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SPM SEMINAR 2019

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PART 1

PHYSICS

VIDEO PEMBELAJARAN LENGKAP DI

Tingkatan 4

Tingkatan 5



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INTRODUCTION TO PHYSICS

PHYSICAL QUANTITY

Quantity that can be measured.

Base Quantity	Derived Quantity
Length, l (m)	Quantity that produce by (\times) or (\div) or both operation of base quantity (other than 5 base quantity).
Mass, m (kg)	
Time, t (s)	
Temperature, T (K)	
Current, I (A)	

CONVERSION

$$10 \frac{\text{km}}{\text{h}} \rightarrow \frac{\text{m}}{\text{s}}$$

SHIFT CONV 1 9

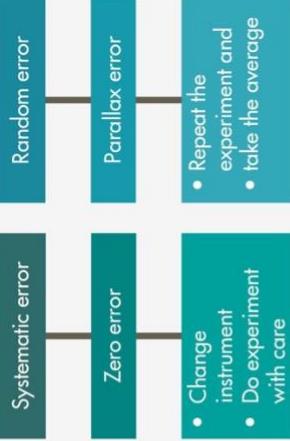
$$10 \frac{\text{m}}{\text{s}} \rightarrow \frac{\text{km}}{\text{h}}$$

SHIFT CONV 2 0

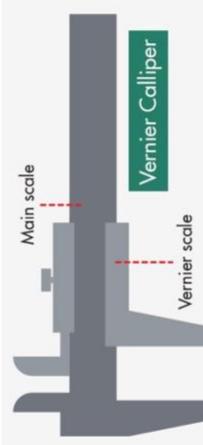
$$10 \text{ cm} \rightarrow \text{m}$$

$10 \times 10^{-2} \text{ m}$

ERROR

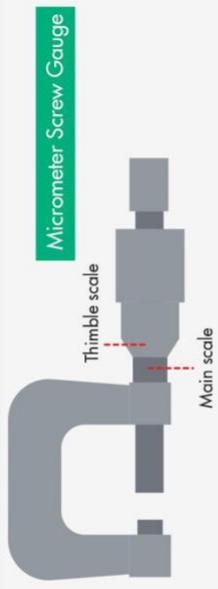


VERNIER CALLIPER



+ve zero error -ve zero error No zero error

MICROMETER SCREW GAUGE



Actual reading = Observe reading - zero error



+ve zero error -ve zero error No zero error





FORCE & MOTION (1)

SCALAR

Distance, d

$$\frac{\text{Distance}}{\text{Time}} = \frac{m}{s} = \text{ms}^{-1}$$

Displacement, s
-5m left → +5m right

VECTOR

Distance, d

$$\frac{\text{Distance}}{\text{Time}} = \frac{m}{s} = \text{ms}^{-1}$$

Displacement, s
-5m left → +5m right

VELOCITY

$$\frac{\text{Displacement}}{\text{Time}} = \frac{m}{s} = \text{ms}^{-1}$$

Area A + Area B
Displacement
Area A - Area B

SPEED

$$\frac{\text{Displacement}}{\text{Time}} = \frac{m}{s} = \text{ms}^{-1}$$

Area A + Area B
Displacement
Area A - Area B

ACCELERATION, a

$$\frac{\text{Velocity}}{\text{Time}} = \frac{m}{s} = \text{ms}^{-2}$$

$v^2 = u^2 + 2as$
 $s = ut + \frac{1}{2}at^2$

NEWTON'S 1ST LAW

$$\frac{\text{Velocity}}{\text{Time}} = \frac{m}{s} = \text{ms}^{-2}$$

$v^2 = u^2 + 2as$
 $s = ut + \frac{1}{2}at^2$

MOMENTUM, p

$$\frac{\text{P} = (\text{mass})(\text{velocity})}{\text{P} = \text{mv}}$$

$\alpha = \frac{v-u}{t}$
 $\alpha = \frac{ms^{-1}}{s} = ms^{-2}$

FORCE, F

$$\frac{\text{F} = (\text{mass})(\text{acceleration})}{\text{F} = \text{ma}}$$

$F_x = F \cos \theta$
 $F_y = F \sin \theta$

UNBALANCE FORCE

$$\sum \text{F} = 0$$

$\alpha = ?$
 $f \leftarrow m \rightarrow F$
 $F - f = ma$

INERTIA

$$\text{Mass } \blacktriangle, \text{ Inertia } \blacktriangle$$

tendency of object to retain its state of motion.

Principle Conservation of Momentum

$$\text{TOTAL momentum before collision is equal to TOTAL momentum after collision.}$$

Elastic Collision

$$\frac{m_1u_1 + m_2u_2 = m_1v_1 + m_2v_2}{m_1 = m_2}$$

Inelastic Collision

$$\frac{m_1u_1 + m_2u_2 = (m_1 + m_2)v}{m_1 = m_2}$$

Explosion

$$\frac{m_1v_1 = m_2v_2}{g = \text{gravitational acceleration } (10\text{ms}^{-2})}$$

Impulsive Force

$$\frac{F = \frac{mv - mu}{t}}{\downarrow \text{time of impact, } \blacktriangle F}$$

Rate of change of momentum

$$\frac{F_t = mv - mu}{\text{Rate of change of momentum}}$$

Weight, W

$$\frac{W = mg}{g = \text{gravitational acceleration } (10\text{ms}^{-2})}$$

Principle Conservation of Energy

$$\frac{\text{Kinetic Energy} = \frac{1}{2}mv^2}{\text{Potential Energy} = mgh}$$

Work, W

$$\frac{W = Fd}{F = \frac{W}{d}}$$

Power, P

$$\frac{P = W/t}{P = Fv}$$

Efficiency, η

$$\eta = \frac{W_{useful}}{W_{total}}$$

Newton's 3rd Law

$$\frac{\text{For every action, there is equal & opposite reaction}}{\text{# if } a = 0\text{ms}^{-2}, \text{ the object is either at rest or at constant velocity.}}$$

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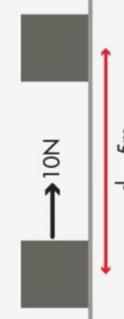


FORCE & MOTION (2)

WORK, W

$$W = \text{Force} \times \text{Displacement}$$

$$W = Fs = \text{Nm}$$



$$W = F_s$$

$$W = (10)(5)$$

$$W = 50\text{J}$$



$$W = F_s$$

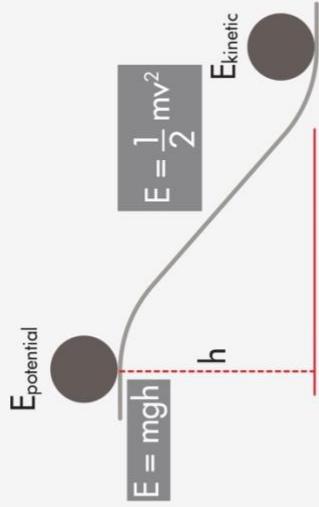
$$W = (-10)(-5)$$

$$W = 50\text{J}$$

Work: Scalar quantity
sometime, question ask about **Work** but
need to use **Energy** formula.

ENERGY, E

Ability to do work.
Principle of Conservation of Energy.
TOTAL energy is conserved.



POWER, P

Rate of change of work.
Rate of change of energy.

$$P = \frac{W}{t}$$

$$P = \frac{E}{t}$$

$$= \frac{J}{s} = \frac{1}{s}$$

Js^{-1} or Watt, W

HOOKE'S LAW

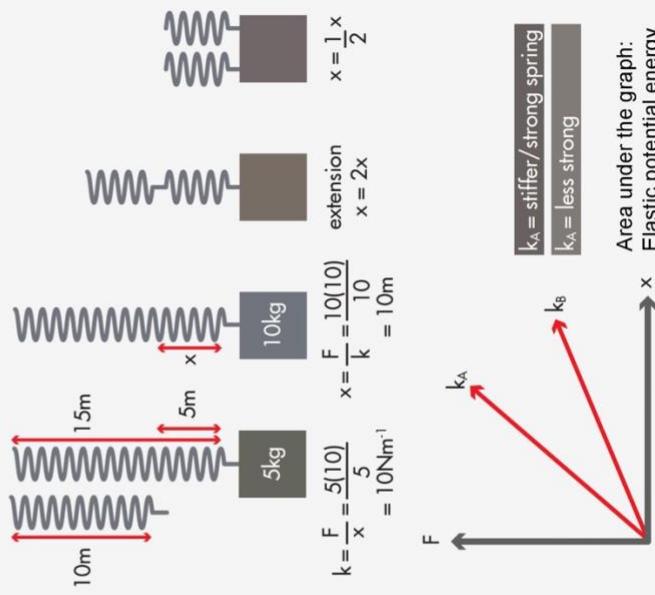
$$F = kx$$

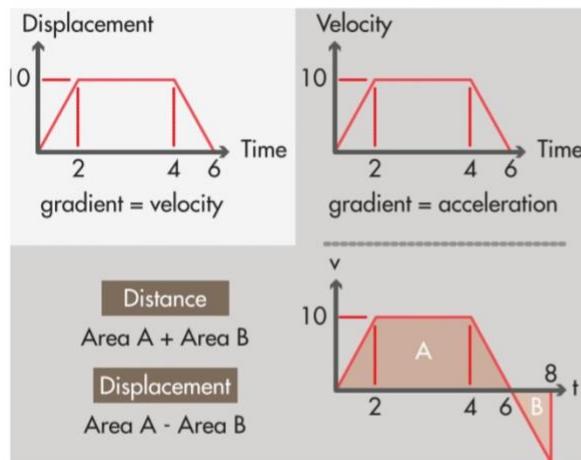
$$\text{force} = (\text{spring constant})(\text{extension})$$

$$k = \frac{F}{x} = \frac{N}{m}$$

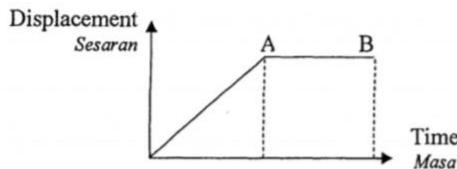
$$= \text{Nm}^{-1}$$

Factors	Stiffer/Spring
- Length	- Shorter ▲
- Spring diameter	- Greater ▲
- Type	- Steel ▲ than Copper
- Coil diameter	- Smaller ▼





Rajah menunjukkan graf sesaran-masa bagi gerakan sebuah kereta.
Diagram shows a displacement-time graph for the motion of a car.



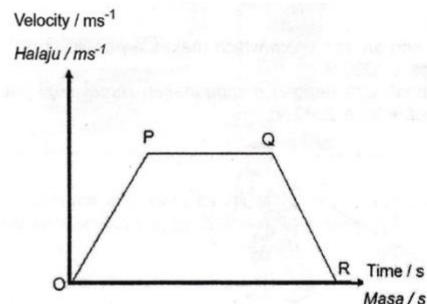
Berdasarkan graf, pernyataan manakah yang menerangkan pergerakan kereta tersebut dari A ke B?

Based on the graph, which statement explains the motion of the car from A to B?

- A Nyahpecutan / deceleration
- B Tidak bergerak / Stationary
- C Memecut / Accelerating
- D Halaju seragam / constant velocity

Rajah menunjukkan graf halaju-masa bagi gerakan sebuah kereta.

Diagram shows a velocity-time graph for the motion of a car.



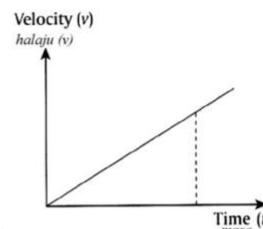
Berdasarkan graf, pada bahagian manakah kereta sedang menyahpecut.

Based on the graph, which part shows the car decelerate.

- A OP
- B QR
- C PQ
- D OR

Rajah menunjukkan graf halaju-masa bagi gerakan sebuah kereta.

Diagram shows a velocity-time graph for the motion of a car.

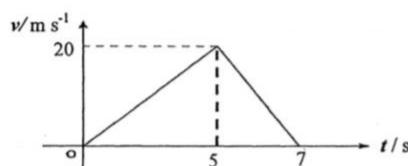


Penyataan manakah menerangkan graf ini
Which statement explained the graph.

	Gradient of the graph <i>Kecerunan graf</i>	Area under the graph <i>Luas di bawah graf</i>
A	Acceleration <i>Pecutan</i>	Displacement <i>Sesaran</i>
B	Acceleration <i>Pecutan</i>	Kinetic energy <i>Tenaga kinetik</i>
C	Displacement <i>Sesaran</i>	Acceleration <i>Pecutan</i>
D	Displacement <i>Sesaran</i>	Kinetic energy <i>Tenaga kinetik</i>

Rajah menunjukkan graf halaju-masa bagi gerakan sebuah kereta.

Diagram shows a velocity-time graph for the motion of a car.



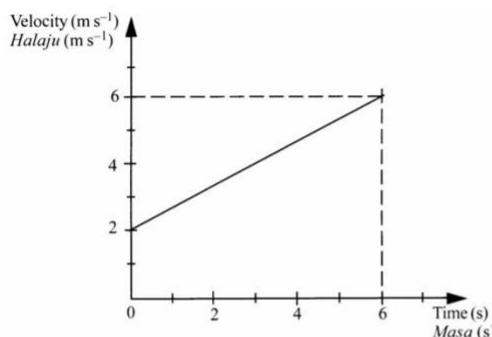
Berapakah sesaran kereta itu selepas 7 s?

What is the displacement after 7 s?

- A. 50 m
- B. 20 m
- C. 70 m
- D. 100 m

Rajah menunjukkan graf halaju-masa bagi gerakan sebuah objek

Diagram shows a velocity-time graph for the motion of an object



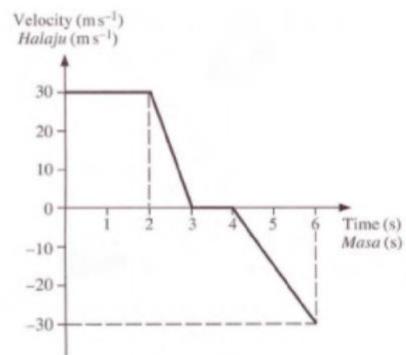
Berapakah sesaran object itu selepas 6 s?

What is the displacement of the object after 6 s?

- A. 12 m
- B. 24 m
- C. 18 m
- D. 36 m

Rajah menunjukkan graf halaju-masa bagi gerakan sebuah kereta.

Diagram shows a velocity-time graph for the motion of a car.



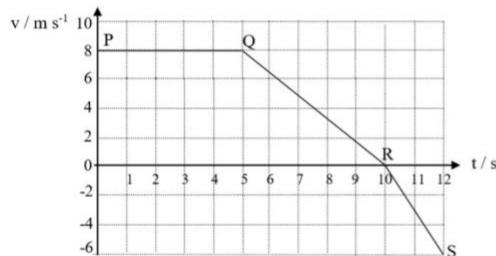
Berapakah sesaran kereta itu selepas 6 s?

What is the displacement after 6 s?

- A. 75 m
- B. 45 m
- C. 30 m
- D. 105 m

GRAF GERAKAN

- 9) Rajah menunjukkan graf halaju-masa bagi pergerakan sebuah kereta mainan.
Diagram shows a velocity-time graph for the movement of a toy car.

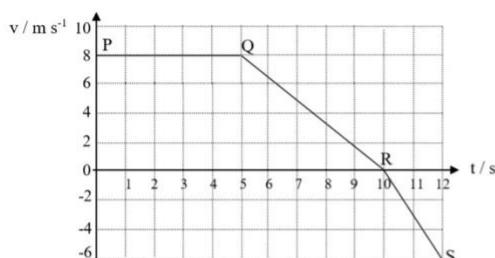


Dibahagian manakah kereta itu bergerak dengan pecutan?

Which position where the object accelerate?

- A. RS
- B. QR
- C. PQ
- D. OP

- 10) Rajah menunjukkan graf halaju-masa bagi pergerakan sebuah kereta mainan.
Diagram shows a velocity-time graph for the movement of a toy car.

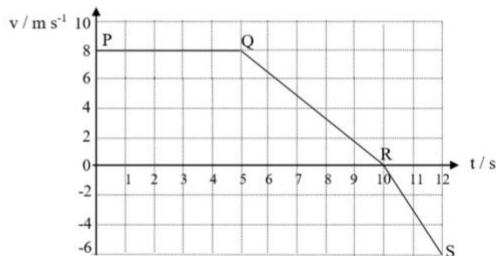


Berapakah jumlah jarak yang dilalui oleh kereta mainan itu dalam masa 12 saat?

What is the distance travel by the toy car in 12s?

- A. 36 m
- B. 132 m
- C. 54 m
- D. 66 m

- 11) Rajah menunjukkan graf halaju-masa bagi pergerakan sebuah kereta mainan.
Diagram shows a velocity-time graph for the movement of a toy car.

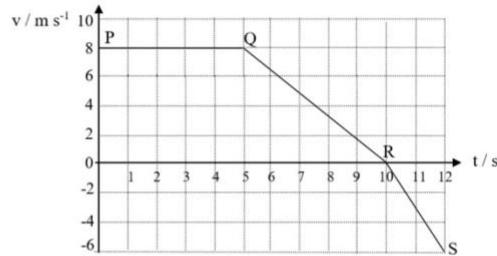


Berapakah sesaran yang dilalui oleh kereta mainan itu dalam masa 12 saat?

What is the displacement travel by the toy car in 12s?

- A. 132 m
- B. 36 m
- C. 66 m
- D. 54 m

- 12) Rajah menunjukkan graf halaju-masa bagi pergerakan sebuah kereta mainan.
Diagram shows a velocity-time graph for the movement of a toy car.



Berapakah halaju purata dalam masa 12 saat?

What is the average velocity at the time of 12s?

- A. 8.0 ms⁻¹
- B. 11 ms⁻¹
- C. 5.5 ms⁻¹
- D. 4.5 ms⁻¹

- 16) Penumpang berdiri di dalam sebuah bas cenderung untuk terhumban ke depan apabila bas berhenti dengan tiba-tiba. Gerakan ini boleh diterangkan oleh.

The passenger standing in a bus have the tendency of falling forward when the bus stop suddenly. This movement can be explained by

- A. Konsep keseimbangan daya
Concept of equilibrium force
- B. Konsep inertia
Concept of inertia
- C. Konsep keabadian tenaga
Concept of conservation of energy
- D. Konsep keabadian momentum
Concept of conservation of momentum

- 17) Rajah menunjukkan keadaan dua buah troli sebelum dan selepas perlanggaran.
Diagram shows the situation of two trolleys before and after collision.



Berapakah halaju kedua-dua troli tersebut selepas perlanggaran?

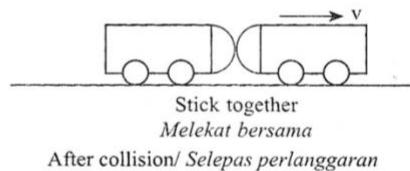
What is the velocity of both trolleys after collision?

- A. 0.71 ms⁻¹
- B. 1.40 m s⁻¹
- C. 2.50 ms⁻¹
- D. 4.70 ms⁻¹

- 18) Rajah menunjukkan troli yang serupa, J dan K diletakkan di atas suatu satah tanpa geseran.

Troli J bergerak dan melanggar troli K yang pegun. Selepas perlanggaran, kedua-dua troli melekat dan bergerak Bersama-sama.

Diagram shows two identical trolley, J and K, placed on the frictionless plane. Trolley J moves and collides with the stationary trolley K. After collision, both trolley stick and move together.



Antara pernyataan berikut yang manakah betul?
Which of the following statement is correct?

- A. Kedua-dua troli tidak mengalami perubahan momentum
Both trolley do not experience change in momentum
- B. Jumlah tenaga kinetik selepas perlanggaran dan sebelum perlanggaran adalah sama
Total kinetic energy before and after collision is the same.
- C. Jumlah momentum sebelum dan selepas berlanggar adalah sama
The total momentum before and after collision is the same.
- D. Jenis perlanggaran adalah perlanggaran kenyal
The type of collision is elastic collision

- 19) Dalam perlanggaran kenyal antara dua jisim berlainan.

In an elastic collision between two masses.

- A. Hanya jumlah tenaga kinetik diabadikan
Only the total kinetic energy is conserved
- B. Hanya jumlah momentum diabadikan
Only the total momentum is conserved
- C. Jumlah tenaga kinetik dan jumlah momentum diabadikan
Total kinetic energy and total momentum is conserved

- 20) Rajah menunjukkan sebiji bola tenis berjisim 0.058 kg mengenai dinding konkrit dengan halaju 50 ms^{-1} . Bola itu melantun semula dengan halaju 45 ms^{-1} .
Diagram shows a tennis ball of mass 0.058 kg hitting a concrete wall with a velocity of 50 ms^{-1} . The ball bounces back with a velocity of 45 ms^{-1} .



What is the impulse acting on the ball?
Apakah impuls yang bertindak ke atas bola itu?

- A. - 5.51 kgms^{-1}
- B. - 0.29 kgms^{-1}
- C. 0.29 kgms^{-1}
- D. 5.51 kgms^{-1}

- 21) Rajah menunjukkan sebiji bola tenis sedang melanggar dinding. Halaju awal bola tenis itu ialah 8 ms^{-1} ke arah dinding dan memantul semula dengan halaju 6 ms^{-1} .
Diagram shows a tennis ball being hit towards a wall. The ball approaches the wall at an initial velocity of 8 ms^{-1} and rebounds with a velocity of 6 ms^{-1} .



Hitungkan perubahan momentum yang berlaku pada bola itu jika jisim bola ialah 200g?
Calculate the change in momentum applied to the ball if the mass of the ball is 200g?

- A. 1.30 kgms^{-1}
- B. - 1.30 kgms^{-1}
- C. 2.8 kgms^{-1}
- D. - 2.8 kgms^{-1}

- 20) Satu objek dengan jisim 0.4 kg ditarik dengan 20 N dalam masa 10 s. Berapakah impuls ke atas objek itu

An object of mass 0.4 kg is pulled with a force of 20 N for 10 s. How much is the impulse upon the object?

- A. 8 Ns
- B. 20 Ns
- C. 200 Ns
- D. 250 Ns

- 21) Sebiji bola besi jatuh bebas dari kedudukan yang tinggi di bumi. Antara berikut, kuantiti yang manakah akan bertambah ?

A metal ball experience free fall from a high position on earth. Which of the following quantities will increase ?

- A. Halaju / velocity
- B. Pecutan graviti / Acceleration due to gravity
- C. Berat / Weight
- D. Tenaga keupayaan / Potential energy

- 23) Sebuah kereta berjisim 1000 kg yang bergerak dengan halaju 80 kmh^{-1} merempuh sebuah tembok dan berhenti dalam masa 1 saat. Berapakah daya impuls yang bertindak ke atas kereta itu?

A car with mass of 1000 kg moves with velocity 80 kmh^{-1} crash onto the wall and stop in 1 seconds. How much impulsive force act on the car?

- A. 100000 N
- B. 22222.22 N
- C. 1000 N
- D. 222 N

DAYA SEIMBANG

$$\sum F = 0$$

#tak bergerak/
halaju malar



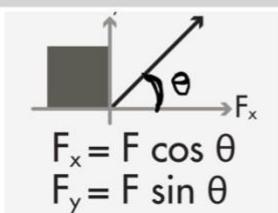
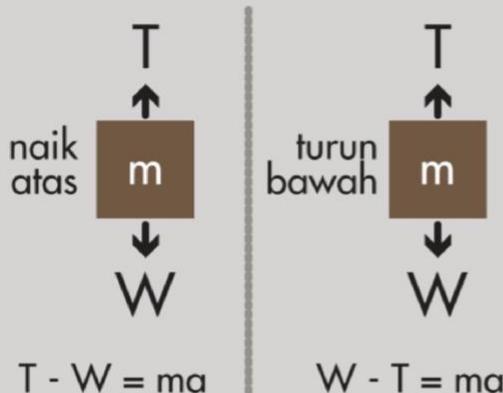
DAYA TAK SEIMBANG

$$\sum F = ma$$

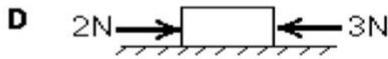
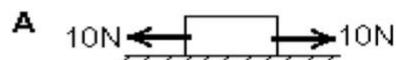
$$a = ?$$



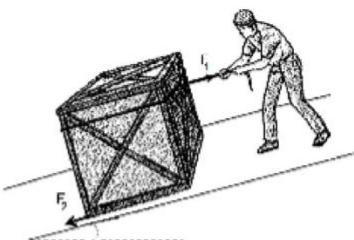
$$F - f = ma$$



- 16) Objek manakah yang berikut yang akan memecut?
Which of the following objects will accelerate.



- 17) Rajah menunjukkan Kamil sedang menarik sebuah kotak berjisim 50 kg di atas sebuah permukaan condong yang kasar. Kotak itu bergerak dengan pecutan 2 ms^{-2} .
The diagram shows Kamil is pulling a box of mass 50 kg on a rough inclined surface. The box moves with an acceleration 2 ms^{-2} .



- Pasangan daya manakah adalah betul?
Which pair of force is correct?

	F_1	F_2
A	500	400
B	700	350
C	900	300
D	1 200	250

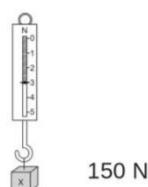
- 18) Rajah menunjukkan kamarul menunggang motor pada laju seragam 18 ms^{-1} . Dua daya yang menentang pergerakan beliau ialah rintangan udara 30N dan daya geseran 80N .
Diagram shows kamarul drove his motorbike at a constant speed of 18 ms^{-1} . Two force resisting his motion are air friction of 30 N and frictional force of 80 N .



Hitungkan daya tujah enjin.
Determine the thrust of the engine.

- A. 50 N
 B. 110 N
 C. 0 N
 D. 85 N

- 19) Rajah menunjukkan satu objek yang digantung pada hujung neraca spring yang diletak di atas siling sebuah lif.
Diagram shows an object which is hung from the end of a spring balance attached to the ceiling of the lift



Jika bacaan neraca spring ialah 150N apabila lif itu dalam keadaan pegun, berapakah bacaan neraca spring itu apabila lif itu mengalami pecutan ke atas pada 2 ms^{-2} ?
If the reading of the spring balance is 150N when the lift is stationary, what is the reading of spring balance when the lift is accelerating upwards at 2 ms^{-2} ?

- A. 100 N
 B. 180 N
 C. 150 N
 D. 220 N

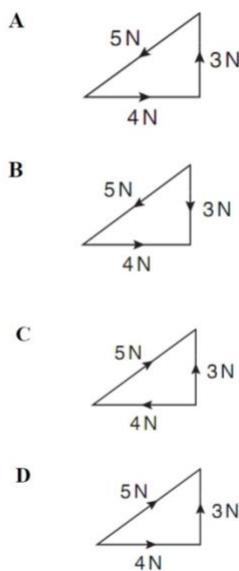
- 20) Rajah menunjukkan sebuah kereta bergerak dengan halaju seragam
The diagram shows a car moves with constant velocity..



Daya-daya adalah seimbang apabila..
The force are balanced when.

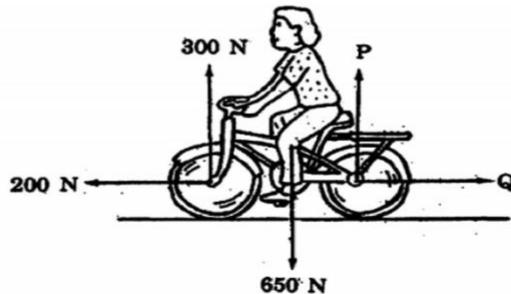
- A. Daya bersih adalah sifar
Net force is zero
 B. Daya bersih adalah sama
Net force is equal
 C. Daya bersih adalah sama dengan daya geseran
Net force is equal to frictional force
 D. Daya bersih kurang dari daya geseran
Net force less than frictional force

- 21) Rajah manakah betul menunjukkan penambahan daya 4N dan 3N ?
Which diagram correctly shows the addition of 4N and 3N .



4. Diagram 4 shows a cyclist is riding along a road at constant velocity. The total of downward force acting on the bicycle and the cyclist 650 N. The normal reaction of the front tyre is 300 N and forward thrust is 200 N.

Rajah 4 menunjukkan seorang penunggang basikal menunggang basikal di sepanjang suatu jalan raya dengan halaju seragam. Jumlah daya yang bertindak ke bawah ialah 650 N. Tindak balas normal yang bertindak pada tayar hadapan ialah 300 N dan tujahan ke hadapan ialah 200 N.



- (a) (i) Name force Q.

Namakan daya Q.

[1 mark]

- (ii) What is the magnitude of Q ?

Berapakah magnitud Q ?

[1 mark]
[1 markah]

- (b) Calculate the normal reaction, P acting on the rear tyre.

Hitungkan tindak balas normal, P yang bertindak pada tayar belakang.

[2 marks]
[2 markah]

- (c) The forward thrust is increased to become 250 N.

Tujahan ke hadapan ditambah menjadi 250 N.

- (i) What happens to the motion of the bicycle ?

Apakah yang berlaku kepada gerakan basikal itu ?

[1 mark]

- (ii) Give one reason for your answer in (c)(i).

Berikan satu sebab untuk jawapan anda di (c)(i).

[1 mark]
[1 markah]

Rajah 7.1 menunjukkan sekeping cermin rata dengan berat 20N digantungkan secara bebas oleh seutas tali dengan panjang 40 cm. Panjang cermin itu adalah 30 cm
Diagram 7.1 shows that a plane mirror with a weight of 20 N is suspended freely by a string which has a length 40 cm. The length of the mirror is 30 cm.

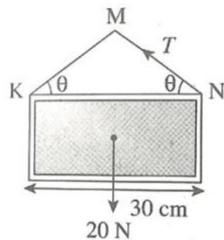


Diagram 7.1

- A) i) Apakah maksud daya paduan?
What is meant by the resultant force?
-

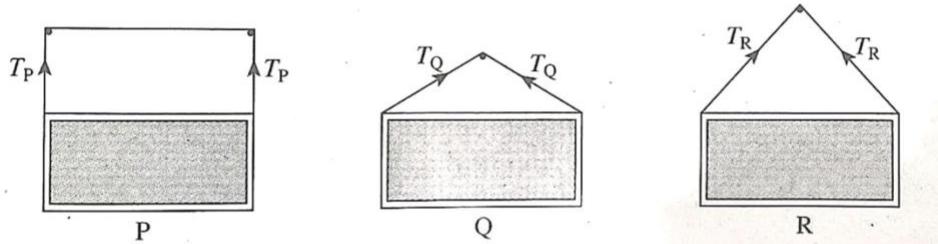
- ii) nyatakan satu syarat bagi keseimbangan daya?
State one condition for the equilibrium force?
-

- B) i) Berdasarkan rajah 7.1, hitung nilai bagi sudut @?
Based on diagram 7.1, calculate the value of @?

- ii) Cermin dalam rajah 7.1 adalah dalam keseimbangan. Apakah tegangan T, pada tali tu?
The mirror in diagram 7.1 is in equilibrium condition, what is the tension, T on the string?

- C) Terdapat tiga kaedah, P Q dan R untuk menggantung cermin itu, seperti ditunjukkan dalam rajah 7.2

There are three methods P, Q and R for suspending the mirror. As shown in Diagram 7.2



Tegangan dalam tali pada kaedah P, Q dan R adalah T_p , T_q dan T_r masing-masing.

The tension on the string each of the method P, Q and R is T_p , T_q and T_r respectively

- i) Bandingkan magnitudes T_p , T_q dan T_r
Compare the magnitudes of T_p , T_q and T_r
-

- ii) Nyatakan hubungan antara tegangan, T dengan sudut, @
State the relationship between tension, T and the angle @
-

- (d) i) Cara manakah adalah paling sesuai untuk menggantungkan sekeping cermin yang berat?
Which method is the most suitable for suspending a heavy mirror?
-

- ii) Berikan satu sebab kepada jawapan 2(d) (i)
Give one reason for your answer in 2 (d) (i)
-

- 2 Diagram 2.1 shows Razman standing on a weighing scale on a stationary lift. The mass of Razman is 55 kg.

Rajah 2.1 menunjukkan Razman sedang berdiri di atas sebuah penimbang dalam sebuah lif yang pegun. Jisim Razman ialah 55 kg.

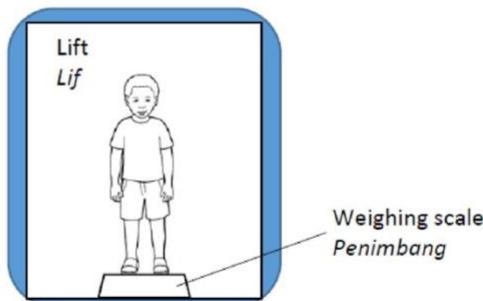


Diagram 2.1
Rajah 2.1

- (a) Mark and label the directions of forces acting on Razman in Diagram 2.1.
Tanda dan labelkan arah-arah daya yang bertindak pada Razman dalam Rajah 2.1.

[2 marks]
[2 markah]

- (b) Calculate the reading of the weighing scale when:

Hitung bacaan penimbang apabila:

- (i) the lift is stationary
lif itu pegun

[1 mark]
[1 markah]

- (ii) the lift moves downwards with an acceleration of 1.8 ms^{-2} .
lif itu bergerak ke bawah dengan pecutan 1.8 ms^{-2} .

[2 marks]
[2 markah]

- 3 Diagram 3 shows a model car hitting the wall in a testing room . The initial speed of the car is 100 km h^{-1} and it comes to a stop in 1 s. The mass of the car is 500 kg.

Rajah 3 menunjukkan sebuah model kereta yang menghentam dinding di dalam bilik ujian. Laju awal kereta ialah 100 km j^{-1} dan ia berhenti dalam masa 1 s. Jisim kereta adalah 500 kg.



Diagram 3 / Rajah 3

- (a) What is the meaning of impulsive force?

Apakah maksud daya impuls?

[1 mark / markah]

- (b) Calculate the impulsive force acting on the car.

Hitungkan daya impuls yang bertindak pada kereta.

[2 marks / markah]

- (c) (i) What will happen to the impulsive force if the wall is replaced with a softer board?

Apakah yang berlaku ke atas daya impuls jika dinding digantikan dengan satu kepingan lembut?

[1 mark / markah]

- (ii) Give a reason for your answer in 3(c)(i).

Berikan alasan untuk jawapan anda dalam 3(c)(i)

[1 mark / markah]

- (d) Give **one** safety feature in vehicles to protect the driver from high impulsive force during an accident.

*Beri **satu** ciri keselamatan dalam kenderaan untuk melindungi pemandu daripada daya impuls yang sangat besar semasa kemalangan.*

[1 mark / markah]



PRESSURE (P)

SOLID

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

Force
Area of Contact



LIQUID

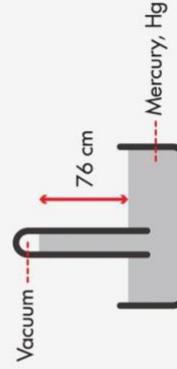
$$P = h\rho g$$

h = height/depth (m)
 ρ = density (kg m^{-3})
 g = gravitational acceleration (10ms^{-2})



ATMOSPHERE

Measured by using Barometer

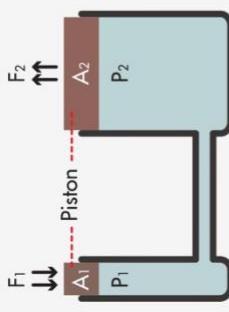


Why Mercury?

Opaque, \blacktriangle density (13600kg m^{-3})

PASCAL'S PRINCIPLE

In enclosed system, pressure of fluid (liquid/gas) is equally distributed.



Hydraulic/Pneumatic System

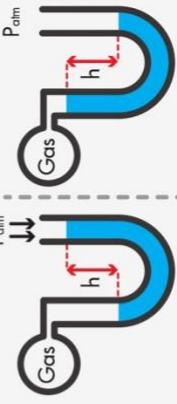
$$P_1 = P_2$$

$F_1 \neq F_2$
 $A_1 \neq A_2$

increase in A_2 area, increase in force

GAS

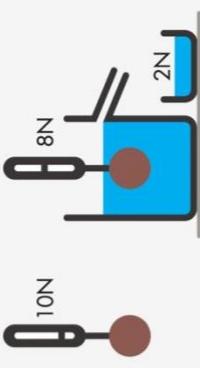
Measured by using Manometer



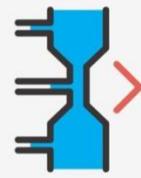
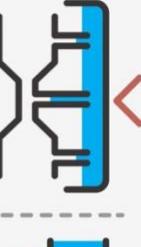
$$\begin{aligned} P_{\text{gas}} &= P_{\text{atm}} + P_{\text{liq}} \\ P_{\text{gas}} &= P_{\text{atm}} + h\rho g \end{aligned}$$

ARCHIMEDES' PRINCIPLE

Buoyant force, F_B is equal to weight displace.



$$\begin{aligned} F_B &= \text{Weight displace} \\ F_B &= mg \\ F_B &= 10\text{N} \end{aligned}$$



BERNOULLI'S PRINCIPLE

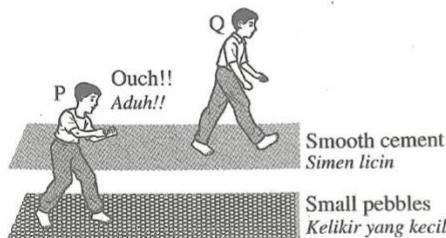


As speed of fluid increase, the pressure decrease.

$$\begin{aligned} V \blacktriangle &\quad P \blacktriangledown \\ V \blacktriangleright &\quad P \blacktriangleright \end{aligned}$$

- 46) Rajah 7 menunjukkan dua orang lelaki P dan Q yang mempunyai jisim dan saiz yang sama berjalan di atas laluan yang berlainan secara berkaki ayam.

Diagram 7 shows two mans, P and Q, of the same mass and size walking on different tracks bare-footed.

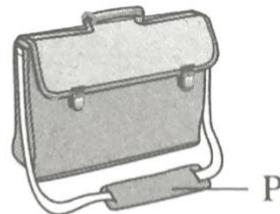


Why does student P feel pain when walking on the pebbles?

Mengapakah Pelajar P berasa sakit apabila berjalan di atas kelikir?

- A. P mempunyai tapak kaki yang lebih besar
P has larger feet
- B. Q mempunyai tapak kaki yang lebih kecil
Q has smaller feet
- C. Daya yang lebih besar dikenakan ke atas tapak kaki P
Larger force is exerted on P's feet
- D. Tekanan pada tapak kaki P lebih besar
The pressure on P's feet is large

- 47) Rajah menunjukkan sebuah beg dengan sekeping pad bahu, P diselitkan kepada tali beg itu.



Apakah fungsi P

What is the fuction of P

- A. Menambahkan berat dan tekanan
To increase weight and pressure
- B. Untuk menambah luas permukaan dan menambahkan tekanan
To increase surface area and to increase pressure
- C. Mengurangkan berat dan menambah tekanan
to decrease weight and increase pressure
- D. Untuk menambahkan luas dan mengurangkan tekanan
To increase surface area and decrease pressure

- 48) Sebuah tayar mengenakan tekanan 270 kPa ke atas jalan. Luas tayar yang bersentuhan dengan jalan ialah 0.016 m².

A tyre exerts a pressure on the road of 270 kPa. The area of the tyre touching the road is 0.016 m².

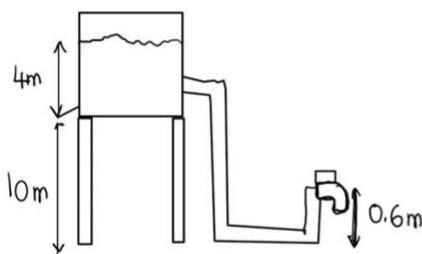
Berapakah daya yang dikenakan ke atas jalan oleh tayar itu?

What is the force exerted on the road by the tyre?

- A. 4.32 N
- B. 16 875 N
- C. 4320 N
- D. 16 875 000 N

- 49) Rajah menunjukkan sebuah tangki air diletakkan pada ketinggian 10 m dari tanah. Di P, sebuah kepala paip yang berada 0.6 m dari tanah disambung kepada tangki air itu.

Diagram shows a water tank that is placed 10 m from the ground. At P, a tap which is 0.6 m from the ground, is connected to the water tank.



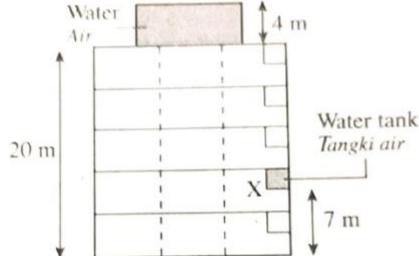
Hitung tekanan air di P

*Calculate the pressure of the water at P
[ketumpatan air/density of water: 1000 kgm⁻³]*

- A. $0.40 \times 10^5 \text{ Nm}^{-2}$
- B. $0.94 \times 10^5 \text{ Nm}^{-2}$
- C. $1.00 \times 10^5 \text{ Nm}^{-2}$
- D. $1.34 \times 10^5 \text{ Nm}^{-2}$

- 50) Rajah menunjukkan sistem simpanan air di suatu rumah pangsa 5 tingkat.

Diagram shows the water storage system in a 5-storey flat.

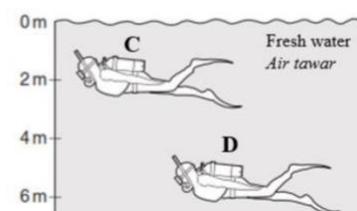
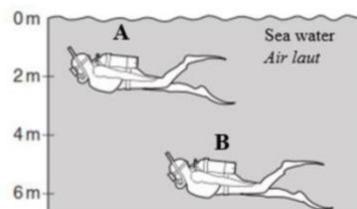


Apakah tekanan air dalam unit X bagi rumah pangsa itu? [Abaikan tekanan atmosfera]
What is the water pressure in unit X of the flat?
[Ignore atmospheric pressure]

- A. 4 m of water
- B. 7m of water
- C. 13m of water
- D. 17m of water

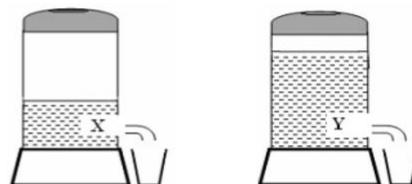
- 51) Rajah menunjukkan dua penyelam berenang di laut dan dua penyelam berenang di air tawar. Air laut adalah lebih tumpat daripada air tawar. Penyelam manakah berada pada tekanan paling rendah?

Diagram show two divers swimming in the sea and two divers swimming in fresh water. Sea water is denser than fresh water. Which diver feeling the lowest pressure?



- 52) Rajah menunjukkan dua bekas yang serupa mengandungi cecair X dan cecair Y. Jarak pancutan kedua-dua cecair adalah sama.

The diagram shows two identical containers containing liquid X and liquid Y. The horizontal distance of the spouts for both liquids is same.



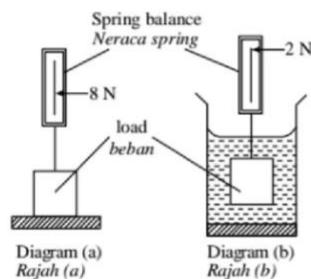
Antara pernyataan berikut, yang manakah benar mengenai perbandingan antara ketumpatan cecair X dan cecair Y?

Which of the following is the correct comparison between the density of liquid X and liquid Y?

- A. Ketumpatan X = ketumpatan Y
Density of X = Density of Y
- B. Ketumpatan X < Ketumpatan Y
Density X < Density Y
- C. Ketumpatan X > Ketumpatan Y
Density X > Density Y

- 63) Rajah (a) menunjukkan berat sebuah beban di udara. Rajah (b) menunjukkan beban yang sama dimasukkan kedalam air.

*Diagram(a) shows the weight of the load in the air.
Diagram (b) shows the same weight immersed in water.*



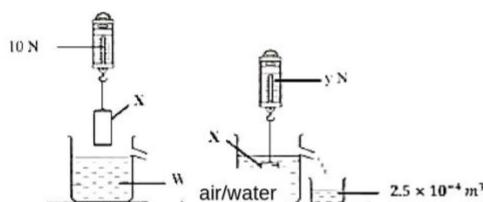
Berapakah daya tujah yang dialami oleh beban itu setelah dimasukkan kedalam air?

What is the buoyant force when the load is fully immersed in water?

- A. 2 N
- B. 6 N
- C. 8 N
- D. 10 N

- 64) Rajah menunjukkan berat suatu objek X diukur di udara dan kemudian di dalam air

Diagram shows the weight of object X measured in the air and in the water.



Berapakah bacaan y?

What is the reading of y?

(ketumpatan air = 1000 kg m^{-3})
(Density of water = 1000 kg m^{-3})

- A. 2.5 N
- B. 7.5 N
- C. 10.0 N
- D. 12.5 N

- 65) Rajah menunjukkan seorang lelaki di atas suatu rakit buloh yang terapung dan bergerak melalui air sungai.

Diagram shows a man on a bamboo raft floating and moving through river water.



Jumlah berat lelaki dan rakit itu ialah 2100 N. Apakah isipadu bahagian rakit yang tenggelam di bawah air?

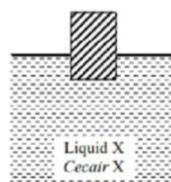
The total weight of the man and the raft is 2100 N. What is the volume of the raft that sinks below the water?

Density of water: 1000 kg m^{-3}
Ketumpatan air : 1000 kg m^{-3}

- A. 0.12 m^3
- B. 0.21 m^3
- C. 0.33 m^3
- D. 0.54 m^3

- 66) Rajah menunjukkan suatu objek yang terapung di air. 20% daripada isipadu objek tersebut berada di atas air.

Diagram shows an object floating in water, 20% of its volume is above water.



Hitung ketumpatan objek itu?

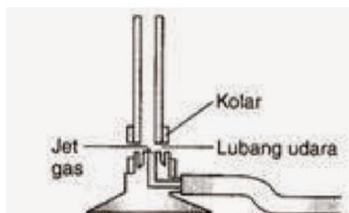
Calculate the density of the object?

[Ketumpatan air/Density of water: 1000 kg m^{-3}]

- 200 kg m^{-3}
- 800 kg m^{-3}
- 1000 kg m^{-3}
- 1200 kg m^{-3}

- 69) Rajah menunjukkan keratan rentas sebuah penunu bunsen. Gas dimasukkan ke dalam penunu seperti yang ditunjukkan

Diagram shows the cross-section of a Bunsen burner. Gas is fed into the burner as shown.



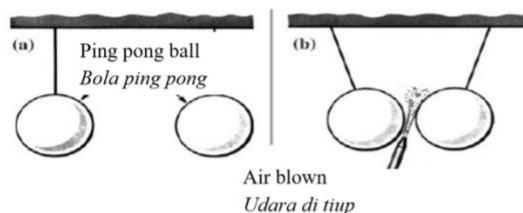
Udara disedut masuk pada bahagian dasar penunu itu. Prinsip manakah yang menerangkan fenomena ini?

Air is sucked in at the base of the burner. Which principle explains this phenomenon?

- Prinsip pascal/Pascal principle
- Prinsip Archimedes / Archimedes principle
- Prinsip bernoulli/ Bernoulli principle
- Prinsip keabadian momentum

- 70) Rajah menunjukkan dua bola ping pong mendekati di antara satu sama lain apabila udara ditiupkan di antara kedua-dua bola ping pong tersebut.

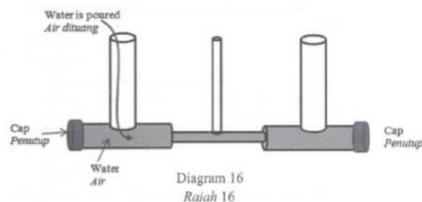
Diagram shows two ping pong balls are getting closed to each others when air is blown between them,



Apakah prinsip fizik yang terlibat dalam situasi itu?
What is the principle involved in this situation?

- Prinsip Bernoulli
Bernoulli's principle
- Prinsip Pascal
Pascal principle
- Prinsip Archimedes
Archimedes principles
- Prinsip keabadian momentum
Principle conservation momentum

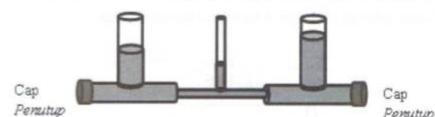
71)



Rajah menunjukkan sebuah tiub venturi dengan kedua-dua hujung ditutup. Selepas air dituang ke dalam tiub, yang manakah menunjukkan aras air yang betul?

Diagram shows a ventury tube with both end are closed. After water is poured into the tube, which of the tube shows the correct water level?

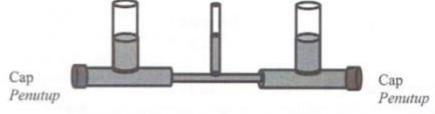
A



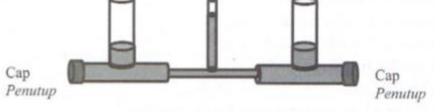
B



C

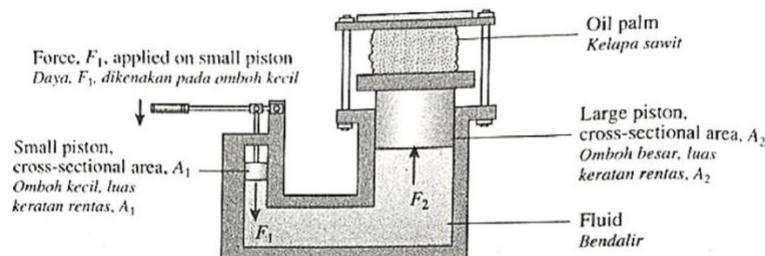


D



Rajah 11.1 menunjukkan sebuah pemampat hidraulik yang digunakan untuk memampatkan kelapa sawit disebuah kilang

Diagram 11.1 shows a hydraulic compressor which is used for compressing oil palm in a factory



A) i) Nyatakan prinsip Pascal?

State pascal's principle?

(1 markah)

ii) Terangkan bagaimana pemampat hidraulik boleh digunakan untuk memampatkan kelapa sawit apabila daya, F_1 dikenakan pada omboh kecil dengan luas keratan rentas A_1 .

Explain how the hydraulic compressor can be used to compres oil palm when a force, F_1 is applied on the small piston of cross-sectional area A_1

(4 markah)

b) Dalam satu sistem pemampat hidraulik, luas keratan rentas omboh kecil dan omboh besar ialah 0.02 m^2 dan 5.00 m^2 . Daya 60 N dikenakan keatas omboh kecil itu

In hydraulic compressor system, the cross-sectional area of small piston and large piston are 0.02 m^2 and 5.00 m^2 respectively. A force 60 N is applied to the small piston.

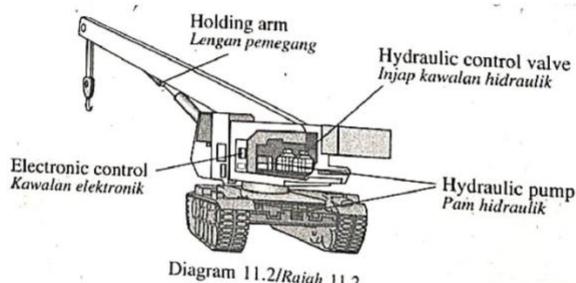
Hitung /Calculate

i) Tekanan yang dipindahkan ke omboh besar melalui bendarir itu
the pressure transmitted to the large piston through the fluid

ii) Daya yang dikenakan keatas omboh besar itu
Force exerted on the large piston

C) Rajah 11.2 menunjukkan satu sistem kren hidraulik yang digunakan untuk mengangkat beban yang sangat berat.

Diagram 11.2 shows a hydraulic crane system which used for lifting a very heavy load



Anda dikehendaki menyiasat ciri-ciri sistem kren hidraulik seperti yang ditunjukkan dalam jadual 11
You are required to investigate the characteristics of hydraulic crane system as shown in table 11

Hydraulic system <i>Sistem hidraulik</i>	Ratio of cross sectional area of small piston to large piston <i>Nisbah luas keratan rentas omboh kecil kepada omboh besar</i>	Type of fluid <i>Jenis bendalir</i>	Boiling point of fluid <i>Takat didih bendalir</i>	Ratio load/Effort for the arm <i>Nisbah beban/Daya bagi lengan</i>
P	50 : 2	Incompressible <i>Tidak boleh dimampat</i>	Low <i>Rendah</i>	Low <i>Rendah</i>
Q	2 : 50	Compressible <i>Boleh dimampat</i>	High <i>Tinggi</i>	Moderate <i>Sederhana</i>
R	5 : 300	Incompressible <i>Tidak boleh dimampat</i>	Low <i>Rendah</i>	Moderate <i>Sederhana</i>
S	1 : 300	Incompressible <i>Tidak boleh dimampat</i>	High <i>Tinggi</i>	High <i>Tinggi</i>

Table 11/Jadual 11

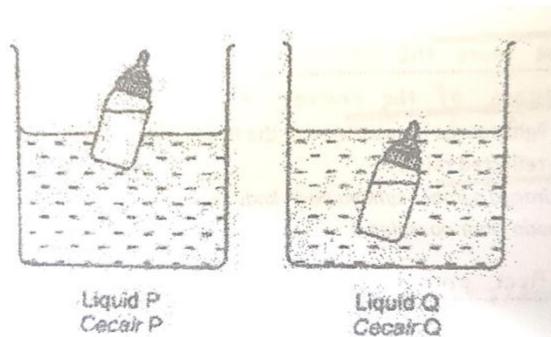
Terangkan kesesuaian setiap ciri sistem kren hidraulik. Tentukan sistem hidraulik yang paling berkesan untuk digunakan dalam suatu sistem kren hidraulik. Berikan sebab-sebab untuk pilihan anda

Explain the suitability of each characteristic of the hydraulic system. Determine the most effective hydraulic system to be used in a hydraulic crane system
(10 markah)

Bahagian B (20 markah)

Rajah 9.1 menunjukkan dua botol susu yang serupa terapung dalam cecair P dan cecair Q masing-masing. Botol susu itu terapung kerana daya bersih yang bertindak ke atas botol itu adalah sifar.

Diagram 9.1 shows two identical feeding bottle floating in liquid P and liquid Q respectively. The feeding bottle floats because net force acting on the bottle is zero.



Nyatakan apakah prinsip Archimedes?
State what is the Archimedes' Principle?

Menggunakan Rajah 9.1 bandingkan kedudukan botol susu dalam cecair P dan cecair Q. Bandingkan juga berat botol dan daya apungan yang bertindak ke atas botol dalam cecair P dan cecair Q. Bandingkan ketumpatan cecair P dan cecair Q.

Hubungkaitkan kedudukan botol dengan ketumpatan cecair bagi menghasilkan satu konsep fizik yang sesuai
*Using Diagram 9.1 compare the position of bottles in liquid P and liquid Q, the weights and the buoyant forces that are acting on the bottles in liquid P and liquid Q. Compare the density of liquid P and liquid Q.
Relate the position of the bottle and the density of liquid to deduce a relevant physics concept*

Jawapan

The position of the bottles in liquid P float _____ than bottle in liquid Q.

Weight and the buoyant force are _____ in both cases.

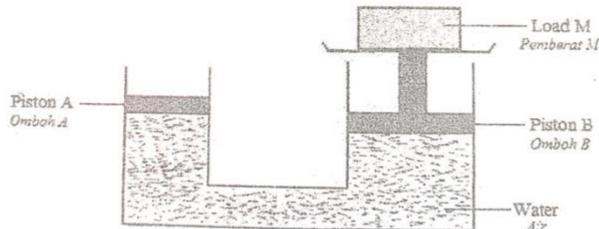
Density of liquid P is _____ than liquid Q.

As the density of liquid _____ increases, the _____ the bottle floats

When density of liquid _____ the volume of liquid displaced _____ to produce the same buoyant force.

- B) Rajah menunjukkan satu jek hidraulik ringkas

Diagram shows a simple hydraulic jack



Terangkan bagaimana pemberat M boleh diangkat dan berikan satu sebab mengapa luas keratan rentas omboh A lebih kecil dari pada luas keratan rentas omboh B.

Explain how load M can be lifted and give reason why the cross sectional area of piston is smaller than the cross sectional area of piston B.

Jawapan

When force is applied to piston A

By using pascal principle, pressure is produced and transmitted equally throughout the liquid towards piston B.

Pressure multiplies by the surface area of piston B will produce the output force that lift the load M.

Cross-sectional area of piston A is smaller than piston B to produce large output force.

- C) Jek hidraulik ringkas dalam rajah 9.2 tidak sesuai untuk digunakan bagi mengangkat sebuah kereta di dalam bengkel membaiki kereta. Menggunakan konsep fizik yang sesuai terangkan pengubahsuai yang diperlukan bagi membolehkan mesin ini mengangkat kereta dengan lebih mudah. Pengubahsuai merangkumi aspek-aspek berikut:
- the simple hydraulic jack in diagram 9.2 is not suitable to use to lift a car in a workshop. Using suitable physics concepts, explain the required modification that need to be done to enable the machine to lift a car easily in a workshop. You can emphasise on the following aspects in your modification.*

- i) Method so that only small force is applied at piston A
Kaedah supaya daya yang kecil sahaja dikenakan pada omboh A
- ii) Component to control flow of liquid in the hydraulic jack.
Komponen untuk mengawal pengaliran cecair dalam jet hidraulik
- iii) component in the hydraulic jack to lower the car
Komponen di dalam jek hidraulik untuk menurunkan kereta
- iv) Size pistons
Saiz piston
- v) Type of liquid used
Jenis cecair yang digunakan

- C) Jek hidraulik ringkas dalam rajah 9.2 tidak sesuai untuk digunakan bagi mengangkat sebuah kereta di dalam bengkel membaiki kereta. Menggunakan konsep fizik yang sesuai terangkan pengubahsuaian yang diperlukan bagi membolehkan mesin ini mengangkat kereta dengan lebih mudah. Pengubahsuaian merangkumi aspek-aspek berikut:
the simple hydraulic jack in diagram 9.2 is not suitable to use to lift a car in a workshop. Using suitable physics concepts, explain the required modification that need to be done to enable the machine to lift a car easily in a workshop. You can emphasise on the following aspects in your modification.
- i) Method so that only small force is applied at piston A
Kaedah supaya daya yang kecil sahaja dikenakan pada omboh A
 - ii) Component to control flow of liquid in the hydraulic jack.
Komponen untuk mengawal pengaliran cecair dalam jet hidraulik
 - iii) component in the hydraulic jack to lower the car
Komponen di dalam jek hidraulik untuk menurunkan kereta
 - iv) Size pistons
Saiz piston
 - v) Type of liquid used
Jenis cecair yang digunakan

modification	
Increase length of handle to pull the piston	Increase distance between force and fulcrum, less force used on small piston to produce bigger force
Use valve A at smaller piston, valve B at bigger piston	Open valve A and close valve B to move the fluid from the tank to piston A. Open valve B and close valve A to move fluid from piston A to B.
Use release valve	The liquid in the bigger piston will flow to the tank
Size of piston B is bigger than A	To produce bigger force in the enclosed fluid/ output piston
Use incompressible liquid	More efficient, no work done to compress the fluid



HEAT

HEAT, Q

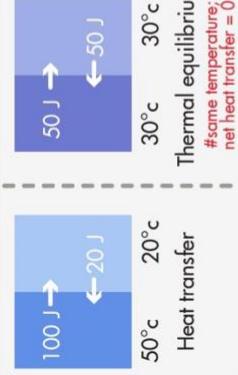
Temperature	Heat, Q
Degree of hotness Kelvin, K (°C, F)	Energy Joule, J ${}^{\circ}\text{C} \rightarrow \text{Kelvin, K}$ ${}^{\circ}\text{C} = (\theta + 273) \text{ K}$

$$Q = mc\theta$$

$$\text{heat (energy)} = (\text{mass}) (\text{specific heat capacity}) (\text{temp. change})$$

$$J = \text{kg}(\text{J kg}^{-1} \text{°C}^{-1})(\text{°C})$$

THERMAL EQUILIBRIUM



Thermometer

Use concept of thermal equilibrium



$$\text{Temp. } \theta = \frac{\varrho_\theta - \varrho_0}{\varrho_{100} - \varrho_0} \times 100^{\circ}\text{C}$$

mercury? sensitive to temperature change
heat uniformly/non-sticky

SPECIFIC HEAT CAPACITY, C

The amount of heat/energy required by 1kg substance to:

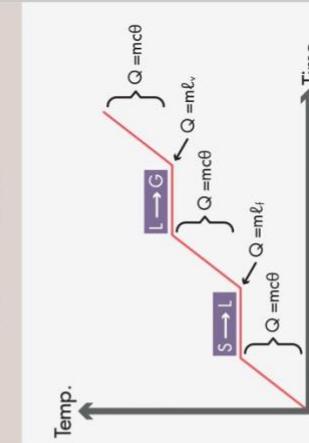
change its temperature by 1°C without changing state

$$P_t = mc\theta$$

$$P_t = mC\theta$$

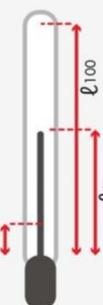
$$P_t = mC\theta$$

Q is heat (energy)
if using immersion heater (electric)



Thermometer

Use concept of thermal equilibrium



$$\text{Temp. } \theta = \frac{\varrho_\theta - \varrho_0}{\varrho_{100} - \varrho_0} \times 100^{\circ}\text{C}$$

mercury? sensitive to temperature change
heat uniformly/non-sticky

LATENT HEAT, L (SPECIFIC)

Latent heat fusion, ℓ_f
Latent heat vaporisation, ℓ_v



$$Q = m\ell$$

heat (energy) = (mass)(latent heat)

$$J = \text{kg}(\text{J kg}^{-1} \text{°C}^{-1})(\text{°C})$$

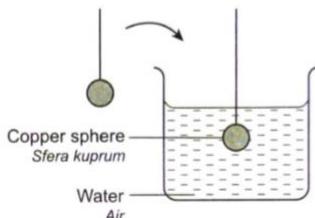
What is quantity of heat required to change 2kg of water from 20°C to 30°C?
Temperature change. Specific heat capacity, $Q=mc\theta$

Water to ice (liquid → solid). Latent heat, $Q=m\ell$
What is quantity of heat released to change 2kg of water at 0°C to ice at 0°C?
State change (solid → liquid), temperature change:
 $Q_1 = mc\theta$
 $Q_2 = m\ell$
 $Q_t = Q_1 + Q_2$



- 72) Perubahan suhu sebanyak 25 K adalah setara dengan perubahan suhu sebanyak
Temperature change of 25 K is similar to the change of temperature
 A. 25 F
 B. 25°C
 C. 298°F
 D. 298 °C

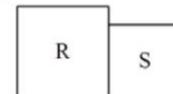
- 73) Rajah menunjukkan satu sfera logam yang panas direndam di dalam air sejuk pada suhu 0°C.
Diagram shows a hot metal sphere immersed in cold water at 0°C.



Keseimbangan terma tercapai apabila
Thermal equilibrium is reached when the

- A Suhu sfera > suhu air
temperature of sphere > temperature of the water
 B Suhu sfera < suhu air
temperature of sphere < temperature of the water
 C Suhu sfera = suhu air
temperature of sphere = temperature of the water
 D apabila air mendidih
When the water is boil
- 74) Rajah menunjukkan dua objek R dan S yang saling bersentuhan. Suhu awal R ialah 80 oC dan suhu awal S ialah 60 oC.
Diagram shows two objects, R and S touching each other. The initial temperature of R is 80 oC while S is 60 oC.

Pernyataan manakah yang betul semasa R dan S berada dalam keseimbangan terma?
Which statement is correct when R and S are in thermal equilibrium?



- A. Suhu R lebih tinggi dari suhu S.
Temperature R is higher than S
 B. Kadar pengaliran haba bersih antara R dan S adalah sifar.
Net rate of heat flow between R and S is zero
 C. Kadar perubahan suhu R lebih besar dari S.
Rate of change in temperature R is bigger S

- 75) Rajah menunjukkan sebatang sudu diletakkan dalam semangkuk sup bersuhu 95 oC.
Diagram shows a spoon is placed in a bowl of soup at 95 oC.



Penyataan manakah benar apabila keseimbangan terma dicapai?
Which statement is correct when thermal equilibrium is reached

- A. Suhu sup tidak berubah
temperature of soup is unchange.
 B. Suhu sudu tidak berubah
temperature of spoon is unchange
 C. tiada pengaliran haba antara sudu dan sup
No flow of heat between soup and spoon
 D. Sudu dan sup mempunyai suhu yang sama
temperature of soup and spoon is the same

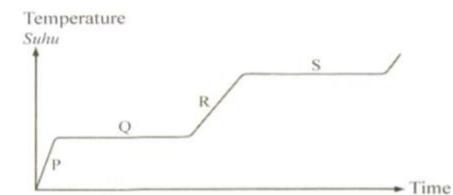
Rajah menunjukkan 200 g air kopi pada 60 oC.
Diagram shows 200g of coffee at 60 oC



Kirakan haba yang dibebaskan apabila suhu air kopi turun kepada 40 oC
Calculate the heat released when the temperature of coffee drop to 40 oC
(muatan haba tentu kopi/ heat capacity of coffee:
 $4184 \text{ J kg}^{-1} \text{oC}^{-1}$)

- A. $1.67 \times 10^4 \text{ J}$
- B. $3.34 \times 10^4 \text{ J}$
- C. $5.02 \times 10^4 \text{ J}$
- D. $1.67 \times 10^7 \text{ J}$

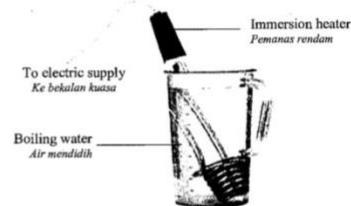
Suatu bahan dipanaskan pada kadar seragam. Bahan itu berubah dari keadaan pepejal kepada cecair, kemudian kepada gas. Graf menunjukkan bagaimana suhu berubah dengan masa.
A substance is heated at a steady rate. It changes from solid to liquid, and then to gas. Graph shows how its temperature change with time



Bentangan manakah pada graf menunjukkan perubahan keadaan jirim sedang berlaku
Which parts of the graph shows a change of state is taking place

- A. P and R
- B. Q and s
- C. P and S
- D. Q and R

Rajah menunjukkan 500 g air mendidih yang dipanaskan menggunakan pemanas rendam 1 kW.
Diagram shows 500 g of boiling water being heated using an immersion heater of 1 kW.



Berapa lamakah masa yang diambil untuk air itu mendidih dan bertukar menjadi wap?
(Haba pendam tentu pengewapan = $2.26 \times 10 \text{ Jkg}^{-1} \text{oC}^{-1}$
How long does it take for the water to boiling water and vapourize?
(specific latent heat of vapourisation of water = $2.26 \times 10^5 \text{ J kg}^{-1}$)

- A. 111 s
- B. 565 s
- C. 1130 s
- D. 2260 s

Jadual menunjukkan muatan haba bagi bahan R,S dan T.
Table shows the specific heat capacity for material R,S and T.

Material	Specific heat capacity/Jkg ⁻¹ oC ⁻¹
R	390
S	840
T	1700

Manakah antara pasangan berikut adalah paling sesuai untuk djadikan dasar dan pemegang bagi kuali?
Which of the following pairs is most suitable for making the base and the handle of the frying pan?

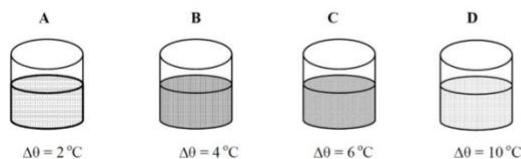
Base of the frying pan
Dasar kuali memanas

Handle of the frying pan
Pemegang kuali memanas

- | | | |
|---|---|---|
| A | R | T |
| B | T | R |
| C | S | T |
| D | T | S |

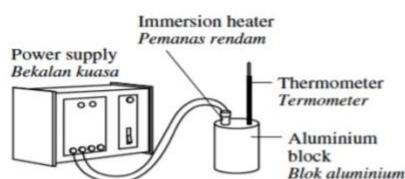
Rajah menunjukkan empat jenis cecair A, B,C dan D yang sama jisim diletakkan di dalam bekas yang sama. Bekas-bekas tersebut diletakkan di bawah sinaran matahari selama satu jam dan menyebabkan kenaikan suhu yang berbeza. Cecair manakah yang mempunyai muatan haba yang paling tinggi?

Diagram shows four type of liquid, A, B, C and D of same mass filled in the same type of container. All the containers are placed under the sunlight for one hour and caused the different temperature increases, $\Delta\theta$. Which of the following liquid has higher specific heat capacity?



Rajah menunjukkan susunan radas untuk menentukan muatan haba tentu, c bagi satu blok aluminium.

Diagram below shows an apparatus set-up to determine the specific heat capacity, c of an aluminium block.



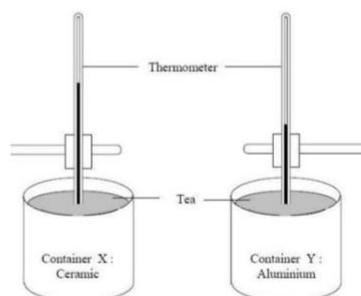
Langkah manakah yang tidak boleh meningkatkan kejituuan nilai c ?

Which step cannot increase the accuracy value of c ?

- Balut blok aluminium dengan kapas.
Wrap the aluminium block with cotton.
- Letak blok aluminium di atas kepingan polisterina
Put the aluminium block on a polystyrene sheet
- Tutup bahagian atas blok aluminium dengan kerajang aluminium
Cover the top of the aluminium block with aluminium foil.
- Tuang sedikit minyak pelincir ke dalam lubang di mana termometer dimasukkan
Pour some lubricating oil into the hole where the thermometer is inserted

Air teh dengan isipadu dan jisim yang sama bersuhu 80°C dituangkan ke dalam dua bekas yang diperbuat daripada bahan yang berbeza. Rajah menunjukkan bacaan termometer selepas 10 minit

Equal volume and mass of tea at 80°C are poured into two containers of different materials. Diagram shows the thermometer reading after 10 minutes.



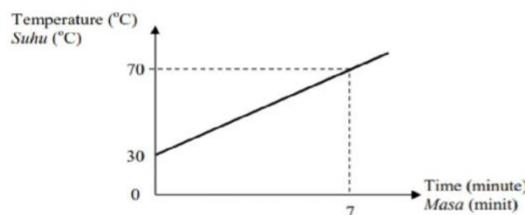
Berdasarkan rajah, bacaan termometer itu berbeza kerana

Based on diagram, thermometer readings are different because

- Muatan haba bekas X > muatan haba bekas Y
heat capacity container X > Y
- Muatan haba bekas Y > muatan haba bekas X
Heat capacity container Y > X
- Haba pendam bekas X > haba pendam Y
latent heat of X > latent heat Y
- Haba pendam bekas Y > haba pendam X
latent heat of Y > latent heat X

Rajah menunjukkan lengkung pemanasan bagi 0.5 kg cecair yang dipanaskan pemanas rendam 100 W.

Diagram shows the heating curve for 0.5 kg heated by a 100 W immersion heater.



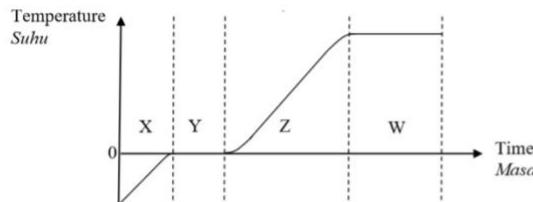
Berapakah muatan haba tentu cecair itu?

What is the specific heat capacity of the liquid?

- A. $280 \text{ kg}^{-1} \text{ }^{\circ}\text{C}^{-1}$
- B. $1400 \text{ kg}^{-1} \text{ }^{\circ}\text{C}^{-1}$
- C. $2100 \text{ kg}^{-1} \text{ }^{\circ}\text{C}^{-1}$
- D. $4200 \text{ kg}^{-1} \text{ }^{\circ}\text{C}^{-1}$

Rajah menunjukkan lengkung pemanasan suatu bahan pepejal

Diagram shows a heating curve of a solid substance.



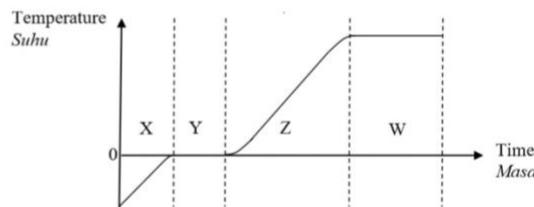
Pada peringkat W, haba yang diserap oleh objek ialah

At stage W, the heat absorb by the object is

- A. Sifar
Zero
- B. Haba pendam pengewapan
Latent heat of vaporization
- C. Haba pendam pelakuran
Latent heat of fusion
- D. Muatan haba tentu
Specific heat capacity

Suatu bahan dipanaskan pada kadar seragam. Bahan itu berubah dari keadaan pepejal kepada cecair, kemudian kepada gas. Graf menunjukkan bagaimana suhu berubah dengan masa.

A substance is heated at a steady rate. It changes from solid to liquid, and then to gas. Graph shows how its temperature change with time



Bahagian manakah pada graf menunjukkan perubahan keadaan jirim sedang berlaku

Which parts of the graph shows a change of state is taking place

- A. X and Z
- B. Y and W
- C. X and W
- D. Y and Z

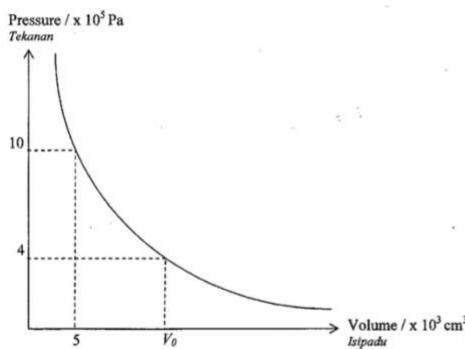
Apakah yang berlaku semasa peleburan naftalena?

What occur during melting of naphthalene?

- A. Haba dibebaskan oleh naftalena
Heat is released by the naphthalene
- B. Suhu naftalena bertambah
Temperature of naphthalene increases
- C. Daya ikatan antara molekul-molekul naftalena bertambah.
The bonding force between naphthalene molecules.
- D. Tenaga kinerik molekul-molekul naftalena tetap.
Kinetic energy of the naphthalene remain constant

Rajah menunjukkan tekanan melawan isipadu pada suhu tetap.

Diagram shows a graph of pressure against volume at constant temperature.



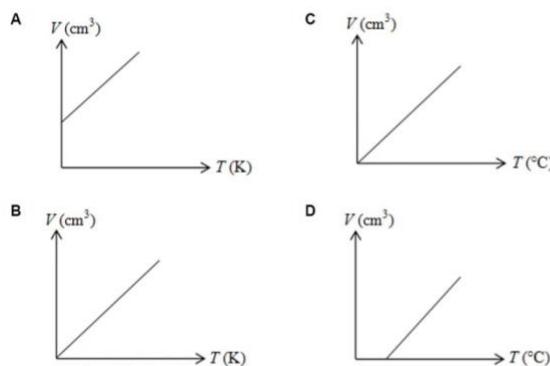
Berapa nilai V_0 ?

what is the value of V_0 ?

- A. 7.5
- B. 12.5
- C. 10.5
- D. 2.0

Graf manakah menunjukkan hubungan antara isipadu,V dengan suhu,T bagi gas pada tekanan tetap?

Which graph shows the relationship between volume,V and temperature,T of a gas at constant pressure?



Tekanan udara di dalam tayar sebuah kereta ialah 210 kPa pada suhu awal 25 oC. Selepas suatu perjalanan yang jauh, suhu udara itu meningkat kepada 35 oC. Berapakah tekanan tayar ketika itu?

The air pressure in the tyre of a car is 210 kPa at an initial temperature of 25 oC. After a long journey the air temperature has increased to 35 oC. What is the air pressure in the tyre after the journey?

- A. 150 kPa
- B. 217 kPa
- C. 294 kPa
- D. 437 kPa

Pada 27 'C sebiji belon yang digunakan dalam ramalan kaji cuaca mempunyai tekanan 100 kPa. Apabila belon itu mencapai ketinggian tertentu, tekanan berkurang kepada 90 kPa. Berapakah suhu pada ketinggian itu?

At 27°C a balloon is used in weather forecast has a pressure of 100 kPa. As the balloon reaches a certain altitude, the pressure decreases to 90 kPa. What is the temperature at the altitude?

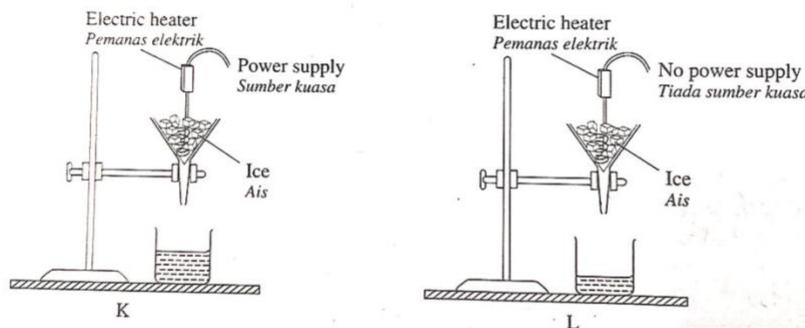
- A. -3.0 'C
- B. 3.0 'C
- C. 24.3 'C
- D. 60.3 'C

Satu gelembung udara berisipadu 0.1 cm^3 berada pada dasar sebuah tasik. Jika kedalaman tasik ialah 20 m air dan tekanan atm ialah 10 m air, hitung isipadu gelembung udara apabila tiba di permukaan air?

An Air bubble with volume of 0.1 cm^3 is in the base of the lake. at the depth of 20 m water and atmospheric pressure 10m, calculate the volume of air bubble when it reach the surface of water?

- A. 0.1 cm^3
- B. 3.3 cm^3
- C. 0.3 cm^3
- D. 10 cm^3

Rajah menunjukkan radas yang disediakan untuk menentukan haba pendam tentu pelakuran ais.
 Diagram shows the apparatus set up to determine the specific latent heat of fusion of ice.



Dua set radas yang serupa digunakan. Dalam radas K, pemanas disambungkan kepada sumber kuasa manakala dalam radas L, pemanas tidak disambungkan kepada kuasa sumber. Mengapakah pemanas dalam radas L tidak disambung kepada sumber kuasa?

Two identical sets of appratus are used. In K, heater is connected to a power supply. While in L, the heater is not connected to power supply. Why is the heater in L not connected to a power supply?

(1 markah)

- B) Pada awal eksperimen, 0.5 kg ais dimasukkan ke dalam setiap corong bersama pemanas. Pemanas 250 W di K dihidupkan dan sebuah bikar diletak dibawah setiap corong. Selepas 4 minit, pemanas itu dimatikan dan isipadu air yang dikutip di dalam bikar diukur. Hitung tenaga yang dibekalkan kepada ais oleh pemanas di K dalam 4 minit.

At the beginning of the experiment, 0.5 kg of ice is put into each funnel together with the heater. The 250 W heater in K is switched on and a beaker is placed under each funnel. After 4 minutes, the heater is switch off and the volume of water collected in each beaker is measured. Calculate the energy supplied to the ice by the heater K in 4 minutes.

(2 markah)

- C) Diberi isipadu air yang dikumpul di K = 250 ml dan isipadu air yang dikumpul di L = 52 ml. Hitung jisim air yang dileburkan oleh pemanas K.

Given the volume of water collected in K= 250 ml and volume of water collected in L =52 ml. Calculate the mass of water melted by the heater K.

[Ketumpatan air / density of water = 1.0 g ml⁻³]

(2 markah)

- D) Hitung nilai haba pendam tentu pelakuran air

Calculate the value of the specific latent heat of fusion of water.

(2 markah)

5. Diagram 5.1 and Diagram 5.2 show an experiment to study the relationship between the temperature and the pressure of gas.

Diagram 5.1 shows the beaker is heated for 5 minutes while Diagram 5.2 shows the beaker is heated for 10 minutes.

Rajah 5.1 dan Rajah 5.2 menunjukkan satu eksperimen yang dilakukan untuk mengkaji hubungan di antara suhu dan tekanan gas. Rajah 5.1 menunjukkan bikar dipanaskan selama 5 minit manakala Rajah 5.2 menunjukkan bikar dipanaskan selama 10 minit.

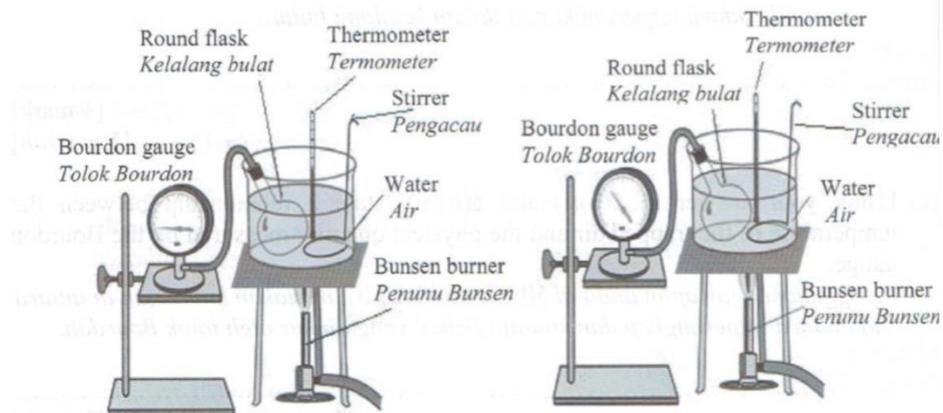


Diagram 5.1

Rajah 5.1

Diagram 5.2

Rajah 5.2

Based on Diagram 5.1 and 5.2,
Berdasarkan Rajah 5.1 dan 5.2,

- (a) What is the function of Bourdon gauge?

Apakah fungsi tolok Bourdon?

[1 mark]

[1 markah]

- (b) Compare:

Bandingkan :

- (i) temperature of the trapped air inside the round flask.
suhu udara terperangkap di dalam kelalang bulat.

[1 mark]

[1 markah]

(ii) the reading of Bourdon gauge.
bacaan tolok Bourdon.

[1 mark]

[1 markah]

(iii) the volume of trapped air inside round flask.

isipadu udara terperangkap di dalam kelalang bulat.

[1 mark]

[1 markah]

(c) Using your answer in 5(b)(i) and 5(b)(ii), state a relationship between the temperature of the trapped air and the physical quantity measured by the Bourdon gauge.

Menggunakan jawapan anda di 5(b)(i) dan 5(b)(ii), nyatakan hubungan di antara suhu udara terperangkap dan kuantiti fizikal yang diukur oleh tolok Bourdon.

[1 mark]

[1 markah]

(d) Using the Kinetic Theory of Matter, explain your answer in 5 (c).

Menggunakan Teori Kinetik Jirim, terangkan jawapan anda di 5(c).

[2 marks]

[2 markah]

(e) Name a physics law involved in the above observation.

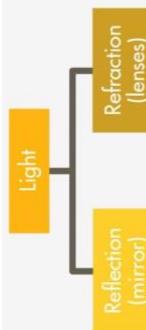
Namakan satu hukum fizik yang terlibat dalam pemerhatian di atas.

[1 mark]

[1 markah]



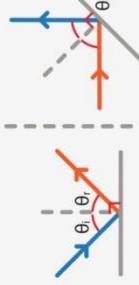
LIGHT



REFLECTION

Law of Reflection
 incident angle = reflected angle
 $\theta_i = \theta_r$

Incident ray (i), reflected ray (r), and normal line lies on the same plane.



Plane Mirror

- Characteristic of image:
 1. Virtual
 2. Upright
 3. Same size
 4. Laterally inverted
 5. Same distance

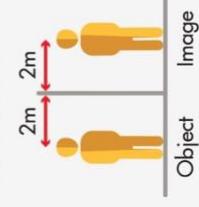
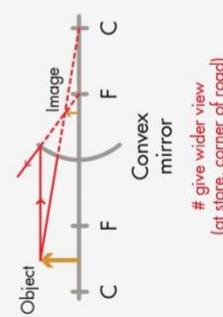
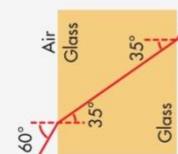


Image DO NOT depend on position of the object
 1. Virtual 2. Upright 3. Diminish



REFRACTION

Bending of light when travel through different optical density.

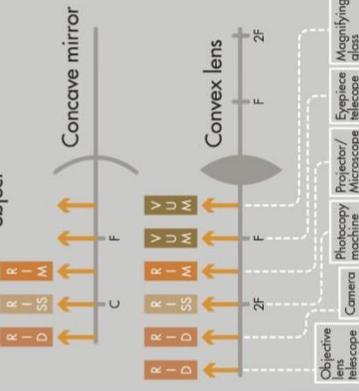


Refractive Index, n

1. NO unit!
 2. Value must be MORE > 1

Convex mirror = Concave lens

Image DEPEND on position of the object



$$n = \frac{\sin i}{\sin r} \quad \# \text{ bigger angle at TOP!}$$

$$n = \frac{\text{speed of light in vacuum, } c}{\text{speed of light in medium}} \quad \text{where } c = 3 \times 10^8 \text{ ms}^{-1}$$

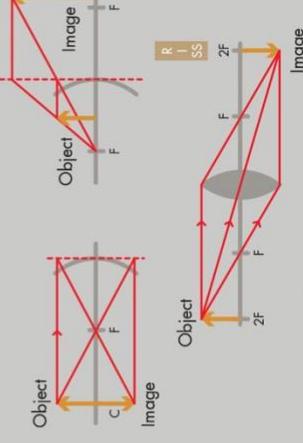
$$n = \frac{\text{real depth, } D}{\text{apparent depth, } d}$$

$$n = \frac{1}{f - u} + \frac{1}{v} \quad \text{Magnification, } m = \frac{v}{u} = \frac{h_i}{h_o}$$

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

Convex mirror = Concave lens

Image DEPEND on position of the object



$v = \text{image distance}$ $v = \text{image length}$ $f = \text{focal length}$

$P = \frac{100}{D}$ $P \blacktriangle f \blacktriangledown$
 Dioptr, D in Meter

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

Telescope \blacktriangle Power \blacktriangledown Power
 Microscope \blacktriangle Power \blacktriangledown Power

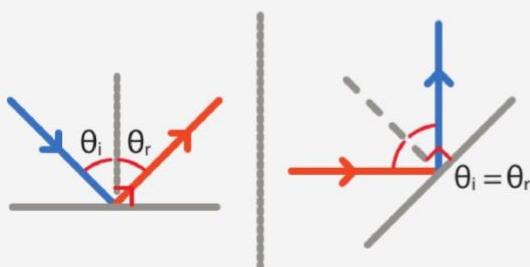
PANTULAN

Hukum Pantulan

$$\text{sudut tuju} = \text{sudut pantulan}$$

$$\theta_i = \theta_r$$

Sinar tuju (i), sinar pantulan (r), dan garis normal terletak pada satah yang sama

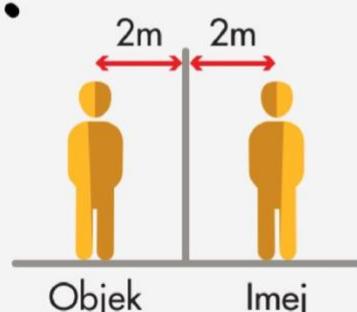


Cermin satah

Ciri-ciri imej:

1. Maya
2. Menegak
3. Sama saiz
4. Songsang sisi
5. Sama jarak

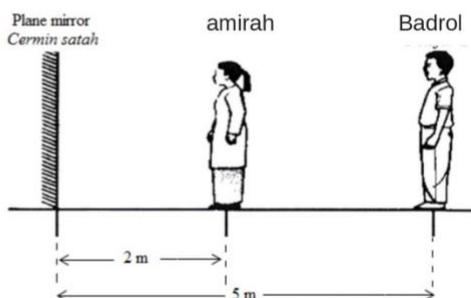
•



PANTULAN DAN CERMIN

Rajah menunjukkan Amirah dan Badrol berdiri dihadapan sebuah cermin satah masing-masing pada jarak 2m dan 5m.

The diagram shows Amirah and Badrol standing in front of a plane mirror at a distance of 2m and 5m respectively.



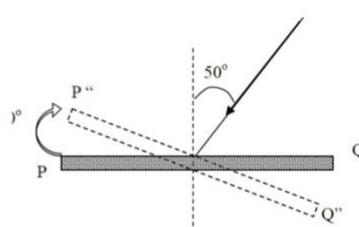
Berapakah jarak antara Amirah dan Imej Badrol?

What is the distance between Amirah and image of Badrol?

- A 3m
- B 7m
- C 4m
- D 10m

Rajah menunjukkan sinar cahaya menuju cermin satah PQ pada $i=50^\circ$

Diagram shows an incident ray of light directed to a plain mirror, PQ with $i=50^\circ$

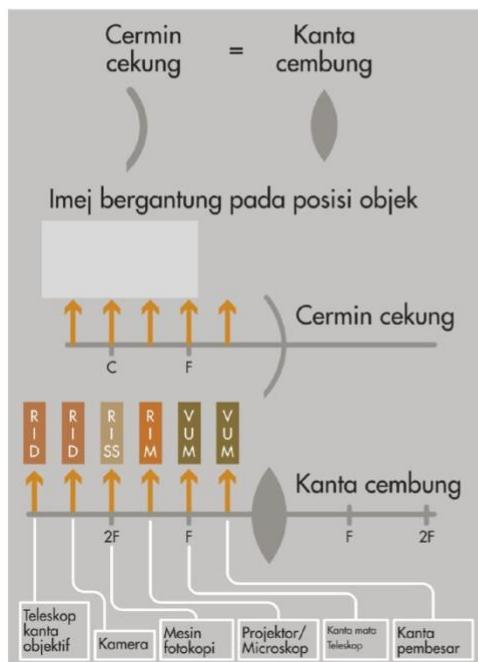


Berapa sudut pantulan bagi sinar cahaya yang dipantulkan oleh cermin satah PQ diputar sebanyak 30° ke kedudukan P''Q''?

What is the reflected angle of light ray when the plain mirror PQ is rotated 30° to P''Q''?

- A. 70
- B. 20
- C. 50
- D. 30

CERMIN CEKUNG (CONCAVE MIRROR)
KANTA CEMBUNG (CONVEX LENS).



CERMIN CEMBUNG (CONVEX MIRROR)
KANTA CEKUNG (CONCAVE LENS).

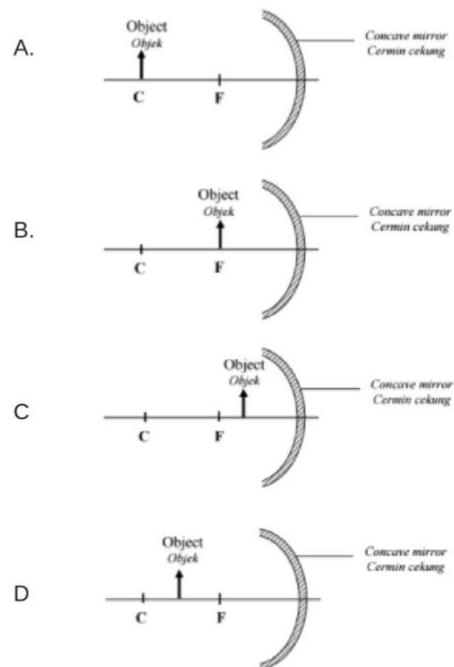


Manakah antara kedudukan objek berikut akan menghasilkan imej yang nyata, songsang, dan lebih besar bagi cermin cekung?

F ialah titik fokus bagi cermin manakala C adalah pusat lengkungan

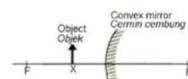
Which object position will produce a real, inverted and bigger image for a concave mirror?

F is the focal point of the mirror while C is its center of curvature.



Rajah menunjukkan sebuah objek di letakkan di hadapan cermin cembung pada kedudukan X. F merupakan titik fokus bagi cermin

Diagram shows an object placed in front of a convex mirror at position X, F is focal point of mirror

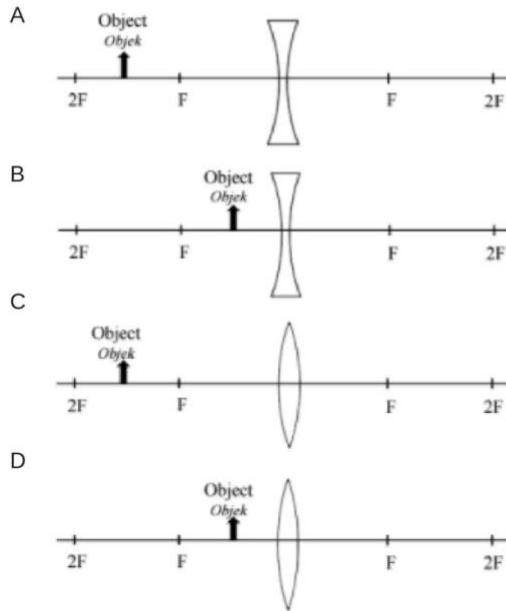


Apakah ciri-ciri imej yang terbentuk?

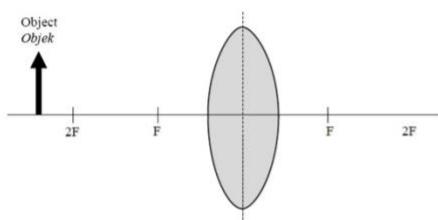
What are the characteristic of image formed?

- Nyata, tegak, kecil
Real, upright, smaller
- Maya, tegak, kecil
Virtual, upright, smaller
- Nyata, tegak, diperbesarkan
Real, upright, bigger
- Maya tegak, diperbesarkan
virtual, upright,bigger

Manakah antara berikut yang akan menghasilkan imej nyata, songsang dan dibesarkan.
Which of the following will produce image of real, inverted and magnified



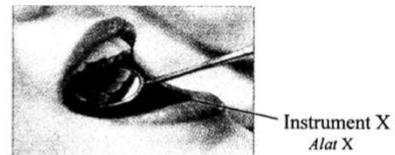
Rajah menunjukkan satu objek diletakkan di hadapan suatu kanta cembung.
The diagram shows an object placed in front of a convex lens.



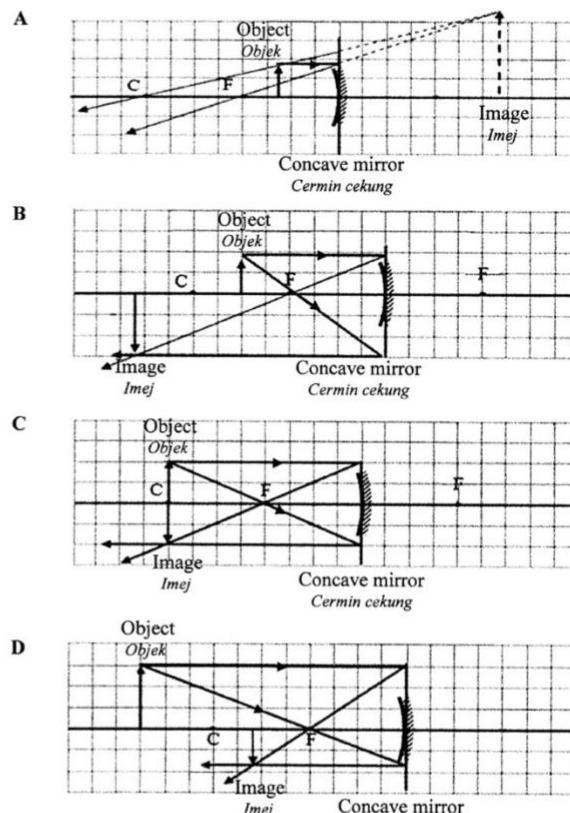
Apakah ciri-ciri imej yang terbentuk?
What are the characteristic of the image formed?

- A Maya, tegak, dibesarkan
Virtual, upright, magnified
- B Nyata, Songsang , dikecilkan
Real, inverted, diminished
- C Nyata, Songsang, dibesarkan
Real, inverted, magnified
- D Nyata, songsang, sama saiz
Real, inverted, same size

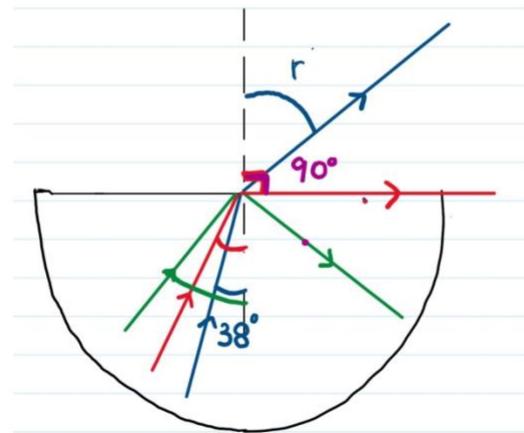
Rajah menunjukkan satu alat X yang digunakan oleh seorang doktor gigi untuk memeriksa gigi pesakit.
Diagram shows an instrument X used by a dentist to examine the teeth of his patient



Rajah sinar manakah yang betul menerangkan situasi tersebut
Which ray diagram is correct in explaining the situation?



P.D. P / T.I.R



syarat PDP / TIR

- 1.
- 2.

Aplikasi

- 1.
- 2.
- 3.
- 4.

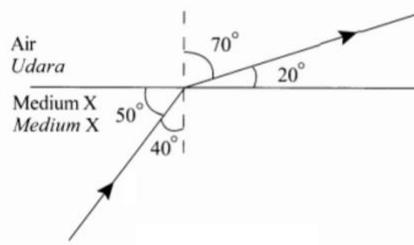
Fenomena semulajadi

- 1.
- 2.

**PEMBIASAN / REFRACTION
PANTULAN DALAM PENUH
TOTAL INTERNAL REFLECTION**

Rajah menunjukkan satu sinar cahaya bergerak dari medium X ke udara

The diagram shows a light ray, travelling from medium X to air.



Berapakah indeks biasan medium X?
What is the refractive index of medium X?

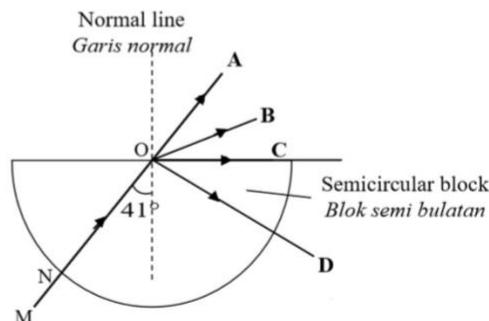
- A. 0.65
- B. 1.46
- C. 1.23
- D. 2.24

Sebuah kolam diisi dengan air sehingga kedalaman 4.5 m. Berapakah dalam ketara kolam itu?

A pool is filled with water to a depth of 4.5 m. What is the apparent depth of the pool?
[Indeks pembiasan air : 1.33]

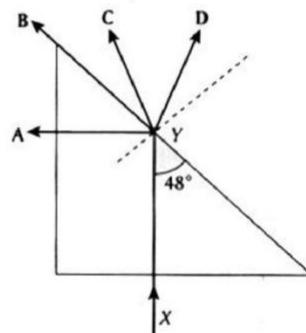
- A. 0.27 m
- B. 0.30 m
- C. 3.38 m
- D. 6.00 m

Rajah menunjukkan satu sinar cahaya MN ditujukan ke arah satu blok semi bulat yang lutsinar. Sudut genting bagi blok lutsinar itu ialah 41° . Arah manakah sinar itu bergerak dari titik O.
The diagram shows a light ray MN directed to a transparent block. The critical angle of the transparent block is 41° . Which direction does the ray move from point O.



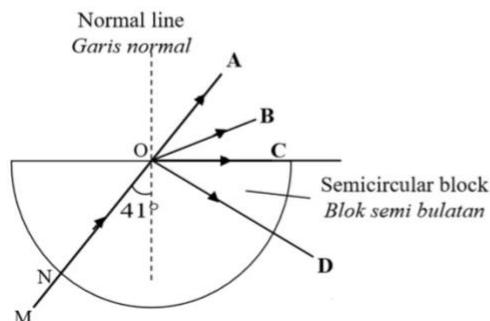
Rajah menunjukkan satu sinar cahaya X yang ditujukan ke dalam blok kaca. Sudut genting kaca itu ialah 42° . Ke manakah arah sinar cahaya itu merambat dari titik Y?

The diagram shows a light ray X is directed into a glass block. The critical angle of the glass is 42° . Which direction does the light travels from point Y?



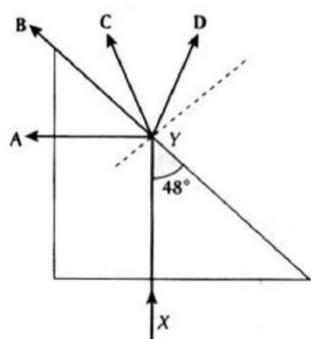
Rajah menunjukkan satu sinar cahaya MN ditujukan ke arah satu blok semi bulatan yang lutsinar. Sudut genting bagi blok lutsinar itu ialah 41° . Arah manakah sinar itu bergerak dari titik O jika sudut tujuanya ialah 38° .

The diagram shows a light ray MN directed to a transparent block. The critical angle of the transparent block is 41° . Which direction does the ray move from point O if the incident angle is 38° ?



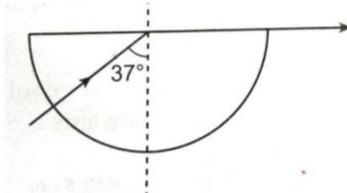
Rajah menunjukkan satu sinar cahaya X yang ditujukan ke dalam blok kaca. Sudut genting kaca itu ialah 42° . Ke manakah arah sinar cahaya itu merambat dari titik Y?

The diagram shows a light ray X is directed into a glass block. The critical angle of the glass is 42° . Which direction does the light travel from point Y?



Rajah menunjukkan satu sinar cahaya merambat di dalam satu blok kaca semi bulatan.

The diagram shows a light ray propagates in a glass block

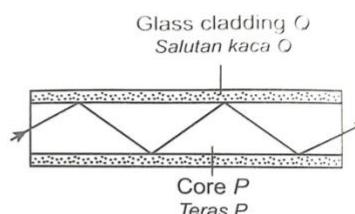


Berapakah indeks biasan bagi blok kaca itu?
What is the refractive index of the glass block?

- 1.25
- 1.33
- 1.55
- 1.66

Rajah menunjukkan satu sinar cahaya bergerak melalui gentian optik. Gentian optik itu mempunyai teras kaca, P dan satu salutan kaca, Q

The diagram shows a light ray travelling through an optical fibre. The optical fibre has glass core, P and glass cladding, Q

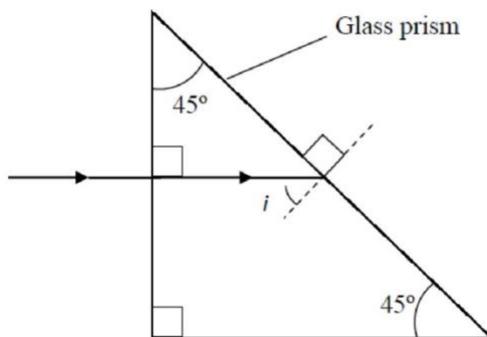


Manakah antara berikut adalah perbandingan yang betul tentang indeks biasan P dan Q?
Which of the following is correct comparison of refractive index P and Q?

- Indeks biasan P = Q
refractive index P = Q
- Indeks biasan P > Q
refractive index P > Q
- Indeks biasan P < Q
refractive index P < Q
- Indeks biasan P > 1, Q < 1
refractive index P > 1, Q < 1

- 8 Diagram 8.1 shows a light ray entering a glass prism.
[Refractive index of glass = 1.51]

Rajah 8.1 menunjukkan satu sinar cahaya merambat ke dalam sebuah prisma kaca.
[Indeks biasan kaca = 1.51]



- a) (i) Calculate the critical angle, c , of the glass prism.
Hitung sudut genting, c , prisma kaca itu.

[2 marks/ markah]

- (ii) Compare the critical angle, c , in 8(a)(i) with angle of incidence, i .
Bandingkan sudut genting, c , dalam 8(a)(i) dan sudut tuju, i .

..... [1
mark/ markah]

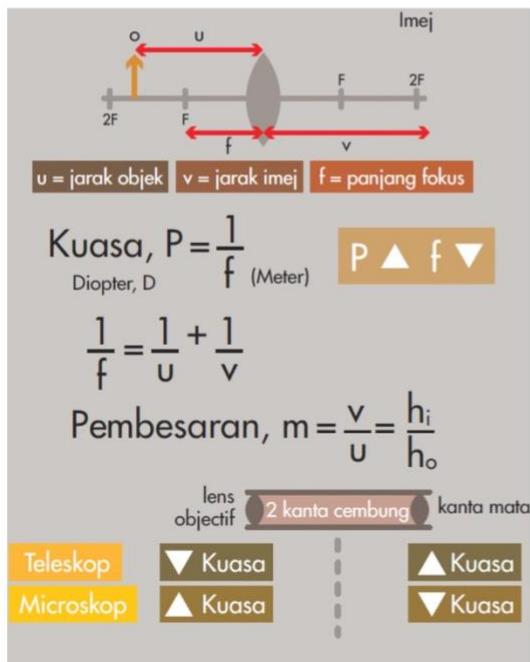
- (iii) Name the phenomenon that has occurred to the light ray .
Namakan fenomena yang telah berlaku kepada sinar cahaya.

[1 mark/ markah]

- (iv) State two conditions for this phenomenon to occur.
Nyatakan dua syarat untuk fenomena ini berlaku

[2 marks/ markah]

Persamaan kanta
Lens Equation
Kuasa (power)
Pembesaran(magnification)

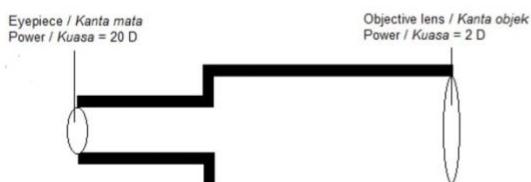


Rajah menunjukkan sebuah teleskop astronomi dalam pelarasan normal.

Diagram shows an astronomical telescope at normal adjustment.

Berapakah jarak antara kanta mata dan kanta objek bagi teleskop itu.

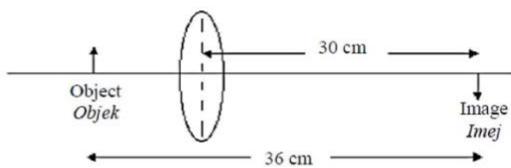
What is the distance between the eyepiece and the objective lens of the telescope.



- A. 45 cm
- B. 55 cm
- C. 65 cm
- D. 75 cm

Rajah menunjukkan pembentukan imej satu objek oleh satu kanta cembung

Diagram shows the formation of the image of an object by a convex lens.



Berapakah kuasa kanta itu?

What is the power of the lens?

- A. +5 D
- B. +20 D
- C. 6D
- D. -20 D

Berapakah pembesaran imej bagi objek itu?

What is the magnification of image of object?

- A. 5
- B. 2
- C. 4
- D. 1.2

Berapakah ketinggian objek jika ketinggian imej ialah 5 cm?

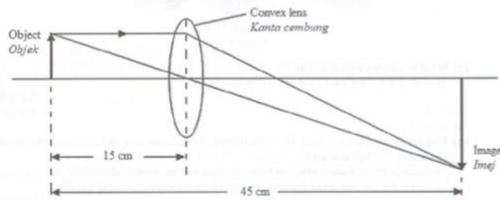
What is the height of object if the height of image is 5cm?

- A. 2 cm
- B. 5 cm
- C. 3 cm
- D. 1 cm

Persamaan kanta**Lens Equation****Kuasa (power)****Pembesaran(magnification)**

Rajah menunjukkan pembentukan imej satu objek oleh satu kanta cembung

Diagram shows the formation of the image of an object by a convex lens.



Berapakah panjang fokus kanta itu?

What is the focal length of the lens?

- A 10.0 cm
- B 15.0 cm
- C 11.25 cm
- D 30.0 cm

Berapakah pembesaran imej bagi objek itu?

What is the magnification of image of object?

- A 5
- B 2
- C 4
- D 1.2

Berapakah ketinggian imej jika ketinggian objek adalah 2 cm?

What is the height of image if the height of object is 2cm?

- A. 4 cm
- B. 5 cm
- C. 6 cm
- D. 1 cm

Pembesaran bagi satu imej yang apabila satu objek diletakkan dihadapan sebuah kanta cembung ialah 1. Dimanakah antara berikut adalah kedudukan objek tersebut?

Magnification of image for an object in front of convex lens is 1. Which of the following is the position of the object?

- A. Objek jauh dari $2F$
object far from $2F$
- B. Objek berada di $2F$
object is at $2F$
- C. Objek berada diantara $2F$ dan F
object is between $2F$ and F
- D. Objek berada di F
Object is at F

Sebuah kanta cembung mempunyai kuasa 5D. Berapakah jarak objek sekiranya jarak imej daripada kanta tersebut ialah 60 cm.

A convex lens has a power of 5D. What is the distance of the object if the image distance is 60 cm

- A. 20 cm
- B. 40 cm
- C. 30 cm
- D. 5.45 cm

Berapakah kuasa bagi sebuah kanta cekung yang mempunyai panjang fokus 10 cm?

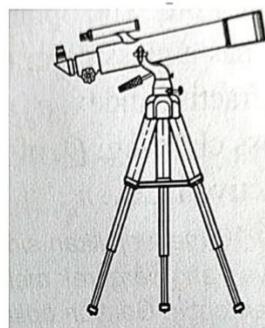
What is the power of concave lens with focal length of 10 cm?

- A. 10 D
- B. -10 D
- C. 0.1 D
- D. -0.1 D

Persamaan kanta**Lens Equation****Kuasa (power)****Pembesaran(magnification)**

Rajah menunjukkan sebuah teleskop astronomi dalam pelarasian normal.

Diagram shows an astronomical telescope at normal adjustment.



Berapakah jarak antara kanta mata dan kanta objek bagi teleskop itu jika kuasa kanta objek dan kanta mata ialah 4D dan 20 D

What is the distance between the eyepiece and the objective lens of the telescope if the power of objective lens and eyepieces lens is 4D and 20 D respectively

- A. 24 cm
- B. 30 cm
- C. 48 cm
- D. 16 cm

Berapakah pembesaran bagi imej yang terhasil untuk teleskop di atas

What is the magnification of the image produce by above telescope.

- A. 5
- B. 16
- C. 1/5
- D. 1/16

ajah menunjukkan sebuah teleskop astronomi dalam pelarasian normal.

Diagram shows an astronomical telescope at normal adjustment.



Sekiranya kuasa kanta mata digandakan dua kali ganda, apa yang akan berlaku kepada pembesaran imej yang dihasilkan?

If the power of the eyepiece lens being double, what happen to the magnification of image produce by the telescope?

- A. pembesaran imej bertambah 2 kali ganda
Magnification is image increase 2 times
- B. pembesaran imej berkurang 2 kali ganda
magnification is image decrease 2 times
- C. Pembesaran imej kekal sama tidak
Magnification will remain the same

jah menunjukkan sebuah teleskop astronomi dalam pelarasian normal.

Diagram shows an astronomical telescope at normal adjustment.



Berapakah pembesaran imej bagi objek apabila kanta objek digantikan dengan kanta cembung yang mempunyai kuasa kanta 4 D?

What is the magnification of image for an object when the objective lens used is change with convex lens of power 4 D?

- A 5
- B 10
- C 4
- D 20

- 8** Diagram 8.1 shows an object, O is placed in front of a convex lens. Focal length of the lens is 6 cm.

Rajah 8.1 menunjukkan satu objek, O diletakkan di hadapan suatu kanta cembung. Panjang fokus kanta ialah 6 cm.

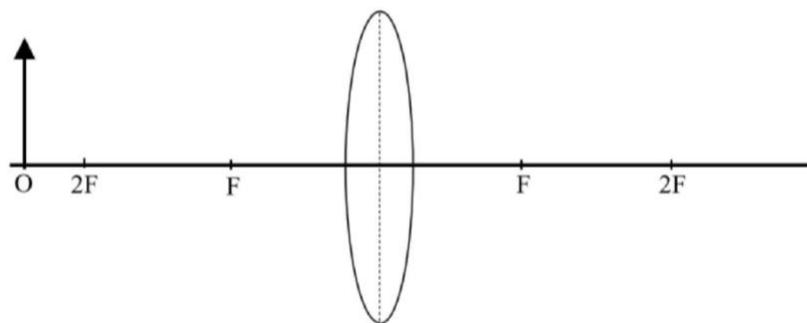


Diagram 8.1 / Rajah 8.1

- (a) What is the meaning of focal length?

Apakah yang dimaksudkan dengan panjang fokus?

[1 mark / markah]

- (b) (i) Draw the ray diagram on Diagram 8.1 to show how the image is formed.

Lukis rajah sinar pada Rajah 8.1 untuk menunjukkan bagaimana imej terbentuk.

[3 marks / markah]

- (ii) State two characteristics of the image formed in Diagram 8.1.

Nyatakan dua ciri imej yang terbentuk dalam Rajah 8.1.

[1 mark / markah]

- (c) Diagram 8.2 shows an astronomical telescope.

Rajah 8.2 menunjukkan satu teleskop astronomi.

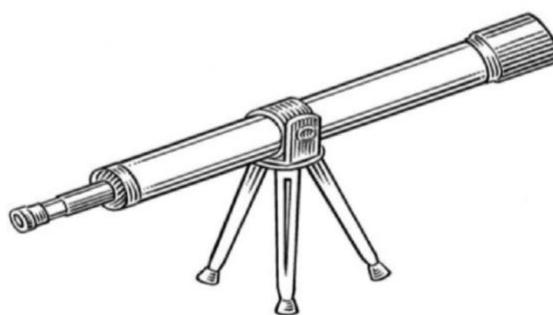


Diagram 8.2 / Rajah 8.2

Table 8 shows four lenses that can be used to build the telescope.

Jadual 8 menunjukkan empat kanta yang boleh digunakan untuk membina teleskop tersebut.

Lens Kanta	Type of lens Jenis kanta	Focal length, f / cm Panjang fokus, f / cm	Diameter of lens Diameter kanta
P	Convex <i>Cembung</i>	100	Big / Besar
Q	Convex <i>Cembung</i>	25	Big / Besar
R	Concave <i>Cekung</i>	100	Small / Kecil
S	Concave <i>Cekung</i>	25	Small / Kecil

Table 8 / Jadual 8

Based on Table 8, state the suitable characteristics of the lens to be used as objective lens.

Berdasarkan Jadual 8, nyatakan ciri-ciri kanta yang sesuai untuk digunakan sebagai kanta objektif.

- (i) Types of lens / Jenis kanta:

.....
Reason / Sebab:

[2 marks / markah]

- (ii) Focal length, f / Panjang fokus, f:

.....
Reason / Sebab:

[2 marks / markah]

- (iii) Diameter / Diameter:

.....
Reason / sebab:

[2 marks / markah]

- (d) Based on your answer in 8 (c), choose the most suitable lens to be used as an objective lens.

Berdasarkan jawapan anda di 8 (c), pilih kanta yang paling sesuai digunakan sebagai kanta objektif.

[1 mark / markah]

One of the convex lens will acts as an eye piece and the other as objective lens.
Satu daripada kanta cembung akan bertindak sebagai kanta mata dan satu lagi sebagai kanta objektif.

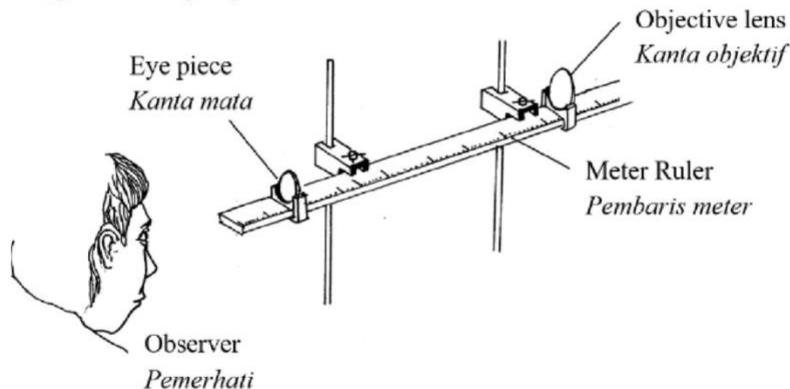


Diagram 11.2
Rajah 11.2

You are asked to investigate the arrangement and characteristics of the lenses used to construct the simple astronomical telescope as shown in Diagram 11.3.

Anda ditugaskan untuk menyiasat susunan kanta dan sifat-sifat kanta yang akan digunakan untuk membina sebuah teleskop astronomi ringkas seperti dalam Rajah 11.3.

Arrangement of lenses <i>Susunan kanta</i>	Focal length of objective lens, f_o /cm <i>Panjang fokus kanta objek, f_o/cm</i>	Magnification of image <i>Pembesaran imej</i>	Distance between objective lens and eyepiece, D / cm <i>Jarak antara kanta objek dengan kanta mata, D / cm</i>	Diameter of objective lens, d /cm <i>Diameter kanta objek, d /cm</i>
J	40.0	4.00	50.0	Large <i>Besar</i>
K	40.0	0.25	60.0	Small <i>Kecil</i>
L	10.0	4.00	50.0	Large <i>Besar</i>
M	10.0	0.25	60.0	Small <i>Kecil</i>

Diagram 11.3
Rajah 11.3

Explain the suitability of the arrangement and characteristics of the lenses and determine the arrangement which can produce an effective simple astronomical telescope.

Terangkan kesesuaian susunan dan sifat-sifat kanta dan tentukan susunan yang dapat menghasilkan teleskop astronomi ringkas yang efektif.

[10 marks]

[10 markah]

- (d) A telescope is constructed using two convex lenses of different power. The power of the lenses are 2.5 D and 20 D.

Sebuah teleskop dibina dengan menggunakan dua buah kanta cembung yang berlainan kuasanya. Kuasa bagi kanta-kanta itu adalah 2.5 D dan 20 D.

Calculate

Hitungkan

- (i) focal length for lens of power 2.5 D

panjang fokus bagi kanta berkuasa 2.5 D

[2 marks]

[2 markah]

- (ii) focal length for lens of power 20 D

panjang fokus bagi kanta berkuasa 20 D

[1 marks]

[1 markah]

- (iii) the magnification of image formed

pembesaran imej yang terhasil

[2 marks]

[2 markah]

Sila lengkapkan borang penilaian bagi Seminar SPM yang telah anda hadiri. Penilaian anda dapat membantu kami memahami tahap keberkesanannya program ini dan seterusnya membolehkan kami meningkatkan kualiti perkhidmatan kami di masa hadapan.

Terima kasih!

Please fill up this form for the session that you are attending. Your evaluation will help us improve our service and help us understand the effectiveness of this program.

Thank you!

1. Nombor Telefon

Phone Number

2. Apakah subjek bagi seminar yang sedang anda sertai sekarang?

What is the seminar's subject that you're attending now?

- | | |
|---------------------------------------|--|
| <input type="radio"/> Bahasa Malaysia | <input type="radio"/> Kimia |
| <input type="radio"/> English | <input type="radio"/> Chemistry |
| <input type="radio"/> Sejarah | <input type="radio"/> Fizik |
| <input type="radio"/> Sains | <input type="radio"/> Physics |
| <input type="radio"/> Science | <input type="radio"/> Matematik Tambahan |
| <input type="radio"/> Matematik | <input type="radio"/> Additional Maths |
| <input type="radio"/> Mathematics | <input type="radio"/> Perniagaan |
| <input type="radio"/> Biologi | <input type="radio"/> Prinsip Perakaunan |
| <input type="radio"/> Biology | <input type="radio"/> Ekonomi |

3. Pernahkah anda menonton mana-mana video BACfreeschool (sebelum ini dikenali sebagai EduNation)?

Have you ever watched any BACFreeschool's (previously known as EduNation) videos?

- | |
|-----------------------------------|
| <input type="radio"/> Ya
Yes |
| <input type="radio"/> Tidak
No |

4. Nilai kefahaman guru terhadap isi kandungan yang diajar bagi subjek ini.

Rate the teacher's understanding of this particular subject.

Sangat Rendah

Very Low

Rendah

Low

Sederhana

Intermediate

Tinggi

High

Sangat Tinggi

Very High

5. Nilai cara penyampaian guru bagi subjek ini.

Rate the teacher's delivery of the subject.

Sangat Tidak Menarik

Very Uninteresting

Tidak Menarik

Not Interesting

Sederhana

Intermediate

Menarik

Interesting

Sangat Menarik

Very Interesting

6. Nilai tahap kepuasan terhadap nota tambahan yang telah diberikan.

Rate your satisfaction level with the notes given.

Sangat

Tidak Berpuashati

Very Unsatisfied

Tidak Berpuashati

Not Satisfied

Sederhana

Intermediate

Berpuashati

Satisfied

Sangat Berpuashati

Very Satisfied

7. Nilai tahap kebergunaan isi kandungan seminar.

Rate the usefulness of the seminar's content to your SPM preparation.

Sangat Tidak Berguna

Not Very Useful

Tidak Berguna

Not Useful

Sederhana

Intermediate

Useful

Berguna

Sangat Useful

Very Useful

8. Bagi pendapat anda, 3 jam untuk satu sesi seminar adalah...

In your opinion, 3 hours per session is...

terlalu pendek.
too short.

bersesuaian.
just right.

terlalu panjang.
too long.

9. Adakah anda mempunyai sebarang maklum balas/komen bagi meningkatkan prestasi kami?

Do you have any additional comments, questions, or concerns you would like to share?