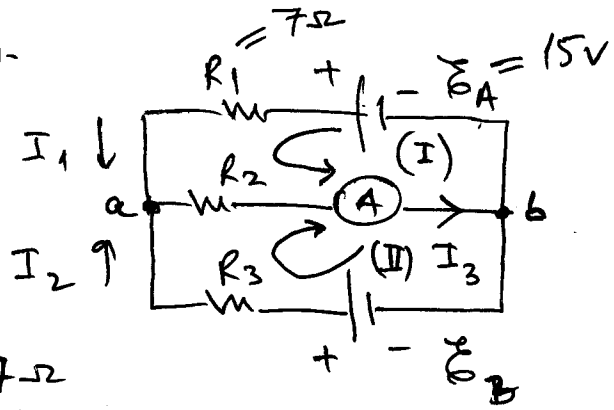
21. (32).



$I_1 = ?$ $I_2 = ?$ $\mathcal{E}_B = ?$

Since $I_3 = 2\,A$ we choose its direction to be $a \to b$ (both batteries tend to push current $a \to b$, so the resultant should be as shown)

$$\begin{cases} R_1 = 7\,\Omega \\ R_2 = 5\,\Omega \\ R_3 = 2\,\Omega \\ \mathcal{E}_A = 15\,V \end{cases}$$

We have 2 loops and 2 points → 2 eqn. → $2 - 1 = 1$ eqn. for currents

$$\Rightarrow \text{(I)} \quad +\mathcal{E}_A = R_1 I_1 + R_2 I_3$$

$$\text{(II)} \quad +\mathcal{E}_B = R_3 I_2 + R_2 I_3$$

$$\text{(a)} \quad I_1 + I_2 = I_3 \longrightarrow I_1 = I_3 - I_2$$

$$\Rightarrow \mathcal{E}_A = R_1 (I_3 - I_2) + R_2 I_3 \Rightarrow I_2 = \frac{-\mathcal{E}_A + (R_1 + R_2) I_3}{R_1}$$

$$I_2 = \frac{-15 + 12 \cdot 2}{7} = \frac{9}{7}\,A \approx 1.29\,A$$

$$I_1 = 2 - \frac{9}{7} = \frac{5}{7}\,A \simeq 0.71\,A$$

$$\mathcal{E}_B = 2 \cdot \frac{9}{7} + 5 \cdot 2 = \frac{88}{7}\,V \simeq 12.6\,V$$

$$I_1 = 0.71\,A, \quad I_2 = 1.29\,A, \quad \mathcal{E}_B = 12.6\,V$$