**武汉大学物理科学与技术学院2018－2019(一)**

**《量子力学》课程期末考试试题A卷**

**学号： 姓名： 专业： 得分：**

1. (15 points) Show that two noncommuting operators can not have a complete set of common eigenfunctions.
2. (16 points) A particle of mass *m* in the infinite square well has the initial wave function:

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determine A(4 points), find (8 poingts),and calculate the expectation value of the energy(4 points).

1. (16 points)Construct the angular momentum matrices () and  for a system of angular quantum number .
2. (18 points) Find the allowed three lowest energies of two-noninteracting particles in the infinite square well, and obtain these wavefunctions,

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(a). distinguishable particles without spin(6 points);

(b). identical bosons with spin 1(6 points);

(c). identical fermions with spin 1/2(6 points).

5. (20 points) The three dimensional rotation Hamiltonian is

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find the energy for ground state:

(a).(5 points);

(b).(5 points);

(c). (10 points).

6. (15 points) Find the ground state energy of the one-dimensional infinite square well, using the triangular trial wave function:

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