

## MIDTERM # 1 TOPICS

- **Magnetic Fields (Ch. 33)**
  - **Generating Magnetic Fields**
    - **Biot-Savart & Ampere's Law**
    - **Fields of loops and solenoids**
  - **Magnetic Dipoles- Loops and Permanent magnets**
    - **Comment: Make sure you understand convention that magnetic field emerges from North Pole for both (see Fig. 33.19 of book). The magnetic moment  $\mu$  is defined as along the emerging direction of B. Namely from S to N (p. 1011)**
  - **Forces due to magnetic fields and electric field (Lorentz Force)**
    - **Charged particle orbits in constant B fields and crossed E and B fields**
    - **Forces and Torques on magnetic dipoles**
- **Electromagnetic Induction (Ch. 34)**
  - **Motional emf and induced currents - Eddy Currents**
  - **Magnetic Flux – Lenz's law**
  - **Faraday's law – Calculating Induced Fields**
  - **Inductors – Inductance –Energy in B – fields –LR circuits**
  - **Do not study LC circuits. They will be tested in Mid # 2 along with LRC and AC circuits.**

- EM Field and Waves (ch. 35)
  - Transformation of E and B fields
  - **Skip almost relativity for now**
  - Displacement Current
    - Induced B Fields in discharging capacitors
  - Maxwell's Equations
  - EM waves
    - Propagation
    - Properties – Energy, Power, Poynting flux, Intensity, Radiation pressure
    - Polarization
      - Malus's Law

### **General Exam Suggestions:**

- You should be able to complete every problem
  - If you are confused ask
  - If it seems too hard, you are not thinking enough
  - Look for hints in other problems
  - If you are doing math, you are doing too much
- Read directions and problem completely (before & after)
- Write down what you know before starting
- Draw pictures, define (label) variables
  - Make sure that unknowns drop out of solution
- Don't forget units when they are needed

### **What you should study :**

- Review HW problems and solutions
- Review Chs 33, 34, 35 and Chapter Summaries
- Review Supplements and Summaries
- Review Examples of Solved Problems

## Exam Policy – From Web Site

All exams are closed book. A single 4x6 index card will be allowed for each midterm exam, and two 4x6 cards will be allowed for the final exam. **No calculators with memory or wireless communication are allowed. If you bring such a calculator to an exam, you will not be allowed to use it.** The exams will be full duration of the allotted time of the lecture, 1 hour and 15 minutes. The exams will include numerical constants you may need. Make-up exams will only be given under extraordinary circumstances, in which case an oral exam will be conducted. If you have a good reason that you cannot attend an exam, please talk to me before the exam so we can arrange for an oral exam to be given on an alternate date.

**Please inform on any disability accommodations needed before the exam**