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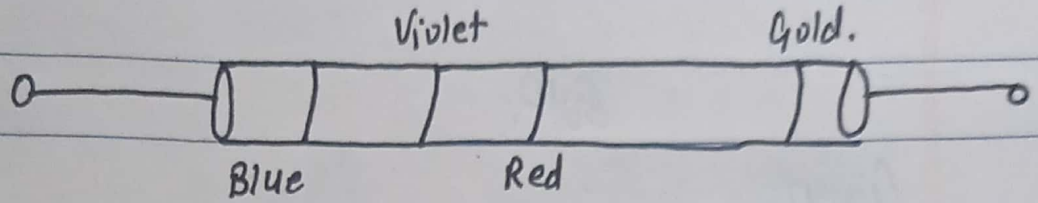
Num. No. 1: Find the resistance ~~and~~ range of the given resistor.



Soln:

Here, the resistor is 4-band scheme. So,

blue gives the first digit = 6

Violet gives the second digit = 7

Red gives the power of ten multiplier = 2

Gold gives the tolerance = ± 5%.

So,

Resistance = $67 \times 10^2 \pm 5\%$.

= $6700\ \Omega \pm 5\%$.

$\therefore$ Range = [6700 − 5% of 6700, 6700 + 5% of 6700]

= [6365 Ω, 7035 Ω]

Resistance lies betⁿ the range.

Num. No. 2: A wire of length 3m and area of cross-section $1.7 \times 10^{-6}\ m^2$ has resistance $3 \times 10^{-2}\ \Omega$. Find the resistivity of the wire.

Sol^n:

Given,
length of wire (l) = 3m
area of cross-section (A) = $1.7 \times 10^{-6}\ m^2$
Resistance of wire (R) = $3 \times 10^{-2}\ \Omega$
Resistivity of wire (ρ) = ?

We know,

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

or, $$\rho = \frac{RA}{l}$$

$$= \frac{3 \times 10^{-2} \times 1.7 \times 10^{-6}}{3}$$

$\therefore \rho = 1.7 \times 10^{-8}\ \Omega m$.

Num. No. 3: If the resistance of a copper wire is $50\ \Omega$ at 20°C. what is its resistance at 100°C ?

Sol^n:

Given,

$T_1 = 20°C$ $\quad$ $T_2 = 100°C$

$R_1 = 50\ \Omega$ $\quad$ $R_2 = ?$

We know,

$$\frac{234.5° + T_1}{R_1} = \frac{234.5° + T_2}{R_2}$$

or, $$R_2 = \frac{(234.5° + 100°) \times 50}{(234.5° + 20°)}$$

$\therefore R_2 = 65.717\ \Omega$.

(Num. No. 4): If the resistance of copper wire at freezing is 30Ω. What is the resistance at -40°C?

Solution.

Given,

$T_1 = 0°C$ $\quad T_2 = -40°C$

$R_1 = 30\Omega$ $\quad R_2 = ?$

We know,

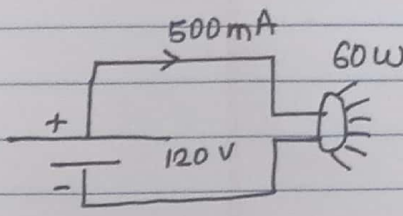
$$\frac{234.5° + T_1}{R_1} = \frac{234.5° + T_2}{R_2}$$

or, $$\frac{234.5}{30} = \frac{234.5° - 40}{R_2}$$

$$\therefore R_2 = \frac{(234.5 - 40) \times 30}{234.5°} = 24.88\Omega$$

(Num. No. 5): Calculate the resistance of 60W bulb. If a current of 500 mA results from an applied voltage of 120 V.

Sol^n:



Given,

$R = ?$

$I = 500\,mA$

$= 500 \times 10^{-3}\,A$

$V = 120\,V$

We know, from ohm's law,

$$V = IR$$

or $$R = \frac{V}{I} = \frac{120}{500 \times 10^{-3}}$$

$$\therefore R = 240\Omega$$