The existence and nonexistence of the ground state to Nonlinear Schrödinger equation on several types of metric graphs are considered. In particular, for some star graphs with only one central vertex, the existence of ground state solution or positive solutions are shown. It is shown that the structure of the set of positive solution is quite different from the one for corresponding bounded n-dimensional domain. The proofs are based on variational methods, rearrangement arguments, energy estimates and phase plane analysis. (Received July 27, 2018)