

1. Please give experimental supports for wave-particle duality; one for the particle properties of waves and one for the wave properties of particles.(15%)
2. Please explain why the electron in a H atom does not collapse to the positive charged nucleus.(10%)
3. Please explain why the possible energy states of the electron in a H atom is discrete?(15%)
4. Please discuss the formation of band structures in solids and their relation with different atomic bondings for insulating, semiconducting and metallic solids.(15%)
5. What are the time-dilation effect in the theory of special relativity and its origin?(15%)
6. Please give examples for fermions and bosons. What are the physical properties of fermions and bosons? (15%)
7. Explain what the liquid drop model and the shell model for the atomic nucleus are and why there is no contradiction in having both theories accounting for much known nuclear behaviour.(15%)