IND Worksheet
revised April 18, 2006

Your Name: __________________________________ Signature:________________________________

Lab partner(s): __________________________________ __________________________________________

Course & Section: ___________________________ Station # ____________ Date: ________________

1. For section D.2.2, with the rectangular coil:

   Record the largest (positive or negative) induced EMF you found for:

   i. motion of the coil outside the magnet, about 40 cm away: ____________
   ii. motion over the magnet with coil ends kept from crossing the boundary: _______
   iii. 40 cm-to-center motion: _______ ; center-to-40 cm: __________

   Explain why the sign of the EMF changed between these two directions.

   Record the values of the integrals for each part of the motion (Don’t forget units.):
   40 cm-to-center motion: ____________ ; center-to-40 cm: __________

   Explain why these two integrals should be equal in magnitude and opposite in sign.

   Remember to attach a copy of your LoggerPro scan for measurement iv.

   iv. Record the maximum magnitude of the EMF for your two other speeds:

       Motion 40 cm to center: slower: _____________ faster: _____________
       motion center to 40 cm: slower: _____________ faster: _____________

       Explain why the magnitude changed with speed.

       Record the value of the integral of the EMF for

       fast motion: __________ slow motion: __________

       Are the integrals for the two different speeds the same? Should they be? Explain why or why not.

   v. Record the values of the integrals for:
moving the coil onto the magnet: _______ lifting it up and back: ________

Are these values equal but opposite? Is this behavior expected? Explain why or why not.

2. **For section D.3 with rotating coils:** *(Attach a copy of the printout as requested.)*
   Record the values of the integrated areas for the 90º flips. *(average of two values)*
   Fast: _______________  Slow: _______________
   Record the average time integral for your four 180º flips. ________________
   Determine the strength of the magnet from these flips. __________

3. **Section D.4 - Coupled Circuits**
   Explain the shape of the induced waveform in relation to the input waveform.

   What are the EMFs for the various coils at 20 Hz?
   16 turn: __________  160 turn __________  1600 turn __________
   Compare this behavior to theory.

**GRADE:** _______  **GRADED BY:** _______
(out of 30 points)  (TA’s initials)