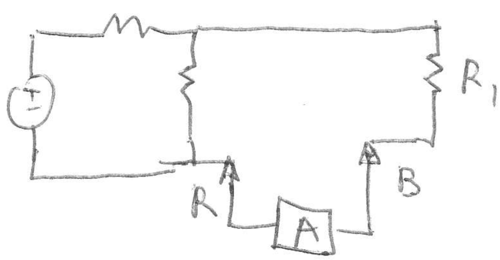
▽

(1)



(2) $i_a = -8A$

(3) (a) $X = -2V$

(b) $P_1 = 8W$

(c) $P_2 = 40W$

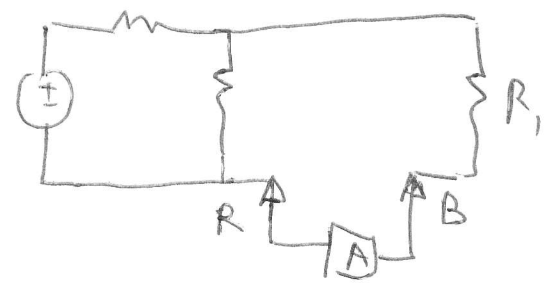
(4) (a) $i_a = -1A$

(b) $v_x = -4V$

(c) $i_x = -3A$

△

(1)



(2) $i_a =$ ~~[illegible]~~ $-6A$

(3) (a) $X = -2V$

(b) $P_1 = 12W$

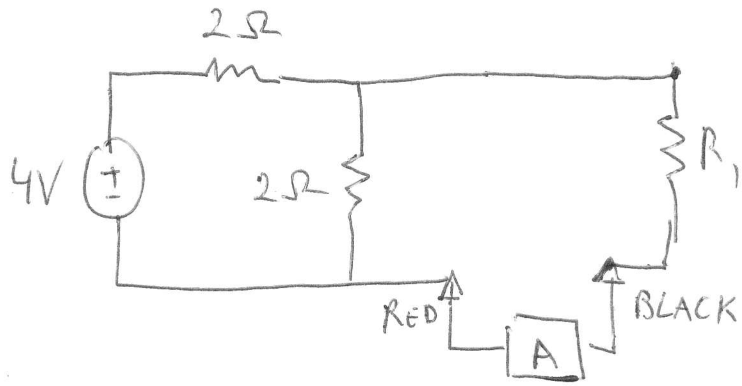
(c) $P_2 = 60W$

(4) (a) $i_a = -1A$

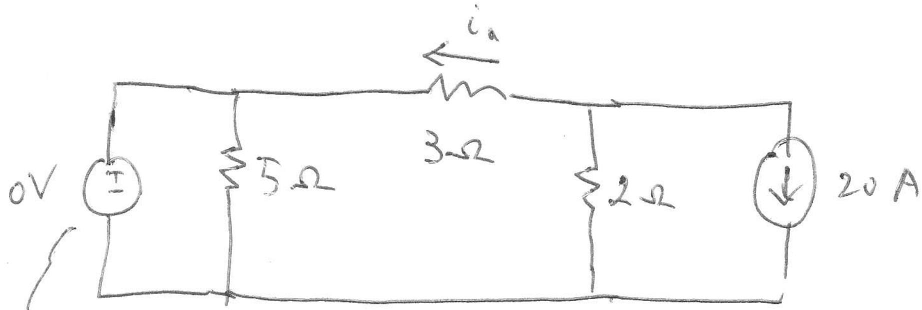
(b) $v_x = -3V$

(c) $i_x = -4A$

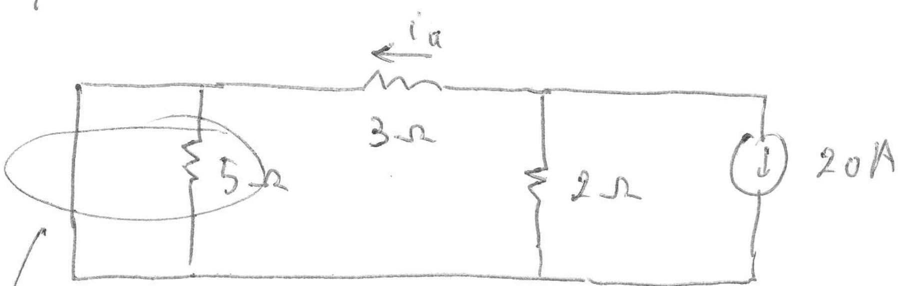
(i)



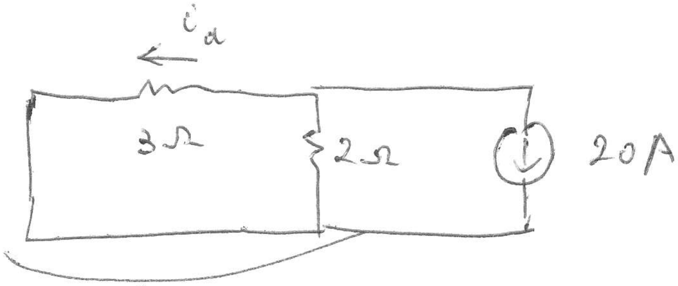
2



equivalent to a short



parallel : $R_{eq} = \dfrac{1}{\frac{1}{0} + \frac{1}{5}} = \dfrac{1}{\infty + \frac{1}{5}} = \dfrac{1}{\infty} = 0$

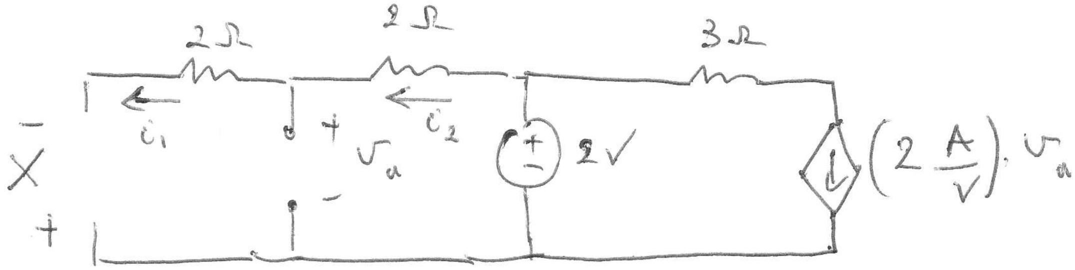


current divider

$$i_a = (-20) \cdot \frac{2}{2+3} = -8\ A$$

$$\boxed{i_a = -8\ A}$$

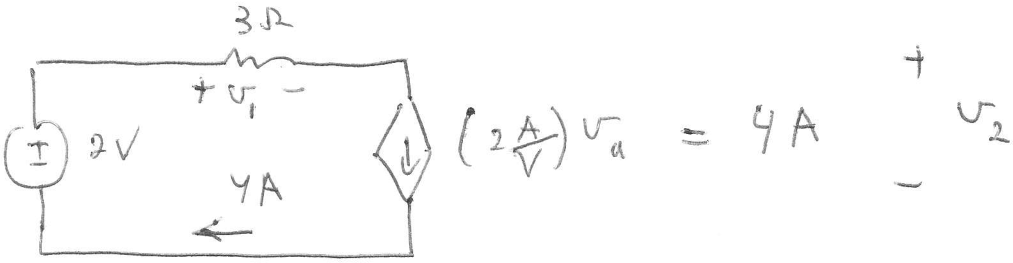
(3)

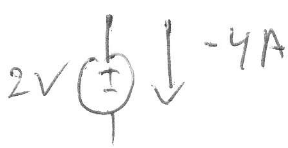


$i_1 = 0\,A \qquad i_2 = 0\,A$

(a) $\Rightarrow v_a = 2V \Rightarrow \boxed{X = -2V}$

(b)



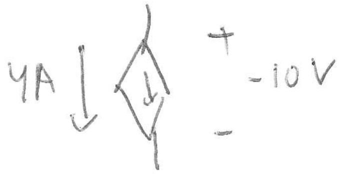


$P = 2(-4) = -8W$ received

$\boxed{P_1 = 8W}$ supplied

(c) $v_1 = 3\Omega \cdot 4A = 12V$

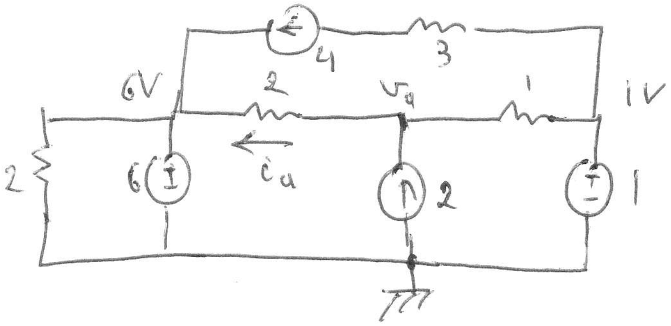
KVL: $-2 + v_1 + v_2 = 0 \Rightarrow v_2 = 2 - v_1 = -10V$



$P = 4 \cdot (-10) = -40\,W$ received

$\boxed{P_2 = 40W}$ supplied

(4) (a)



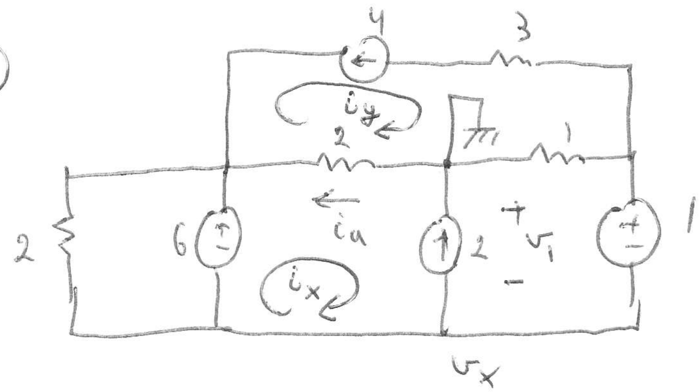
nodal analysis: $\frac{v_a-6}{2}+\frac{v_a-1}{1}-2=0 \Rightarrow v_a-6+2(v_a-1)-4=0$

$3v_a-12=0$

$v_a=4V$

$i_a=\frac{v_a-6}{2}=\frac{4-6}{2}=-1$ $\boxed{i_a=-1A}$

(b) (c)



$i_y=-4$

(*) i_a is the same

Consider mesh currents i_x and i_y: $i_a=i_y-i_x=-1$

$\Rightarrow i_x=i_y-i_a=-4-(-1)=-3$

$\boxed{i_x=-3A}$

(*) v_1 is the same

$v_1=v_a-0=4 \Rightarrow v_1=0-v_x=4$

$\boxed{v_x=-4V}$