J02Q.1—Particle in a Spherically Symmetric Potential

Problem

A particle of mass m moves in the spherically symmetrical potential in 3 dimensions:

$$V(r) = \begin{cases} 0, & 0 \leq r < a, \\ -U_0, & a < r < b, \\ 0, & b < r \end{cases}$$

where $U_0 > 0$.

What is the condition on U_0 so that there will not be any bound states?