

SULIT
Fizik
Kertas 1
November
2022

1 $\frac{1}{4}$ jam



4531/1

MAKTAB RENDAH SAINS MARA

PEPERIKSAAN AKHIR SIJIL PENDIDIKAN MRSM 2022

FIZIK

Kertas 1

Satu jam lima belas minit

JANGAN BUKA KERTAS PEPERIKSAAN INI SEHINGGA DIBERITAHU

1. Kertas peperiksaan ini adalah dalam dwibahasa.
This paper is written in English and bahasa Melayu.
2. Soalan di atas adalah dalam bahasa Melayu dan soalan dalam bahasa Inggeris terdapat di bawahnya.
The question in Bahasa Melayu is written on top while the English version is below.
3. Calon dikehendaki membaca maklumat di halaman belakang kertas peperiksaan.
Candidates are required to read the information at the back of the booklet. ini.

Free download @telegram [soalanpercubaanspm](#)

Kertas peperiksaan ini mengandungi **40** halaman bercetak.

Rumus – rumus berikut boleh membantu anda menjawab soalan. Simbol – simbol yang diberi adalah yang biasa digunakan.

DAYA DAN GERAKAN I
FORCE AND MOTION I

- 1 $v = u + at$
- 2 $s = \frac{1}{2} (u + v)t$
- 3 $s = ut + \frac{1}{2} at^2$
- 4 $v^2 = u^2 + 2as$
- 5 Momentum = mv
- 6 $F = ma$

KEGRAVITIAN
GRAVITATION

- 1 $F = \frac{Gm_1m_2}{r^2}$
- 2 $g = \frac{Gm}{r^2}$
- 3 $F = \frac{mv^2}{r}$
- 4 $a = \frac{v^2}{r}$
- 5 $v = \frac{2\pi r}{T}$
- 6 $\frac{T_1^2}{r_1^3} = \frac{T_2^2}{r_2^3}$
- 7 $v = \sqrt{\frac{GM}{r}}$
- 8 $u = -\frac{GMm}{r}$
- 9 $v = \sqrt{\frac{2GM}{r}}$

HABA
HEAT

- 1 $Q = mc\theta$
- 2 $Q = ml$
- 3 $Q = Pt$
- 4 $P_1V_1 = P_2V_2$
- 5 $\frac{V_1}{T_1} = \frac{V_2}{T_2}$
- 6 $\frac{P_1}{T_1} = \frac{P_2}{T_2}$

GELOMBANG
WAVES

- 1 $v = f\lambda$
- 2 $\lambda = \frac{ax}{D}$

CAHAYA DAN OPTIK
LIGHT AND OPTICS

- 1 $n = \frac{c}{v}$
- 2 $n = \frac{\sin i}{\sin r}$
- 3 $n = \frac{1}{\sin c}$
- 4 $n = \frac{H}{h}$
- 5 $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$
- 6 $n_1 \sin \theta_1 = n_2 \sin \theta_2$
- 7 Pembesaran linear, $m = \frac{v}{u}$
Linear magnification, $m = \frac{v}{u}$

DAYA DAN GERAKAN II
FORCE AND MOTION II

1 $F = kx$

2 $E = \frac{1}{2} Fx$

3 $E = \frac{1}{2} kx^2$

TEKANAN
PRESSURE

1 $P = \frac{F}{A}$

2 $P = h\rho g$

3 $\rho = \frac{m}{v}$

ELEKTRIK
ELECTRICITY

1 $E = \frac{F}{Q}$ 6 $\mathcal{E} = V + Ir$

2 $I = \frac{Q}{t}$ 7 $P = VI$

3 $V = \frac{E}{Q}$ 8 $P = \frac{E}{t}$

4 $V = IR$ 9 $E = \frac{V}{d}$

5 $R = \frac{\rho l}{A}$

KEELEKTROMAGNETAN
ELECTROMAGNETISM

1 $\frac{V_s}{V_p} = \frac{N_s}{N_p}$

2 $\eta = \frac{\text{Kuasa output}}{\text{Kuasa input}} \times 100\%$

$\eta = \frac{\text{Output power}}{\text{Input power}} \times 100\%$

ELEKTRONIK
ELECTRONICS

1 Tenaga keupayaan elektrik, $E = eV$
Electrical potential energy, $E = eV$

2 Tenaga kinetik maksimum, $E = \frac{1}{2}mv^2$
Maximum kinetic energy, $E = \frac{1}{2}mv^2$

3 $\beta = \frac{I_C}{I_B}$

FIZIK NUKLEAR
NUCLEAR PHYSICS

1 $N = \left(\frac{1}{2}\right)^n N_0$

2 $E = mc^2$

3 $c = 3.00 \times 10^8 \text{ m s}^{-1}$

4 1 u.j.a = $1.66 \times 10^{-27} \text{ kg}$
1 a.m.u = $1.66 \times 10^{-27} \text{ kg}$

FIZIK KUANTUM
QUANTUM PHYSICS

1 $E = hf$

2 $f = \frac{c}{\lambda}$

3 $\lambda = \frac{h}{p}$

4 $\lambda = \frac{h}{mv}$

5 $E = \frac{hc}{\lambda}$

6 $P = nhf$

7 $hf = W + \frac{1}{2}mv_{\text{maks}}^2$

8 $W = hf_0$

PEMALAR
CONSTANT

1 $g = 9.81 \text{ m s}^{-2}$ @ 9.81 N kg^{-1}

2 $G = 6.67 \times 10^{-11} \text{ N m}^2 \text{ kg}^{-2}$

3 $h = 6.63 \times 10^{-34} \text{ J s}$

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SULIT

1 Kuantiti fizik manakah merupakan kuantiti skalar?

Which physical quantity is a scalar quantity?

A Jisim
Mass

B Berat
Weight

C Halaju
Velocity

D Pecutan
Acceleration

2 Jadual 1 menunjukkan senarai unit kuantiti terbitan.

Table 1 shows a list of units of derived quantities.

Antara berikut pasangan manakah yang betul?

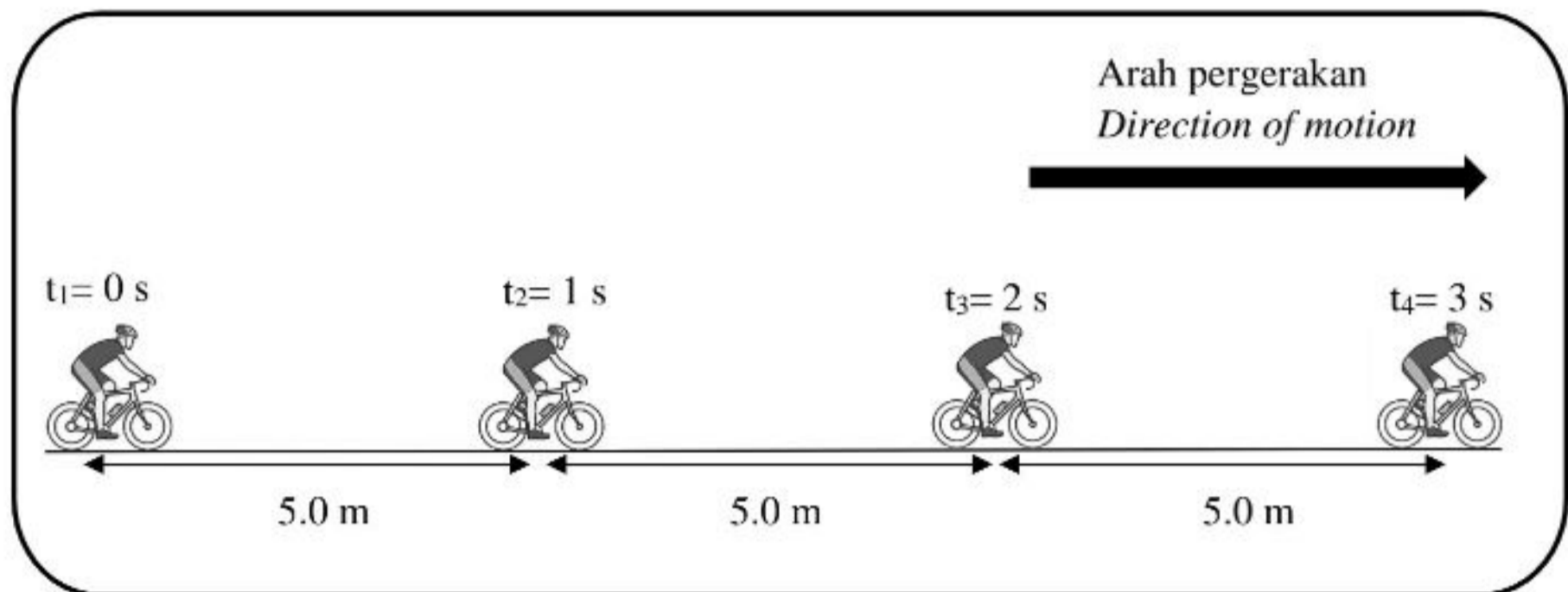
Which of the following pair is correct?

	Kuantiti Terbitan <i>Derived Quantities</i>	Unit <i>Units</i>
A	Momentum <i>Momentum</i>	kg m^{-3} kg m^{-3}
B	Tekanan <i>Pressure</i>	N m^{-3} N m^{-3}
C	Kerja <i>Work</i>	N m s^{-1} N m s^{-1}
D	Daya <i>Force</i>	kg m s^{-2} kg m s^{-2}

Jadual 1
Table 1

3 Rajah 1 menunjukkan gerakan sebuah basikal.

Diagram 1 shows the motion of a bicycle.



Rajah 1
Diagram 1

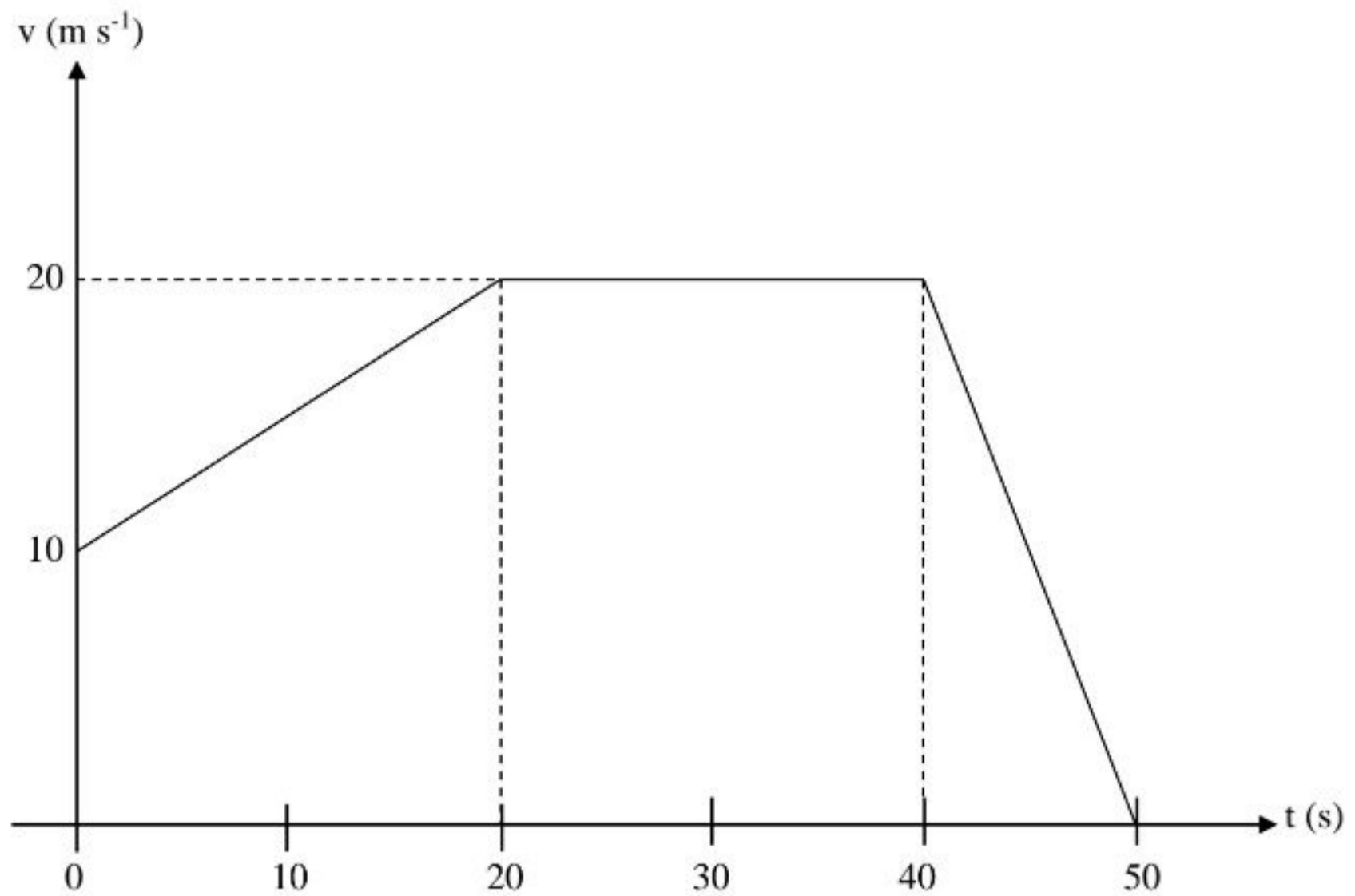
Apakah jenis gerakan tersebut?

What is the type of motion?

- A Halaju seragam.
Uniform velocity.
- B Halaju berkurang.
Decreasing velocity.
- C Halaju meningkat.
Increasing velocity.
- D Halaju tidak seragam.
Non – uniform velocity.

4 Rajah 2 menunjukkan graf halaju, v melawan masa, t bagi sebuah objek.

Diagram 2 shows a graph of velocity, v against time, t of an object.



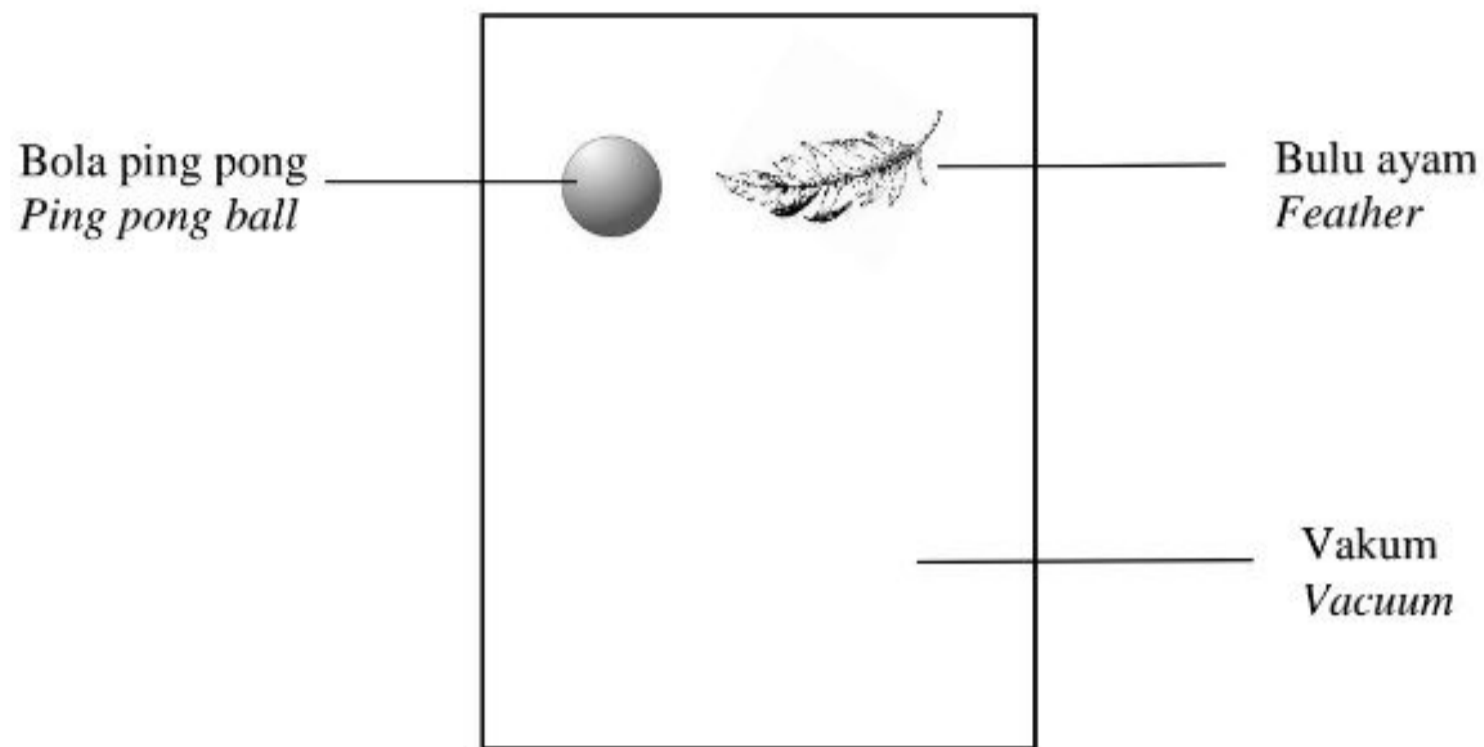
Rajah 2
Diagram 2

Pernyataan manakah yang benar?

Which statement is correct?

- A** Jumlah sesaran objek dalam masa 50 s ialah 700 m.
Total displacement object in 50 s is 700 m.
- B** Objek tersebut kekal pegun dari $t = 20$ s hingga $t = 40$ s.
The object remains stationary from $t = 20$ s to $t = 40$ s.
- C** Objek bergerak dengan nyahpecutan dari $t = 40$ s hingga $t = 50$ s.
The object decelerates from $t = 40$ s to $t = 50$ s.
- D** Objek bergerak dengan pecutan bertambah dari $t = 0$ s hingga $t = 20$ s.
The object moves with increasing acceleration from $t = 0$ s to $t = 20$ s.

- 5 Rajah 3 menunjukkan dua objek yang dijatuhkan dari ketinggian yang sama dalam vakum.
Diagram 3 shows two objects dropped from the same height in vacuum.



Rajah 3
Diagram 3

Apakah yang berlaku kepada pecutan kedua-dua objek?

What happen to the acceleration of both objects?

- A** Kedua-dua objek mempunyai pecutan sifar.
Both objects have zero acceleration.
- B** Kedua-dua objek mempunyai pecutan yang sama.
Both objects have same acceleration.
- C** Pecutan bola ping pong lebih kecil dari bulu ayam.
The acceleration of ping pong ball is smaller than feather.
- D** Pecutan bola ping pong lebih besar dari bulu ayam.
The acceleration of ping pong ball is greater than feather.

- 6 Rajah 4 menunjukkan payung yang basah dipusing dan dihentikan dengan tiba-tiba menyebabkan titisan air meninggalkan permukaan payung.

Diagram 4 shows a wet umbrella is rotated with a sudden stop causes water droplets leave the surface of the umbrella.



Rajah 4
Diagram 4

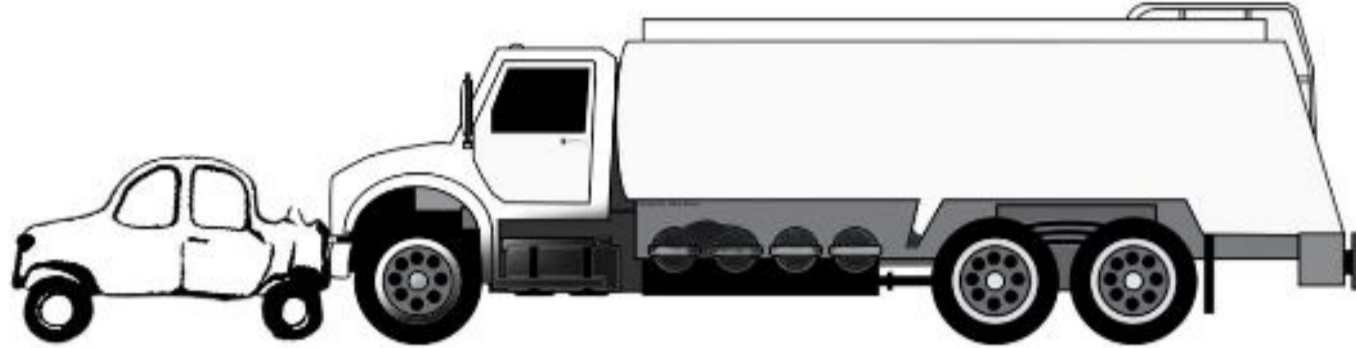
Hukum fizik manakah menerangkan situasi di atas?

Which physics law explained the above situation?

- A** Hukum Gerakan Newton Pertama.
Newton's First Law of Motion.
- B** Hukum Gerakan Newton Kedua.
Newton's Second Law of Motion.
- C** Hukum Gerakan Newton Ketiga.
Newton's Third Law of Motion.
- D** Hukum Kegravitian Semesta Newton.
Newton's Universal Law of Gravitation.

- 7 Rajah 5 menunjukkan lori tangki minyak berjisim 7500 kg melanggar sebuah kereta berjisim 1000 kg. Sebelum pelanggaran, lori dan kereta bergerak pada arah yang sama dengan kelajuan masing-masing 30 m s^{-1} dan 25 m s^{-1} .

Diagram 5 shows an oil tanker of mass 7500 kg collides with a car of mass 1000 kg. The lorry and car move in the same direction with velocity of 30 m s^{-1} and 25 m s^{-1} respectively before collision.



Rajah 5
Diagram 5

Selepas pelanggaran, kedua-dua kenderaan melekat bersama-sama. Berapakah halaju akhir, v kedua-dua kenderaan?

After collision, both vehicles stick together. What is the final velocity, v of both vehicles?

- | | |
|----------------------------|----------------------------|
| A 2.94 m s^{-1} | B 25.59 m s^{-1} |
| C 29.41 m s^{-1} | D 33.33 m s^{-1} |
- 8 Pernyataan manakah betul menerangkan berat?
Which statement is correct to describe weight?
- A Daya angkat yang bertindak ke atas objek.
The lifting force acting on the object.
 - B Daya geseran yang bertindak ke atas objek.
The frictional force acting on the object.
 - C Daya graviti yang bertindak ke atas objek.
The gravitational force acting on the object.
 - D Daya tujah ke depan yang bertindak ke atas objek.
The forward force acting on the object.

- 9 Rajah 6 menunjukkan satelit Teleskop Angkasa Hubble berjisim 11000 kg yang mengorbit pada ketinggian 547 km dari permukaan bumi.

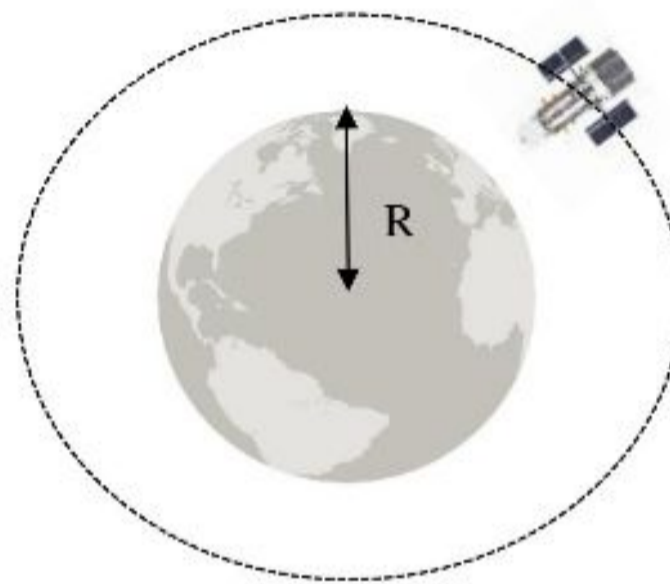
[Jejari Bumi, $R = 6.37 \times 10^6$ m]

[Jisim Bumi, $M = 5.97 \times 10^{24}$ kg]

Diagram 6 shows the Hubble Space Telescope satellite with mass of 11000 kg orbits at a height of 547 km above the earth's surface.

[Radius of the Earth, $R = 6.37 \times 10^6$ m]

[Mass of the Earth, $M = 5.97 \times 10^{24}$ kg]



Rajah 6
Diagram 6

Berapakah daya graviti satelit tersebut?

What is the gravitational force of the satellite?

A 9.155×10^4 N

B 1.079×10^5 N

C 1.464×10^7 N

D 6.332×10^{11} N

- 10** Manakah antara satelit berikut yang paling sesuai untuk digunakan bagi siaran langsung Piala Dunia FIFA Qatar 2022?

Which of the following satellites is the most suitable to be used for live broadcast of 2022 FIFA World Cup Qatar?

- A** Satelit geopegun dengan tempoh orbit 72 jam.
Geostationary satellite with 72 hours orbital period.
- B** Satelit geopegun dengan tempoh orbit 24 jam.
Geostationary satellite with 24 hours orbital period.
- C** Satelit bukan geopegun dengan tempoh orbit 24 jam.
Non-geostationary satellite with 24 hours orbital period.
- D** Satelit bukan geopegun dengan tempoh orbit 18 jam.
Non-geostationary satellite with orbital period 18 hours.

11 Rajah 7 menunjukkan periuk yang mempunyai tapak Aluminium.

Diagram 7 shows a pot with Aluminium base.



Rajah 7
Diagram 7

Apakah yang terjadi kepada masa memasak makanan jika tapak periuk tersebut digantikan dengan Kuprum?

[Muatan haba tentu Aluminium = $900 \text{ J kg}^{-1} \text{ }^\circ\text{C}^{-1}$]
[Muatan haba tentu Kuprum = $390 \text{ J kg}^{-1} \text{ }^\circ\text{C}^{-1}$]

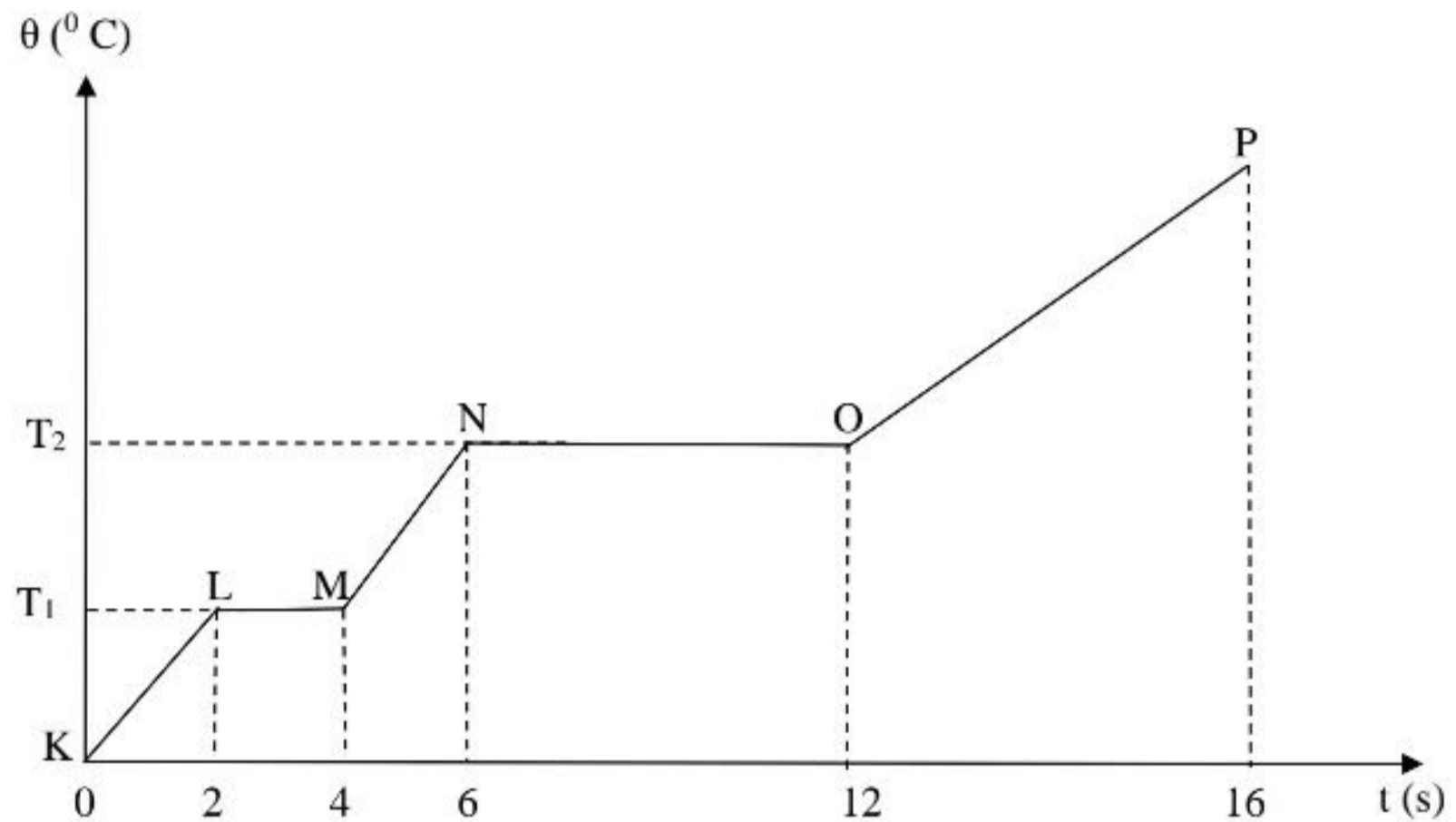
What happen to the time to cook the food if the base of the pot is replaced with Copper?

[*Specific heat capacity of Aluminium = $900 \text{ J kg}^{-1} \text{ }^\circ\text{C}^{-1}$*]
[*Specific heat capacity of Copper = $390 \text{ J kg}^{-1} \text{ }^\circ\text{C}^{-1}$*]

- A Bertambah
Increase
- B Berkurang
Decrease
- C Kekal sama
Remain the same

12 Rajah 8 menunjukkan graf pemanasan suhu, θ melawan masa, t bagi bahan X.

Diagram 8 shows a heating graph of temperature, θ against time, t for substance X.



Rajah 8
Diagram 8

Pernyataan manakah yang benar?

Which statement is correct?

- A** Haba yang dibekalkan semasa NO digunakan untuk mengatasi daya tarikan antara molekul - molekul.

Heat supplied during NO is used to overcome force of attraction between molecules.

- B** Haba yang dibekalkan semasa LM digunakan untuk meningkatkan suhu bahan.

Heat supplied during LM is used to increase the temperature of the substance.

- C** Haba yang dibekalkan semasa MN dipanggil haba pendam tentu pelakuran.

Heat supplied during MN is called specific latent heat of fusion.

- D** Semasa OP, purata tenaga kinetik molekul adalah malar.

During OP, average kinetic energy of molecules are constant.

- 13 Rajah 9 (a) menunjukkan sebiji belon diletakkan di atas pinggan.
Rajah 9 (b) menunjukkan belon tersebut selepas cecair nitrogen dituang ke atasnya.

Diagram 9 (a) shows a balloon is put on a plate.

Diagram 9 (b) shows the balloon after nitrogen liquid was poured over it.



Rajah 9 (a)
Diagram 9 (a)



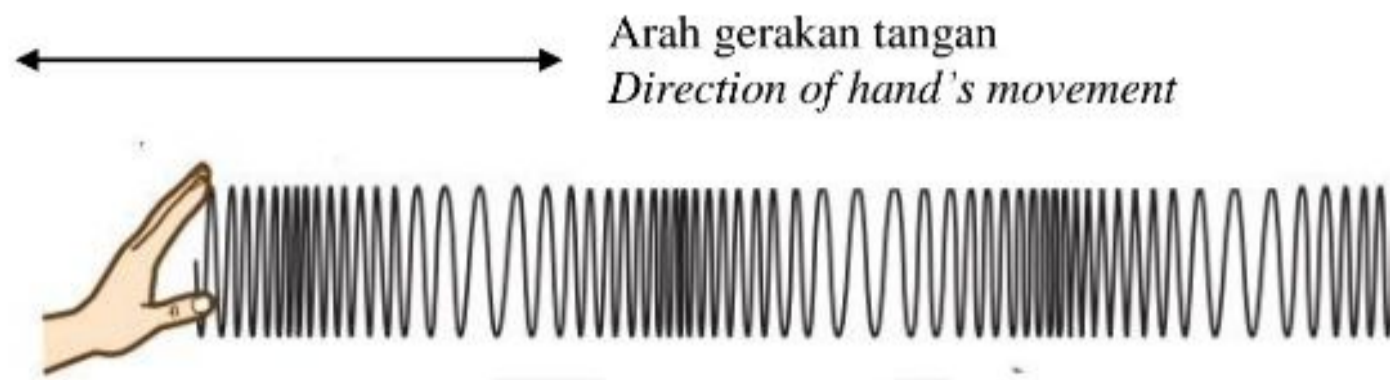
Rajah 9 (b)
Diagram 9 (b)

Hukum Fizik manakah yang menerangkan situasi di atas?

Which Physics law explains the situation above?

- A Hukum Lenz
Lenz's Law
- B Hukum Boyle
Boyle's Law
- C Hukum Charles
Charles' Law
- D Hukum Gay-Lussac
Gay-Lussac's Law

- 14 Rajah 10 menunjukkan spring slinki digerakkan ke hadapan dan belakang pada satu hujungnya.
Diagram 10 shows a slinky spring being moved forward and backward at one of its ends.



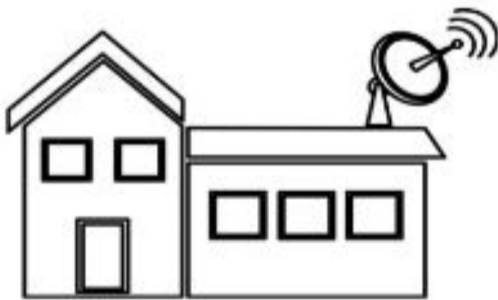
Rajah 10
Diagram 10

Situasi yang manakah menghasilkan jenis gelombang yang sama seperti di atas?
Which of the following situation produce same type of wave as above?

A



B



C



D



15 Rajah 11 menunjukkan seorang budak lelaki di atas buaian.

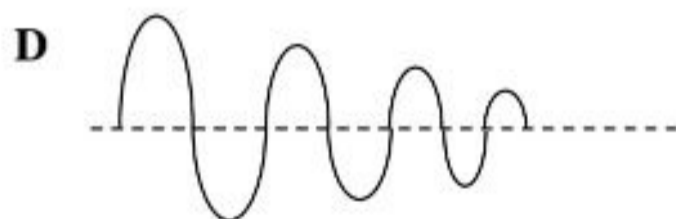
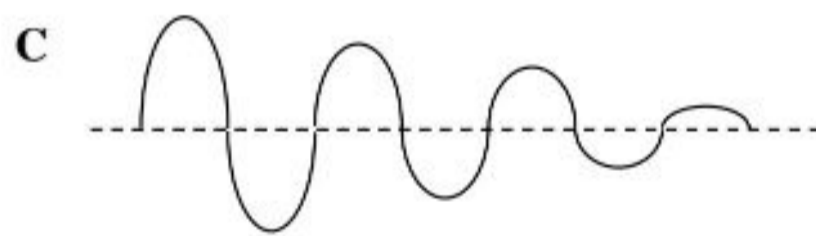
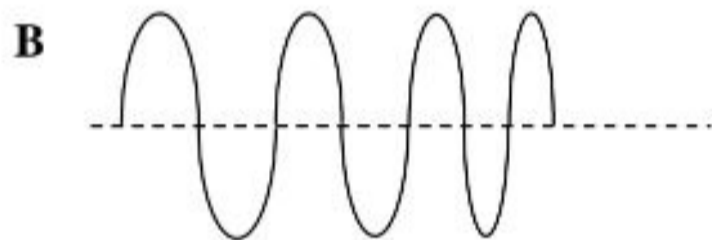
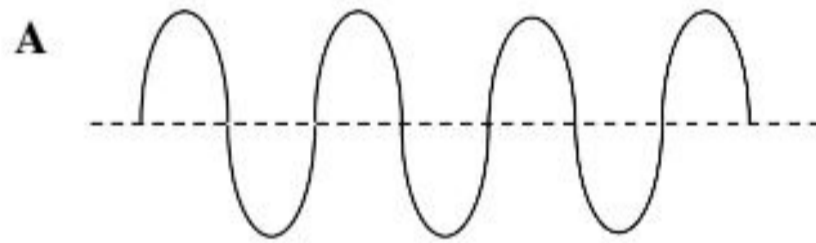
Diagram 11 shows a boy on a swing.



Rajah 11
Diagram 11

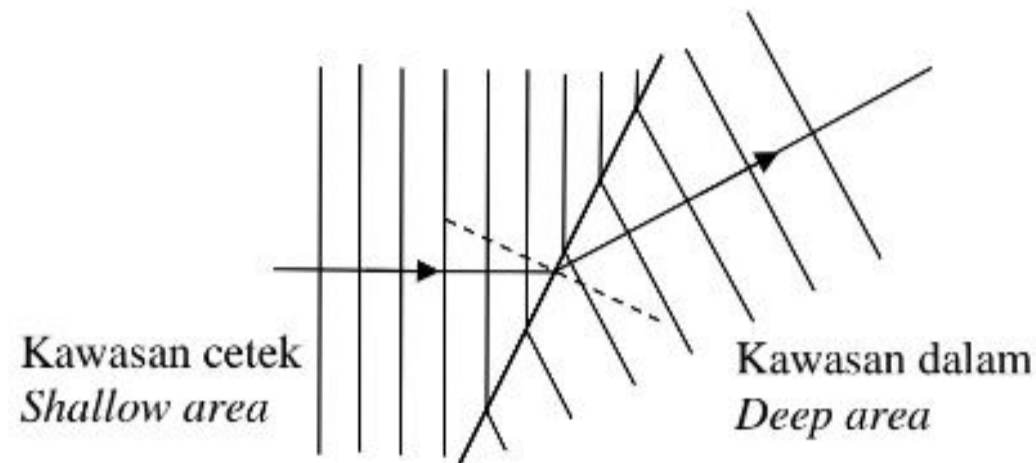
Buaian tersebut mengalami pelembapan.
Jawapan manakah yang betul?

The swing undergoes damping.
Which answer is correct?



16 Rajah 12 menunjukkan gelombang air merambat dari kawasan cetek ke kawasan dalam.

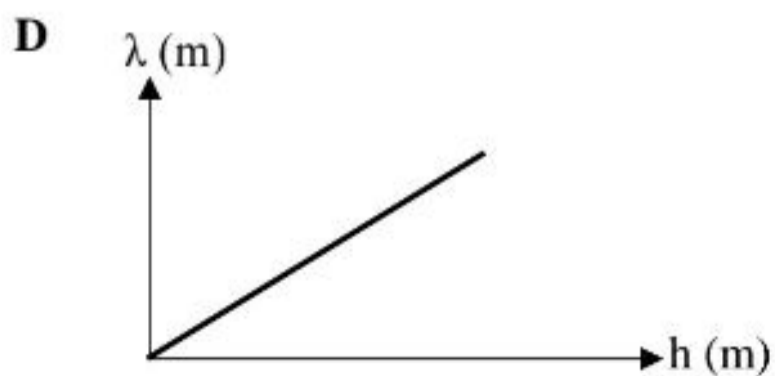
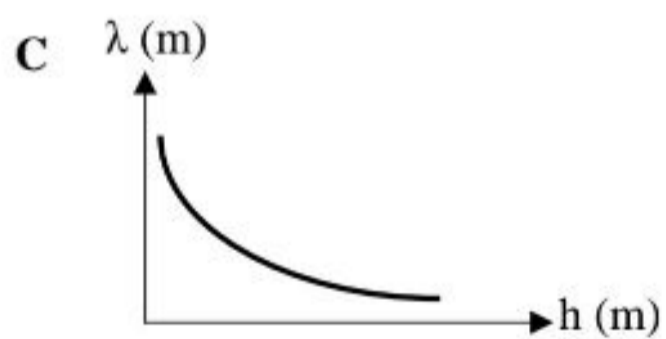
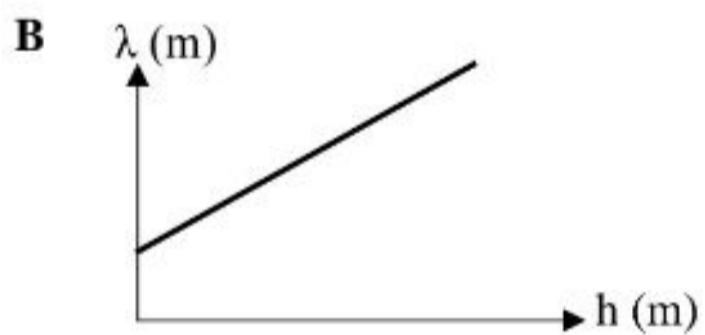
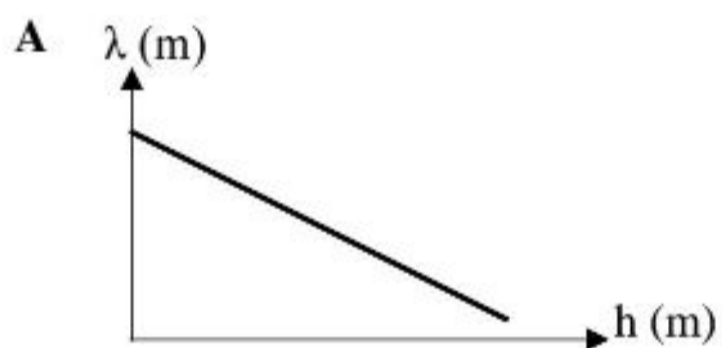
Diagram 12 shows water waves propogates from shallow area to deep area.



Rajah 12
Diagram 12

Graf yang manakah mewakili hubungan antara panjang gelombang, λ dan kedalaman air, h ?

Which graph represents the relationship between wavelength, λ and depth, h of the water?



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SULIT

17 Rajah 13 menunjukkan hologram pada sekeping kad bank.

Diagram 13 shows hologram on a bank card.



Rajah 13
Diagram 13

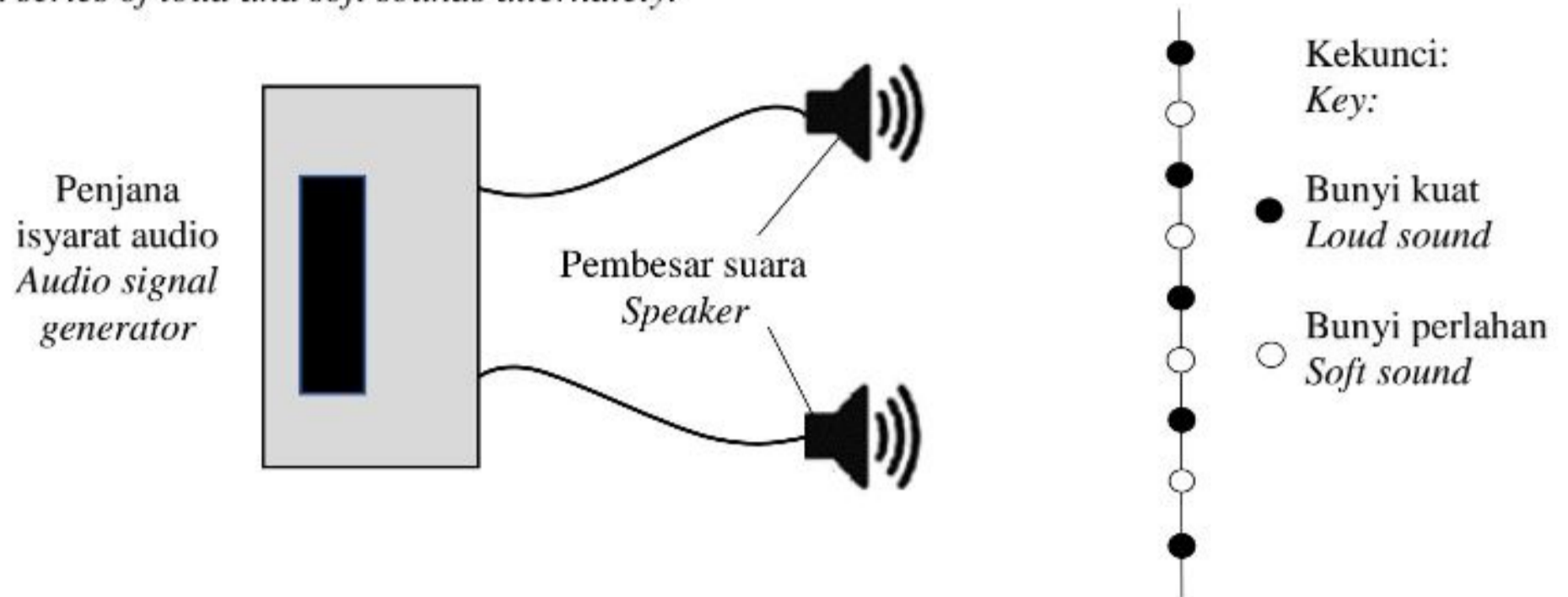
Kuantiti manakah yang berubah apabila cahaya melepasi hologram tersebut?

Which quantity changes when the light pass through the hologram?

- A Laju berkurang
Speed decreases
- B Tenaga berkurang
Energy decreases
- C Frekuensi berkurang
Frequency decreases
- D Panjang gelombang berkurang
Wavelength decreases

- 18 Rajah 14 menunjukkan dua pembesar suara yang disambungkan kepada satu penjana isyarat audio. Pembesar suara menghasilkan siri bunyi kuat dan perlahan berselang seli.

Diagram 14 shows two speakers connected to an audio signal generator. The speakers produced a series of loud and soft sounds alternately.



Rajah 14
Diagram 14

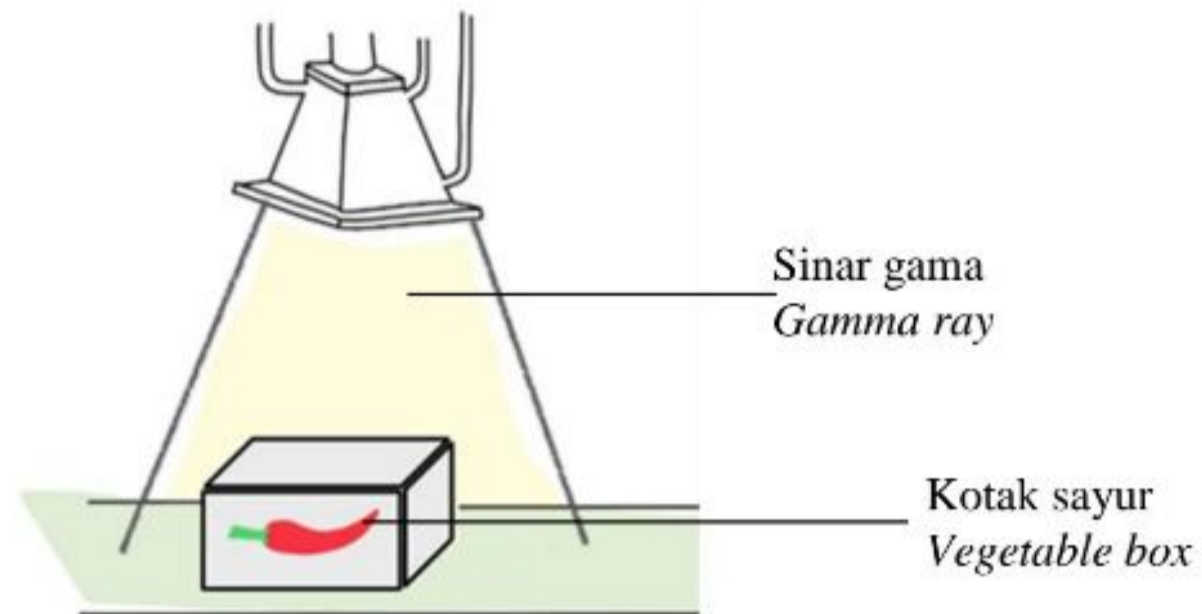
Jarak di antara dua bunyi kuat yang berturutan bertambah apabila
The distance between two consecutive loud sound increases when

- A frekuensi bunyi berkurang.
the frequency of sound decreases.
- B panjang gelombang berkurang.
wavelength decreases.
- C jarak di antara dua pembesar suara bertambah.
the distance between two speakers increases.
- D jarak serenjang dari pembesar suara dan kedudukan di mana siri bunyi kuat dan perlahan dihasilkan berkurang.
the perpendicular distance from the speakers and the position where series of loud and soft sound produced decreases.

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SULIT

19 Rajah 15 menunjukkan sinar gama digunakan untuk mengekalkan kesegaran sayur.

Diagram 15 shows gamma ray used to maintain the freshness of vegetables.



Rajah 15
Diagram 15

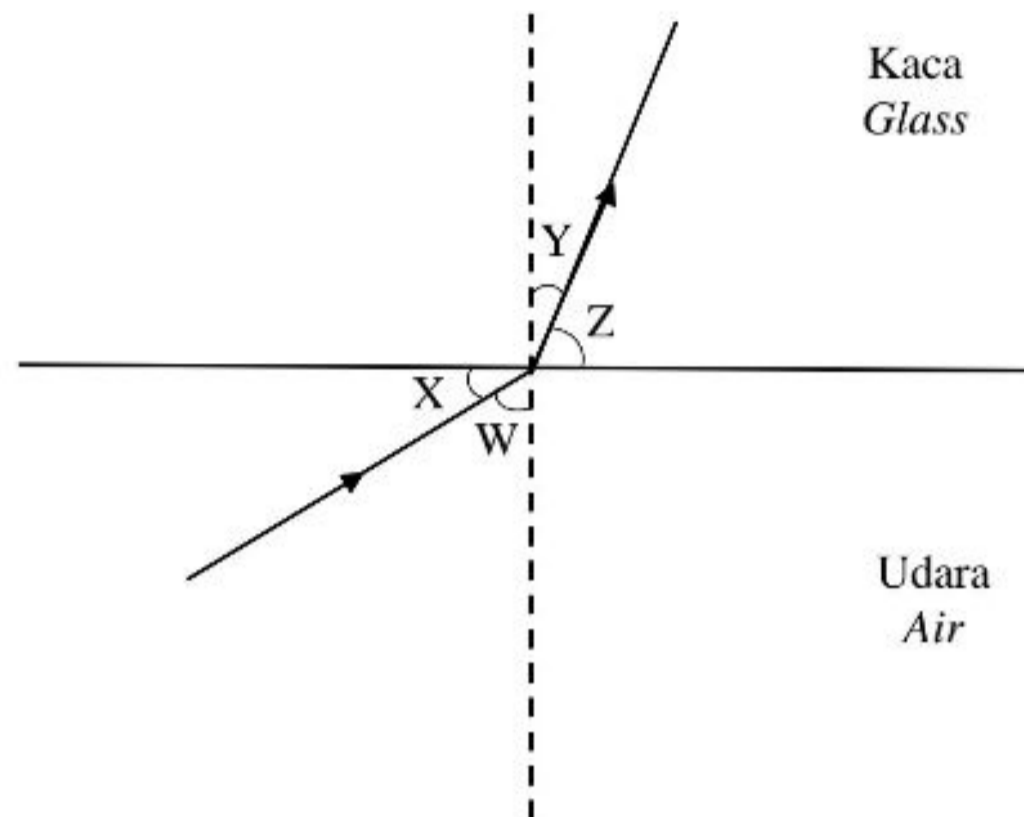
Pasangan ciri manakah yang betul?

Which pair of characteristics is correct?

	Panjang gelombang <i>Wavelength</i>	Frekuensi <i>Frequency</i>
A	Pendek <i>Short</i>	Tinggi <i>High</i>
B	Pendek <i>Short</i>	Rendah <i>Low</i>
C	Panjang <i>Long</i>	Tinggi <i>High</i>
D	Panjang <i>Long</i>	Rendah <i>Low</i>

20 Rajah 16 menunjukkan satu sinar cahaya merambat dari udara ke kaca.

Diagram 16 shows a light ray propagates from air to glass.



Rajah 16
Diagram 16

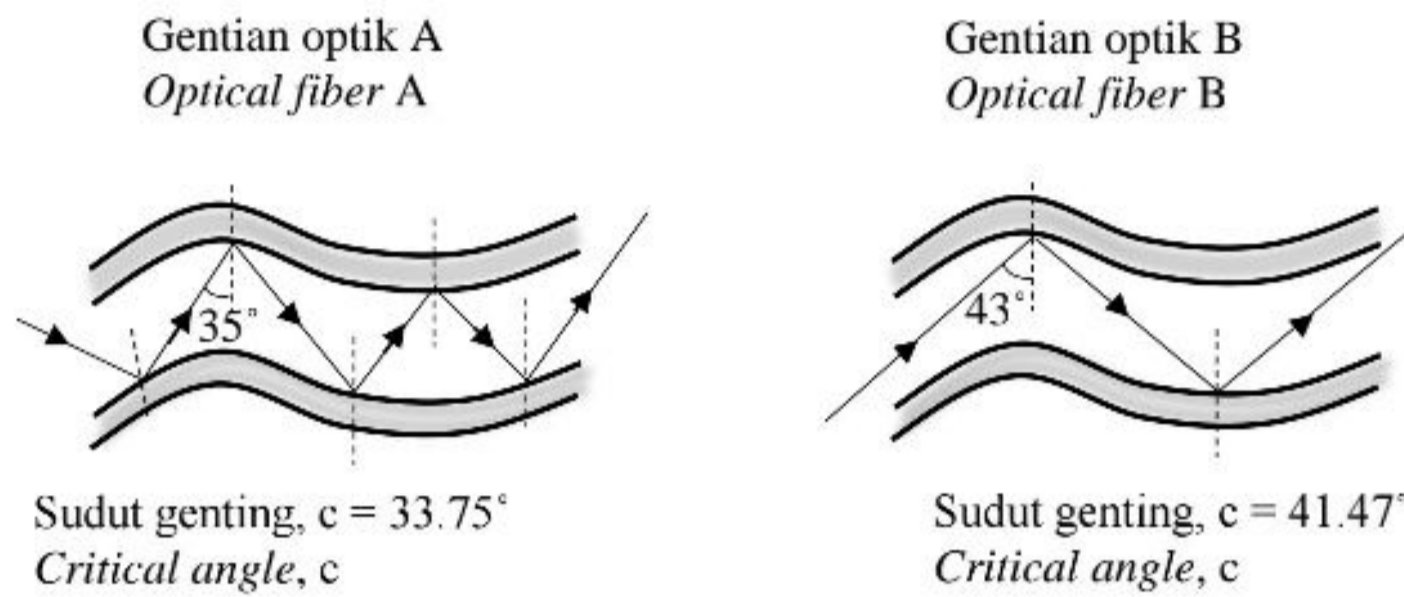
Apakah indeks biasan kaca itu?

What is the refractive index of the glass?

- A $\frac{\sin Y}{\sin W}$
- B $\frac{\sin W}{\sin Y}$
- C $\frac{\sin Z}{\sin X}$
- D $\frac{\sin X}{\sin Z}$

- 21 Rajah 17 menunjukkan dua kabel gentian optik yang digunakan untuk penghantaran maklumat dalam sistem telekomunikasi.

Diagram 17 shows two optical fiber cables that are used in transferring information in telecommunication systems.



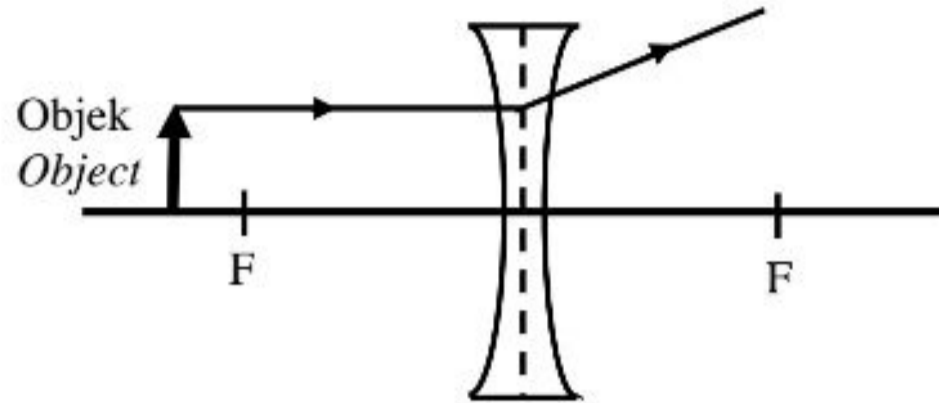
Rajah 17
Diagram 17

Pasangan ciri manakah dapat mengurangkan kehilangan maklumat semasa penghantaran?
 Which pair of characteristic can reduce information lost during transmission?

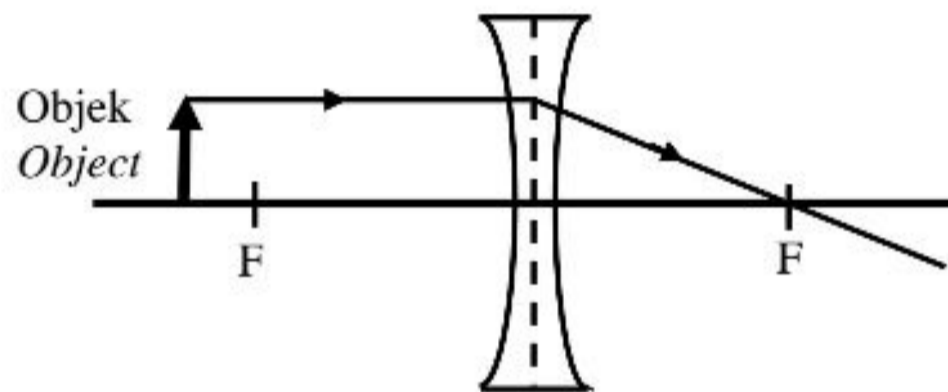
	Nilai indeks biasan teras dalam <i>Refractive index of inner core</i>	Pantulan dalam penuh <i>Total internal reflection</i>
A	Tinggi <i>Higher</i>	Tinggi <i>Higher</i>
B	Rendah <i>Lower</i>	Rendah <i>Lower</i>
C	Tinggi <i>Higher</i>	Rendah <i>Lower</i>
D	Rendah <i>Lower</i>	Tinggi <i>Higher</i>

- 22 Rajah manakah menunjukkan lintasan sinar cahaya yang betul?
Which diagram shows the correct path of light ray?

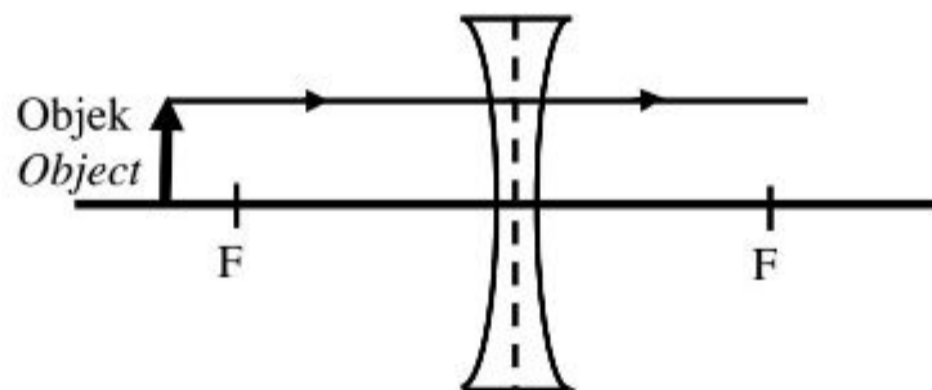
A



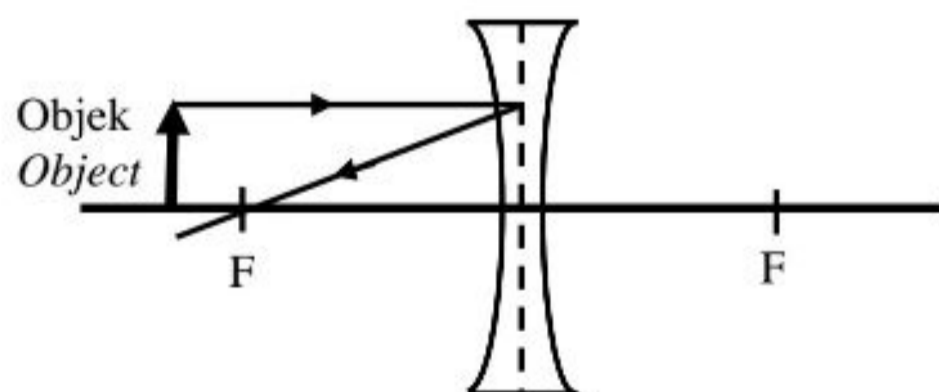
B



C

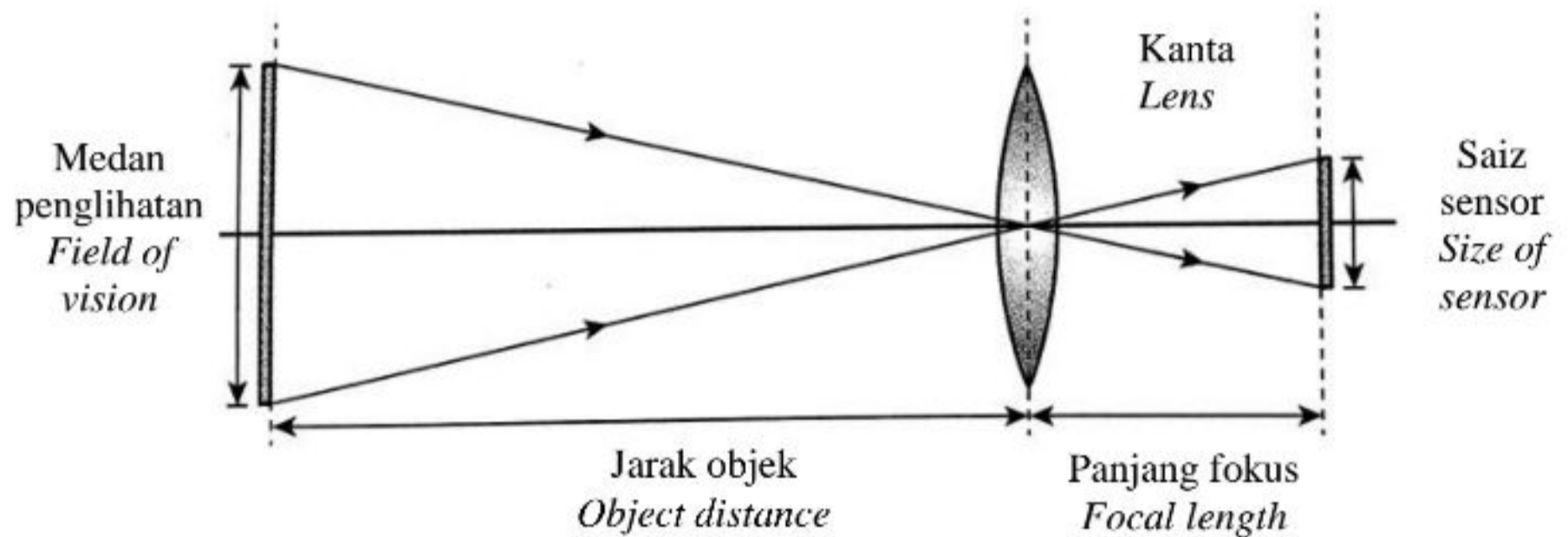


D



23 Rajah 18 menunjukkan imej nyata, kecil dan songsang yang terbentuk oleh kanta cembung.

Diagram 18 shows a real, diminished and inverted image formed by convex lens.



Rajah 18
Diagram 18

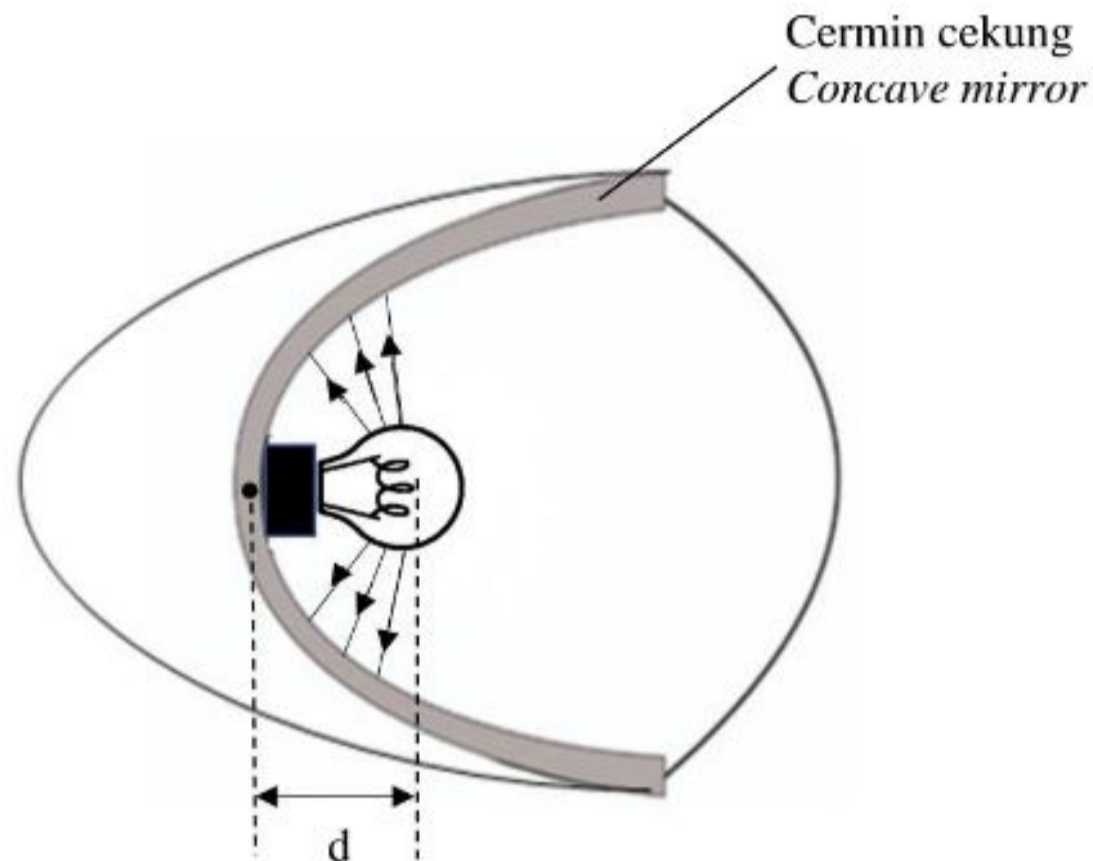
Alatan manakah yang menghasilkan imej yang sama seperti Rajah 18?

Which instrument produced image as in Diagram 18?

- A Teleskop
Telescope
- B Projektor LCD
LCD Projector
- C Kamera telefon pintar
Smartphone camera
- D Mikroskop majmuk
Compound microscope

- 24 Rajah 19 menunjukkan keratan rentas cermin cekung bersama mentol yang digunakan pada lampu hadapan kereta. Jarak antara mentol dan kutub cermin sfera adalah d .

Diagram 19 shows a cross sectional area of a concave mirror with bulb used in a car headlight. Distance between bulb and pole of spherical mirror is d .



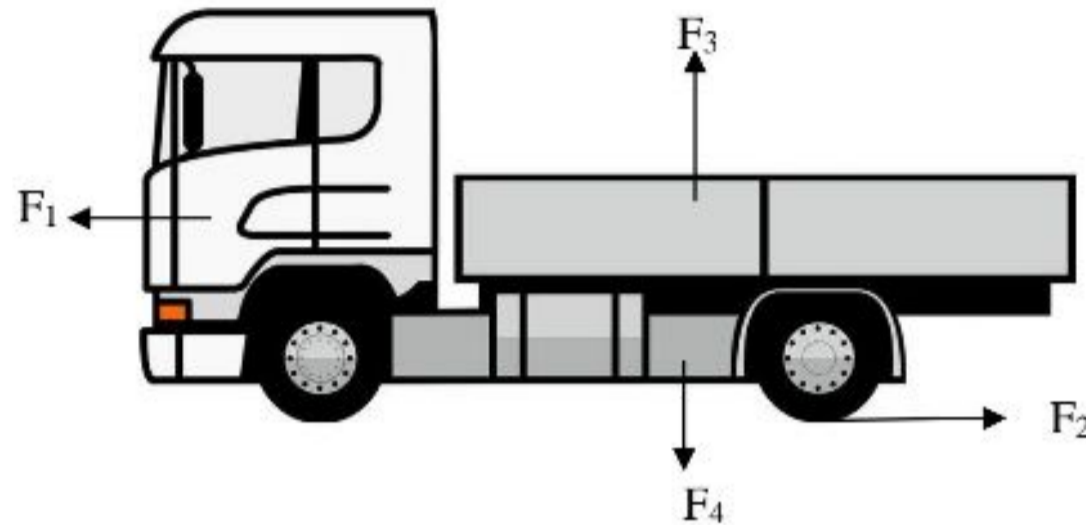
Rajah 19
Diagram 19

Kedudukan mentol yang manakah menghasilkan pantulan cahaya yang selari?
At which position bulb will produce parallel reflection of light?

- A** $d <$ panjang fokus, f
 $d <$ focal length, f
- B** $d >$ panjang fokus, f
 $d >$ focal length, f
- C** $d =$ panjang fokus, f
 $d =$ focal length, f
- D** $d >$ dua kali panjang fokus, $2f$
 $d >$ two times focal length, $2f$

- 25 Rajah 20 menunjukkan sebuah lori berada dalam keadaan pegun. F_1 , F_2 , F_3 dan F_4 ialah daya-daya yang bertindak ke atas lori tersebut.

Diagram 20 shows a lorry at rest. F_1 , F_2 , F_3 and F_4 are the forces acting on the lorry.



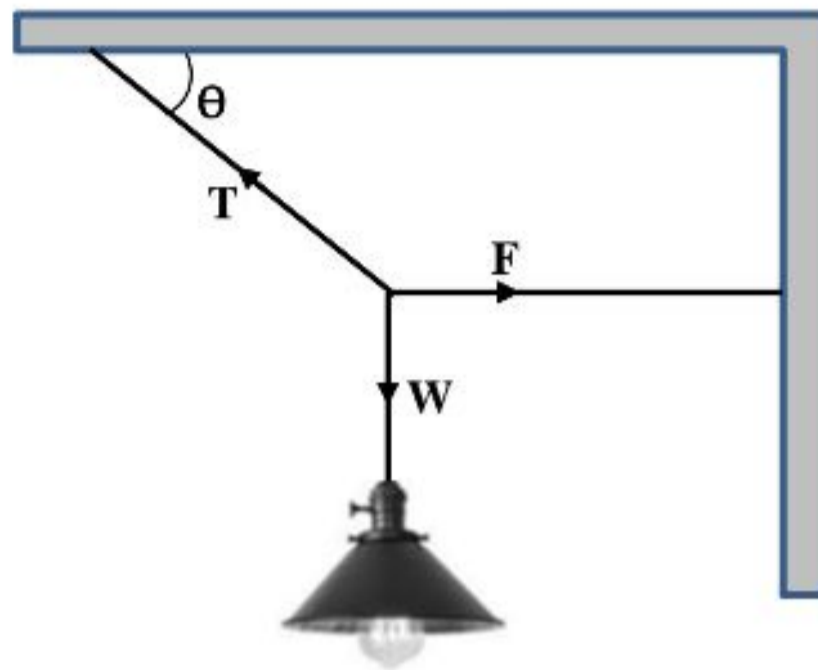
Rajah 20
Diagram 20

Persamaan manakah menunjukkan hubungan daya-daya yang betul apabila lori mula bergerak ke hadapan?

Which equation shows the correct relationship of forces when the lorry starts moving forward?

- A** $F_1 < F_2$ dan $F_3 = F_4$
 $F_1 < F_2$ and $F_3 = F_4$
- B** $F_3 < F_4$ dan $F_1 = F_2$
 $F_3 < F_4$ and $F_1 = F_2$
- C** $F_1 > F_2$ dan $F_3 = F_4$
 $F_1 > F_2$ and $F_3 = F_4$
- D** $F_3 > F_4$ dan $F_1 = F_2$
 $F_3 > F_4$ and $F_1 = F_2$

- 26 Rajah 21 menunjukkan sebuah lampu digantung menggunakan dua tali.
Diagram 21 shows a lamp hanging from two strings.



Rajah 21
Diagram 21

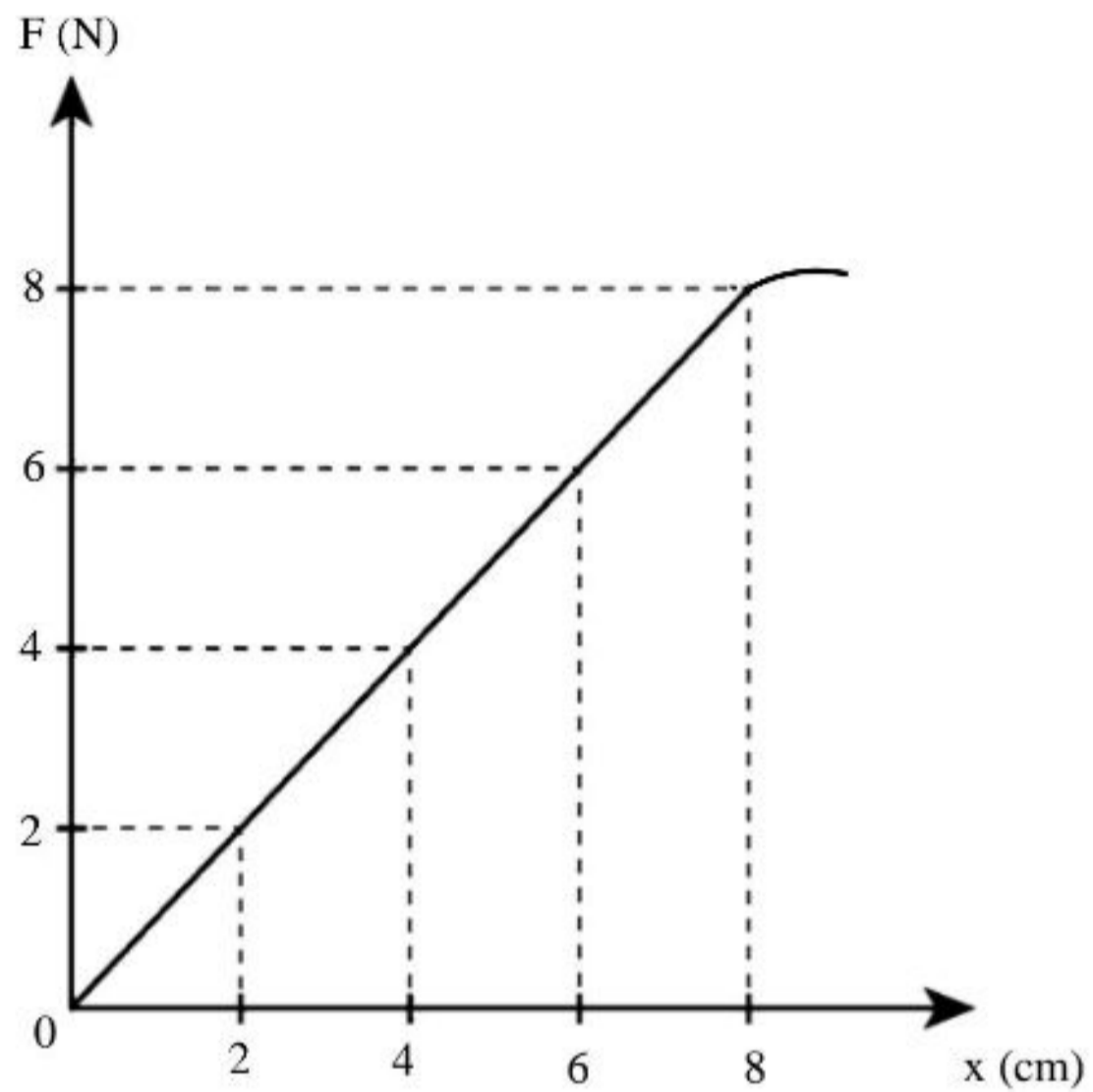
Persamaan manakah yang betul?

Which equation is correct?

- I. $T + F + W = 0$
- II. $T = F = W$
- III. $T \cos \theta = F$
- IV. $T \cos \theta = W$

- A I dan II sahaja
I and II only
- B I dan III sahaja
I and III only
- C II dan IV sahaja
II and IV only
- D III dan IV sahaja
III and IV only

- 27 Rajah 22 menunjukkan graf daya, F melawan pemanjangan spring, x .
Diagram 22 shows graph of force, F against extension of spring, x .



Rajah 22
Diagram 22

Tentukan had kenyal bagi spring itu.
Determine the elastic limit of the spring.

- A 2 N
- B 4 N
- C 6 N
- D 8 N

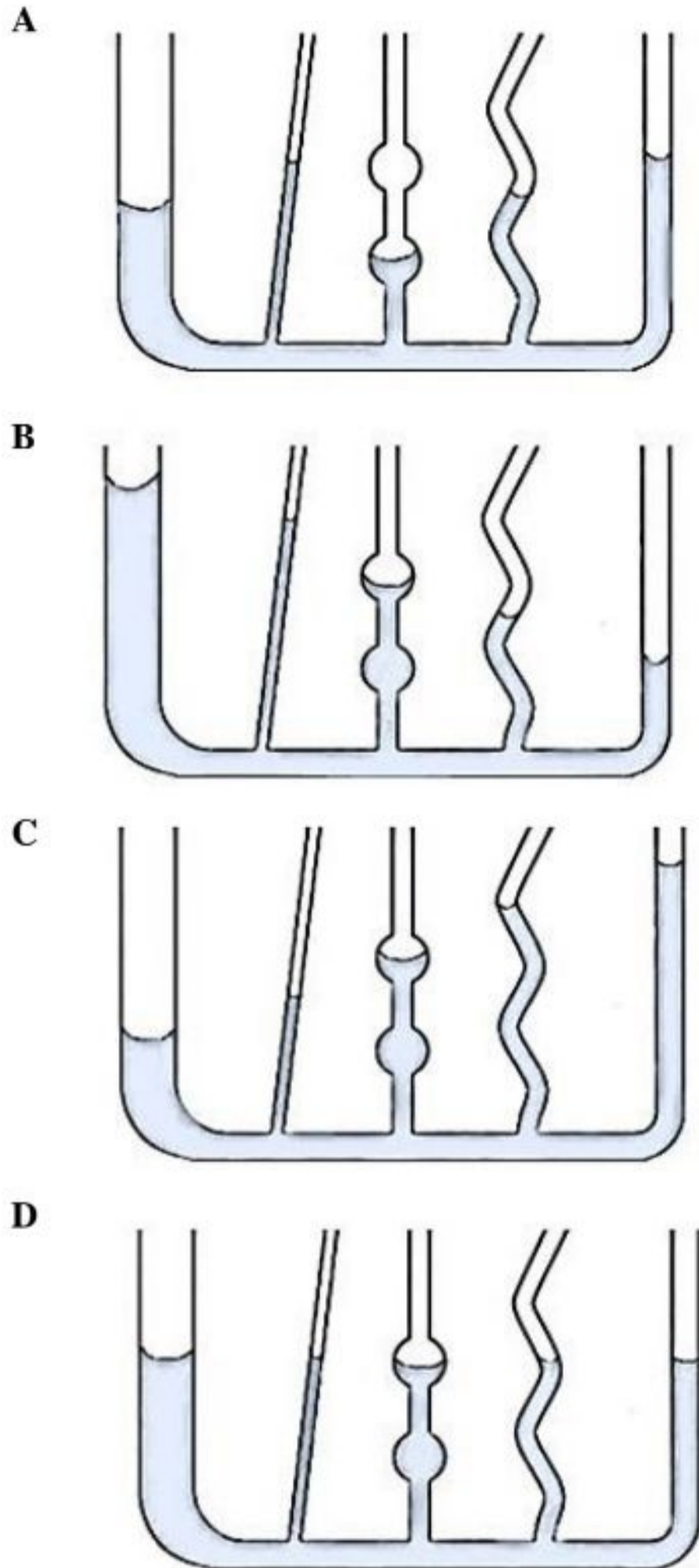
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28 Radas aras cecair diisi dengan air berwarna.

Liquid level apparatus is filled with coloured water.

Rajah manakah yang betul?

Which diagram is correct?



29 Antara berikut, alat manakah digunakan untuk mengukur tekanan atmosfera?

Which of the following instrument is used to measure the atmospheric pressure?

- I. Manometer
Manometer
- II. Barometer Aneroid
Aneroid Barometer
- III. Barometer Fortin
Fortin Barometer
- IV. Manometer Merkuri
Mercury Manometer

A I dan II

I and II

B II dan III

II and III

C I, II dan IV

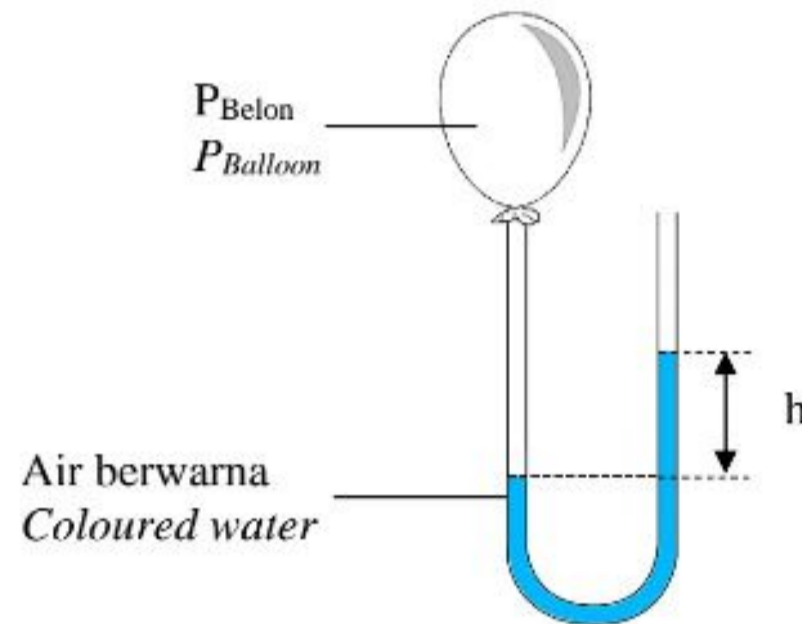
I, II and IV

D Semua di atas

All of the above

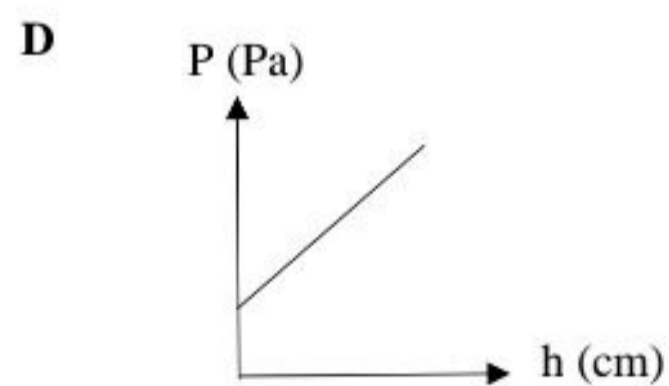
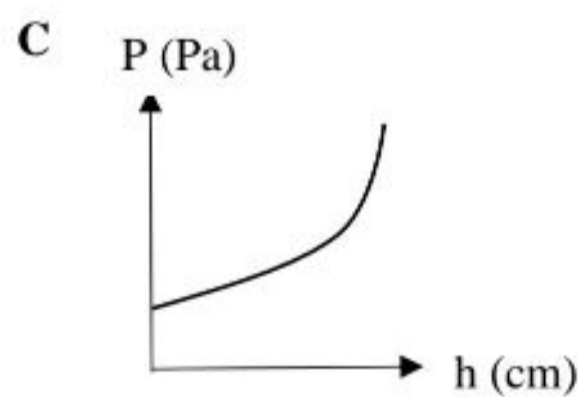
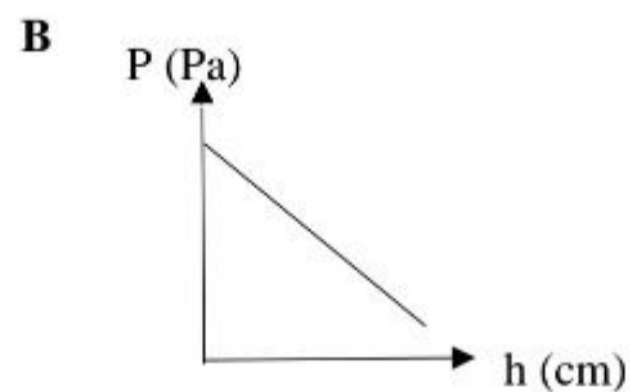
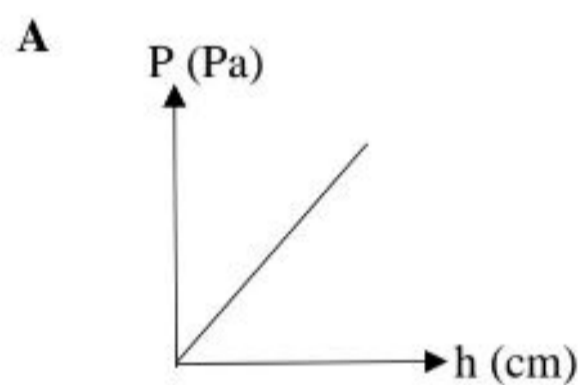
- 30 Rajah 23 menunjukkan satu eksperimen untuk menyiasat tekanan udara, P di dalam belon dan perbezaan ketinggian paras air, h di tiub U.

Diagram 23 shows an experiment to investigate air pressure, P in the balloon and the difference height of water level, h in U-tube



Rajah 23
Diagram 23

Graf manakah menunjukkan konsep yang betul apabila belon dicucuk dengan jarum?
Which graph shows a correct concept when the balloon is poked with needle?



- 31 Sebiji bola besi berjisim 0.5 kg tenggelam sepenuhnya dalam air. Berapakah isipadu bola jika berat ketara adalah 3.5 N?

[Ketumpatan air = 1000 kg m^{-3}]

A metal ball of mass 0.5 kg is completely immersed in water. What is the volume of ball if the apparent weight is 3.5 N?

[*Density of water = 1000 kg m^{-3}*]

- A $1.43 \times 10^{-4} \text{ m}^3$ B $1.50 \times 10^{-4} \text{ m}^3$
C $3.06 \times 10^{-4} \text{ m}^3$ D $3.57 \times 10^{-4} \text{ m}^3$
- 32 Rajah 24 menunjukkan rekaan *spoiler* yang digunakan pada kereta lumba untuk mengekalkan kestabilan pada kelajuan yang tinggi.

Diagram 24 shows a design of spoiler used in a racing car to maintain stability at high speed.



Rajah 24
Diagram 24

Prinsip fizik manakah menjelaskan situasi di atas?

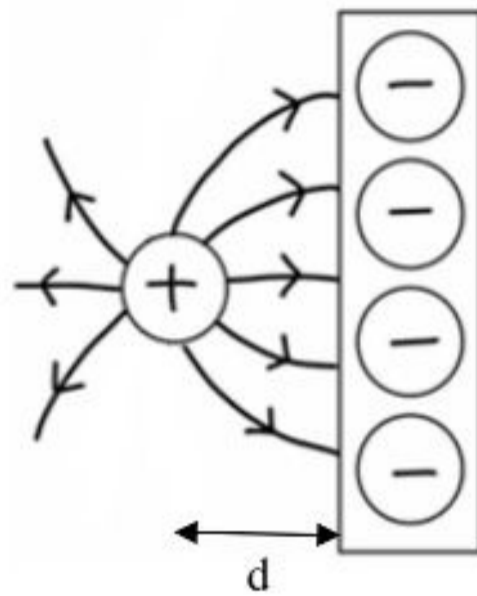
Which physics principle explain the situation above?

- A Prinsip Pascal
Pascal's Principle
- B Prinsip Bernoulli
Bernoulli's Principle
- C Prinsip Archimedes
Archimedes' Principle
- D Prinsip Keabadian Momentum
Principle of Conservation of Momentum

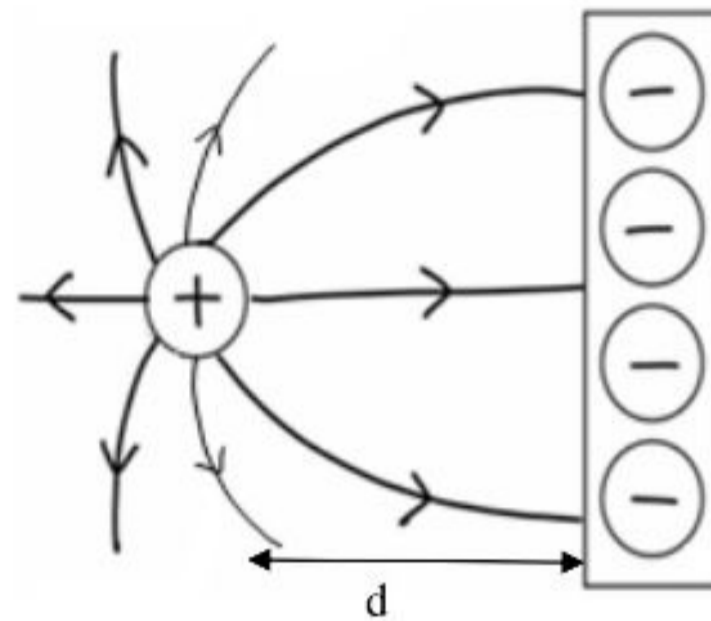
- 33 Diagram 25.1 menunjukkan satu corak medan elektrik.
Diagram 25.2 menunjukkan corak medan elektrik apabila jarak, d bertambah.

Diagram 25.1 shows an electric field pattern.

Diagram 25.2 shows an electric field pattern when the distance, d increases.



Rajah 25.1
Diagram 25.1



Rajah 25.2
Diagram 25.2

Mengapakah jarak antara garis-garis medan elektrik bertambah dalam Rajah 25.2?

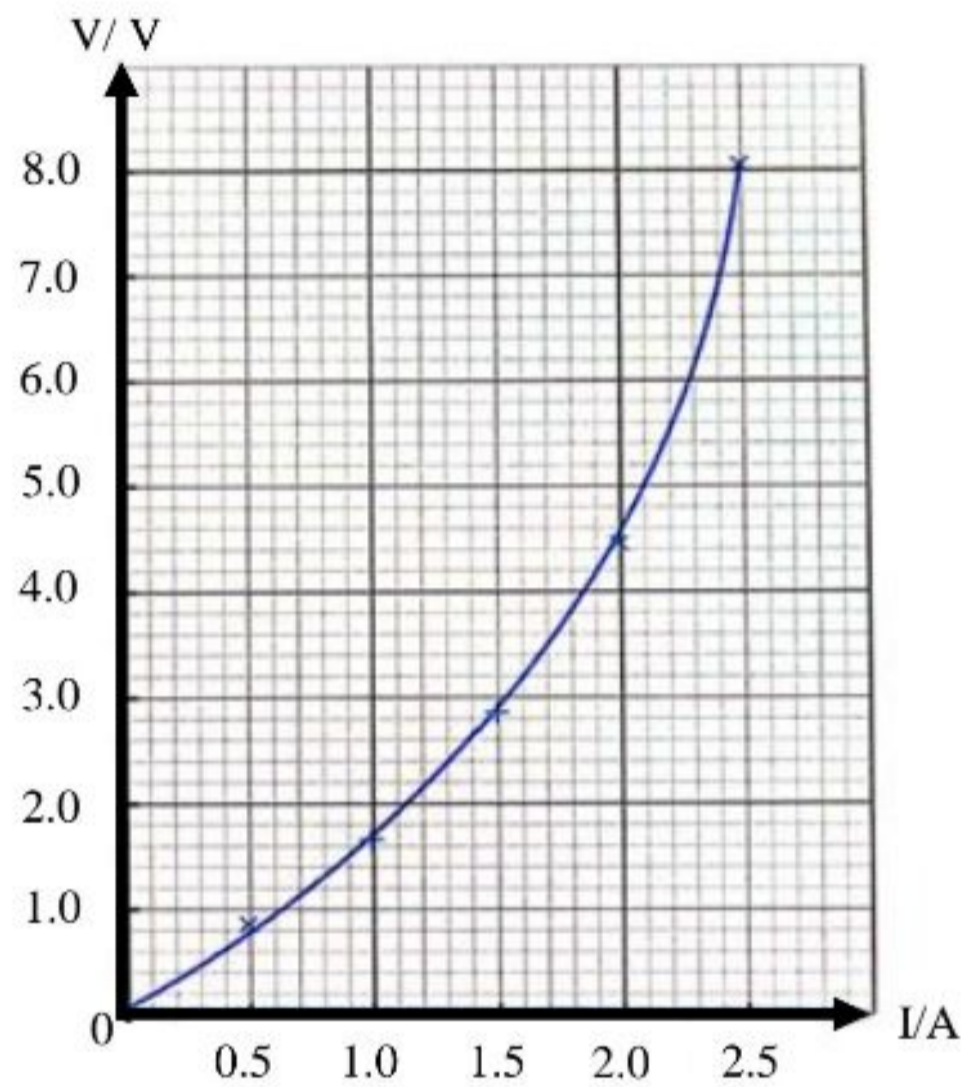
Why the distance between electric field lines increases in Diagram 25.2?

- A Daya elektrik bertambah.
Electrical force increases.
- B Arus elektrik bertambah.
Electric current increases.
- C Beza keupayaan bertambah.
Potential difference increases.
- D Kekuatan medan elektrik berkurang.
Strength of electric field decreases.

[Lihat halaman sebelah
SULIT

34 Rajah 26 menunjukkan graf beza keupayaan, V melawan arus, I bagi sebuah mentol filamen.

Diagram 26 shows a graph of potential difference, V against current, I for filament bulb.



Rajah 26
Diagram 26

Pernyataan manakah yang betul?

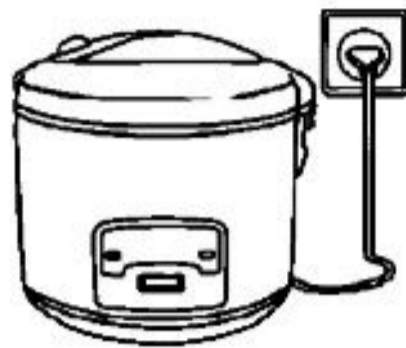
Which statement is correct?

- A Rintangan sifar.
Resistance is zero.
- B Rintangan seragam.
Resistance constant.
- C Rintangan berkurang.
Resistance decreases.
- D Rintangan bertambah.
Resistance increases.

35 Rajah 27 menunjukkan dua periuk nasi yang digunakan untuk memasak 500 g beras.

Diagram 27 shows two rice cookers used to cook 500 g of rice.

Periuk A
Pot A



240 V, 900 W

Periuk B
Pot B



240 V, 1500 W

Rajah 27
Diagram 27

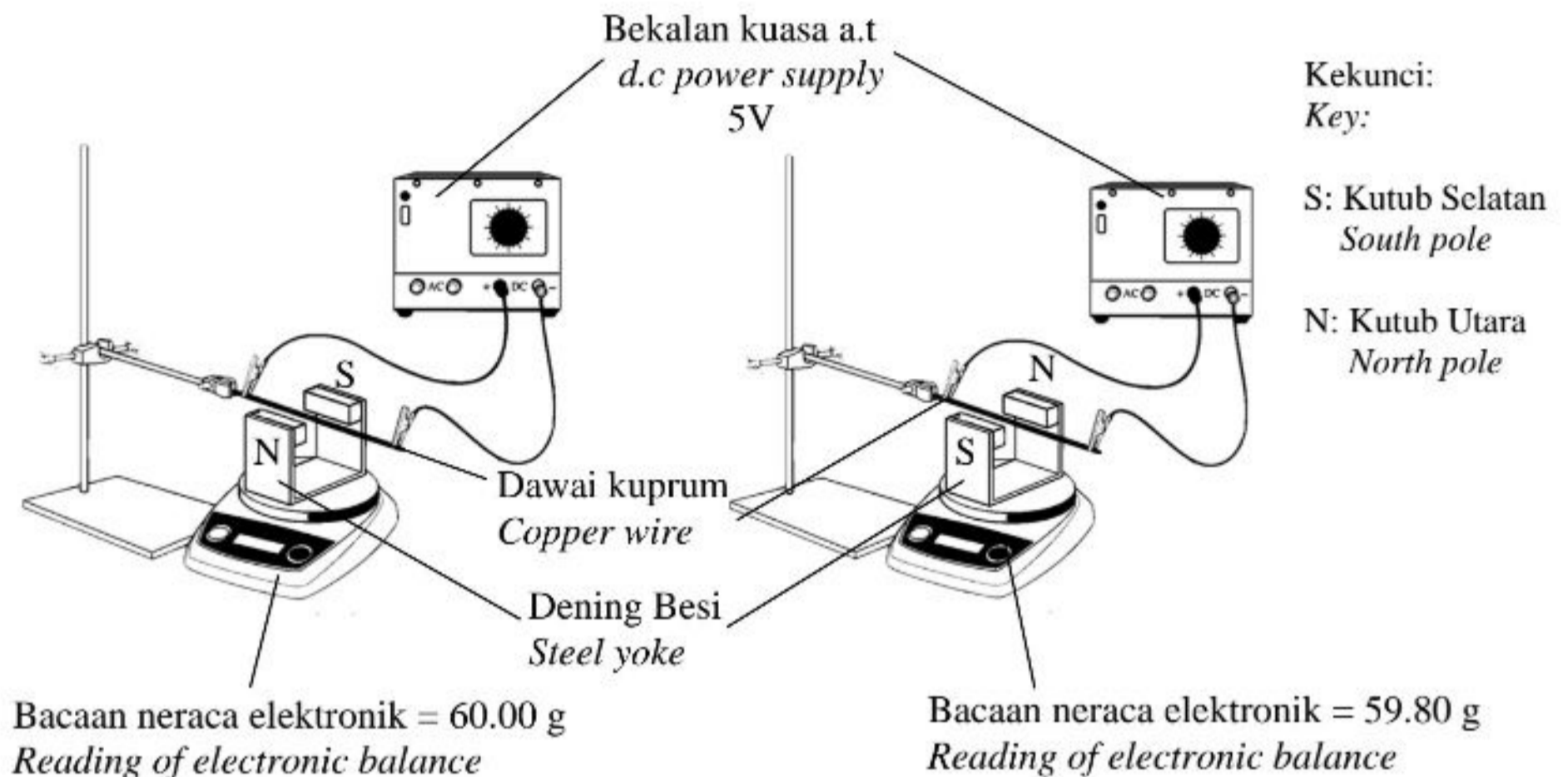
Mengapakah nasi dalam periuk B masak lebih cepat?

Why the rice in pot B cook faster?

- A Tenaga yang dibebaskan rendah.
Energy release is lower.
- B Tenaga yang dibebaskan tinggi.
Energy release is higher.
- C Kadar pembebasan tenaga rendah.
The rate of energy release is lower.
- D Kadar pembebasan tenaga tinggi.
The rate of energy release is higher.

- 36 Rajah 28 (a) dan Rajah 28 (b) menunjukkan satu eksperimen untuk mengkaji magnitud daya yang bertindak ke atas konduktor pembawa arus dalam suatu medan magnet menggunakan neraca elektronik.

Diagram 28 (a) and 28 (b) show an experiment to study magnitude of force acting on a current-carrying conductor in a magnetic field by using electronic balance.



(a)

Rajah 28
Diagram 28

(b)

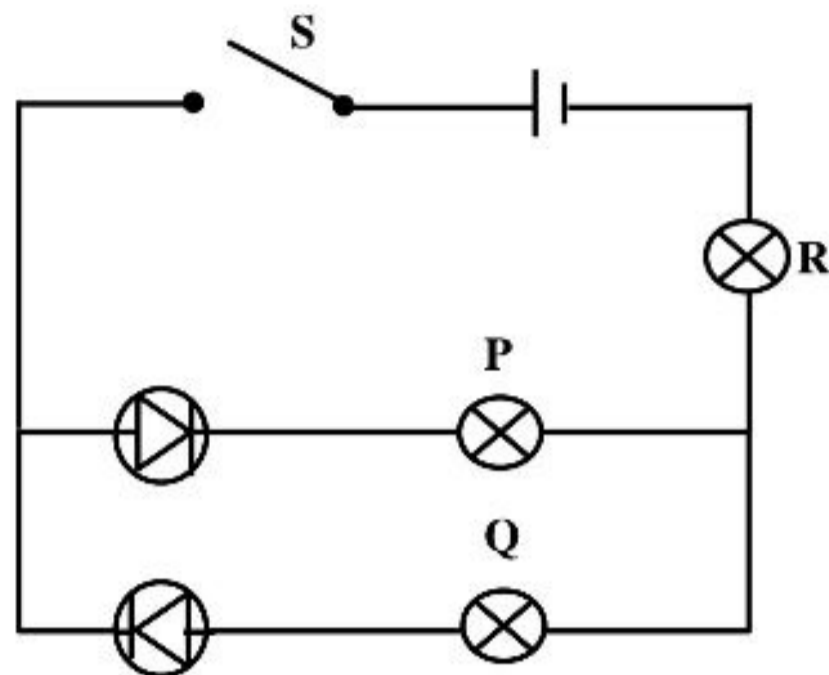
Penyataan manakah yang menerangkan situasi di atas?

Which statement explains the above situation?

- A** Apabila daya pada dawai kuprum bertindak ke bawah, bacaan neraca elektronik bertambah.
When the force acting on the copper wire is downwards, the reading of electronic balance increases.
- B** Apabila daya pada dawai kuprum bertindak ke atas, bacaan neraca elektronik bertambah.
When the force acting on the copper wire is upwards, the reading of electronic balance increases.
- C** Perbezaan bacaan neraca elektronik mewakili jumlah arus elektrik yang mengalir pada konduktor.
The difference in reading of electronic balance represent the amount of current flow in the conductor.
- D** Perbezaan bacaan neraca elektronik mewakili kekuatan medan magnet.
The difference in reading of electronic balance represent the strength of magnetic field.

37 Rajah 29 menunjukkan dua diod yang disambungkan secara selari dalam suatu litar.

Diagram 29 shows two diodes that are connected parallel in a circuit.



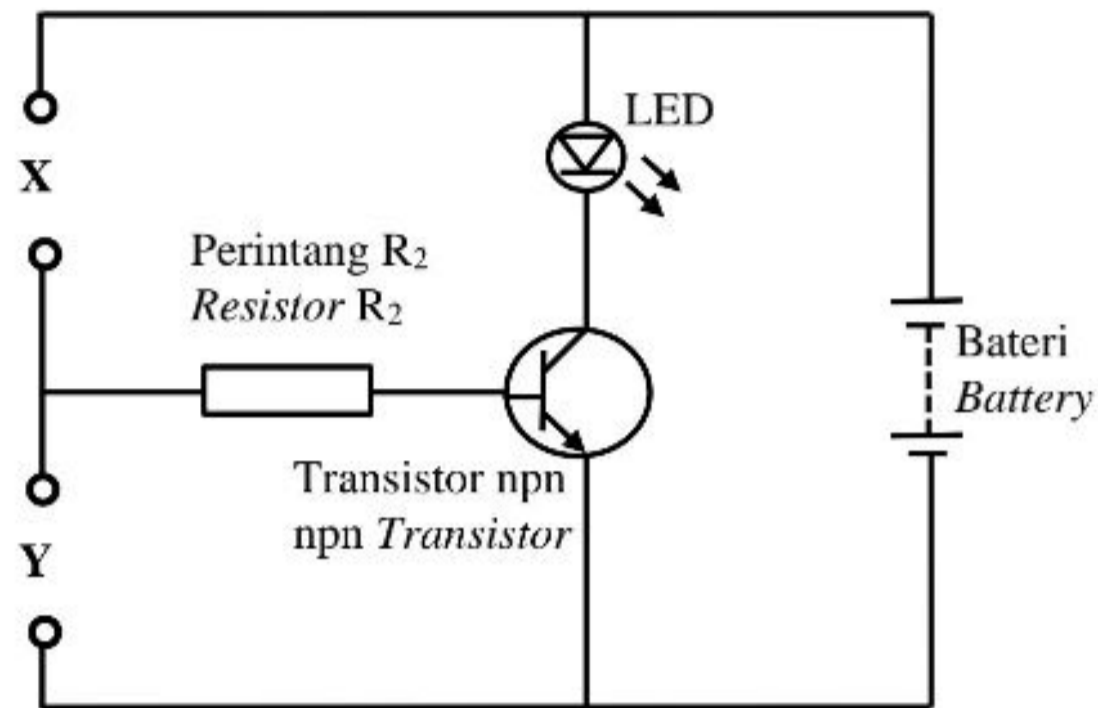
Rajah 29
Diagram 29

Apabila suis S ditutup, mentol yang manakah akan menyala?

When switch S is closed, which bulb will light up?

- A R sahaja
R only
- B P dan Q sahaja
P and Q only
- C P dan R sahaja
P and R only
- D Q dan R sahaja
Q and R only

38 Rajah 30 menunjukkan diod pemancar cahaya (LED) menyala pada waktu siang.
 Diagram 30 shows the light-emitting diode (LED) lights up during daytime.



Rajah 30
 Diagram 30

Antara berikut, manakah yang betul tentang komponen X dan Y?
 Which of the following is correct about components X and Y?

	Component X <i>Komponen X</i>	Component Y <i>Komponen Y</i>
A	Termistor <i>Thermistor</i>	Perintang <i>Resistor</i>
B	Perintang R <i>Resistor R</i>	Termistor <i>Thermistor</i>
C	Perintang peka cahaya, PPC <i>Light-dependent resistor, LDR</i>	Perintang <i>Resistor</i>
D	Perintang <i>Resistor</i>	Perintang peka cahaya, PPC <i>Light-dependent resistor, LDR</i>

- 39 Bahan reaktor nuklear manakah yang akan menyerap neutron yang berlebihan?
Which nuclear reactor material will absorb excess neutrons?
- A Boron
Boron
 - B Grafit
Graphite
 - C Rod uranium
Uranium rods
 - D Air berat
Heavy water
- 40 Bagaimanakah tenaga foton berubah jika panjang gelombang cahaya digandakan?
How does the energy of a photon change if the wavelength of light is doubled?
- A Tenaga bertambah 4 kali ganda.
Energy increases 4 times.
 - B Tenaga bertambah 2 kali ganda.
Energy increases 2 times.
 - C Tenaga berkurang separuh.
Energy is reduced to half.
 - D Tenaga tidak berubah.
Energy unchanged.

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KERTAS SOALAN TAMAT
END OF QUESTION PAPER

**MAKLUMAT UNTUK CALON
INFORMATION FOR CANDIDATES**

1. Kertas soalan ini mengandungi **40** soalan.
*This question paper consists of **40** questions.*
2. Jawab **semua** soalan
*Answer **all** questions.*
3. Tiap-tiap soalan diikuti oleh **tiga** atau **empat** pilihan jawapan. Pilih satu jawapan yang terbaik bagi setiap soalan dan hitamkan ruangan yang betul pada kertas jawapan anda.
*Each question is followed by **three** or **four** options. Choose the best option for each question and blacken the correct space on the answer sheet.*
4. Hitamkan **satu** ruangan sahaja bagi setiap soalan
*Blacken only **one** space for each question.*
5. Sekiranya anda hendak menukarkan jawapan, padamkan tanda yang telah dibuat. Kemudian hitamkan jawapan yang baru.
If you wish to change your answer, erase the blackened mark that you have made. Then blacken the space for the new answer.
6. Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.
The diagrams in the questions provided are not drawn to scale unless stated.
7. Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.
You may use a non-programmable scientific calculator.
8. Satu senarai formula disediakan di halaman 2 dan 3.
A list of formulae is provided on page 2 and 3.