Nama: ………..……….…………….……….………..……. Tingkatan: …………………..

LOGO
DAN
NAMA
SEKOLAH

PEPERIKSAAN PERCUBAAN SPM 2020
PHYSICS
KERTAS 1
TINGKATAN 5
OKTOBER
1 ¼ JAM

4531/1

Satu jam lima belas minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Kertas soalan ini adalah dalam dwibahasa.*
2. *Soalan dalam Bahasa Inggeris mendahului soalan yang sepadan dalam Bahasa Melayu.*
3. *Kertas soalan ini mengahdungi 50 soalan. Jawab semua soalan.*
4. *Tiap-tiap soalan diikuti oleh empat pilihan jawapan iaitu A, B, C, dan D. Bagi setiap soalan, pilih satu jawapan sahaja. Hitamkan jawapan kamu pada kertas jawapan objektif yang disediakan. Jika kamu hendak menukar jawapan, padamkan tanda yang telah dibuat. Kemudian hitamkan jawapan yang baru.*
5. *Penggunaan kalkulator saintifik yang tidak boleh diprogramkan adalah dibenarkan.*

Kertas peperiksaan ini mengandungi 29 *halaman bercetak*

INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON

The following formulae may be helpful in answering the questions. The symbols given are the ones commonly used.
Rumus-rumus berikut boleh membantu anda untuk menjawab soalan. Simbol-simbol yang diberi adalah biasa digunakan.

1. $a = \frac{v - u}{t}$
2. $v^2 = u^2 + as$
3. $s = ut + at^2$
4. Momentum $= mv$
5. $F = ma$
6. Kinetic energy $= \frac{1}{2}mv^2$
7. Potential energy / *Tenaga keupayaan gravity* $= mgh$
8. Elastic potential energy / *Tenaga keupayaan kenyal* $= \frac{1}{2}Fx$
9. $\rho = \frac{m}{v}$
10. Pressure, $p = h\rho g$
11. Pressure/*tekanan*, $P = \frac{F}{A}$
12. Heat/*haba*, $Q = mc\theta$
13. Heat/*haba*, $Q = ml$
14. $\frac{PV}{T}$ = constant/*pemalar*
15. $E = mc^2$
16. $v = f\lambda$
17. Power, $P = \frac{\text{energy}}{\text{time}}$

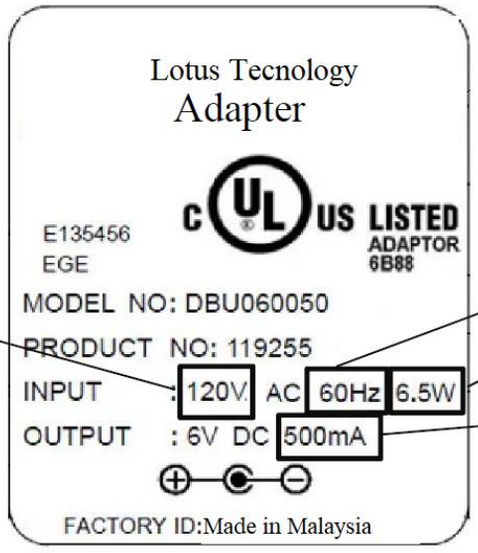
    Kuasa, $P = \frac{tenaga}{masa}$
18. $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$
19. Linear magnification $= \frac{\text{image size}}{\text{object size}}$

    Pembesaran linear $= \frac{saiz\ imej}{saiz\ objek}$
20. $\lambda = \frac{ax}{D}$
21. $n = \frac{Sin\ i}{Sin\ r}$
22. $n = \frac{\text{real depth}}{\text{apparent depth}}$

    $n = \frac{dalam\ nyata}{dalam\ ketara}$
23. $Q = It$
24. $V = IR$
25. Power/*kuasa*, $P = IV$
26. $\frac{N_s}{N_p} = \frac{V_s}{V_p}$
27. Efficiency/*kecekapan* $= \frac{I_s V_s}{I_p V_p} \times 100\%$
28. $g = 10\ \text{ms}^{-2}$

1. Diagram 1 shows an adapter of an electric device. Which label represent base quantity?
Rajah 1 menunjukkan adapter bagi alat elektrik. Label manakah mewakili kuantiti asas?

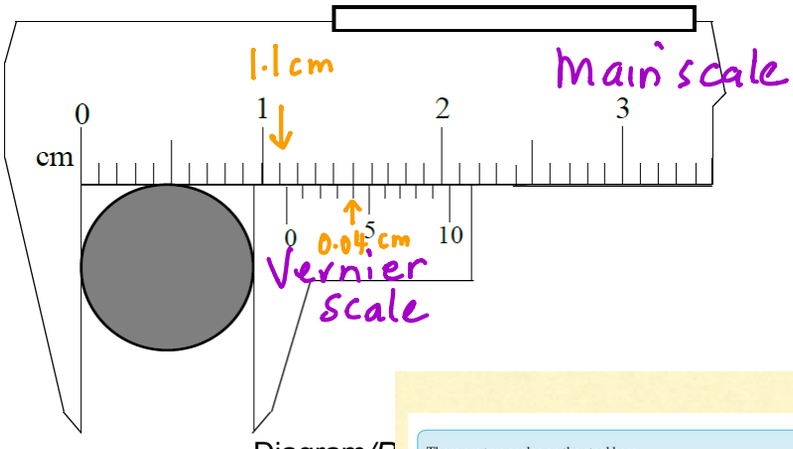
Base Quantity
1. Current, I
2. length, l
3. mass, m
4. temp, T
5. time, t



Diagram/*Rajah* 1

2. Diagram 2 shows a vernier calliper.
Rajah 2 menunjukkan satu angkup vernier.

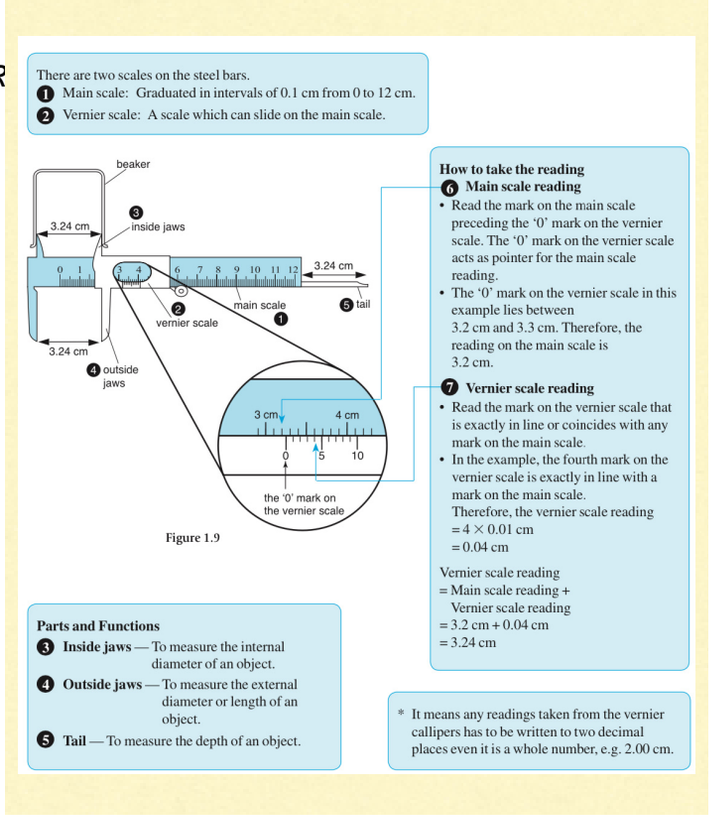
Vernier scale reading
= main scale + vernier scale
= 1.1 cm + 0.04 cm
= 1.14 cm



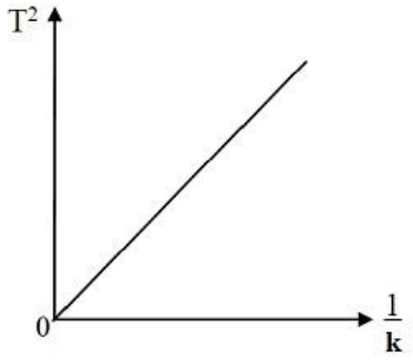
Diagram/*R*

What is the reading of the vernier calliper?
Berapakah bacaan angkup vernier tersebut?

A 0.94 cm
B 0.97 cm
C 1.07 cm
D 1.14 cm



3. Based on the graph in Diagram 3, state the correct relationship between T^2 and k
Berdasarkan graf dalam Rajah 3, nyatakan hubungan yang betul antara T^2 *dan* k



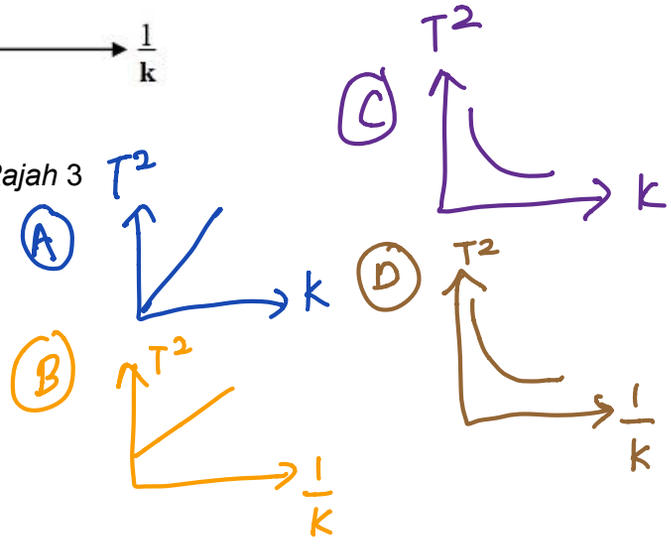
Diagram/*Rajah* 3

A T^2 directly proportional to k
T^2 *berkadar terus terhadap* k

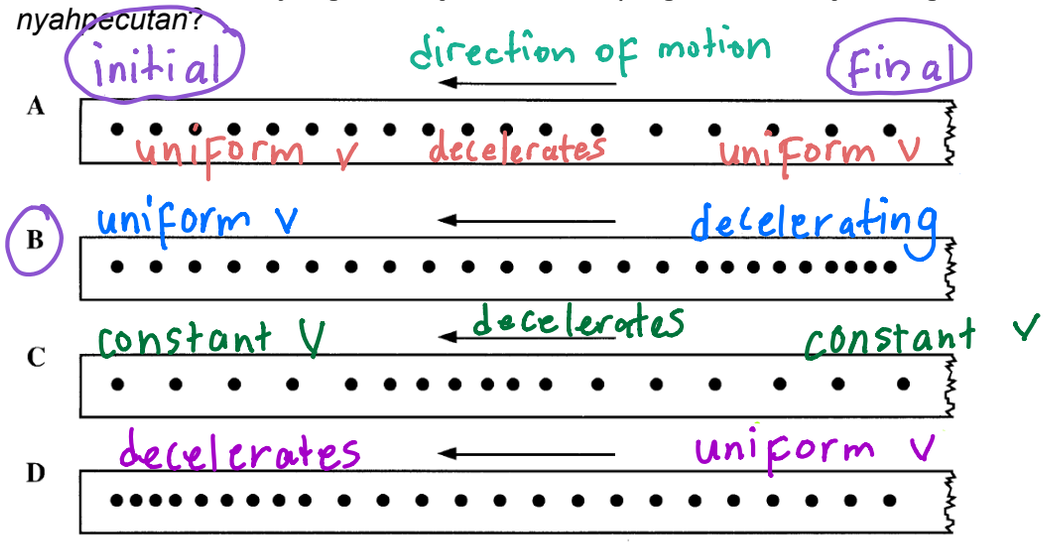
B T^2 increases linearly against $\frac{1}{k}$
T^2 *meningkat secara linear terhadap* $\frac{1}{k}$

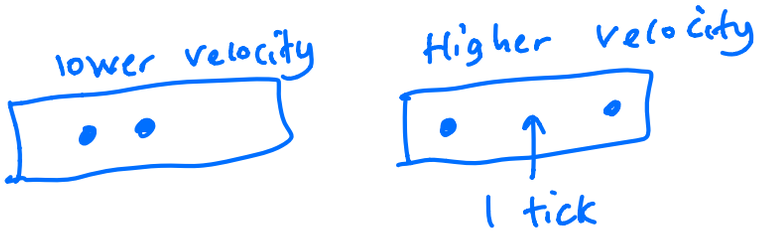
C T^2 inversely proportional to k.
T^2 berkadar *songsang terhadap* k

D T^2 inversely proportional to $\frac{1}{k}$
T^2 *berkadar songsang terhadap* $\frac{1}{k}$

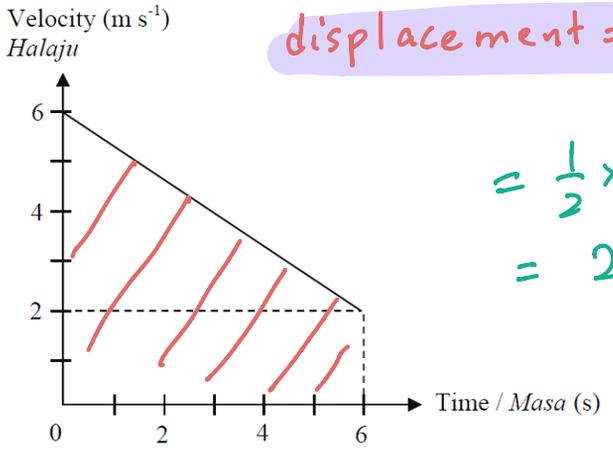


4. Which ticker tape shows a movement with uniform velocity and then deceleration?
Pita detik manakah yang menunjukkan suatu pergerakan halaju seragam dan kemudian nyahpecutan?





5. Diagram 4 shows a velocity-time graph for a motion of an object.
Rajah 4 menunjukkan satu graf halaju-masa bagi gerakan satu objek.



Diagram/*Rajah* 4

displacement = area under the graph

$= \frac{1}{2} \times 6 \times (2+6)$

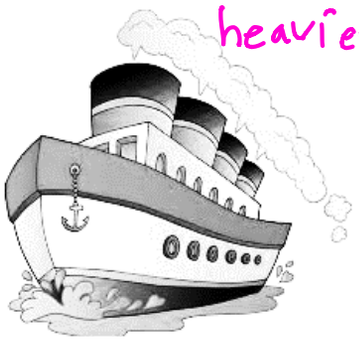
$= 24\ m$

What is the displacement of the object?
Apakah sesaran objek itu?

A - 24 m
B - 48 m
C 24 m
D 48 m

6. Which of the following types of vehicles has the biggest inertia?
Antara jenis kenderaan berikut, yang manakah mempunyai inersia yang paling besar?

A heaviest



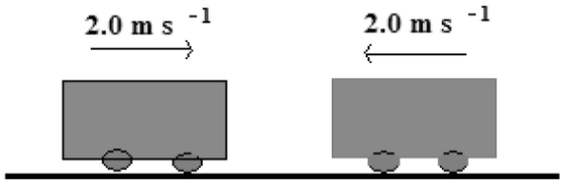
C

B

D

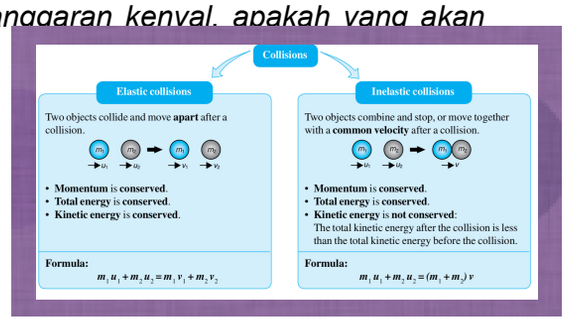
When mass high, inertia high

7. Diagram 5 shows two trolleys of the same mass approaches each other with the same speed.
Rajah 5 *menunjukkan dua troli yang sama jisim menuju satu sama lain dengan laju yang sama.*



Diagram/*Rajah* 5

If the collision between the trolleys is an elastic collision, what happens to the trolleys after the collision?
Jika perlanggaran diantara troli-troli itu adalah perlanggaran kenyal, apakah yang akan berlaku selepas perlanggaran itu?



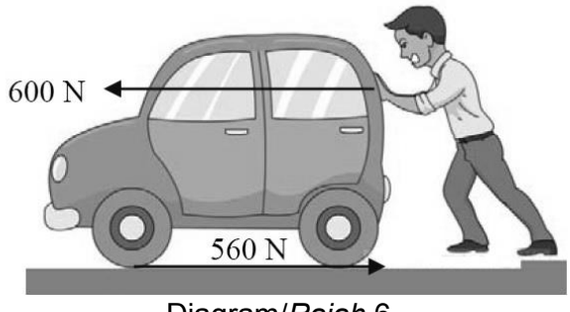
A The trolleys stop
Troli-troli itu berhenti

B The trolleys move off together
Troli-troli itu bergerak bersama-sama

C The trolleys move off separately to the right.
Troli-troli itu bergerak berasingan ke arah kanan.

D The trolleys move off separately in opposite directions
Troli-troli itu bergerak berasingan dalam arah bertentangan

8. Diagram 6 shows a man pushing a car with a force 600 N. The mass of the car is 1 500 kg.
Rajah 6 *menunjukkan seorang lelaki menolak sebuah kereta dengan daya* 600 N. *Jisim kereta adalah* 1 500 kg.



Diagram/*Rajah* 6

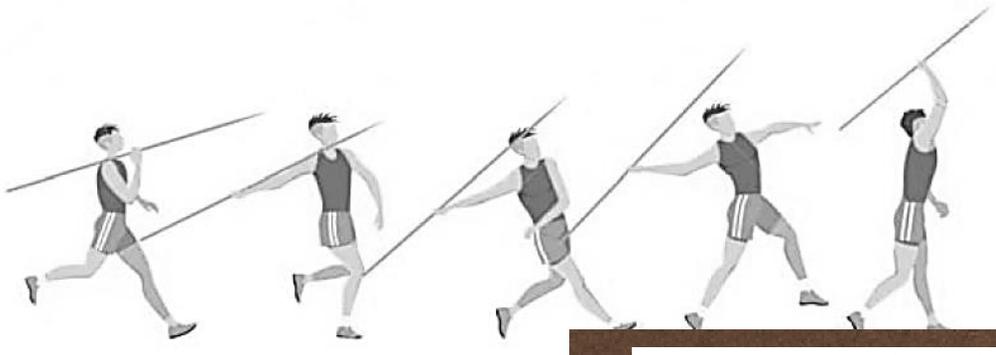
If the friction force acting on the tires of car is 560 N, calculate the acceleration of car.
Jika daya geseran bertindak pada tayar kereta adalah 560 N, *hitung pecutan kereta.*

A 0.027 ms^{-2}
B 0.373 ms^{-2}
C 0.400 ms^{-2}
D 0.773 ms^{-2}

$F = ma$
$f - fr = ma$
$600 - 560 = 1500\,(a)$
$0.027\,ms^{-2} = a$ #

* f = net force

9. Diagram 7 shows an action doing by a javelin athlete before throwing the javelin.
Rajah 7 menunjukkan aksi yang dilakukan oleh atlit rejam lembing sebelum merejam lembing.



Diagram

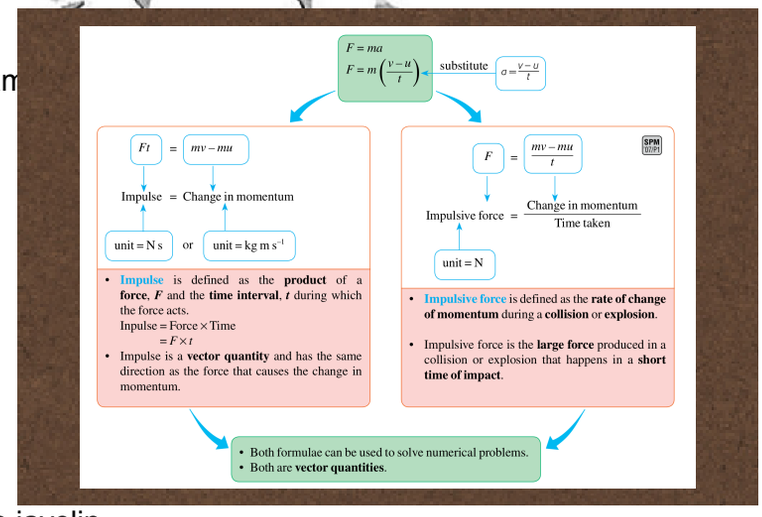
This "follow through" action is to
Aksi "ikut lajak" ini adalah untuk

A Increase the impulse
Meningkatkan impuls

B Decrease the impulsive force
Mengurangkan daya impuls

C Increase the time of javelin in air
Meningkatkan masa lembing di udara

D Reduce the air resistance acting on the javelin
Mengurangkan rintangan udara yang bertindak pada lembing



10. The weight of Karim on the moon is 100 N. What will happen to his weight on the earth?
Berat Karim di bulan adalah 100 N. *Apakah yang akan berlaku kepada beratnya di bumi*?

A Increased / *Bertambah*
B Unchanged / *Tidak berubah*
C Decreased / *Berkurang*
D Becomes zero / *Menjadi sifar*

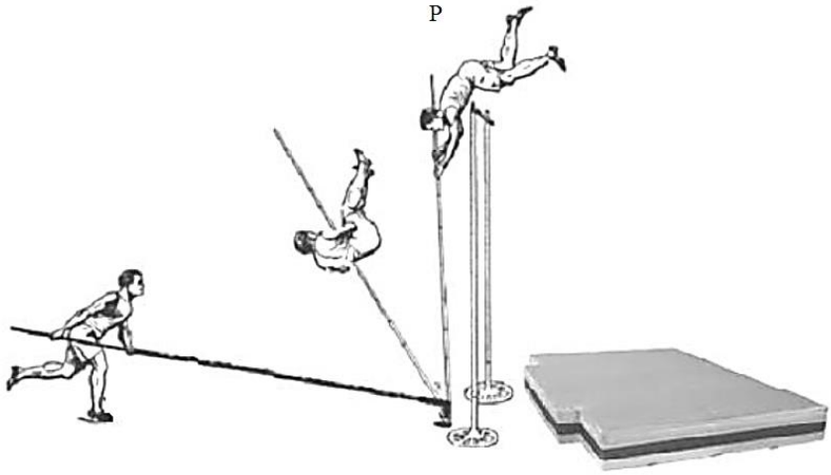
W

Weight, W = mg (mass; gravitational acceleration ~10 ms⁻²)

g Moon = 1/6 of that on earth

→ so less grav. acceleration on moon.

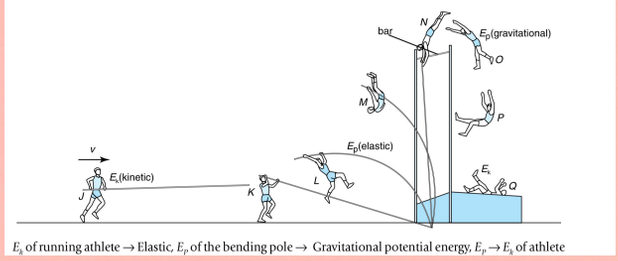
11. Diagram 8 shows an athlete in a pole vault event.
Rajah 8 menunjukkan seorang atlet dalam satu acara lompat bergalah.



Diagram/*Rajah* 8

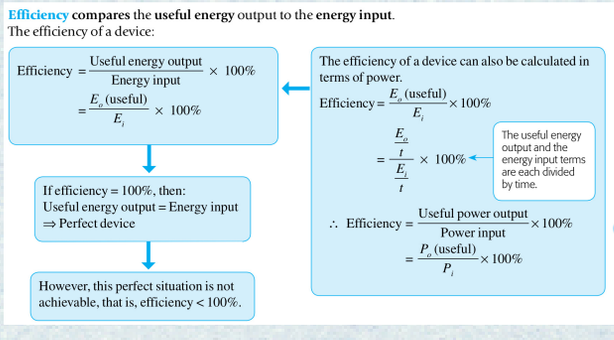
Energy possess by the athlete at position P is
Tenaga yang dipunyai oleh atlet tersebut pada

A heat energy
tenaga haba
B chemical energy
tenaga kimia
C kinetic energy
tenaga kinetik
D gravitational potential energy
tenaga keupayaan graviti

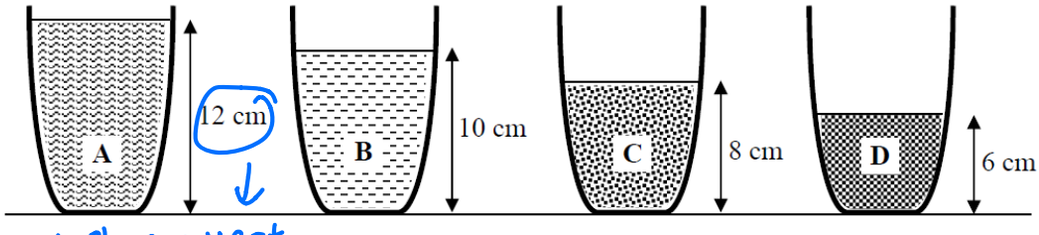


12. Which action increases efficiency of a lamp?
Tindakan manakah yang boleh meningkatkan

A Increase the input energy of lamp
Meningkatkan tenaga input lampu
B Increase the input power of lamp
Meningkatkan kuasa input lampu
C Reduce the output power of lamp
Mengurangkan kuasa output lampu
D Increase the output energy of lamp
Meningkatkan tenaga output lampu



13. Diagram 9 shows four identical containers filled with four different types of liquids.
Rajah 9 menunjukkan empat buah bekas serupa yang diisi dengan empat jenis cecair yang berlainan.



must convert to m unit

Diagram/*Rajah* 9

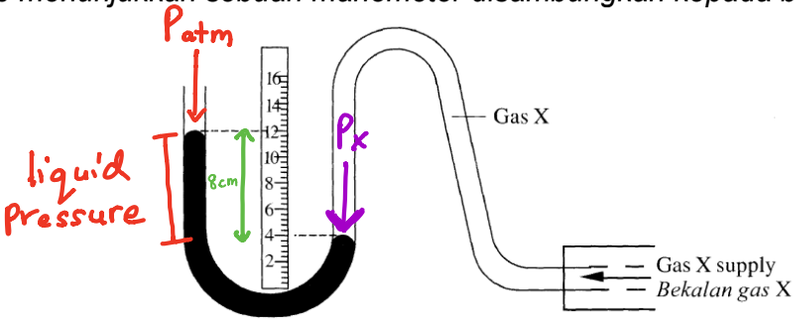
Table 1 shows the densities of the liquids.
Jadual 1 *menunjukkan ketumpatan bagi cecair-cecair itu.*

Liquid *Cecair*	Density / kg m^{-3} *Ketumpatan* / kg m^{-3}
A	700
B	900
C	1000
D	1200

Table/*Jadual* 1

Which liquid exerts the highest pressure on the base of the container?
Cecair yang manakah mengenakan tekanan yang paling tinggi ke atas dasar bekas?

14. Diagram 10 shows a manometer being connected to a gas X supply.
Rajah 10 *menunjukkan sebuah manometer disambungkan kepada bekalan gas* X.

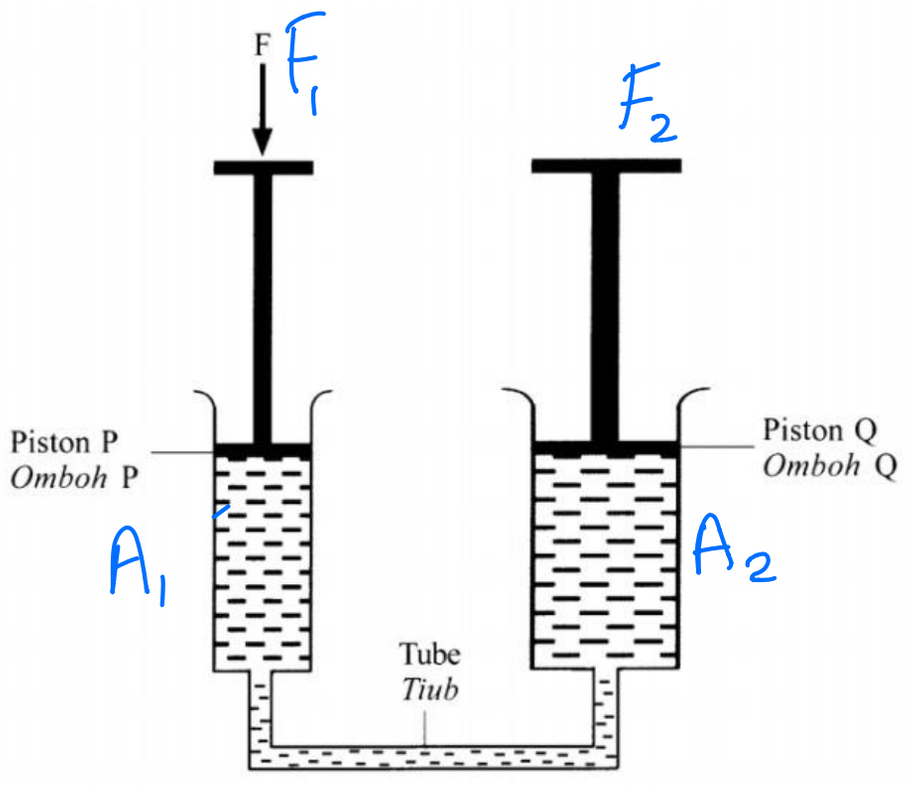


Diagram/*Rajah* 10

Atmospheric pressure is 76 cm Hg.
What is the pressure of gas X?
Tekanan atmosfera ialah 76 cm Hg.
Berapakah tekanan gas X?

A 76 cm Hg
B 80 cm Hg
C 84 cm Hg
D 88 cm Hg

15. Diagram 11 shows force F, acting on a piston P in a hydraulic system.
Rajah 11 *menunjukkan daya* F*, bertindak pada omboh* P *dalam sistem hidraulik.*



Diagram/*Rajah* 11

Which modification can increase the force acting on piston Q?
Pengubahsuaian manakah boleh menambah daya bertindak pada omboh Q?

A Increase the diameter of the tube
Menambah diameter tiub

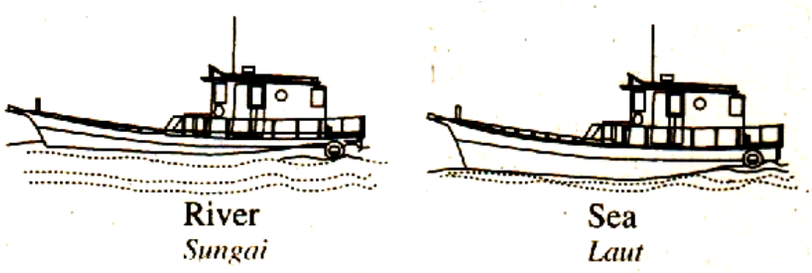
B Decrease the diameter of the tube
Mengurangkan diameter tiub

C Increase the surface area of piston Q
Menambah luas permukaan omboh Q

D Decrease the surface area of piston Q
Mengurangkan luas permukaan omboh Q

Pascal's principle states that pressure exerted on an **enclosed liquid** is **transmitted equally throughout the liquid**.

16. Diagram 12 shows two identical ships floating in a river and in a sea.
Rajah 12 *menunjukkan dua kapal yang serupa terapung di sungai dan di laut.*



Diagram/*Rajah* 12

Why does the ship sink deeper in the river water compared to the sea water?
Mengapakah kapal tenggelam lebih dalam di dalam air sungai berbanding dengan air laut?

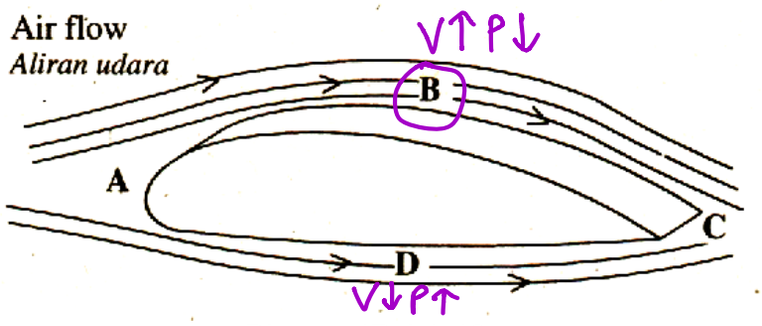
A Density of the ship < density of the river water
Ketumpatan kapal < ketumpatan air sungai

B Density of the ship > density of the river water
Ketumpatan kapal > ketumpatan air sungai

C Density of river water < density of the sea water
Ketumpatan air sungai < ketumpatan air laut

D Density of the ship in the river > density of the ship in the sea
Ketumpatan kapal di sungai > ketumpatan kapal di laut

17. Diagram 13 shows a model of an aeroplane wing.
Rajah 13 *menunjukkan model sebuah sayap kapal terbang.*



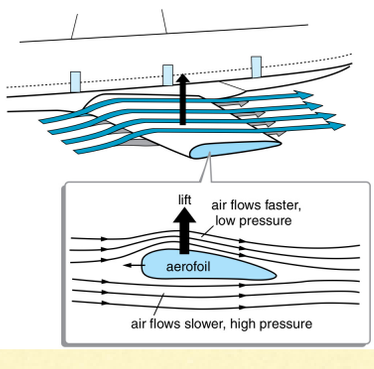
Diagram/*Rajah* 13

Which part **A, B, C** or **D** experiences the lowest pressure?
Antara bahagian **A, B, C** *dan* **D**, *yang manakah mengalami tekanan paling rendah*?

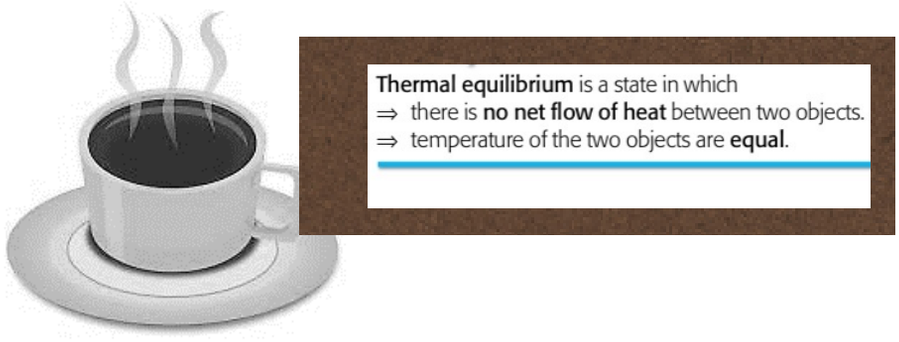
Bernoulli's principle states that:
In a **steady flow of a fluid**, the **pressure of the fluid decreases** when the **velocity of the fluid increases** — and the converse is also true.

Aerofoil

1 The flight of an airplane is based on the principle regarding the effect of the flow of air around its wings, which are in the form of an aerofoil.
2 Figure 3.62 shows an aerofoil with a leading edge that is rounded and a pointed trailing edge. The top surface is arched and the bottom surface is relatively flat.



18. Diagram 14 shows a cup of hot coffee is left to cool until it achieves room temperature.
Rajah 14 *menunjukkan secawan kopi panas dibiarkan sejuk sehingga mencapai suhu bilik.*



Diagram/*Rajah* 14

Which statement is correct about the coffee at room temperature?
Penyataan manakah yang betul tentang kopi itu pada suhu bilik?

A Heat loss by hot coffee is equal to heat loss by the surrounding
Kehilangan haba oleh kopi panas adalah sama dengan kehilangan haba oleh persekitaran

B Heat loss by hot coffee is less than heat gain by the surrounding
Kehilangan haba oleh kopi panas adalah lebih rendah daripada penerimaan haba oleh persekitaran

C Heat loss by hot coffee is greater than heat gain by the surrounding
Kehilangan haba oleh kopi panas adalah lebih besar daripada penerimaan haba oleh persekitaran

D Heat loss by hot coffee is equal to heat gain by the surrounding
Kehilangan haba oleh kopi panas adalah sama dengan penerimaan haba oleh persekitaran

19. 24 000 J of heat is used to increase the temperature of 0.8 kg metal block from 25 °C to 55 °C.
What is the specific heat capacity of the metal block?
24 000 J *haba digunakan untuk meningkatkan suhu sebuah blok logam* 0.8 kg *daripada* 25 °C *kepada* 55 °C.
Berapakah muatan haba tentu blok logam itu?

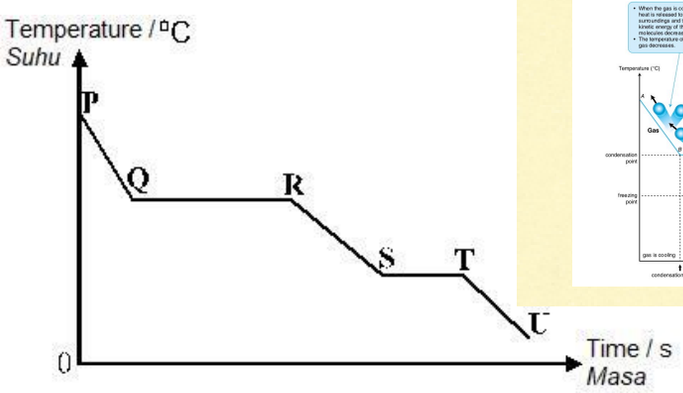
$Q = mc\theta$

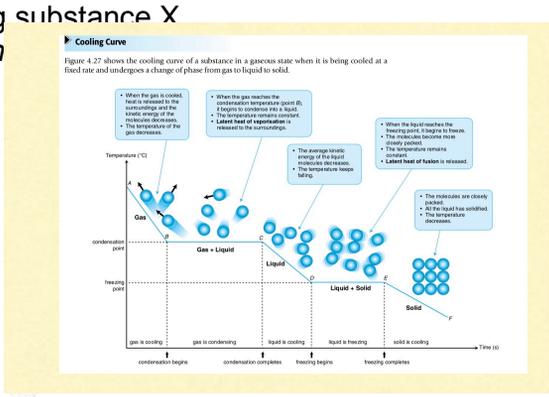
$24000\,J = 0.8\,kg \times c \times (55^{\circ}C - 25^{\circ}C)$

$c = 1000\,J\,kg^{-1}\,^{\circ}C^{-1}$

A 375 J kg^{-1} °C^{-1}
B 545 J kg^{-1} °C^{-1}
C 1 000 J kg^{-1} °C^{-1}
D 1 200 J kg^{-1} °C^{-1}

20. Diagram 15 shows the temperature-time graph for cooling substance X.
Rajah 15 *menunjukkan graf suhu-masa bagi penyejukkan*



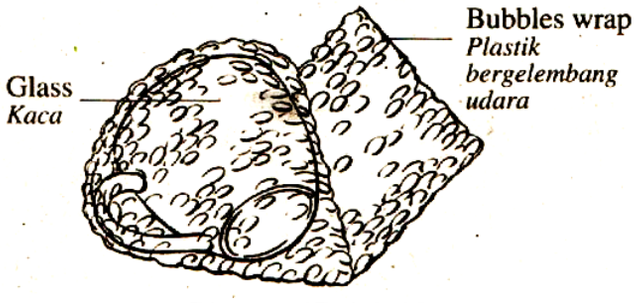


Diagram/*Rajah* 15

At which stage the specific latent heat of fusion is released to the surroundings?
Pada peringkat manakah haba pendam tentu pelakuran dibebaskan ke persekitaran?

A PQ
B QR
C RS
D ST

21. Diagram 16 shows a bubbles wrap which is normally used for packing fragile glassware.
Air bubbles expand when the surrounding temperature increases.
Rajah 16 *menunjukkan plastik bergelembung udara yang biasa digunakan untuk pembungkusan barang kaca mudah pecah. Gelembung-gelembung udara mengembang apabila suhu persekitaran meningkat.*



Diagram/*Rajah* 16

This situation can be explained by
Keadaan ini boleh dijelaskan oleh

A Boyle's Law
Hukum Boyle
B Charles's Law
Hukum Charles
C Pressure's Law
Hukum Tekanan

Charles' law states that the **volume** of a fixed mass of gas is **directly proportional** to its **absolute temperature** (kelvin), provided the **pressure** of the gas is kept **constant**.

$$V \propto T$$

$$\frac{V}{T} = \text{constant}$$

$$\therefore \quad \frac{V_1}{T_1} = \frac{V_2}{T_2}$$

22. Diagram 17 shows the pressure of a car tyre is 200 kPa at temperature 30 °C.
Rajah 17 *menunjukkan tekanan pada tayar kereta adalah* 200 kPa *pada suhu* 30 °C.

$\frac{P_1}{T_1} = \frac{P_2}{T_2}$

$\frac{200\,kPa}{30+273} = \frac{P_2}{60+273}$

$P_2 = 219.8\,kPa$

Diagram/*Rajah* 17

After a long journey, the temperature of the tyre increased to 60 °C.
What is the new pressure?
(Volume of the air in the tyre does not change)
Selepas satu perjalanan yang jauh, suhu tayar itu meningkat kepada 60 °C. *Berapakah tekanan yang baharu*?
(*Isipadu udara di dalam tayar tidak berubah*)

A 219.8 kPa
B 304.5 kPa
C 400.0 kPa
D 504.5 kPa

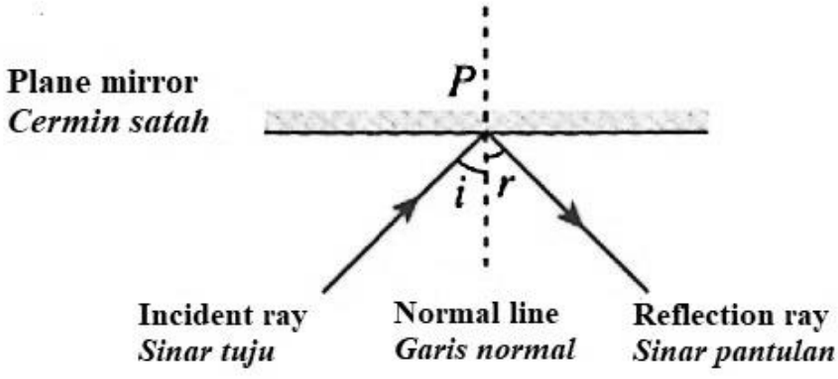
The **pressure law** states that the **pressure** of a fixed mass of gas is **directly proportional** to its **absolute temperature** (in kelvin), provided the **volume** of the gas is kept **constant**.

$\therefore \quad P \propto T$ (at constant volume)

or $\frac{P}{T} = \text{constant}$

$\frac{P_1}{T_1} = \frac{P_2}{T_2}$

23. Diagram 18 shows a reflection ray diagram.
Rajah 18 *menunjukkan gambarajah sinar pantul*



Diagram/*Rajah* 18

If the angle of incident, i = 30°, what is the angle of reflection, r ?
Jika sudut tuju, i = 30°, *berapakah sudut pantulan,* r ?

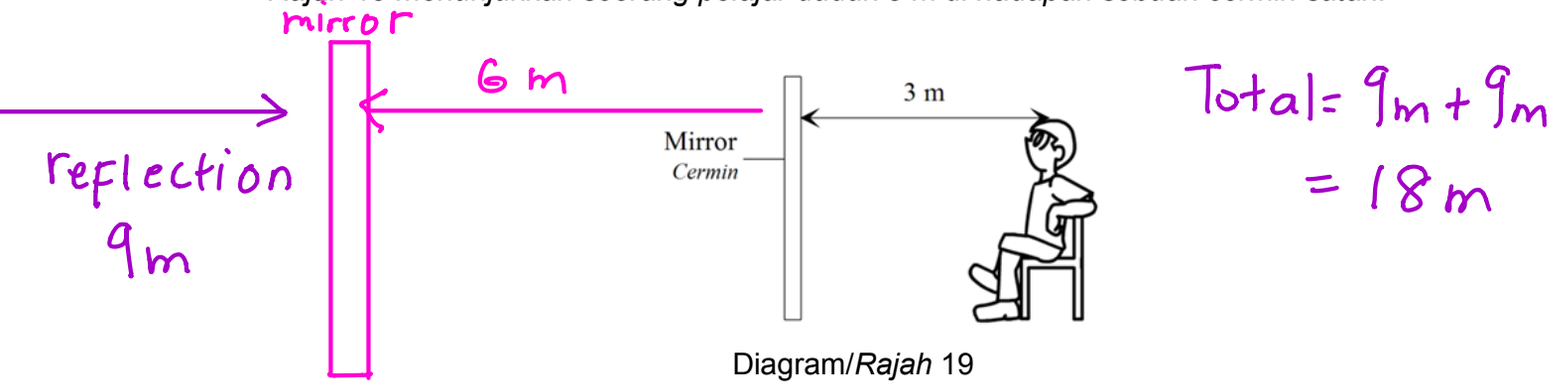
A 10°
B 30°
C 60°
D 90°

Laws of reflection

a The **incident ray**, the **reflected ray**, and the **normal** all lie in the **same plane**.

b The **angle of incidence** is **equal** to the **angle of reflection**, i.e., $i = r$.

24. Diagram 19 shows a student sitting 3 m in front of a plane mirror.
Rajah 19 *menunjukkan seorang pelajar duduk* 3 m *di hadapan sebuah cermin satah.*

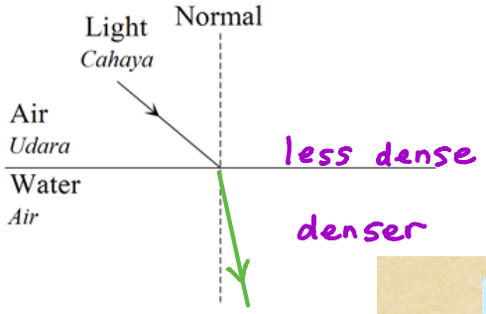


Diagram/*Rajah* 19

If the mirror is moved 6 m away from the student, what is the distance between the student and his image?
Jika cermin itu digerakkan 6 m *menjauhi pelajar itu, berapakah jarak di antara pelajar itu dengan imejnya*?

A. 3 m
B 6 m
C 9 m
D 18 m

25. Diagram 20 shows a ray of light directed to water.
Rajah 20 *menunjukkan suatu sinar cahaya diarahkan ke air.*



Diagram/*Rajah* 20

Ray of light travels from air (less dense) to glass (denser):
- The ray is bent **towards the normal**.
- After entering the glass, the **speed of light decreases**. This causes the ray of light to bend towards the normal.
- From **F**ast to **S**low, bend **T**owards the normal (**FST rule**).

Which statement is correct?
Pernyataan manakah yang betul?

A The refracted angle is equal to the incident angle
Sudut biasan sama dengan sudut tuju
B The refracted angle is larger than the incident angle
Sudut biasan lebih besar daripada sudut tuju
C When the light enters the water, the speed of light decreases
Apabila cahaya memasuki air, kelajuan cahaya berkurang
D When the light enters the water, the brightness of light increases
Apabila cahaya memasuki air, kecerahan cahaya bertambah

26 Diagram 21 shows a diamond with critical angle, *c* = 24°.
Rajah 21 *menunjukkan sebuah berlian dengan sudut genting,* c = 24°.

The **critical angle** is the **angle of incidence** in the optically denser medium for which the angle of refraction in the less dense medium is 90°.
The **conditions required for the occurrence of total internal reflection** are:
(a) the light ray must travel from an **optically denser medium to a less dense medium**.
(b) the **angle of incidence must be greater than the critical angle**, that is, $i > c$.

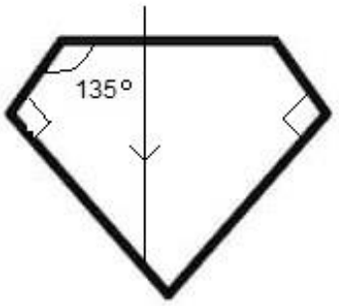


Diagram / *Rajah* 21

total internal reflection

Which method is used to make the diamond looks sparkle?
Cara yang manakah digunakan untuk membolehkan berlian kelihatan berkilau?

A Angle of incidence, *i* = 24°
Sudut tuju, i = 24°

B Decrease the angle of incidence, *i* less than 24°
Mengurangkan sudut tuju, i kurang daripada 24°

C Increase the angle of incidence, *i* more than 24°
Menambah sudut tuju, i lebih daripada 24°

27 Diagram 22 shows a ray diagram of concave lens.
Rajah 22 *menunjukkan gambar rajah sinar sebuah kanta cekung.*

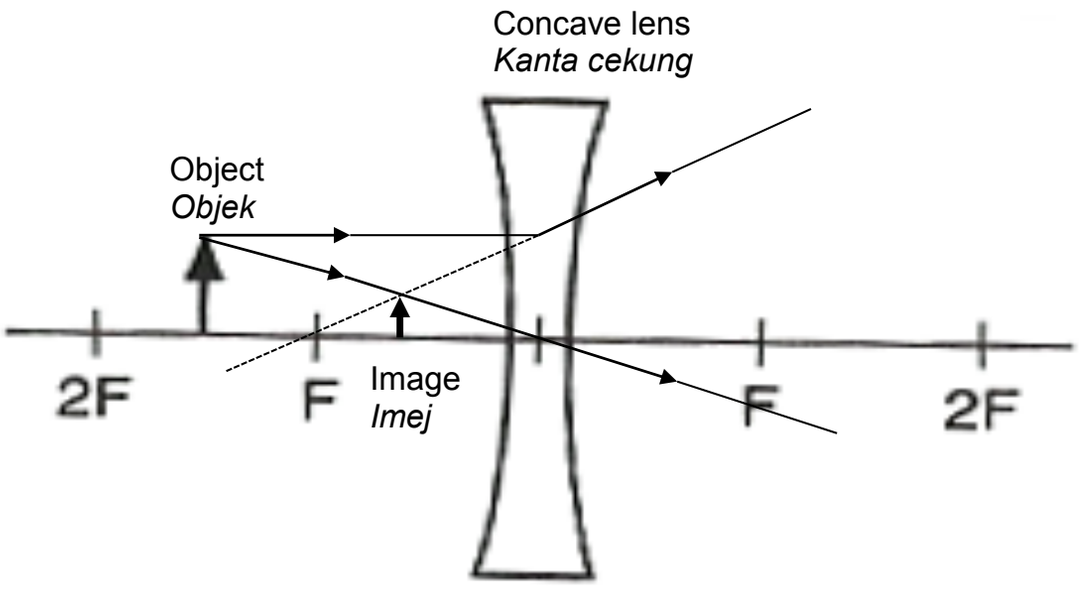


Diagram / *Rajah* 22

What happen to the image if the object is placed at a distance less than focal length?
Apakah yang berlaku kepada imej jika objek diletakkan pada jarak kurang dari jarak fokus?

Images formed by concave lenses **do not** depend on the **position of the object** with respect to the lens.
An image formed by a concave lens is always
(a) **virtual**,
(b) **upright**,
(c) **smaller** than the object,

A Image is inverted
Imej adalah songsang

B Image is real
Imej adalah nyata

C Image is laterally inverted
Imej songsang sisi

D Image is virtual
Imej maya

28 When a system is made to oscillate at its natural frequency by an external force. The phenomenon is known as
Apabila suatu sistem dibuatkan berayun pada frekuensi aslinya oleh daya luar. Fenomena ini dikenali sebagai

A Damping
Pelembapan

B Resonance
Resonans

C Forced oscillation
Ayunan dipaksa

D Diffraction
Pembelauan

29 Diagram 23 shows graph of propagation of wave.
Rajah 23 *menunjukkan graf perambatan gelombang.*

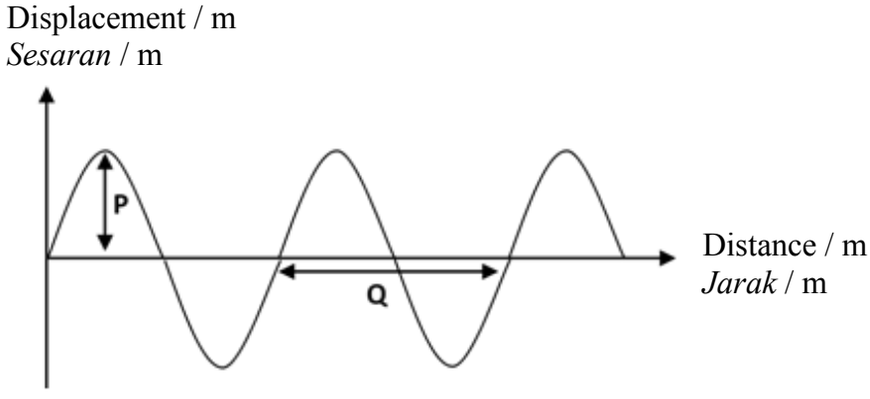
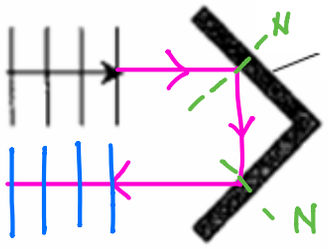


Diagram / *Rajah* 23

What are the physical quantities represented by **P** and **Q**?
Apakah kuantiti fizik yang ditunjukkan oleh jarak **P** dan **Q**?

	P	Q
A	Amplitude *Amplitud*	Wavelength *Panjang gelombang*
B	Amplitude *Amplitud*	Period *Tempoh*
C	Wavelength *Panjang gelombang*	Period *Tempoh*
D	Wavelength *Panjang gelombang*	Amplitude *Amplitud*

30 Diagram 24 shows plane water waves propagate towards a L-shaped reflector in a ripple tank.
Which diagram shows the correct reflected wave?
Rajah 24 *menunjukkan gelombang satah air bergerak menuju pemantul berbentuk-L di dalam sebuah tangki riak.*
Rajah yang manakah menunjukkan corak gelombang pantulan yang betul?



L-shaped reflector
Pemantul berbentuk-L

Diagram / *Rajah* 24

A

C

B

D

31 Diagram 25 shows water waves propagates from sea to the shore.
Rajah 25 menunjukkan gelombang air merambat dari laut ke pantai.

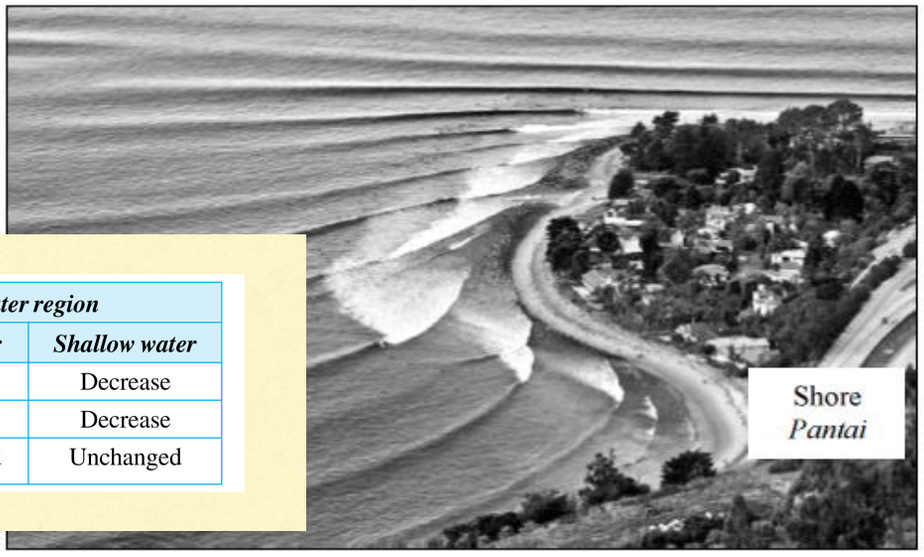


Diagram / *Rajah* 25

Aspect	*Water region*	
	Deep water	*Shallow water*
Velocity	Increase	Decrease
Wavelength	Increase	Decrease
Frequency	Unchanged	Unchanged

Which characteristics of wave for above situation are correct?
Manakah ciri-ciri gelombang bagi situasi di atas yang betul?

	Speed ***Laju***	***Wavelength*** ***Panjang gelombang***	***Frequency*** ***Frekuensi***
A	*Decrease* *Berkurang*	*Increase* *Bertambah*	*Decrease* *Berkurang*
B	*Increase* *Bertambah*	*Decrease* *Berkurang*	*Decrease* *Berkurang*
C	*Increase* *Bertambah*	*Increase* *Bertambah*	*Unchanged* *Kekal*
D	*Decrease* *Berkurang*	*Decrease* *Berkurang*	*Unchanged* *Kekal*

32 Diagram 26.1 shows apparatus to observe diffraction of light.
Rajah 26.1 *menunjukkan bahan radas untuk memerhatikan cahaya dibelaukan.*

Diagram 26.2 shows the wave pattern when red light is diffracted.
Rajah 26.2 *menunjukkan corak gelombang apabila cahaya merah dibelaukan.*

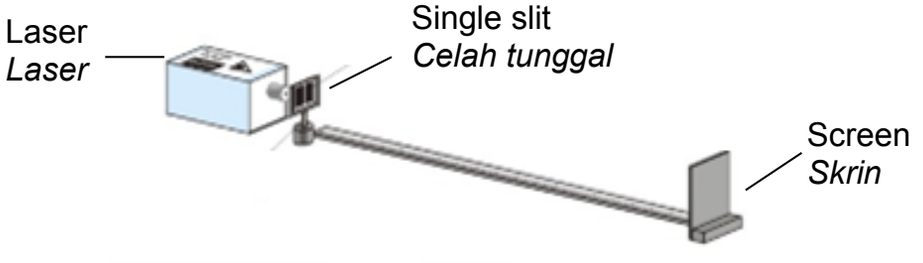


Diagram / *Rajah* 26.1

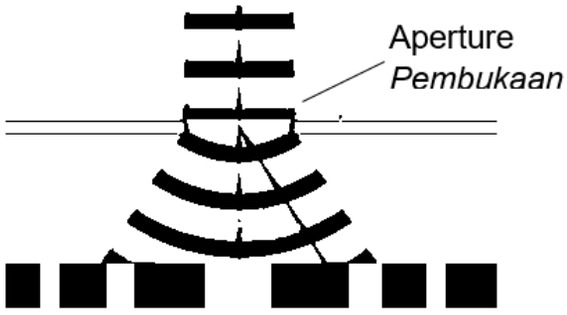


Diagram / *Rajah* 26.2

Which of the statement below is correct when red light is replaced by blue light in the above experiment?
Kenyataan berikut yang manakah betul apabila cahaya merah digantikan dengan cahaya biru dalam eksperimen di atas?

λ blue < λ red
⇒ so ∡ diffraction also reduced.

A Angle of diffraction increases
Sudut pembelauan bertambah

B Angle of diffraction decreases
Sudut pembelauan berkurang

C Speed of wave propagation increases
Laju gelombang perambatan bertambah

D Speed of wave propagation decreases
Laju gelombang perambatan berkurang

* speed is unchanged because light waves travel at same speed, $c = 3 \times 10^8$ m/s

33 Diagram 27 shows two loud speakers are connected to an audio signal generator. Each student is standing at the position where the loud sound is heard.
Rajah 27 menunjukkan dua buah pembesar suara disambungkan kepada sebuah penjana isyarat audio. Setiap pelajar berdiri di kedudukan di mana bunyi kuat kedengaran.

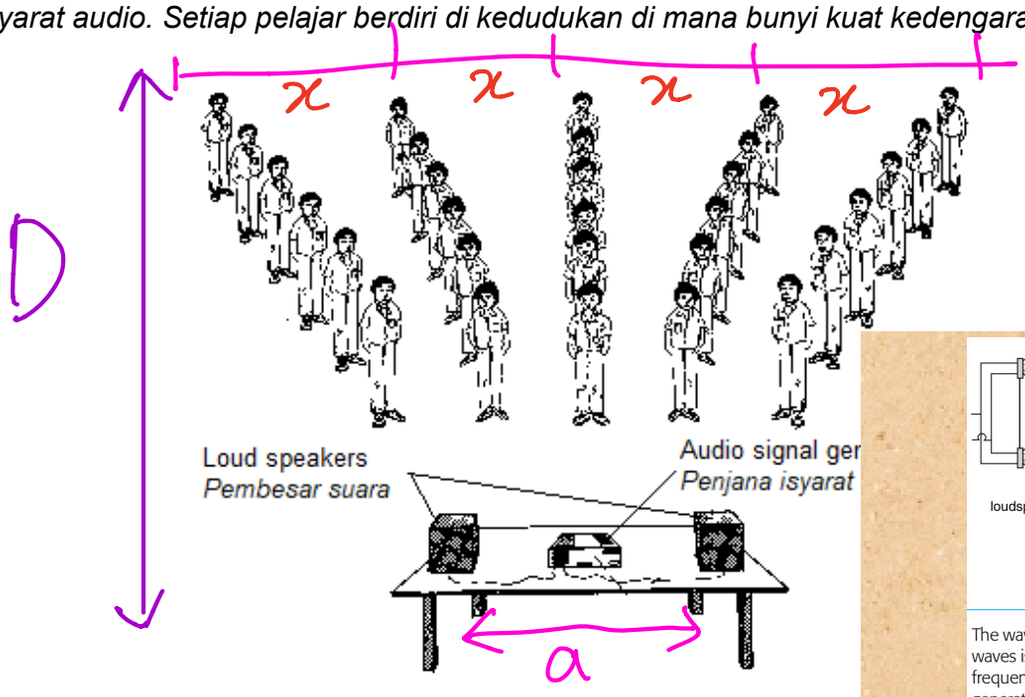
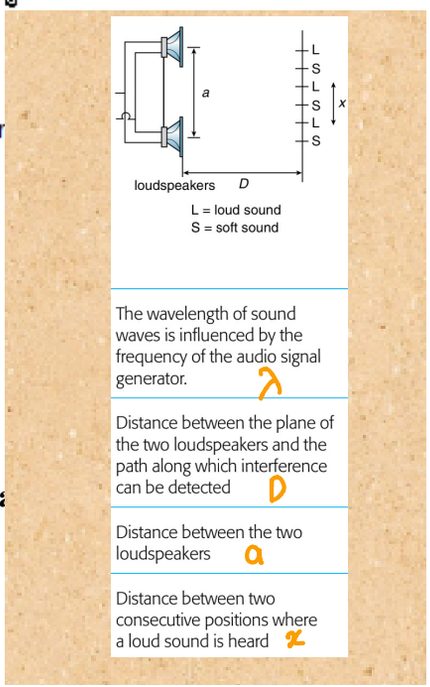


Diagram / *Rajah* 27



[Liha

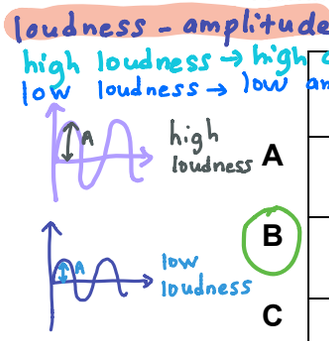
Which of the method below can increase the distance between two consecutive loud sounds heard?
Cara yang manakah dapat menambah jarak antara dua bunyi kuat berturutan?

A Decrease the distance of the loud speakers
Mengurangkan jarak antara pembesar suara

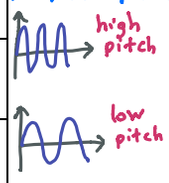
B Increase the frequency of the audio signal generator
Menambah frekuensi penjana isyarat audio

C Increase the distance between two loud speakers
Menambah jarak antara dua pembesar suara

34 Which combination produce high loudness and low pitch sound?
Kombinasi manakah menghasilkan bunyi kenyaringan tinggi dan kelangsingan rendah?



	Amplitud *Amplitude*	Frequency *Frekuensi*
A	Small *Kecil*	Low *Rendah*
B	Large *Besar*	Low *Rendah*
C	Small *Kecil*	High *Tinggi*
D	Large *Besar*	High *Tinggi*



35 Diagram 28 shows an electromagnetic spectrum of wave.
Rajah 28 menunjukkan suatu spektrum gelombang elektromagnet

Gamma ray *Sinar gama*	Y	Ultra violet *Ultra ungu*	Visible light *Cahaya nampak*	X	Microwave *Gelombang mikro*	Radio wave *Gelombang radio*

Diagram / *Rajah* 28

Which comparison is correct?
Perbandingan manakah adalah betul?

A Wavelength of X is shorter than Y
Panjang gelombang X *lebih pendek daripada* Y

B Speed of wave X is higher than Y
Laju gelombang X *lebih tinggi daripada* Y.

C Speed of wave X is same as Y.
Laju gelombang X *sama dengan* Y.

D Frequency of X is same as Y.
Frekuensi gelombang X *sama dengan* Y.

36 Diagram 29 shows electric field lines of two charges Q_1 and Q_2.
Rajah 29 menunjukkan garis medan elektrik bagi dua cas Q_1 dan Q_2.

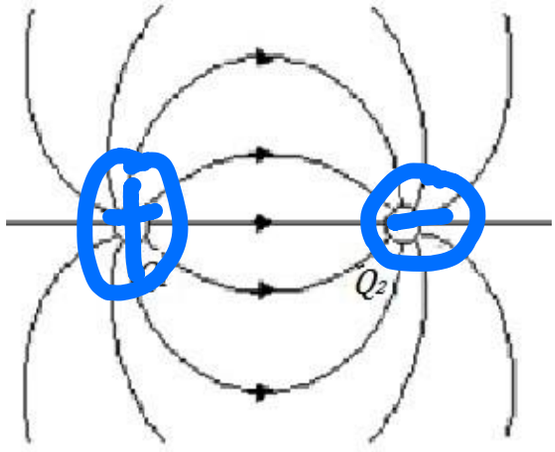


Diagram / *Rajah* 29

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

	Q_1	Q_2
A	Positive *Positif*	Negative *Negatif*
B	Positive *Positif*	Positive *Positif*
C	Negative *Negatif*	Negative *Negatif*
D	Negative *Negatif*	Positive *Positif*

37 Diagram 30 shows a graph of voltage, *V* against electric current, *I.*
Rajah 30 *menunjukkan graf voltan,* V *melawan arus elektrik,* I.

$V = IR$

$\frac{V}{I} = R \Rightarrow$ gradient

$= \frac{8-0}{4-0}$

$= 2\ \Omega$ ✱

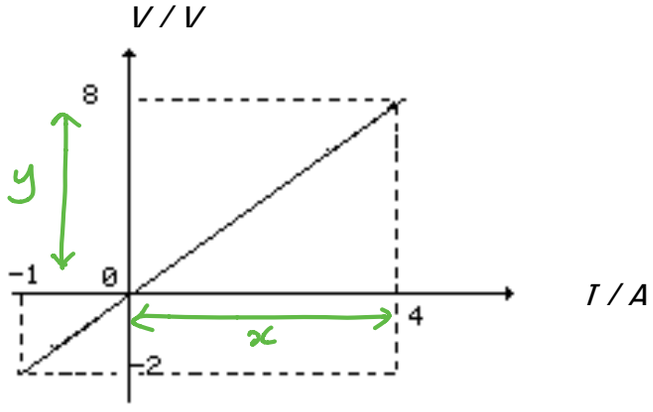


Diagram / *Rajah* 30

What is the value of resistance?
Berapakah nilai rintangan?

A 1.0 Ω C 4.0 Ω

B 2.0 Ω D 8.0 Ω

38 Diagram 31 shows a complete circuit.
Rajah 31 *menunjukkan satu litar yang lengkap.*

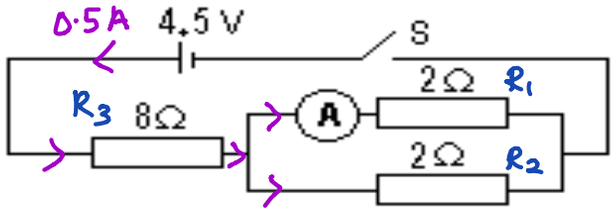


Diagram / *Rajah* 31

What is the ammeter reading when switch *S* is closed?
Apakah nilai ammeter apabila suis S *ditutup*?

A 0.20 A C 0.38 A

B 0.25 A D 0.50 A

39 Diagram 32 shows an electric circuit.
Rajah 32 *menunjukkan suatu litar elektrik.*

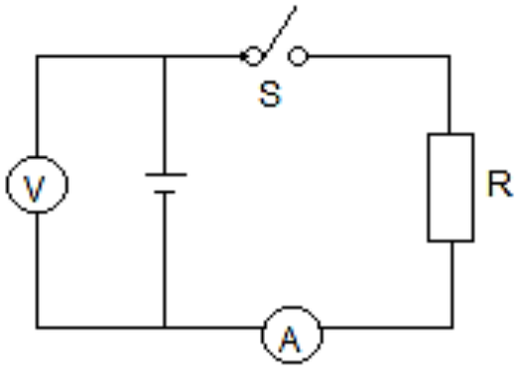


Diagram / *Rajah* 32

When switch S is open, the reading of voltmeter, V is 3.0 V. When switch S is closed, the reading of voltmeter is 2.5 V and the current flows is 1.0 A.
What is the value of internal resistance?
Apabila suis S *dibuka, bacaan voltmeter,* V, *adalah* 3.0 V. *Apabila suis* S *ditutup, bacaan voltmeter adalah* 2.5 V *dan arus yang mengalir adalah* 1.0 A.
Apakah nilai rintangan dalam?

A 0.5 Ω C 0.7 Ω

B 0.6 Ω D 0.8 Ω

40 Diagram 33 shows a LED bulb that has a specification of 240 V, 12 W.
Rajah 33 *menunjukkan sebuah mentol* LED *yang mempunyai spesifikasi* 240 V, 12 W.

$E = Pt$
$= \left(\frac{12}{1000}\right) kW \times (48) h$
$= 0.576\ kWh$

Diagram / *Rajah* 33

What is the electrical energy consumed by the bulb in 48 hours, in kWh?
Apakah tenaga elektrik yang digunakan oleh mentol itu dalam masa 48 *jam dalam* kWj?

A 0.576 kWh
0.576 kWj

B 11.52 kWh
11.52 kWj

C 576 kWh
576 kWj

D 11 520 kWh
11 520kWj

41 Diagram 34 shows two iron core wound with coil.
Rajah 34 *menunjukkan dua teras besi dililitkan dengan dawai.*

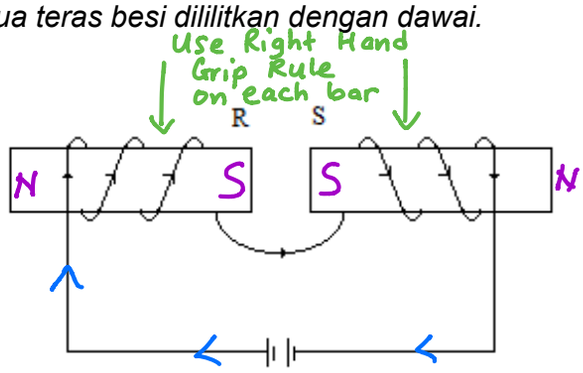


Diagram / *Rajah* 34

What will happen to R and S when current flows?
Apakah yang akan terjadi pada R *dan* S *apabila arus mengalir*?

A R and S are stationery
R *dan* S *adalah pegun*

B R and S attract each other
R *dan* S *menarik satu sama lain*

C R and S repel each other
R *dan* S *menolak satu sama lain*

D R and S first attract then repel
R *dan* S *mula menarik kemudian menolak*

● the **right-hand grip rule** (for a solenoid)

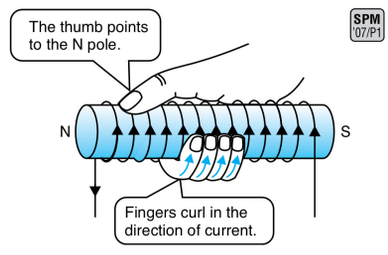


Figure 3.16 Right-hand grip rule for a solenoid

Imagine gripping the current-carrying solenoid with your **right hand** so that your fingers curl round the solenoid in the direction of the current. Your **thumb** will then point towards the **north pole** (N pole) of the solenoid.

42 Diagram 35 shows current carrying conductors P and Q are placed between two magnets.
Rajah 35 menunjukkan konduktor membawa arus P dan Q diletakkan di antara dua magnet.

Use Fleming's Left Hand Rule to determine direction of Force

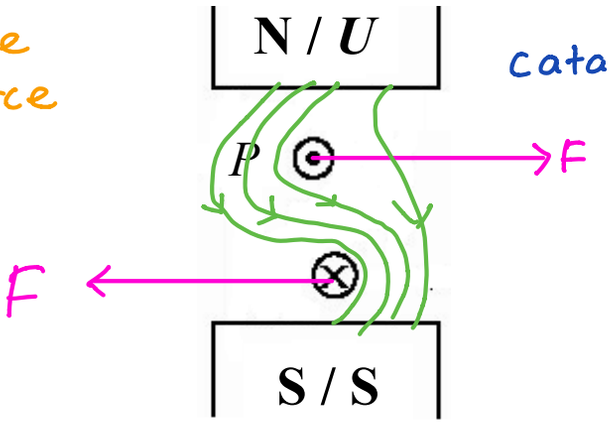
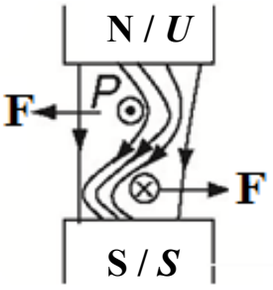


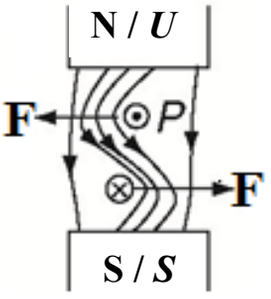
Diagram / *Rajah* 35

Which magnetic field pattern is correct to shows the situation?
Corak medan magnet manakah yang betul untuk menunjukkan situasi itu?

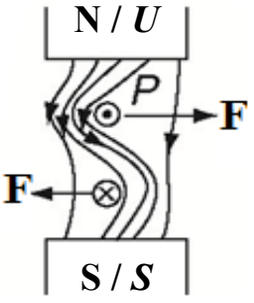
A



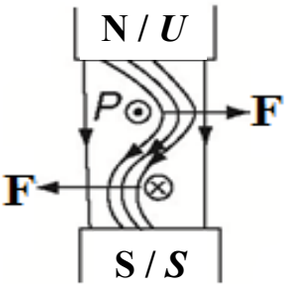
C



B



D



43 Diagram 36 shows a bar magnet is oscillated in a solenoid.
Rajah 36 menunjukkan satu magnet bar diayunkan dalam solenoid.

The induced current increases when
(a) the speed of relative motion is increased
(b) the strength of the magnetic field is increased,
(c) the number of turns in the solenoid is increased.

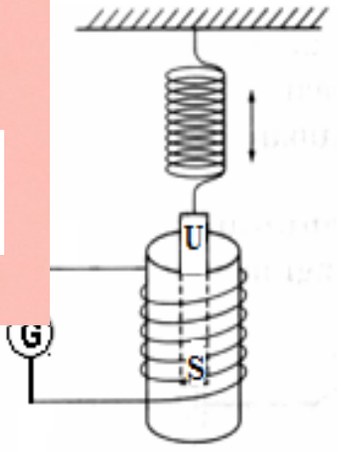


Diagram / *Rajah* 36

Which step will **not** increase the deflection of the pointer of galvanometer?
*Langkah manakah **tidak** akan menambah pesongan jarum galvanometer?*

A Decrease diameter of solenoid ✓ magnetic field closer can increase strength of magnetic field
Mengurangkan diameter solenoid

B Increase oscillation speed of magnet ✓
Menambah laju ayunan magnet

C Inverse the polarity of magnet ✗ not affected because same strength of induced current
Menyongsangkan kekutuban magnet

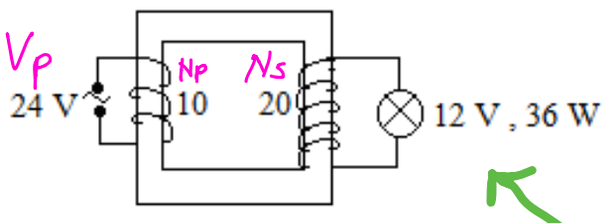
D Increase numbers of turns of solenoid ✓
Menambahkan bilangan lilitan gegelung

44 Which circuit below causes the bulb to light up with normal brightness?
Litar yang manakah berikut menyebabkan mentol menyala dengan kecerahan normal?

* transformer use AC ~ and calculate which bulb produce correct voltage

symbol AC ~

A



$\frac{Vs}{Vp} = \frac{Ns}{Np}$

$Vs = \frac{Ns}{Np} \times Vp$

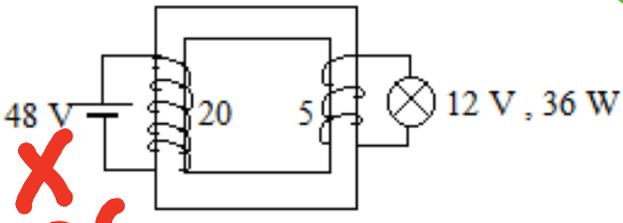
$= \frac{20}{10} \times 24$

$= 48V$

not equal

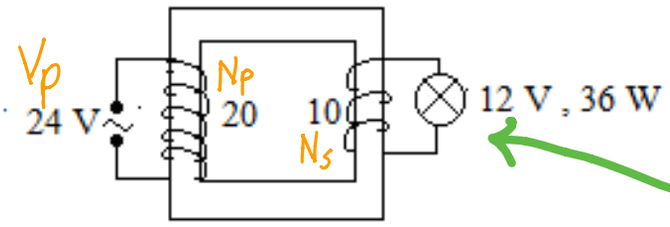
symbol DC ⊣⊢

B



X DC

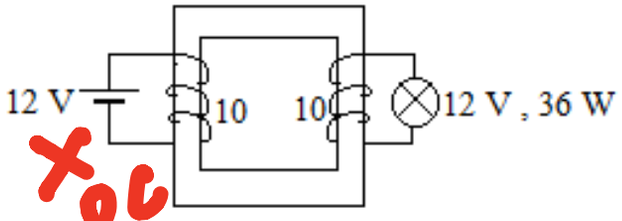
C



$V_S = \frac{10}{20} \times 24$

$= 12V$ ✓

D



45 Diagram 37 shows a model of transmission of electricity.
njukkan model penghantaran elektrik.

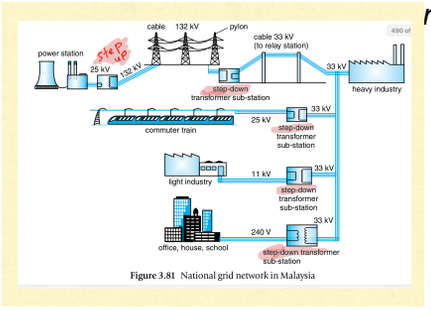


Figure 3.81 National grid network in Malaysia

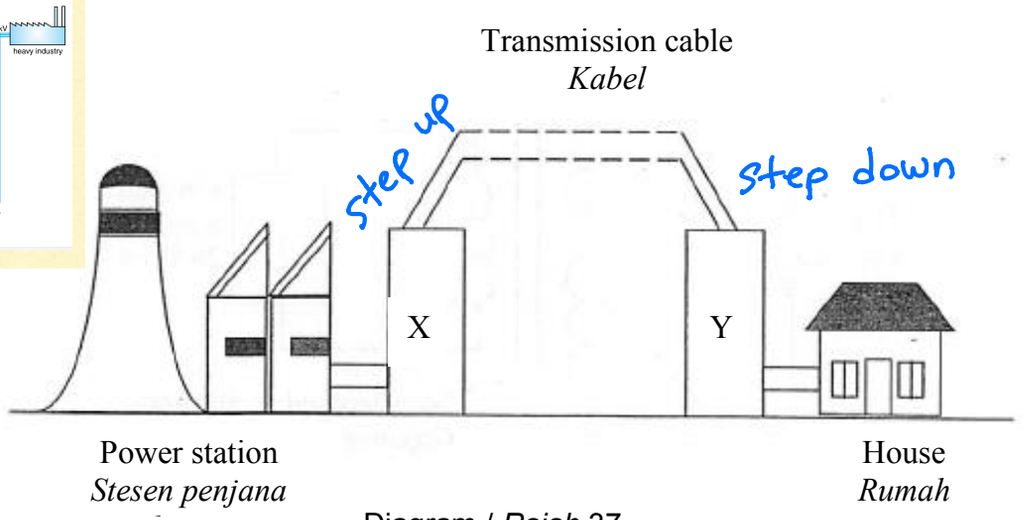


Diagram / *Rajah* 37

Which combination of the primary coil and secondary coil of transformer X and Y is correct?
Kombinasi gegelung primer dan sekunder yang manakah betul bagi transformer X *dan* Y?

	Transformer X		Transformer Y	
	Primary coil (turns) *Gegelung primer (lilitan)*	**Secondary coil (turns) *Gegelung sekunder (lilitan)***	**Primary coil (turns) *Gegelung primer (lilitan)***	**Secondary coil (turns) *Gegelung sekunder (lilitan)***
A	120	2400	120	2400
B	120	2400	2400	120
C	2400	120	120	2400
D	2400	120	2400	120

46 Which particle is cathode ray?
Zarah manakah adalah sinar katod?

A Electron beam
Alur elektron

B Gamma ray
Sinar gama

C Proton
Proton

D Neutron
Neutron

47 Diagram 38 shows an electronic symbol representing an electronic component.
Rajah 38 *menunjukkan satu simbol elektronik yang mewakili satu komponen elektronik.*

Diagram / *Rajah* 38

What is the electronic component?
Apakah komponen elektronik itu?

A Transistor
Transistor

B Capacitor
Kapasitor

C Resistor
Perintang

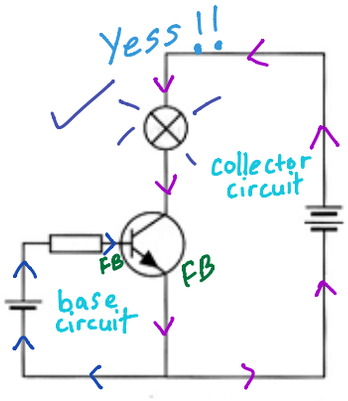
D Diode
Diod

Both collector circuit & base circuit must be in FB arrangement.

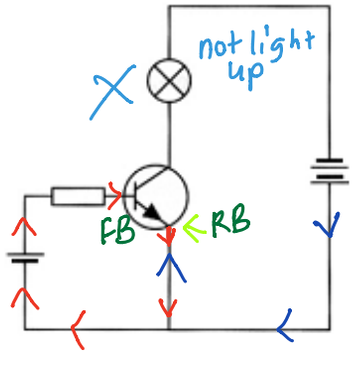
FB - Forward bias → current completely flow so bulb lights up
RB - Reverse bias → current incompletely flow so bulb not light up

48 Which bulb in the circuit will light up?
Mentol pada litar manakah menyala?

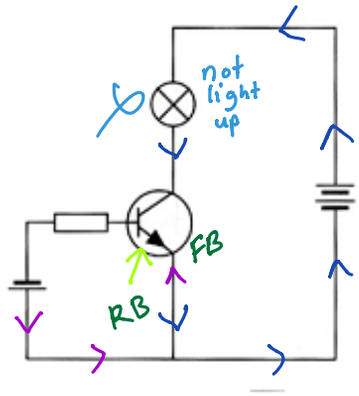
A



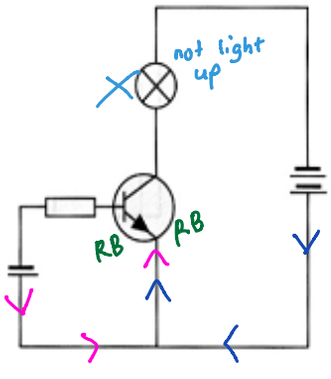
B



C



D



49 Technetium-99m is injected into a patient's body to detect blood clot.
What is the half-life of Technetium-99m if 87.5 % of its original activity decays in 18 hours?
Teknetium-99m *disuntik ke dalam badan pesakit untuk mengesan darah beku.* *Berapakah separuh hayat* Teknetium-99m *jika* 87.5 % *dari aktiviti asalnya mereput dalam tempoh* 18 *jam*?

100% original activity → ① 50% → ② 25% → ③ 12.5%

87.5%

3 half lives, $3T_{1/2} = 18$ days

$T_{1/2} = \frac{18 \text{ days}}{3} = 6$ days

A 3 hours
3 *jam*

B 4 hours
4 *jam*

C 6 hours
6 *jam*

D 9 hours
9 *jam*

50 A polonium nucleus $^{210}_{84}Po$ decays by emitting an alpha particle. What are the nucleon and proton numbers of the daughter nucleus respectively?
Nukleus polonium $^{210}_{84}Po$ *mereput dengan mengeluarkan satu zarah alfa. Apakah nombor nukleon dan nombor proton nukleus anak*?

	Nucleon number *Nombor nukleon*	Proton number *Nombor proton*
A	82	218
B	218	82
C	82	206
D	206	82

$^{210}_{84}Po \rightarrow {}^{A}_{Z}X + {}^{4}_{2}\alpha$

parent nucleus (A) → daughter nucleus (B) + alpha particle

Total nucleon no. in A = Total nucleon no. in B

Total proton no. in A = total proton no. in B

$210 = A + 4$
$A = 210 - 4$
$= 206$

$84 = Z + 2$
$Z = 84 - 2$
$= 82$

END OF QUESTION PAPER
KERTAS PEPERIKSAAN TAMAT