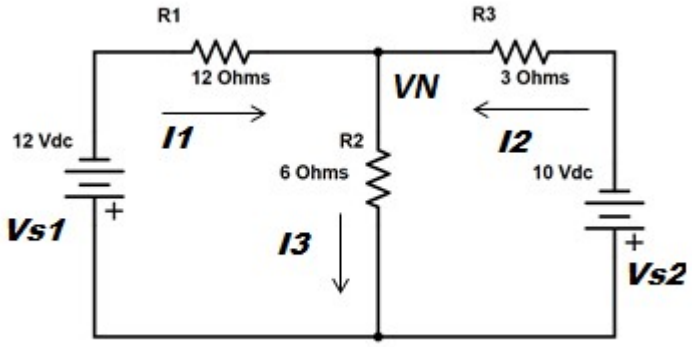
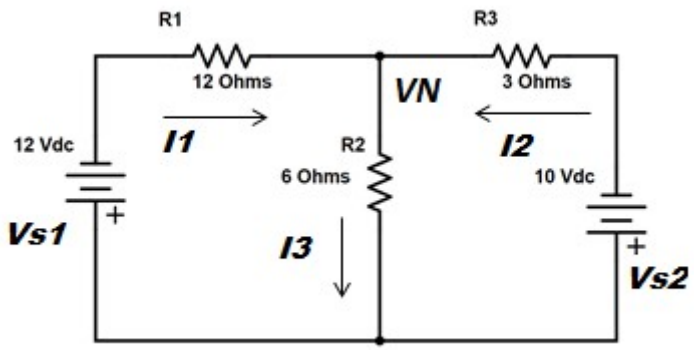
Find Vn using Kirchoffs Voltage Analysis



Find: Vn , VR1, VR3 & I1 & I2 & I3

Find Vn using Kirchoffs Voltage Analysis



1. $I1 + I2 = I3$

2. VR1/R1 + VR3/VN = VN/R3 (I in terms of V/R)

3. VR1 + Vn =12 Vdc or VR1= 12Vdc – Vn (Vs1 in terms of Vs1 & Vn)

   VR3 + Vn =10 Vdc or VR3 = 10 Vdc – Vn (Vs2 in terms of Vs2 & Vn)

4. (12 – Vn/12) + (10 – Vn/3) = Vn/6 Divide by 12

5. –Vn + 4(10 –Vn) = 2Vn

6. -2 Vn + 40 = 2 Vn

7. 40 = 4 Vn

8. Vn = 10

Check

VR1 = 12vdc –Vn ; 12vdc -10 Vdc =2 Vdc

VR3 = 10 Vdc - 10 vdc = 0 vdc

Vs1 = Vn + VR1; 10 Vdc + 2 Vdc = 12 Vdc

Vs2 = Vn + VR3; 10 Vdc + 0 Vdc = 10 Vdc

Vs1 +VR1+ VR3 + VS2 = 0 ; 12 Vdc +(-2 Vdc) +0 Vdc + -10 Vdc = 0