UCONN ENGR-ECE4243/6243 09/13/16, Due on 9/20/16, F. Jain

**HW3** Conductivity Quantization in Nanowires and CNTs

Q.1(a). Calculate the minimum value of resistance in a nanowire.

Q.1(b) Point out the difference between elastic and inelastic scattering of electrons in a semiconductor.

Q.2. why is the phonon scattering is phase breaking or coherence breaking and results in non-ballistic transport?

Q.3 If we have discrete energy levels with some energy width in a nanowire, how the current will flow. Will this cause conductivity quantization in nanowires and nanotubes as we increase the value of current?

Q.4. Explain the resistance plots of Wharam et al paper (page 99-102A).

Q.5. What is the ballistic or quasi-ballistic current transport also called global transport.

Q.6. What is the primary cause of universal conductivity fluctuation in nanowires and nanotubes.