

94. (Second problem of **Cluster**)

- (a) The loop rule (proceeding counterclockwise around the right loop) leads to $\mathcal{E}_2 - i_1 R_1 = 0$ (where i_1 was assumed downward). This yields $i_1 = 0.060$ A (downward).
- (b) The loop rule (counterclockwise around the left loop) gives

$$(+\mathcal{E}_1) + (+i_1 R_1) + (-i_3 R_3) = 0$$

where i_3 has been assumed leftward. This yields $i_3 = 0.180$ A (leftward).

- (c) The junction rule tells us that the current through the 12 V battery is $0.180 + 0.060 = 0.240$ A upward.