PHYS 212 S2013 Study Guide for Test #4     Chapters 28,29 & 30  
  
Test will consist regular questions, derivations, and problems.  
  
1. Chapter Reading. 2. Practice WileyPlus assignments.

Chap 28:

Electric force on a charge: Magnetic force on a moving charge: http://edugen.wiley.com/edugen/courses/crs1650/art/math/halliday8019c28/math153.gif

Net force on a moving charge in electric and magnetic fields:

Vector cross product:

Vector dot product: = 0  
 where *θ* is the angle between the vectors.

A Charged Particle Circulating in a Magnetic Field:http://edugen.wiley.com/edugen/courses/crs1650/art/math/halliday8019c28/math156.gif

**Magnetic Force on a Current-Carrying Wire** A straight wire carrying a current *i* in a uniform magnetic field experiences a sideways force

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| http://edugen.wiley.com/edugen/courses/crs1650/art/common/pixel.gif | |
| http://edugen.wiley.com/edugen/courses/crs1650/art/math/halliday8019c28/math159.gif |  |

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| **Chap 29: Magnetic Field of a Long Straight Wire:** | |
| http://edugen.wiley.com/edugen/courses/crs1650/art/math/halliday8019c29/math011.gif |  |
| http://edugen.wiley.com/edugen/courses/crs1650/art/common/pixel.gif | |

http://edugen.wiley.com/edugen/courses/crs1650/art/math/halliday8019c29/math069.gif  
  
Finding magnetic field using Ampere’s law and Biot-Savart law.

**Chapter 30: Magnetic Flux** The *magnetic flux* http://edugen.wiley.com/edugen/courses/crs1650/art/math/halliday8019c30/math008.gifthrough an area *A* in a magnetic field http://edugen.wiley.com/edugen/courses/crs1650/art/math/halliday8019c30/math002.gifis defined as



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| **Faraday's Law of Induction** If the magnetic flux http://edugen.wiley.com/edugen/courses/crs1650/art/math/halliday8019c30/math008.gifthrough an area bounded by a closed conducting loop changes with time, a current and an emf are produced in the loop; this process is called *induction*. The induced emf is http://edugen.wiley.com/edugen/courses/crs1650/art/common/pixel.gif | | |
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| http://edugen.wiley.com/edugen/courses/crs1650/art/common/pixel.gif | | |
| http://edugen.wiley.com/edugen/courses/crs1650/art/math/halliday8019c30/math258.gif |  | |
| http://edugen.wiley.com/edugen/courses/crs1650/art/common/pixel.gif | | |

**Lenz's Law** An induced current has a direction such that the magnetic field *due to the current* opposes the change in the magnetic flux that induces the current. The induced emf has the same direction as the induced current.