Answer on Question #38270 – Physics - Mechanics | Kinematics | Dynamics

A piece of copper wire [a=1.7*10^5/degrees celsius] has a length of exactly 50 meters when at a temperature of 120 degrees celsius. what will be the increase in length if its tempurature is rasied to 232

Solution:

$\alpha = 1.7 \times 10^{-5} \, °C^{-1} -$ thermal expansion coefficient ;
$L = 50m -$ length of the wire;
$\Delta T = 232°C - 120°C = 112°C -$ temperature increase;

The final length of the wire will be:

$$L_2 = L \cdot (1 + \alpha \cdot \Delta T) = 50m \cdot (1 + 112°C \cdot 1.7 \times 10^{-5}°C^{-1}) = 50.095m$$

The increase in the length of the wire was

$$L_2 - L = 50.095m - 50m = 9.5cm$$

Answer: increase in the length of the wire is 9.5cm.