Physics 112
Quiz #21
November 13, 2000

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.

THERE ARE FOUR QUESTIONS: ***Questions #1 and #2 are on this page; Questions #3 and #4 are on OPPOSITE SIDE OF THIS PAGE***

For each of these four questions, a conducting loop is in a region where there is a magnetic field. "Initial" refers to the situation at a given moment in time, and "final" refers to the situation a few seconds later.

1. Consider the following cases:

   Case one: The magnetic field starts at an initial value of five teslas, and remains constant at this value for the whole time period; the angle between the direction of the magnetic field and the normal to the plane of the loop starts at zero degrees, and remains constant for the whole time period.

   Case two: The magnetic field starts at an initial value of two teslas, and decreases to a final value of one tesla; the angle between the direction of the magnetic field and the normal to the plane of the loop starts at zero degrees, and remains constant for the whole time period.

   Case three: The magnetic field starts at an initial value of one tesla, and remains constant at this value for the whole time period; the angle between the direction of the magnetic field and the normal to the plane of the loop starts at zero degrees, and increases to a final value of ninety degrees.

The cases in which a current will flow in the conducting loop are:

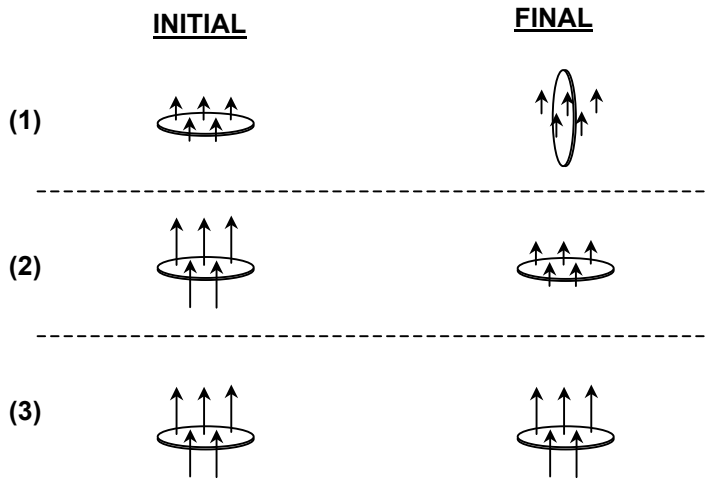
A. one only
B. two only
C. three only
D. one and two only
E. one and three only
F. two and three only
G. all three cases
H. none of the three cases

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

2. The cases (see diagram) in which a current will flow in the conducting loop are:

A. 1 only
B. 2 only
C. 3 only
D. 1 and 2
E. 1 and 3
F. 2 and 3
G. 1, 2, and 3
H. none of the them

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



3. Consider the following cases (θ = angle between $\vec{B}$ and normal to plane of loop):

(1)

$B_{initial} = 5T;\ B_{final} = 5T$

$\theta_{initial} = 0°;\ \theta_{final} = 0°$

(2)

$B_{initial} = 1T;\ B_{final} = 1T$

$\theta_{initial} = 0°;\ \theta_{final} = 90°$

(3)

$B_{initial} = 2T;\ B_{final} = 1T$

$\theta_{initial} = 0°;\ \theta_{final} = 0°$

$I \neq 0\ A$ in which cases?

A. 1 only
B. 2 only
C. 3 only
D. 1 and 2
E. 1 and 3
F. 2 and 3
G. 1, 2, and 3
H. none of the them

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

4. The cases (see graphs) in which a current will flow in the conducting loop are:

A. 1 only
B. 2 only
C. 3 only
D. 1 and 2
E. 1 and 3
F. 2 and 3
G. 1, 2, and 3
H. none of the them

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

(B is magnitude of magnetic field, and θ is angle between the direction of the magnetic field and the normal to the plane of the loop)