

國立中山大學八十八學年度碩博士班招生考試試題

科目：電磁學 (電電所)

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1. Calculate the capacitance C of a spherical condenser of inner radius R_1 and outer radius R_2 , which is filled with a dielectric varying as

$$\epsilon = \epsilon_0 + \epsilon_1 \cos^2 \theta,$$

where θ is the polar angle. (30%)

2. A flywheel of radius R , with charge Q uniformly distributed along the rim, rotates with an angular velocity ω . What is the rate at which energy is radiated by the system? (30%)

3. A long straight wire carrying current I is placed a distance d above a semi-infinite magnetic medium of permeability μ . Calculate the force per unit length acting on the wire; be sure to specify the direction of the force. (40%)