Assignment 3

Last date for submission: 5 -10-2017.

1. According to Bohr theory, how many revolutions will an electron make in the first excited state of hydrogen if life time in that state is 10^{-8} s.
2. Calculate the possible orientations of the total angular momentum vector, P_ψ, corresponding to the azimuthal quantum number k=3.
3. Draw sommerfeld elliptical orbits corresponding to n=1, 2 and 3 for hydrogen, He^{+1} and Li^{+2}.
4. The phase velocity of ripples on a liquid surface is $\sqrt{\frac{2\pi S}{\lambda\rho}}$, where S is surface tension and ρ is density of the liquid. Find group velocity of the ripples.
5. The wavefunction of a particle is $\psi = A\cos^2 x$ for $-\pi/2 < x < \pi/2$. (a) Find the value of A. (b) Find probability that particle be found between $x = 0$ and $x = \pi/4$.
6. An eigenfunction of the operator $\frac{d^2}{dx^2}$ is sin nx, where n = 1, 2, 3.... . Find the corresponding eigen values.