Physics 112
Quiz #20
November 8, 1999

Name: _____

IF YOU WANT A QUESTION GRADED OUT OF THREE POINTS (–1 [MINUS ONE] FOR WRONG ANSWER!!) WRITE "3" IN SPACE PROVIDED ON EACH QUESTION.

1. A galvanometer is connected to a large solenoidal coil. ***Inside*** that coil is another, smaller coil (with the same axis) connected to a battery through an open switch. The switch is suddenly closed, completing the circuit and connecting the small coil to the battery; the switch remains closed permanently. What will you observe on the galvanometer?
   A. No deflection.
   B. Needle will suddenly deflect, and stay steady at some non-zero value.
   C. Needle will slowly rise to some non-zero value, and remain there.
   D. Needle will steadily deflect to larger and larger values.
   E. Needle will suddenly deflect, and then rapidly drop back to zero.
   F. Needle will deflect to one side, and then deflect sharply to the ***opposite*** side.

   Grade out of 3? Write "3" here: _____

2. A battery connected to two identical bulbs in series supplies 3 W. If the bulbs are connected in parallel to the same battery, what will the battery now have to supply? *Hint: Consider what happens to* ***total current*** *through battery.*
   A. ¾ W
   B. 3/2 W
   C. 3 W
   D. 6 W
   E. 12 W

3. A loop of wire is placed in a magnetic field, and an ammeter is connected to the loop. Which type of field will result in the greatest deflection of the ammeter needle?
   A. perpendicular to the plane of the loop; magnitude initially at 0 T, decreasing at 0.01 tesla per second.
   B. perpendicular to the plane of the loop; magnitude initially at 1 T, increasing at 0.001 tesla per second.
   C. perpendicular to the plane of the loop; magnitude initially at 0.01 T, decreasing at 1 tesla per second.
   D. perpendicular to the plane of the loop; magnitude constant at 100 T.
   E. 45° angle to the plane of the loop; magnitude initially at 10 T, decreasing at 0.1 T per second
   F. 45° angle to the plane of the loop; magnitude initially at 100 T, decreasing at 0.01 T per second
   G. parallel to the plane of the loop; magnitude initially at 1 T, increasing at 1 tesla per second.
   H. parallel to the plane of the loop; magnitude initially at 100 T, decreasing at 10 T per second.

   Grade out of 3? Write "3" here: _____

4. Two long straight wires, parallel to each other, are separated by 12 m. They carry currents in the same direction; the current in wire A is ***double*** the current in wire B. The points at which the net magnetic field is zero are how far from ***wire A***?
   A. 2 m
   B. 3 m
   C. 4 m
   D. 6 m
   E. 8 m
   F. 9 m
   G. 10 m
   H. There are no points with zero net magnetic field.
   I. The net magnetic field is zero at ***all*** points ***between*** the wires.