



EECS 42 – Introduction to Electronics for Computer Science

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Dept. EECS,
UC Berkeley
Course Web Site <http://www-inst.EECS.Berkeley.EDU/~ee42/>

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Midterm #1 October 3rd, 2001

Closed Book, Closed Notes
Write on the Exam paper

Print Your Name: _____

Sign Your Name: _____

Show your work so that the method as well as the answer can be graded for correctness and completeness. Correct answers alone are only worth 70% of full credit.

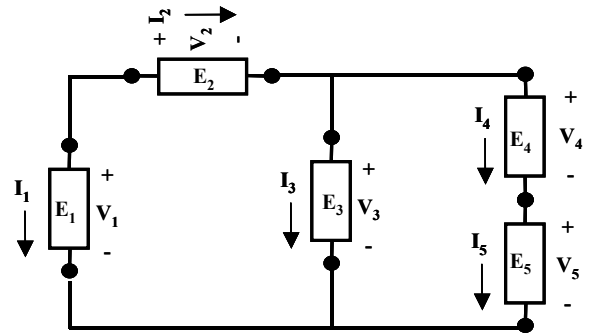
Problem	Possible	Score
I	20	
II	20	
III	20	
IV	20	
V	20	
Total	100	

I (20 Points) Basic Circuit Analysis

$$V_1 = 1V \quad V_2 = 2V \quad V_5 = -3V$$

$$I_1 = 1 \text{ mA} \quad I_4 = 2 \text{ mA}$$

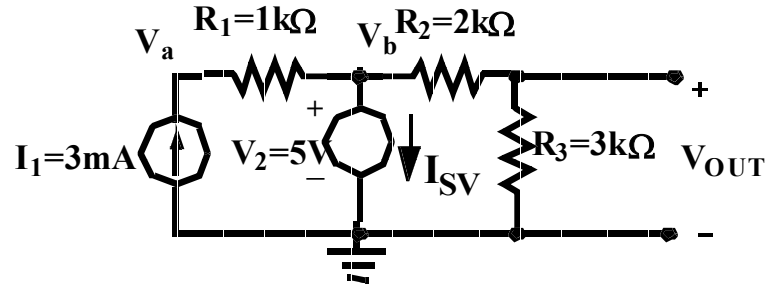
a) For the circuit shown find V_4 .



b) For the circuit shown find I_3 .

c) For the circuit shown find the power into E_2 .

II (20 Points) Equivalent Circuits and Analysis



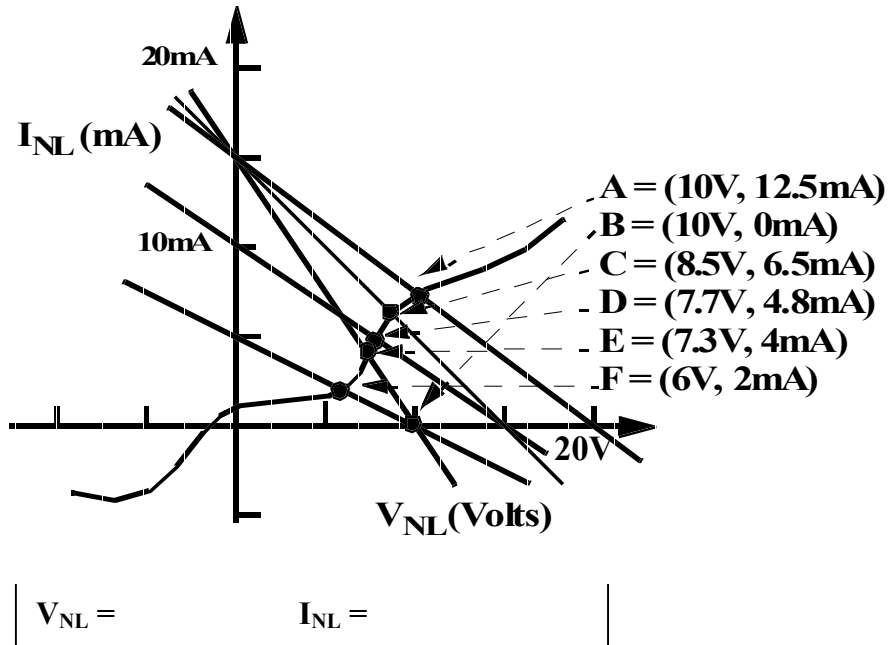
a) For the circuit shown find the Thevinin equivalent circuit looking into the output.

b) For the circuit shown find the current through the voltage source (I_{SV}) when the output is shorted.

III (20 Points) Equivalent Circuits and Analysis

A linear circuit is connected to a nonlinear load. Before it is connected the circuit is tested and has an open circuit voltage of 15 volts and a short circuit current of 10 mA.

- a) Using one of the following load lines correctly determine the voltage and current through the nonlinear load when the circuit is connected to the nonlinear load.

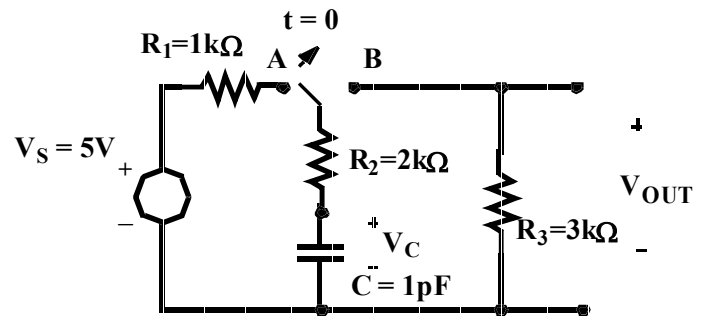


- b) Find the power out of the source in the Thevinin equivalent circuit and the fraction of its power that is delivered to the nonlinear load.

IV (20 Points) Transient

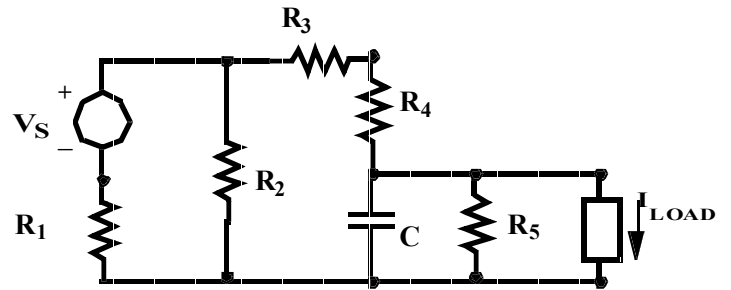
The switch in the circuit moves from A to B at $t = 0$. Find the output voltage $V_{OUT}(t)$.

NOTE 'OUT'!



V (20 Points) Node Equations

Label the nodes and write a complete set of node equations for determining the node voltages that only contain the node voltages themselves and resistance, capacitance, V_S and I_{Load} .



Plan what you are going to do because you can save yourself a lot of writing. The equations should hold for both time varying as well as steady state node voltages.