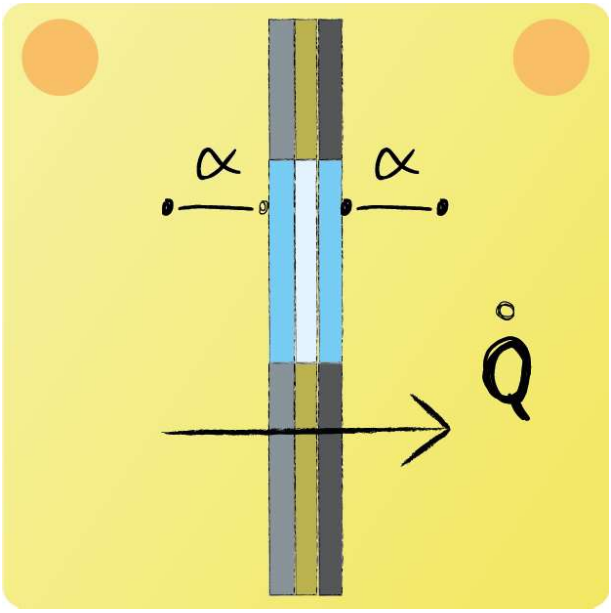
Lecture 4 - Question 1



Which statements are correct for the steady state heat transfer in a multi layered wall of constant cross sectional area without sources?

For a wall with no heat sources/sinks the energy conservation yields a constant heat flux $\dot{Q}$ for a steady case. Since it is a material property, thermal conductivity can be assumed to be constant within a layer. Together with a constant cross section area, this yields a linear temperature profile which is inversely proportional to the layer's thermal conductivity. From the definition of thermal conductivity it is obvious that thermal resistance is inversely proportional to this quantity. That is an increased thermal conductivity leads to an increased heat flux for a given temperature difference, hence the thermal resistance is decreased.