

### **Prelab Questions**

All pre lab questions must be submitted at the beginning of each laboratory session. They are designed to prepare you for the lab so that you can finish the lab on-time. You will receive zero credit for the pre lab questions, if you come to the lab without answering the pre lab questions. Post lab questions must be handed in class at the beginning of each lecture after the completion of the lab.

- (1) Draw a LI curve of a semiconductor laser. Label the axis and location of the laser threshold. What is the typical semiconductor laser threshold of an NEC laser diode?
- (2) You inject a 100mA current into a semiconductor laser. This current can be converted to number of injected electron per second (1 A is 1 Coulomb per second and 1 electron is  $1.6 \times 10^{-19}$  Coulomb). How many electrons are you injecting into the semiconductor per sec? A photon is emitted when an electron and a hole are combined. If we assume that the laser is above threshold and that 80% of the electron and hole are recombined to emit as light. How many photons are emitted per second? What is the output light power if the wavelength is 670nm?
- (3) Determine the relative radiance of the laboratory LED and LD as calculated from the specification sheets?