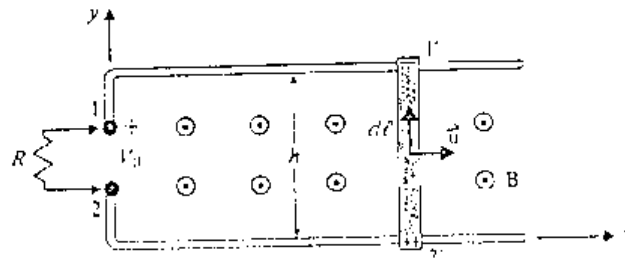


參考用

(Each problem 25%)

1. Write and explain the Maxwell's equations.
2. A positive point charge Q is at the center of a spherical conducting shell of an inner radius R_i and an outer radius R_o . Determine the electric field intensity \vec{E} and the electrical potential V as functions of the radius distance R .
3. Find the magnetic flux density \vec{B} at a distant point of a small circular loop of radius b that carries current I (a magnetic dipole).
4. A metal bar slides over a pair of conducting rails in a uniform magnetic field $\vec{B} = \vec{e}_y B_0$ with a constant velocity \vec{u} , as shown in the following figure:



- a) Determine the open-circuit voltage V_0 that appears across terminal 1 and 2.
- b) Assuming that a resistance R is connected between the terminals, find the electric power dissipated in R .
- c) Show that this electric power is equal to the mechanical power required to move the sliding bar with a velocity \vec{u} .