LEMBAGA PEPERIKSAAN
KEMENTERIAN PELAJARAN MALAYSIA

SIJIL PELAJARAN MALAYSIA 2013

4531/1

PHYSICS
Kertas 1
Nov./Dis.
$1\frac{1}{4}$ jam

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 belakang kertas soalan ini.*

Kertas soalan ini mengandungi 45 halaman bercetak dan 3 halaman tidak bercetak.

[*Lihat halaman sebelah*

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. $\rho = \frac{m}{V}$
10. Pressure / *Tekanan*, $p = h\rho g$
11. Pressure / *Tekanan*, $p = \frac{F}{A}$
12. Heat / *Haba*, $Q = mc\theta$
13. Heat / *Haba*, $Q = ml$
14. $\frac{pV}{T}$ = constant / *pemalar*
15. $E = mc^2$
16. $v = f\lambda$
17. Power, $P = \frac{\text{energy}}{\text{time}}$

    Kuasa, $P = \frac{tenaga}{masa}$
18. $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$

19. $\lambda = \dfrac{ax}{D}$

20. $n = \dfrac{\sin i}{\sin r}$

21. $n = \dfrac{\text{real depth}}{\text{apparent depth}}$

$n = \dfrac{\textit{dalam nyata}}{\textit{dalam ketara}}$

22. $Q = It$

23. $V = IR$

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

25. $\dfrac{N_S}{N_P} = \dfrac{V_S}{V_P}$

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

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

28. $c = 3{\cdot}0 \times 10^8 \text{ m s}^{-1}$

1 Which pair of physics quantity and SI unit is correct?
Pasangan kuantiti fizik dan unit SI *manakah yang betul*?

	Physics quantity ***Kuantiti fizik***	**SI unit** ***Unit* SI**
A	Electric current *Arus elektrik*	Ampere *Ampere*
B	Pressure *Tekanan*	Newton *Newton*
C	Weight *Berat*	kilogramme *kilogram*
D	Force *Daya*	Joule *Joule*

2 Diagram 1 shows the method of measuring a diameter of a bead.
Rajah 1 *menunjukkan kaedah mengukur diameter sebiji manik.*

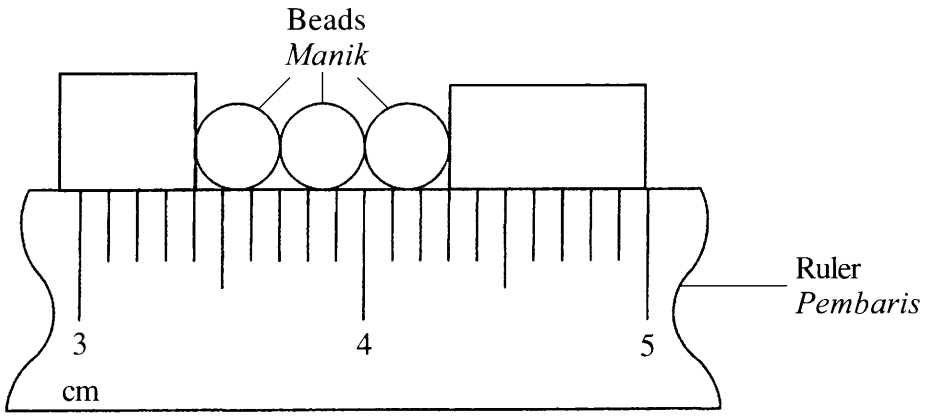


Diagram 1
Rajah 1

What is the diameter of a bead?
Apakah diameter sebiji manik?

A 0·3 cm
B 0·9 cm
C 3·4 cm
D 4·3 cm

3 Diagram 2 shows a velocity-time graph. The gradient of the graph represent the acceleration.

Rajah 2 menunjukkan satu graf halaju-masa. Kecerunan graf mewakili pecutan.

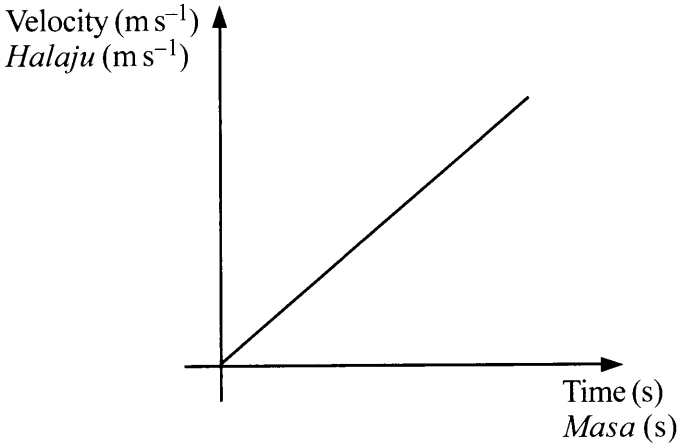


Diagram 2
Rajah 2

Which quantity is the manipulated variable?

Kuantiti manakah adalah pembolehubah dimanipulasikan?

A Time
Masa

B Velocity
Halaju

C Acceleration
Pecutan

4 The volume of a liquid in a container is 2·5 cm^3.

What is the volume of the liquid, in m^3?

Isi padu cecair dalam satu bekas adalah 2·5 cm^3.

Berapakah isi padu cecair itu, dalam m^3?

A $2{\cdot}5 \times 10^{-2}$

B $2{\cdot}5 \times 10^{-6}$

C $2{\cdot}5 \times 10^{2}$

D $2{\cdot}5 \times 10^{6}$

5 Table 1 shows the number of goals scored by players K, L, M and N in three matches.

Jadual 1 *menunjukkan bilangan gol yang dijaringkan oleh pemain* K, L, M *dan* N *dalam tiga perlawanan.*

Player ***Pemain***	**Match 1** ***Perlawanan* 1**	**Match 2** ***Perlawanan* 2**	**Match 3** ***Perlawanan* 3**
K	1	3	2
L	3	0	2
M	2	1	2
N	0	1	2

Table 1
Jadual 1

Which player shows consistency?

Pemain manakah yang menunjukkan kepersisan?

A K

B L

C M

D N

6 A car travels at a velocity of $84{\cdot}6\,\text{km}\,\text{h}^{-1}$.

What is its velocity in $\text{m}\,\text{s}^{-1}$?

Sebuah kereta bergerak dengan halaju $84{\cdot}6\,\text{km}\,\text{j}^{-1}$.

Berapakah halajunya dalam $\text{m}\,\text{s}^{-1}$?

A 11·8

B 23·5

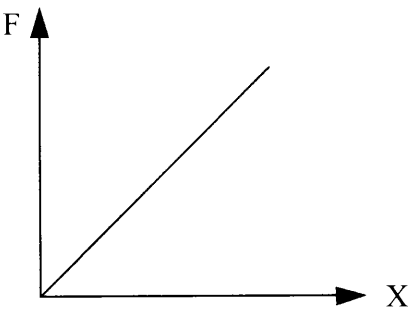
C 84·7

D 304·8

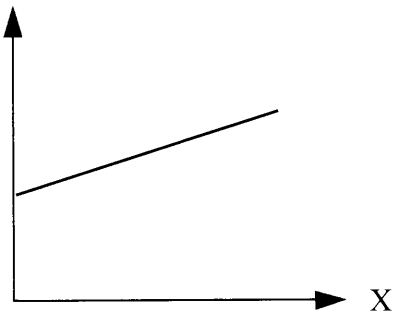
7 Which graph shows that F is inversely proportional to X?

Graf manakah yang menunjukkan F *berkadar songsang dengan* X?

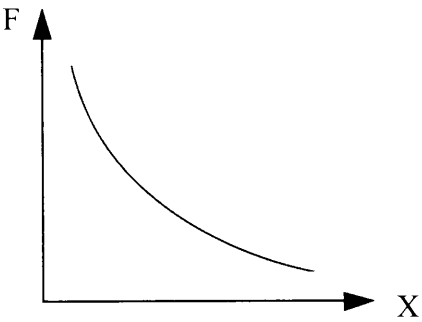
A



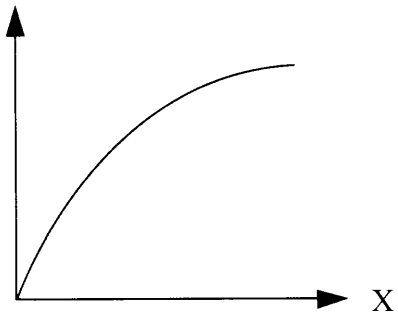
B



C



D



8 Diagram 3 shows a load suspended on a spring oscillating in water.

Rajah 3 menunjukkan satu beban tergantung pada spring berayun dalam air.

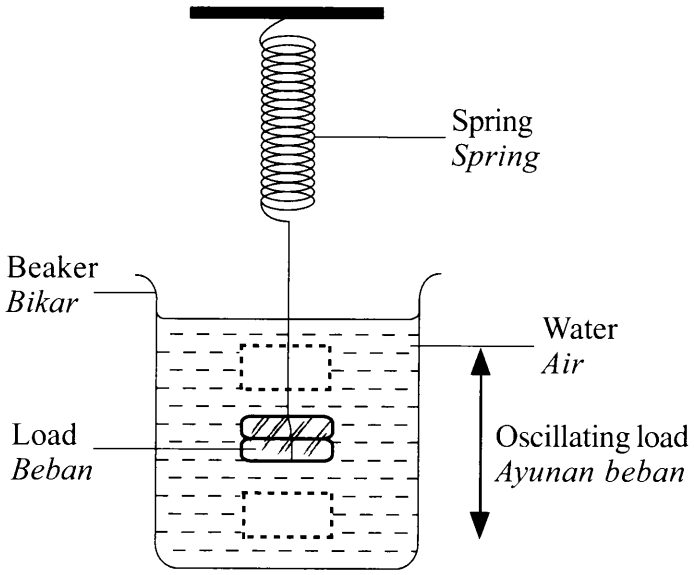
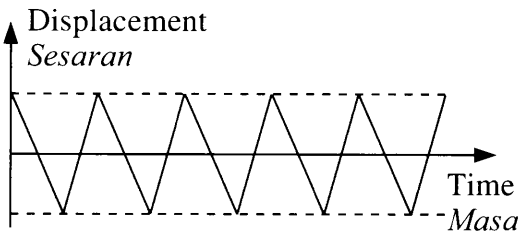


Diagram 3
Rajah 3

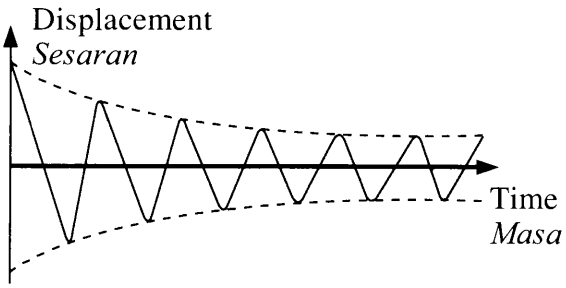
Which displacement-time graph describes the motion of the load?

Graf sesaran-masa manakah yang menerangkan gerakan beban tersebut?

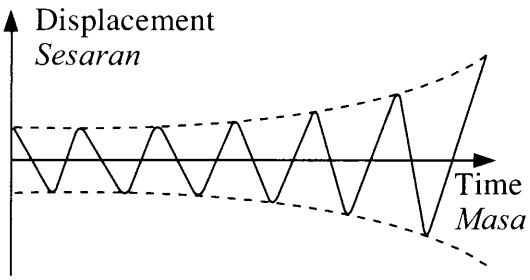
A



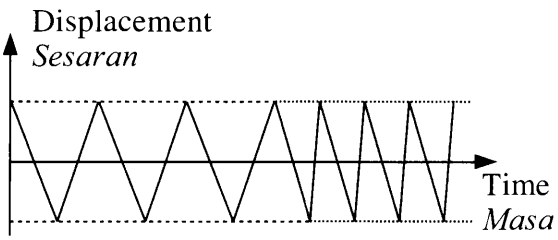
B



C



D



9 Diagram 4 shows a balloon with air rushing out from the nozzle of the balloon.

Rajah 4 menunjukkan satu belon dengan udara meluru keluar dari muncung belon itu.

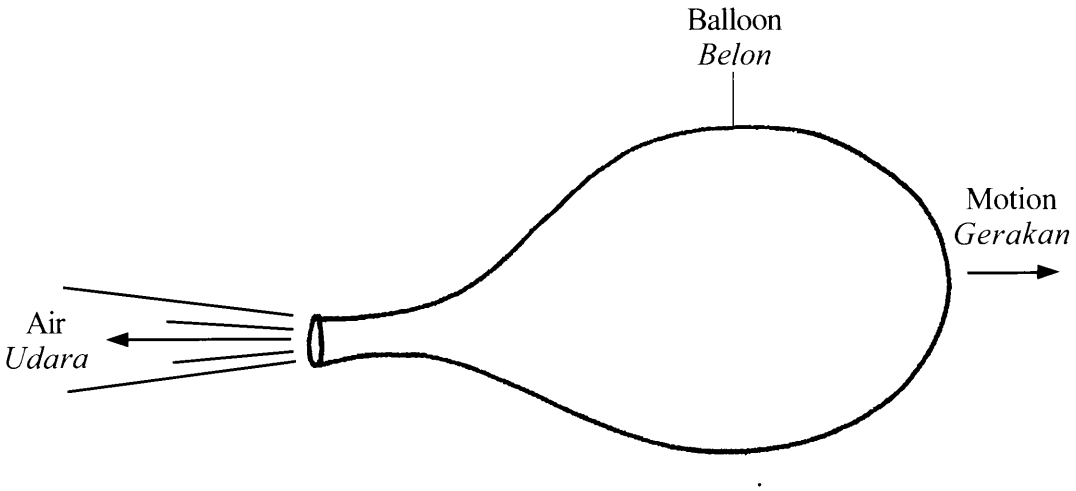


Diagram 4
Rajah 4

This situation is explained by

Situasi ini diterangkan oleh

A inertia

inersia

B impulse

impuls

C impulsive force

daya impuls

D Newton's third law

Hukum Newton ketiga

10 Which situation shows forces are in equilibrium?

Situasi manakah menunjukkan daya-daya dalam keseimbangan?

A A car speeding up on a highway

Kereta meningkatkan kelajuannya di lebuhraya

B A boat moving with uniform velocity

Bot bergerak dengan halaju seragam

C An aeroplane take-off on a runway

Kapal terbang berlepas di atas landasan

D A cyclist slowing down his bicycle

Penunggang basikal memperlahankan basikalnya

11 Diagram 5 shows a tractor on a muddy ground.

Rajah 5 menunjukkan traktor di atas tanah berlumpur.

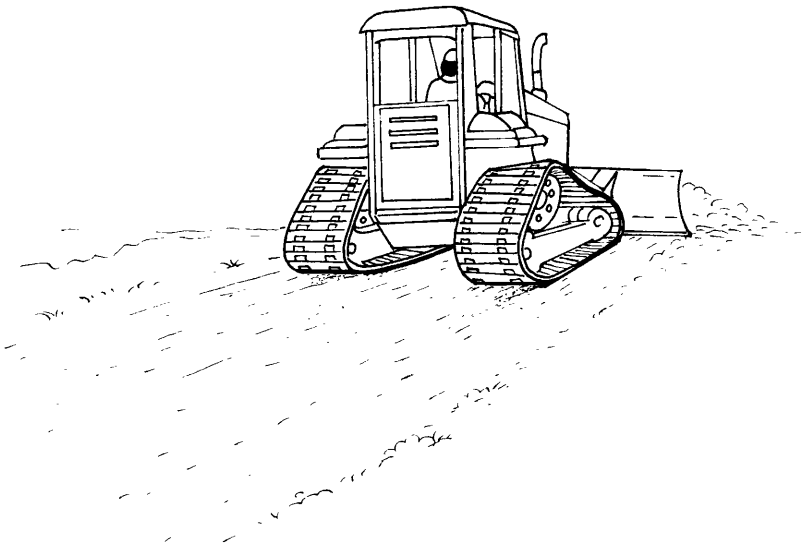


Diagram 5
Rajah 5

Why does the tractor has big and wide tyres?

Mengapa traktor mempunyai tayar yang besar dan lebar?

A To reduce the pressure on the ground

Untuk mengurangkan tekanan pada tanah

B To support the weight of the tractor

Untuk menampung berat traktor

C To produce a strong grip on the ground

Untuk menghasilkan cengkaman kuat pada tanah

D To avoid the tractor from skidding

Untuk mengelakkan traktor dari tergelincir

12 Diagram 6 shows three identical springs with the original length of 16·0 cm.

Rajah 6 menunjukkan tiga spring yang serupa dengan panjang asal 16·0 cm.

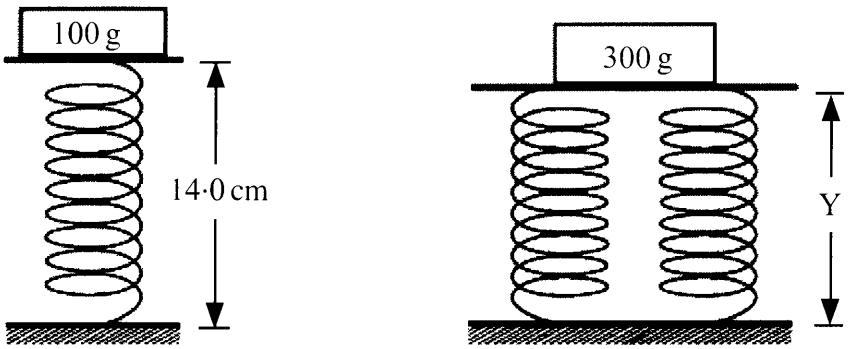


Diagram 6
Rajah 6

What is the length of Y?

Berapakah panjang Y?

A 2·0 cm

B 6·0 cm

C 10·0 cm

D 13·0 cm

13 Diagram 7 shows force F_1 exerted on a small piston producing pressure P_1. Pressure P_1 is transferred to the large piston to produce pressure P_2 and force F_2.

Rajah 7 menunjukkan daya F_1 *dikenakan ke atas omboh kecil menghasilkan tekanan* P_1. *Tekanan* P_1 *dipindahkan ke omboh besar menghasilkan tekanan* P_2 *dan daya* F_2.

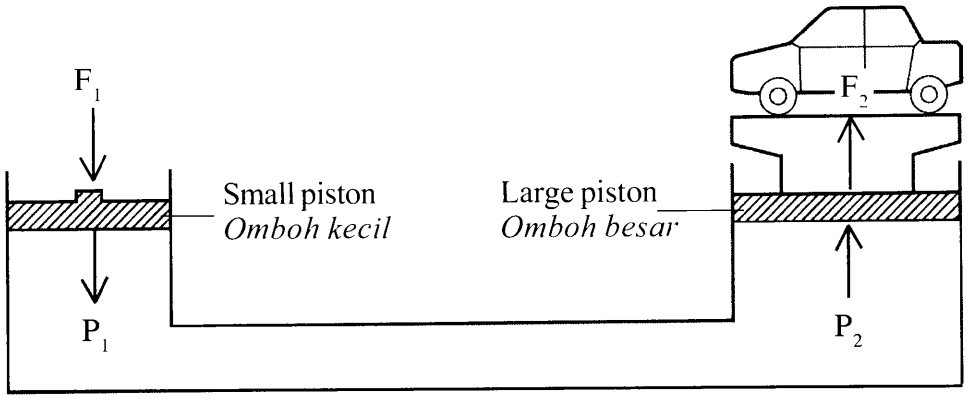


Diagram 7
Rajah 7

Which comparison is correct?

Perbandingan manakah yang betul?

A $F_1 = F_2$

B $F_1 > F_2$

C $P_1 = P_2$

D $P_1 > P_2$

14 Diagram 8 shows an apparatus set-up to measure pressure in liquid.

Rajah 8 *menunjukkan susunan radas untuk mengukur tekanan dalam cecair.*

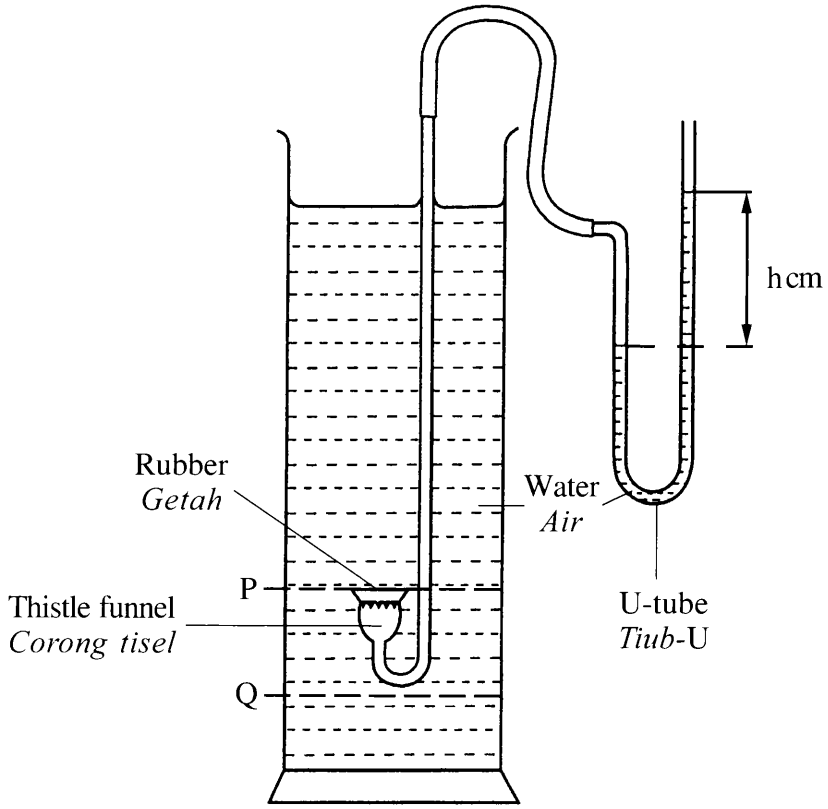


Diagram 8
Rajah 8

What happens to the height of water h, if the thistle funnel is lowered from level P to Q?

Apakah yang berlaku pada ketinggian air, h, *jika corong tisel diturunkan dari paras* P *ke* Q?

A Increases

Bertambah

B Decreases

Berkurang

C No change

Tiada perubahan

15 Diagram 9 shows a man standing on one leg. His weight is 720 N and the surface area of his shoe is 0·02 m^2.

Rajah 9 menunjukkan seorang lelaki sedang berdiri di atas sebelah kaki. Beratnya adalah 720 N dan luas permukaan tapak kasutnya adalah 0·02 m^2.

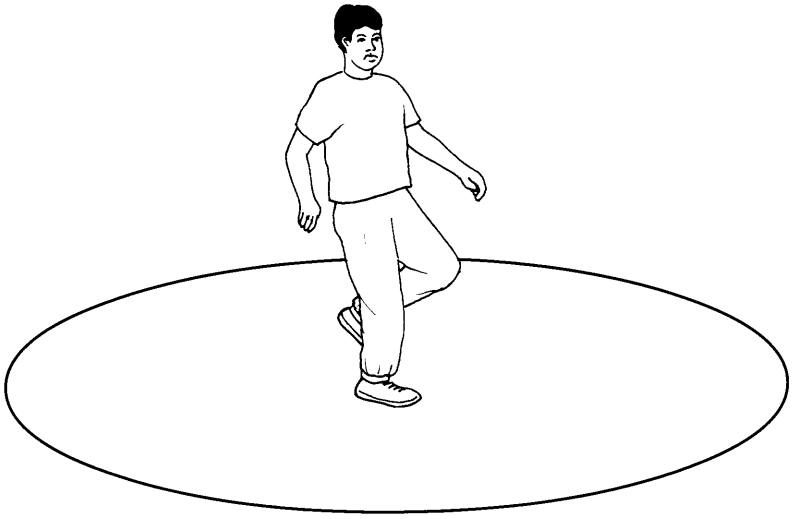


Diagram 9
Rajah 9

What is the pressure exerted by the man?

Apakah tekanan yang dikenakan oleh lelaki tersebut?

A 14·4 Pa

B 28·8 Pa

C 18 000 Pa

D 36 000 Pa

16 Diagram 10 shows a manometer is connected to gas supply.

Rajah 10 *menunjukkan manometer disambung kepada bekalan gas.*

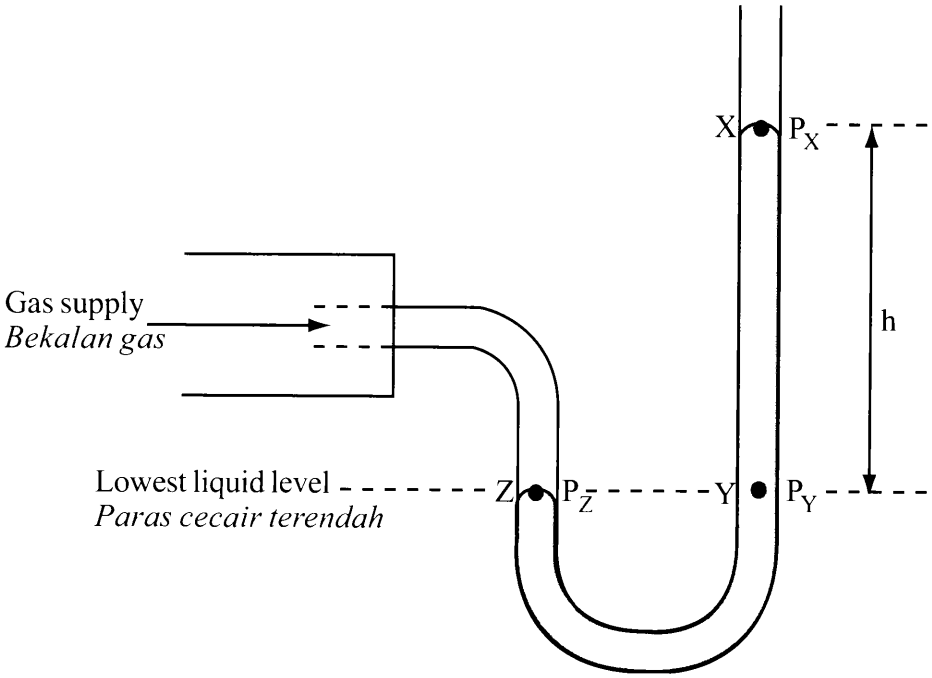


Diagram 10
Rajah 10

Which comparison about pressure at X, Y and Z is correct?

Perbandingan manakah berkaitan tekanan pada X, Y *dan* Z *adalah betul?*

A $P_X = P_Y$

B $P_X > P_Y$

C $P_Y = P_Z$

D $P_Y > P_Z$

17 Diagram 11 shows the apparatus to measure water pressure.

Rajah 11 *menunjukkan radas untuk mengukur tekanan air.*

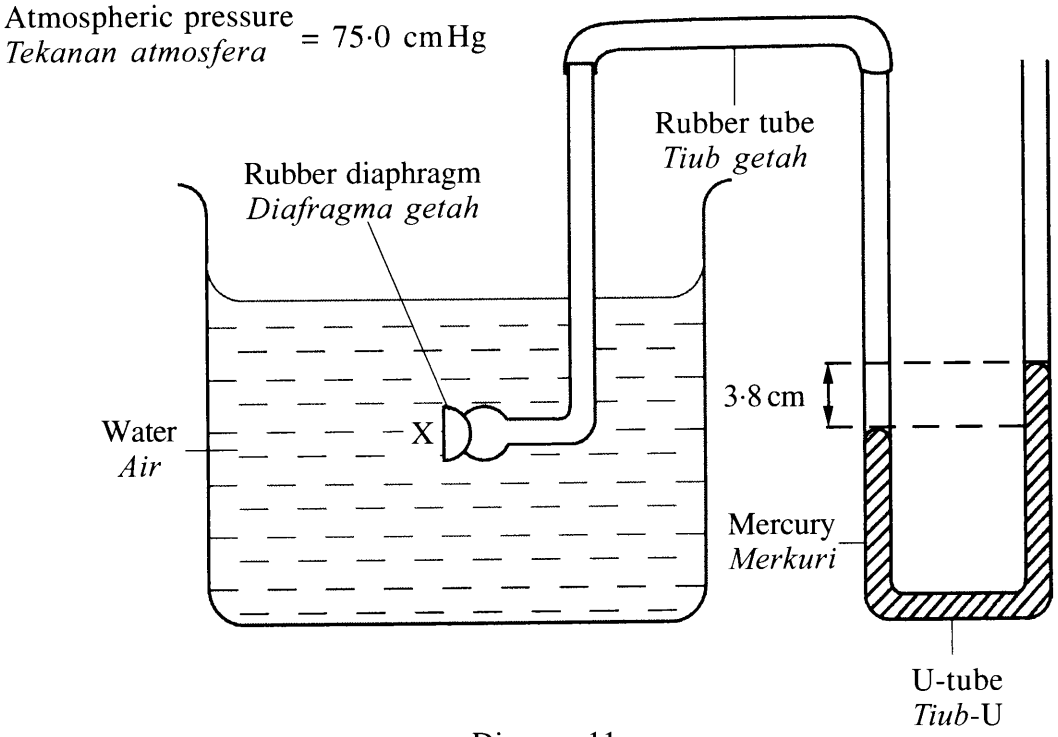


Diagram 11
Rajah 11

What is the water pressure at X?

Berapakah tekanan air di X?

A 71·2 cm Hg

B 75·0 cm Hg

C 78·8 cm Hg

D 82·6 cm Hg

18 Which instrument is used to measure atmospheric pressure?

Instrumen manakah yang digunakan untuk mengukur tekanan atmosfera?

A Hydrometer
Hidrometer

B Bourdon gauge
Tolok Bourdon

C Barometer
Barometer

D Micrometer screw gauge
Tolok skrew mikrometer

19 A rubber ball is dropped into the water. The ball sinks and moves upward after reaching a certain depth.

Which pair is correct to show the relationship between buoyant force and weight?

Bola getah dijatuhkan ke dalam air. Bola itu tenggelam dan bergerak ke atas selepas sampai kedalaman tertentu.

Pasangan manakah yang betul untuk menunjukkan hubungan antara daya apung dengan berat?

	Sink ***Tenggelam***	**Moves Upward** ***Bergerak ke atas***
A	Buoyant force < Weight *Daya apung < Berat*	Buoyant force > Weight *Daya apung > Berat*
B	Buoyant force > Weight *Daya apung > Berat*	Buoyant force = Weight *Daya apung = Berat*
C	Buoyant force = Weight *Daya apung = Berat*	Buoyant force > Weight *Daya apung > Berat*
D	Buoyant force < Weight *Daya apung < Berat*	Buoyant force = Weight *Daya apung = Berat*

20 Which equipment works based on the Bernoulli's principle?

Peralatan manakah yang berfungsi berdasarkan prinsip Bernoulli?

A Suction pump

Pam penyedut

B Bunsen burner

Penunu Bunsen

C Vacuum cleaner

Pembersih vakum

D Hydraulic jack

Jek hidraulik

21 Two metal blocks of the same mass, P and Q are heated simultaneously with identical heaters. After 15 minutes, the temperature of metal block Q is higher than the temperature of metal block P.

Which comparison is correct?

Dua blok logam dengan jisim yang sama, P *dan* Q *dipanaskan serentak dengan pemanas-pemanas yang serupa. Selepas* 15 *minit, suhu blok logam* Q *adalah lebih tinggi daripada suhu blok logam* P.

Perbandingan manakah adalah betul?

A Specific heat capacity of P > Specific heat capacity of Q

Muatan haba tentu P > *Muatan haba tentu* Q

B Specific heat capacity of P < Specific heat capacity of Q

Muatan haba tentu P < *Muatan haba tentu* Q

C Specific latent heat of P > Specific latent heat of Q

Haba pendam tentu P > *Haba pendam tentu* Q

D Specific latent heat of P < Specific latent heat of Q

Haba pendam tentu P < *Haba pendam tentu* Q

22 Diagram 12 shows 1 kg of liquid being heated using an electric heater for 10 minutes.

Rajah 12 *menunjukkan* 1 kg *cecair dipanaskan menggunakan pemanas elektrik selama* 10 *minit.*

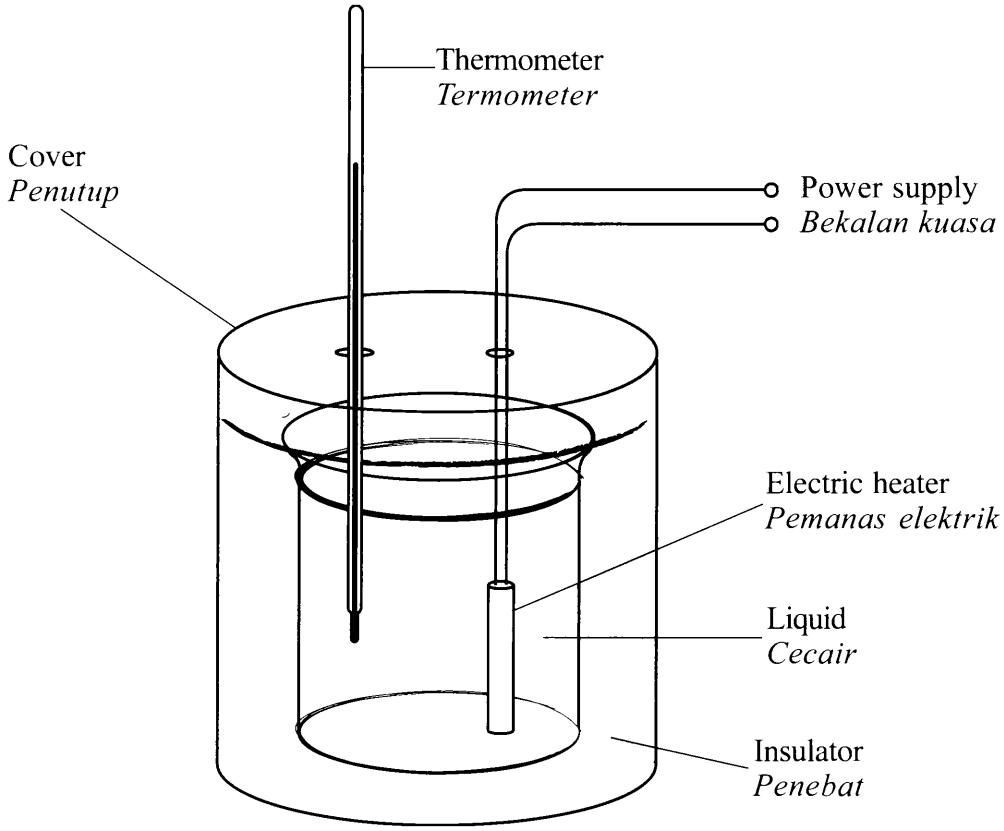


Diagram 12
Rajah 12

The temperature of the liquid is increased faster by

Suhu cecair meningkat lebih cepat dengan

A using liquid of higher specific heat capacity

menggunakan cecair yang lebih besar muatan haba tentu

B reducing the time of heating

mengurangkan masa pemanasan

C reducing the mass of liquid

mengurangkan jisim cecair

D removing the insulator

menyingkirkan penebat

23 Diagram 13 shows two beakers with different volume of liquid X and same initial temperature. Both beakers are then heated with the same amount of heat energy.

Rajah 13 *menunjukkan dua bikar yang mempunyai isi padu cecair* X *yang berlainan dan suhu awal yang sama. Kedua-dua bikar kemudiannya dipanaskan dengan amaun tenaga haba yang sama.*

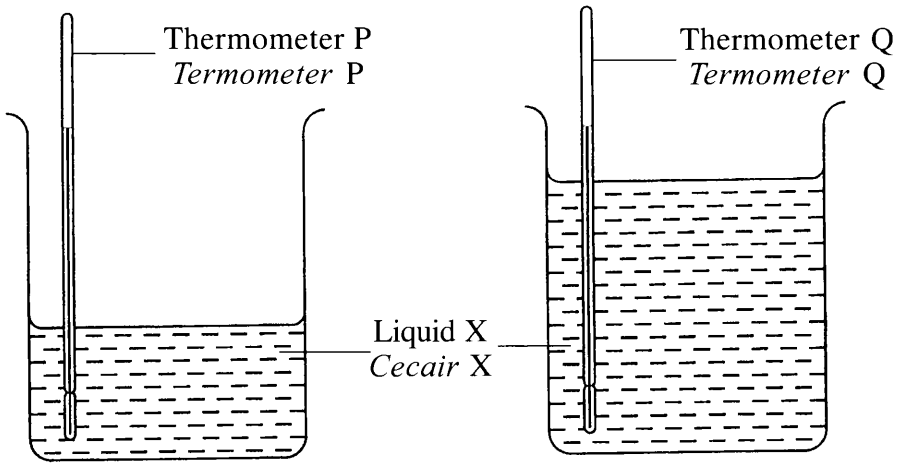


Diagram 13
Rajah 13

Which comparison is correct about the reading of thermometer P and thermometer Q?

Perbandingan manakah yang betul tentang bacaan termometer P *dan termometer* Q?

A Reading of thermometer P > Reading of thermometer Q
Bacaan termometer P > *Bacaan termometer* Q

B Reading of thermometer P < Reading of thermometer Q
Bacaan termometer P < *Bacaan termometer* Q

C Reading of thermometer P = Reading of thermometer Q
Bacaan termometer P = *Bacaan termometer* Q

24 What are the characteristics of an image formed by a plane mirror?

Apakah ciri-ciri imej yang dibentuk oleh satu cermin satah?

A Upright and real
Tegak dan sahih

B Upright and virtual
Tegak dan maya

C Inverted and real
Songsang dan sahih

D Inverted and virtual
Songsang dan maya

[*Lihat halaman sebelah*

25 Diagram 14 shows a ray of light entering a transparent glass block.
Rajah 14 *menunjukkan sinar cahaya ditujukan ke dalam bongkah kaca lutsinar.*

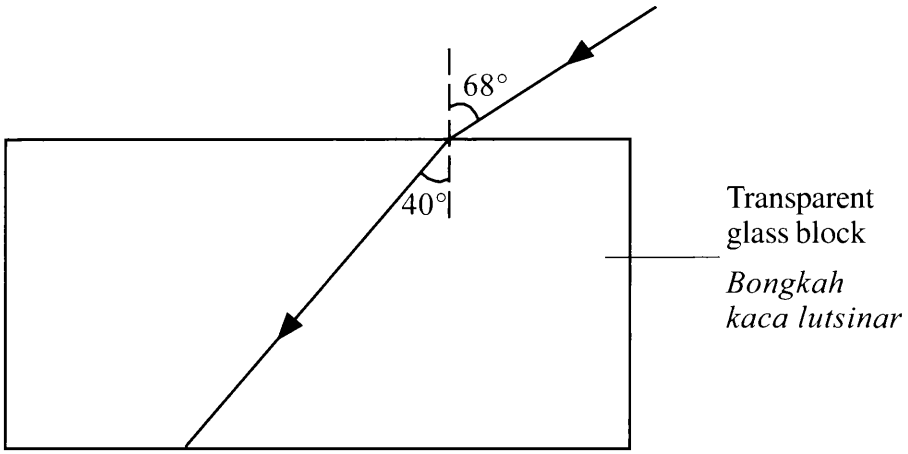


Diagram 14
Rajah 14

What is the refractive index of the glass block?
Berapakah indeks biasan bongkah kaca itu?

A 0·59

B 0·69

C 1·44

D 1·70

26 Diagram 15 shows a light ray propagating from air into water.

Rajah 15 *menunjukkan satu sinar cahaya merambat dari udara ke dalam air.*

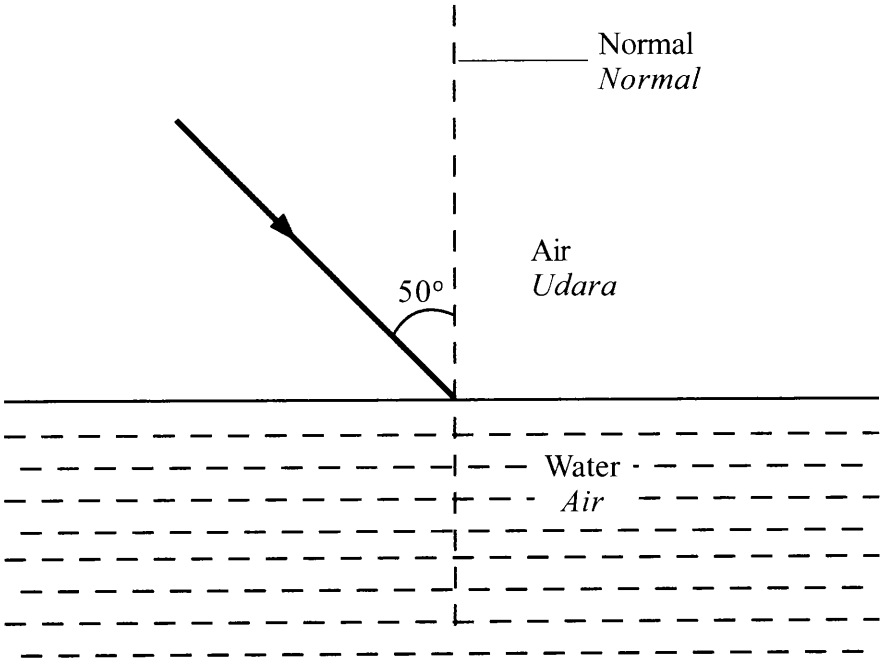


Diagram 15
Rajah 15

What happens to the light ray in the water?

Apakah yang berlaku kepada sinar cahaya di dalam air?

A Refracts towards normal

Dibiaskan ke arah normal

B Refracts away from normal

Dibiaskan menjauhi normal

C Experiences total internal reflection

Mengalami pantulan dalam penuh

D Reflects with the same angle as the incidence angle

Dipantulkan dengan sudut yang sama dengan sudut tuju

27 Which equipment uses total internal reflection?

Peralatan manakah yang menggunakan pantulan dalam penuh?

A Binocular

Binokular

B Telescope

Teleskop

C Microscope

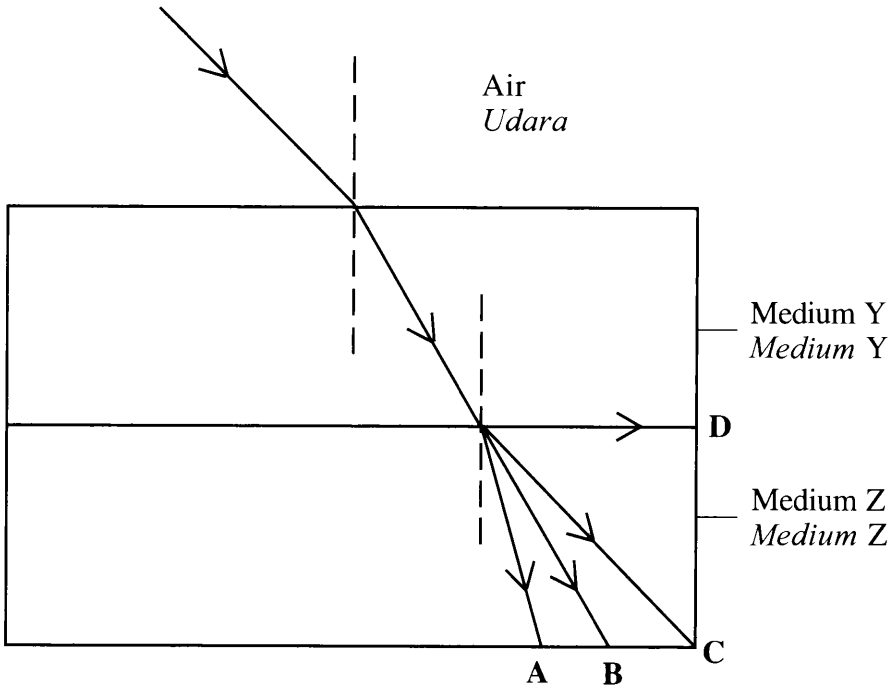
Mikroskop

D Slide projector

Projektor slaid

28 Which path **A**, **B**, **C** or **D**, shows the correct propagation of light as it enters medium Z of greatest refractive index?

Lintasan manakah **A**, **B**, **C**, *dan* **D**, *menunjukkan perambatan cahaya yang betul semasa ia memasuki medium* Z *yang indeks biasannya paling tinggi*?



29 Diagram 16 shows a periscope with two prisms, X and Y.

Rajah 16 *menunjukkan satu periskop dengan dua prisma*, X *dan* Y.

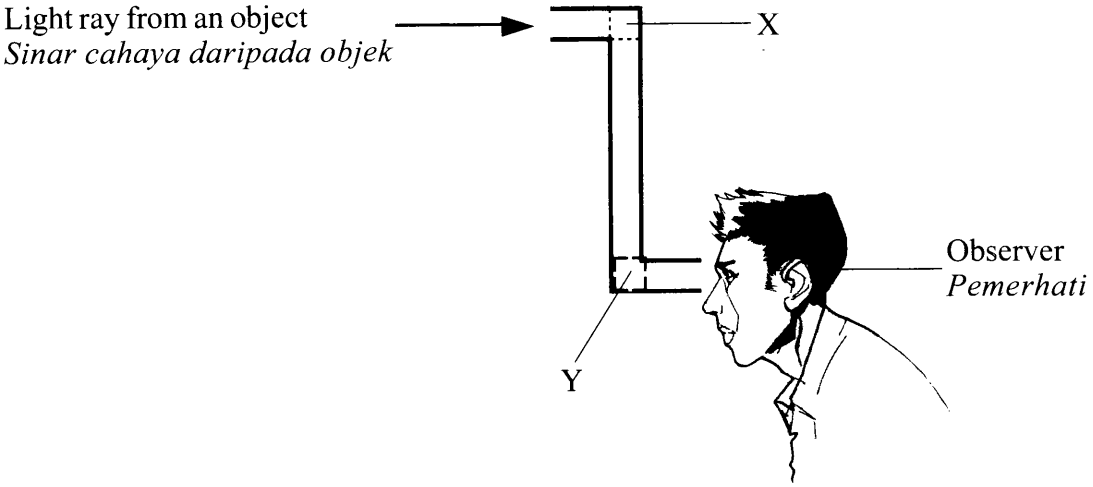
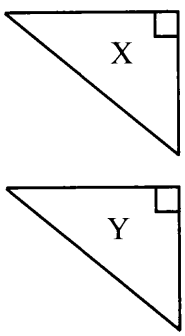


Diagram 16
Rajah 16

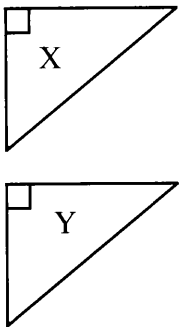
Which arrangement of prisms X and Y is correct so that the observer can see the image of the object?

Susunan manakah yang betul bagi prisma X *dan* Y *supaya pemerhati itu dapat melihat imej objek itu*?

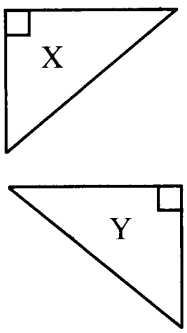
A



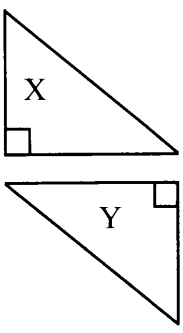
B



C



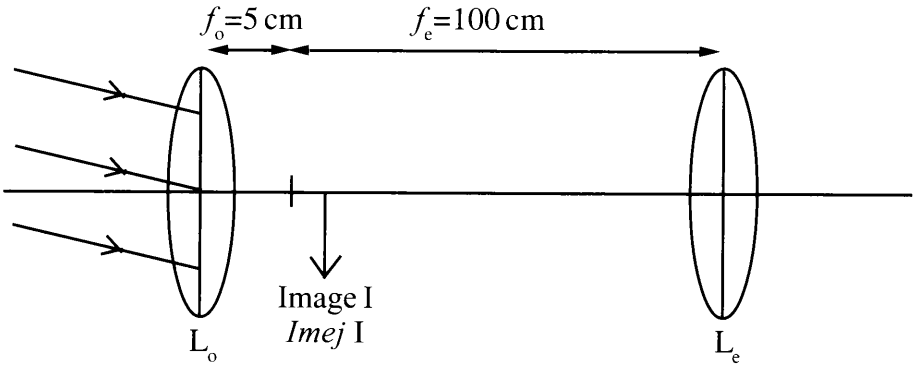
D



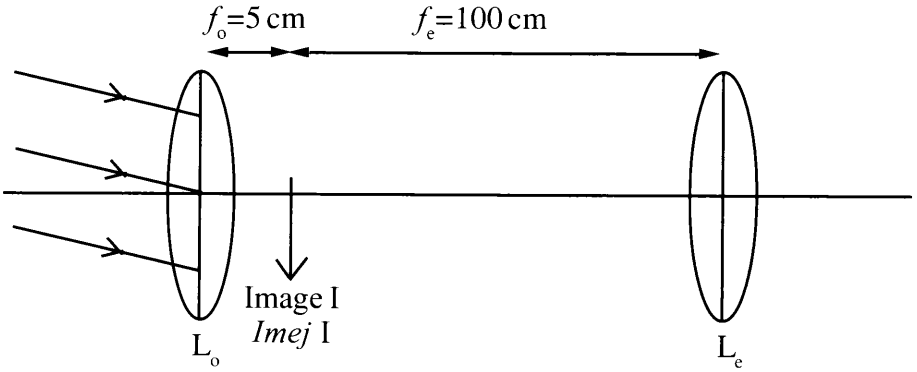
30 Which arrangement of objective lens, L_o, eyepiece, L_e and position of image I, is correct for a telescope at normal adjustment?

Susunan kanta objek, L_o, *kanta mata*, L_e *dan kedudukan imej* I, *manakah yang betul untuk satu teleskop pada pelarasan normal*?

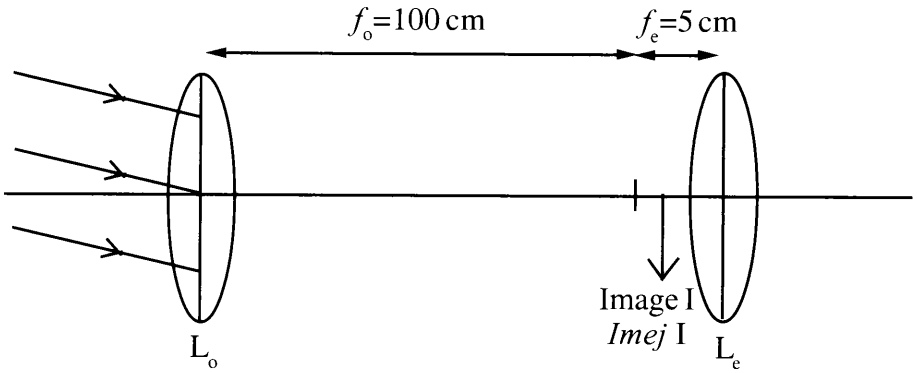
A



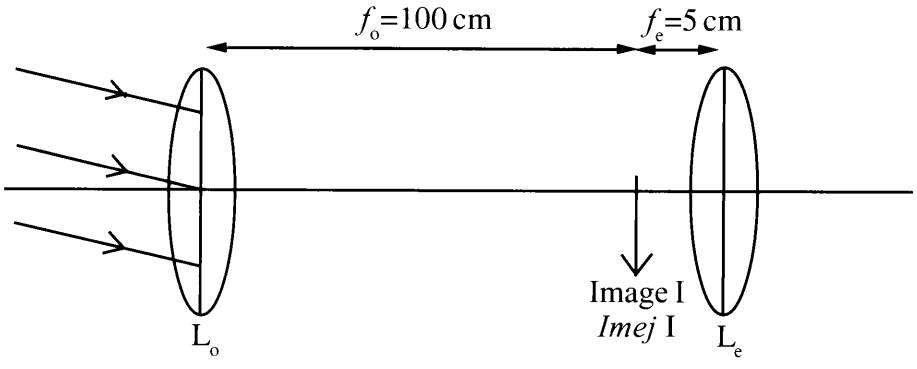
B



C



D



31 What quantity decreases when a wave propagates through a gap?

Apakah kuantiti yang berkurang apabila suatu gelombang merambat melalui satu celah?

A Speed

Laju

B Frequency

Frekuensi

C Amplitude

Amplitud

D Wave length

Panjang gelombang

32 Diagram 17 shows water waves propagating from the sea to the shore.

Rajah 17 menunjukkan gelombang air merambat dari laut ke pantai.

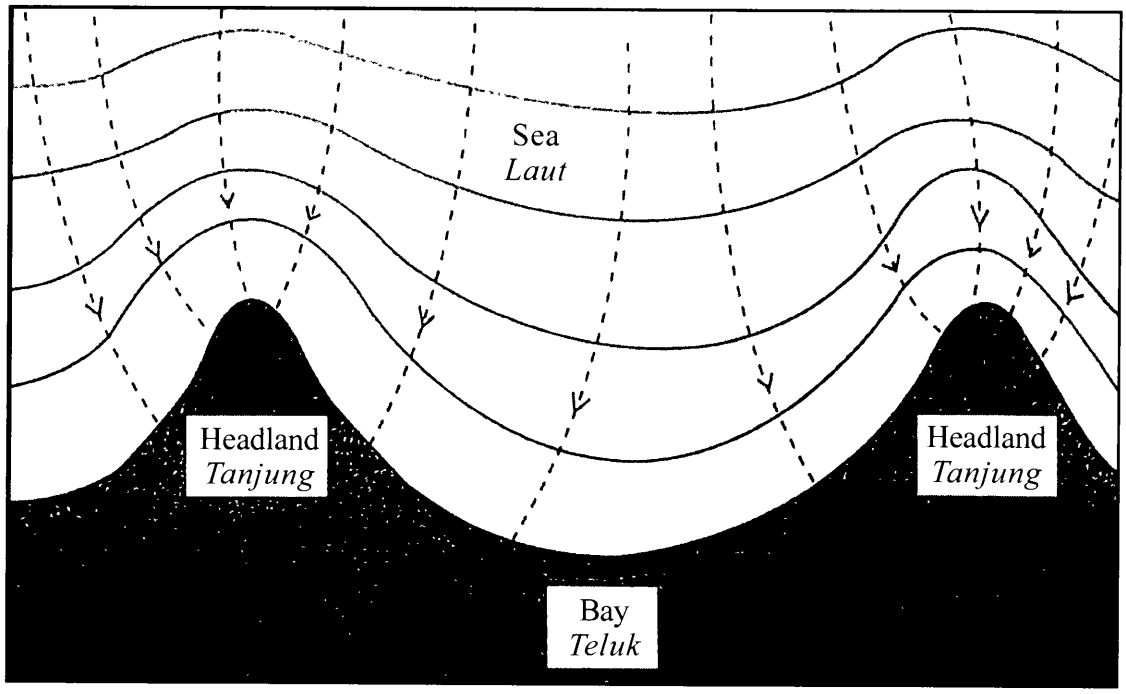


Diagram 17
Rajah 17

Which waves properties at headland and bay are correct?

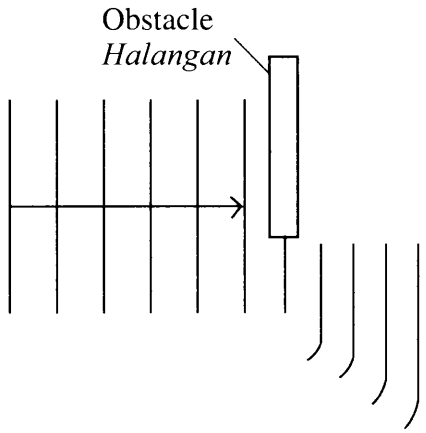
Ciri-ciri gelombang manakah di tanjung dan di teluk yang betul?

	Headland ***Tanjung***	**Bay** ***Teluk***
A	Energy is dispersed *Tenaga disebarkan*	Wave length is longer *Panjang gelombang lebih panjang*
B	Energy is focused *Tenaga ditumpukan*	Wave length is shorter *Panjang gelombang lebih pendek*
C	Wave length is longer *Panjang gelombang lebih panjang*	Energy is focused *Tenaga ditumpukan*
D	Wave length is shorter *Panjang gelombang lebih pendek*	Energy is dispersed *Tenaga disebarkan*

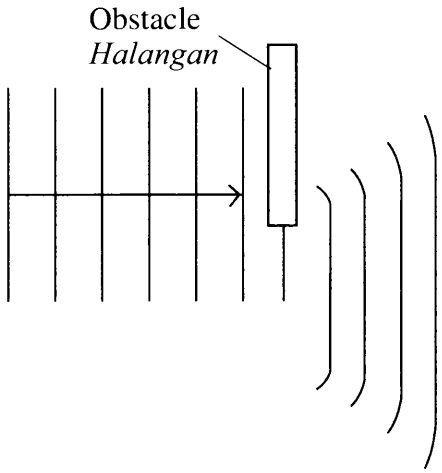
33 Which diffraction pattern is correct when waves pass through an obstacle?

Corak belauan manakah yang betul apabila gelombang melalui satu halangan?

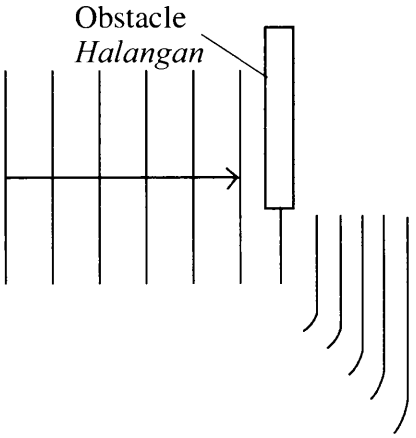
A



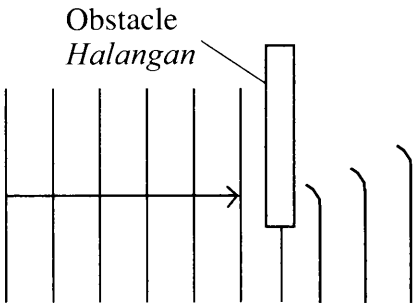
B



C



D



34 Diagram 18 shows an interference pattern.

Rajah 18 *menunjukkan satu corak interferens.*

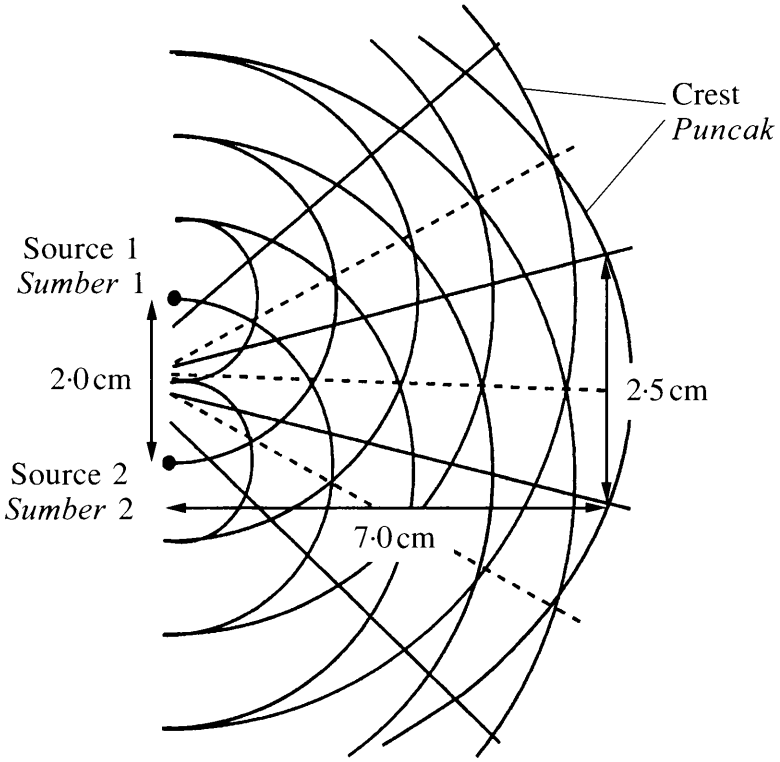


Diagram 18
Rajah 18

What is the wavelength of the waves?

Apakah panjang gelombang bagi gelombang itu?

A 0·27 cm

B 0·71 cm

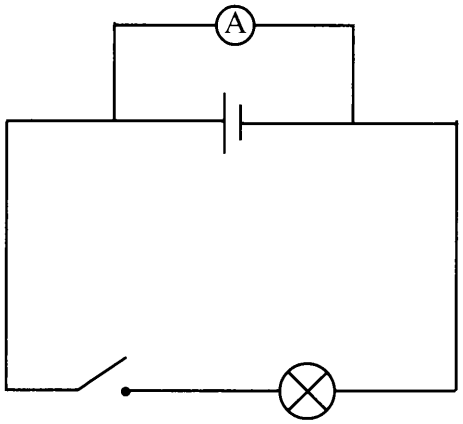
C 1·88 cm

D 3·75 cm

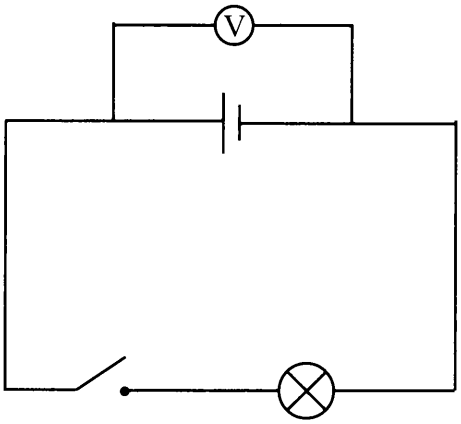
35 Which circuit is used to determine the electromotive force, e.m.f. of a dry cell?

Litar manakah yang digunakan untuk menentukan daya gerak elektrik, d.g.e. *bagi sel kering*?

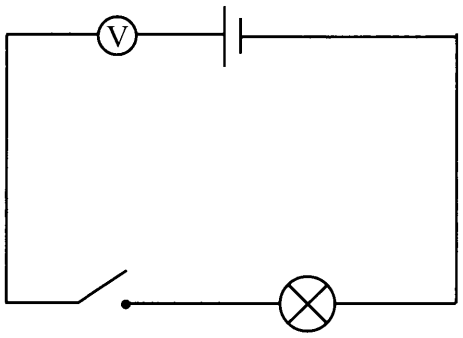
A



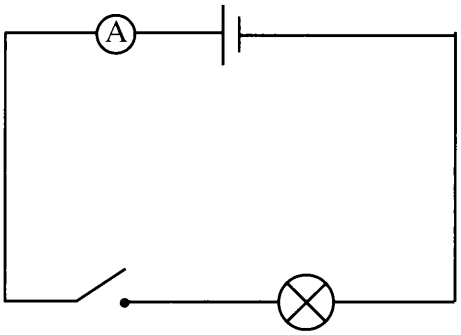
B



C



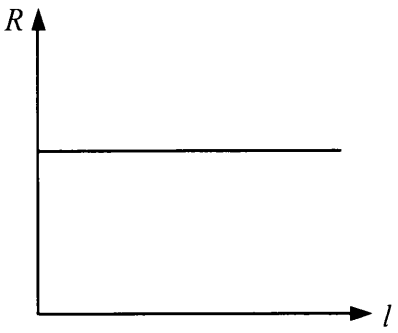
D



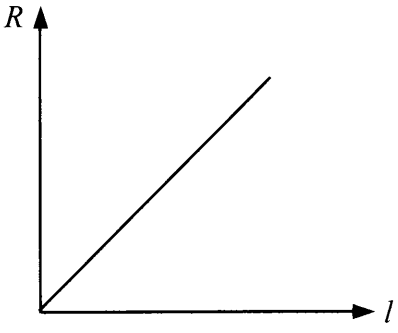
36 Which graph shows the correct relationship between resistance, R and length, l for a conductor?

Graf manakah yang menunjukkan hubungan yang betul antara rintangan, R dengan panjang, l bagi konduktor?

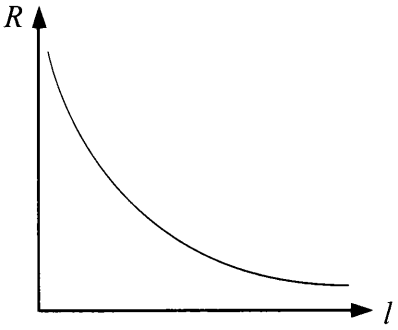
A



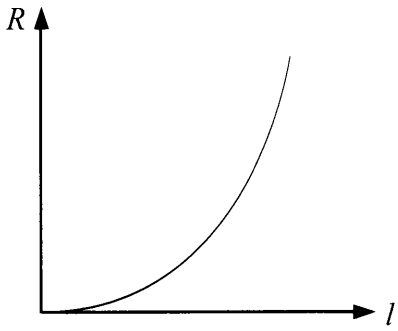
B



C



D



37 Diagram 19 shows an electric circuit.

Rajah 19 *menunjukkan satu litar elektrik.*

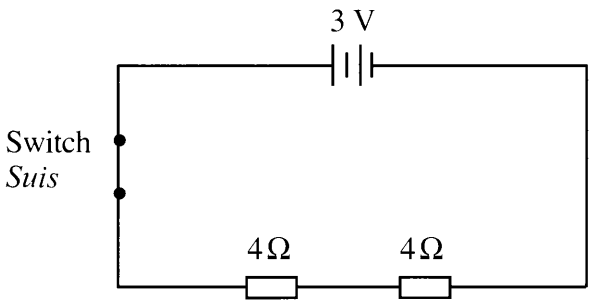


Diagram 19
Rajah 19

What is the heat energy produced in the circuit in 5 second?

Berapakah tenaga haba yang terhasil dalam litar dalam 5 *saat*?

A 5·63 J

B 3·75 J

C 1·88 J

D 11·25 J

38 Diagram 20 shows the direction of movement of a current carrying conductor that is placed between two magnets.

Rajah 20 menunjukkan arah gerakan satu konduktor membawa arus yang diletakkan di antara dua magnet.

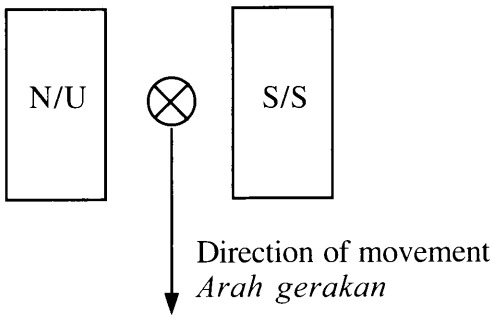
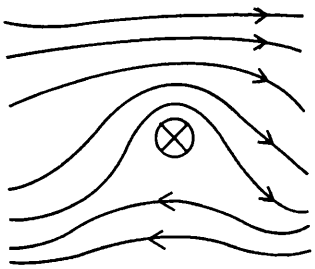


Diagram 20
Rajah 20

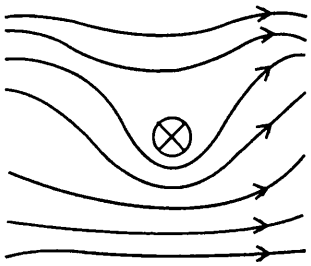
Which magnetic field pattern is correct to show the situation?

Corak medan magnet manakah yang betul untuk menunjukkan situasi itu?

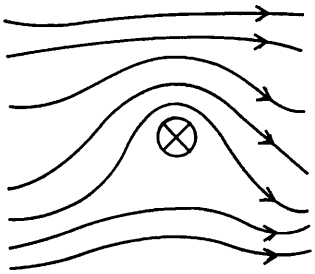
A



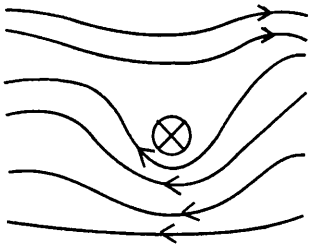
B



C



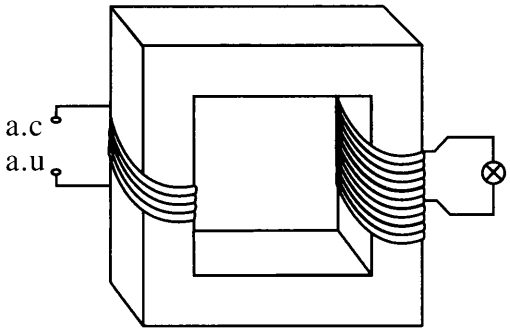
D



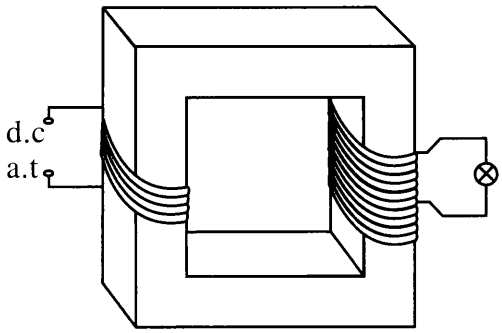
39 Which is a functional step-down transformer?

Transformer injak turun manakah yang berfungsi?

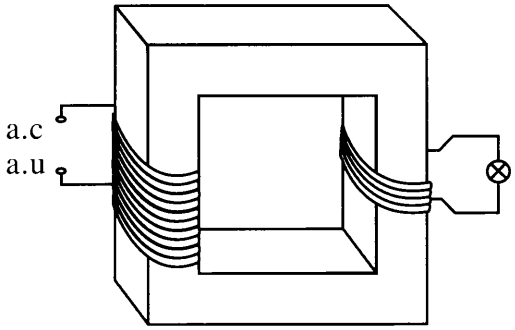
A



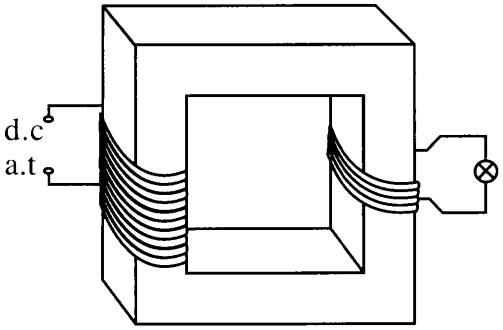
B



C



D



40 Diagram 21 shows a plotting compass placed on a cardboard near a current carrying conductor.

Rajah 21 *menunjukkan satu kompas memplot diletakkan di atas kadbod berhampiran satu konduktor membawa arus.*

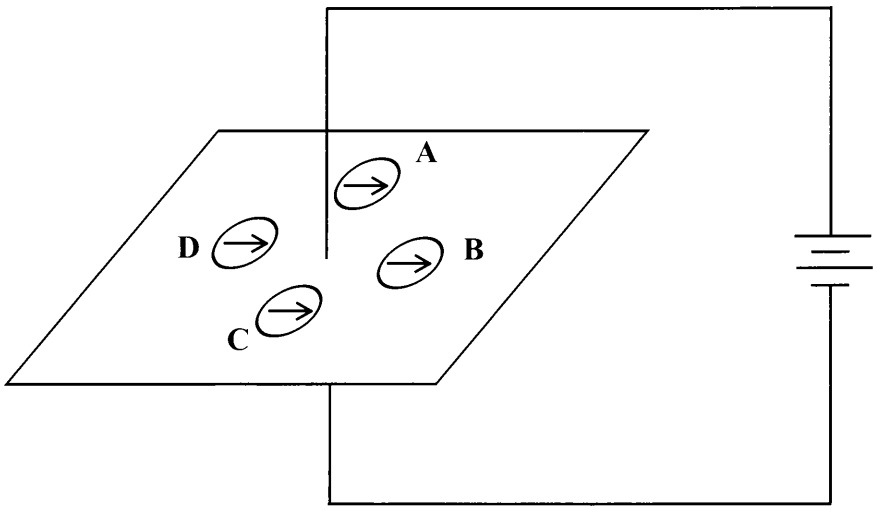


Diagram 21
Rajah 21

Which compass shows the correct direction of the magnetic field?

Kompas manakah menunjukkan arah medan magnet yang betul?

41 Diagram 22 shows two bar magnets, P and Q, hang freely at both ends of the solenoid.

Rajah 22 *menunjukkan dua magnet bar*, P *dan* Q *tergantung bebas di kedua-dua hujung solenoid.*

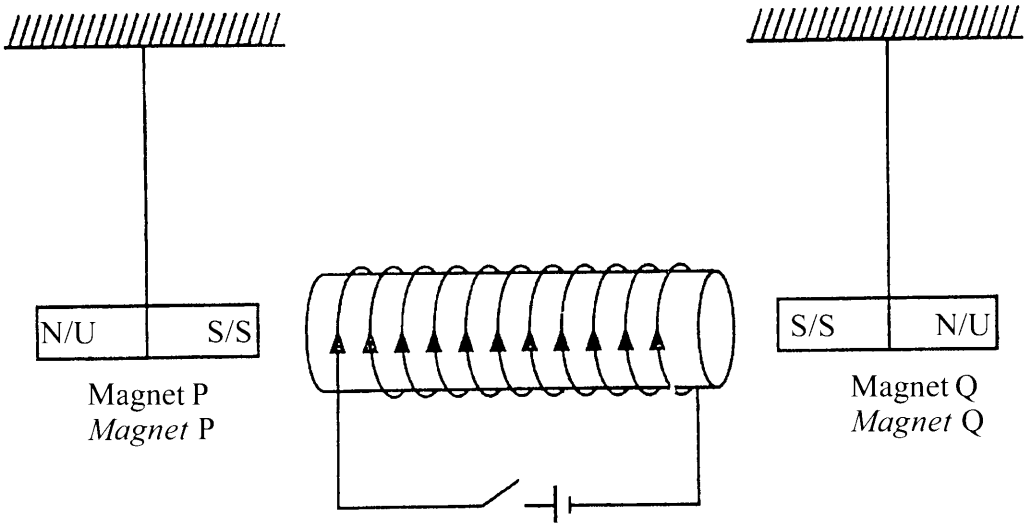


Diagram 22
Rajah 22

Which observation is correct when the switch is turned on?

Pemerhatian manakah yang betul apabila suis dihidupkan?

	Magnet P ***Magnet* P**	**Magnet Q** ***Magnet* Q**
A	Moves away from the solenoid *Bergerak menjauhi solenoid*	Moves towards the solenoid *Bergerak mendekati solenoid*
B	Moves away from the solenoid *Bergerak menjauhi solenoid*	Moves away from the solenoid *Bergerak menjauhi solenoid*
C	Moves towards the solenoid *Bergerak mendekati solenoid*	Moves towards the solenoid *Bergerak mendekati solenoid*
D	Moves towards the solenoid *Bergerak mendekati solenoid*	Moves away from the solenoid *Bergerak menjauhi solenoid*

42 Diagram 23 shows the process of producing an induced current in a wire.

Rajah 23 menunjukkan proses menghasilkan arus aruhan di dalam suatu dawai.

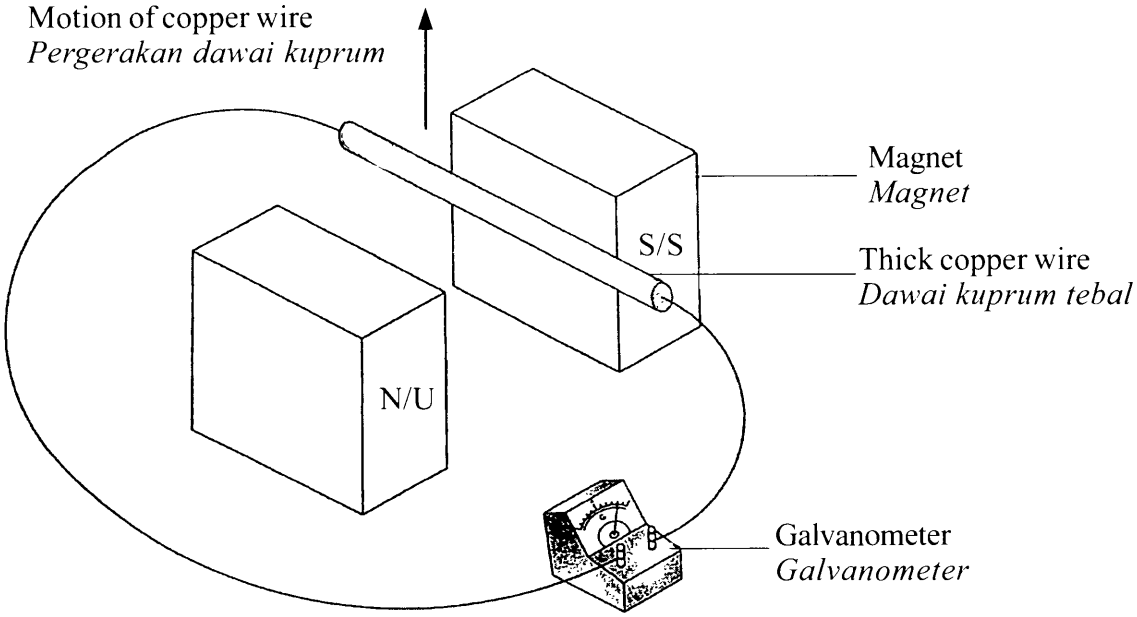


Diagram 23
Rajah 23

This process is explained by

Proses ini diterangkan oleh

A Hooke's law

Hukum Hooke

B Fleming's right hand rule

Peraturan tangan kanan Fleming

C Newton's third law

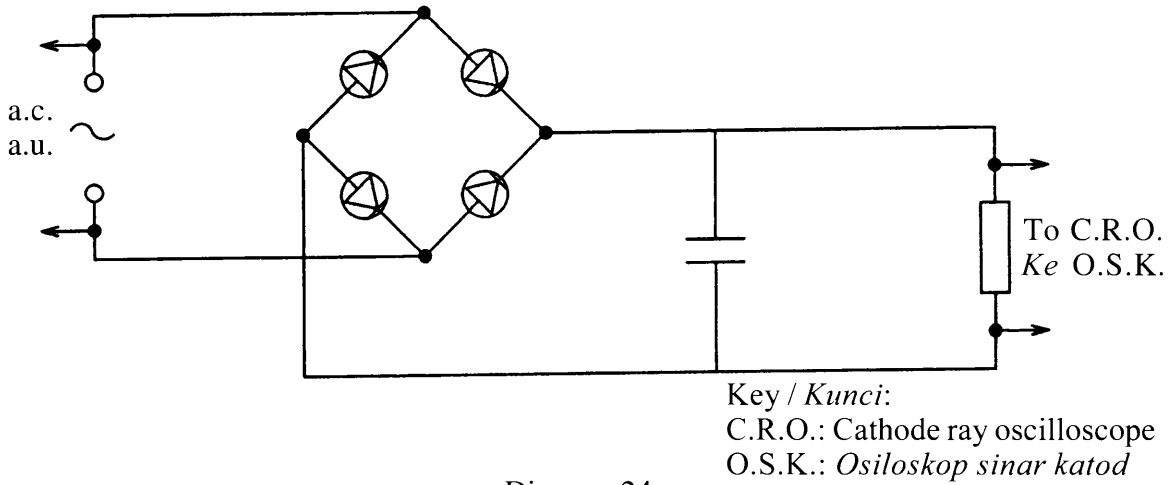
Hukum gerakan Newton ketiga

D Right hand grip rule

Peraturan genggaman tangan kanan

43 Diagram 24 shows four diodes which are connected to form a rectifier.

Rajah 24 *menunjukkan empat diod yang disambung untuk membentuk rektifier.*



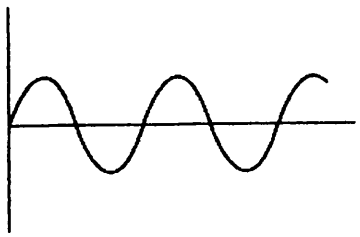
Key / *Kunci*:
C.R.O.: Cathode ray oscilloscope
O.S.K.: *Osiloskop sinar katod*

Diagram 24
Rajah 24

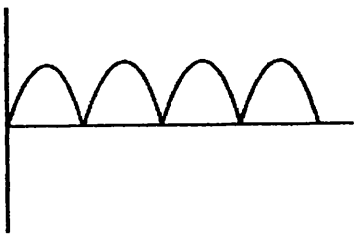
Which wave pattern is produced on the C.R.O. screen?

Corak gelombang manakah yang dihasilkan pada skrin O.S.K.?

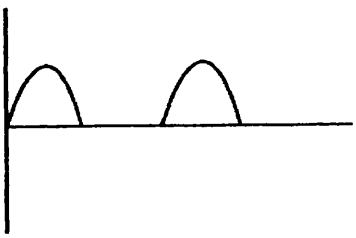
A



B



C



D

44 Which particle is cathode ray?

Zarah manakah adalah sinar katod?

A Electron beam

Alur elektron

B Gamma ray

Sinar gama

C Neutron

Neutron

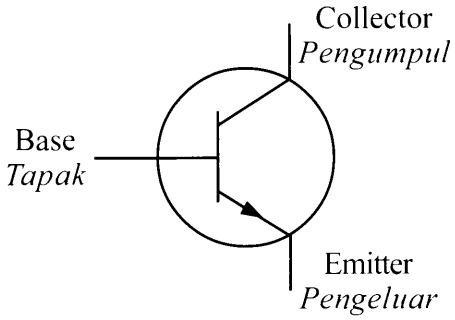
D Alpha particles

Zarah alfa

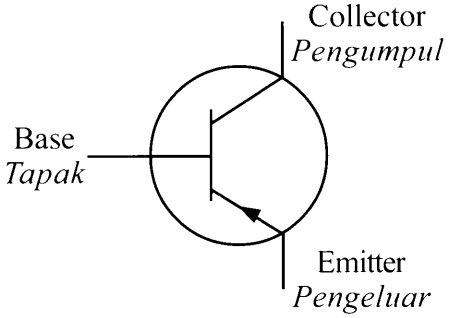
45 What is the symbol for n-p-n transistor?

Apakah simbol untuk transistor n-p-n?

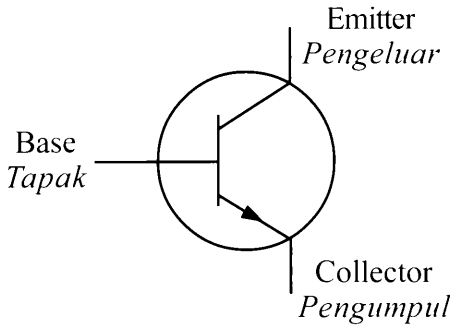
A



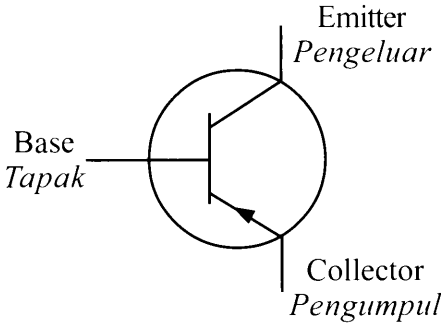
B



C



D



46 Diagram 25 shows a combination of three logic gates. Signal P and signal Q are supplied to the input.

Rajah 25 menunjukkan satu kombinasi bagi tiga get logik. Isyarat P *dan* isyarat Q *dibekalkan kepada input.*

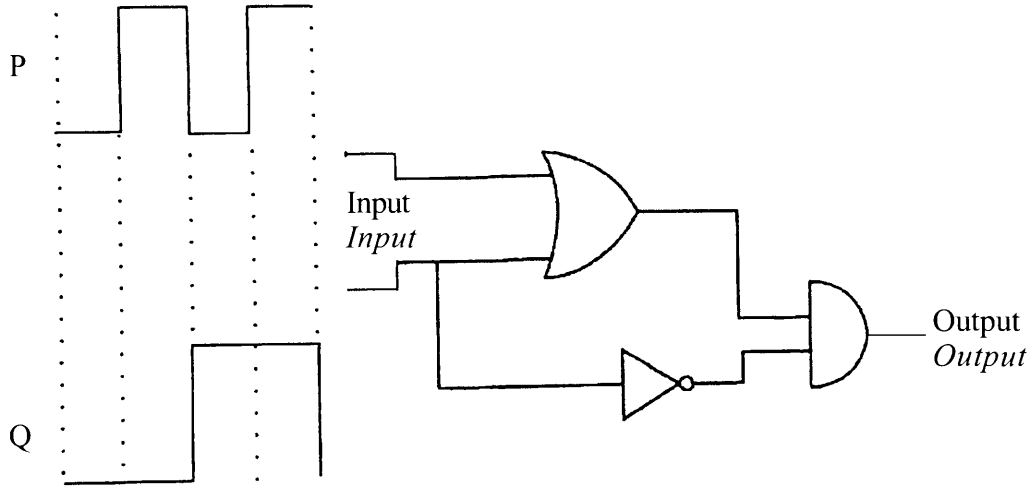
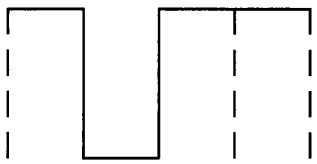


Diagram 25
Rajah 25

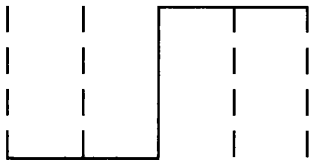
Which output signal is correct?

Isyarat output manakah yang betul?

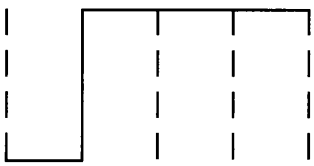
A



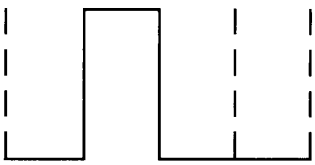
B



C



D



47 Diagram 26 shows a nuclide notation of radioactive element Actinium-227.
Rajah 26 *menunjukkan notasi nuklida satu unsur radioaktif Aktinium*-227.

$$^{227}_{89}\mathbf{Ac}$$

Diagram 26
Rajah 26

Number of neutron in the element is
Bilangan neutron dalam elemen ialah

A 89

B 138

C 227

D 316

48 25 % of Gallium-65 atoms have decayed after 15 minutes.
What is the half-life of Gallium-65?
25 % *daripada atom Galium*-65 *telah mereput selepas* 15 *minit*.
Apakah separuh hayat bagi Galium-65?

A 30·0 minutes
30·0 *minit*

B 23·4 minutes
23·4 *minit*

C 15·0 minutes
15·0 *minit*

D 7·5 minutes
7·5 *minit*

49 Diagram 27 shows the equation for the decaying of nucleus X.

Rajah 27 menunjukkan persamaan bagi pereputan nukleus X.

$$X \longrightarrow {}^{226}_{88}Ra + {}^{4}_{2}He + Energy$$

Diagram 27
Rajah 27

What is the number of protons and neutrons for nucleus X?

Berapakah bilangan proton dan neutron dalam nukleus X?

	Protons ***Proton***	**Neutrons** ***Neutron***
A	86	140
B	86	230
C	90	140
D	90	230

50 Table 2 shows the information of radioactive samples P, Q, R and S.
Jadual 2 menunjukkan maklumat bagi sampel radioaktif P, Q, R *dan* S.

Radioactive sample *Sampel radioaktif*	**Half-life** *Separuh hayat*	**Radiation emission** *Pancaran radiasi*
P	30 minutes 30 *minit*	γ -ray *Sinar-*γ
Q	5 hours 5 *jam*	β -particles *Zarah-*β
R	10 days 10 *hari*	β -particles *Zarah-*β
S	20 seconds 20 *saat*	γ -ray *Sinar-*γ

Table 2
Jadual 2

Which sample is most suitable to detect leakage in underground water pipes?
Sampel manakah yang paling sesuai untuk mengesan kebocoran dalam paip air bawah tanah?

A P

B Q

C R

D S

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

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 either **three** or **four** options. Choose the best option for each question and blacken the correct space on the objective answer sheet.

   Tiap-tiap soalan diikuti oleh sama ada **tiga** *atau* **empat** *pilihan jawapan. Pilih satu jawapan yang terbaik bagi setiap soalan dan hitamkan ruangan yang betul pada kertas jawapan objektif.*

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 scientific calculator.

   Anda dibenarkan menggunakan kalkulator saintifik.

8. A list of formulae is provided on pages 2 and 3.

   Satu senarai formula disediakan di halaman 2 *dan* 3.

