1. Let $\gamma : [a, b] \to (M, g)$ be a geodesic and let $V_\gamma$ be the vector space of piecewise smooth vector fields along $\gamma$. Recall that the index form along $\gamma$ is the bilinear form $I : V_\gamma \times V_\gamma \to \mathbb{R}$ given by

$$I(V, W) \equiv \int_a^b \{ \langle V', W' \rangle - \langle R(\gamma', V)\gamma', W \rangle \} dt.$$ 

Now let $V_\gamma^0 = \{ V \in V_\gamma : V(a) = V(b) = 0 \}$. Show that a vector field $J$ along $\gamma$ is a Jacobi field if and only if $I(J, V) = 0$ for every $V \in V_\gamma^0$. 