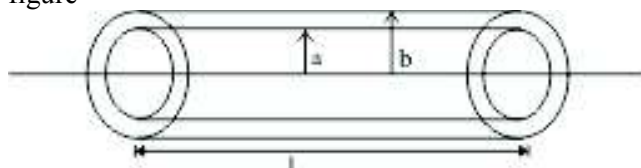


Electric current, resistance and resistivity

Assignment 1

Question 1:

A cylindrical tube of length L has inner radius a and outer radius b as shown below in the figure



Given that ρ is the resistivity of the material. Find the resistance of the tube between its ends.

Question 2:

α_1 and α_2 are the temperature coefficient of the two resistors R_1 and R_2 at any temperature T_0 °C. Find the equivalent temperature coefficient of their equivalent resistance if both R_1 and R_2 are connected in series combination. Assume that α_1 and α_2 remain same with change in temperature

Question 3:

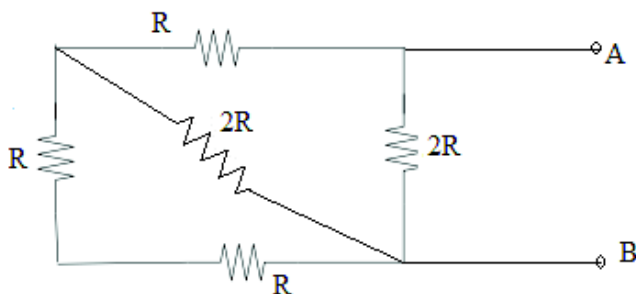
If a copper wire is stretched to make it .2% longer. Find the percentage change in the resistance

Question 4:

An electric current of 5 A passes through a circuit containing three wires(A,B,C) of the same material .Length of the wires in the circuit are in the ratio 2:3:4 And their diameters are in the ratio 3:4:5.Find the amount of current flowing in each branch of the circuit when wires are arranged in parallel combination

Question 5:

Find the equivalent resistance between point A and B in following combination of resistors



Question 6:

The current density across a cylindrical conductor of Radius A varies according to the following relation

$$\mathbf{J} = \mathbf{K}\left(1 - \frac{x}{A}\right)$$

Where \mathbf{K} is the constant vector across the length of the conductor and x is the distance from axis.

Find the current through cylindrical cross-section

NOTE:- We will provide you more circuit related problems in the assignment with next chapter when we'll introduce the concept of Kirchoff's Law.