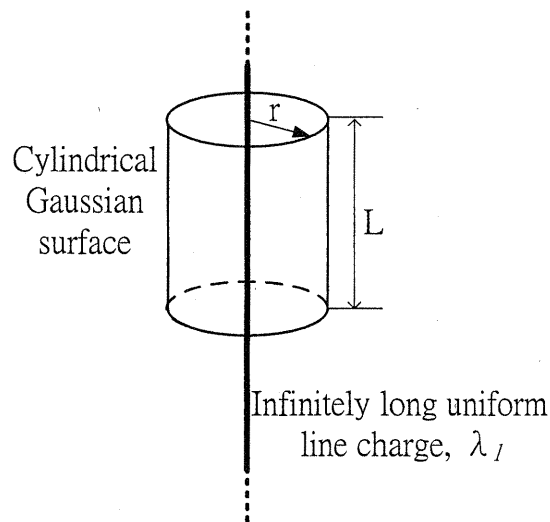


科目	電磁學	適用系所	電機工程學系電波組、光電組	時間	100 分鐘
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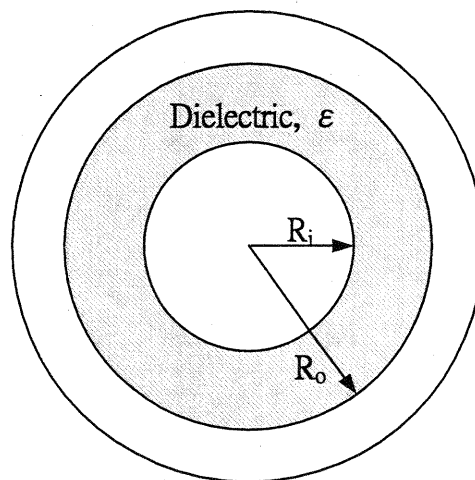
※請務必在答案卷作答區內作答。

共2頁 第1頁

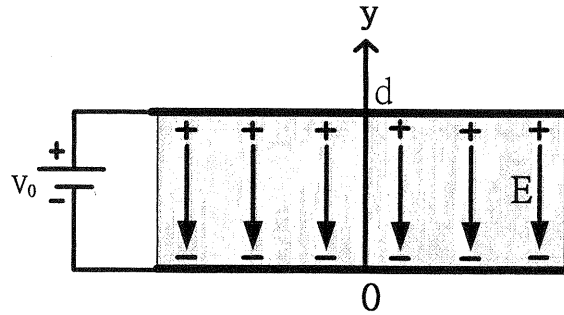
1. Use Gauss's law to determine the electric field intensity of an infinitely long, straight, line charge of a uniform density λ_l in air. (12%)



2. What are the general boundary conditions for electrostatic fields at a conductor/free space interface? (12%)
3. A spherical capacitor consists of an inner conducting sphere of radius R_i and an outer conductor with a spherical inner wall of radius R_o . The space in between is filled with a dielectric of permittivity ϵ . Determine the capacitance. (13%)



4. The two plates of a parallel-plate capacitor are separated by a distance d and maintained at potentials 0 and V_0 , as shown in the Fig. Assuming negligible fringing effect at the edges, determine the potential at any point between the plates. (13%)



5. A sinusoidal electric intensity of amplitude $250(\text{V/m})$ and frequency 1GHz exists in a lossy dielectric medium that has a relative permittivity of $\epsilon_r = 2.5$ and a loss tangent of 0.0001 . Find the average power dissipated in the medium per cube? (15%)
6. Please write down Maxwell's equations in integral form? (15%)
7. Consider a semi-circle ring with radius b . If it locates in the xy -plane, its center in the origin with a current I in the \hat{a}_ϕ direction. Find the magnetic field intensity in the $(0, 0, b)$? (20%)