OPTI380A

Prelab Questions – Lab 3 2009

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.

1. For an ideal silicon photodiode with unity efficiency, calculate the expected output current for incident wavelengths of 0.438 μm and 0.91 μm for input flux levels of 1 mW and 1 μW. You should have a total of four answers for the different cases.

2. (a) If I were to use a Burle 931A photomultiplier tube with an anode-to-cathode bias of -800 V to detect He-Ne laser radiation at 633 nm, what would be the minimum laser power I could expect to observe with a signal-to-noise ratio (SNR) of 10? The data you need for this calculation can be found in the data sheet on the class web site. (Hint: use Fig. 1 to get the responsitivity and Fig. 7 to get the noise current.)

   (b) A 931A photomultiplier is connected to a coax cable terminated with a 50 Ohm load for measurement of a continuous laser beam modulated at 100 MHz. The light level is such that there is a 0.5 volt signal on the scope. What is the SNR, assuming same conditions as 2(a)? Is the detector fast enough for the job?