



南台科技大學 101 學年度研究所考試入學招生考試

系組：光電系

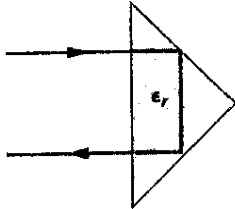
准考證號碼：□□□□□□□□

科目：電磁學

(請考生自行填寫)

注意事項	<p>一、請先檢查准考證號碼、報考系(組)別、考試科目名稱，確定無誤後再作答。</p> <p>二、所有答案應寫於答案紙上，否則不予計分。</p> <p>三、作答時應依試題題號，依序由上而下書寫，作答及未作答之題號均應抄寫。</p>
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- Let $Q_1 = 8 \mu\text{C}$ be located at $P_1(2,5,8)$ while $Q_2 = -5 \mu\text{C}$ is at $P_2(6,15,8)$. Let $\epsilon = \epsilon_0$. Find \vec{F}_2 , the force on Q_2 . (10%)
- (a) Write down both the differential and integral forms of Maxwell's equations. (b) Derive the wave equations for \vec{E} in free space, starting from the Maxwell's equations. (20%)
- (a) Determine the minimal relative permittivity ϵ_r of a dielectric medium for which the critical angle of total reflection from the dielectric into air is less than 45 degrees. (b) Is it possible to make from such a dielectric a right-angled isosceles triangular prism that returns the light wave as in the Figure below? Is there reflection of the light wave when it enters the prism? Give your explanation. (20%)



- Please draw the electric field lines for the following cases. (a) a negative point charge, and (b) a electric dipole. (10%)
- What are the (a) total internal reflection, (b) critical angle, (c) snell's law, and (d) optical fiber? Please explain it clearly. (20%)
- 根據下圖，若導線棒長 1 m 且以 2 m/s 之速率向右移動，而磁場大小為 $B=0.005 \text{ T}$. (a) 求其感應電動勢? (b)若迴路電阻為 $R=0.5 \Omega$ ，求此導線棒所受磁力之大小及方向? (c) 感應電流之方向? (20%)

