The lab write-ups can actually be fairly short. All you need to do is answer the questions in the lab. I have reproduced them here and added some additional (optional) material.

In general the write-ups for these labs should be similar to those you have been doing all semester where you have used measurements to document the performance of your circuits. However, your grade in this lab will also be based upon the quality of the analysis and explanations accompanying your measurements.

Lab 9B – Optical Communications

1. TRANSMITTER
What is the maximum forward current rating, and the maximum reverse voltage rating of the LED diode?
Choose the resistor, R, to limit the current through the LED.
What is the purpose of the other diode in Figure 1?

Comments:

- Explain what type of circuit you used to drive the LED. The values of all components and a circuit diagram should be included.
- How did you measure the performance of your transmitter? How do you know it worked? Include some sketches or oscilloscope waveforms as appropriate to illustrate how well it worked. How can you optimize the performance of your transmitter?

2. RECEIVER
What happens to the signal as you shield the photodiode from the room lights?
What happens to the signal as you misalign either of the ends of the fiber guide?

Comments:

- Is your detector sensitive to room lighting? Look at the spectral response data for the photodiode. For your reference, fluorescent lamps typically output in the 450-650nm spectral region.
- What kind of receiver circuit did you use. Were you detecting voltage or current? The lab handout somewhat discusses the difference between voltage and current sensing. This is also discussed in a new applications note posted on the EECS 245 Web page.
- The values of all components and a circuit diagram should be included.
- How did you measure the performance of your receiver and the overall system? Include some sketches or oscilloscope waveforms to illustrate your point.

3. General.

(a) Your detector is enclosed in a black housing which does not transmit visible wavelengths. Why is this useful for optical communications?
(b) The PN323B you used is a photodiode. What can you say about the relative sensitivity of the PN323B photodiode versus other devices such as a phototransistor. See the Web page for a datasheet on a phototransistor. Which is more sensitive?

4. (OPTIONAL)
Design a better receiver or transmitter circuit Sketch your new design indicating the values of the voltages and resistors. How does the performance of this circuit theoretically compare to that of your original design?

COMMENTS
This is a difficult question. You will probably need to do some reading outside the textbook to help you design a better optical communications system. Two of my favorite "old" references which KSL has are:

Optoelectronics applications manual / prepared by the Applications Engineering Staff of the Hewlett-Packard Optoelectronics Division ; Stan Gage ... [et al.]
McGraw-Hill, c1977
TK7871.89.L53H48 1977

Optoelectronics/fiber-optics applications manual / prepared by the Applications Engineering Staff of the Hewlett-Packard Optoelectronics Division ; Stan Gage ... [et al.]
New York : McGraw-Hill, c1981
Edition2d ed
TK7871.89.L53H48 1981
Descript'n ca. 500 p. in various pagings : ill. ; 28 cm
Note Published in 1977 under title: Optoelectronics applications manual
Includes index