# JEE-Main-24-01-2026 (Memory Based)
# [MORNING SHIFT]
# Physics

**Question: A spring of stiffness k = 15 N/m is cut into a ratio of 3 : 1. Find the spring constant of smaller length spring thus formed.**

**Options:**

(a) 15 N/m

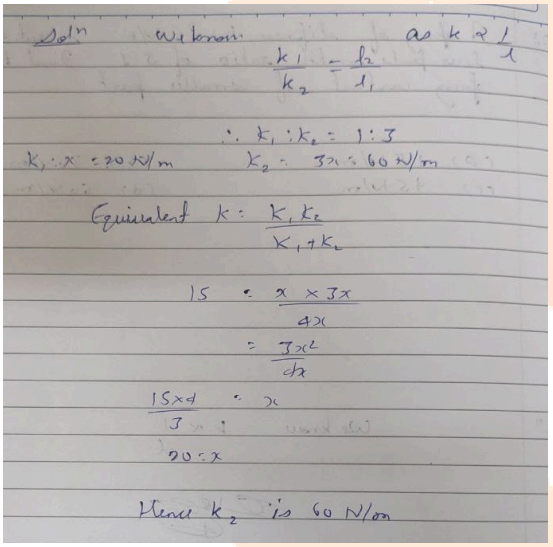
(b) 30 N/m

(c) 45 N/m

(d) 60 N/m

**Answer: (d)**

**Solution:**




**Question: EM waves and their source are given**

| | Column-I | | Column-II |
|---|---|---|---|
| **a)** | **X-rays** | **p)** | **Hot bodies and molecules** |
| **b)** | **Infrared Rays** | **q)** | **Oscillatory current in Atenas** |
| **c)** | **Microwaves** | **r)** | **Magnetron** |
| **d)** | **Radio waves** | **s)** | **Fast moving electrons striking a metal plate** |

**Options:**

(a) a-p, b-s, c-r, d-q

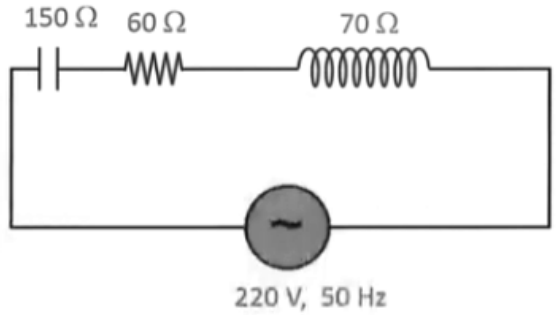
(b) a-s, b-p, c-r, d-q

(c) a-s, b-p, c-s, d-q

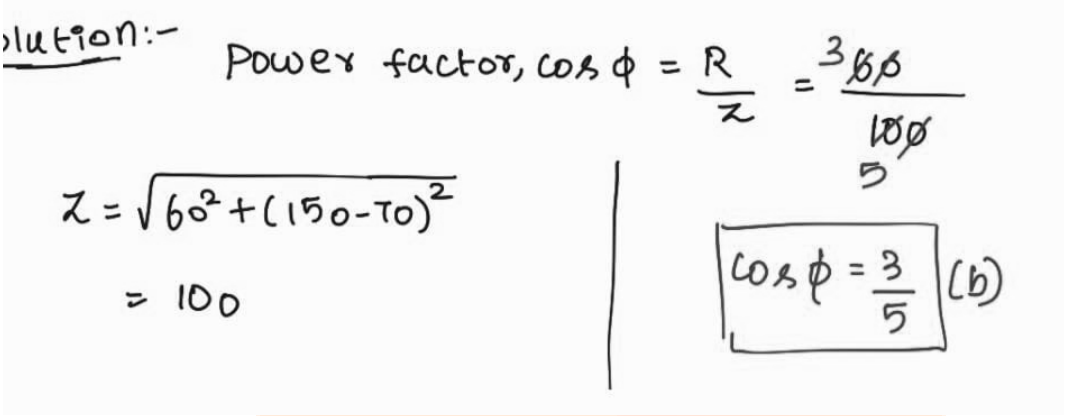
(d) a-s, b-r, c-p, d-q

**Answer: (b)**
**Solution:**

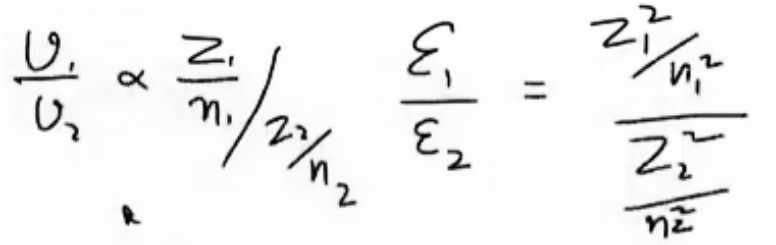
**Question: For the given as circuit, find the power factor.**



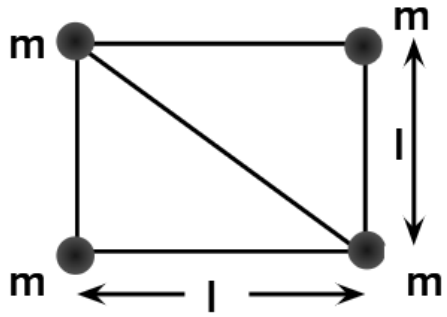

**Options:**
(a) 4/5
(b) 3/5
(c) 3/4
(d) 4/3
**Answer: (b)**
**Solution:**



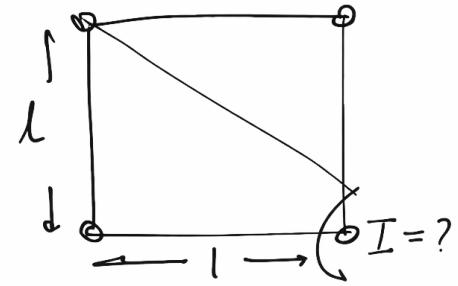

**Question: In H-like atom ratio of speed in two orbits is 3 : 2, then ratio of energy is**
**Options:**
(a) 2 : 3
(b) 9 : 4
(c) 2 : 1
(d) 5 : 3
**Answer: (b)**
**Solution:**



**Question: 4 particles each of mass m are present on the 4 radius of a sequence of length 'l'. Find the moment of inertia of the system about an axis passing through one of the vertices & perpendicular to the plane of the square.**

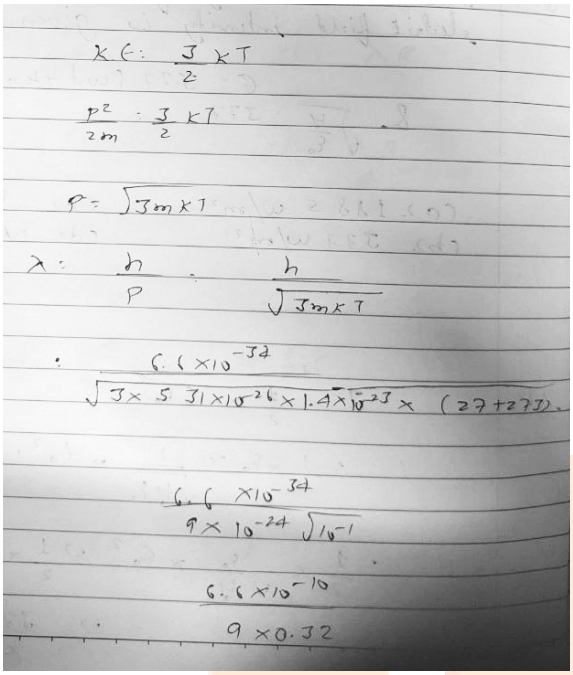



**Options:**
(a) $ml^2$
(b) $3ml^2$
(c) $4ml^2$
(d) $6ml^2$
**Answer: (c)**
**Solution:**

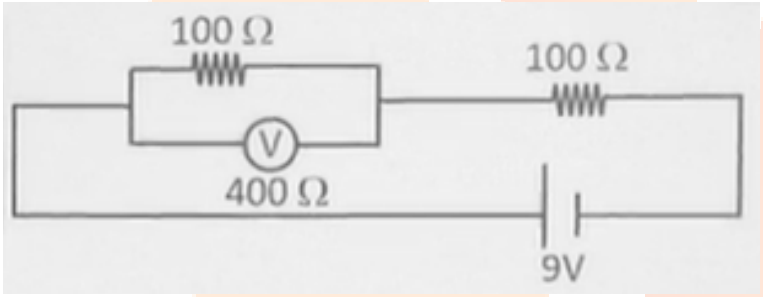



$$I = 0 + ml^2 + m(\sqrt{2}l)^2 + mnl^2$$
$$= 4ml^2$$

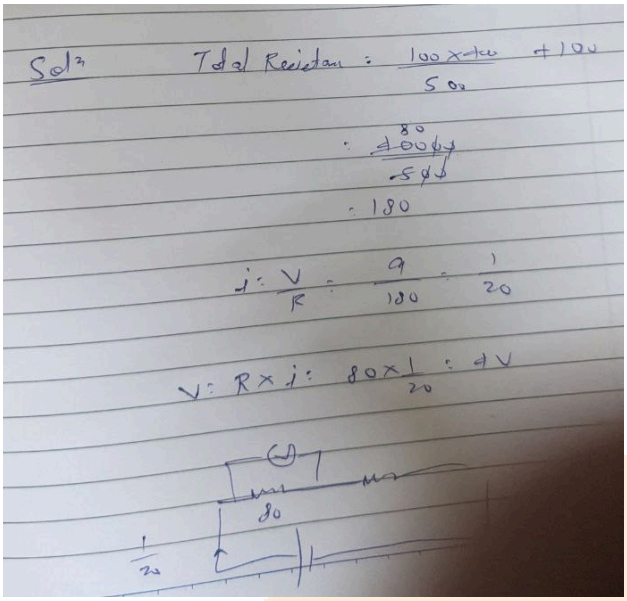
**Question: Find the de broglie wavelength for $O_2$ molecules. Who are maintained at a temperature of 27℃.**
**(Mass of $O_2 = 5.3 \times 10^{-26}$ kg)**
**Options:**
(a) 2.3 Å
(b) 6.1 Å
(c) 5.2 Å
(d) 8 Å
**Answer: (a)**
**Solution:**



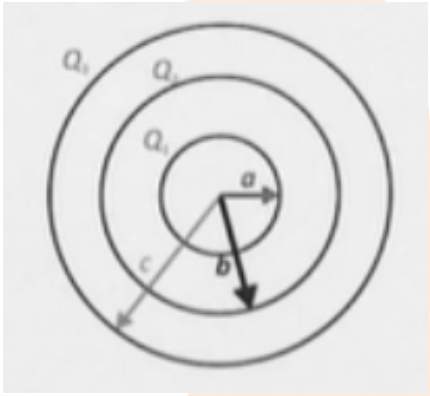
**Question: A voltmeter of 400 W resistance is in parallel with 100 W resistor. And the combination is connected with 100 W resistor and a battery of 9 volt in series as shown. Find the reading of voltmeter.**




**Options:**
(a) 5 volts
(b) 3 volts
(c) 4 volts
(d) 6 volts
**Answer: (c)**
**Solution:**



**Question: Three uniformly concentric charged shells are kept as shown. Find potential of each shell.**




**Options:**

(a) $V_A = \frac{kQ_1}{a} + \frac{kQ_2}{b} + \frac{kQ_3}{c}, V_B = \frac{k(Q_1+Q_2+Q_3)}{b}, V_C = \frac{k(Q_1+Q_2+Q_3)}{c}$

(b) $V_A = \frac{kQ_1}{a} + \frac{kQ_2}{b} + \frac{kQ_3}{c}, V_B = \frac{k(Q_1+Q_2)}{b} + \frac{kQ_3}{c}, V_C = \frac{k(Q_1+Q_2+Q_3)}{c}$

(c) $V_A = \frac{kQ_1}{a} + \frac{k(Q_2+Q_3)}{c}, V_B = \frac{k(Q_1+Q_2)}{b} + \frac{kQ_3}{c}, V_C = \frac{k(Q_1+Q_2+Q_3)}{c}$

(d) $V_A = \frac{kQ_1}{a} + \frac{kQ_2}{b} + \frac{kQ_3}{c}, V_B = \frac{k(Q_1+Q_2)}{a} + \frac{kQ_2}{b}, V_C = \frac{k(Q_1+Q_2+Q_3)}{c}$

**Answer: (b)**

**Solution:**

$$V_a = \frac{kQ_1}{a} + \frac{kQ_2}{b} + \frac{kQ_3}{c}$$

$$V_b = \frac{kQ_1}{b} + \frac{kQ_2}{b} + \frac{kQ_3}{c}$$

$$V_c = \frac{kQ_3}{c} + \frac{kQ_1}{c} + \frac{kQ_2}{c}$$

**Question: Find the rate of maximum wavelength in Lyman series to that of maximum wavelength in Balmer series in Hydrogen Spectrum?**

**Options:**

(a) 27/5

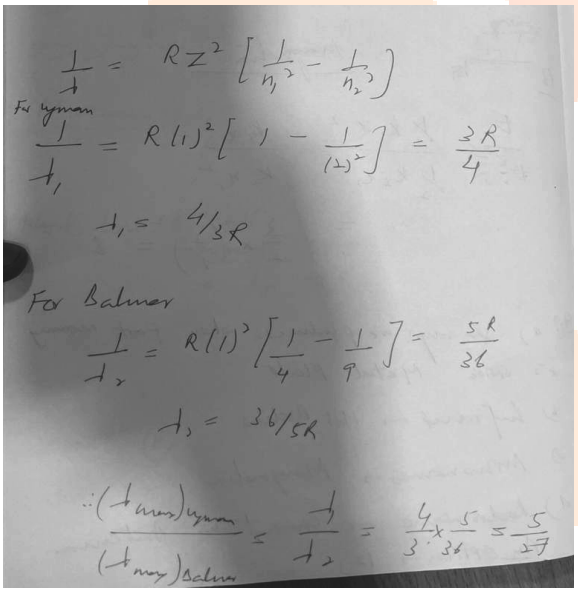
(b) 5/27

(c) 3/4

(d) 9/5

**Answer: (b)**

**Solution:**




**Question: A conducting rod of length 10 cm is dropped vertically from rest through a height 10 m in a region of uniform inward magnetic field of magnitude 0.5T. The rod is always remains Perpendicular to magnetic field. Neglect air resistance and electrical resistance. The magnitude of induced emf in the rod just before it reaches ground is**

**Options:**

(a) 0.25√2 V

(b) 0.5 V

(c) 0.5√2 V

(d) √2 V

**Answer: (c)**

**Solution:**

$v = \sqrt{2gh}$

$= \sqrt{2 \times 10 \times 10}$

$v = 10\sqrt{2}$ m/s

$e = Blv$

$= 0.5 \times 10 \times 10^{-2} \times 10\sqrt{2}$

$e = 0.5\sqrt{2}\ v$

**Question:A particle thrown at an angle of 450 . It reaches its highest point of trajectory after t = 2 sec. It hits a building located on the ground at some distance from its point of projection after 3 sec. Find the height of the building.**

**Options:**

(a) 30 m

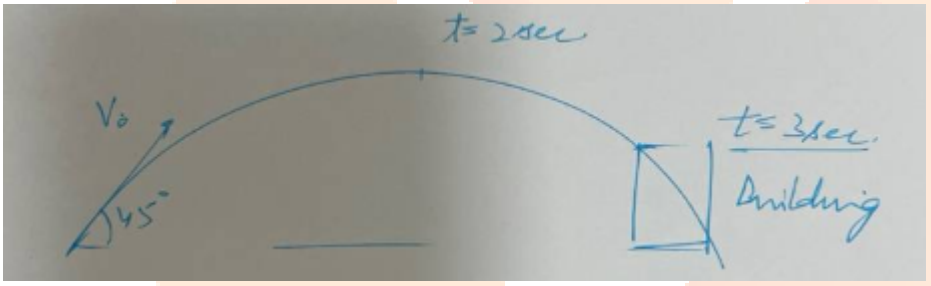
(b) 15 m

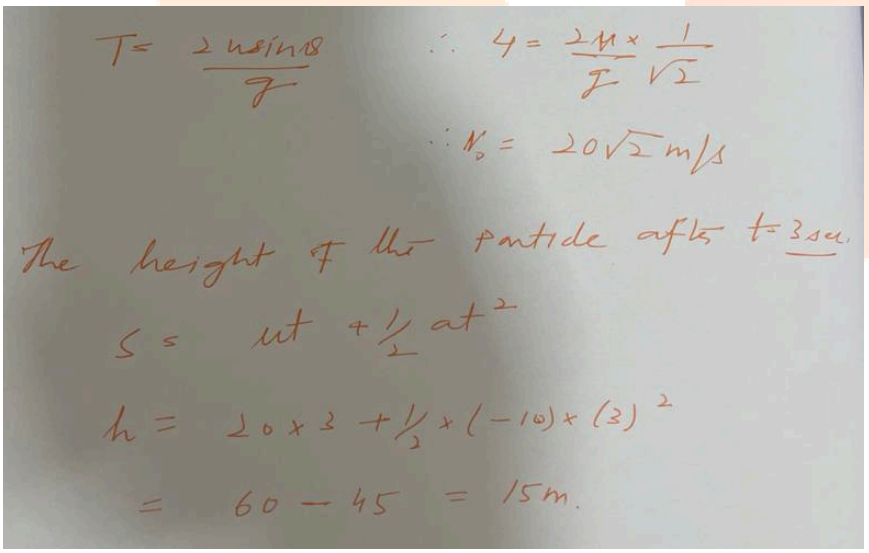
(c) 45 m

(d) None of these

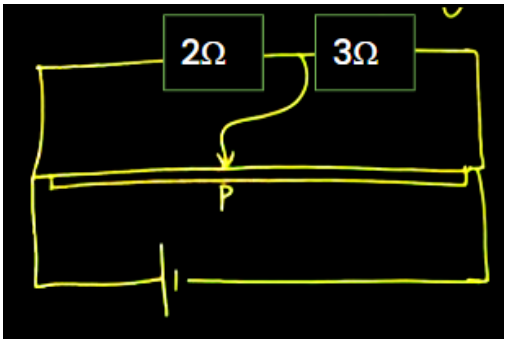
**Answer: (b)**

**Solution:**

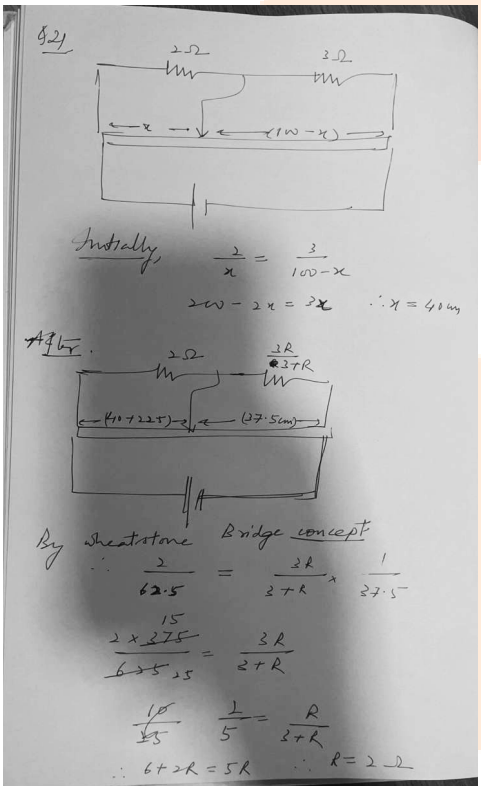


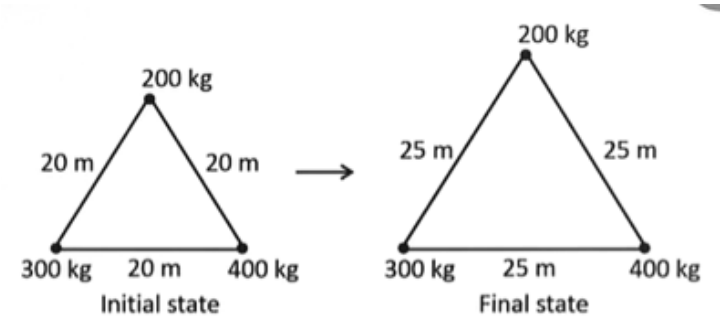

**Question: Figure shows a meter bridge. Initially null points was achieved at P. When an unknown resistance R is connected in parallel with 3Ω then the point is shifted by 22.5 cm. Find the unknown R.**




**Options:**
(a) 2Ω
(b) 3Ω
(c) 2.5Ω
(d) 5Ω
**Answer: (a)**
**Solution:**




**Question: There are 3 particles present at the vertex of an equilateral triangle of length 20 cm. Find the work done to increase the distance between them from 20 cm to 25 cm.**




**Options:**

(a) $1.7342 \times 10^{-7}$ J

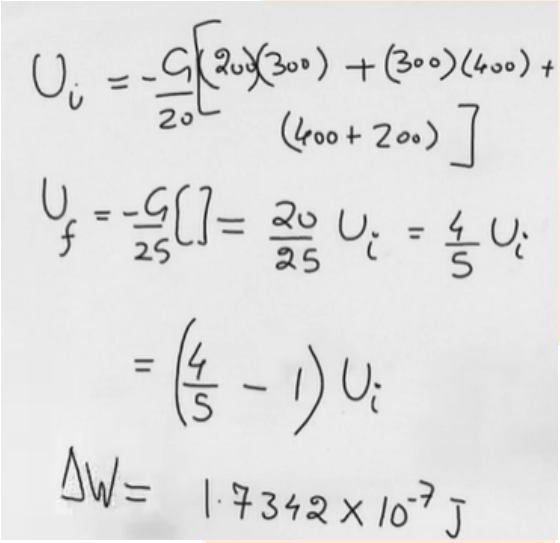
(b) $1.6253 \times 10^{-7}$ J

(c) $2.5232 \times 10^{-7}$ J

(d) $6.6325 \times 10^{-7}$ J

**Answer: (a)**

**Solution:**




**Question: Electric potential at a point is given as $E = Ar^3 + B$. Find charge in sphere of radius 1 m.**

**Options:**

(a) $-4\varepsilon_0 A\pi$

(b) $-8\varepsilon_0 A\pi$

(c) $-12\varepsilon_0 \pi A$

(d) $-16\varepsilon_0 \pi A$

**Answer: (c)**

**Solution:**

Solution:

$$E = -\frac{dV}{dr} = -\frac{d}{dr}(Ar^3 + B)$$

$$= -3Ar^2 \qquad [r = 1]$$

$$\boxed{E = -3A}$$

By Gauss law, $E \cdot 4\pi r^2 = \frac{Q}{\varepsilon_0}$

$$-3A \cdot 4\pi (1)^2 = \frac{Q}{\varepsilon_0}$$

$$\boxed{-12\pi A \varepsilon_0 = Q} \text{ Ans}$$

**Question: A light wave is incident from medium 1 to medium 2 speed of light in medium 1 is $V_1 = 2.4 \times 10^8$ m/s, & speed in medium 2 is $v_2 = 2.7 \times 10^8$ m/s. Find the angle.**

**Options:**

(a) $\sin^{-1}(0.88)$

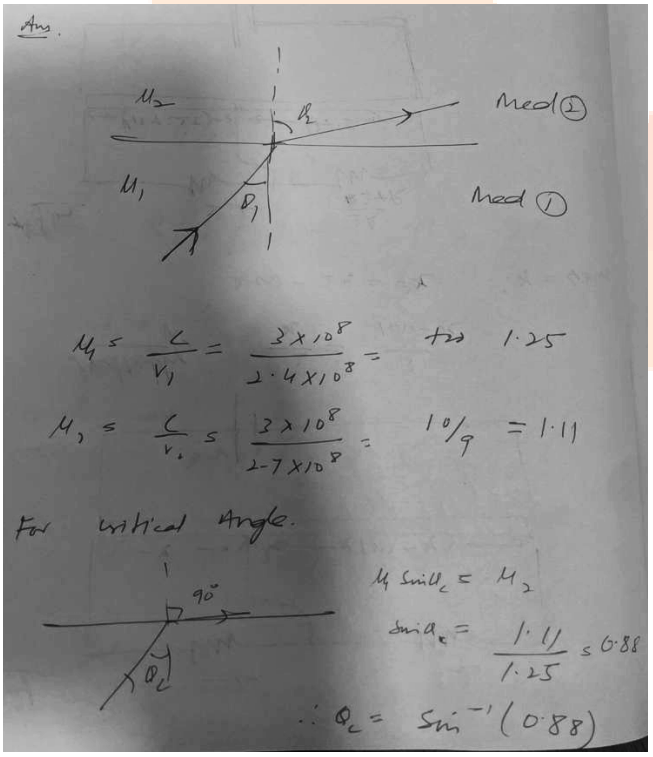
(b) $\tan^{-1}(0.88)$

(c) $\cos^{-1}(0.8)$

(d) $\sec^{-1}(0.8)$

**Answer: (a)**

**Solution:**



**Question: Two thin prisms are combined in such a way that there is deviation without dispersion. If $H_v = 1.523$ & $H_r = 1.515$ are refractive index for $P_f$ and $H_v = 1.666$ & $H_r = 1.650$ for $P_2$. Then find the angle of prism for $P_2$. (Given $A_1 = 10°$)**

**Options:**

(a) 5°

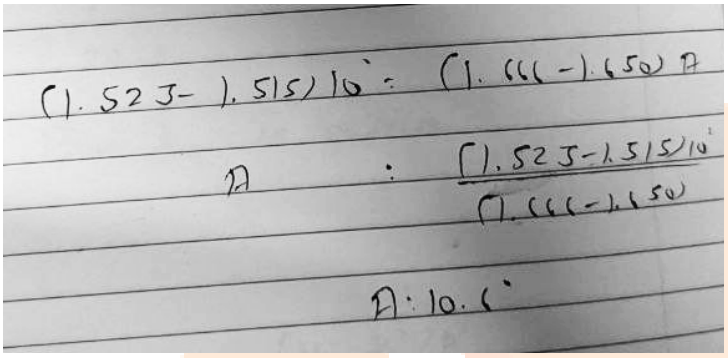
(b) 7.8°

(c) 10.5°

(d) 20°

**Answer: (c)**

**Solution:**



**Question: Match the two Lists given below**

| | List-I | | List-II |
|---|---|---|---|
| a) | Magnetic flux | 1) | $M^1L^2T^{-2}A^{-2}$ |
| b) | Magnetic permeability | 2) | $M^1L^2T^{-2}A^{-1}$ |
| c) | Magnetic induction | 3) | $M^1L^1T^{-2}A^{-2}$ |
| d) | Self induction | 4) | $M^1L^0T^{-2}A^{-1}$ |

**Options:**

(a) a-2, b-3, c-4, d-1

(b) a-3, b-2, c-1, d-4

(c) a-4, b-3, c-1, d-2

(d) a-1, b-2, c-3, d-4

**Answer: (a)**

**Solution:**

$B = \frac{F}{IL}$

$[B] = M T^{-2} A^{-1}$

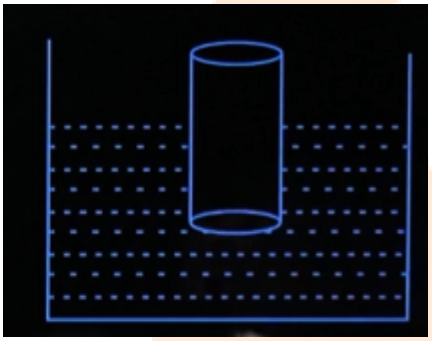
$[BA] = [\phi] =$

$= M L^2 T^{-2} A^{-1}$

$\mu_0 = \frac{BL}{I}$

$M L T^{-2} A^{-2}$

**Question: A cylinder of mass m, length l and area of cross section A is in equilibrium in liquid of density ρ. Find time period of small vertical oscillations.**



**Options:**

(a) $2\pi\sqrt{\frac{mA}{\rho g}}$

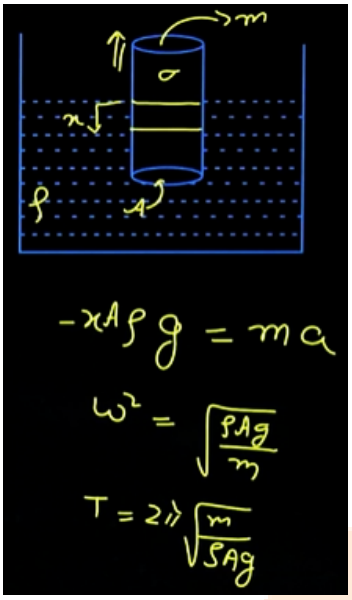
(b) $2\pi\sqrt{\frac{mg}{\rho A}}$

(c) $2\pi\sqrt{\frac{m}{\rho A^2 g}}$

(d) $2\pi\sqrt{\frac{m}{\rho A g}}$

**Answer: (d)**

**Solution:**



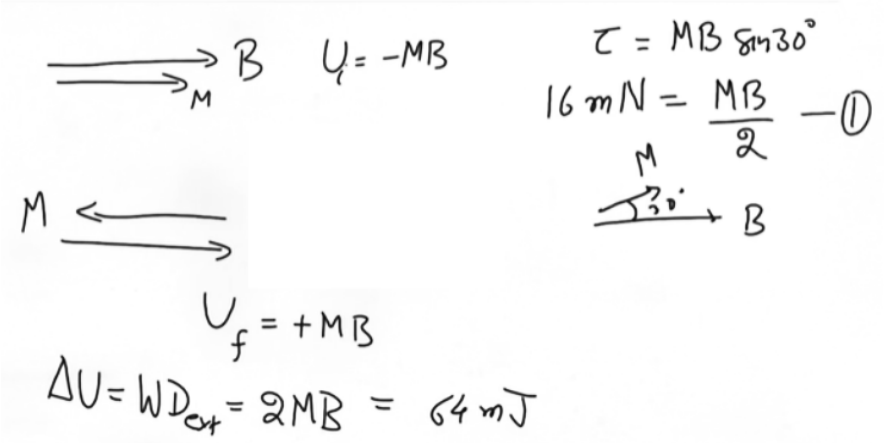

**Question: Match the two Lists given below**

| | **Column-I** | | **Column-II** |
|---|---|---|---|
| **1)** | **Faraday's law of EMI** | **A)** | $\oint \vec{B}.\vec{dl} = \mu_0 I_{enclosed}$ |
| **2)** | **Ampere's circuital law** | **B)** | $\Phi = \frac{q_{in}}{\varepsilon_0}$ |
| **3)** | **Gauss law** | **C)** | $\oint \vec{E}.\vec{dl} = -\frac{d\Phi_B}{dt}$ |
| **4)** | **Maxwell's equations (Gauss's law for magnetism)** | **D)** | $\Delta\vec{B} = 0$ |

**Options:**
(a) 1-C, 2-A, 3-B, 4-D
(b) 1-A, 2-C, 3-D, 4-B
(c) 1-C, 2-B, 3-A, 4-D
(d) 1-D, 2-A, 3-B, 4-C
**Answer: (a)**

**Question: A dipole is placed in uniform magnetic field B = 800 gauss at an angle 30° then it experiences the torque of $16 \times 10^{-3}$ N-m. Find the work done in slowly moving the dipole from stable equilibrium to unstable equilibrium.**
**Options:**
(a) $64 \times 10^{-3}$ J
(b) $5 \times 10^{-3}$ J
(c) $24.5 \times 10^{-3}$ J
(d) $7.6 \times 10^{-3}$ J
**Answer: (a)**

**Solution:**




**Question: A brass rod is rigidly fixed and maintained at 27℃. If it cools drawn to -43℃ then the tension in the rod is T0. Find at what temperature tension will be 1.4 T0.**

**Options:**

(a) -71℃

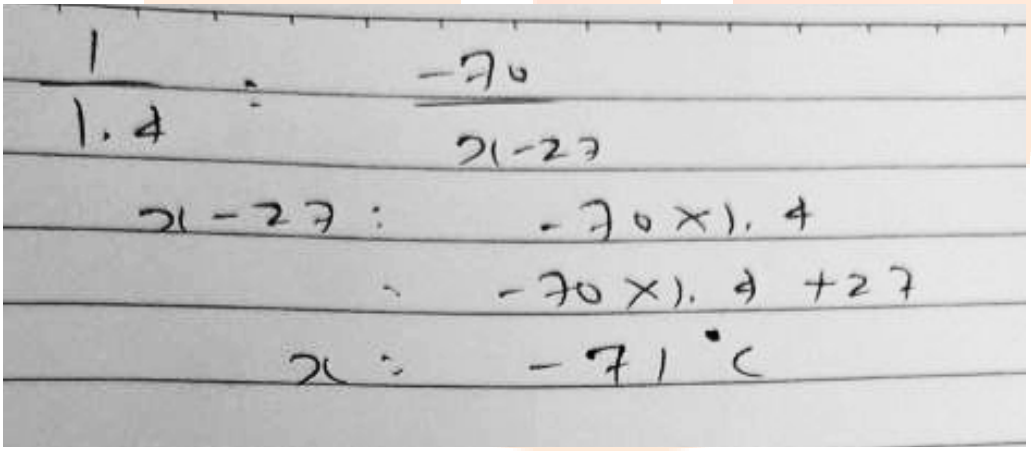
(b) 108℃

(c) 71℃

(d) -108℃

**Answer: (a)**

**Solution:**




**Question: In an screw gauge if 7th division is coinciding with the horizontal main state when nothing is there than find the actual diameter of pen when main scale reading is 7 and circular division is 65th.**

**Options:**

(a) 7.58 mm

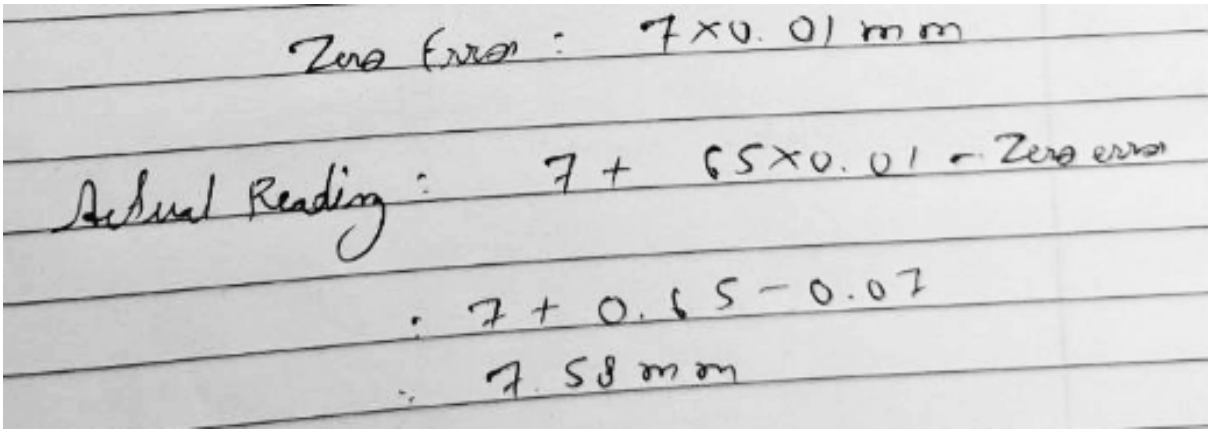
(b) 7.72 mm

(c) 7.65 mm

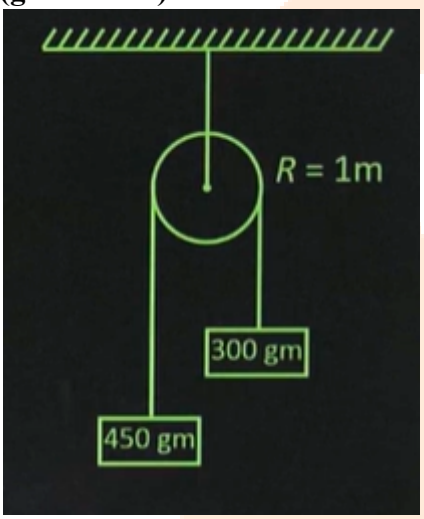
(d) None of these

**Answer: (a)**

**Solution:**




**Question: When system is released from rest the heavier mass goes 81 cm in 9 sec, find rotational inertia.**
**(g = 10 m/s$^2$)**




**Options:**
(a) 74.25 kg-m$^2$
(b) 100.25 kg-m$^2$
(c) 50.25 kg-m$^2$
(d) 25.25 kg-m$^2$
**Answer: (a)**
**Solution:**

$\frac{1}{2} a t^2 = 0.81$

$a = 0.02\ m/s^2$

$a = \frac{(m_2 - m_1) g}{m_1 + m_2 + I/R^2}$

$0.02 = \frac{0.15 \times 10}{0.75 + I/(1)^2}$

**Question: Statement-1: Binding energy per nucleon always increase with mass number. Statement-2: Binding energy per nucleon for smaller mass number always performs nucleon fusion.**

**Options:**

(a) Statement-1, true Statement-2, false

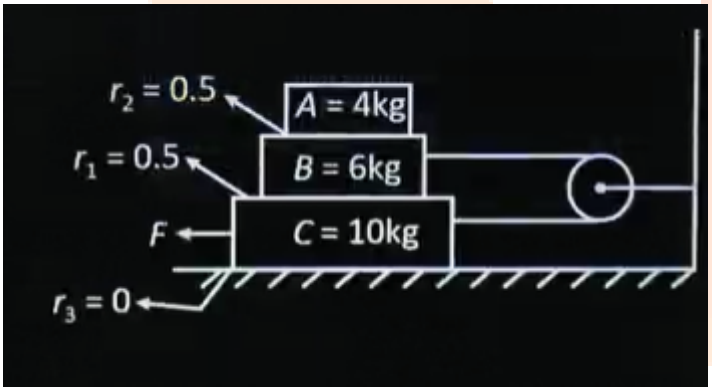
(b) Statement-1, true Statement-2, true

(c) Statement-1, false Statement-2, true

(d) Statement-1, false Statement-2, false

**Answer: (c)**

**Question: For the given arrangement find the value of F(in Newton) so that body c moves with constant velocity.**




**Options:**

(a) 100 N

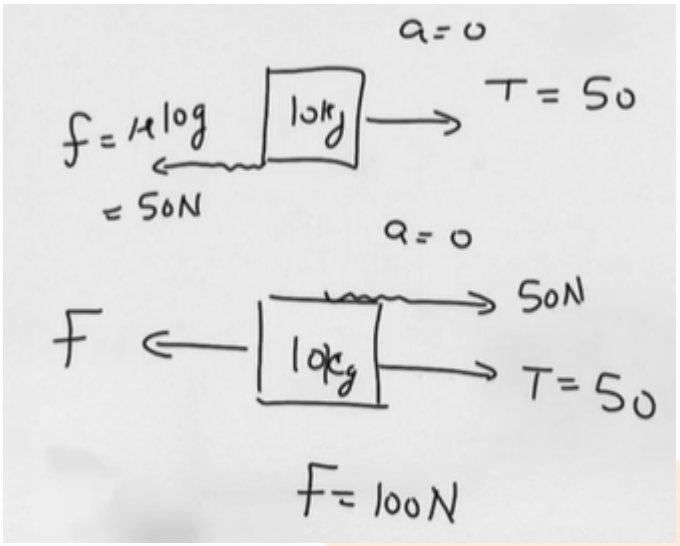
(b) 200 N

(c) 300 N

(d) 400 N

**Answer: (100 N)**

**Solution:**




**Question: In YDSE the wavelengths of lights used are $\lambda_1$ and $\lambda_2$. The separation between slits are $d_1$ and $d_2$. Distance between slit and screen are $D_1$ and $D_2$ Respectively. If fringe width obtained in both experiments are same then ratio of $\frac{D_1}{D_2}$ is**

**Options:**

(a) $\frac{\lambda_1 d_1}{\lambda_2 d_2}$

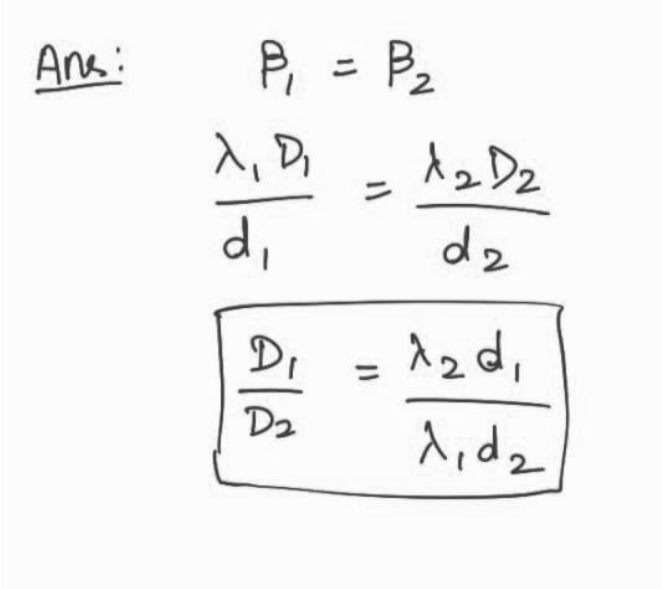
(b) $\frac{\lambda_2 d_1}{\lambda_1 d_2}$

(c) $\frac{\lambda_1 d_2}{\lambda_2 d_1}$

(d) $\frac{\lambda_2 d_2}{\lambda_1 d_1}$

**Answer: (b)**

**Solution:**




**Question: In a cylindrical flux two lens of focal length 25 cm & 5 cm are arranged in such a way that the can object a very for placed object with a magnetication of $5^k$. Find value of k.**

**Options:**

(a) 1

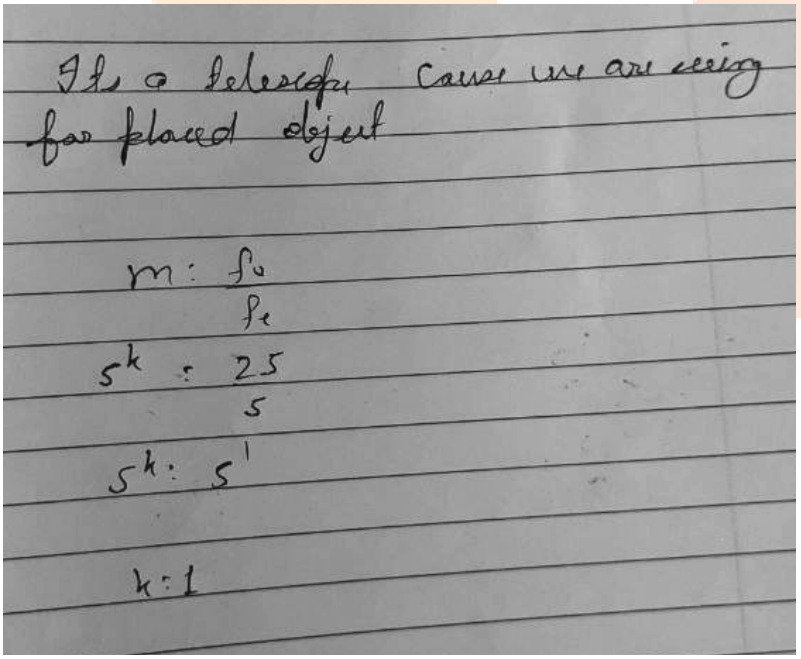
(b) 2

(c) 3

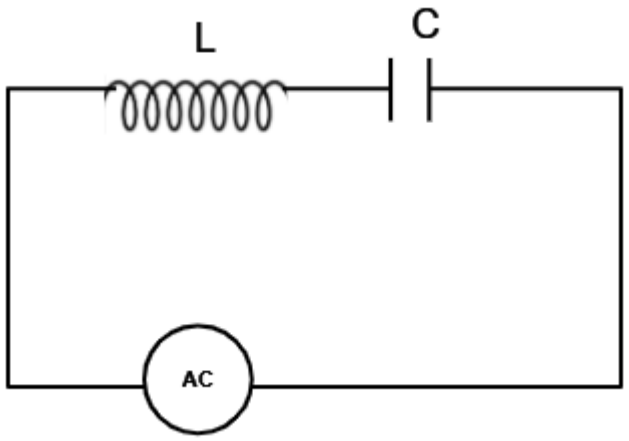
(d) -4

**Answer: (a)**

**Solution:**




**Question:In the given LC circuit, EMF of the circuit a is given by $E_0$ sinωt. If capacitance of capacitor is C and inductance is L then find the value of max current.**




**Options:**

(a) $V_0\sqrt{\frac{C}{L}}$

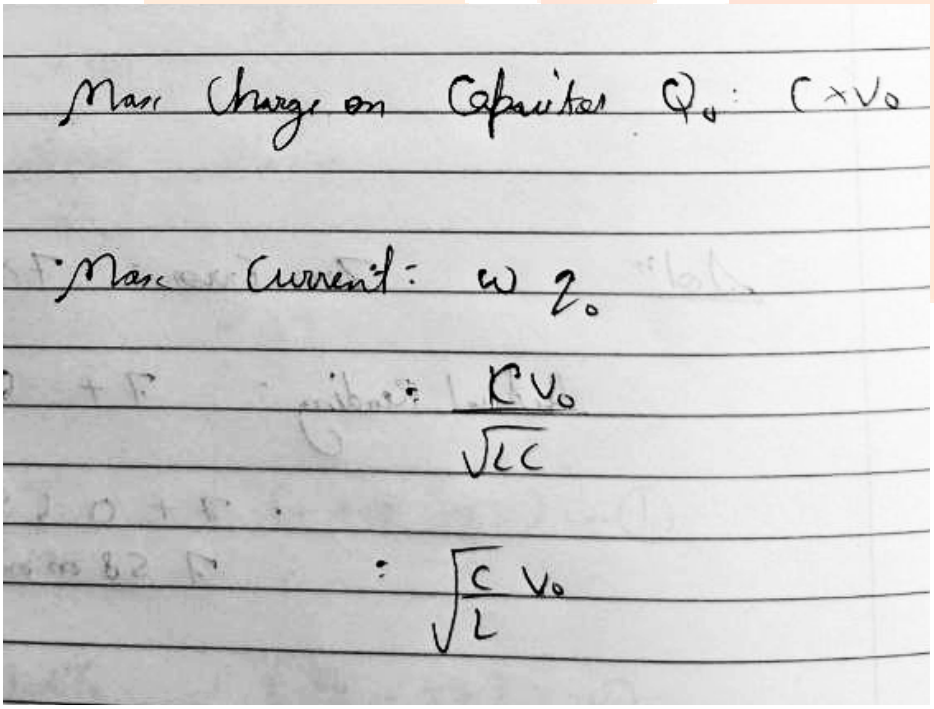
(b) $\frac{V_0}{\sqrt{LC}}$

(c) $\frac{V_0}{\sqrt{C}}$

(d) None of these

**Answer: (a)**

**Solution:**




**Question: Velocity of electron in $n^{th}$ shell of a hydrogen like atom is $3 \times 10^5$ m/s and velocity of electron in mth shell of that atom is $2.5 \times 10^5$ m/s. Find ratio of radius of mth shell to nth shell.**

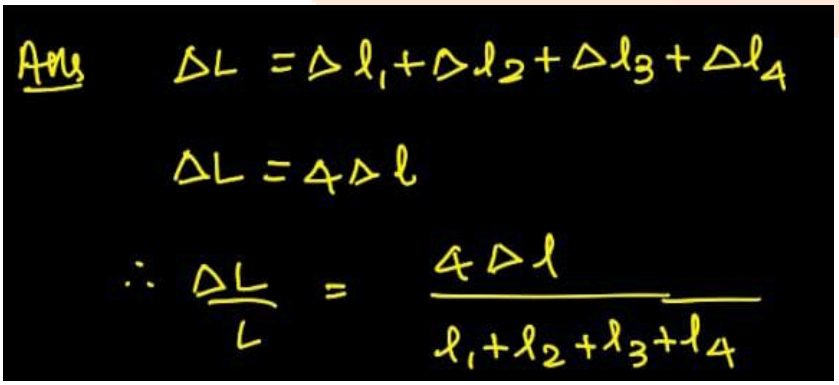
**Options:**

(a) 25/40
(b) 25/36
(c) 36/25
(d) 36/35
**Answer: (c)**
**Solution:**

$$v_n = \frac{Z}{n} V_0 \qquad r_n = r_0 \frac{n^2}{Z}$$

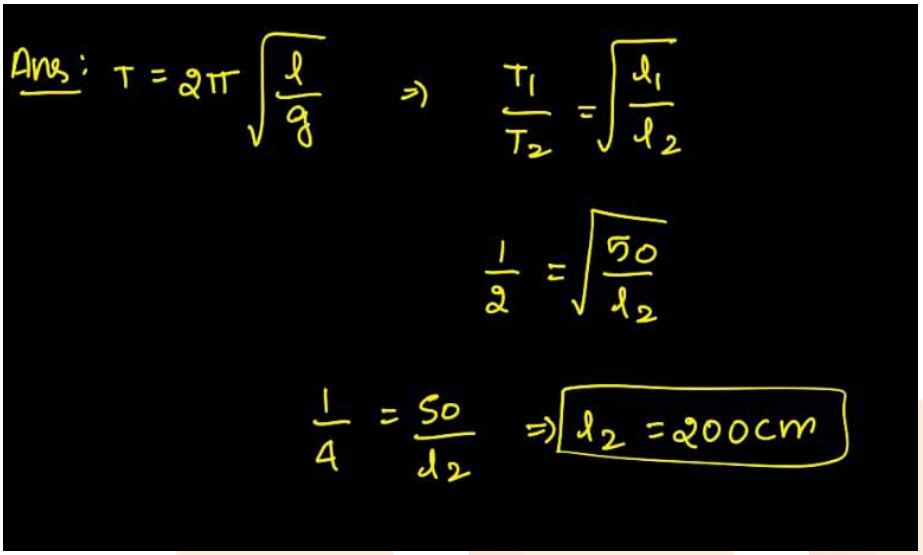
$$\frac{v_n}{v_m} = \frac{m}{n} = \frac{6}{5} \qquad \frac{r_m}{r_n} = \frac{m^2}{n^2} = \frac{36}{25}$$

**Question: Four lengths $l_1$, $l_2$, $l_3$, $l_4$ are measured independently. These lengths are added to obtain total length, $L = l_1 + l_2 + l_3 + l_4$. Each length is measured with same absolute error $\Delta l$. Find $\Delta L/L$**
**Options:**
(a) $\frac{\Delta l}{l_1 + l_2 + l_3 + l_4}$
(b) $\frac{4\Delta l}{l_1 + l_2 + l_3 + l_4}$
(c) $\frac{\Delta l}{l_1 l_2 l_3 l_4}$
(d) $\frac{\Delta l}{4(l_1 + l_2 + l_3 + l_4)}$
**Answer: (b)**
**Solution:**

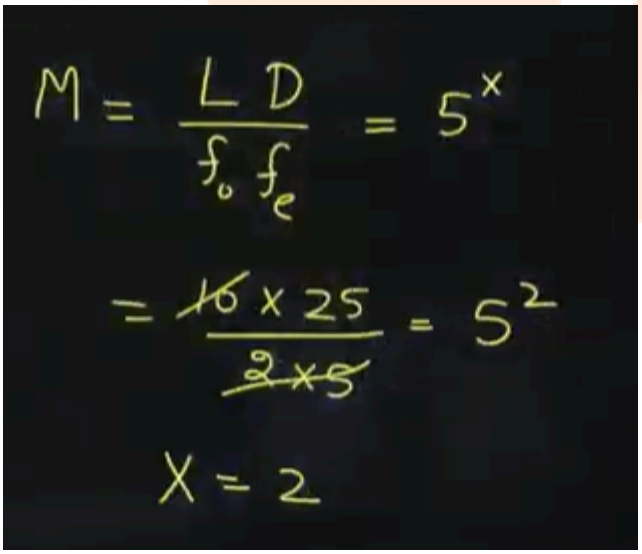



**Question: The time period and length of the Pendulum is given as $T_1 = 25$, $T_2 = 2T$, $l_1 = 50$ cm. Find $l_2$.**
**Options:**
(a) 100 cm

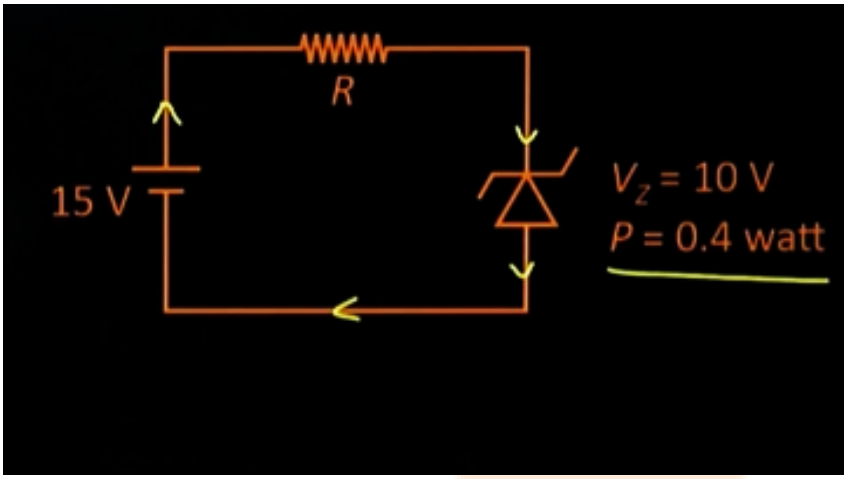
(b) 150 cm
(c) 200 cm
(d) 50 cm
**Answer: (c)**
**Solution:**



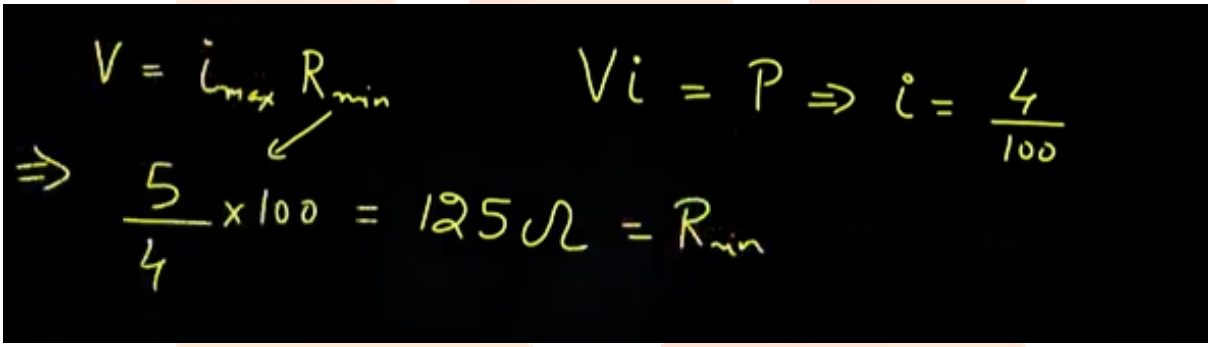

**Question: For a microscope focal length of objective is 2 cm and focal length of eyepiece is 4 cm. Tube length is L = 10 cm. Magnification for normal adjustment is 5x. Find the value of x.**
**Options:**
(a) 2
(b) 3
(c) 4
(d) 6
**Answer: (a)**
**Solution:**




**Question: For the given the breakdown voltage of Zener diode is $V_z$ = 10 volts and it can with-stand the power dissipation of 0.4 watt. Find the value of resistance R (in Ω)**




**Options:**
(a) 120 Ω
(b) 125 Ω
(c) 135 Ω
(d) 110 Ω
**Answer: (b)**
**Solution:**




**Question: If potential varies as distance r as v(r) = $ar^3$ + b. Total magnitude of charge Q inclosed within a sphere of unit radius is Q = α($\pi\alpha\varepsilon_0$). Find the value of α.**
**Options:**
(a) 12
(b) 16
(c) 14
(d) 13
**Answer: (a)**
**Solution:**