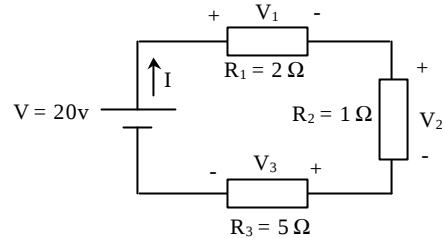


# Electrical Devices & Circuits (EE1020A)

## Problem Sheet 1

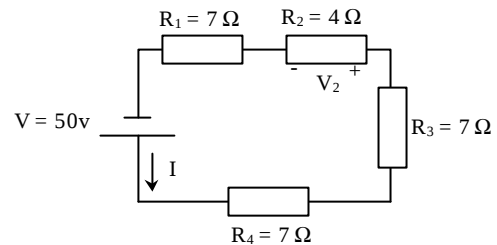
*Dr. M. K. Darwish*

- 1) a- Find the total resistance.
- b- Calculate the current I.
- c- Determine the voltages  $V_1$ ,  $V_2$ , and  $V_3$ .
- d- Calculate the power dissipated by  $R_1$ ,  $R_2$  and  $R_3$ .
- e- Determine the power delivered by the source and compare to the sum of the power levels of part (d).



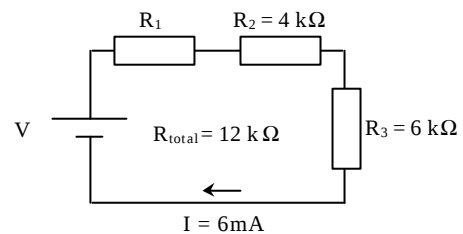
(8Ω, 2.5A, 5V, 2.5V, 12.5V, 12.5W, 6.25W, 31.25W, 50W)

- 2) Determine  $R_{total}$ , I and  $V_2$ .



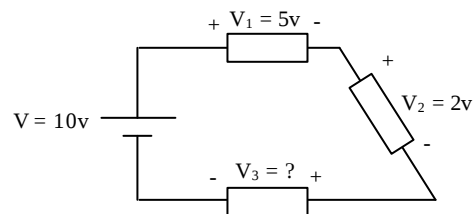
(25Ω, 2A, 8V)

- 3) Given  $R_{total}$  and I, calculate  $R_1$  and V.



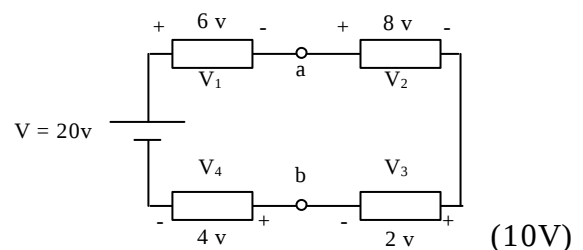
(2kΩ, 72V)

- 4) Determine the unknown voltage.



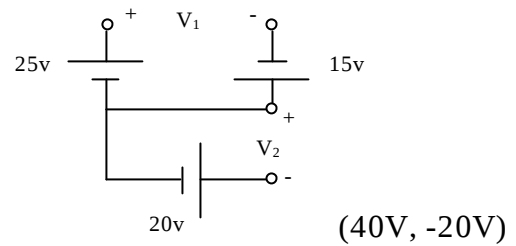
(3V)

- 5) Determine  $V_{ab}$ .

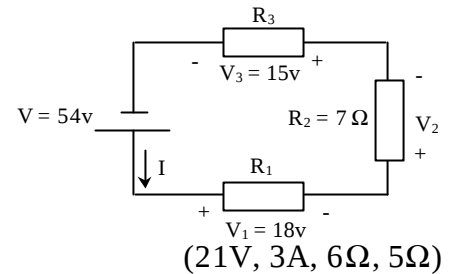


(10V)

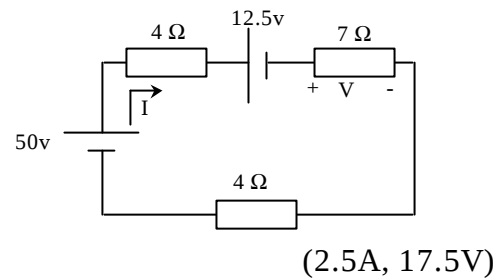
6) Find  $V_1$  and  $V_2$ .



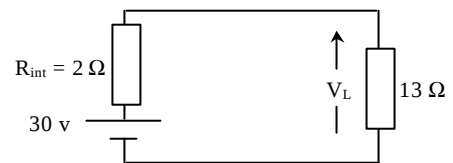
7) a- Determine  $V_2$  using Kirchhoff's voltage law.  
b- Determine  $I$ .  
c- Find  $R_1$  and  $R_3$ .



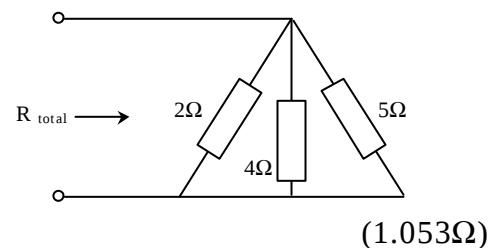
8) Determine  $I$  and the voltage across the  $7\Omega$  resistor.



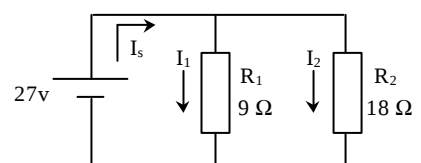
9) The battery in the figure has an internal resistance of  $2\Omega$ . Find the voltage  $V_L$  and the power lost to the internal resistance if the load is  $13\Omega$  resistor.



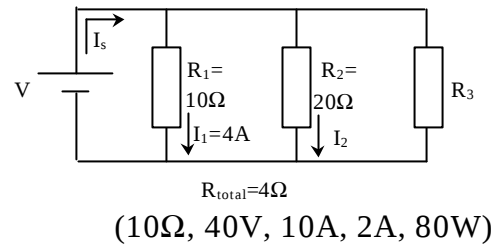
10) Determine the total resistance.



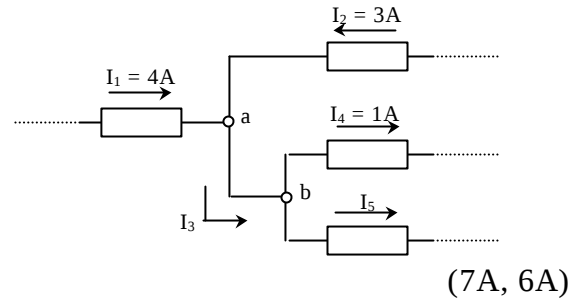
11) a- Calculate  $R_{total}$ .  
b- Determine  $I_s$ .  
c- Calculate  $I_1$  and  $I_2$  and show that  $I_s = I_1 + I_2$   
d- Determine the power to each resistive load.  
e- Determine the power delivered by the source and compare it to the power dissipated in  $R_1$  and  $R_2$ .



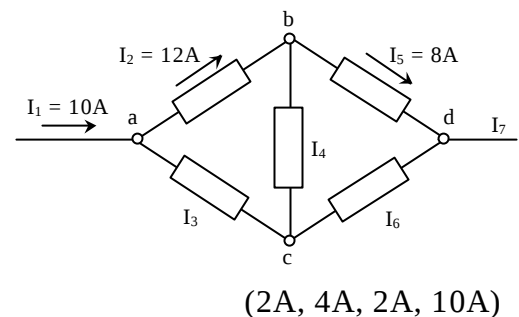
- 12) Given  $R_{\text{total}} = 4\Omega$ . Calculate  $R_3$ ,  $V$ ,  $I_s$ ,  $I_2$  and determine the power dissipated in  $R_2$ .



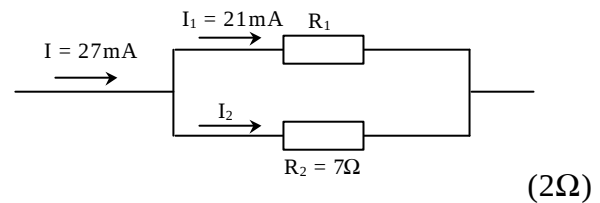
- 13) Determine the currents  $I_3$  and  $I_5$  through applications of Kirchhoff's current law.



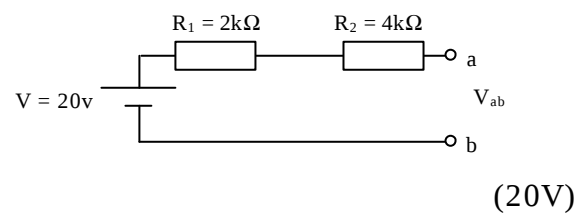
- 14) Find the magnitude and direction of the currents  $I_3$ ,  $I_4$ ,  $I_6$  and  $I_7$ .



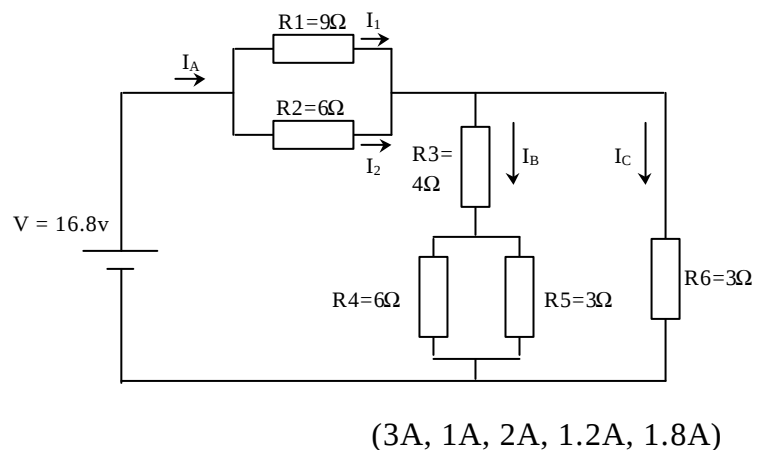
- 15) Determine  $R_1$ .



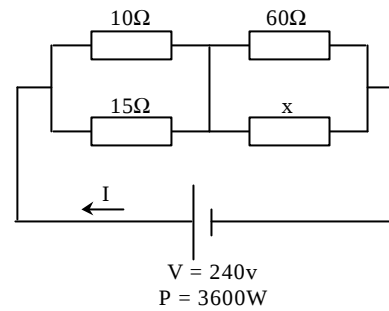
- 16) Determine  $V_{ab}$ .



- 17) Calculate  $I_A$ ,  $I_B$ ,  $I_C$ ,  $I_1$  and  $I_2$ .

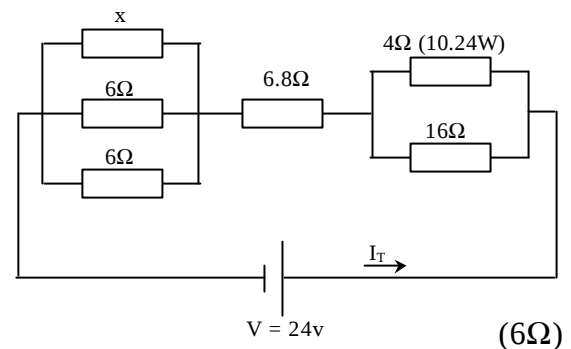


- 18) a- Find the resistor 'x'.  
b- Find the current flowing in each of the four resistors.

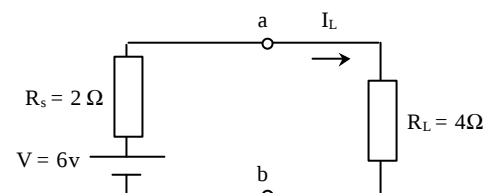


(12Ω, 2.5A, 12.5A, 9A, 6A)

- 19) Calculate the value of x when 10.24 W is dissipated in the 4Ω resistor.



- 20) a- Convert the voltage source to a current source and calculate the current through the 4Ω load for each source.  
b- Replace the 4Ω load with a 1kΩ load and calculate the current  $I_L$  for the voltage source.  
c- Repeat the calculation of part (b) assuming the voltage source is ideal ( $R_s=0$ ).



(1A, 5.99 mA, 6 mA)