銘傳大學 97 學年度研究所碩士班招生考試

電子工程學系碩士班

電磁學試題(第三節)

(第 1 頁共 1 頁)(限用答案本作答)　　□可使用計算機 ☑不可使用計算機

1. a. What is Gauss's Law? (10)
   b. Determine the E field caused by a spherical cloud of electrons with a volume charge density $\rho = -\rho_0$ for $0 \leq R \leq b$ (both ρ_0 and b are positive) and $\rho = 0$ for $R > b$. Configuration is shown in Fig. 1. (20)
2. a. What is Biot-Savart Law? (10)
   b. Find the magnetic flux density at a point on the axis of a circular loop of radius b that carries a direct current I shown in Fig. 2. (20)
3. a. What is *flux cutting eqn*(*motional emf*)? (10)
   b. A metal bar slides over a pair of conducting rails in a uniform magnetic field $B = a_z B_0$ with a constant velocity u as shown in Fig. 3. (20)
4. Please write down the integral form of *Maxwell' s equations.* (10)

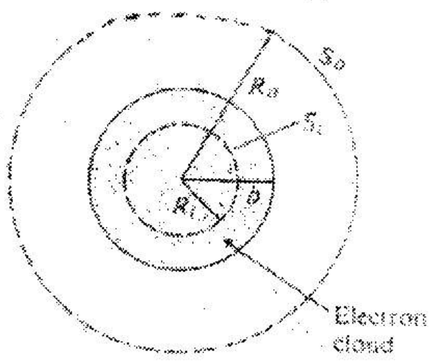

Fig. 1.

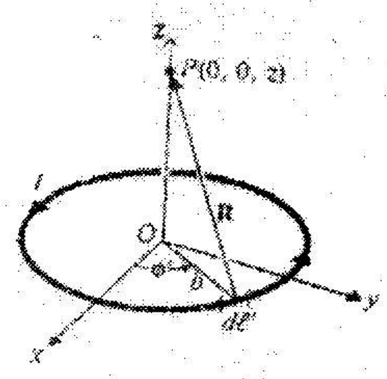

Fig. 2.

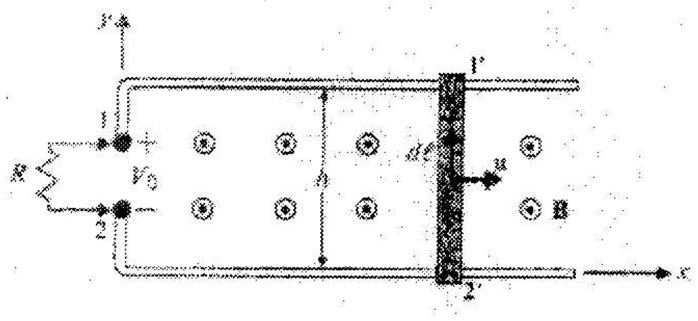

Fig. 3.

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