This study aims to determine the optimal configuration of the dual-junction InGaN solar cell. Several parameters of the dual-InGaN-junction solar cell have been investigated as the band gap combination and the thicknesses of the layers. Physical models and the optical properties of the $In_xGa_{1-x}N$ according to the indium content have been used. The dual-junction solar cell has been designed and simulated for each chosen band gap combination. The current densities drawn from the sub-cells were matched by adjusting their emitter layers thicknesses. The best conversion efficiency obtained for the optimized dual-junction $In_{0.49}Ga_{0.51}N/In_{0.74}Ga_{0.26}N$ solar cell, under standard conditions, was 34.93% which corresponds to the band gap combination of 1.73 eV/1.13 eV. The short-circuit current density and the open circuit voltage obtained from the tandem cell $In_{0.49}Ga_{0.51}N/In_{0.74}Ga_{0.26}N$ are respectively, 21.3941 mA/cm^2 and 1.9144 V. The current mismatch was 0.057%. The effects of the front and back layers thicknesses of the top and bottom cells on the efficiency were also studied. Furthermore, the electrical characteristics of the dual-junction solar cell and its sub-cells were also discussed