Quiz 5 (9/20/2018)

1. Which is not a basic electrical quantity?
   A) Charge  B) Mass  C) Voltage  D) Current

2. Using Circuit 1, what is the value of current $I_4$?
   A) -12 mA  B) -7.5 mA  C) 7.5 mA  D) 3 mA  E) None of A-D

3. Using Circuit 2, what is the value of voltage $V_0$?
   A) -16 V  B) 4 V  C) 8 V  D) 24 V  E) None of A-D

4. Using Circuit 2, what is the value of current $I_z$?
   A) -4 mA  B) 4 mA  C) 2 mA  D) 52 mA  E) None of A-D

2. Define $V$ in active sign with current source, as shown. Then $I_4$ is in passive sign with $V$, and we can use
   current div. formula: $I_4 = \frac{I_4}{V_4+I_4+I_4}/15mA = \frac{3mA}{I_4}$

   Check: $V = I_4 \cdot 4 \Omega = 12mV$ and other 2 resistor currents (up) are both $I_2 = 6mA$, KCL: $15mA = 6mA + 6mA + 3mA$

3. Define $I_0$ in passive sign w/ $V_0$. KVL: $-24 + I_0 \cdot (8 \Omega) + I_0 \cdot (9 \Omega) = 0$
   $I_0 = \frac{24}{12k} = 2mA$

   Ohm: $V_0 = I_0 (4k) = 8V = V_0$

   Or: Voltage div: $V_0 = \frac{4k}{4k+8k} (24) = 8V$

4. KVL (left side): $-26V + V_2 + 24V = 0 \Rightarrow V_2 = 2V$

   Ohm: $I_2 = \frac{2V}{500} = \frac{4mA}{I_2}$

   Check for 3 & 4: Ohm: $I_0 = \frac{V_0}{4k} = 2mA$  $I_x = \frac{24}{12k} = 2mA$

   KCL: $I_2 = I_0 + I_x = 2mA + 2mA = 4mA = I_2 $