



$$\begin{array}{ll} R_1 = 60 \, \Omega & R_2 = 6 \, \Omega \\ R_3 = 10 \, \Omega & R_4 = 20 \, \Omega \\ E_1 = 15 \, \text{V} & E_2 = 10 \, \text{V} \end{array}$$

- 1) What is the relationship between the magnitudes of the currents I_3 (through resistor R_3) and I_4 (through resistor R_4)? [4]

a) $|I_3| > |I_4|$

b) $|I_3| = |I_4|$

c) $|I_3| < |I_4|$

Rubric:

Correct answer (4)

- 2) What is the current I_1 through resistor R_1 ? (A positive value means current flows in the direction of the arrow on the diagram.) [4]

$$E_1 + E_2 - I_1 R_1 = 0$$

$$I_1 = 0.42 \text{ A}$$

Rubric:

Correct problem setup (2)

Correct answer (2)

- 3) What is the current I_2 through resistor R_2 ? (A positive value means current flows in the direction of the arrow on the diagram.) [6]

$$E_1 + E_2 - I_2 (R_1 + R_{34}) = 0 \text{ where } R_{34} \text{ is the equivalent resistance for } R_3 \text{ and } R_4, R_{34} = 6.7 \text{ ohms}$$

$$I_2 = 1.97 \text{ A}$$

Rubric:

Correct problem setup (4)

Correct answer (2)

- 4) What is the potential difference $V_B - V_C$ between points **B** and **C**? [6]

$$V_B - V_C = V_2 - I_2 R_2 = -1.84 \text{ V}$$

Rubric:

Correct problem setup (4)

Correct answer (2)