ELECTRICAL ENGINEERING DEPARTMENT
CALIFORNIA POLYTECHNIC STATE UNIVERSITY

EE 112 Electric Circuit Analysis I

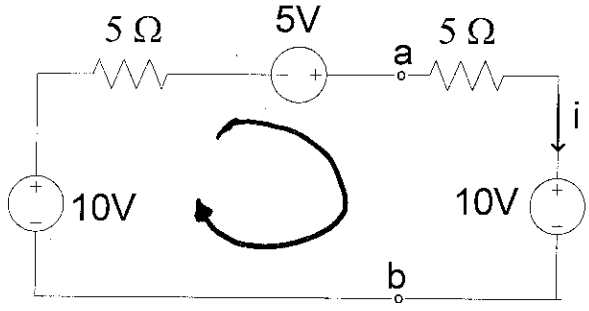
EXAM 1 **Winter 2004**

Name:_____ **Last 4 digits of Student ID:**_____

Section #:_____

1 (7)	2 (7)	3 (5)	4 (6)	Total (25)

PROBLEM #1
Find the current i and voltage v_{ab} for the following circuit.



KVL for the loop:

$5i - 5 + 5i + 10 - 10 = 0$ (2)

$10i = 5$

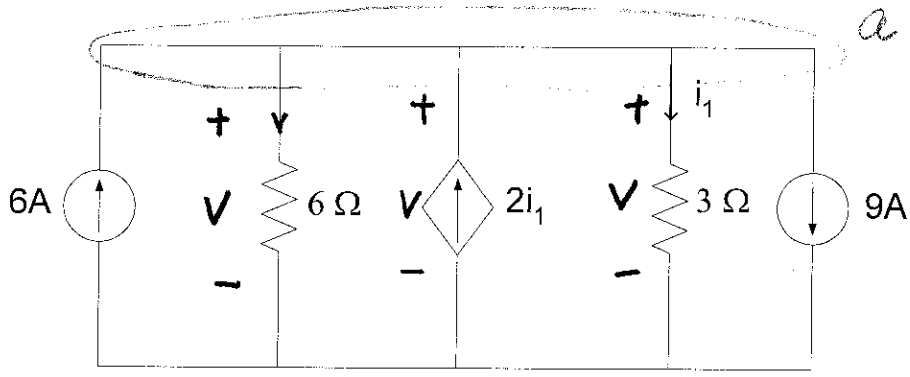
$i = 0.5A$ (2)

$V_{ab} = 5i + 10$ (2)

$= 12.5\,V$ (1)

PROBLEM #2

Find i_1. Calculate the power for the controlled current source (indicate whether the power is absorbed or supplied).



KCL @ node a:

$$\begin{cases} 6 - \frac{V}{6} + 2i_1 - i_1 - 9 = 0 \\ V = 3i_1 \end{cases}$$

$$\frac{i_1}{2} = 3$$

$$\underline{i_1 = 6\,A}$$

$$V = 3i_1 = 18\,V$$

$$P_{DS} = -2i_1 \cdot V$$

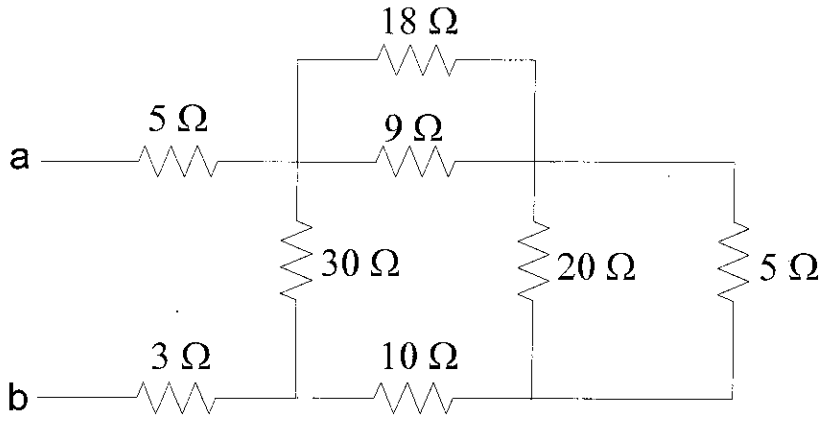
$$= -2 \times 6 \times 18$$

$$= \underline{-216\,W}$$

The power is supplied.

PROBLEM #3

Find the equivalent resistance R_{ab} for the following circuit.



$$R_{ab} = 5 + \left[(18 \,//\, 9) + (20 \,//\, 5) + 10\right] \,//\, 30 + 3$$

$$= 8 + \left(\frac{18 \times 9}{18+9} + \frac{20 \times 5}{20+5} + 10\right) \,//\, 30$$

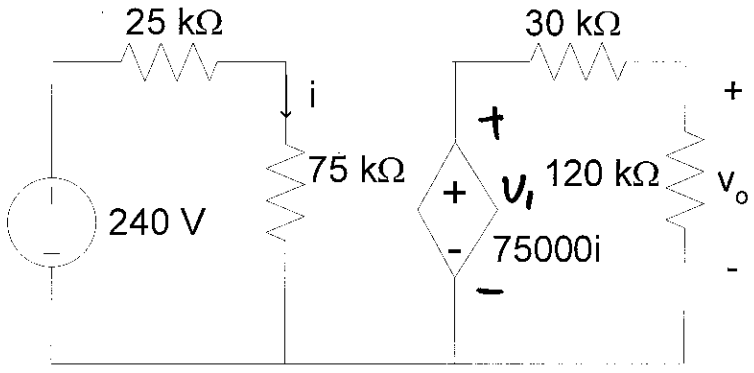
$$= 8 + (6 + 4 + 10) \,//\, 30$$

$$= 8 + \frac{20 \times 30}{20+30}$$

$$= 8 + 12$$

$$= \underline{20\,\Omega}$$

PROBLEM #4
Find v_o for the following circuit.



$$i = \frac{240}{100k} = 2.4\ mA$$

$$v_1 = 75000i = 75 \times 2.4 = 180V$$

$$v_o = \frac{120}{120+30} \cdot v_1$$

$$= \frac{120}{150} \times 180$$

$$= 144V$$