

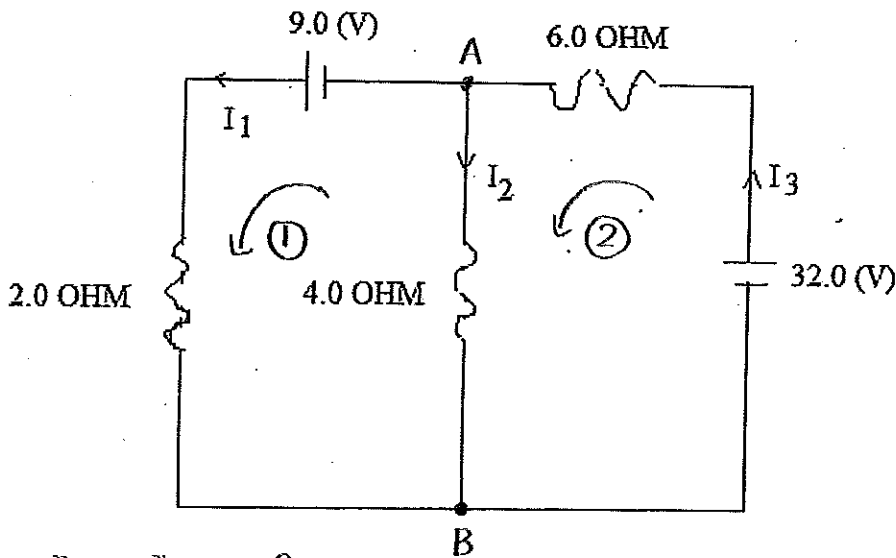
1. FIND THE THREE CURRENTS IN CIRCUIT. FOR BEST RESULTS, USE DETERMINANT AND MATRIX METHODS. OTHERWISE, IT WILL BE DIFFICULT TO GRADE AND GIVE PARTIAL CREDIT.

Equation : $I_1 + I_2 - I_3 = 0$

① : $+9.0 - 2I_1 + 4I_2 = 0$

② : $32 - 6I_3 - 4I_2 = 0$

$$\Rightarrow \begin{cases} I_1 + I_2 - I_3 = 0 \\ 2I_1 - 4I_2 = 9 \\ 4I_2 + 6I_3 = 32 \end{cases}$$



I_1	I_2	I_3	Constant
1	1	-1	0
2	-4	0	9
0	4	6	32

$$\begin{vmatrix} 1 & 1 & -1 \\ 2 & -4 & 0 \\ 0 & 4 & 6 \end{vmatrix} = 1 \times (-24 - 0) - 1 \times (12 - 0) - 1 \times (8 - 0) = -24 - 12 - 8 = -44$$

$$= \begin{vmatrix} 0 & 1 & -1 \\ 9 & -4 & 0 \\ 32 & 4 & 6 \end{vmatrix} = 0 - 1(54) - 1(36 + 128) = -218$$

$$\Delta I_2 = \begin{vmatrix} 1 & 0 & -1 \\ 2 & 9 & 0 \\ 0 & 32 & 6 \end{vmatrix} = 1(54) - 0 - 1(64) = -10$$

$$\Delta I_3 = \begin{vmatrix} 1 & 1 & 0 \\ 2 & -4 & 9 \\ 0 & 4 & 32 \end{vmatrix} = 1(-128 - 36) - 1(64) + 0 = -228$$

$$\therefore I_1 = \frac{\Delta I_1}{\Delta} = \frac{-218}{-44} = 4.95 \text{ A}$$

$$I_2 = \frac{\Delta I_2}{\Delta} = 0.227 \text{ A}$$

$$I_3 = \frac{\Delta I_3}{\Delta} = 5.18 \text{ A}$$