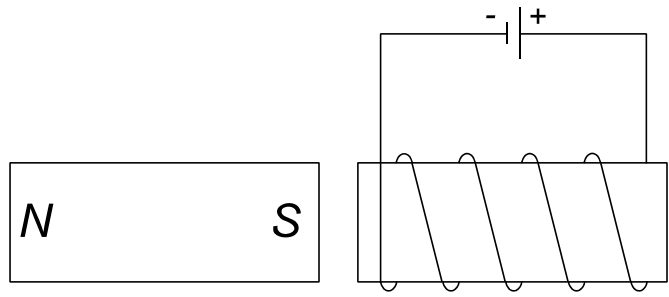


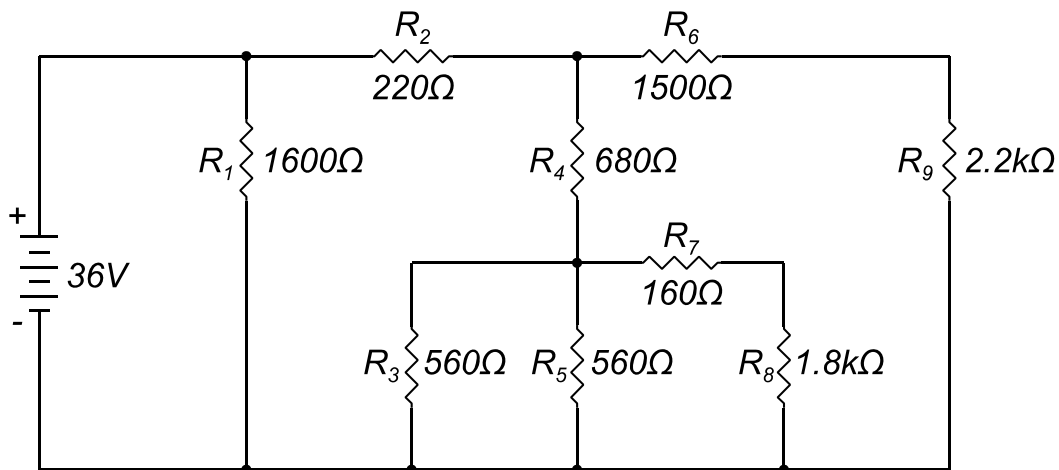
**ELECTROTECHNOLOGY**  
**ELTK1100**  
**REVIEW #3**

1. Given a 0.6mA, 200Ω meter movement, draw the circuit and calculate the resistances required to convert the movement into a multirange voltmeter measuring:  
 10V, 25V, and 50V.  
**( $R_{S1} = 16.47k\Omega$ ,  $R_{S2} = 25k\Omega$ ,  $R_{S3} = 41.67k\Omega$ )**

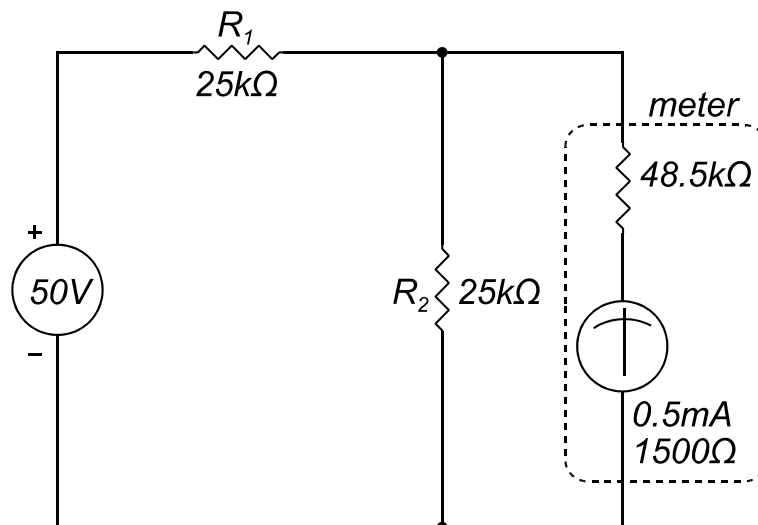
2. A 1000 turn coil had 6A of current flowing through it. If the current is reversed in 10 seconds and 20 volts are produced across this device, determine:
- the inductance of the device. **(16.7H)**
  - the reluctance. **( $60 * 10^3 \text{ A}\cdot\text{T/Wb}$ )**
  - the current to develop a flux of 80 mWb. **(4.8A)**
  - in the following drawing, will the coil shown repel or attract the permanent magnet. Why? **(Attract, opposites attract NS NS - See Right Hand Rule)**



3. For the following circuit, find the:
- total resistance for the circuit. **(600Ω)**
  - current in  $R_1$  resistor. **(22.5mA)**
  - power dissipated by  $R_9$  resistor. **(0.124W)**
  - voltage drop of the  $R_5$  resistor. **(7.35V)**



4. Draw the circuit and design an ohmmeter using a 2mA, 500Ω movement and a 10V battery. Calibrate the ohmmeter for half-scale and quarter-scale deflection.  
**( $R_{INT} = 4.5k\Omega$ ,  $R_{EXT HSD} = 5k\Omega$ ,  $R_{EXT QSD} = 15k\Omega$ )**
5. An electromagnet with an inductance of 0.2H is formed from 500 turns wrapped around a steel core carrying a current of 8A. Determine:  
 (a) the strength of the electromagnet flux. **(3.2mWb)**  
 (b) the self-induced electromotive force when the current is reversed in 20ms. **(160V)**  
 (c) the rate of change of flux in (b). **(0.32Wb/s)**
6. In the following circuit, determine:  
 (a) the type of meter shown. **(Single-range Voltmeter)**  
 (b) the range of the meter. **(25V)**  
 (c) the %error caused by the meter. **(20%)**  
 (d) how do you ensure the %error for this type of meter is less than 2% in the lab? **( $R_{meter} \gg R_{Measured}$ )**



7. A 50μA, 800Ω movement meter is used to construct the following devices. For each device, draw the circuit diagram and calculate:  
 (a) the resistances for a multi-range ammeter with ranges:  
 1mA, 10mA, and 100mA.  
**( $R_{SH1} = 42.11\Omega$ ,  $R_{SH2} = 4.010\Omega$ ,  $R_{SH3} = 0.4002\Omega$ )**  
 (b) the resistance to convert it to a 10V voltmeter. **(199.2kΩ)**  
 (c) the resistance to convert it to an ohmmeter if the battery is 1.5V and calibrate the ohmmeter for half-scale position. **( $R_{INT} = 29.2k\Omega$ ,  $R_{EXT} = 30k\Omega$ )**