

1. Antara kuantiti berikut, yang manakah adalah kuantiti vektor?

Which of the following quantities is a **vector quantity**?

A Tenaga / Energy

B Kuasa / Power

C Daya / Force

D Tekanan / Pressure

→ magnitude + direction

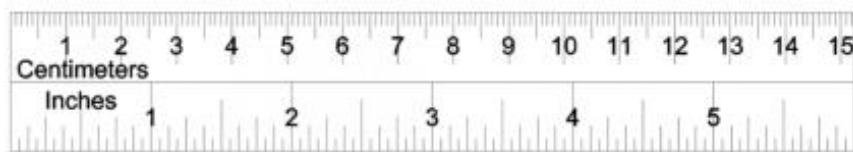
2. Antara pasangan berikut, manakah yang menunjukkan pasangan kuantiti asas dan kuantiti terbitan?

Which of the following pairs shows a **basic quantity** and **derived quantity**?

	Kuantiti asas / Basic quantity	Kuantiti terbitan / Derived quantity
A	Panjang / Length ✓	Suhu / Temperature ✗
B	Daya / Force ✗	Masa / Time ✗
C	Arus elektrik / Electric current ✓	Momentum / Momentum ✓
D	Laju / Speed ✗	Halaju / Velocity ✓

3. Rajah 1 menunjukkan sebatang pembaris.

Diagram 1 shows a ruler.



Rajah 1 / Diagram 1

Inci adalah contoh bagi

Inches is an example of

A Unit metrik / Metric unit

B Unit S.I / S.I Unit

C Unit imperial / Imperial unit

meter
liter
gram

inch (length)
sq. foot (area)
ounce // pound (mass)
gallon, pint (volume)

4. Antara pasangan berikut yang manakah menunjukkan pasangan kuantiti fizik dengan unit yang betul?

Which of the following pair shows physical quantity and its unit correctly?

	Kuantiti fizik / <i>Physical quantity</i>		Unit / <i>Unit</i>
A	Pecutan / <i>Acceleration</i>	X	m s^{-1} (ms^{-2})
B	Berat / <i>Weight</i>	X	kilogram, kg (N)
C	Arus elektrik / <i>Electric current</i>	✓	Ampere, A
D	Suhu termodinamik / <i>Thermodynamic temperature</i>	X	Darjah Celsius / <i>Degree Celsius</i> (K)

5. Antara pernyataan berikut, yang manakah betul mengenai sesaran?

Which of the following statements is correct about displacement?

I Panjang satu lintasan yang dilalui oleh pergerakan suatu objek
The length of a trajectory travelled by the movement of an object

II Jarak terpendek yang dilalui pada satu arah tertentu
The shortest distance travelled in a specific direction

III Nilainya sama dengan panjang garis lurus di antara kedudukan awal dengan akhir
The value is equal to the length of the straight line between the initial and final positions

A I dan II sahaja
I and II only

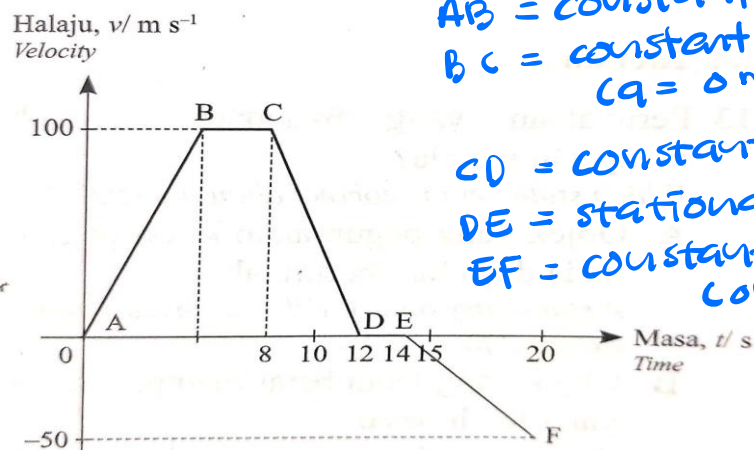
B II dan III sahaja
II and III only

C II, III dan IV sahaja
II, III and IV only

D I, III dan IV sahaja
I, III and IV only

6. Rajah 2 menunjukkan graf gerakan sebuah motosikal.

Diagram 2 shows a graph of the motion of a motorcycle



AB = constant acceleration
 BC = constant velocity
 ($a = 0 \text{ m/s}^2$)
 CD = constant deceleration
 DE = stationary
 EF = constant acceleration
 (opposite direction)

Rajah 2 / Diagram 2

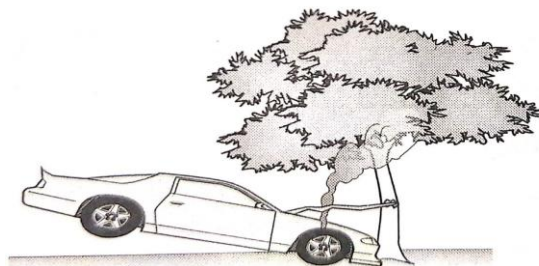
Pernyataan manakah yang betul tentang gerakan tersebut?

Which statement is correct regarding the motion?

- ☒ A Motosikal mengalami pecutan seragam di AB
The motorcycle is in uniform acceleration at AB
- B Motosikal dalam keadaan pegun di BC
The motorcycle is in stationary at BC
- C Motosikal mengubah arah ke belakang di CD
The motorcycle changes the direction backward at CD
- D Motosikal mengurangkan halaju di EF
The motorcycle reduces the velocity at EF

7. Rajah 3 menunjukkan sebuah kereta remuk apabila melanggar sebatang pokok.

Diagram 3 shows a crushed car when it collides a tree



Rajah 3 / Diagram 3

Mengapakah bahagian depan dan belakang kereta direka supaya mudah remuk?

Why is the front and rear of the car are designed to be easily crushed?

A Untuk mengurangkan masa impak dan mengurangkan daya impuls

To reduce the impact time and reduce the impulsive force

B Untuk mengurangkan momentum

To reduce the momentum

☒ C Untuk meningkatkan masa impak dan mengurangkan daya impuls

To increase the impact time and reduce the impulsive force

$t \uparrow \therefore F \downarrow$

D Untuk meningkatkan daya geseran

To increase the frictional force

8. Apakah yang akan berlaku kepada daya tarikan graviti antara dua jasad sekiranya jarak di antara dua jasad itu adalah dua kali ganda?

What will happen to the gravitational force between two bodies if the distance between the two bodies is doubled?

$$F = G \frac{m_1 m_2}{r^2}$$

A Menjadi dua kali ganda / *Becomes doubled*

B Menjadi empat kali ganda / *Becomes quadrupled*

$$F \propto \frac{1}{r^2}$$

C Berkurang kepada separuh daripada nilai asal

Reduced to half of the original value

$$r \Rightarrow 2r$$

☒ D Berkurang kepada satu perempat daripada nilai asal

Reduced to a quarter of the original value

$$\therefore F \propto \frac{1}{(2r)^2}$$

9. Tempoh orbit satelit geopegun ialah

The orbital period of a geostationary satellite is

$$F \propto \frac{1}{4r^2}$$

☒ A 24 jam / hours

C 48 jam/ hours

B 36 jam / hours

D 72 jam/ hours

10. Kedudukan bagi sebuah planet yang berada paling hampir dengan Matahari ketika mengorbit dikenali sebagai

The position of a planet that is closest to the Sun when orbiting is known as

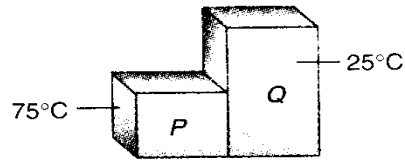
☒ A perihelion / *perihelion*

B titik fokus / *focal point*

C aphelion / *aphelion* — *further to the sun*

D pusat / *center*

11. Rajah 4 di bawah menunjukkan dua blok logam. Pernyataan yang BETUL adalah
Diagram 4 shows two metal blocks. The CORRECT statement is



Rajah 4 / Diagram 4

- A P dan Q adalah dalam keseimbangan terma
P and Q are in thermal equilibrium
 - B P dan Q tidak bersentuhan secara terma
P and Q are not in thermal contact
 - C Tenaga dipindahkan dari Q ke P
Energy is transferred from Q to P
 - ☒ D Tenaga dipindahkan dari P ke Q
Energy is transferred from P to Q
- ↪ higher T to lower T

12. Apabila berlaku pembekuan air, perkara berikut akan berlaku
*When there is **freezing of water**, the following situation will occur*

- A Suhu air naik / *Temperature of water rises*
- B Suhu air turun / *Temperature of water decreases*
- ☒ C Suhu air tidak berubah / *Temperature of water is constant*

latent heat of fusion

13. Suhu sifar mutlak adalah suhu di mana molekul-molekul gas secara teori

***Absolute zero** is the temperature at which gas molecules theoretically*

- ☒ A tiada langsung isipadu / *occupy no volume at all*
- B bergerak paling laju / *move the fastest*
- C bacaan suhu adalah 273°C / *Temperature reading is 273°C*
- D mengandungi dua kali bilangan molekul pada suhu bilik
contain twice the number of molecules at room temperature

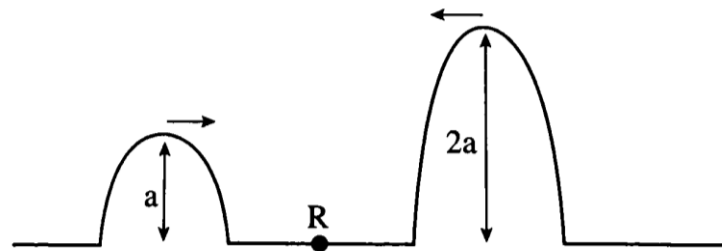
Pressure and volume

become zero!

OK = -273°C

14. Rajah 5 menunjukkan dua gelombang bergerak pada arah yang bertentangan dan bertemu di titik R.

Diagram 5 shows two waves moving in the opposite direction and meeting at point R.



Rajah 5 / Diagram 5

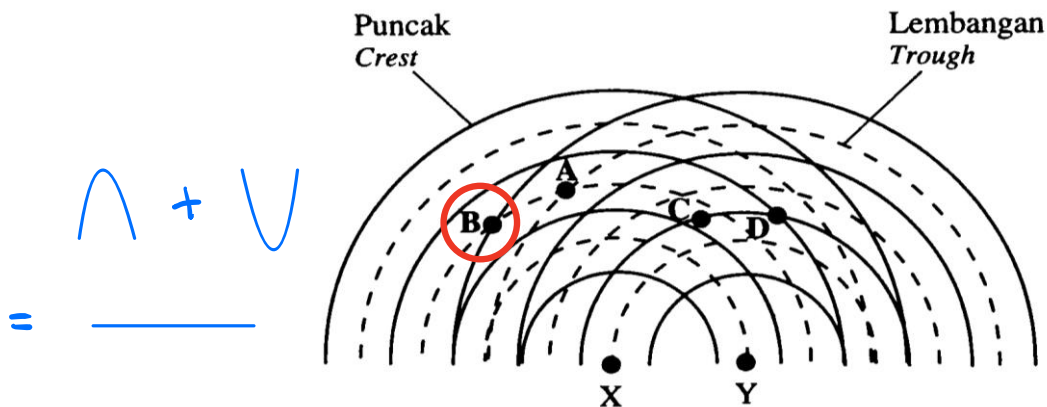
Berapakah amplitud paduan gelombang pada titik R?

What is the resultant amplitude of the wave at point R?

- | | | | |
|---|---|----------|----|
| A | 0 | C | 2a |
| B | a | D | 3a |

15. Rajah 6 menunjukkan corak interferens bagi dua punca gelombang air yang koheren, X dan Y.

Diagram 6 shows an interference pattern of two coherent water wave sources, X and Y.



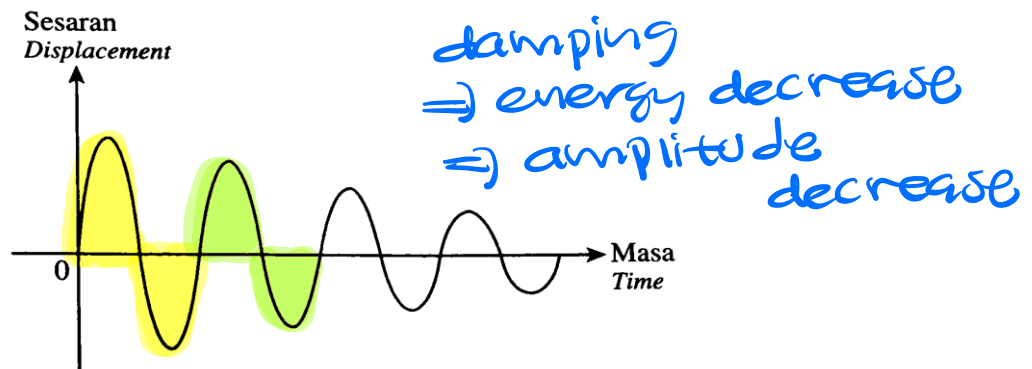
Rajah 6 / Diagram 6

Pada titik manakah, A, B, C atau D, interferens memusnah berlaku?

*At which point, A, B, C or D, does the **destructive** interference occur?*

16. Rajah 7 menunjukkan graf sesaran – masa bagi suatu gelombang

Diagram 7 shows a displacement – time graph for a wave



Rajah 7 / Diagram 7

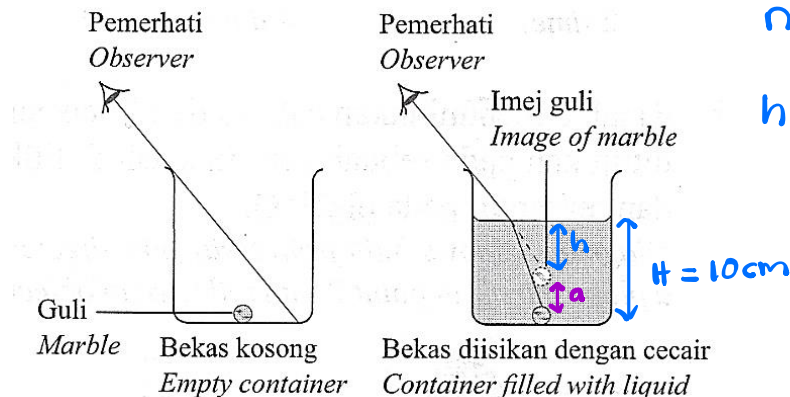
Antara yang berikut, yang manakah betul tentang frekuensi dan tenaga bagi gelombang ?

Which of the following is correct about the frequency and energy of the wave?

	Frekuensi / Frequency	Tenaga / Energy
A	Meningkat / Increases	Tidak berubah / Unchanged
B	Meningkat / Increases	Berkurang / Decreases
C	Tidak berubah / Unchanged	Meningkat / Increases
D	Tidak berubah / Unchanged	Berkurang / Decreases

17. Rajah 8 menunjukkan sebiji guli berada di dasar sebuah bekas kaca. Imej guli itu hanya dapat dilihat setelah suatu cecair ditambah sedalam 10 cm ke dalam bekas kaca berkenaan.

Diagram 8 shows a marble at the base of a glass container. The image of marble can only be seen after a liquid is added to a depth of 10 cm into the glass container.



$$n = \frac{H}{h}$$

$$h = \frac{H}{n} = \frac{10}{1.33}$$

$$h = 7.52 \text{ cm}$$

Rajah 8 / Diagram 8

$$\therefore a = 10 - 7.52$$

$$= 2.48 \text{ cm}$$

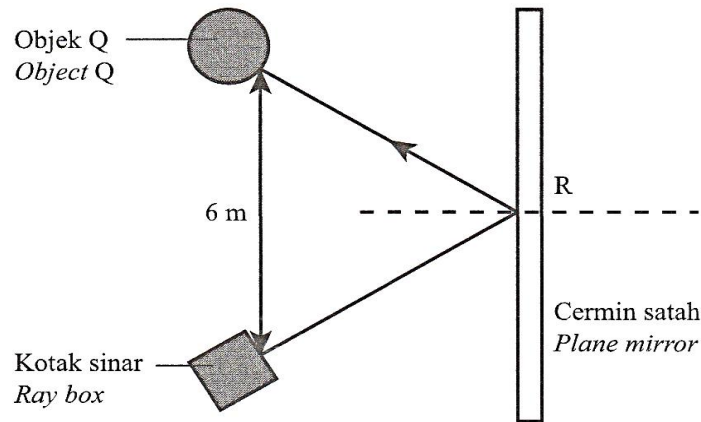
Jika indeks biasan cecair tersebut ialah 1.33, berapakah jarak imej guli dari kedudukan guli sebenar?

If the refractive index of the liquid is 1.33, what is the distance of the image of marble from the actual position of the marble?

- | | | | |
|------------------------------------|---------|---|----------|
| A | 1.00 cm | C | 7.52 cm |
| ☒ B | 2.48 cm | D | 13.33 cm |

18. Rajah 9 menunjukkan cahaya dari kotak sinar ditujukan pada sebuah cermin satah di titik R dan terpantul pada objek Q.

Diagram 9 shows light from a ray box directed at a plane mirror at point R and reflected at object Q.



Rajah 9 / Diagram 9

Jika kotak sinar digerakkan 1 m secara menegak ke bawah, berapa jauhkah objek Q perlu digerakkan untuk memastikan cahaya masih terpantul pada objek Q?

If the ray box is moved 1 m vertically downward, how far should the object Q be moved to ensure that the light is still reflected toward object Q?

- | | |
|------------------------------------|-------------------------|
| ☒ A | 1 m ke atas / upward |
| B | 1 m ke bawah / downward |
| C | 2 m ke atas / upward |
| D | 2 m ke bawah / downward |

$$\frac{1}{f} = \frac{1}{u} + \frac{1}{v} \quad \frac{1}{v} = \frac{1}{-12} - \frac{1}{4}$$

$$-\frac{1}{12} = \frac{1}{4} + \frac{1}{v} \quad v = \underline{\underline{-3 \text{ cm}}}$$

19. Berapakah pembesaran linear jika jarak objek adalah 4 cm dengan panjang fokus kanta cekung adalah 12 cm?

What is the linear magnification if the object distance is 4 cm with the focal length of the concave lens is 12 cm?

- A 0.75 $m = \left| \frac{v}{u} \right|$ C 1.25
 B 0.95 $= \left| \frac{-3}{4} \right| = \underline{\underline{0.75}}$ D 2.50

20. Berdasarkan Rajah 10 di bawah, pecutan adalah bersamaan 5 m s⁻² jika Y ialah
Based on the Diagram 10 below, the acceleration is equal to 5 m s⁻² if Y is

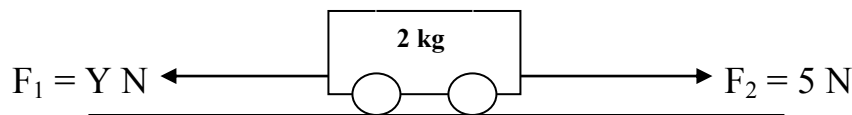
$$F_{\text{net}} = ma$$

$$Y - 5 = 2(5)$$

$$= 10$$

$$Y = 10 + 5$$

$$= \underline{\underline{15 \text{ N}}}$$



Rajah 10 / Diagram 10

- A 5 N C 15 N
 B 10 N D 20 N
21. Sebuah bakul berjisim 2.0 kg diletakkan di atas penimbang yang digantung dari siling sebuah lif. Apakah yang akan berlaku kepada bacaan penimbang jika lif bergerak ke bawah dengan pecutan?

A basket of mass 2.0 kg is suspended from a weighing scale hanging from the ceiling of a lift. What happens to the reading of the scale if the lift moves downward with an acceleration?

- A bertambah / increases C tidak berubah / unchanged
 B berkurang / decreases D sifar / zero

$$W > R$$

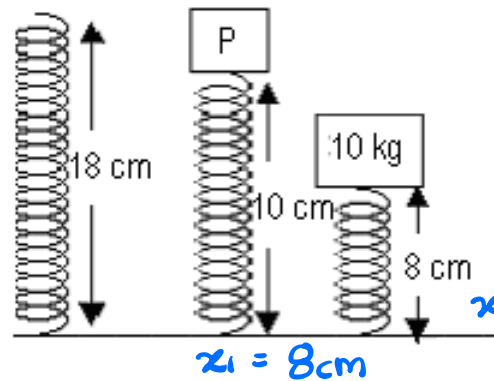
$$W - R = ma$$

$$R = W - ma$$

$$R = mg - ma$$

22. Rajah 11 menunjukkan satu spring dengan panjang asal 18 cm dimampatkan kepada 10 cm oleh beban P dan dimampatkan kepada 8 cm oleh beban 10 kg

Diagram 11 shows a spring of length 18 cm compressed to a length of 10 cm by a load of P and compressed to a length of 8 cm by a load of 10 kg.



$$\begin{aligned} 10 \text{ cm} &\rightarrow 10 \text{ kg} \\ 8 \text{ cm} &\rightarrow \frac{8 \times 10}{10} \\ &= 8 \text{ kg} \end{aligned}$$

$$x_2 = 10 \text{ cm}$$

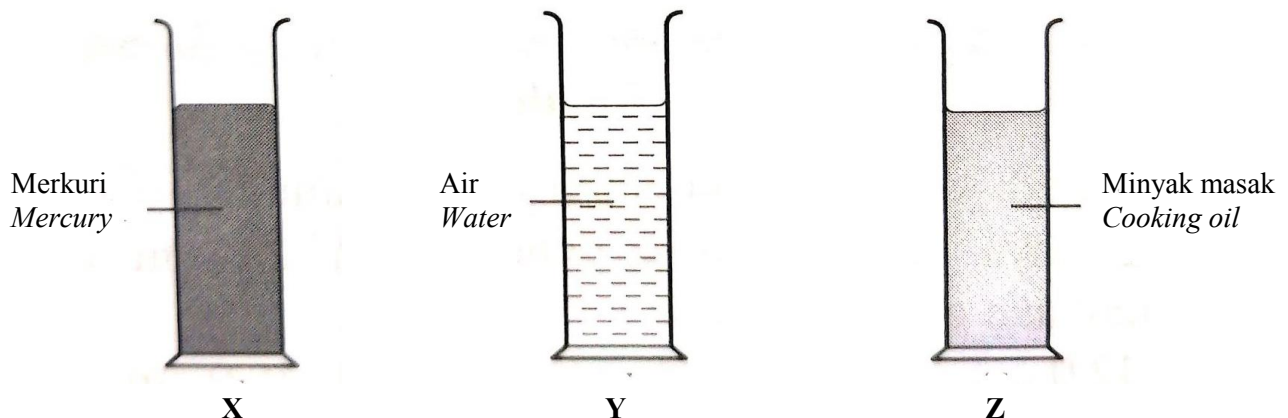
Rajah 11 / Diagram 11

Apakah nilai P? / What is the value of P?

- A 4 kg
B 6 kg
C 8 kg
D 9 kg
23. Rajah 12 menunjukkan tiga bekas yang diisi dengan merkuri, air dan minyak masak.

Tekanan di dasar bekas masing-masing ialah P_x , P_y dan P_z .

Diagram 12 shows three container filled with mercury, water and oil. Pressure at the bottom of the containers is shown as P_x , P_y and P_z .



$$\begin{aligned} P &= \rho gh \\ P &\propto \rho \\ \rho \uparrow &\therefore P \uparrow \end{aligned}$$

$$\begin{aligned} \rho: x &> y > z \\ P: x &> y > z \end{aligned}$$

Rajah 12 / Diagram 12

Perbandingan antara tekanan yang manakah betul?

Which comparison of pressure is correct?

A $P_x = P_y > P_z$

C $P_x > P_z > P_y$

☒ B $P_x > P_y > P_z$

D $P_z > P_y > P_x$

24. Apabila daya 20 N bertindak ke atas omboh kecil dalam satu system hidraulik, satu daya output 100 N akan terhasil. Apakah daya yang akan dihasilkan pada omboh kecil apabila daya 20 N itu dikenakan ke atas omboh besar?

When a force of 20 N acted on a small piston in one hydraulic system, an output of 100 N is produced. What is the force produced on the small piston if, 20 N is put on the bigger piston?

A 2 N

C 5 N

☒ B 4 N

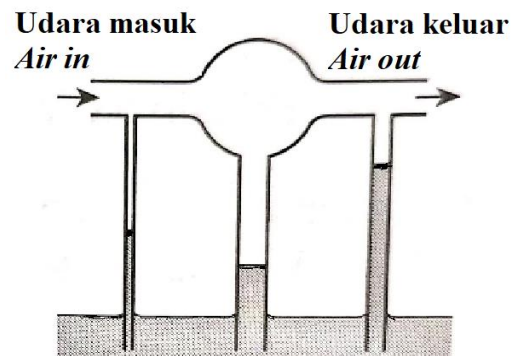
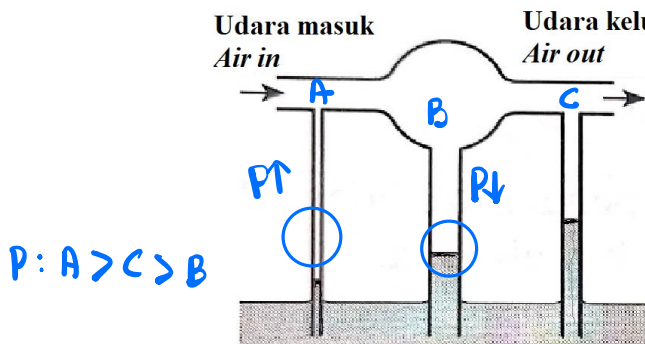
D 6 N

25. Pemerhatian manakah yang betul? = 4 N

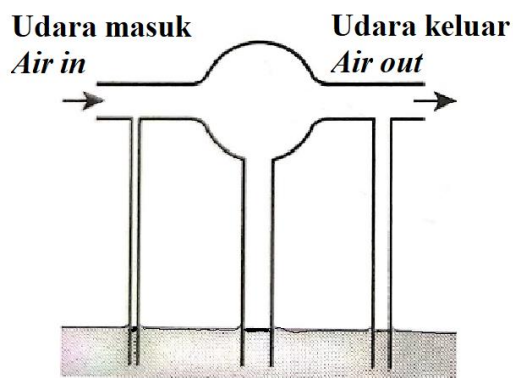
Which observation is correct?

☒ A

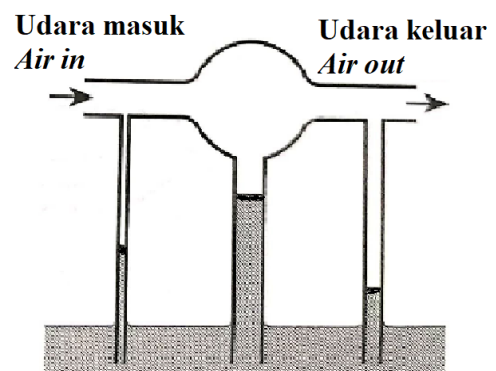
C



B

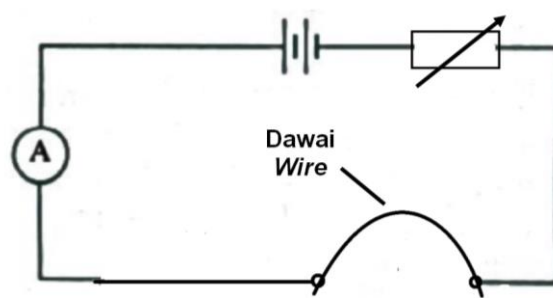


D



26. Rajah 13 menunjukkan suatu litar elektrik.

Diagram 13 shows an electrical circuit.



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

$$R \downarrow \therefore I \uparrow$$

$$\therefore l \downarrow$$

$$P \downarrow$$

$$A \uparrow$$

Rajah 13 / Diagram 13

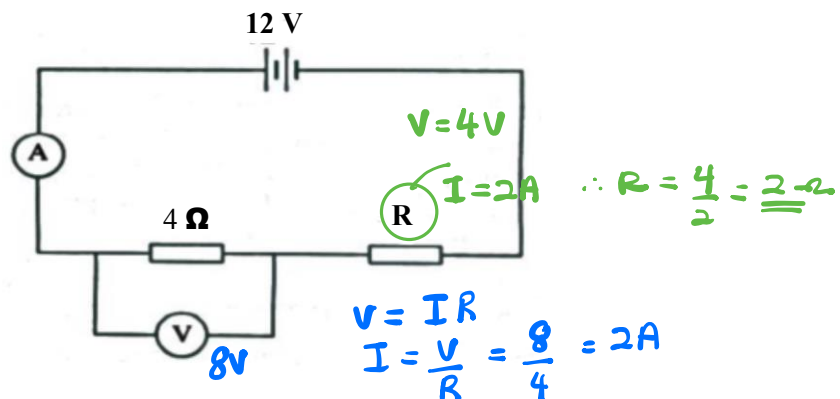
Perubahan manakah pada dawai yang akan menghasilkan bacaan tertinggi pada ammeter?

Which changes to the wire will produce the **greatest reading on the ammeter?**

	Panjang dawai / Length of wire		Diameter dawai / Diameter of wire
A	Lebih panjang/ Longer $\times$	$\times$	Lebih besar / Bigger
B	Lebih panjang/ Longer $\times$	$\checkmark$	Lebih kecil/ Smaller
C	Lebih pendek/ Shorter $\checkmark$	$\times$	Lebih kecil/ Smaller
D	Lebih pendek/ Shorter $\checkmark$	$\checkmark$	Lebih besar/ Bigger

27. Rajah 14 menunjukkan suatu litar elektrik.

Diagram 14 shows an electrical circuit.



Rajah 14 / Diagram 14

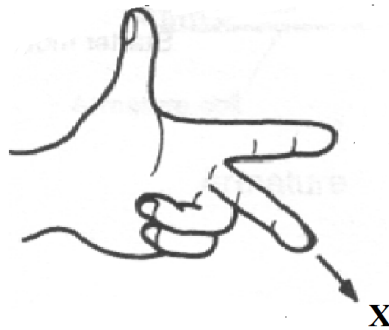
Bacaan voltmeter ialah 8 V. Berapakah nilai arus yang mengalir melalui perintang R?

The voltmeter reading is 8 V. What is the value of the current flowing through the resistor R?

- | | | | |
|------------------------------------|-------|---|-------|
| ☒ A | 2.0 A | C | 4.0 A |
| B | 3.0 A | D | 5.0 A |

28. Rajah 15 menunjukkan tangan kiri yang mewakili Petua Tangan Kiri Fleming.

Diagram 15 shows a left hand which represents the Fleming Left-Hand Rule.



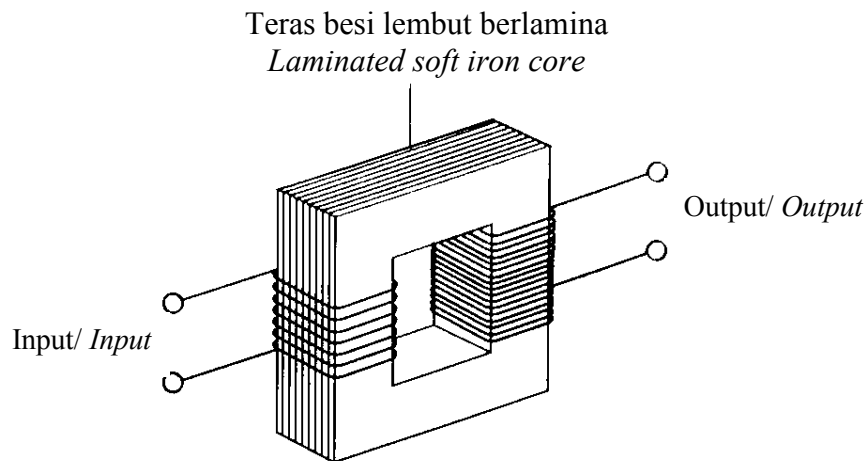
Rajah 15 / Diagram 15

X mewakili / X represents

- | | | | |
|------------------------------------|-----------------|---|--------------------------------------|
| A | Gerakan/ Motion | C | Medan magnet/ Magnetic field |
| ☒ B | Arus/ Current | D | Beza keupayaan/ Potential difference |

29. Rajah 16 menunjukkan struktur sebuah transformer.

Diagram 16 shows a structure of a transformer.



Rajah 16 / Diagram 16

Apakah fungsi teras besi lembut berlamina?

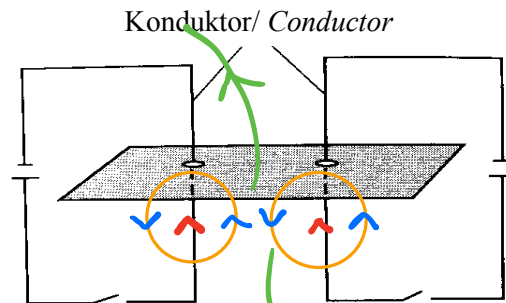
What is the function of the laminated soft iron core?

- A Menyejukkan transformer / *To cool down the transformer*
- B Mengurangkan arus pusar / *To reduce eddy current***
- C Mencegah kebocoran fluks magnet / *To prevent magnetic flux leakage*
- D Meningkatkan arus pusar / *To increase the eddy current*

30. Rajah 17 menunjukkan susunan radas untuk memerhatikan medan magnet yang dihasilkan oleh dua konduktor pembawa arus lurus.

Diagram 17 shows the apparatus set up to observe the magnetic field produced by two straight current-carrying conductors.

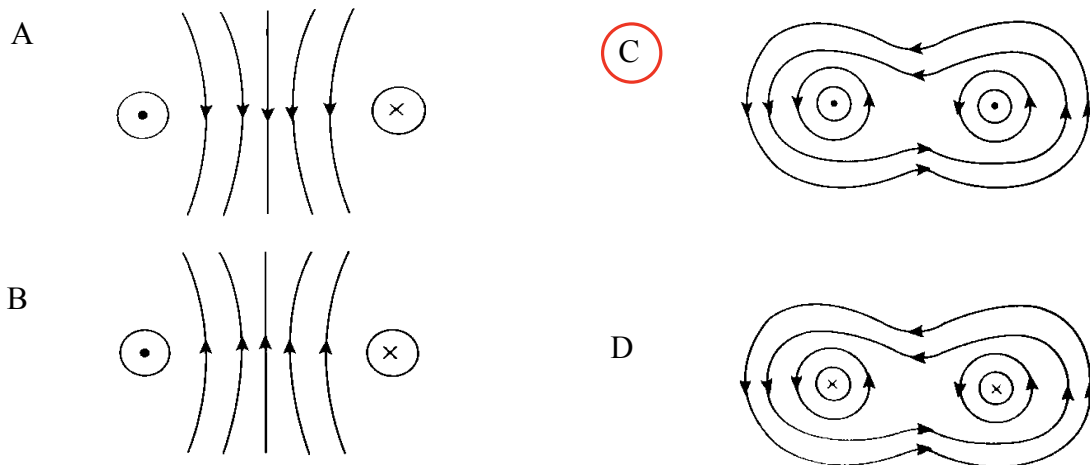
- ① same direction of I
- ② in different (prefer blue color)
- ③ conductor $\rightarrow$ attracted



Rajah 17 / Diagram 17

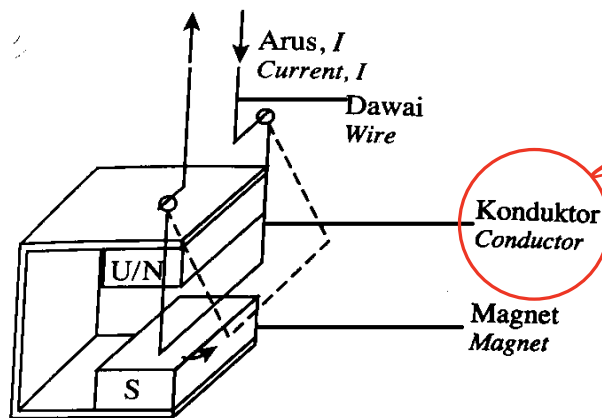
Rajah manakah yang menunjukkan medan magnet yang terbentuk apabila kedua-dua suis ditutup?

Which diagram shows the magnetic field pattern formed when both switches are closed?



31. Rajah 18 menunjukkan satu wayar digantung bebas di antara dua kutub sebuah magnet.

Diagram 18 shows a wire hanging freely between the poles of a magnet.



Rajah 18 / Diagram 18

Sudut pesongan wayar boleh ditingkatkan dengan

The angle of deflection of the wire can be increased by

- I meningkatkan arus / increasing the current
 - II menggunakan dawai yang lebih tebal / using a thicker wire
 - III menggunakan dawai konstantan / using constantan wire
- A I dan II sahaja / I and II only
- B I dan III sahaja / I and III only**
- C II dan III sahaja / II and III only

thicker conductor

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

$$R \propto \frac{l}{A}$$

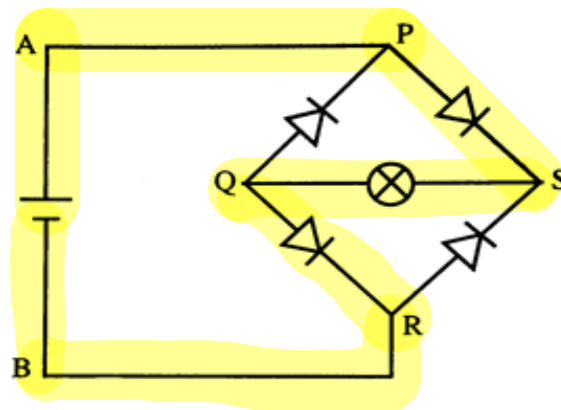
$$A \uparrow \therefore R \downarrow$$

$$\Rightarrow I \uparrow$$

$$\therefore R \downarrow$$

32. Rajah 19 menunjukkan sambungan empat diod dan satu mentol dalam satu litar.

Diagram 19 shows the connection of four diodes and one light bulb in a circuit.



Rajah 19 / Diagram 19

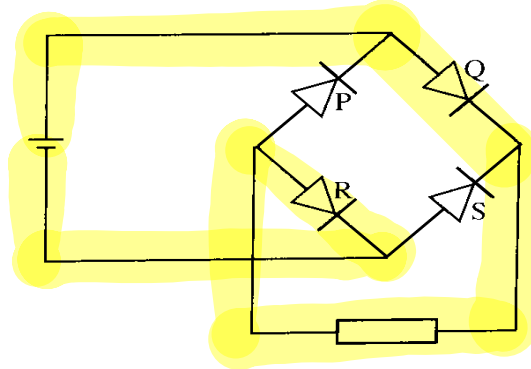
Lintasan arus manakah yang akan menyalakan mentol itu?

Which path of the current will light up the bulb?

- | | | | |
|------------------------------------|--------|---|--------|
| ☒ A | APSQRB | C | BRSQPA |
| B | APQSRB | D | BRQSPA |

33. Rajah 20 menunjukkan empat diod yang disambungkan kepada satu bekalan kuasa arus terus.

Diagram 20 shows four diodes connected to a direct current power supply



Rajah 20 / Diagram 20

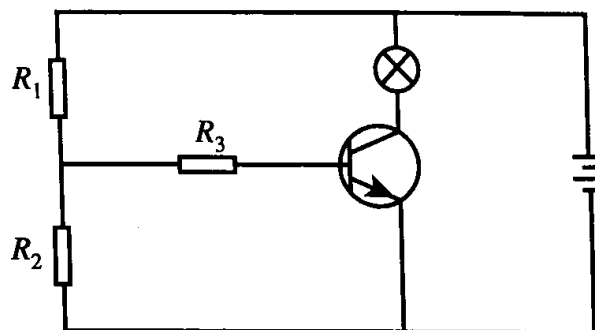
Diod manakah yang dipincang ke depan?

Which diode is forward biased?

- | | | | |
|---|-------------------|------------------------------------|-------------------|
| A | P dan R / P and R | ☒ C | Q dan R / Q and R |
| B | P dan S / P and S | D | Q dan S / Q and S |

34. Rajah 21 menunjukkan satu litar suis automatik.

Diagram 21 shows an automatic switch circuit.



Rajah 21 / Diagram 21

Pernyataan manakah yang benar?

Which statement is true?

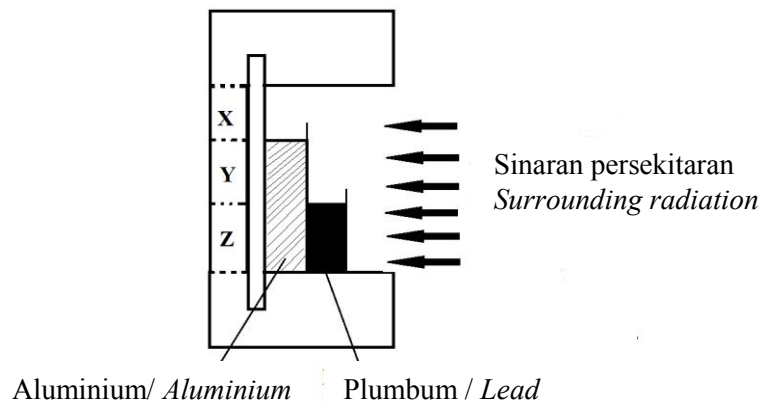
- (A) Jika R_1 ialah perintang peka cahaya, mentol menyala pada waktu siang.
If R_1 is a light dependent resistor, the bulb will light up in daylight
- B Jika R_2 ialah perintang peka cahaya, mentol menyala pada waktu siang.
If R_2 is a light dependent resistor, the bulb will light up in daylight
- C Jika R_3 ialah perintang peka cahaya, mentol menyala pada waktu siang
If R_3 is a light dependent resistor, the bulb will light up in daylight
- D Jika terminal bateri disongsangkan, mentol menyala pada waktu siang
If the battery terminals reversed, the bulb lights up in daylight

35. Alat pengesan radioaktif manakah dapat mengesan sinaran radioaktif yang mempunyai kuasa pengionan tinggi sahaja ?

Which radioactive detector can detect the radioactive ray which has high ionization power only?

- A Tiub Geiger-Muller / *Geiger – Muller Tube*
 - B Pembilang bunga api / *Spark counter*
 - C Filem fotografi / *Photographic film*
 - (D) Kebuk awan / *Cloud chamber*
36. Rajah 22 menunjukkan keratan rentas lencana sinaran yang dipakai oleh pekerja dalam stesen jana kuasa nuklear.

Diagram 22 shows a cross-sectional of a radiation badge worn by a worker in a nuclear power station.



Rajah 22 / *Diagram 22*

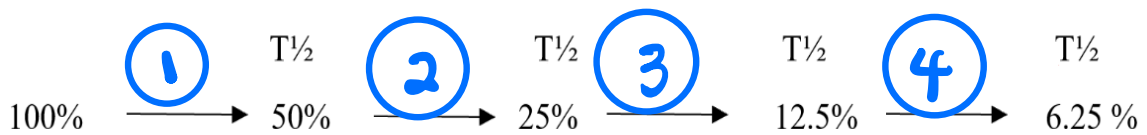
Bahagian lencana manakah menjadi gelap apabila pekerja itu terdedah kepada dos sinar alfa yang tinggi?

Which part of the badge becomes dark when the worker is exposed to a high dose of alpha ray?

- ☒ A X
- ☐ B Y
- ☐ C Z

37. Aktiviti sampel X menjadi 6.25% daripada nilai asal selepas 120 minit.

The activity of sample X becomes 6.25 % of its original value after 120 minutes.



Apakah separuh hayatnya?

What is its half-life?

- ☐ A 40 minit / 40 minutes
- ☒ B 30 minit / 30 minutes
- ☐ C 60 minit / 60 minutes
- ☐ D 120 minit / 120 minutes

$$4T_{1/2} = 120 \text{ min}$$

$$T_{1/2} = 30 \text{ min}$$

38. Mengapakah elektron dikatakan bersifat kedualan gelombang-zarah?

Why are electrons said to be wave-particle duality?

- ☐ A Elektron mempunyai dua jenis gelombang
Electrons have two type of waves
- ☐ B Elektron menghasilkan cas-cas negatif dalam gelombang
Electrons produced negative charges in wave
- ☐ C Elektron membentuk daya tolakan dan daya tarikan
Electrons formed repulsive and attractive forces
- ☒ D Elektron menunjukkan sifat zarah dan sifat gelombang
Electrons exhibit the properties of both particle and wave

39. Pernyataan manakah yang betul tentang kesan fotoelektrik?

Which statement is correct about photoelectric effect?

- A Semakin tinggi keamatan cahaya, semakin tinggi tenaga elektrik fotoelektron
The higher the intensity of light, the higher the kinetic energy of photoelectron
- ☒ B Semakin tinggi frekuensi foton cahaya, semakin tinggi tenaga kinetik fotoelektron yang dipancarkan daripada permukaan logam
The higher the frequency of the photon of light, the higher the kinetic energy of the photoelectron emitted from the metal surface
- C Kesan fotoelektrik akan berlaku apabila frekuensi cahaya adalah lebih rendah daripada frekuensi ambang
Photoelectric effect will occur when the frequency of light is lower than the threshold frequency
- D Elektron terlepas dari permukaan logam secara serta merta melalui pancaran termion
Electrons escape from the metal surface instantaneously by thermionic emission

40. Antara berikut, yang manakah aplikasi kesan fotoelektrik?

Which of the following is an application of photoelectric effect?

- A Cerek elektrik
Electric kettle
- ☒ B Pengesan cahaya pada pintu automatik
Light detector at the automatic doors
- C Loceng elektrik di sekolah
Electric bell in school
- D Jek hidraulik
Hydraulic jack

KERTAS SOALAN TAMAT

END OF QUESTIONS