

系別：電機工程學系

科目：電 磁 學(含電磁波)

准帶項目請打「V」	
X	簡單型計算機

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本試題雙面印製

- 一. Consider two spherical conductors with radii b_1 and b_2 ($b_2 > b_1$) that are connected by a conducting wire. The distance of separation between the conductors is assumed to be very large in comparison to b_2 so that charges on the spherical conductors may be considered as uniformly distributed. A total charge Q is deposited on the spheres. Find (a) the charges on the two spheres, and (b) the electric field intensities at the sphere surface. (20%)
- 二. A cylinder capacitor consists of an inner conductor of radius a and an outer conductor whose inner radius is b . The space between the conductors is filled with a dielectric of permittivity ϵ , and the length of the capacitor is L . Determine the capacitance of this capacitor. (20%)
- 三. An infinitely long, straight conductor with a circular cross section of radius b carries a steady current I . Determine the magnetic flux density both inside and outside the conductor. (20%)

淡江大學 95 學年度碩士班招生考試試題

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IV. A sinusoidal electric intensity of amplitude 250 (V/m) and frequency 1 (GHz) exists in a lossy dielectric medium that has a relative permittivity of 2.5 and a loss tangent of 0.001 . Find the average power dissipated in the medium per cube meter. (20%)

V. A y -polarized uniform plane wave (E_i, H_i) with a frequency 100 (MHz) propagates in air in the x direction and impinges normally on a perfectly conducting plane at $x=0$. Assuming the amplitude of E_i to be 6 (mV/m) , write the phasor and instantaneous expressions for (a) E_i and H_i of the incident wave; (b) E and H of the total wave in air. (20%)