

Ans: 1

$$\begin{aligned} PE &= \frac{0.5}{125} \times 100\% \\ &= 0.004 \times 100\% \\ &= 0.4\% \end{aligned}$$

option (c)

Ans: 2 Given,

$$\text{Current} = (2.5 \pm 0.5) \text{ A}$$

$$\text{P.D.} = (20 \pm 1) \text{ V}$$

We know,

$$R = V/I = 20/2.5 = 8$$

Now,

$$\frac{\Delta R}{R} = \frac{\Delta V}{V} + \frac{\Delta I}{I}$$

$$\frac{\Delta R}{8} = \frac{1}{20} + \frac{0.5}{2.5}$$

$$\Delta R = (0.05 + 0.2) 8$$

$$\Delta R = 0.25 \times 8$$

$$\therefore \Delta R = 2$$

$$\therefore \text{Resistance} = (8 \pm 2) \Omega$$

Ans 3 Given,

$$R_1 = (100 \pm 3) \Omega$$

$$R_2 = (200 \pm 4) \Omega$$

$$\begin{aligned}\therefore R_s &= R_1 + R_2 \\ &= 100 + 200 \\ &= 300 \Omega\end{aligned}$$

Now,

$$\frac{\Delta R_s}{R_s} = \frac{\Delta R_1}{R_1} + \frac{\Delta R_2}{R_2}$$

$$\frac{\Delta R_s}{300} = \frac{3}{100} + \frac{4}{200}$$

$$\Delta R_s = (0.03 + 0.02) \times 300$$

$$\Delta R_s = 0.05 \times 300$$

$$\therefore \Delta R_s = 15$$

$$\therefore \text{Equivalent resistance} = (300 \pm 15) \Omega$$

Ans: 9

Given,

$$\text{temperature at 7AM} = (27.0 \pm 0.5)^\circ\text{C}$$

$$\text{temperature at 11AM} = (52.5 \pm 0.5)^\circ\text{C}$$

$$\begin{aligned}\therefore \text{Rise in temperature (T)} &= (52.5 - 27.0)^\circ\text{C} \\ &= 25.5^\circ\text{C}\end{aligned}$$

Now,

$$\begin{aligned}\Delta T &= \Delta T_1 + \Delta T_2 \\ &= 0.5 + 0.5 \\ &= 1\end{aligned}$$

$$\therefore \text{rise in temperature} = (25.5 \pm 1)^\circ\text{C}$$

Ans: Given,

$$\text{Mass of an object} = (225 + 0.05) \text{ g}$$

$$\text{P.E.} = \frac{\Delta M}{M} \times 100 = \frac{0.05}{225} \times 100\%$$

$$= 0.0002 \times 100\%$$

$$= 0.02\%$$

$$\begin{aligned}
 \text{Ans: } \cancel{to} \text{ Volume} &= l \times b \times t \\
 &= (5.250 \times 3.450 \times 1.740) \text{ cm}^3 \\
 &= (18.1125 \times 1.740) \text{ cm}^3 \\
 &= 31.51575 \text{ cm}^3 = 31.5168 \text{ cm}^3
 \end{aligned}$$

Now,

$$\frac{\Delta V}{V} = \frac{\Delta l}{l} + \frac{\Delta b}{b} + \frac{\Delta t}{t}$$

$$\frac{\Delta V}{V} = \frac{0.001}{5.250} + \frac{0.001}{3.450} + \frac{0.001}{1.740}$$

$$\frac{\Delta V}{V} = 0.00019 + 0.00029 + 0.00057$$

$$\Delta V = 0.00105 \times 31.5168$$

$$\therefore \Delta V = 0.033$$

$$\therefore \text{Volume of block} = (31.5168 \pm 0.032) \text{ cm}^3$$

$$PE = \frac{\Delta V}{V} \times 100\% = \frac{0.033}{31.5168} \times 100\%$$

$$= 0.001 \times 100\%$$

$$= 0.1\%$$

$$\text{Q. No. 7} \quad \mu_m = \frac{1.29 + 1.33 + 1.34 + 1.35 + 1.32 + 1.36 + 1.30 + 1.33}{8}$$

$$= \frac{10.62}{8} = 1.3275 \approx 1.33$$

$$\begin{aligned} \Delta \mu_1 &= 1.33 - 1.29 = 0.04 \\ \Delta \mu_2 &= 1.33 - 1.33 = 0 \\ \Delta \mu_3 &= 1.33 - 1.34 = -0.01 \\ \Delta \mu_4 &= 1.33 - 1.35 = -0.02 \\ \Delta \mu_5 &= 1.33 - 1.32 = 0.01 \\ \Delta \mu_6 &= 1.33 - 1.36 = -0.03 \\ \Delta \mu_7 &= 1.33 - 1.30 = 0.03 \\ \Delta \mu_8 &= 1.33 - 1.33 = 0 \end{aligned}$$

~~Now,  $\Delta \bar{\mu} =$~~

Now,

$$\Delta \bar{\mu} = \frac{|\Delta \mu_1| + |\Delta \mu_2| + |\Delta \mu_3| + |\Delta \mu_4| + |\Delta \mu_5| + |\Delta \mu_6| + |\Delta \mu_7| + |\Delta \mu_8|}{8}$$

$$= \frac{0.04 + 0 + 0.01 + 0.02 + 0.01 + 0.03 + 0.03 + 0}{8}$$

$$= \frac{0.14}{8} = 0.0175 \approx 0.02$$

$$\text{P.E.} = \frac{\Delta \bar{\mu}}{\mu_m} \times 100\% = \frac{0.02}{1.33} \times 100\%$$

$$= 1.5\%$$



$$\therefore \mu = (1.33 \pm 0.02)$$

Ans: 8 Given

$$V = (0.785 \pm 0.08) \text{ cm}^3$$

$$m = (6.25 \pm 0.01) \text{ g}$$

$$\therefore d = \frac{m}{V} = \frac{6.25}{0.785} = 7.96$$

Now,

$$\frac{\Delta d}{d} = \frac{\Delta m}{m} + \frac{\Delta V}{V}$$

$$\frac{\Delta d}{7.96} = \frac{0.01}{6.25} + \frac{0.08}{0.785}$$

$$\Rightarrow \Delta d = (0.0016 + 0.1019) \times 7.96$$

$$\Rightarrow \Delta d = 0.1035 \times 7.96$$

$$\Rightarrow \Delta d = 0.82386$$

$$\therefore \Delta d = 0.823$$

$$P.E. = \frac{0.823}{7.96} \times 100\%$$

$$= 0.103 \times 100\%$$

$$= 10.3\%$$

$$\begin{aligned} \text{Ans: } R_m &= \frac{4.12 + 4.08 + 4.22 + 4.14}{4} \\ &= \frac{16.56}{4} \\ &= 4.14 \Omega \end{aligned}$$

$$\Delta R_1 = 4.14 - 4.12 = 0.02 \Omega$$

$$\Delta R_2 = 4.14 - 4.08 = 0.06 \Omega$$

$$\Delta R_3 = 4.14 - 4.22 = -0.08 \Omega$$

$$\Delta R_4 = 4.14 - 4.14 = 0 \Omega$$

$$\Delta \bar{R} = \frac{|\Delta R_1| + |\Delta R_2| + |\Delta R_3| + |\Delta R_4|}{4}$$

$$= \frac{0.02 + 0.06 + 0.08 + 0}{4}$$

$$= \frac{0.16}{4}$$

$$\therefore \Delta \bar{R} = 0.04$$

$$\begin{aligned} R.E. &= \frac{\Delta \bar{R}}{R_m} = \frac{0.04}{4.14} \\ &= 0.0096 \end{aligned}$$

$$\begin{aligned} R.E. &= 0.0096 \times 100\% \\ &= 0.96\% \end{aligned}$$

Ans: 10 Given,

$$a = (2 \pm 0.01) \text{ m/s}^2$$

$$t = (10 \pm 0.01) \text{ s}$$

$$\therefore v = 2 \times 10 \\ = 20 \text{ m/s}$$

Now,

$$\frac{\Delta v}{v} = \frac{\Delta a}{a} + \frac{\Delta t}{t}$$

$$\Rightarrow \frac{\Delta v}{20} = \frac{0.01}{2} + \frac{0.01}{10}$$

$$\Rightarrow \frac{\Delta v}{20} = 0.005 + 0.001$$

$$\Rightarrow \Delta v = 0.051 \times 20$$

$$\therefore \Delta v = 1.02$$

$$P.E. = \frac{\Delta v}{v} \times 100\%$$

$$= \frac{1.02}{20} \times 100\%$$

$$= 0.051 \times 100\%$$

$$= 5.1\%$$