Test 4 Study Guide: Lectures 12-16

General topics:

- Irreducible circuits
  - Using the loop and junction rules
  - Potential rise and drop across different circuit elements
- RC Circuits
  - Long and short term behavior when charging and discharging
- Forces exerted by magnetic fields
  - On a moving charge
  - While an electric field is present
  - On a current-carrying wire
  - On a wire loop

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Be prepared to deal with the following situations:

- Write or identify a correct loop rule equation for a given circuit
- Use the loop rule and the junction rule to set up and solve a system of equations to find an unknown quantity in a circuit
- Identify what happens in a circuit while a capacitor charges/discharges
- Solve for a quantity in a circuit when a capacitor has just started charging/discharging or it has been a long time
- Relate direction of charge velocity, magnetic field, and magnetic force to solve for an unknown direction
- Determine the magnetic force exerted on a moving charge
- Identify information about charges based on their circular motion
- Balance the forces from electric and magnetic fields that act on a charge
- Determine force on a length of current-carrying wire
- Determine force and/or torque on a current-carrying loop in a magnetic field