

# 淡江大學 97 學年度轉學生招生考試試題

97

系別：物理學系三年級

科目：電 磁 學

可否使用計算機		
可		否
		<input checked="" type="checkbox"/>

本試題共 4 大題， 1 頁

※ 請詳細列出各步驟及計算過程，否則不予計分。  
※ 每題 25 分。

- An electric dipole of moment  $p$  consisted of two charges separated by a distance  $s$  is lined up with the  $z$ -axis at the origin of coordinates.
  - Find the electric potential at point  $P$ . The distance between  $P$  and the origin is  $r$ .
  - A second dipole of moment  $p$  is centered at the point  $(a,0,a)$  and is pointed toward the origin. Calculate the force on the second dipole.
- A point charge  $q$  is embedded at the center of a sphere of linear dielectric material (with susceptibility  $\chi_e$  and radius  $R$ ).
  - Find the electric field, the polarization, and the bound charge densities,  $\rho_b$  and  $\sigma_b$ .
  - What is the total bound charge in the surface?
  - Where is the compensating negative bound charge located?
- Two infinitely long parallel wires carrying currents  $I_a$  and  $I_b$ , separated by a distance  $R$ .
  - Find the force between these two wires.
  - Find the magnetic induction and the vector potential.
- What is Poynting theorem? Write the equation for it and give the physical meaning for each term in it.
  - Write down the Poynting vector and give its physical meaning.