Problem Set # 4
Due: 1 PM Sep 24th, 2003 in box outside 240 Cory

Announcements:
Quiz in class 9/25 for 20 minutes on Basic Circuit Analysis and Basic Transients. Midterm in class 10/2 covers lectures 1-9, closed book, closed notes, bring calculator, paper provided.
Reading Week #4: Schwarz and Oldham 8.1 and RC_Handout; 53-58; 2.5-2.6.
Review Sessions for Midterm: TBA

4.1 Transient

Assume that the 5pF capacitor has been uncharged for a very long time until t = 0.
(a) Find $v_c(t)$ for $t \geq 0$.
(b) Find the energy stored on the capacitor as time goes to infinity.

4.2 Transient Analysis Cont.
a) Draw the equivalent Thevenin circuit with respect to $V_{OUT}$. Compute $V_{TH}$ and $R_{TH}$.

b) Suppose at time $t = 0$, an uncharged capacitor (2pF) is attached to $V_{OUT}$ of the circuit found in part a. Determine $v_c(t)$, which is the voltage across the capacitor for $t \geq 0$.

c) Determine $i_R(t)$ for $t > 0$.

d) Compute the total energy absorbed by the capacitor.

### 4.3 Nodal Analysis

![Diagram](image)

a) Write nodal equations at each unknown node, excluding the ground node.

b) Solve for $V_A$ and $V_B$

### 4.4 Nodal Analysis Cont.

![Diagram](image)

a) Identify a convenient place to put the ground node.

b) Label the unknown voltage nodes, excluding the ground node.

c) Write nodal equations at each node. Solve for all the unknown voltage nodes.