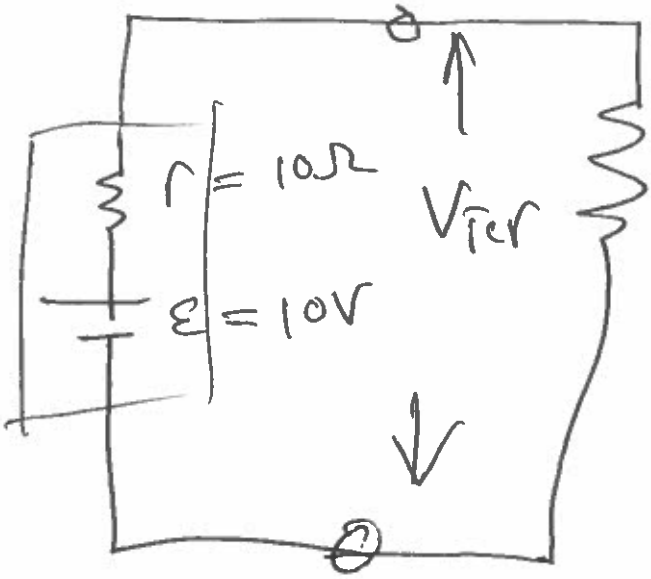


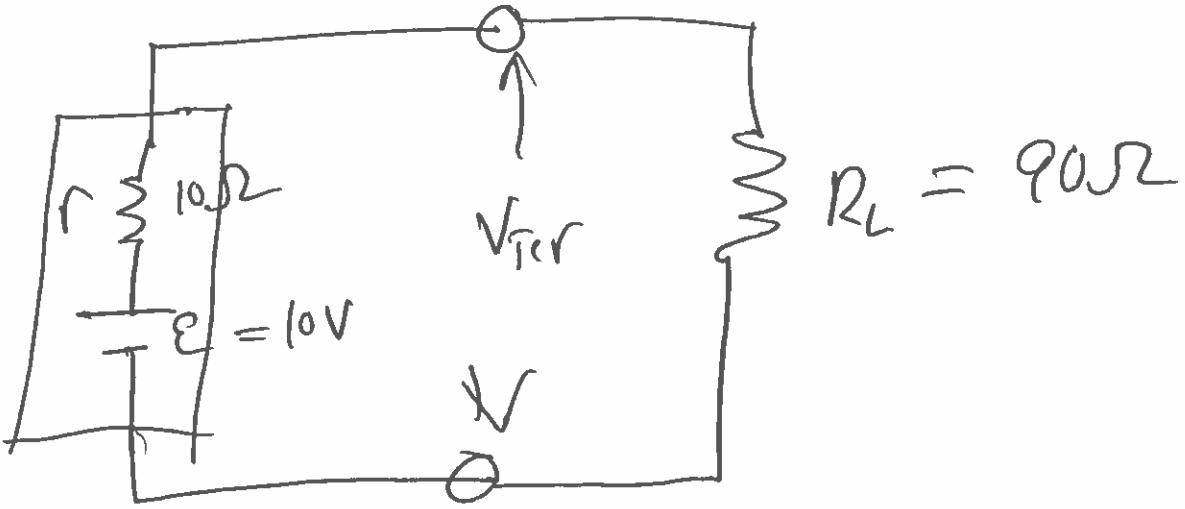
$$V_{RL} = ? = V_{TOT}$$

$$i = \frac{V_{TOT}}{R_{TOT}} = \frac{10V}{10\Omega + 40\Omega} = \frac{10V}{50\Omega}$$

$$i = 0.20\ A$$

$$V_{TOT} = \varepsilon - i r_{int} = 10V - (.20A)(10\Omega)$$

$$V_{TOT} = 10V - 2V = \boxed{8.0V}$$



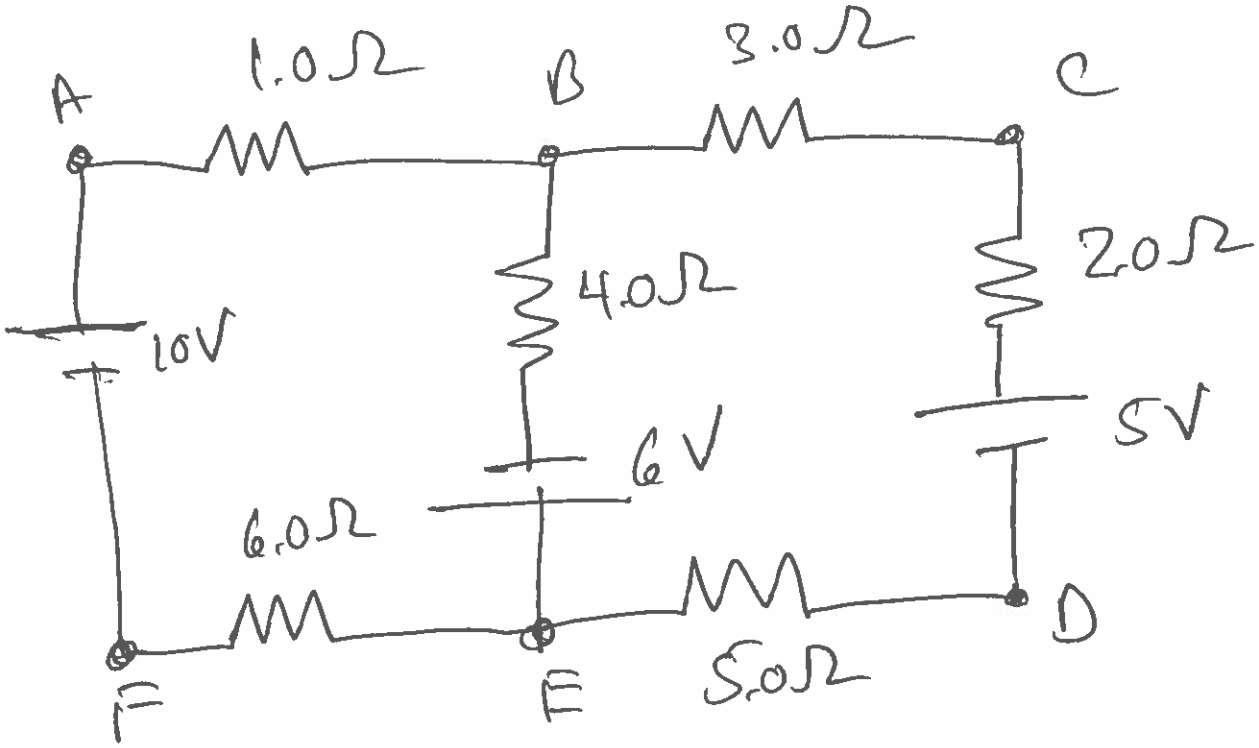
$$i = \frac{V_{Tot}}{R_{Tot}} = \frac{10V}{10\Omega + 90\Omega} = \frac{10V}{100\Omega}$$

$$i = 0,10\,A$$

$$V_{Tcr} = \varepsilon - ir = 10V - (0,1A)(10\Omega)$$

$$V_{Tcr} = 10V - 1V$$

$$V_{Tcr} = 9\,V$$



To solve this circuit use Kirckhoff's Laws of circuits

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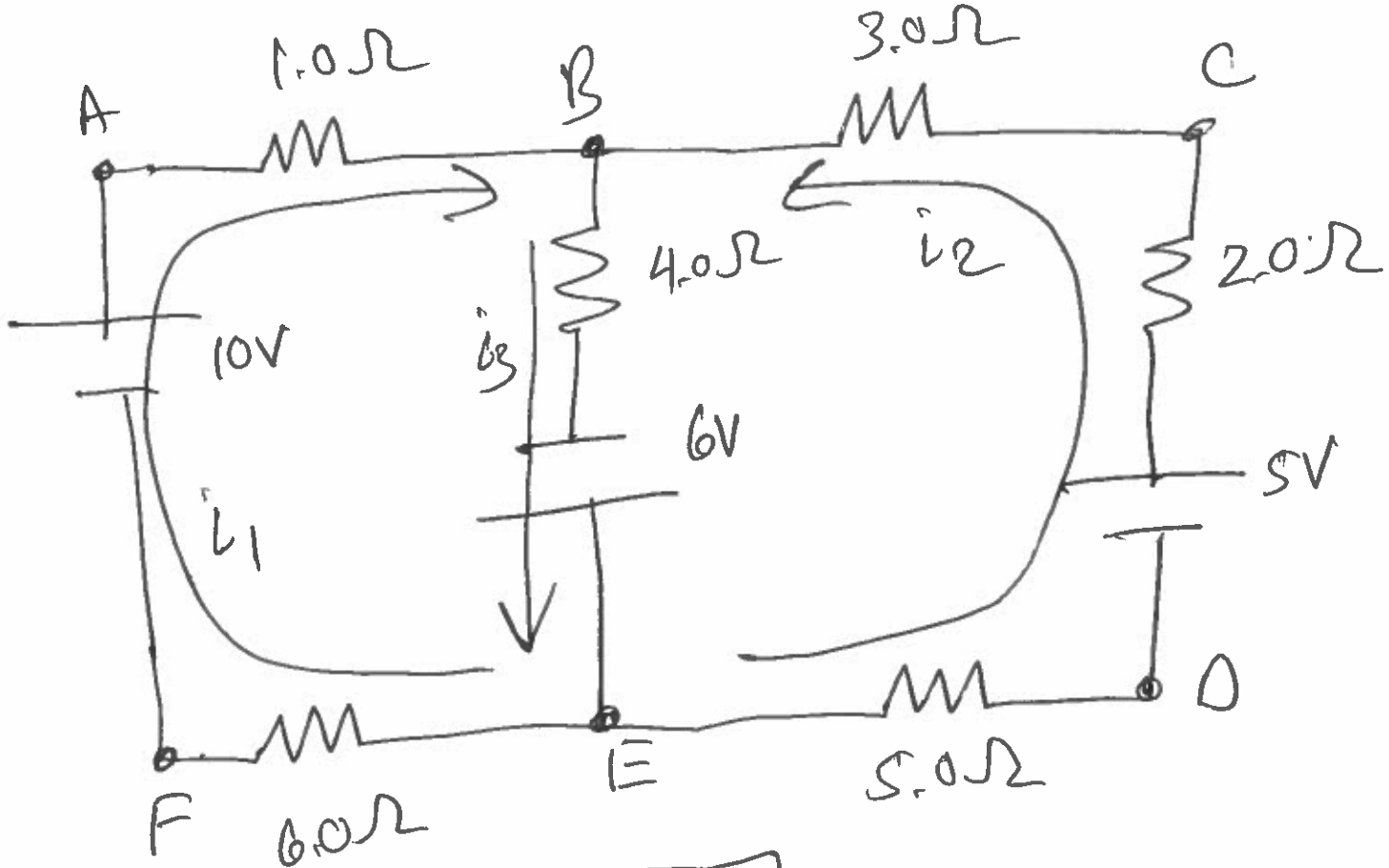
1) Junction Rule ⇒ The Amount of current going into A point of A circuit must equal the amount of current leaving the point. (conservation of charge).

2) Loop Rule ⇒ The sum of the voltages changes around a closed loop must equal zero. (conservation of Energy).



AT (B) $\boxed{i_1 + i_2 = i_3}$

Current Through a resistor Goes from + To − Potential ⇒ Going Through a resistor in same direction as current flow is a drop in potential ⇒ $-iR$

Going Through a resistor in the opposite direction as the current flow is a rise in potential ⇒ $+iR$

Start point E go to left clockwise

$$-i_1(6.0\Omega) + 10V - i_1(1.0\Omega) - i_3(4.0\Omega) + 6V = 0$$

Start point E go to right counterclockwise

$$-i_2(5.0\Omega) + 5V - i_2(2.0\Omega) - i_2(3.0\Omega) - i_3(4.0\Omega) + 6V = 0$$

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3 currents i_1, i_2, i_3

3 eqns $i_1 + i_2 = i_3$

$$i_1(6\Omega + 1.0\Omega) + i_3(4\Omega) = 16V$$

$$i_2(5\Omega + 2\Omega + 3\Omega) + i_3(4\Omega) = 11V$$

$i_1 = 1.31\,A$

$i_2 = 0.41\,A$

$i_3 = 1.72\,A$

What is $\Delta V_{E \to B}$?

$\Delta V_{E \to B} = V_B - V_E =$

$E \to F - A \to B$

$\Delta V_{E \to B} = -i_1(6\Omega) + 10V - i_1(1\Omega)$

$= 10V - i_1(7\Omega)$

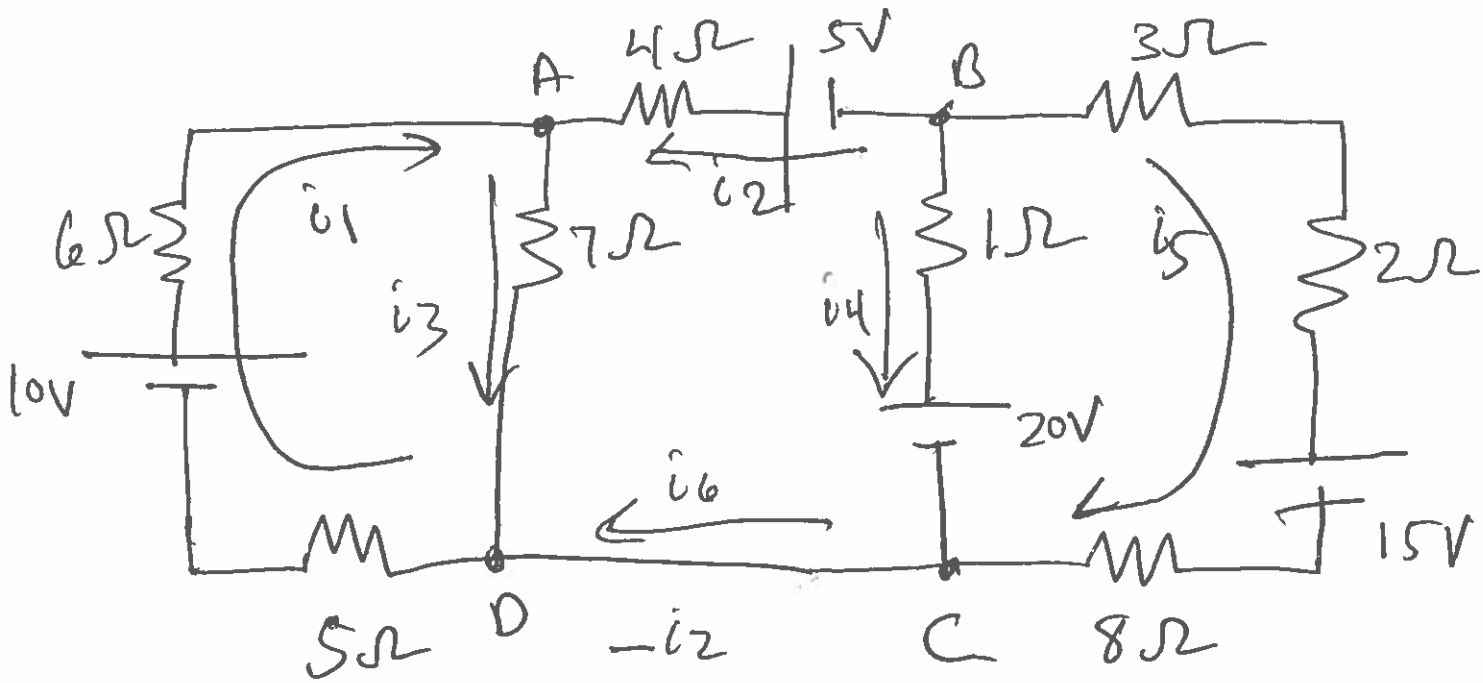
$= 10V - 1.31A(7\Omega) = +0.83\,V$

$E \to B$

$\Delta V_{E \to B} = -6V + i_3(4\Omega)$

$= -6V + (1.72A)(4\Omega)$

$= +0.88\,V$



AT (A) $i_1 + i_2 = i_3$

AT (B) $0 = i_2 + i_4 + i_5$

AT (C) $i_6 + i_4 + i_5 = i_6$

AT (D) $i_3 + i_6 = i_1$

$i_6 = -i_2$

Left Loop start D Clockwise

$$-i_1\,5\Omega + 10V - i_1\,6\Omega - i_3\,7\Omega = 0$$