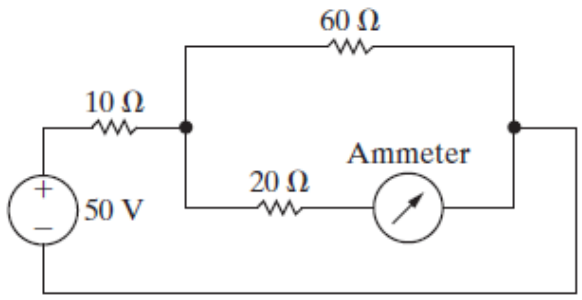
ENGR 065: Circuit Theory

Problem Set #4

Read Chapter 3 from [1] and then solve the following problems:

Problem 1 [20%]:

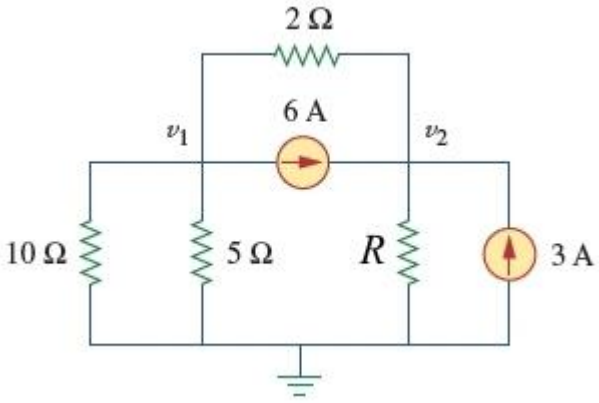
a) Consider the following circuit with an ideal Ammeter. What is the reading of the Ammeter?



b) repeat a) using a real ammeter with an internal resistance 0.1Ω.

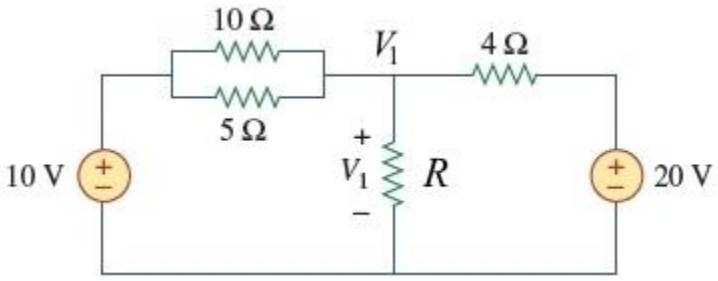
Problem 2 [20%]:

In the circuit given below, R = 8 Ω. Calculate v_1 and v_2.



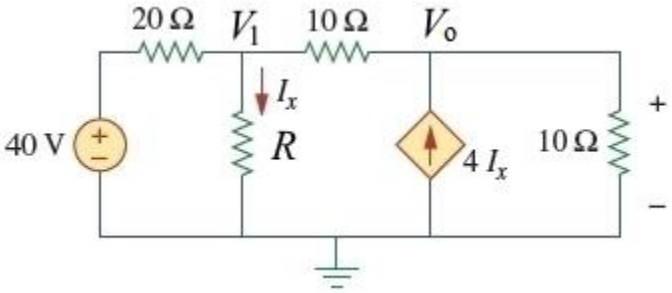
Problem 3 [20%]:

In the circuit given below, R = 15 Ω. Find the value of V_1 using nodal analysis.



Problem 4 [20%]:

In the circuit given below, R = 25 Ω. Determine V_o.

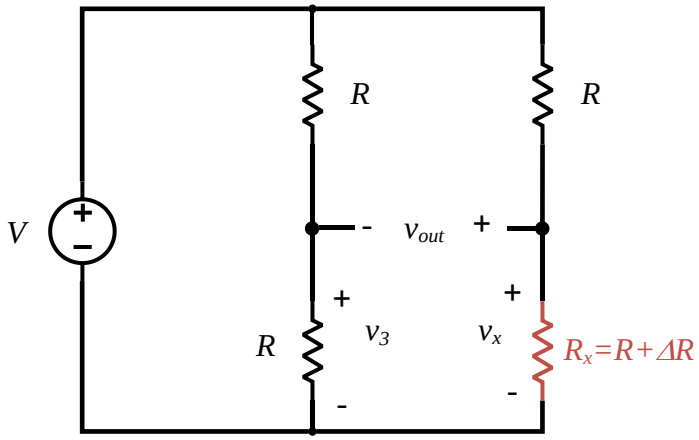


Problem 5 (20%):

Consider the following **modified** Wheatstone bridge. Assume that

- V and R are known;
- $R_x = R + \Delta R$, where ΔR is an unknown value
- $\frac{\Delta R}{R} \ll 1$

Show that $v_{out} \approx \frac{\Delta R}{4R} V$



References

[1] C. Alexander and M. Sadiku “Fundamentals of Electric Circuits”, 7th Edition, 2021, McGraw-Hil