

King Fahd University Of Petroleum & Minerals  
Department of Electrical Engineering  
2009-2010 First Semester (091)

EE204 – Quiz # 1

Ser	Name	ID#	SEC#

Assume the following:

Element 1 with voltage  $v_1$

absorbs -12 W.

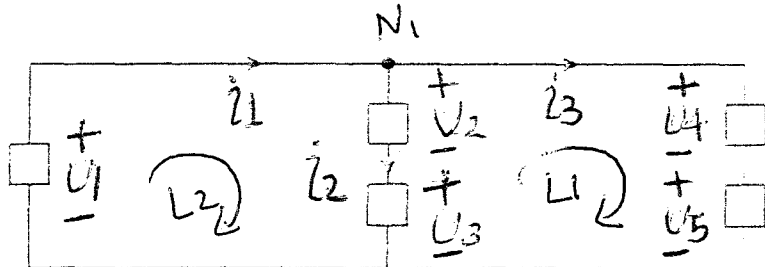
$v_2 = v_3 = 2\text{ V}$ .

$v_4 = 1\text{ V}$

$i_5 = 1\text{ A}$

Determine  $v_1, v_5, i_1, i_2$  and

Verify Conservation of Power.



apply KVL for  $L_1$  :-

$$-v_3 - v_2 + v_4 + v_5 = 0 \Rightarrow v_5 = v_2 + v_3 - v_4 = 2 + 2 - 1$$

$v_5 = 3\text{ V}$

apply KVL for  $L_2$  :-

$$-v_1 + v_2 + v_3 = 0 \Rightarrow v_1 = v_2 + v_3 = 2 + 2 \Rightarrow$$

$v_1 = 4\text{ V}$

apply the power law for element 1 :-

$$P = -v_1 i_1 \Rightarrow -12 = -(4) i_1 \Rightarrow$$

$i_1 = 3\text{ A}$

apply KCL at  $N_1$  :-

$$i_1 = i_2 + i_3 \Rightarrow i_2 = i_1 - i_3 = 3 - 1 \Rightarrow$$

$i_2 = 2\text{ A}$

$$P_1 = -12\text{ W} ; P_2 = i_2 v_2 = 4\text{ W} ; P_3 = i_2 v_3 = 4\text{ W}$$

$$P_4 = i_3 v_4 = 1\text{ W} ; P_5 = i_3 v_5 = 3\text{ W}$$

$$\sum_{i=1}^5 P_i = -12 + 4 + 4 + 1 + 3 = 0$$