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**Quiz 3**

Name: \_\_\_\_\_ Roll No. \_\_\_\_\_

Date: 19/09/2014

Time: 25 min.

Total points: 10

1. State true or false. Explain your answer. (8 points)
  - a. For a system of  $n$  non-interacting particles, each stationary state wavefunction has the form  $\psi = \psi_1(q_1) + \psi_2(q_2) + \dots + \psi_n(q_n)$ .
  - b. The energy of a system of non-interacting particles is the sum of the energies of the individual particles, where the energy of each particle is found by solving a one-particle Schrödinger equation.
  - c. The value zero is never allowed for an eigenvalue of the Schrödinger equation.
  - d. In the equation  $\langle B \rangle = \int \psi^* \hat{B} \psi d\tau$ , where  $d\tau = r^2 \sin \theta dr d\theta d\phi$ ,  $\hat{B}$  operates on  $\psi$  only and does not operate on  $r^2 \sin \theta$ .
  
2. Define Hermitian operator and prove that its eigenvalues are real. (2 points)