The main objective of this work is to demonstrate a convenient and efficient way to get a closed-form solution for buckling of heterogeneous orthotropic truncated conical shells under external pressures. The first-order shear deformation shell theory (FOSDT) is adopted to formulate the theoretical model. The basic equations of shear deformable heterogeneous orthotropic truncated conical shells are derived using Donnell shell theory. To solve this problem is used an unknown parameter $A$ in the approximation functions. The partial differential equations are transformed into algebraic equations using unknown parameter and Galerkin’s method. The expressions for non-dimensional external pressures of heterogeneous orthotropic truncated conical shells are obtained by solving algebraic equations. The parameter which is included in the obtained expressions is get from the minimum conditions of the critical external pressures. The accuracy and reliability of the current solutions are validated by numerical examples and comparison with the results available in the literature. The influences of variations of the semi-vertex angle, radius-to-thickness ratio, orthotropy ratio and heterogeneity factor on the non-dimensional critical external pressures of truncated conical shells within the CST and SDT are also discussed.