek

B the temperatures of both objects are equal
suhu bagi kedua-dua objek adalah sama

C the total amount of heat stored in both objects are equal
jumlah tenaga haba yang disimpan dalam kedua-dua objek adalah sama

D heat flows from the object with higher temperature to object with lower temperature.
haba mengalir dari objek yang bersuhu lebih tinggi ke objek yang bersuhu rendah.

20. Table 1 shows the values of specific heat capacities of several substances.
Jadual 1 *menunjukkan nilai muatan haba tentu bagi beberapa bahan.*

Substance ***Bahan***	**Special heat capacity/ J kg^{-1} °C^{-1}** ***Muatan haba tentu*** **/ J kg^{-1} °C^{-1}**
Lead *Plumbum*	130
Iron *Besi*	450
Aluminium *Aluminium*	900

Table 1
Jadual 1

Which of the following statements is true about the thermal properties of lead, iron and aluminium based on Table 1?
Antara pernyataan yang berikut, manakah benar tentang sifat-sifat terma bagi plumbum, besi, dan aluminium berdasarkan Jadual 1*?*

A Aluminium has higher melting point than iron and lead.
Aluminium mempunyai takat lebur yang lebih tinggi daripada besi dan plumbum.

B Lead has lower specific latent heat of vaporisation than aluminium and iron.
Plumbum mempunyai haba pendam tentu pengewapan yang lebih rendah daripada aluminium dan besi.

C The rate of heat transfer of lead is lower than iron and aluminium.
Kadar pemindahan haba bagi plumbum adalah lebih tinggi daripada besi dan aluminium.

D The heat capacity of 1 kg of aluminium is higher than iron and lead of same mass at 100 °C.
Muatan haba bagi 1 *kg aluminium adalah lebih tinggi daripada besi dan plumbum bagi jisim yang sama pada suhu* 100 *°C.*

21. Diagram 21 shows 0.16 kg of water at temperature of 60 °C being poured into a glass filled with ice at 0 °C until it is fully melted.
Rajah 21 *menunjukkan* 0.16 *kg air pada suhu* 60 °C *dituangkan ke dalam gelas yang mengandungi ais pada suhu* 0 °C *sehingga semuanya melebur.*

Diagram 21
Rajah 21

What is the mass of the ice that melts?
[Specific latent heat of ice = 3.36×10^5 J kg^{-1}]
[Specific heat capacity of water = 4200 J kg^{-1} $°C^{-1}$]
[Assume no heat loss to the surrounding]
Berapakah jisim ais yang melebur?
[*Haba pendam tentu ais* = 3.36×10^5 *J* kg^{-1}]
[*Muatan haba tentu air* = 4200 *J* kg^{-1} $°C^{-1}$]
[*Anggap tiada kehilangan haba ke persekitaran*]

A 0.04 kg **B** 0.08 kg
C 0.12 kg **D** 0.16 kg

22. A closed container contains gas at temperature 25 °C and a pressure of 100 kPa. If the gas is heated to 40 °C, what is the pressure of the gas?
Sebuah bekas tertutup berisi udara pada suhu 25 °C *dan tekanan* 100 kPa. *Sekiranya gas tersebut dipanaskan kepada* 40 °C, *berapakah tekanan gas tersebut?*

A 62.5 kPa **B** 95.0 kPa
C 105 kPa **D** 160 kPa

23. The focal length of a concave mirror is *f*. What are the characteristics of the image if the object is placed 1.5*f* from the mirror?
Panjang fokus suatu cermin cekung adalah f. Apakah ciri-ciri imej jika objek diletakkan 1.5f dari cermin itu?

A Real and diminished
Nyata dan disongsangkan
B Virtual and magnified
Maya dan dibesarkan
C Real and inverted
Nyata dan disongsangkan
D Virtual and diminished
Maya dan dikecilkan

24. Diagram 24.1 shows a light ray propagate from medium X to medium Y.
Diagram 24.2 shows a light ray propagate from medium X to medium Z.
Rajah 24.1 *menujukkan satu sinar cahaya merambat dari medium X ke medium Y*
Rajah 24.2 *menujukkan satu sinar cahaya merambat dari medium X ke medium Z.*

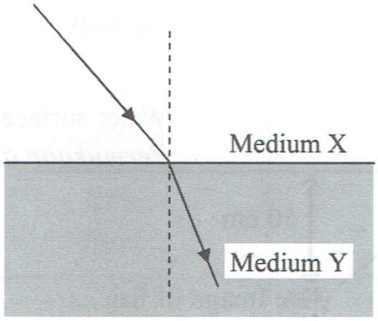


Diagram 24.1
Rajah 24.1

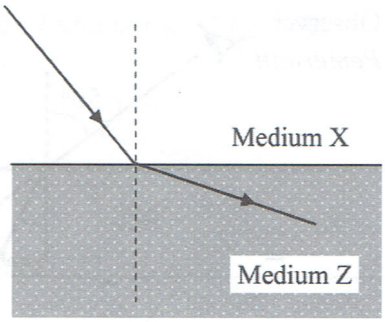


Diagram 24.2
Rajah 24.2

Arrange the optical density of the medium, in ascending order.
Susun ketumpatan optik medium dalam urutan menaik.

A Z, X, Y
B Y, X, Z
C Z, Y, X
D X, Y, Z

25. Diagram 25 shows the pathway of a light ray from air to a glass prism.
Rajah 25 *menunjukkan lintasan sinar cahaya dari udara ke satu prisma kaca.*

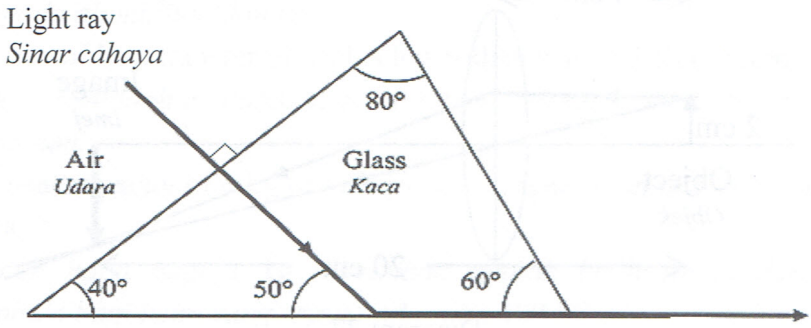


Diagram 25
Rajah 25

What is the critical angle of the glass prism?
Berapakah sudut genting bagi prisma kaca?

A 60°
B 40°
C 50°
D 80°

26. Diagram 26 shows an observer looking at the image of a fish 50 cm from the water surface.
Rajah 26 menunjukkan seorang pemerhati melihat imej seekor ikan 50 cm dari permukaan air.

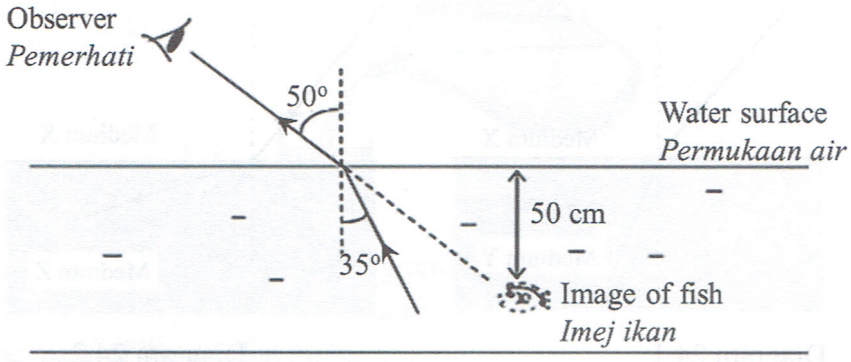


Diagram 26
Rajah 26

What is the actual depth of the fish?
Apakah dalam nyata ikan tersebut?

A 26.7 cm
B 37.4 cm
C 66.8 cm
D 71.4 cm

27. Diagram 27 shows the formation of an image by a convex lens.
Rajah 27 menunjukkan pembentukan imej bagi sebuah kanta cembung.

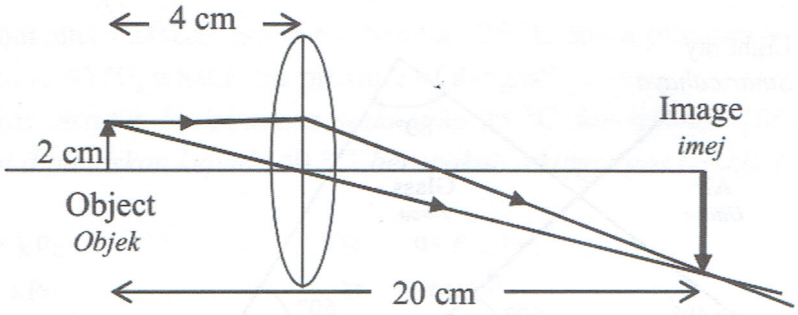


Diagram 27
Rajah 27

If the height of the object is 2 cm, what is the height of the image?
Jika tinggi objek ialah 2 cm, berapakah tinggi imej?

A 4.0 cm
B 5.0 cm
C 8.0 cm
D 10.0 cm

28. Diagram 28 shows a student using a magnifying glass to read a map.
Rajah 28 menunjukkan seorang pelajar menggunakan sebuah kanta pembesar untuk membaca peta.

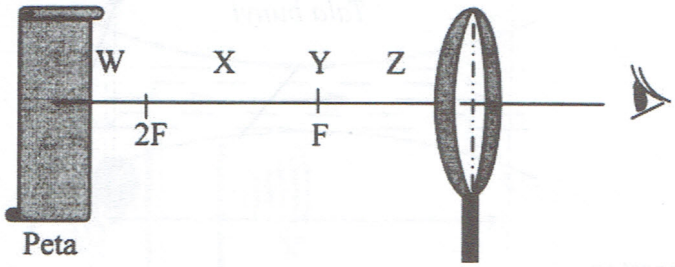


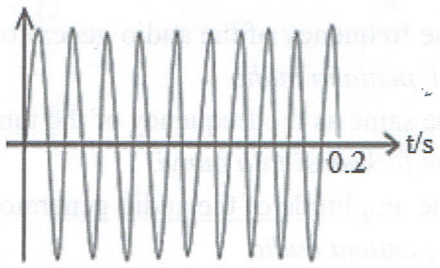
Diagram 28
Rajah 28

Which of the following position, W, X, Y and Z, is the best to place the map?
Manakah antara posisi yang berikut, W, X, Y *dan* Z *merupakan kedudukan terbaik untuk meletakkan peta itu*?

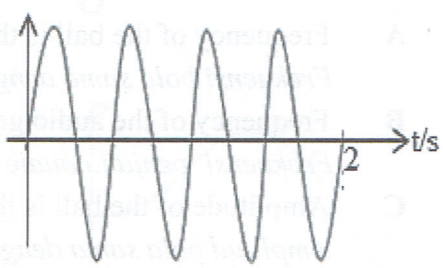
A W
B X
C Y
D Z

29. Which of the graphs below is produced by a vibrator with frequency of 50 Hz?
Manakah antara graf di bawah yang dihasilkan oleh penggetar dengan frekuensi 50 Hz?

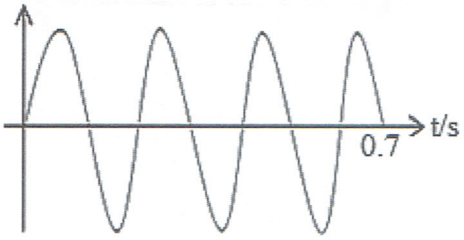
A



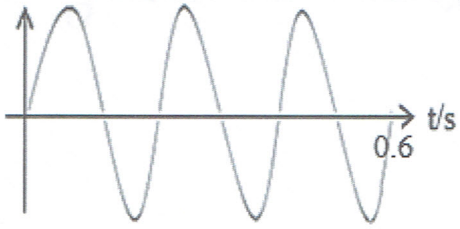
B



C



D



30. Diagram 30 shows when the audio generator is switched on, the ball oscillates.
Rajah 30 *menunjukkan apabila penjana audio dihidupkan, bola berayun.*

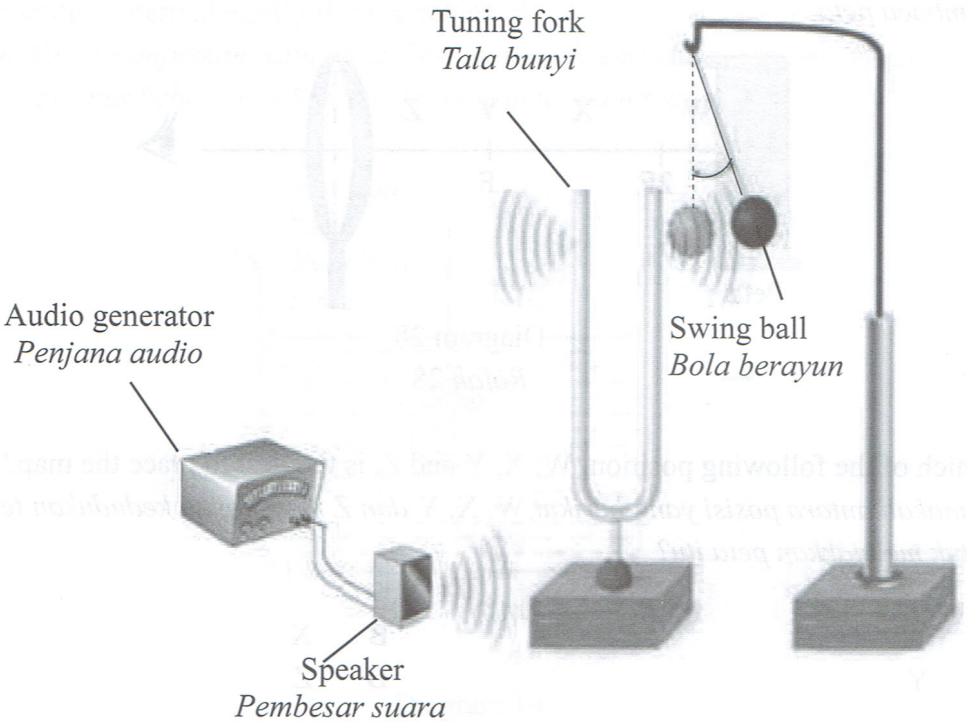


Diagram 30
Rajah 30

Which of the statements is correct about the situation?
Penyataan manakah yang benar berkaitan situasi tersebut?

A Frequency of the ball is the same as the frequency of the audio generator
Frekuensi bola sama dengan frekuensi penjana audio

B Frequency of the audio generator is the same as the frequency of the tuning fork
Frekuensi penjana audio sama dengan frekuensi tala bunyi.

C Amplitude of the ball is the same as the amplitude of the audio generator
Amplitud bola sama dengan amplitud penjana audio

D Amplitude of the audio generator is same as the amplitude of the tuning fork
Amplitud penjana audio sama amplitud dengan tala bunyi

31. Diagram 31 shows two students hit a drum and blow a whistle.
Rajah 31 *menunjukkan dua orang pelajar yang sedang memukul dram dan meniup wisel.*

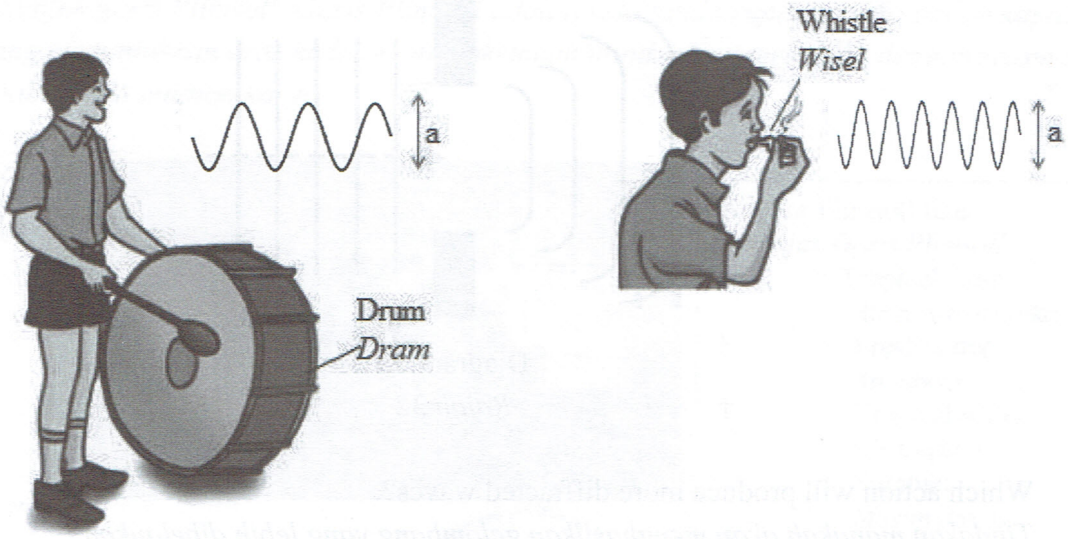


Diagram 31
Rajah 31

Which of the statements is **true** about the two situations.
Penyataan manakah adalah **benar** *berkaitan dengan dua situasi di atas.*

A Drum has higher loudness than whistle.
Bunyi dram lebih nyaring dari bunyi wisel

B Whistle has higher loudness than drum.
Bunyi wisel lebih nyaring dari bunyi dram

C Drum has higher pitch than whistle.
Bunyi dram lebih langsing dari bunyi wisel

D Whistle has higher pitch than drum.
Bunyi wisel lebih langsing dari bunyi dram

32. Diagram 32 shows water waves being diffracted after passing through a slit.
Rajah 32 menunjukkan gelombang air dibelaukan selepas melalui satu celah.

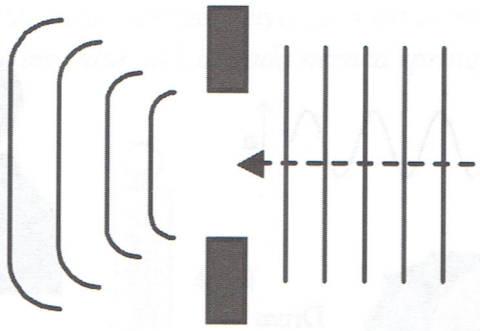


Diagram 32
Rajah 32

Which action will produce more diffracted waves?
Tindakan manakah akan menghasilkan gelombang yang lebih dibelaukan?

A Meningkatkan the frequency of the vibrator
Meningkatkan frekuensi penggetar

B Decrease the wavelength
Mengurangkan panjang gelombang

C Increase the frequency of the wave
Menambahkan frekuensi gelombang tersebut

D Decrease the size of the slit
Mengurangkan saiz celah

33. Two coherent speakers are placed beside one to another at 50 cm and produced sounds at a frequency of 1500 Hz. A student hold a microphone and walks along a path 2.0 m in front of the loudspeakers. The student noticed that in every few centimeters the microphone is moved, the amplitude displayed on the CRO have a maximum and minimum reading alternately.
[Assume the speed of sound is 330 m s^{-1}]
Dua pembesar suara yang koheren diletakkan bersebelahan antara satu sama lain sejauh 50 cm dan menghasilkan bunyi berfrekuensi 1500 Hz. *Seorang pelajar memegang mikrofon dan berjalan pada satu garis lurus pada jarak* 2.0 *m di hadapan pembesar suara itu. Pelajar itu mendapati setiap beberapa centimeter mikrofon digerakkan, amplitud yang dipaparkan pada OSK mempunyai bacaan maksimum dan minimum secara berselang seli.*
[*Anggapkan laju bunyi ialah* 330 m s^{-1}]

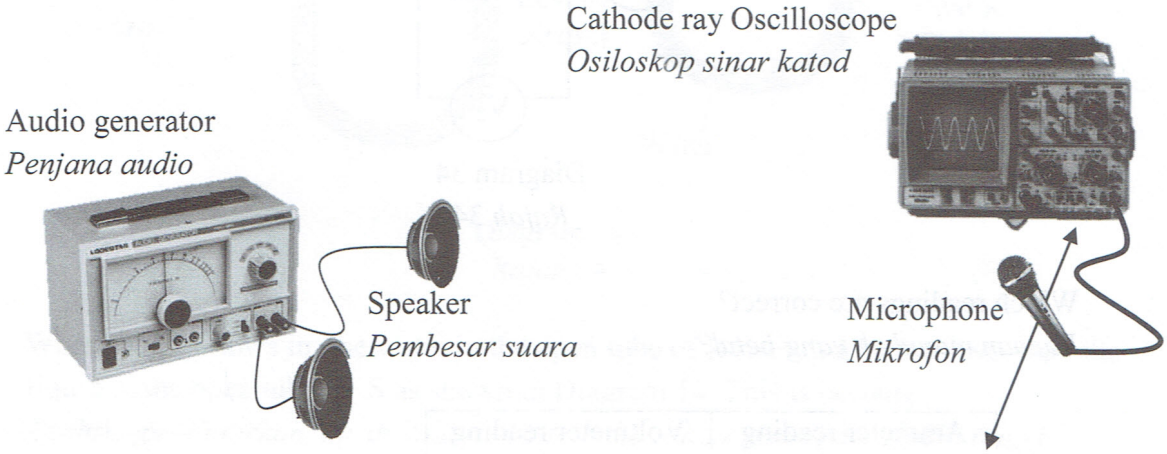


Diagram 33
Rajah 33

What is the distance between the two consecutive maximum amplitude detected by the microphone?
Berapakah jarak antara dua amplitud maksimum yang berturutan yang dikesan oleh mikrofon tersebut?

A 44.0 cm
B 0.22 cm
C 88.0 cm
D 5.5 cm

34. Diagram 34 shows a part of an electrical circuit. Current flows into a junction where two resistors are connected in parallel. I_1 and I_2 are the readings of ammeters, V_1 and V_2 are the readings of the voltmeters.
Rajah 34 menunjukkan sebahagian satu litar elektrik. Satu arus mengalir ke suatu simpang yang mana dua perintang disambung secara selari. I_1 dan I_2 ialah bacaan ammeter V_1 dan V_2 ialah bacaan voltmeter.

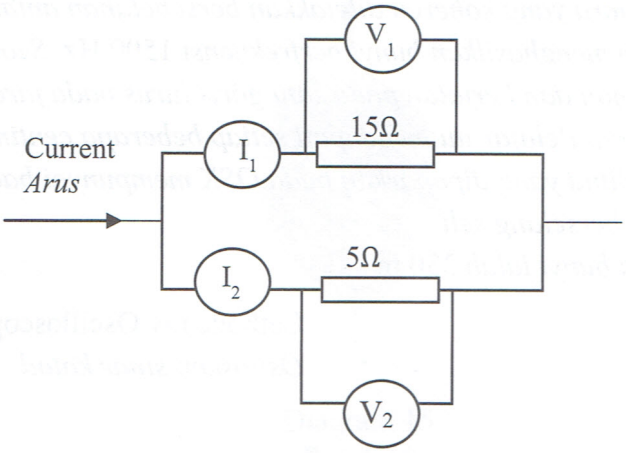


Diagram 34
Rajah 34

Which readings are correct?
Bacaan manakah yang betul?

	Ammeter reading *Bacaan ammeter*	Voltmeter reading *Bacaan voltmeter*
A	$I_1 < I_2$	$V_1 > V_2$
B	$I_1 > I_2$	$V_1 = V_2$
C	$I_1 = I_2$	$V_1 < V_2$
D	$I_1 < I_2$	$V_1 = V_2$

35. The following electrical appliances operate from the same voltage supply at the stated duration. Which electrical appliances consume the least electrical energy?
Peralatan elektrik berikut beroperasi daripada bekalan voltan yang sama pada tempoh yang dinyatakan. Peralatan elektrik manakah yang menggunakan tenaga elektrik yang paling rendah?

	Electrical appliance ***Peralatan elektrik***	**Power rating** ***Kadar kuasa***	**Duration of usage** ***Tempoh penggunaan***
A	Electric Kettle *Cerek elektrik*	2 kW	5 minutes 5 min
B	Steam Iron *Seterika Wap*	1800 W	10 minutes 10 min
C	Television *Televisyen*	60 W	5.8 hours 5.8 *jam*
D	Computer *Komputer*	40 W	0.6 day 0.6 *hari*

36. Diagram 36 shows an electric circuit.
Rajah 36 menunjukkan satu litar elektrik.

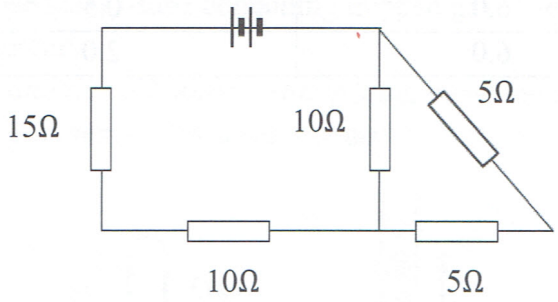


Diagram 36
Rajah 36

Calculate the effective resistance in this circuit.
Hitung rintangan berkesan dalam litar ini.

A 30 Ω
B 35 Ω
C 40 Ω
D 45 Ω

37. Diagram 37 shows a graph of potential difference, V against current, I of a dry cell.
Rajah 37 *menunjukkan graf beza keupayaan,*V *melawan arus,* I *bagi suatu sel kering.*

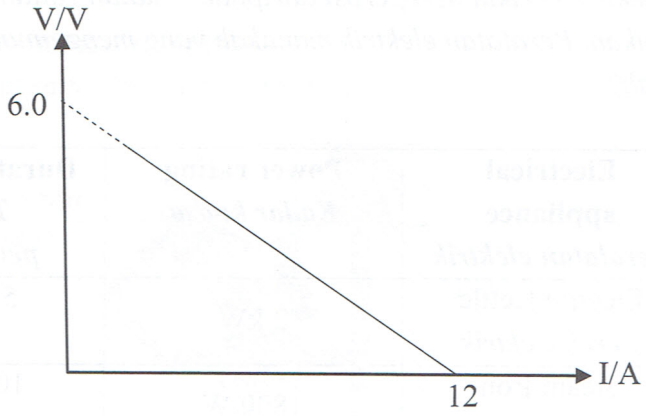


Diagram 37
Rajah 37

Which is the following is correct about the dry cell?
Antara berikut yang manakah benar mengenai sel kering itu?

	Electromotive force / V *Daya gerak elektrik/* **V**	**Internal resistance/Ω** *Rintangan dalam/Ω*
A	3.0	0.5
B	3.0	2.0
C	6.0	0.5
D	6.0	2.0

38. Diagram 38 shows the arrangement of apparatus to investigate the strength of an electromagnet.
Rajah 38 *menunjukkan susunan radas untuk mengkaji kekuatan suatu elektromagnet.*

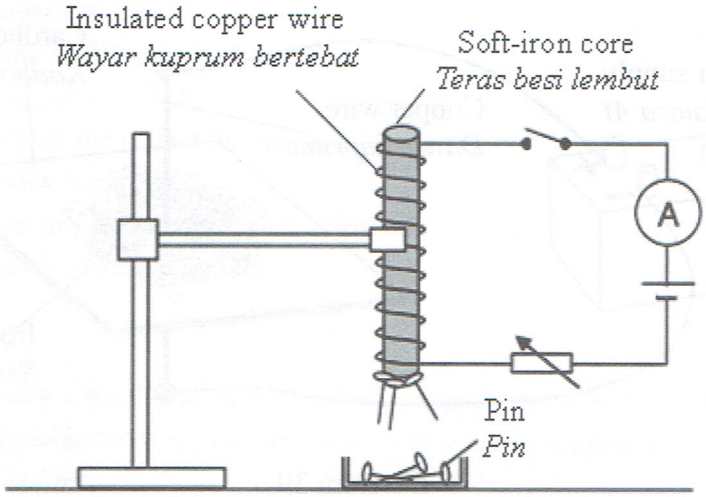


Diagram 38
Rajah 38

The number of pins attracted to the rod can be increased by
Bilangan pin yang tertarik ke arah rod besi lembut boleh ditambah dengan

I increasing the thickness of copper wire.
menambahkan ketebalan wayar kuprum.
II increasing the number of turns of the coil.
menambahkan bilangan lilitan gegelung.
III decreasing the resistance of the rheostat.
mengurangkan rintangan rheostat.

A I and II
I *dan* II
B I and III
I *dan* III
C II and III
II *dan* III
D I, II and III
I, II *dan* III

39. Diagram 39 shows an electrical circuit to investigate the magnetic field produced by a current. Some iron filings are sprinkled on the cardboard.
Rajah 39 menunjukkan suatu litar elektrik untuk menyiasat medan magnet yang dihasilkan oleh arus elektrik. Sedikit serbuk besi ditaburkan di atas kadbod.

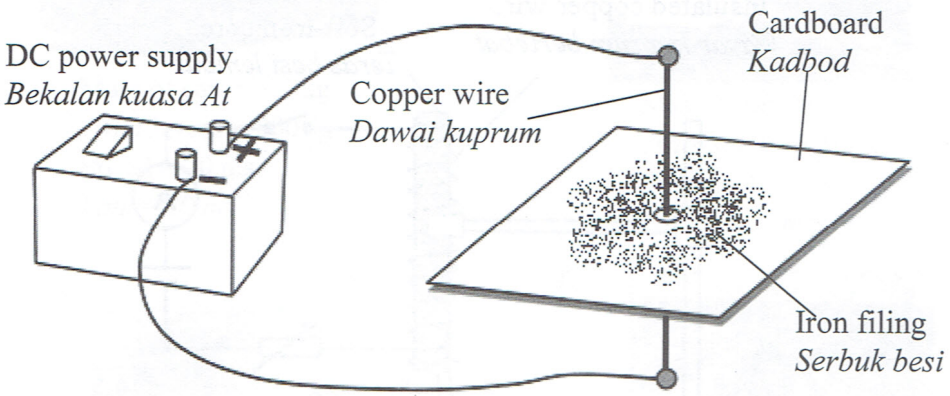
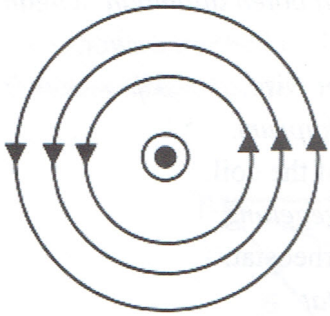


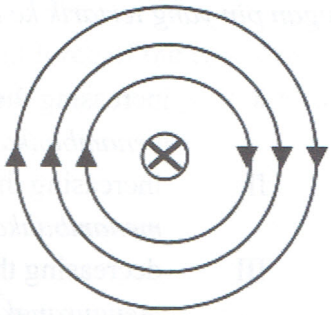
Diagram 39
Rajah 39

What is the pattern and direction of the magnetic field?
Apakah corak dan arah bagi medan magnet tersebut?

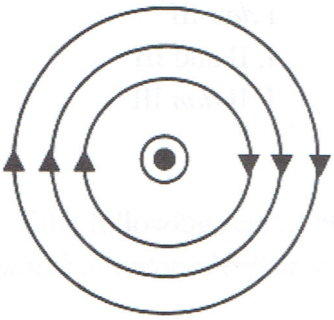
A



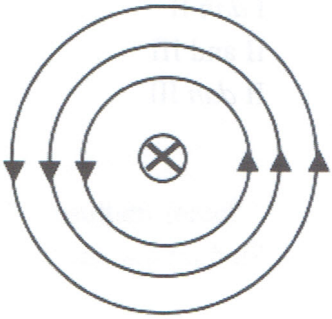
B



C



D



40. Diagram 40 shows an experimental set-up where a bar magnet is placed near a solenoid which is connected to a galvanometer.
Rajah 40 *menunjukkan satu susunan radas di mana satu magnet bar diletakkan berdekatan dengan satu solenoid yang disambung kepada satu galvanometer.*

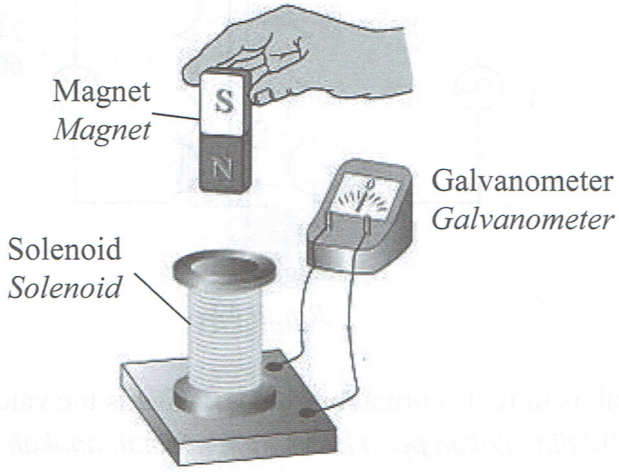


Diagram 40
Rajah 40

Which of the following actions will **not** produce deflection of the galvanometer?
Antara tindakan berikut, yang manakah **tidak** *akan menghasilkan pesongan pada galvanometer?*

A Moving the magnet towards the solenoid.
Gerakkan magnet ke arah solenoid.
B Moving the solenoid towards the magnet.
Gerakkan solenoid ke arah magnet.
C Both the magnet and solenoid are moved with the same velocity.
Kedua-dua magnet dan solenoid digerakkan dengan halaju yang sama.
D Both the magnet and solenoid are moved towards each other.
Kedua-dua magnet dan solenoid digerakkan ke arah antara satu sama lain.

41. A power station generates 50 MW of power at a voltage of 500 kV. If the resistance of the cable is 20 Ω per km, calculate the power loss due to the 300 km length of transmission cable.
Satu stesen kuasa menjanakan kuasa 50 MW pada voltan 500 kV. Jika rintangan kabel ialah 20 Ω *per km, hitungkan kehilangan kuasa yang disebabkan oleh kabel penghantaran yang sepanjang 300 km.*

A 60 MW
B 600 kW
C 1250 kW
D 1250 MW

42. Diagram 42 shows an ideal transformer.
Rajah 42 menunjukkan transformer ideal

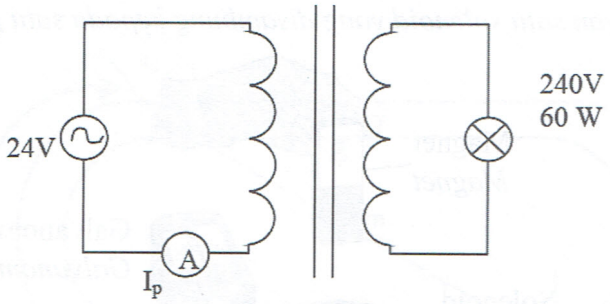


Diagram 42
Rajah 42

If the 60 W bulb is lit to its normal brightness, what is the value of the input current Ip?
Jika mentol 60W dinyalakan pada kecerahan normal, apakah nilai arus primer, Ip?

A 0.025 A
B 0.1 A
C 0.25 A
D 2.5 A

43. Diagram 43 shows the main structure of a cathode ray oscilloscope (CRO).
Rajah 43 menunjukkan struktur utama bagi osiloskop sinar katod (OSK).

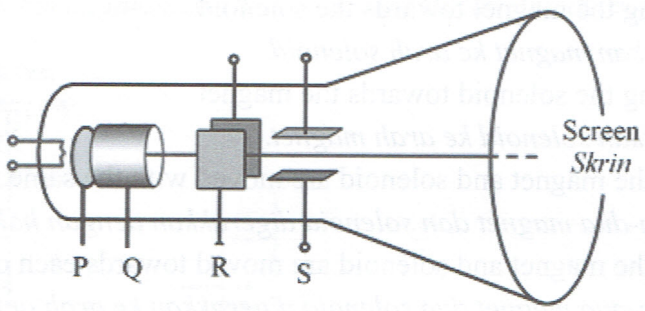


Diagram 43
Rajah 43

Which part of the CRO cause deflection in the vertical direction when a voltage is applied across them?
Manakah bahagian OSK menyebabkan pesongan menegak apabila voltan dikenakan diantaranya?

A P
B R
C Q
D S

44. Diagram 44 shows two diodes which are connected in parallel in a circuit.
Rajah 44 *menunjukkan dua diod disambung secara selari dalam satu litar.*

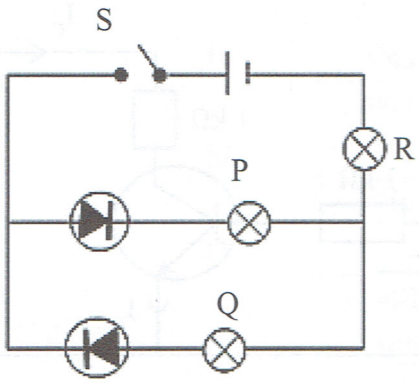


Diagram 44
Rajah 44

When switch S is closed, which bulb/bulbs will light up?
Apabila suis S *ditutup, mentol manakah yang akan menyala?*

A R only
R *sahaja*

B P only
P *sahaja*

C P and Q
P *dan* Q

D P and R
P *dan* R

45. Diagram 45 shows a logic gate circuit which has input signals at R and S of 1100 and 1001 respectively.
Rajah 45 *menunjukkan satu litar get logik dengan isyarat input* R *dan* S masing-masing ialah 1100 *dan* 1001.

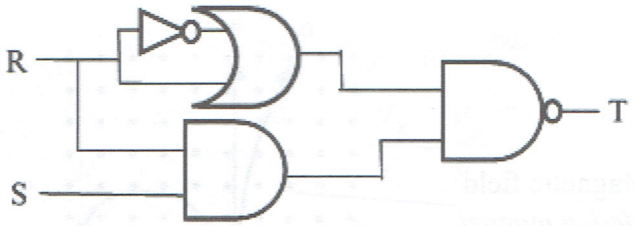


Diagram 45
Rajah 45

What is the output signal at T?
Apakah isyarat output di T?

A 1100

B 1110

C 0111

D 0011

46. Diagram 46 shows a transistor circuit.
Rajah 46 menunjukkan satu litar transistor.

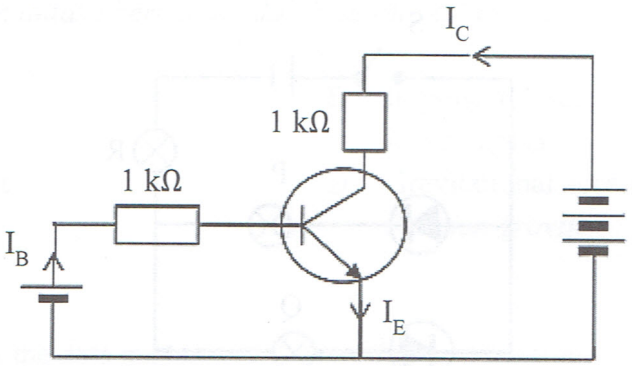


Diagram 46
Rajah 46

Which of the following is correct regarding the flow of current I_B, I_C, and I_E, in the circuit of that diagram?
Antara yang berikut, manakah benar berdasarkan arus yang mengalir I_B, I_C dan I_E dalam litar dalam rajah tersebut?

A $I_E > I_C > I_B$ **B** $I_E > I_B > I_C$
C $I_C > I_E > I_B$ **D** $I_C > I_B > I_E$

47. Based on diagram 47, which of the following correctly describe the ionizing power of alpha, beta and gamma radiation in ascending order?
Berdasarkan rajah 47, yang manakah antara berikut menerangkan dengan betul kuasa pengionan sinaran alfa, beta dan gama mengikut susunan menaik?

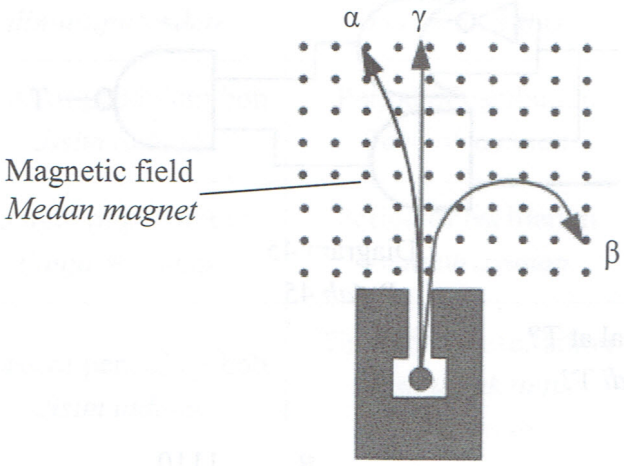


Diagram 47
Rajah 47

A α, γ, β **B** γ, β, α
C α, β, γ **D** γ, α, β

48. Which radioisotope is most suitable to be used as a tracer to study the plant growth?
Radioisotop manakah yang paling sesuai untuk digunakan sebagai penyurih untuk mengkaji pertumbuhan tumbuhan?

	Radioisotope ***Radioisotop***	**Half-life** ***Separuh hayat***
A	Phosphorus-32 *Fosforus*-32	14.3 days 14.3 *hari*
B	Iodine-131 *Iodin*-131	8 days 8 *hari*
C	Krypton-8 *Kripton*-8	3.16 minutes 3.16 *minit*
D	Arsenic-72 *Arsenik*-72	18 days 18 *hari*

49. Sodium-24 has a half-life of 15 hours. How much Sodium-24 has been decayed in a 180 g samples after 90 hours?
Natrium-24 mempunyai separuh hayat 15 *jam. Berapa banyakkah Natrium*-24 *yang telah mereput dalam sampel* 180 *g selepas* 90 *jam?*

A 30.00 g
B 2.81 g
C 177.19 g
D 150.00 g

50. During a nuclear fission, the amount of energy released is 5.38×10^{-13} J. What is the mass defect occurred due to the process?
Dalam suatu pembelahan nukleus, jumlah tenaga yang dibebaskan adalah 5.38×10^{-13} J. *Berapakah cacat jisim yang terjadi akibat proses tersebut?*
[1 u = 1.66×10^{-27} kg, c = 3.00×10^{8} ms^{-1}]

A 5.9778×10^{-30} u
B 0.003601 u
C 1.0803×10^{24} u
D 1.0803×10^{-24} u

END OF QUESTION PAPER
KERTAS SOALAN TAMAT