**4531/1**
**FIZIK**
**KERTAS 1**
**1 JAM 15 MINIT**

**NAMA: .....**

**TINGKATAN: .....**

**MAJLIS PENGETUA SEKOLAH MALAYSIA (MPSM)**
**NEGERI PERAK**

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**MODUL KECEMERLANGAN SPM 2023**
**SET 1**

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# FIZIK

**KERTAS 1**
**1 JAM 15 MINIT**

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**JANGAN BUKA KERTAS PEPERIKSAAN INI SEHINGGA DIBERITAHU**

**ARAHAN:**

1. *Kertas peperiksaan ini mengandungi* **40 soalan aneka pilihan**.
2. *Anda dikehendaki menjawab* **semua** *soalan.*
3. *Jawab* **semua** *soalan dalam kertas objektif yang disediakan.*
4. *Calon dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogramkan.*

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Kertas ini mengandungi 22 halaman bercetak.

Maklumat berikut mungkin berfaedah. Simbol-simbol mempunyai makna yang biasa.
*The following information may be useful. The symbols have their usual meaning.*

## DAYA DAN GERAKAN I
## *FORCE AND MOTION* I

1. $a = \frac{v-u}{t}$
2. $v^2 = u^2 + 2as$
3. $s = ut + \frac{1}{2}at^2$
4. $W = mg$
5. Momentum, $p = mv$
6. $F = ma$
7. Daya impuls, $F = \frac{mv-mu}{t}$ /
   *Impulsive force,* $F = \frac{mv-mu}{t}$

## HABA
## *HEAT*

1. $\theta = \frac{\ell_\theta - \ell_0}{\ell_{100} - \ell_0} \times 100°$
2. Haba, $Q = mc\Delta\theta$ / *Heat,* $Q = mc\Delta\theta$
3. Haba, $Q = mL$ / *Heat,* $Q = mL$
4. Hukum Boyle, $P_1V_1 = P_2V_2$ /
   *Boyle's Law,* $P_1V_1 = P_2V_2$
5. Hukum Charles, $\frac{V_1}{T_1} = \frac{V_2}{T_2}$ /
   *Charles's Law,* $\frac{V_1}{T_1} = \frac{V_2}{T_2}$
6. Hukum Gay Lussac, $\frac{P_1}{T_1} = \frac{P_2}{T_2}$ /
   *Gay-Lussac's Law,* $\frac{P_1}{T_1} = \frac{P_2}{T_2}$

## KEGRAVITIAN
## *GRAVITATION*

1. Daya gravity, $F = \frac{GMm}{r^2}$ /
   *Gravitational force,* $F = \frac{GMm}{r^2}$
2. Pecutan gravity, $a = \frac{GM}{r^2}$ /
   *Gravitational acceleration,* $a = \frac{GM}{r^2}$
3. Daya memusat, $F = \frac{mv^2}{r}$ /
   *Centripetal force,* $F = \frac{mv^2}{r}$
4. Jisim Bumi, $M = \frac{4\pi^2 r^3}{GT^2}$ /
   *Mass of Earth,* $M = \frac{4\pi^2 r^3}{GT^2}$
5. Tempoh orbit, $T^2 = \left(\frac{4\pi^2}{GM}\right) r^3$ /
   *Orbital period,* $T^2 = \left(\frac{4\pi^2}{GM}\right) r^3$
6. $\frac{T_1^2}{r_1^3} = \frac{T_2^2}{r_2^3}$
7. Laju linear satelit, $v = \sqrt{\frac{GM}{r}}$ /
   *Satellite linear speed,* $v = \sqrt{\frac{GM}{r}}$
8. Halaju lepas, $v_{lepas} = \sqrt{\frac{2GM}{R}}$ /
   *Escape velocity,* $v_{escape} = \sqrt{\frac{2GM}{R}}$
9. Tenaga keupayaan gravity, $U = -\frac{GMm}{r}$ /
   *Gravitational potential energy,* $U = -\frac{GMm}{r}$
10. Pecutan gravity Bumi/
    *Earth's gravitational acceleration*
    $g = 9.81 \text{ms}^{-2}$

## GELOMBANG
## *WAVES*

1. $v = f\lambda$
2. $f = \frac{1}{T}$
3. $\lambda = \frac{ax}{D}$
4. $d = \frac{vt}{2}$
5. $c = 3.00 \times 10^8 ms^{-1}$

## DAYA DAN GERAKAN II
## *FORCE AND MOTION* II

1. $F = kx$
2. $E_P = \frac{1}{2}kx^2 = \frac{1}{2}Fx$

## TEKANAN
## *PRESSURE*

1. $P = \frac{F}{A}$
2. $P = \rho gh$
3. $F_b = \rho Vg$
4. $\frac{F_1}{A_1} = \frac{F_2}{A_2}$

## CAHAYA DAN OPTIK
## *LIGHT AND OPTICS*

1. $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$
2. $n_1 \sin\theta_1 = n_2 \sin\theta_2$
3. $n = \frac{\sin i}{\sin r}$
4. $n = \frac{1}{\sin c}$
5. $n = \frac{H}{h}$
6. $n = \frac{c}{v}$
7. $m = \frac{v}{u} = \frac{h_i}{h_o}$

## ELEKTRIK
## *ELECTRICITY*

1. $E = \frac{F}{Q}$
2. $I = \frac{Q}{t}$
3. $V = \frac{E}{Q}$
4. $V = IR$
5. $R = \frac{\rho\ell}{A}$
6. $E = V + Ir$
7. $P = IV$
8. $P = \frac{E}{t}$
9. $E = \frac{V}{d}$

## KEELEKTROMAGNETAN
## *ELECTROMAGNETISM*

1. $\frac{V_S}{V_P} = \frac{N_S}{N_P}$
2. $\eta = \frac{P_{out}}{P_{in}} \times 100\%$

## FIZIK NUKLEAR
## *NUCLEAR PHYSICS*

1. $N = \left(\frac{1}{2}\right)^n N_o$
2. $E = mc^2$
3. $c = 3.00 \times 10^8 ms^{-1}$
4. 1 u.j.a. $= 1.66 \times 10^{-27} kg$

## ELEKTRONIK
## *ELECTRONICS*

1. $E = eV$
2. $E = \frac{1}{2}mv^2$
3. $\beta = \frac{I_C}{I_B}$

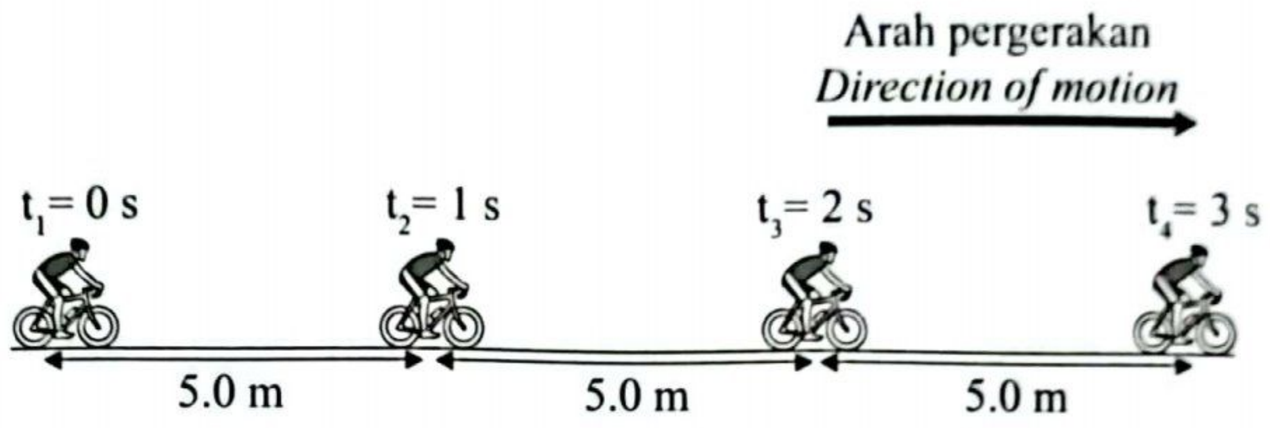
## FIZIK KUANTUM
## *QUANTUM PHYSICS*

1. $E = hf$
2. $f = \frac{c}{\lambda}$
3. $\lambda = \frac{h}{p}$
4. $\lambda = \frac{h}{mv}$
5. $E = \frac{hc}{\lambda}$
6. $p = nhf$
7. $hf = W + \frac{1}{2}mv^2{}_{maks}$
8. $W = hf_o$
9. $h = 6.63 \times 10^{-34} Js$

1 Antara berikut, yang manakah kuantiti vektor?
*Which of the following is a vector quantity?*

**A** Laju
*Speed*
**B** Jisim
*Mass*
**C** Daya
*Force*
**D** Tenaga
*Energy*

2 Rajah 1 menunjukkan sebuah gerakan basikal.
*Diagram* 1 *shows the motion of a bicycle.*




Rajah 1
*Diagram* 1

Apakah jenis gerakan tersebut?
*What is the type of motion?*

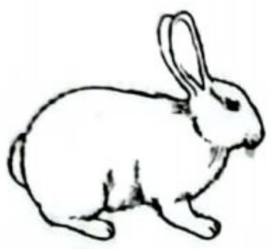
**A** Halaju seragam
*Uniform velocity*
**B** Halaju berkurang
*Decreasing velocity*
**C** Halaju meningkat
*Increasing velocity*
**D** Halaju tidak seragam
*Non-uniform velocity*

3 Chong melontar sebiji batu secara menegak ke atas dengan halaju awal 20 $ms^{-1}$. Berapakah tinggi maksimum yang boleh dicapai oleh batu tersebut jika rintangan udara diabaikan?
[Pecutan graviti, g = 9.81 $ms^{-1}$]
*Chong throws a stone upwards vertically with an initial velocity of* 20 $ms^{-1}$.
*What is the maximum height that the stone can reach if the air resistance is neglected?*
[*Gravitational acceleration*, g = 9.81 $ms^{-1}$]

**A** 10.30 m
**B** 20.39 m
**C** 30.29 m
**D** 40.30 m

4 Manakah antara berikut mempunyai inersia yang paling besar?
*Which of the following has the biggest inertia?*

**A**



1.8 kg Arnab
1.8 kg *Rabbit*

**B**

850 g Sepana
850 g *Spanar*

**C**

1350 g Kuali
1350 g *Pan*

**D**

1.2 kg Mikroskop
1.2 kg *Microscope*

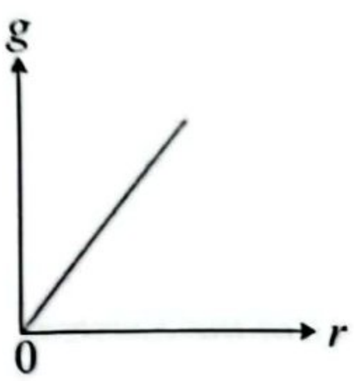
5 Antara penyataan berikut, manakah **benar** tentang perlanggaran tidak kenyal?
*Which of the following statements are* **true** *about inelastic collision?*

I Jumlah tenaga sebelum perlanggaran sama dengan jumlah tenaga selepas perlanggaran.
*The total energy is conserved before and after the collision.*
II Jumlah tenaga kinetik sebelum perlanggaran tidak sama dengan jumlah tenaga kinetik selepas perlanggaran.
*The total kinetic energy is not conserved before and after the collision.*
III Momentum sebelum perlanggaran sama dengan momentum selepas perlanggaran.
*The momentum is conserved before and after the collision.*
IV Jumlah momentum sebelum perlanggaran sama dengan jumlah momentum selepas perlanggaran.
*The total momentum is conserved before and after the collision.*

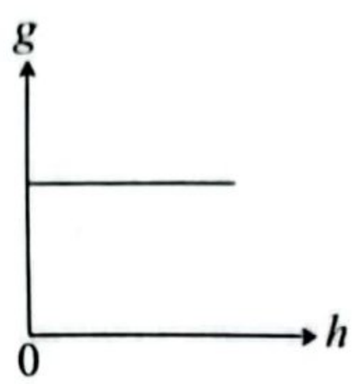
**A** I dan II
I *and* II
**B** I dan IV
I *and* IV
**C** I, II dan III
I, II *and* III
**D** I, II dan IV
I, II *and* IV

**6** Antara graf berikut, yang manakah menunjukkan variasi pecutan graviti, g dengan jarak, r dari pusat Bumi yang betul bagi kedudukan $r \geq R$?
*Which of the following graphs shows the correct variation of gravitational acceleration, g and distance, r from the centre of the Earth for the position of $r \geq R$?*

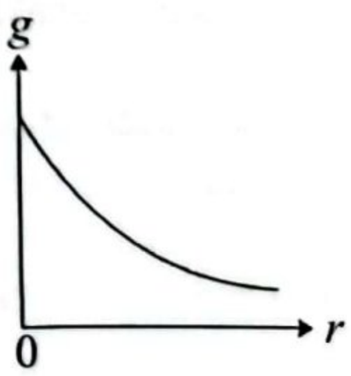
**A**



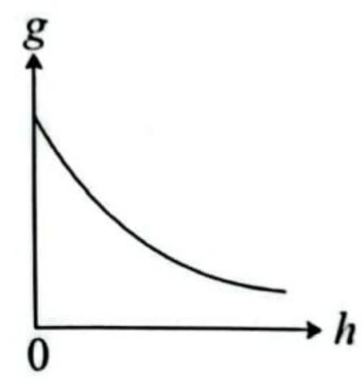

**C**




**B**




**D**




**7** Hukum Kegravitian Semesta Newton menyatakan bahawa daya graviti antara dua jasad berkadar terus dengan hasil darab jisim kedua-dua jasad itu dan berkadar songsang dengan
*Newton's Universal Law of Gravitation states that the gravitational force between two bodies is directly proportional to the product of the masses of the two bodies and is inversely proportional to*

**A** jarak di antara dua jasad
*the distance between the two bodies*
**B** kuasa dua hasil darab jejari jasad
*the square of the product of the bodies' radius*
**C** kuasa tiga jarak di antara dua jasad
*the cube of the distance between the two bodies*
**D** kuasa dua jarak di antara dua jasad
*the square of the distance between the two bodies*

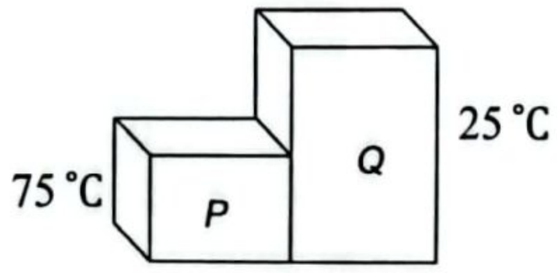
8 Tempoh orbit Bumi dan Musytari ialah 1.0 tahun dan 11.9 tahun masing-masing. Jika jejari orbit Bumi ialah $1.50 \times 10^{11}$ m, hitung jejari orbit Musytari.
*The orbital periods of the Earth and Jupiter are* 1.0 *year and* 11.9 *years respectively. If the orbital radius of the Earth is* $1.50 \times 10^{11}$ *m, calculate the orbital radius of Jupiter.*

**A** $2.88 \times 10^{10}$ m
**B** $7.82 \times 10^{11}$ m
**C** $1.79 \times 10^{12}$ m
**D** $6.16 \times 10^{12}$ m

9 Penyataan yang manakah menerangkan satelit geopegun dengan **betul**?
*Which statement describes the geostationary satellite* **correctly***?*

**A** Banyak digunakan dalam pengimejan Bumi.
*Widely used in Earth imaging.*
**B** Arah gerakan tidak sama dengan arah putaran Bumi.
*Direction of motion is not the same as the direction of the Earth's rotation.*
**C** Tempoh orbit yang lebih lama berbanding dengan tempoh orbit Bumi.
*The orbital period is longer than the Earth's orbital period.*
**D** Sentiasa berada di atas kedudukan geografi yang sama di permukaan Bumi.
*Always above the same geographical location on the surface of the Earth.*

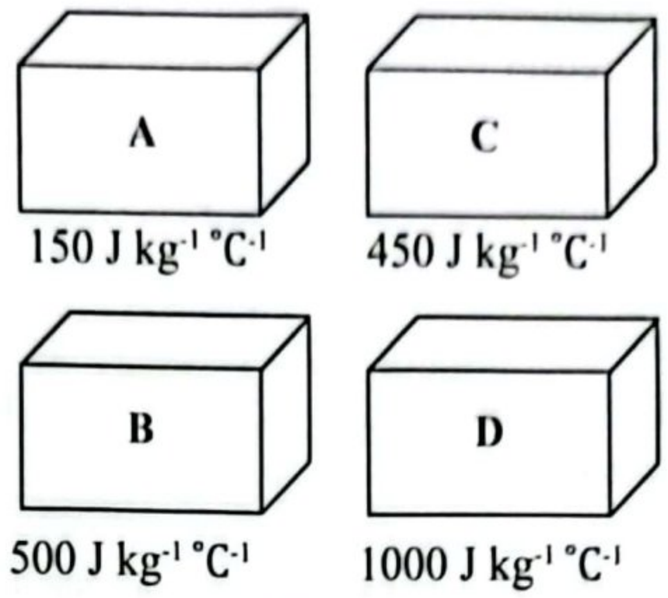
10 Rajah 2 menunjukkan dua blok logam P dan Q. Antara penyataan berikut, manakah yang **benar** mengenai situasi tersebut?
*Diagram* 2 *shows two metal blocks* P *and* Q. *Which of the following statements is* **true** *about the situation?*




Rajah 2
*Diagram* 2

**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 P ke Q sahaja.
*Energy is transferred from* P *to* Q *only.*
**D** Kadar pemindahan haba lebih tinggi dari P ke Q.
*The rate of heat transfer is higher from* P *to* Q.

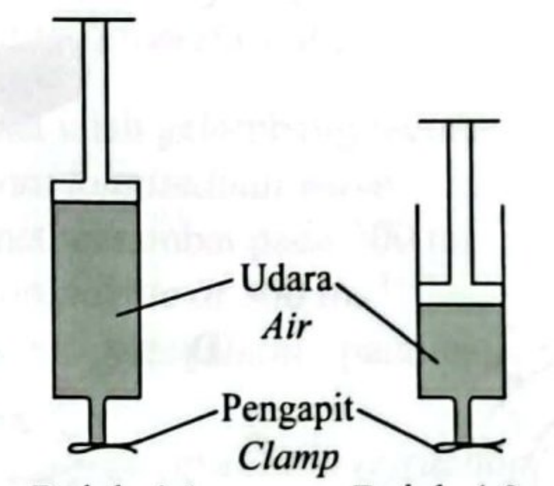
**11** Rajah 3 menunjukkan empat blok logam yang mempunyai jisim yang sama dengan muatan haba tentu yang berbeza. Sejumlah haba yang sama dibekalkan kepada setiap blok.
*Diagram* 3 *shows four metal blocks having the same mass with different specific heat capacities. The same amount of heat is supplied to each block.*




Rajah 3
*Diagram* 3

Antara blok logam **A**, **B**, **C** dan **D**, manakah akan menunjukkan bacaan suhu yang paling tinggi?
*Which metal block* **A**, **B**, **C** *and* **D**, *will show the highest temperature reading?*

**12** Rajah 4.1 menunjukkan sebuah picagari dengan udara terperangkap.
Rajah 4.2 menunjukkan keadaan picagari itu apabila ombohnya ditekan ke bawah.
*Diagram* 4.1 *shows a syringe with air trapped.*
*Diagram* 4.2 *shows the syringe after the piston was pushed down slowly.*

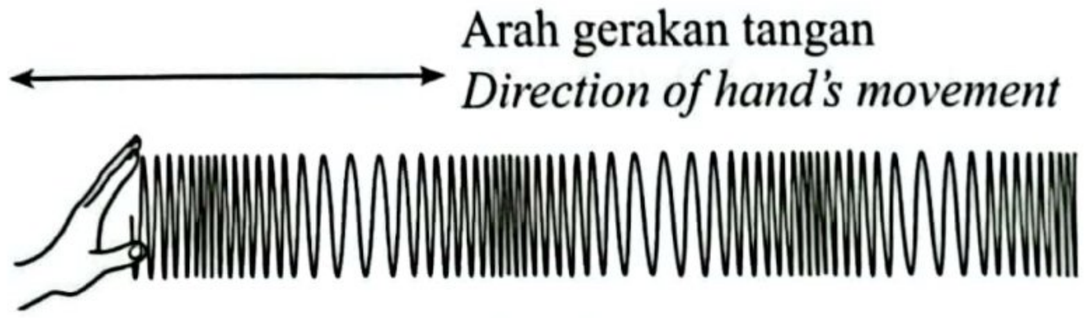



Rajah 4.1 Rajah 4.2
*Diagram* 4.1 *Diagram* 4.2

Antara berikut, yang manakah **betul** mengenai situasi zarah-zarah udara dalam Rajah 4.2 berbanding dengan Rajah 4.1?
*Which comparison is* **correct** *between the situation of air particles in Diagram* 4.2 *compared to Diagram* 4.1*?*

| | **Halaju zarah** *Velocity of particle* | **Kadar perlanggaran zarah dengan dinding picagari** *Rate of collision of particle with the syringe wall* |
|---|---|---|
| **A** | Bertambah *Increases* | Tidak berubah *No change* |
| **B** | Bertambah *Increases* | Berkurang *Decreases* |
| **C** | Berkurang *Decreases* | Bertambah *Increases* |
| **D** | Tidak berubah *No change* | Bertambah *Increases* |

**13** Rajah 5 menunjukkan spring slinki digerakkan ke hadapan dan belakang pada satu hujungnya.
*Diagram 5 shows a slinky spring being moved forward and backward at one of its ends.*




Rajah 5
*Diagram 5*

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

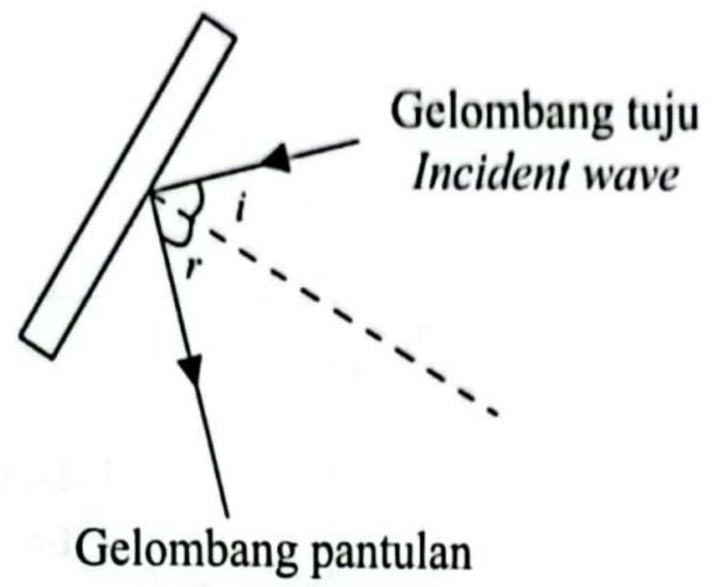
**A**

**B**

**C**

**D**

**14** Rajah 6 menunjukkan pantulan gelombang satah oleh pemantul satah.
*Diagram 6 shows the reflection of a plane wave by a plane reflector.*




Rajah 6
*Diagram 6*

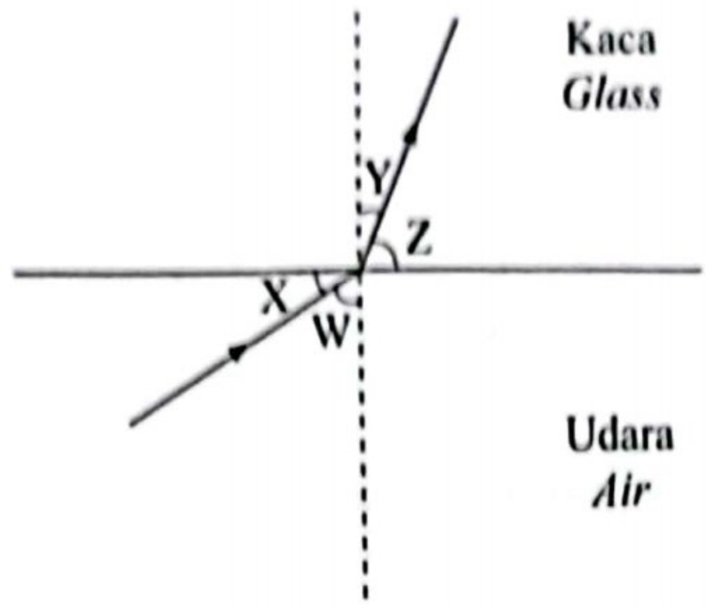
Antara penyataan berikut, manakah yang **tidak** benar?
*Which of the following statements is* **not** *true?*

**A** Sudut tuju, i adalah sama dengan sudut pantulan, r.
*Angle of incidence, i is equal to angle of reflection.*
**B** Arah perambatan gelombang pantulan berubah.
*The direction of propagation of reflected waves is changed.*
**C** Kelajuan gelombang pantulan sama dengan gelombang tuju.
*The speed of the reflected wave is the same as the incident waves.*
**D** Frekuensi gelombang pantulan adalah separuh daripada gelombang tuju.
*The frequency of the reflected wave is half of the incident wave.*

**15** Penyataan manakah **benar** tentang sifat-sifat gelombang elektromagnet?
*Which statement is* **true** *about the properties of electromagnetic waves?*

**A** Gelombang elektromagnet ialah gelombang membujur.
*Electromagnetic waves are longitudinal wave.*
**B** Gelombang elektromagnet merambat pada 300 $ms^{-1}$.
*Electromagnetic waves propagate at* 300 $ms^{-1}$.
**C** Gelombang elektromagnet mengalami pantulan, pembiasan, pembelauan dan interferens.
*Electromagnetic waves undergo reflection, refraction, diffraction and interference.*
**D** Gelombang elektromagnet terdiri daripada medan elektrik dan medan magnet yang berayun selari dengan arah perambatan gelombang.
*Electromagnetic waves consist of an oscillating electric field and magnetic field parallel to the direction of wave propagation.*

**16** Rajah 7 menunjukkan satu sinar cahaya merambat dari udara ke kaca.
*Diagram 7 shows a light ray propagates from air to glass.*




Rajah 7
*Diagram 7*

Apakah indeks biasan kaca itu?
*What is the refractive index of the glass?*

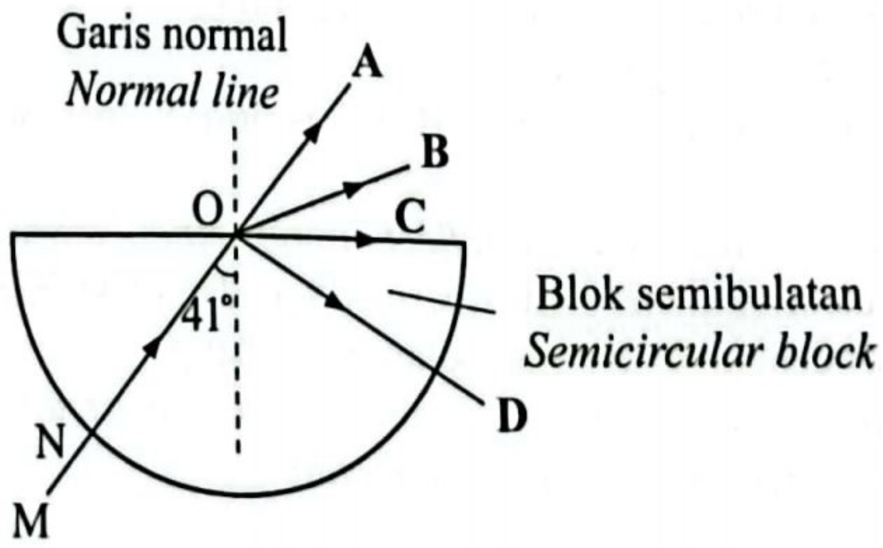
**A** $\frac{\sin Y}{\sin W}$

**B** $\frac{\sin W}{\sin Y}$

**C** $\frac{\sin Z}{\sin X}$

**D** $\frac{\sin X}{\sin Z}$

**17** Rajah 8 menunjukkan satu sinar cahaya MN ditujukan ke arah satu blok semibulatan yang lut sinar. Sudut genting bagi blok lut sinar itu ialah 41°.
Arah manakah sinar itu bergerak dari titik O?
*Diagram 8 shows a light ray* MN *directed to a transparent semicircular block. The critical angle of the transparent block is* 41°.
*Which direction does the ray move from point* O?

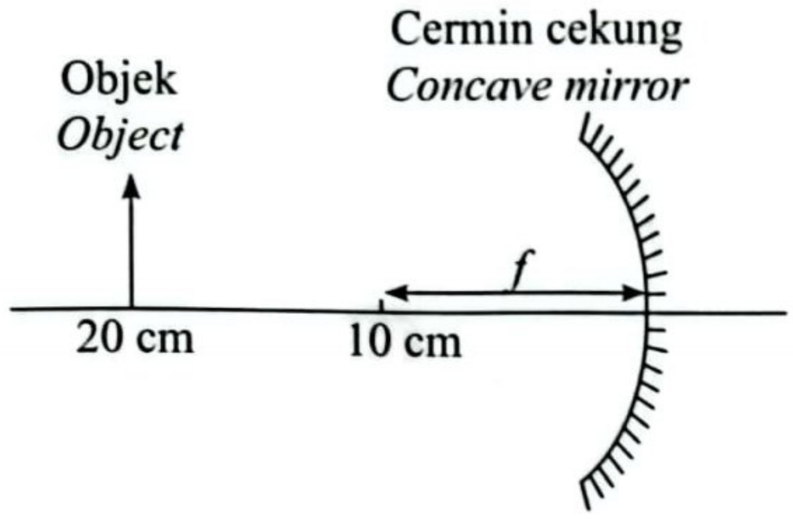



Rajah 8
*Diagram 8*

**18** Antara alat berikut, yang manakah mengaplikasikan pantulan dalam penuh?
*Which of the following instruments applies total internal reflection?*

**A** Kanta pembesar
*Magnifying glass*
**B** Periskop cermin
*Mirror periscope*
**C** Periskop prisma
*Prism periscope*
**D** Mikroskop majmuk
*Compound microscope*

**19** Rajah 9 menunjukkan suatu objek diletakkan 20 cm di hadapan suatu cermin cekung yang mempunyai panjang focus, *f*, 10 cm.
*Diagram 9 shows an object placed 20 cm in front of a concave mirror of focal length, f, 10 cm.*




Rajah 9
*Diagram 9*

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

**A** Nyata, sama saiz, songsang
*Real, same size, inverted*
**B** Nyata, dikecilkan, songsang
*Real, diminished, inverted*
**C** Maya, sama saiz, tegak
*Virtual, same size, upright*
**D** Maya, dikecilkan, tegak
*Virtual, diminished, upright*

**20** Rajah 10 menunjukkan sebuah motosikal sedang memecut di atas lebuh raya.
*Diagram* 10 *shows a motorcycle accelerating on the highway.*


Rajah 10
*Diagram* 10

Daya paduan yang bertindak ke atas motosikal tersebut ialah
*The resultant force acting on the motorcycle is*

**A** P
**B** $P + F_g$
**C** $P - F_g$

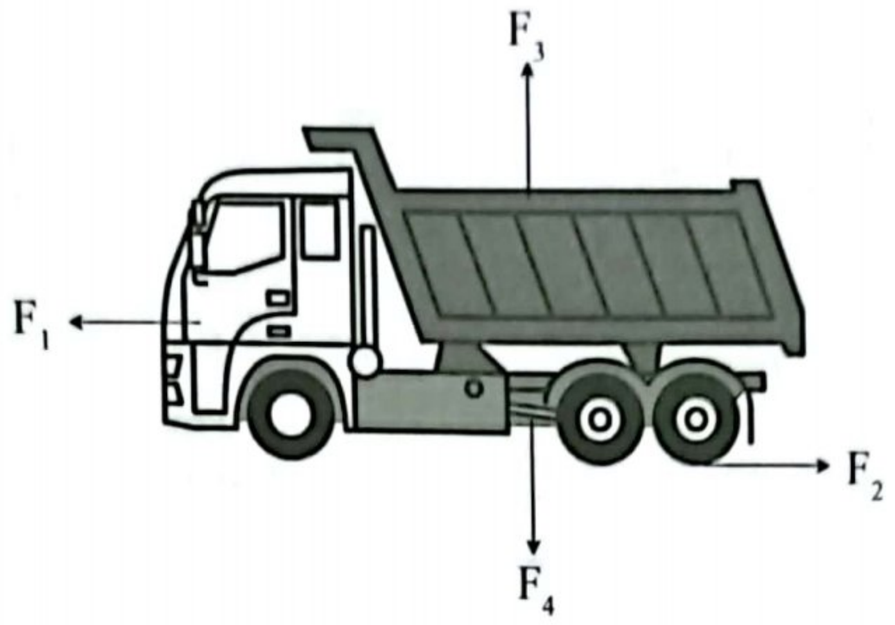
**21** Rajah 11 menunjukkan seorang pekerja sedang mengemop lantai.
*Diagram* 11 *shows a worker is mopping the floor.*


Rajah 11
*Diagram* 11

Berapakah magnitud komponen mengufuk, $F_x$, jika daya tolakan pekerja pada mop itu ialah 40 N?
*What is the magnitude of horizontal component, $F_x$, if the pushing force by the worker on the mop is 40 N?*

**A** 22.3 N
**B** 25.7 N
**C** 30.6 N
**D** 40.0 N

**22** Rajah 12 menunjukkan sebuah lori berada dalam keadaan pegun. $F_1$, $F_2$, $F_3$ dan $F_4$ ialah daya-daya yang bertindak ke atas lori tersebut.
*Diagram* 12 *shows a lorry is at rest.* $F_1$, $F_2$, $F_3$ *and* $F_4$ *are the forces acting on the lorry.*




Rajah 12
*Diagram* 12

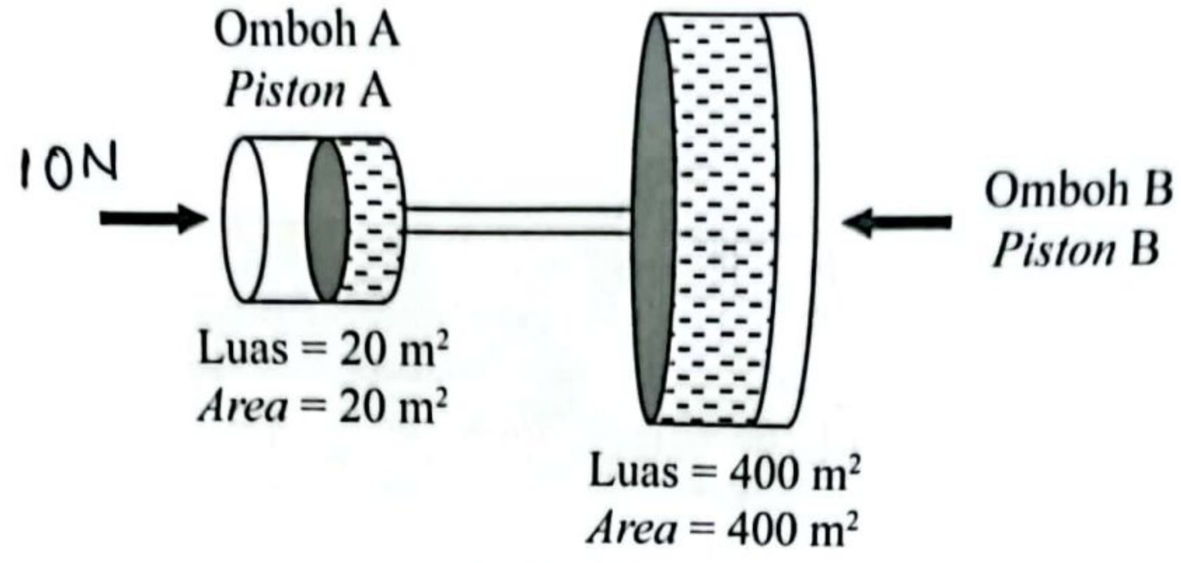
Persamaan manakah menunjukkan hubungan daya-daya yang betul apabila lori mula bergerak ke hadapan?
*Which equation shows the correct relationship of forces when the lorry starts to move forward?*

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

**23** Ketinggian turus merkuri dalam sebuah barometer akan berkurang jika
*The height of a mercury column in a barometer will decrease if*

**A** tiub kaca dicondongkan
*the glass tube is tilted*
**B** tiub kaca dinaikkan ke atas
*the glass tube is lifted up*
**C** tekanan atmosfera berkurang
*the atmospheric pressure decreases*
**D** tiub kaca diturunkan ke dalam bekas
*the glass tube is lowered into the container*

**24** Rajah 13 menunjukkan sistem hidraulik ringkas.
*Diagram* 13 *shows a simple hydraulic system.*




Rajah 13
*Diagram* 13

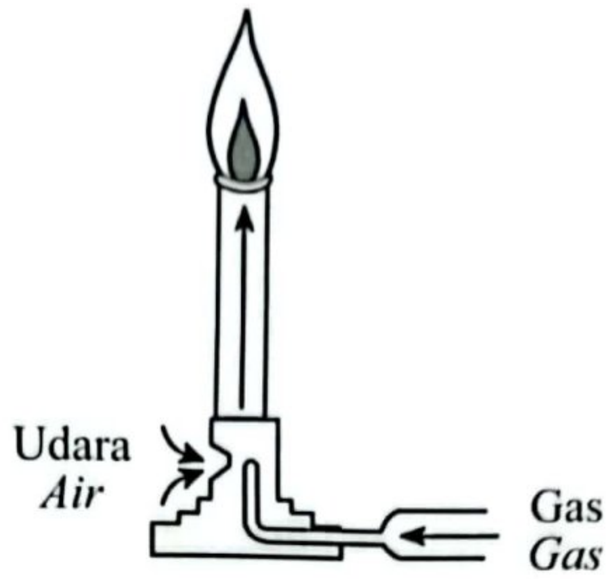
Berapakah tekanan yang dikenakan ke atas omboh B?
*What is the pressure exerted on piston* B*?*

**A** 0.5 Pa
**B** 5.0 Pa
**C** 240 Pa
**D** 480 Pa

**25** Sebiji bola besi berjisim 0.5 kg tenggelam sepenuhnya di dalam air. Berapakah isi padu bola jika berat ketara ialah 3.5 N?
[Ketumpatan air = 1000 $kgm^{-3}$]
*A metal ball of mass* 0.5 kg *is completely immersed in water. What is the volume of the ball if the apparent weight is* 3.5 N*?*
[*Density of water* = 1000 $kgm^{-3}$]

**A** $1.43 \times 10^{-4}$ $m^3$
**B** $3.06 \times 10^{-4}$ $m^3$
**C** $1.50 \times 10^{-4}$ $m^3$
**D** $3.57 \times 10^{-4}$ $m^3$

**26** Rajah 14 menunjukkan sebuah penunu Bunsen di dalam makmal sekolah. Udara ditolak ke dalam penunu Bunsen disebabkan oleh tekanan di dalam yang lebih rendah.
*Diagram* 14 *shows a Bunsen burner in a school laboratory. Air is pushed into the Bunsen burner due to the lower pressure inside.*




Rajah 14
*Diagram* 14

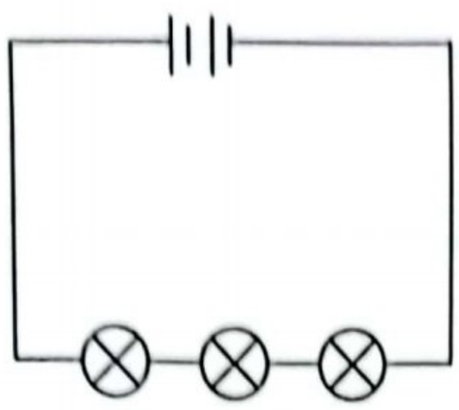
Prinsip yang manakah digunakan dalam alat tersebut?
*Which principle is applied in this device?*

**A** Prinsip Archimedes
*Archimedes' principle*
**B** Prinsip Bernoulli
*Bernoulli's principle*
**C** Prinsip Pascal
*Pascal's principle*
**D** Prinsip keabadian tenaga
*Principle of conservation of energy*

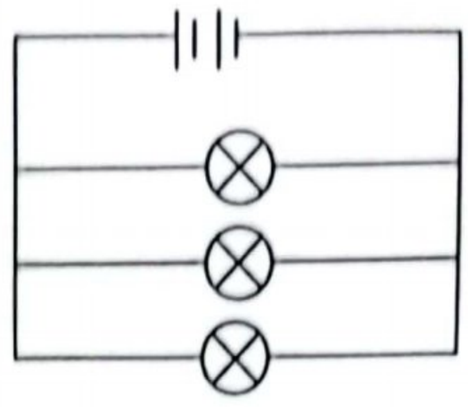
**27** Kerja yang dilakukan untuk menggerakkan satu coulomb cas di antara dua titik ialah maksud bagi
*Work done to move one coulomb of charge between two points is the meaning of*

**A** arus elektrik
*electric current*
**B** rintangan dalam
*internal resistance*
**C** beza keupayaan
*potential difference*
**D** daya gerak elektrik
*electromotive force*

**28** Rajah 15(a) menunjukkan sebuah litar sesiri dan Rajah 15(b) menunjukkan sebuah litar selari.
*Diagram* 15(a) *shows a series circuit and Diagram* 15(b) *shows a parallel circuit.*



Rajah 15(a)
*Diagram* 15(a)



Rajah 15(b)
*Diagram* 15(b)

Penyataan manakah yang **betul** mengenai litar-litar itu?
*Which statement is* **correct** *about the circuits?*

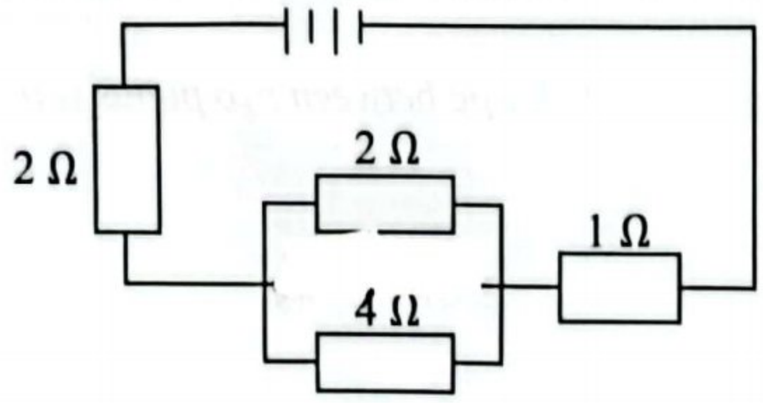
**A** Mentol dalam litar sesiri adalah lebih cerah daripada litar selari.
*The bulbs in the series circuit are brighter than the bulbs in the parallel circuit.*

**B** Rintangan berkesan bagi litar sesiri adalah lebih besar daripada litar selari.
*The effective resistance of the series circuit is larger than the effective resistance of the parallel circuit.*

**C** Jumlah voltan dalam litar sesiri adalah lebih tinggi daripada litar selari.
*The total voltage in the series circuit is higher than the total voltage in the parallel circuit.*

**D** Jumlah arus yang mengalir dalam litar sesiri adalah lebih besar daripada litar selari.
*The total current flow in the series circuit is greater than the total current flow in the parallel circuit.*

**29** Rajah 16 menunjukkan litar gabungan bagi empat perintang.
*Diagram* 16 *shows the combined circuit of four resistors.*



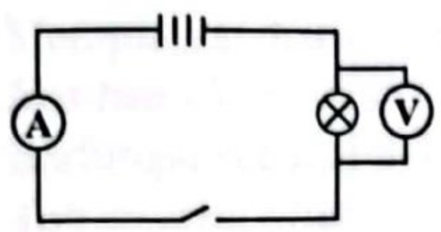

Rajah 16
*Diagram* 16

Hitung rintangan berkesan dalam litar itu.
*Calculate the effective resistance in the circuit.*

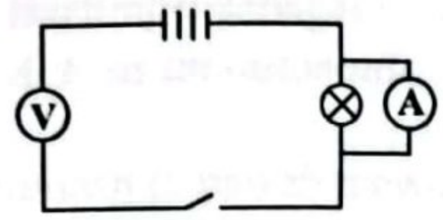
**A** 4.33 Ω
**B** 7.33 Ω
**C** 6.00 Ω
**D** 9.00 Ω

30 Litar yang manakah boleh digunakan untuk menentukan daya gerak elektrik bateri?
*Which circuit can be used to determine the electromotive force of a battery?*

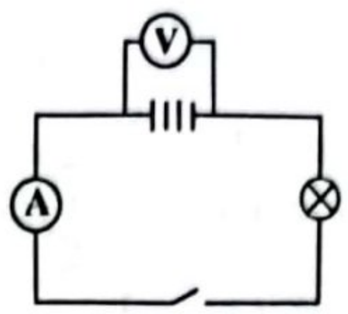
A



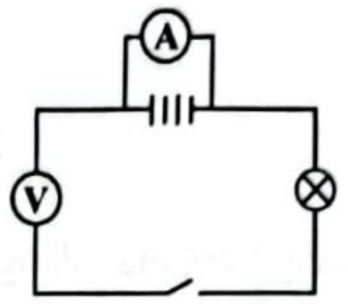

B



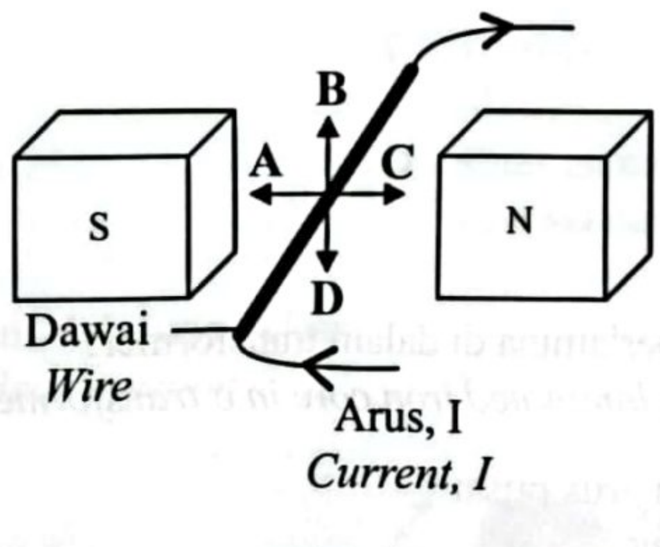

C




D



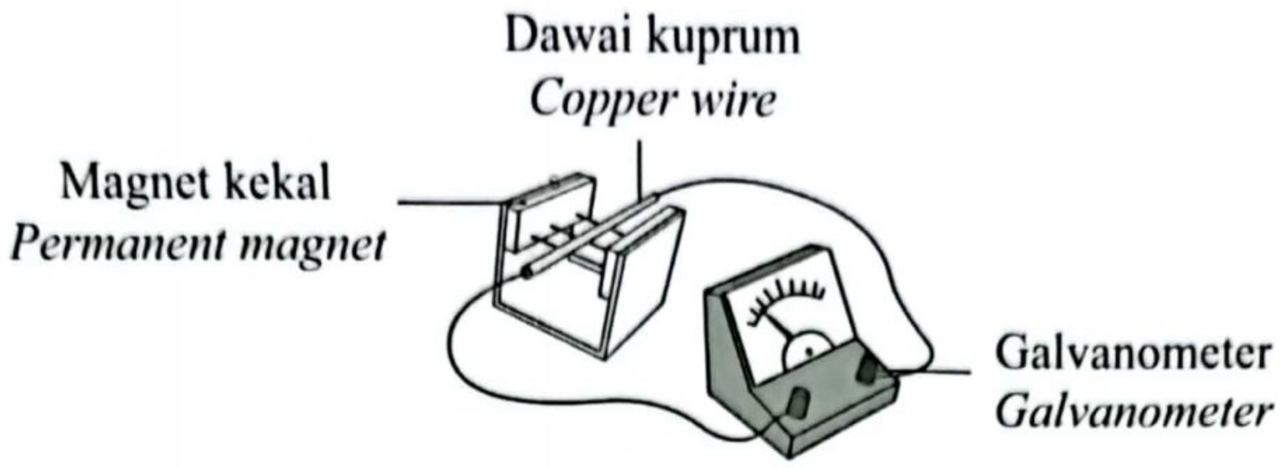

31 Rajah 17 menunjukkan satu dawai pembawa arus berada di antara kutub-kutub magnet kekal.
*Diagram* 17 *shows a current-carrying wire between the poles of permanent magnets.*




Rajah 17
*Diagram* 17

Antara arah **A**, **B**, **C** dan **D**, arah manakah daya bertindak pada dawai itu?
*At which direction* **A**, **B**, **C** *and* **D**, *is the direction of the force acting on the wire?*

**32** Rajah 18 menunjukkan eksperimen penghasilan arus aruhan dalam suatu dawai.
*Diagram* 18 *shows the experiment of producing an induced current in a wire.*




Rajah 18
*Diagram* 18

Manakah hukum yang berkaitan dengan eksperimen di atas?
*Which law relates to above experiment?*

**A** Hukum Ohm
*Ohm's law*
**B** Hukum Hooke
*Hooke's law*
**C** Hukum Lenz
*Lenz's law*
**D** Hukum Faraday
*Faraday's law*

**33** Apakah fungsi teras besi berlamina di dalam transformer?
*What is the function of the laminated iron core in a transformer?*

**A** Untuk mengurangkan arus pusar
*To reduce eddy current*
**B** Untuk mengurangkan rintangan gegelung
*To reduce the resistance of coil*
**C** Untuk mengurangkan kebocoran fluks magnet
*To reduce the leakage of magnetic flux*
**D** Untuk mengurangkan kekuatan medan magnet yang terhasil
*To reduce the strength of the magnetic field produced*

**34** Komponen elektronik manakah boleh menyimpan cas dan sebagai perata arus dalam litar rektifikasi?
*Which electronic component can store charge and smoothen the output current of a rectification circuit?*

**A** Diod
*Diode*
**B** Perintang
*Resistor*
**C** Kapasitor
*Capacitor*
**D** Termistor
*Thermistor*

35 Penyataan manakah yang **betul** mengenai transistor?
*Which statement is* **correct** *about a transistor?*

**A** Mempunyai dua elektrod
*Has two electrodes*
**B** Berfungsi sebagai pelurus
*Acts as a rectifier*
**C** Mempunyai bekalan tenaganya sendiri
*Has its own energy supply*
**D** Berfungsi sebagai suis automatik
*Acts as an automatic switch*

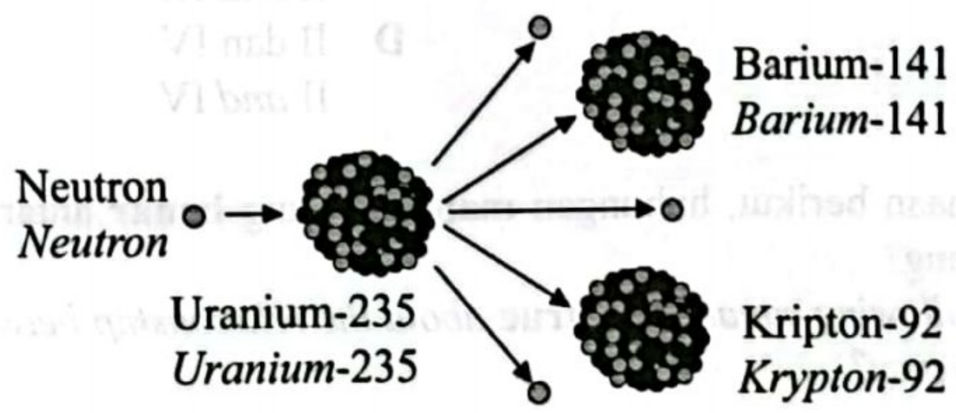
36 Persamaan di bawah mewakili reputan P.
*The equation below shows decay of* P.

$$^{210}_{84}\mathrm{P} \rightarrow {}^{206}_{82}\mathrm{Q} + \mathrm{R}$$

R ialah
R *is*

**A** zarah alfa
*alpha particle*
**B** zarah beta
*beta particle*
**C** sinar-X
*X-ray*
**D** sinar gama
*gamma ray*

37 Rajah 19 menunjukkan tindak balas nuklear.
*Diagram* 19 *shows a nuclear reaction.*




Rajah 19
*Diagram* 19

Tindak balas di atas berlaku apabila
*The reaction above occurs when*

**A** tekanan sangat tinggi
*the pressure is very high*
**B** suhu sangat tinggi
*the temperature is very high*
**C** jisim sampel bahan radioaktif melebihi jisim genting
*the radioactive sample exceeds its critical mass*
**D** nukleus berat dihentam oleh neutron yang perlahan
*the heavy nucleus is bombarded by a slow neutron*

38 Manakah yang **tidak benar** mengenai foton?
*Which is* **not true** *about the photons?*

**A** Semakin pendek panjang gelombang cahaya, semakin rendah tenaga foton.
*The shorter the wavelength of light, the lower the photon energy.*

**B** Semakin tinggi frekuensi gelombang cahaya, semakin tinggi kuantum tenaga.
*The higher the frequency of light waves, the higher the quantum of energy.*

**C** Tenaga foton adalah berkadar terus dengan frekuensi gelombang cahaya.
*Photon energy is directly proportional to the frequency of light waves.*

**D** Foton ialah paket tenaga yang boleh dipindahkan ke dalam kuantum tenaga.
*Photons are packet of energies transferred in quantum of energy.*

39 Penyataan manakah yang **betul** tentang kesan fotoelektrik?
*Which statement is* **correct** *about photoelectric effect?*

I Semakin tinggi frekuensi cahaya, semakin tinggi tenaga kinetik fotoelektron.
*The higher the frequency of light, the higher the kinetic energy of photolectrons.*

II Semakin tinggi keamatan cahaya, semakin tinggi tenaga kinetik fotoelektron.
*The higher the intensity of light, the higher the kinetic energy of photoelectrons.*

III Kesan fotoelektrik berlaku apabila frekuensi cahaya lebih tinggi daripada frekuensi ambang.
*Photoelectric effect occurs when the frequency of light is higher than the threshold frequency.*

IV Kesan fotoelektrik tidak bergantung pada jenis logam yang digunakan.
*Photoelectric effect does not depend on the type of the metal used.*

**A** I dan II
I *and* II

**B** I dan III
I *and* III

**C** II dan III
II *and* III

**D** II dan IV
II *and* IV

40 Antara persamaan berikut, hubungan manakah yang **benar** antara fungsi kerja dengan frekuensi ambang?
*Which of the following equations is* **true** *about the relationship between work function and threshold frequency?*

**A** $W = \frac{1}{f_o}$

**B** $W = hf_o$

**C** $W = mc$

**D** $W = \frac{h}{f_o}$



**KERTAS PEPERIKSAAN TAMAT**
***END OF EXAM PAPER***