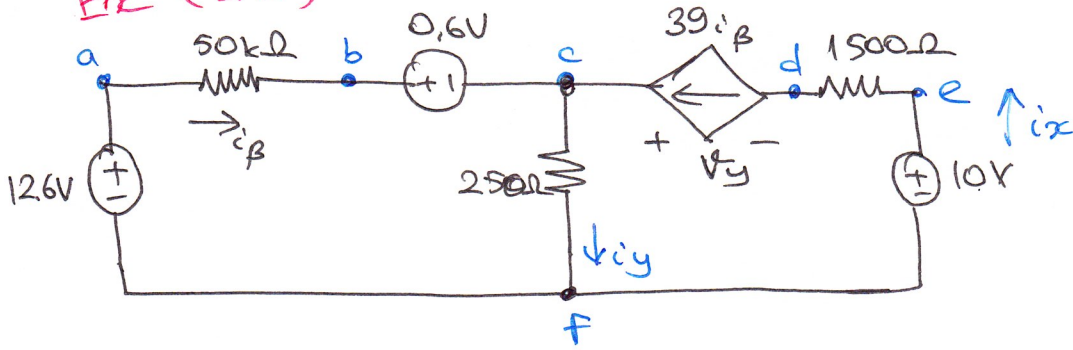


Ex (2.15)



a) Find V_y

b) Show that the total power generated equals the total power absorbed

a) Ohm's Law: $V_{ab} = 50k\Omega i_\beta$
 $V_{cf} = 250\Omega i_y$
 $V_{de} = -1500i_x$

Kirchoff's current Law: 6 nodes \Rightarrow 5 eqn's

node (c) = $i_\beta + i_x - i_y = 0$

Kirchoff's voltage law with ohm's Law

$$-12.6V + 50k\Omega i_\beta + 0.6V + 250i_y = 0$$

$$-250i_y + V_y - 1500i_x + 10V = 0$$

Eqn for dependent source $39i_\beta = i_x$

Sol $i_y = 40i_\beta$

$$-12.6V + 50k\Omega i_\beta + 0.6V + 250(40i_\beta) = 0$$

$$-250(40i_\beta) + V_y - 1500(39i_\beta) + 10V = 0$$

$$60k\Omega i_\beta - 12V \Rightarrow i_\beta = 0.2mA$$

$$V_y = 3.7V$$

$$\Sigma P_{gen} = (12.6 \cdot i_\beta) + (10 \cdot 39i_\beta) + (3.7 \cdot 39i_\beta) = 109.38mW$$

$$\Sigma P_{diss} = (0.2)^2 50 + 0.6 \cdot i_\beta + 8^2 (0.25) + (7.8)^2 (1.5) = 109.38mW$$