# KING FAHD UNIVERSITY OF PETROLEUM & MINERALS

**ELECTRICAL ENGINEERING DEPARTMENT**

**EE-201 ELECTRIC CIRCUITS**

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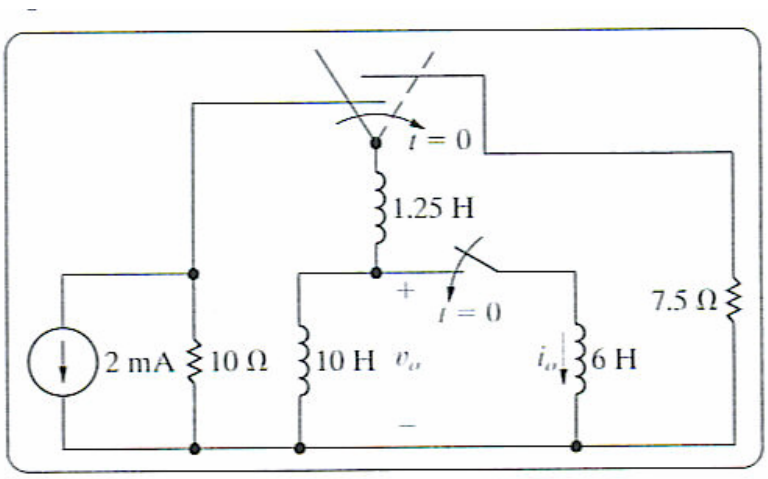
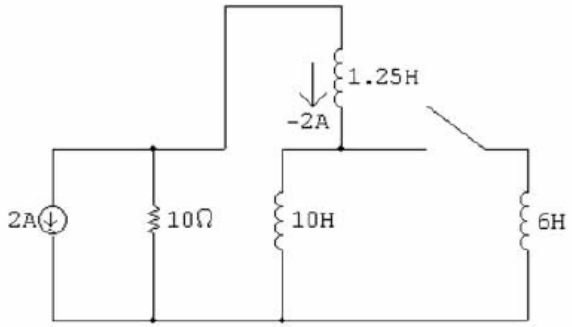
**Sec: 8 Quiz # 5 Ser. # Name: I.D.#**

**Find $v_o(t)$ for $t \geq 0$ in the circuit shown below**

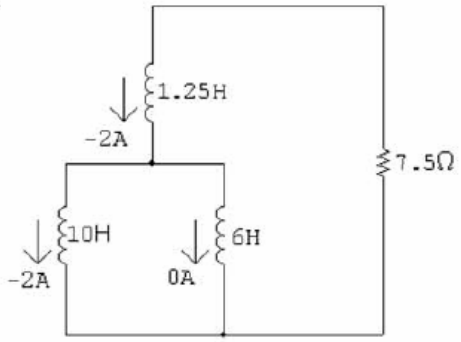



**Solution**

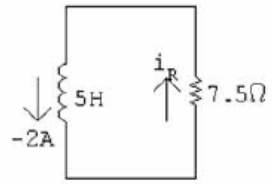
**[a]** $t < 0$:




$t = 0^+$:

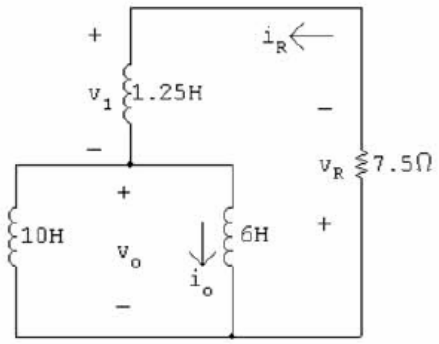



$t > 0$:




$$i_R = -2e^{-t/\tau}\,\text{A}; \qquad \tau = \frac{L}{R} = \frac{5}{7.5} = 666.67\,\text{ms} \quad \therefore \quad \frac{1}{\tau} = 1.5$$

$$i_R = -2e^{-1.5t}\,\text{A}$$




$$v_R = (7.5)(-2e^{-1.5t}) = -15e^{-1.5t}\,\text{V}$$

$$v_1 = 1.25[(-1.5)(-2e^{-1.5t})] = 3.75e^{-1.5t}\,\text{V},$$

$$v_o = -v_1 - v_R = 11.25e^{-1.5t}\,\text{V} \quad t \geq 0^+$$