Accurate pricing of stock options is critical to avoiding arbitrage. Traditional models used in option pricing are limited to a constant drift and volatility of a stock process $X_t$. In this paper, a Markov modulated Ito-Diffusion is developed to describe a stock that switches drift and volatility through a finite state Markov chain $\xi_t$. The valuation of an infinite horizon American put option is described by the general optimal stopping problem $V(x, i) = \sup_\tau E^{(x, i)} [e^{\int_0^\tau -r(\xi_s)ds} \phi(X_\tau)]$. This optimal stopping problem is solved by using a logarithmic transformation and drawing a connection to a set of PDE’s similar to the traditional Black-Scholes equations. (Received September 18, 2012)