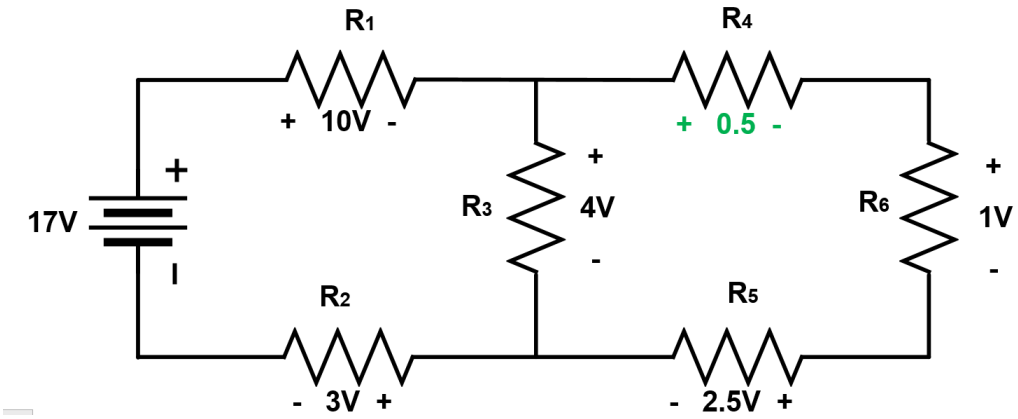
Tutorial-2: Solutions

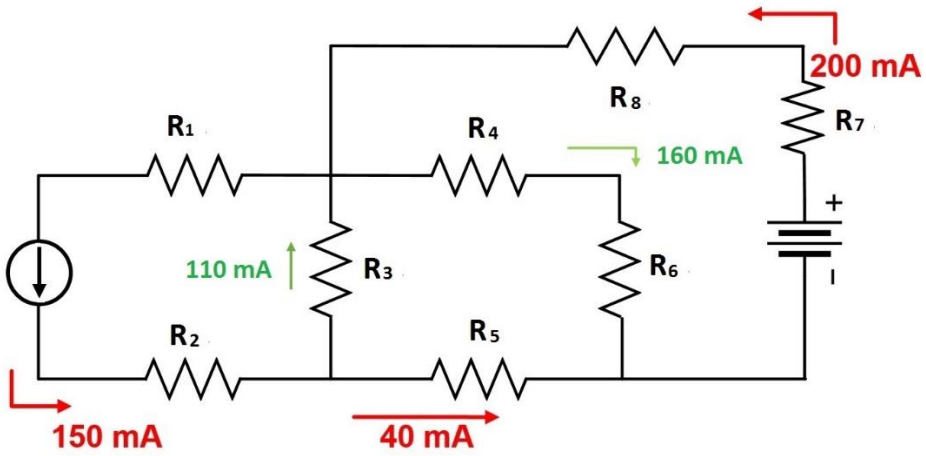
Ans.1

a. V_A = **+30 volts** (red lead on A, black lead on ground)
b. V_B = **+3 volts** (red lead on B, black lead on ground)
c. V_C = **+9 volts** (red lead on C, black lead on ground)
d. V_D = **-15 volts** (red lead on D, black lead on ground)
e. V_{AC} = **+21 volts** (red lead on A, black lead on C)
f. V_{DB} = **-18 volts** (red lead on D, black lead on B)
g. V_{BA} = **-27 volts** (red lead on B, black lead on A)
h. V_{BC} = **-6 volts** (red lead on B, black lead on C)
i. V_{CD} = **+24 volts** (red lead on C, black lead on D)

Ans.2



Ans.3



Ans.4

Battery #2 is charging at a rate of **13 amps**.

Ans.5

$(1010101.111)_2$

$= 1\times2^6+ 0\times2^5+ 1\times2^4+ 0\times2^3+ 1\times2^2+ 0\times2^1+ 1\times2^0+ 1\times2^{-1}+ 1\times2^{-2} + 1\times2^{-3}$

$= 64+ 16+ 4+ 1+ .5+ .25+ .125= \mathbf{(85.875)_{10}}$

Ans. 6

$(43.6875)_{10}$

2	43	
2	21	*1*
2	10	*1*
2	5	*0*
2	2	*1*
2	1	*0*

$(43)_{10} = (101011)_2$

0.6875×2 = 1.375

0.375×2 = .750

0.75×2 = 1.50

0.5×2 = 1.0

Thus, $(0.6875)_{10} = (.1011)_2$

$(43.6875)_{10} = (101011.1011)_2$

Ans. 7

F (A, B, C, D) = $\bar{A}$B+ B$\bar{C}$+ BD+ ABC$\bar{D}$

= B ($\bar{A}$+ $\bar{C}$+ D+ AC$\bar{D}$)

= B ($\overline{AC}$+ D+ AC$\bar{D}$); *De Morgan's Law*

= B ($\overline{AC}$+ D+ AC*); Absorption*

= B (1+D) = B.1 **= B**

Ans. 8

1= A+ $\bar{A}$ = $\bar{A}$+ A (B+$\bar{B}$) = $\bar{A}$+AB +A$\bar{B}$

Thus, C$\bar{D}$= C$\bar{D}$.1

= C$\bar{D}$($\bar{A}$+AB+A$\bar{B}$)

=$\bar{A}$C$\bar{D}$+ ABC$\bar{D}$+ A$\bar{B}$C$\bar{D}$

F (A, B, C, D) = C$\bar{D}$+$\bar{A}$C+ABCD+A$\bar{B}\bar{C}\bar{D}$

=$\bar{A}$C$\bar{D}$+ ABC$\bar{D}$+ A$\bar{B}$C$\bar{D}$+$\bar{A}$C+ ABCD+ A$\bar{B}\bar{C}\bar{D}$

=$\bar{A}$C (1+D) +ABC (D+$\bar{D}$) +A$\bar{B}\bar{D}$(C+$\bar{C}$)

=$\bar{A}$C+ ABC+ A$\bar{B}\bar{D}$

=C ($\bar{A}$+AB) +A$\bar{B}\bar{D}$

=C ($\bar{A}$+B) +A$\bar{B}\bar{D}$

=$\bar{A}$C+BC+A$\bar{B}\bar{D}$