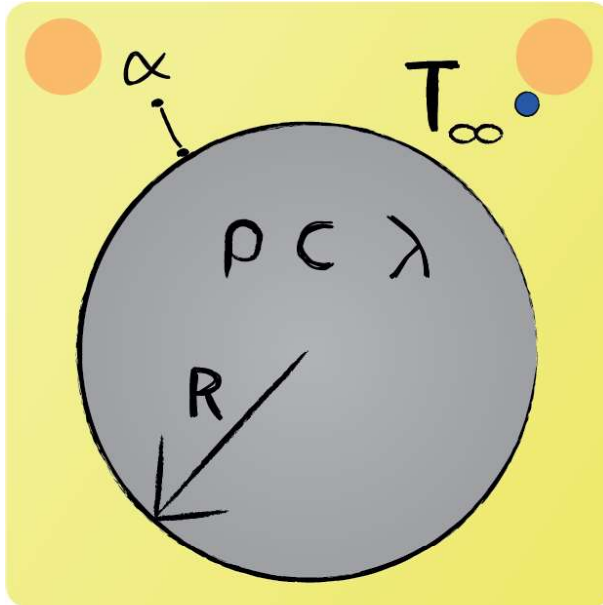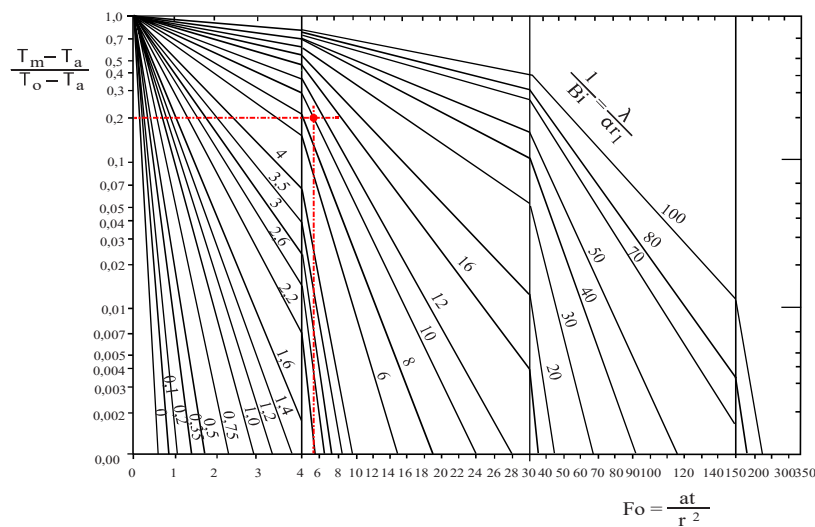# Exam Preparation - Conduction 19

A sphere with radius $R = 1$ cm with initial homogeneous temperature $T(r, t = 0) = 293$ K, is suddenly exposed to a medium of temperature $T_A = 353$ K. Determine the time t_1 at which $T(r = 0, t_1) = 341$ K is reached.

Problem type:
One-dimensional, unsteady-state heat conduction that does penetrate.

$$\frac{1}{\text{Bi}} = \frac{\lambda}{\alpha \cdot r_1} = 10$$

$$\frac{T_m - T_a}{T_o - T_a} = 0.2$$

$$\rightarrow \text{Fo} = 5.35$$

$$t = 3862.46 \text{ s}$$