

## Homework #8      Photodiode Current to Voltage Converter

1) Design a circuit to amplify the signal from a photodiode. The output should be **1V/μW** at **850nm**. You decide to base your design on a PDB-C156 photodiode and a LM741 op-amp with +/-15V supplies. Note: The light intensity doesn't change quickly so don't worry about filtering out high frequencies or reverse biasing the diode.

[http://www.physics.unlv.edu/~bill/PHYS483/Photodiode\\_PDB-C156\\_datasheet.pdf](http://www.physics.unlv.edu/~bill/PHYS483/Photodiode_PDB-C156_datasheet.pdf)

<http://media.digikey.com/pdf/Data%20Sheets/Fairchild%20PDFs/LM741.pdf>

2) You need to do a new experiment and the photodiode must respond faster so you put a **10V** reverse bias on the photodiode.

- a) Redraw the circuit with the reverse biased diode.
- b) About how large will the **dark current** be and what will the **output voltage** be when no light is hitting the photodiode (use the same feedback resistor as above)? You may assume an ideal op-amp (i.e. the input offset voltage and bias currents are zero).
- c) Make a guess at the **response time** of your amplifier design with this photodiode and feedback resistor. You may assume an ideal op-amp (i.e. the input capacitance is zero).