Lab 7 (38 points total)

7-1 JFET Saturation Characteristics (10 points)

3 points for a range of measurements of IDSS and VGS(off) for each of 3 samples of 2N5485 JFET using a sensitive ammeter
6 points for a plot of log ID on the y axis and VGS on the x axis for the 3 samples of 2N5485 JFET (make three different lines, and connect the points with straight lines) (You don't need to show a table of your measurements, although you can if you want to.)
1 point for checking that the values fall within the maximum quoted range

7-2 Discreet JFET Current Sources (6 points)

1 point for VGS(off) of the JFET you decided to use
2 points for a plot of Iout over RL for different values. (Get enough points to get a good sense of the behavior.)
2 points for a plot of ID over VDS for different values. (Get enough points to get a good sense of the behavior.)
1 point for the exact point at which the FET starts to break down (Point out this point on your plot of ID over VD.)
1 point for "Does your FET's 'active region' begin around this value of VDS?"

7-3 Improved Current Source (6 points)

1 point for "What is the expected value of Iout, the current through the load?"
3 points for a table of RD, VDS, and Iout for different values. (Get enough points to get a good sense of the behavior.)
1 point for discussion on if the JFET's linear region (the region with VDS below VGS - VGS(off)) restricts the range of circuit performance
1 point for comparing the range of circuit performance to 7.2

7-4 Source Follower (8 points)

1 point for screenshot of small (0.1 < V < 1) 1kHz sine wave input and output with peak-to-peak measurements on screen
1 point for how much the gain differs from unity
1 point for why there is a difference
1 point for inferring gm for IDQ
1 point for comparing your gm to the gm shown on the transistor's data sheet (is it lower or higher? Why?)
3 points for using your measured VGS(off) and your measured gm to make a plot of gm vs VGS. Make sure your plot extends far enough to reach VGS=0, and identify IDSS on your plot (just like Fig 7.8 of the lab)

7.5 Follower with Current Source Load (8 points)
1 point for screenshot of 1V, 1kHz sine wave input and output with peak-to-peak measurements on screen
1 point for comparing the gain to the gain of the simple follower
1 point for theoretical input impedance of this circuit.
1 point for measuring the input impedance $R_{\text{in}} = \frac{V_{\text{in}}}{I_{\text{in}}}$
1 point for screenshot of DC offset
1 point for identifying where the DC offset originates. e.g., Mismatch of FETs? Mismatch of resistors? Anything else?
2 points for what circuit changes would let you find out