EEE 31 second semester AY2017-2018 : Problem Set 02

Instructions:

- Due 4:00 pm on Friday, 11 May 2018.
- A drop box will be provided at EEEI Room 220.
- Submit your solutions using yellow pad. Start each problem on a new sheet of paper.

1. Refer to the circuit in Figure 1. With switch SW_1 closed, current $I_1 = 2A$. With switch SW_1 open, calculate the maximum power (in W) that can be transferred to R_L

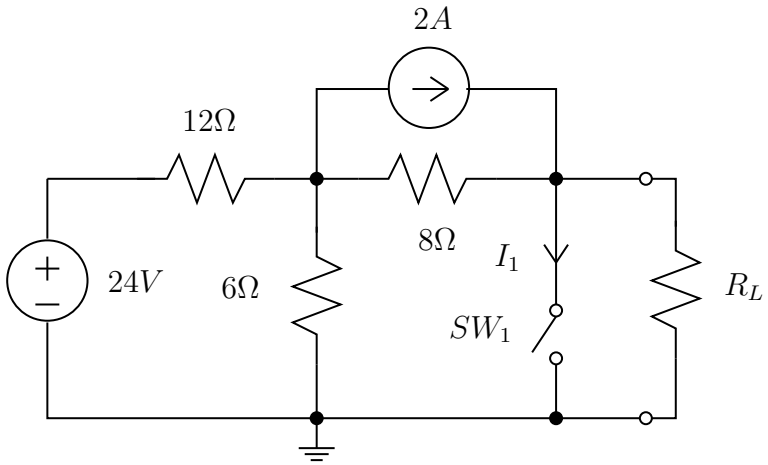

Figure 1:

2. Refer to the circuit in Figure 2. With the $4A$ current source unconnected, $V_{AB} = 10V$. What will be the value of V_{AB} after the $4A$ source is connected between nodes A and B?

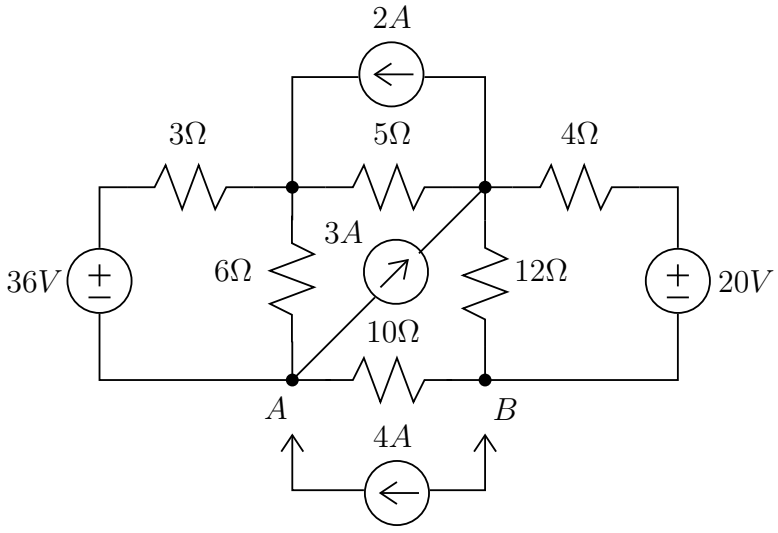

Figure 2:

3. If $V_i = 1.5V$ in the circuit in Figure 3, what is the power dissipated by the $1k\Omega$ resistance? Assume the opamps are ideal.

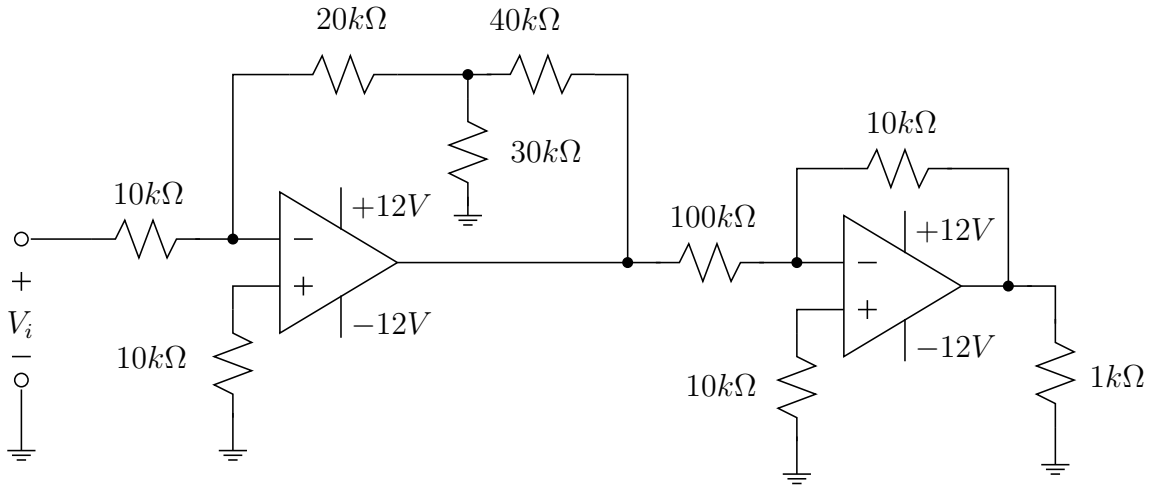

Figure 3:

4. The circuit shown in Figure 4 is a crude battery charging circuit. Show that for any $V_b \geq 0$, V_o is always less than or equal to 14V. R_s and R_b are usually small (less than 1 Ω). Assume the diode is ideal.

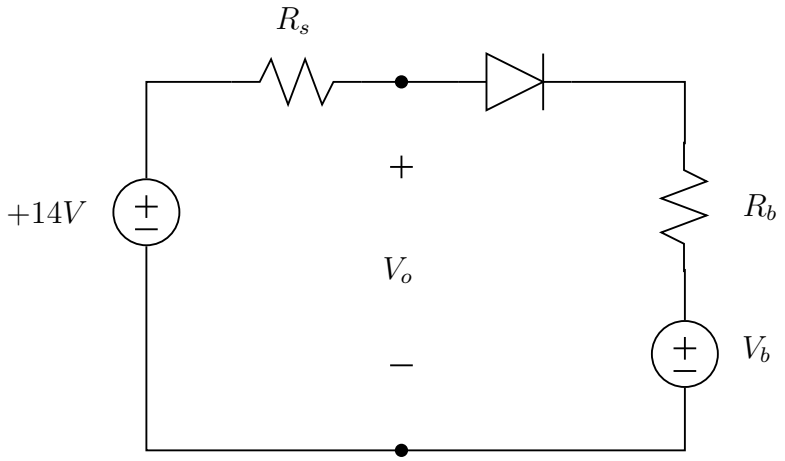

Figure 4: