Q.1: Use Laplace transform to solve the problem

\[ \frac{a^2}{x^2} \frac{\partial^2 u}{\partial x^2} - g = \frac{\partial^2 u}{\partial t^2}, \quad x > 0, \ t > 0, \]

subject to the boundary and initial conditions

\[ u(0, t) = 0, \quad \lim_{x \to \infty} u(x, t) = 0, \quad t > 0, \]

\[ u(x, 0) = 0, \quad \left. \frac{\partial u}{\partial t} \right|_{t=0} = 0, \quad x > 0, \]