國立成功大學

114學年度碩士班招生考試試題

編　號：89

系　所：工程科學系

科　目：電磁學

日　期：0211

節　次：第 2 節

注　意：1.不可使用計算機
2.請於答案卷(卡)作答，於試題上作答，不予計分。

1、Given a coaxial capacitor of length L. Determine the force between the inner conductor of radius a and the outer conductor of radius b that carry charges $+q$ and $-q$, respectively. The permittivity of the insulating material is ε. (25%)

2、Suppose a positive point charge q is placed at the center of a spherical dielectric shell of an inner radius r_i and an outer radius r_o. The dielectric constant of the shell is ε_r. Find the polarization vector as a function of the radial distance r. (25%)

3、Consider a cylindrical bar magnet with a radius r and length l. Assume the cylinder is uniformly magnetized and has axial magnetization $\mathbf{M} = \mathbf{a}_z M_0$. Find the magnetic flux density on the axis of the cylinder. (25%)

4、Define time-harmonic plan-wave field. (25%)