EE101 Quiz #4
November 7, 2012

Name __________________________ Student ID __________________________

Please put boxes around your answer. Show all work on the sheets provided and if necessary you can use back pages, but indicate which problem your work applies to. Answer to two sub-decimal places (example, 10.33 rather than 10.326). Please honor the rules of academic integrity.

1. (10 points) Design an analog computing circuit that contains a 1\( \mu \text{F} \) capacitor to find a solution for the following first-order differential equation \( \frac{dy}{dt} + 2y + 1 = 0 \).

2. (10 points) In the RLC circuit below, the switch contact is changed from terminal 1 to terminal 2 at \( t=0 \). Find \( v(0^+) \), \( \frac{dv(0^+)}{dt} \), \( i(0^+) \), \( \frac{di(0^+)}{dt} \).

\[
\begin{align*}
   v(a^-) &= 4V = v(a^+) \\
   i(a^-) &= 0A = i(a^+) \\
   C \frac{dv(a^+)}{dt} &= -\frac{v(a^+)}{0.5} \\
   \text{thus} \quad \frac{dv(a^+)}{dt} &= -\frac{4V}{0.5} = -8V \\
   0.25 \frac{di(a^+)}{dt} &= v(a^+) \\
   \text{thus} \quad \frac{di(a^+)}{dt} &= \frac{1}{0.25} \times 4 = 16A
\end{align*}
\]