

臺灣綜合大學系統 109 學年度學士班轉學生聯合招生考試試題

科目名稱	電磁學	類組代碼	C01
		科目碼	C0101

※本項考試依簡章規定所有考科均「不可」使用計算機。 本科試題共計 1 頁

- Please write down the Maxwell's equations and their respective physical meanings. (20%)
- (Figure 1)** Two spherical cavities, of radii a and b , are hollowed out from the interior of a neutral conducting sphere of radius R . At the center of each cavity a point charge is placed (call these charge q_a and q_b).
 - Find the surface charges σ_a , σ_b , and σ_R (10%)
 - What is the field E outside the conductor? (10%)
 - What is the field E within each cavity? (10%)
 - What is the force on q_a and q_b ? (10%)
- Please describe Maxwell's corrections to Ampere's Law. (10%)
- (Figure 2)** An infinitely long coaxial transmission line has a solid inner conductor of radius a and a very thin outer conductor of inner radius c , in which two magnetic materials μ_1 and μ_2 are filled. Determine the inductance per unit length of the line. (10%)
- (Figure 3)** A point charge is placed at the position of $(0,d,d)$. Two grounded plane conductors are located along the Y and Z axis, respectively. Please calculate the potential distribution in the region of $(x, y>0, z>0)$. (10%)
- (Figure 4)** Assuming that charges of magnitude Q are installed in the parallel-plate capacitors as shown in the following figures, please find the electric field \vec{E} , and the capacitance. (10%)

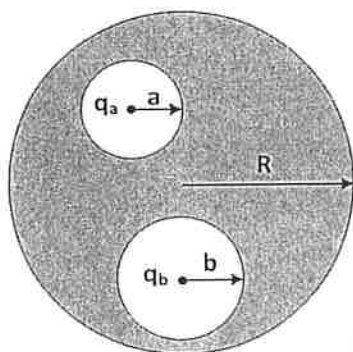


Figure 1

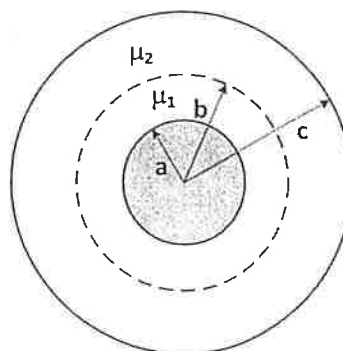


Figure 2

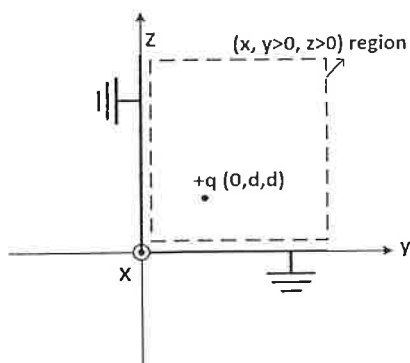


Figure 3

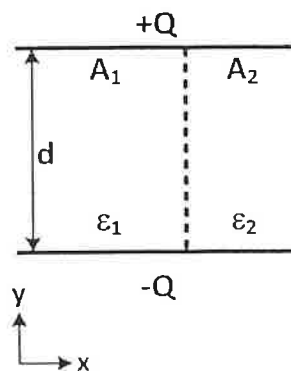


Figure 4