

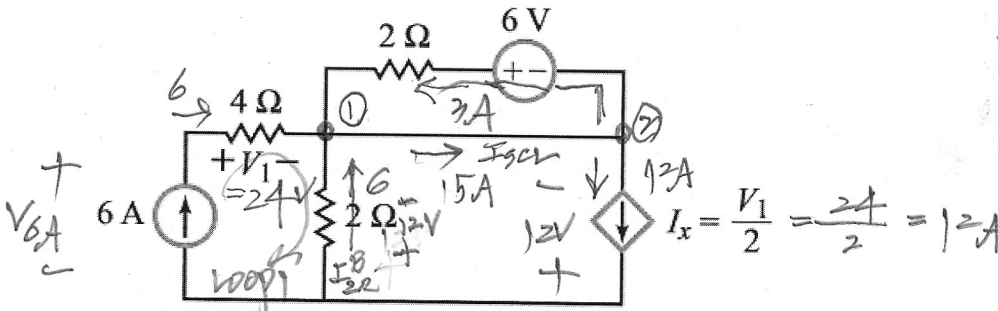
Solution

EE101 Winter 2019 Quiz #1

January 15, 2019

Name _____ Student ID _____

Problem (10 points) For the circuit below, (1) find the voltage across the 6A current source with an appropriate polarity. (2) Find the total power generated in the circuit.



Kcl at ②

- $V_1 = 6A \times 4\Omega = 24V$
- $I_x = \frac{V_1}{2} = 12A$
- $I_{short\ ckt\ line} = 0$
 $3A + 12A + I_{sc} = 0$
 $\Rightarrow I_{sc} = -15A$
 (Flows in)

$6A \uparrow$
 $V_{6A} = 24 + (-12) = 12V$

Kcl at ①

$6A + 3A + I_{2\Omega}^B - 15 = 0$
 $I_{2\Omega}^B = 6A$
 Thus $V_B = 12V$

KVL loop 1:

$-V_{6A} + 24V - 12V = 0$
 $\Rightarrow V_{6A} = 12V$

Answer (1) (6 points)

Voltage = 12 [V]

Mark the Polarity to the source figure with + and - signs.

Answer (2) (4 points)

Total power generated in the circuit = 234 [W].

$P_{6A} = -6 \times 12 = -72W$

$P_{Ix} = -12 \times 12 = -144W$

$P_{6V} = -3 \times 6 = -18W$

-234W

power consumed

$P_{4\Omega} = 6^2 \cdot 4\Omega = 36 \times 4 = 144W$

$P_{2\Omega} = 3^2 \cdot 2\Omega = 18W$

$P_{2\Omega}^B = 6^2 \cdot 2 = 72W$

Sum 234W

Total Sum = 0 (conservation of energy)