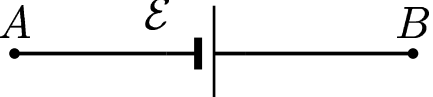Find the loop equation for the loop $ABCDA$.

A) $\mathcal{E}_2 + i_2 R_2 - \mathcal{E}_1 + i_1 R_1 = 0$
B) $\mathcal{E}_2 - i_2 R_2 + \mathcal{E}_1 - i_1 R_1 = 0$
C) $\mathcal{E}_2 + i_2 R_2 - \mathcal{E}_1 - i_1 R_1 = 0$
D) $\mathcal{E}_2 + i_2 R_2 + \mathcal{E}_1 - i_1 R_1 = 0$
E) $\mathcal{E}_2 - i_2 R_2 - \mathcal{E}_1 + i_1 R_1 = 0$

For loop $ABCDA$, we have $\mathcal{E}_2 - i_2 R_2 - \mathcal{E}_1 + i_1 R_1 = 0$

Convention 1:

$$\Delta V = V_B - V_A = +\mathcal{E}$$

$$\Delta V = V_B - V_A = -\mathcal{E}$$

Convention 2:

$$\Delta V = V_D - V_C = -i R$$

$$\Delta V = V_D - V_C = +i R$$

Convention 3: Currents into a junction are positive and currents out of a junction are negative.

Answer **E**.