# 國立中正大學 112 學年度碩士班招生考試

# 試 題

## [第3節]

科目名稱	電磁學
系所組別	機械工程學系光機電整合工程

#### -作答注意事項-

- ※作答前請先核對「試題」、「試卷」與「准考證」之系所組別、科目名稱是否相符。
- 1. 預備鈴響時即可入場,但至考試開始鈴響前,不得翻閱試題,並不得書寫、 書記、作答。
- 2. 考試開始鈴響時,即可開始作答;考試結束鈴響畢,應即停止作答。
- 3.入場後於考試開始 40 分鐘內不得離場。
- 4.全部答題均須在試卷(答案卷)作答區內完成。
- 5.試卷作答限用藍色或黑色筆(含鉛筆)書寫。
- 6. 試題須隨試卷繳還。

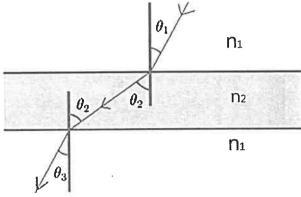
### 國立中正大學 112 學年度碩士班招生考試試題

科目名稱:電磁學

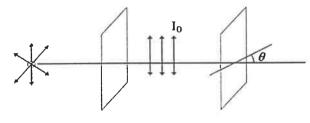
本科目共1頁 第1頁

系所組別:機械工程學系光機電整合工程

- 1. (15%) What is the magnetic field inside a long straight, uniform wire of radius R which carrying a current I?
- 2. (15%) What is the electrical potential inside an isolated conducting spherical shell of radius R carrying a charge Q?
- 3. (20%) Find the Poynting vector on the surface of a long, straight conducting wire (of radius b and conductivity σ) that carries a direct current I; and verify Poynting's theorem.
- 4. (20%) A ray of light incident in a glass the surface from the air making an angle of 10 ° with the normal to the surface. (refractive index of air =  $1(n_1)$  and refractive index of Glass =  $1.52(n_2)$ )



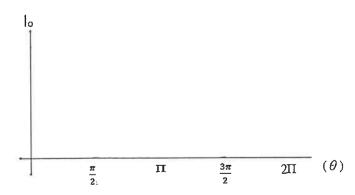
- (a) What is the angle  $\theta_2$  and  $\theta_3$  of refraction? (10%)
- (b) What is the critical angle? (10%)
- 5. (30%) (a) Please explain law of Malus (10%)



Polarizer

Analyzer

(b) Draw a graph showing the variation of intensity (I) of polarized light transmitted by an analyzer with angle ( $\theta$ ) between polarizer and analyzer. ( $\theta$  at  $\frac{\pi}{2}$ ,  $\Pi$ ,  $\frac{3\pi}{2}$ ,  $2\Pi$ ) (10%)



(c) What is the value of refractive index of a medium of polarizing angle 60°? (by Brewster's angle) (1) 1.732 (2) 1.632 (3) 1.532 (4) 1.432 (10%)