Assignment 2

Due on 2019-10-31, 23:59 IST

1. Ensuring a free particle in an infinite boundary potential results in quantum mechanical nature does energy levels restricted motion not the above

2. For a rigid time t > 3 state level:
   - Both energy and linear momentum remain constant with time
   - Both energy and linear momentum change with time
   - Linear momentum changes but energy remains constant with time
   - Energy changes but linear momentum remains constant with time

3. The energy of the form $E = \sqrt{\frac{\sum E_{i}}{\sum E_{f}}}$ and $\sqrt{\sum E_{f}}$ state of the molecule follows the rule:
   - $\Delta E_{g} = \Delta E_{f} = \Delta E_{q}$
   - $\Delta E_{g} = \Delta E_{f} = \Delta E_{q}$
   - $\Delta E_{g} = \Delta E_{f} < \Delta E_{q}$
   - $\Delta E_{g} < \Delta E_{f} = \Delta E_{q}$

4. The Schrödinger equation for the multi-electron atom cannot be solved exactly due to the spin of the electron
   - Electron-electron repulsion
   - Angular momentum of the nucleus-electron-nuclear attraction

5. If the molecular axis of $E_{f}$ is shown as $\alpha$ and $\beta$, the lowest energy is found in which of the following orientations?
   - $\alpha$ initial of $\alpha$
   - $\beta$ initial of $\beta$
   - $\alpha$ initial of $\beta$
   - $\beta$ initial of $\alpha$

6. The number of ways in which two identical spin-half particles can be oriented relative to a magnetic field is:
   - 2
   - 4
   - 3
   - 1

7. Transition between two electronic states is vertical since there is hardly any nuclear motion while this transition occurs. This principle of vertical transitions is known as:
   - Franck-Condon Principle
   - Born-Oppenheimer principle
   - Pauli exclusion principle
   - Hund's rule of maximum multiplicity

8. Any two-electron wave function changes sign when the electron indices are exchanged. This is known as:
   - Pauli exclusion principle
   - Born-Oppenheimer principle
   - Franck-Condon principle
   - Hund's rule of maximum multiplicity

9. The fact that the nuclear mass is extremely large compared to that of the electron mass is used for the separation of variables in solving the Schrödinger equation. This is known as the:
   - Pauli exclusion principle
   - Born-Oppenheimer principle
   - Hund's rule of maximum multiplicity
   - Franck-Condon principle