NAMA : .....

TINGKATAN : .....

LOGO SEKOLAH

NAMA SEKOLAH
ALAMAT SEKOLAH

PEPERIKSAAN PERCUBAAN SPM 2024
FIZIK SET 1
Kertas 1 **4531/1**
Sept 2024
1 ¼ jam **Satu jam lima belas minit**

JANGAN BUKA KERTAS PEPERIKSAAN INI SEHINGGA DIBERITAHU

1. *Kertas soalan ini adalah dalam dwibahasa*

MAKLUMAT UNTUK CALON
INFORMATION FOR CANDIDATES

1. Kertas soalan ini mengandungi **40** soalan.
   This question paper consists of **40** *questions.*
2. Jawab **semua** soalan.
   Answer ***all*** *questions.*
3. Jawab setiap soalan dengan menghitamkan ruangan yang betul pada kertas jawapan.
   Answer each question by blackening the correct space on the answer sheet.
4. Hitamkan **satu** ruangan sahaja bagi setiap soalan.
   Blacken only ***one*** *space for each question.*
5. Sekiranya anda hendak menukar jawapan, padamkan tanda yang telah dibuat. Kemudian hitamkan jawapan yang baru.
   If you wish to change your answer, erase the blackened mark that you have made. Then blacken the space for the new answer.
6. Rajah yang mengiringi soalan tidak dilukiskan mengikut skala kecuali dinyatakan.
   The diagram in the question provided are not drawn to scale unless stated.
7. Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogramkan.
   You may use a non-programmable scientific calculator.
8. Satu senarai rumus disediakan di halaman 2 dan 3.
   A list of formulae is provided in page 2*and* 3.

Kertas peperiksaan ini mengandungi **28** halaman bercetak

LIVEWORKSHEETS

Maklumat berikut mungkin berguna. 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 1

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

KEGRAVITIAN
GRAVITATION

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

HABA
HEAT

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

GELOMBANG
WAVES

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

CAHAYA DAN OPTIK
LIGHT AND OPTICS

1. $n = \frac{c}{v}$
2. $n = \frac{\sin i}{\sin r}$
3. $n = \frac{1}{\sin c}$
4. $n = \frac{H}{h}$
5. $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$
6. $n_1 \sin\Theta_1 = n_2 \sin\Theta_2$
7. Pembesaran linear, $m = \frac{v}{u}$
   Linear magnification

LIVEWORKSHEETS

DAYA DAN GERAKAN II
FORCE AND MOTION II

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

TEKANAN
PRESSURE

1. $P = \frac{F}{A}$
2. $P = h\rho g$
3. $\rho = \frac{m}{V}$

ELEKTRIK
ELECTRICITY

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

KEELEKTROMAGNETAN
ELECTROMAGNETISM

1. $\frac{Vs}{Vp} = \frac{Ns}{Np}$
2. $\eta = \frac{Kuasa\ output}{Kuasa\ input} x\ 100\%$

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

ELEKTRONIK
ELECTRONICS

1. Tenaga keupayaan elektrik, $E = eV$
   Electrical potential energy
2. Tenaga kinetik maksimum, $E = \frac{1}{2}mv^2$
   Maximum kinetic energy
3. $\beta = \frac{I_C}{I_B}$

FIZIK NUKLEAR
NUCLEAR PHYSICS

1. $N = (\frac{1}{2})^8 N_0$
2. $E = mc^2$
3. $c = 3.00 \times 10^8\ ms^{-1}$
4. 1 u.j.a. = 1.66×10^{-27} kg
   1 a.m.u.

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. $w = hf_0$
9. $g = 9.81\ ms^{-2}$ @ $9.81\ Nkg^{-1}$
10. $G = 6.67 \times 10^{-11}\ Nm^2 kg^{-2}$
11. $h = 6.63 \times 10^{-34}$ Js

LIVEWORKSHEETS

1 Rajah 1 menunjukkan spesifikasi bagi sebuah periuk pemanas rendah.
Diagram 1 shows the specification of a slow hot cooker.

Kuasa: 160 W
Power: 160 W

Rajah 1
Diagram 1

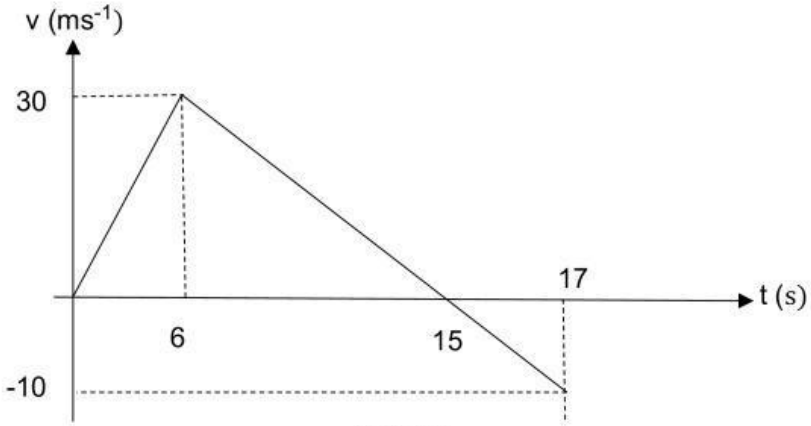
Apakah kuantiti fizik yang diwakili oleh kuasa?
What is the physical quantity represented by power?

A Kuantiti asas
Base quantity

B Kuantiti vektor
Vector quantity

C Kuantiti terbitan
Derived quantity

2 Rajah 2 menunjukkan graf halaju melawan masa.
Diagram 2 shows the velocity against time.



Rajah 2
Diagram 2

Carikan jumlah sesaran.
Find the total of displacement

A 215 m

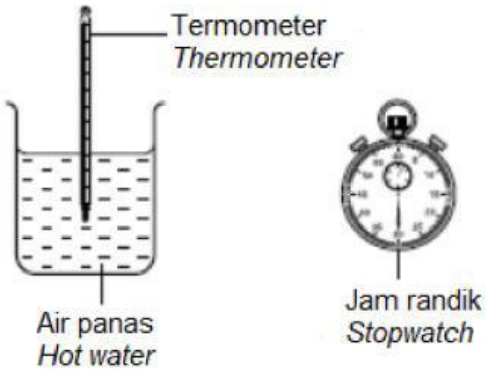
B 225 m

C 234 m

D 340 m

LIVEWORKSHEETS

3 Rajah 3 menunjukkan susunan untuk mengkaji hubungan antara suhu dengan masa semasa penyejukan air panas. Sebikar air panas dibiarkan menjadi sejuk.
Diagram 3 shows a set-up to investigate the relationship between temperature and time during the cooling of hot water. A beaker of hot water is left to cool down.



Rajah 3
Diagram 3

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

	Pemboleh ubah / *Variables*		
	Dimanipulasi *Manipulated*	Bergerak balas *Responding*	Dimalarkan *Constant*
A	Masa penyejukan *Cooling time*	Suhu air *Temperature of water*	Isipadu air *Volume of water*
B	Masa penyejukan *Cooling time*	Isipadu air *Volume of water*	Suhu air *Temperature of water*
C	Isipadu air *Volume of water*	Masa penyejukan *Cooling time*	Suhu air *Temperature of water*
D	Suhu air *Temperature of water*	Isipadu air *Volume of water*	Masa penyejukan *Cooling time*

4 Sebiji nukleus atom yang berada dalam keadaan rehat memancarkan zarah α dengan jisim 4 u. Kelajuan zarah α didapati adalah 5.6×10^6 ms^{-1}. Kirakan kelajuan nukleus anak, dengan jisim 218 u.
An atomic nucleus at rest emits an α-particle of mass 4 u. *The speed of the α-particle is found to be* 5.6×10^6 ms^{-1}. *Calculate the speed with which the daughter nucleus, of mass* 218 u.

A 3.052×10^2 ms^{-1}

B 1.028×10^4 ms^{-1}

C 1.028×10^5 ms^{-1}

D 3.052×10^8 ms^{-1}

LIVEWORKSHEETS

5 Beberapa pemain tenis boleh melakukan servis bola pada kelajuan 55 ms^{-1} Bola tenis mempunyai jisim 60 g. Dalam satu eksperimen, didapati bahawa bola bersentuhan dengan raket selama 25 ms semasa servis. Kirakan daya purata yang dikenakan oleh raket ke atas bola

Some tennis players can serve the ball at a speed of 55 ms^{-1}, *The tennis ball has a mass of* 60 g. *In an experiment, it is determined that the ball is in contact with the racket for* 25 *ms during the serve. Calculate the average force exerted by the racket on the ball.*

A 1.32 N

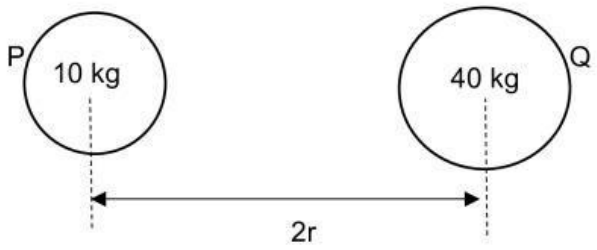
B 130 N

C 132 N

D 1320 N

6 Daya graviti antara dua jasad, planet P dan Q bergantung kepada jisim jasad tersebut, 10 kg dan 40 kg serta jarak antara mereka, 2r.

Gravitational force between two bodies, planet P *and Q depends on the mass of the bodies,* 10 kg *and* 40 kg as *well as the distance between them*, 2r.



Rajah 4
Diagram 4

Berdasarkan Rajah 4, kirakan daya graviti
Based on Diagram 4, *calculate gravitational force*

A $\frac{50G}{4r^2}$

B $\frac{100\ G}{r^2}$

C $\frac{200\ G}{r^2}$

D $\frac{400\ G}{r^2}$

LIVEWORKSHEETS

7 Sebuah satelit mengorbit mengelilingi Bumi dengan tempoh malar T. Jika R adalah jejari Bumi dan g adalah pecutan graviti di permukaan Bumi, apakah ungkapan bagi jejari orbit?
A satellite orbits around the Earth with a constant period T. *If R is the radius of the Earth and* g *is the gravitational acceleration on the surface of the Earth, which expression is the radius of the orbit?*

A $\frac{gT^2}{4\pi^2}$

B $\left(\frac{4\pi^2}{gR^2T^2}\right)^{1/2}$

C $\left(\frac{gR^2T^2}{4\pi^2}\right)^{1/3}$

D $\left(\frac{gR^2T^2}{4\pi^2}\right)^{1/2}$

8 Halaju lepas pada ketinggian 0.2R dari sebuah planet yang mempunyai jejari R adalah 10 kms^{-1} . Apakah halaju lepas dari permukaan planet tersebut?
The escape velocity at the height of 0.2*R from a planet of radius R is* 10 kms^{-1}. *What is the escape velocity from the surface of the planet?*

A 10 kms^{-1}

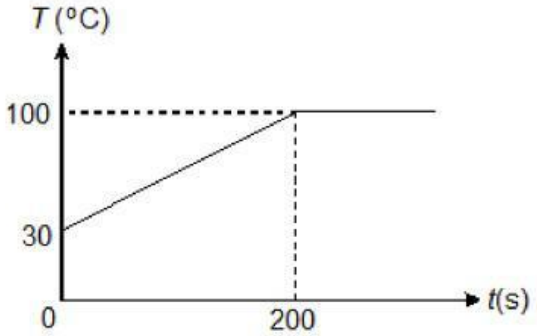
B 11 kms^{-1}

C 12 kms^{-1}

D 13 kms^{-1}

LIVEWORKSHEETS

9 Sebuah cerek elektrik yang mempunyai kadar kuasa 240 V, berkuasa P digunakan untuk mendidih 2 kg air. Rajah 5 menunjukkan graf suhu, T melawan masa,t bagi proses tersebut
An electric kettle with power rating 240V, *power* P *is used to boil* 2 kg *of water. Diagram* 5 *shows the graph of temperature,* T *against time,* t *of the process*



Rajah 5
Diagram 5

Hitung kuasa cerek elektrik,P yang diperlukan untuk mendidihkan 2 kg air.
*Calculate the power of electric kettle,*P *needed to boil* 2 kg *of water*
(Muatan haba tentu air/ *Specific heat capacity* = 4200 J kg^{-1}°C^{-1})

A 1260 W

B 2940 W

C 4200 W

D 5460 W

10

Material *Bahan*	Tenaga haba untuk meleburkan 50g ais pada 0°C (kJ) *Heat energy to melt* 50g *of ice at* 0°C (kJ)	Tenaga haba untuk mendidihkan 50g air pada 100°C (kJ) *Heat energy to boil* 50g *of water at* 100°C (kJ)
Ice / water *Ais / air*	16.5	113

Jadual 6
Table 6

Berdasarkan Jadual 6, berapa kali ganda tenaga yang diperlukan untuk mendidihkan jisim air berbanding peleburan ais pada jisim yang sama?
Based on Table 6, *determine how many times more energy is required to boil a mass of water than to melt the same mass of ice?*

A 0.15

B 6.8

C 56.5

D 96.5

LIVEWORKSHEETS

11 Isipadu satu gelembung udara ialah 6 mm^3 ketika berada pada kedalaman H di bawah permukaan air. Diberi isipadu gelembung udara itu ialah 15 mm^3 apabila berada pada kedalaman 2 m, cari nilai H.
The volume of an air bubble is 6 mm^3 *when it is at a depth of H m below the water surface. Given that its volume is* 15 mm^3 *when it is at a depth of* 2 *m, find the value of* H.

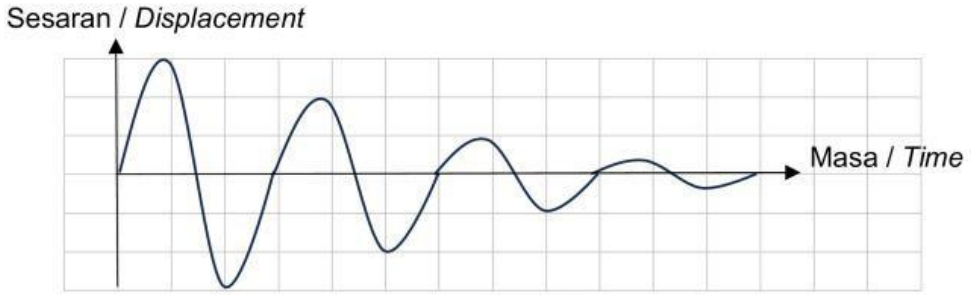
A 20 cm

B 20 m

C 90 cm

D 24 m

12 Rajah 7 menunjukkan graf sesaran melawan masa dalam pelembapan. Mengapa amplitud dalam ayunan berkurang?
Diagram 7 shows a graph of displacement against time for a system experiencing damping, why does the amplitude of oscillation decrease?



Rajah 7
Diagram 7

A Kerana kelajuan berkurang
Because decrease in speed

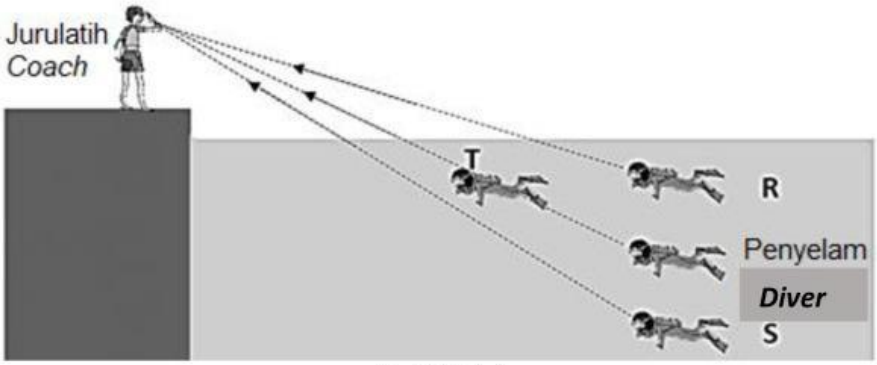
B Kerana panjang gelombang berkurang
Because decrease in wavelength

C Kerana frekuensi berkurang
Because decrease in frequency

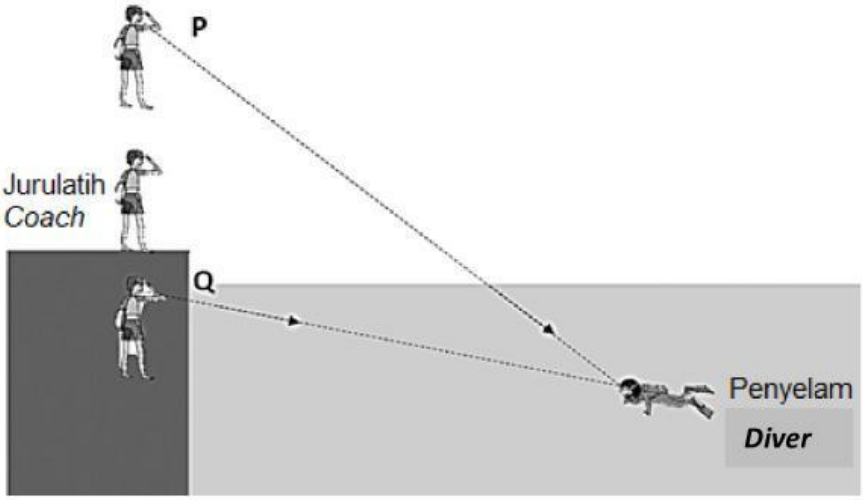
D Kerana tenaga berkurang
Because decrease in energy

LIVEWORKSHEETS

13



Rajah 8(a)
Diagram 8(a)



Rajah 8(b)
Diagram 8(b)

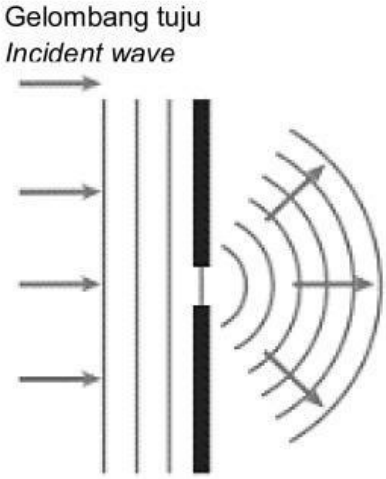
Berdasarkan Rajah 8(a), kedudukan imej penyelam yang mungkin ialah **R, S** atau **T**.
Rajah 8(b) menunjukkan kedudukan imej jurulatih yang mungkin ialah **P** atau **Q**.
Based on diagram 8(a)*, the possible position diver's image is* **R, S** *or* **T.**
Diagram 8(b) *shows possible position of coach's image is* **P** *or* **Q**

Pilih gabungan kedudukan kedua-dua imej yang betul.
Choose the correct combination of both image position

	Rajah 8(a) *Diagram* 8(a)	Rajah 8 (b) *Diagram* 8(b)
A	**T**	**P**
B	**R**	**P**
C	**T**	**Q**
D	**S**	**Q**

LIVEWORKSHEETS

14 Rajah 9 menunjukkan gelombang air merambat melalui suatu celah yang kecil
Diagram 9 shows a water wave propagating through a small gap.



Rajah 9
Diagram 9

Ciri gelombang terbelau manakah yang betul?
Which property of the diffracted wave is correct?

A Kelajuan berkurang
The speed decrease

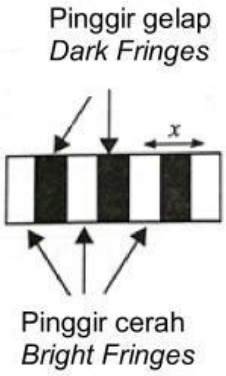
B Amplitud berkurang
The amplitude decrease

C Frekuensi bertambah
The frequency increase

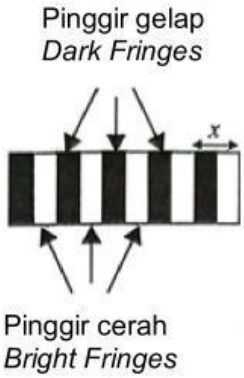
D Panjang gelombang berkurang
The wavelength decrease

LIVEWORKSHEETS

15 Rajah 10(a) dan 10(b) menunjukkan pinggir yang terhasil pada skrin bagi eksperimen dwicelah Young untuk menentukan panjang gelombang suatu cahaya monokromatik.
Diagrams 10 (a) and 10 (b) show the fringes formed on the screen from Young's double-slit experiment for each situation to determine the wavelength of a monochromatic light.



Rajah 10 (*a*)
Diagram 10 (*a*)



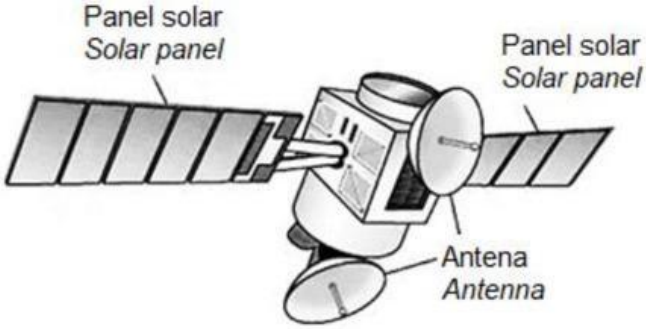
Rajah 10 (*b*)
Diagram 10 (*b*)

Kombinasi manakah menunjukkan hubungan yang **betul** antara jarak dua pinggir cerah berturutan,*x* dengan warna cahaya monokromatik yang digunakan dalam setiap rajah?
*Which combination is **correct** relationship of the distance between two successive bright fringes, x and colour monochromatic light use in each diagram?*

	Rajah 10 (a) *Diagram* 10 (a)	Rajah 10 (b) *Diagram* 10 (b)
A	Ungu *Purple*	Ungu *Purple*
B	Ungu *Purple*	Merah *Red*
C	Merah *Red*	Ungu *Purple*
D	Merah *Red*	Merah *Red*

LIVEWORKSHEETS

16 Rajah 11 menunjukkan sebuah satelit komunikasi.
Diagram 11 *shows a communication satellite.*



Rajah 11
Diagram 11

Apakah jenis gelombang yang digunakan?
What type of wave is used?

A Gelombang radio
Radio waves
B Gelombang mikro
Microwaves
C Inframerah
Infrared
D Sinar UV
UV Light

17 Rajah 12 menunjukkan sebiji berlian, sejenis mineral yang terdiri daripada karbon tulen.
Diagram 12 *shows a diamond, a mineral composed of pure carbon.*

Rajah 12
Diagram 12

Mengapa berlian berkilau dan bersinar?
Why sparkle of diamonds makes them unsurpassed as gems?

A Kerana berlian adalah unsur yang paling keras
Because diamond is the hardest element
B Kerana berlian mempunyai indeks biasan yang rendah
Because diamond has low refractive index
C Kerana berlian mempunyai sudut pantulan yang lebih besar
Because diamond has bigger reflected angle
D Kerana berlian mempunyai sudut genting yang lebih rendah
Because diamond has lower critical angle

LIVEWORKSHEETS

18

Kanta *Lens*	:	Cembung *Convex*
Panjang fokus *Focal length*	:	**P**
Jarak objek *Object distance*	:	10 cm
Ciri-ciri imej *Characteristic of images*	:	**Q**, **R** dan **T** **Q**, **R** *and* **T**
Imej terbentuk di *Image formed at*	:	Infiniti *Infinity*

Jadual 13
Table 13

Berdasarkan Jadual 13, pilih maklumat **P, Q, R** dan **T** yang betul.
Based on Table 13, *choose correct information of* **P, Q, R** *and* **T.**

	P	Q	R	T
A	5 cm	Maya *Virtual*	Tegak *Upright*	Diperbesarkan *Magnified*
B	5 cm	Maya *Virtual*	Tegak *Upright*	Dikecilkan *Diminished*
C	10 cm	Maya *Virtual*	Tegak *Upright*	Diperbesarkan *Magnified*
D	10 cm	Maya *Virtual*	Tegak *Upright*	Dikecilkan *Diminished*

19 Satu objek diletakkan di hadapan kanta cembung pada kedudukan 30 cm dari pusat optikal. Jika panjang fokus kanta cembung ialah 15 cm, apakah nisbah pembesaran imej akhir kepada objek?
An object is put in front of a convex lens at a position of 30 cm from the optical centre. If the focal length of convex lens is 15 *cm, what is the magnification ratio of the final image to object?*

A 1 : 1

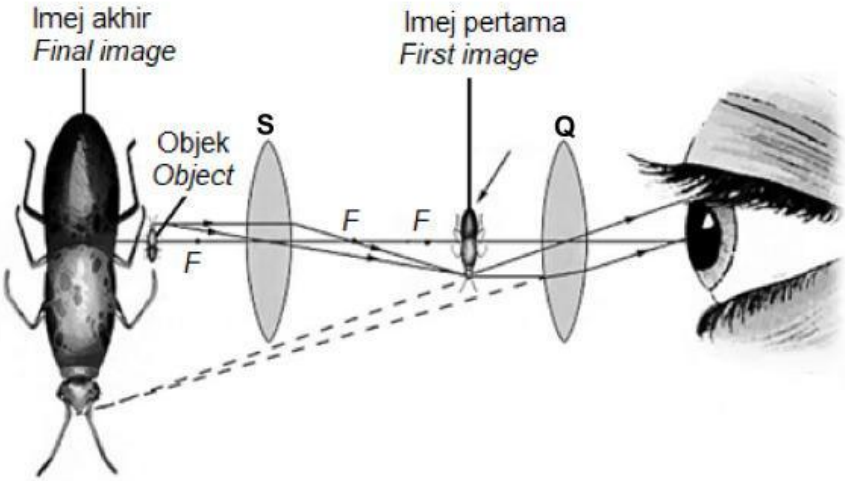
B 1 : 2

C 2 : 1

D 3 : 2

LIVEWORKSHEETS

20 Rajah 14 menunjukkan kedudukan imej pertama dan imej terakhir satu objek dengan menggunakan mikroskop majmuk.
Diagram 14 *shows the position of first image and the final image of an object by using compound microscope*.



Rajah 14
Diagram 14

Pilih pernyataan yang **palsu**.
*Choose **false** statement.*

A Kedua-dua kanta adalah kanta yang berkuasa tinggi
Both lenses are high power lenses

B Kedudukan objek adalah di antara F dan 2F kanta S
Object distance is at between F and 2F of lens S

C Jarak imej pertama adalah kurang daripada panjang fokus kanta Q
The distance of first image is less than focal length of lens Q

D Panjang fokus kanta S lebih tinggi daripada kanta Q
Focal length of lens S is higher than lens Q

LIVEWORKSHEETS