Answer on Question #34542 – Physics | Electric circuits

with the aid of a sketch, in your answer book, explain how you would determine the cold resistance of a lamp filament graphically, if you take the readings of the voltage across it and the current through it. in what region of the graph would you take most of your readings and why?

Solution:

The resistance of an incandescent bulb's filament depends on its temperature. A filament has a positive temperature coefficient, which means that its resistance increases as its temperature increases.

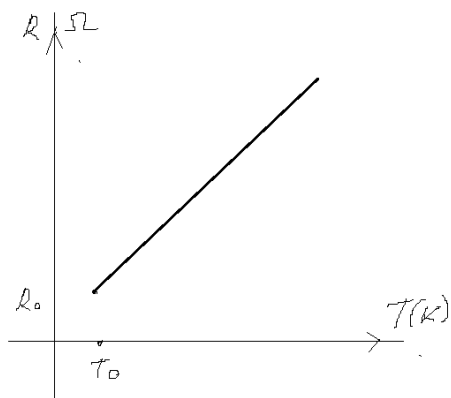$$R_t = R_0(1 + \propto (T_t - T_0))$$

$$R = \rho l/S$$

$\propto = 0.0056\ (1/K)$ for tungsten

Thus, the cold resistance of the filament is minimal when heated - is increased linearly with increase in temperature

Naturally, the higher the voltage applied to the lamp, the higher the current flowing through it, and the higher resistance of the yarn. The increasing resistance of the yarn, in turn, leads to a decrease in the current ... and the resulting dependence of the current through the lamp (and accordingly - and the filament temperature, and its resistance) is obtained by non-linear (logarithmic)
in what region of the graph would you take most of your readings and why?
best to wait until the temperature of the filament reaches the operating mode of 2700-3000K. And resistance stabilized.

I=V/R(T)