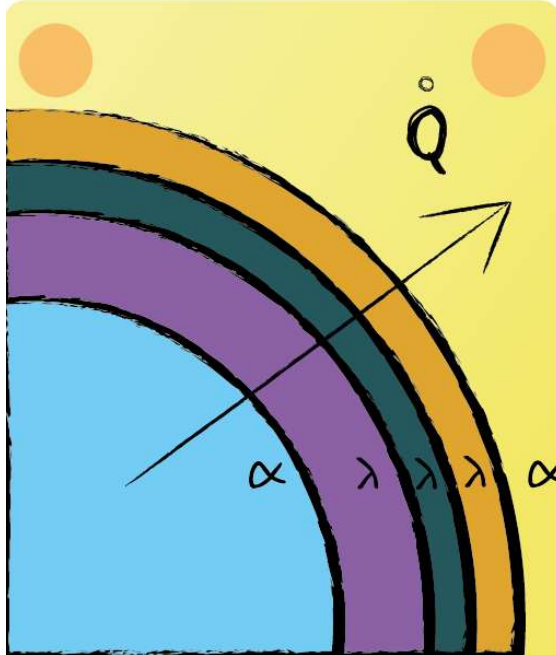# Lecture 8 - Question 4

Consider steady-state heat transfer for a multi-layered pipe wall as in the figure. A fluid is flowing through the pipe. The center and the environmental temperatures remain constant. Which of the following temperature profiles is correct?

At the center r=0 the temperature gradient equals zero due to symmetry. After passing the first layer the heat flux is constant, for which the temperature gradient needs to decrease. This because the thermal resistance increases due to an increase of surface area. This is similar for the next layers. After passing the latter layer, when $r \to \infty$ the temperature gradient should equal zero again. This because of the fact that the temperature approaches the environmental temperature. Resulting in a temperature profile as in the figure below.