

Physics 201

Write name front and back.

1. A square loop of wire, side length a , in the plane of the page, moves at velocity v from a region of zero magnetic field into a region of uniform field, B pointing out of the page. Find the magnitude of voltage in three times: (a) a time before the loop moves into the field, (b) while the loop is entering the field, and (c) when the loop is totally in the field. Once in, the field goes on forever.

2. Find the magnetic field as a function of radius for the following: a current, I , running up the page in a thin wire surrounded by a thick, cylindrical shell, inner radius R_1 , outer radius R_2 , carrying a constant current density J down the page. The direction of the magnetic field is interesting. When $r < R_1$, you should be able to give a direction. When $r > R_2$, find an expression which governs the direction of the magnetic field. In the middle region, $R_1 > r > R_2$, find another expression which determines the direction of the field. This will be similar to the previous expression, but it should differ slightly.