## ECE 2210/00 Exam 1 given: Fall 08 (The space between problems has been rem oved.)

To get the most possible partial credit, always show all the intermediate values that you can calculate. If further calculations depend on a value that you can't figure out, just use a letter (like $\mathrm{I}_{\mathrm{R} 1}$ ) or a guessed value and proceed.

1. (24 pts) Find the resistor values. Show your work

Note: feel free to show answers \& work right on the schematic
a) $\mathrm{R}_{4}=$ ?
b) $\mathrm{R}_{3}=$ ?
c) $\mathrm{I}_{\mathrm{S}}=$ ?

## c)

$$
\mathrm{I}_{\mathrm{S}}=?
$$

2. ( 20 pts) Use the method of superposition to find the voltage across $R_{3}\left(V_{\mathrm{R} 3}\right)$ and the current through $\mathrm{R}_{2}$ $\left(\mathrm{I}_{\mathrm{R} 2}\right)$. Be sure to clearly show and circle your intermediate results.

3. (27 pts) a) Find and draw the Thévenin equival ent of the circuit shown.

The load resistor is $\mathrm{R}_{\mathrm{L}}$.
b) Find and draw the Norton equivalent of the same circuit.
c) Find the power dissipated in the load using your Thévenin equivalent circuit.

$$
\mathrm{P}_{\mathrm{RL}}=?
$$


d) Select a load resistor to maximize the power delivered to the load and find that maximum power.
$\mathrm{P}_{\text {RLmax }}=$ ?
4. (18 pts) a) Use nodal analysis to find the voltage across $\mathrm{R}_{3}\left(\mathrm{~V}_{\mathrm{R} 3}\right)$. ECE 2210/00 Exam 1 Fall 08 p2 You MUST show all the steps of nodal analysis work to get credit, including drawing appropriate symbols and labels on the circuit shown.
b) Find the current through $\mathrm{R}_{2}\left(\mathrm{I}_{\mathrm{R} 2}\right)$.
$\mathrm{I}_{\mathrm{R} 2}=$ ?

5. (11 pts)
a) Find $\mathrm{C}_{\mathrm{eq}}$ between terminals a and b .
b) Find $\mathrm{C}_{\mathrm{eq}}$ between terminals c and d .


## Answers

1. a) $2 \cdot \mathrm{k} \Omega$
b) $850 \cdot \Omega$
c) $29 \cdot \mathrm{~mA}$
2. $4 \cdot \mathrm{~mA}-5 \cdot \mathrm{~mA}=-1 \cdot \mathrm{~mA}$

$$
4.8 \cdot \mathrm{~V}+3 \cdot \mathrm{~V}=7.8 \cdot \mathrm{~V}
$$

## Name

Scores:
Pages 1\&2 $\qquad$ of a possible 44 pts
3. a)

b)
c) $28.8 \cdot \mathrm{~mW}$
d) $51.84 \cdot \mathrm{~mW}$

Pages 3\&4 $\qquad$ of a possible 45 pts

Page 5 $\qquad$ of a possible 11 pts

Total $\qquad$ of a possible 100 pts
4. a) $6 \cdot \mathrm{~V}$
b) $10 \cdot \mathrm{~mA}$

5. a) $4 \cdot \mu \mathrm{~F}$
b) $20 \cdot \mu \mathrm{~F}$

