Review Sheet for Phys. 116 - Exam II

Chapter 21

1) What are magnetic field lines? What are their directions for a permanent magnet? What are the units for magnetic fields?

2) What requirements does a charged particle in a magnetic field have to meet so that a magnetic force acts on it?

3) What is the magnetic force on a charged particle? What is its direction? Practice the right hand rule! (Place your fingers in the direction of the velocity, bend fingers in the direction of the B-field, and the thumb will show the direction of the force.)

4) What path does a charged particle take in a B-field (think of the e/m lab)?

5) What is the force ON a current-carrying wire DUE to an EXTERNAL magnetic field? What is the direction of the force? Practice the right hand rule! (Place your fingers in the direction of the current, bend fingers in the direction of the B-field, and the thumb will show the direction of the force.)

6) What happens to a loop of wire in a magnetic field?

7) A current-carrying wire PRODUCES a current. What is its direction? Practice the right hand rule! (For a long straight wire: place your thumb in the direction of the current flow, curl your fingers in the direction of the B-field. Remember that the B-field is always TANGENTIAL to the circular path at each point along the path. For a loop: wrap your hand around the loop, with the fingers in the direction of the current flow. Your thumb will show the direction of the B-field INSIDE the loop.)

8) What is the B-field DUE to an infinitely long, straight wire?

9) What is the B-field at the center of a circular loop? Inside a solenoid?

10) What is Ampere's law? How do we apply it? How do we pick the amperian loop? What role does the right hand rule have in this situation?

Chapter 22

1) What is "motional emf?" Know the way it was derived (loop of current in the B-field; a conducting rod moving perpendicularly to the B-field, etc.)

2) What is the expression of the magnetic flux? Which vectors is the angle in the equation between?

3) What is Faraday's law of electromagnetic induction? Why the minus sign? What can change with time in that equation?

4) What is Lenz's law?

5) What are the steps in finding the direction for the induced current through a loop in a changing magnetic flux?

6) What are mutual inductance and self-inductance?

7) What is the emf due to self-inductance?

8) How do transformers work? What is the transformer equation?

Chapter 23

1) How does a resistor behave in an AC circuit? What do we know about the voltage and current through a resistor in an AC circuit? How do we draw V and I sinusoidally? As phasors?

2) How does a capacitor behave in an AC circuit? What do we know about the voltage and current through a capacitor in an AC circuit? How do we draw V and I sinusoidally? As phasors? What is the capacitive reactance?

3) How does an inductor behave in an AC circuit? What do we know about the voltage and current through an inductor in an AC circuit? How do we draw V and I sinusoidally? As phasors? What is the inductive reactance?

4) What is the impedance of a series RLC circuit?

5) What is the average power dissipated by the circuit? What is the power factor?

6) What is resonance? What is the resonant frequency?

Chapter 24

1) What type of wave is an electromagnetic wave?

2) What are the four key features of an electromagnetic wave?

3) What is the direction of energy transport of electromagnetic waves?

4) What is the energy density of electromagnetic waves?

5) What is the Doppler effect for electromagnetic waves?

6) What is polarization of light? Is sunlight polarized or not? What happens to sunlight when it passes through one polarizer? How much of its intensity goes through the polarizer? How much of its intensity passes through a second polarizer tilted at an angle θ with respect to the first polarizer?