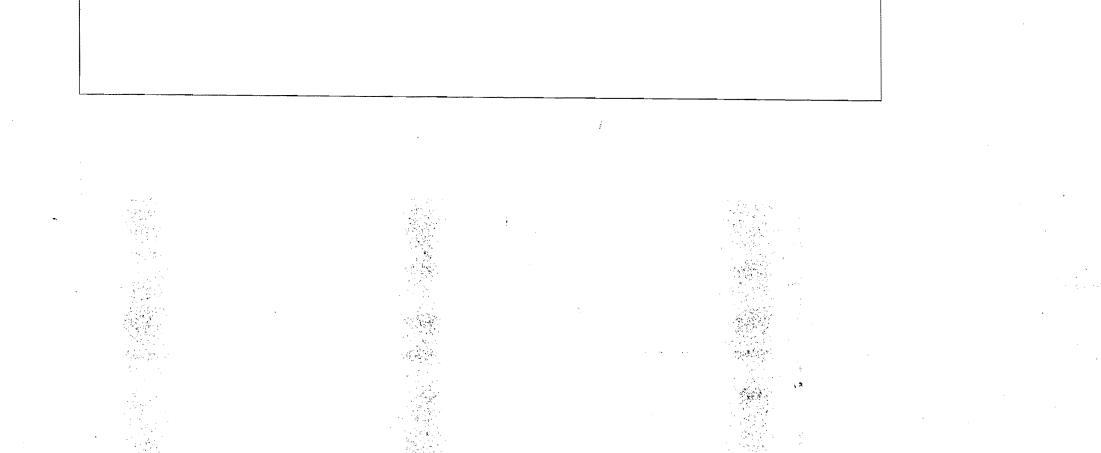
淡江大學 107 學年度日間部轉學生招生考試試題	
系別: 物理學系三年級	科目: 電磁學 24
考試日期 7月27日(星期五) 第1節	本試題共 3 大題 1 頁
*請列出各步驟及計算過程、或詳細說明,否則不予計分。	
<ol> <li>(40 分) Charge is distributed uniformly, with a surface charge density σ(σ= charge per unit area = dQ/dA), over a thin circular disk of radius R.</li> <li>(a) Use Coulomb's law to determine the electric field at a point P on the axis of the disk, a distance z above its center.</li> <li>(b) From (a), what is the electric field at point P if z &lt;&lt; R?</li> <li>(c) Use Gauss's law to verify your answer of (b).</li> <li>(d) Two such planes are parallel separated by a distance d (d &lt;&lt; R). One carries a uniform surface charge density σ and the other carries a uniform surface charge density -σ. Find the electric field between these two planes.</li> <li>(e) Find the potential difference between the two planes described in (d).</li> </ol>	
2. $(30 分)$ Find the magnetic field and the vector potential produced by an infinite solenoid with <i>n</i> turns per unit length, radius <i>R</i> , and carrying a steady current <i>I</i> .	
<ul> <li>3. (30 分) A long coaxial cable carries current <i>I</i> (the current flows down the surface of the inner cylinder, radius <i>a</i>, and back along the outer cylinder, radius <i>b</i>).</li> <li>(a) Find the magnetic field between the cylinders.</li> <li>(b) Find the energy stored in a section of length <i>l</i>.</li> <li>(c) Find the self-inductance per unit length.</li> </ul>	

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