

StudentID: _____

PHYS 451 Quantum Mechanics II (Fall 2017)
Quiz #1

Consider a function in the form

$$\varphi(x, y, z) = A y e^{-\alpha r^2 - \beta r},$$

where $r = \sqrt{x^2 + y^2 + z^2}$, A is the normalization constant, and α and β are adjustable parameters. Is this a good choice of a trial variational function for estimating the energy of the *first excited* state of the hydrogen atom? If so, what value will it yield?

In this quizz you are allowed to use textbooks to look up any information about the hydrogen atom, if needed.