

Question 30599

The dependence of resistance on temperature is linear. Hence, in general it might be expressed as

$$R = R_0(1 + \alpha t) .$$

Using condition that $R = 52.5 \Omega, t = 0C$ obtain $R_0 = 52.5 \Omega$.

Using the condition that $R = 9.75, t = 100C$ obtain $\alpha = \frac{\left(\frac{9.75}{52.5}\right) - 1}{100} = -0.081 \frac{1}{C}$.

Hence, for current case, $R = 52.5(1 - 0.0081 t)$.

Plugging $R = 8.25 \Omega$ into latter formula and solving for t obtain $t = \frac{\left(1 - \left(\frac{8.25}{52.5}\right)\right)}{0.0081} = 104.06C$.