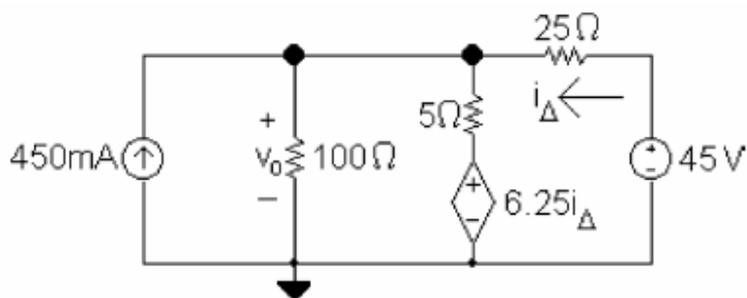


KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
ELECTRICAL ENGINEERING DEPARTMENT
EE-201 ELECTRIC CIRCUITS
Dr. Ibrahim O. Habiballah

Sec: 8 Quiz # 2 Ser. # Name: I.D.#

For the circuit shown below, use nodal analysis to find

- a) the voltage “ v_o ”,
- b) the power of the dependent source (indicating weather it is absorbed or delivered)



[a]

The node voltage equation is:

$$-0.45 + \frac{v_o}{100} + \frac{v_o - 6.25i_{\Delta}}{5} + \frac{v_o - 45}{25} = 0$$

The dependent source constraint equation is:

$$i_{\Delta} = \frac{45 - v_o}{25}$$

Place these equations in standard form:

$$v_o \left(\frac{1}{100} + \frac{1}{5} + \frac{1}{25} \right) + i_{\Delta} \left(-\frac{6.25}{5} \right) = \frac{45}{25} + 0.45$$

$$v_o \left(\frac{1}{25} \right) + i_{\Delta} (1) = \frac{45}{25}$$

Solving, $v_o = 15 \text{ V};$ $i_{\Delta} = 1.2 \text{ A}$

[b] $i_{ds} = \frac{v_o - 6.25i_{\Delta}}{5} = \frac{15 - 7.5}{5} = 1.5 \text{ A}$

$$p_{ds} = [6.25(1.2)](1.5) = 11.25 \text{ W}$$

Thus, the dependent source absorbs 11.25 W