In this study, the stability analysis of functionally graded material (FGM) cylindrical, truncated and complete conical shells subjected to combined loads and resting on elastic foundations for two boundary conditions is investigated. The functionally graded material properties are assumed to vary continuously through the thickness of the conical shell. At first, the basic relations, the stability and compatibility equations of the FGM truncated conical shell on the Pasternak-type elastic foundation are obtained. By applying the Galerkin method to the foregoing equations, the critical combined loads of clamped–clamped and sliding–sliding FGM shells on the Pasternak-type elastic foundation are obtained. Finally, carrying out some computations, effects of the elastic foundation, boundary conditions, the variation of shell characteristics and material composition profiles on the values of critical combined loads have been studied.