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

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))
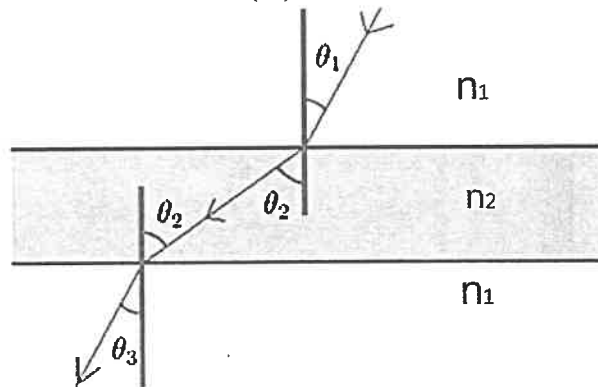
   (a) What is the angle θ_2 and θ_3 of refraction? (10%)

   (b) What is the critical angle? (10%)

5. (30%) (a) Please explain law of Malus (10%)
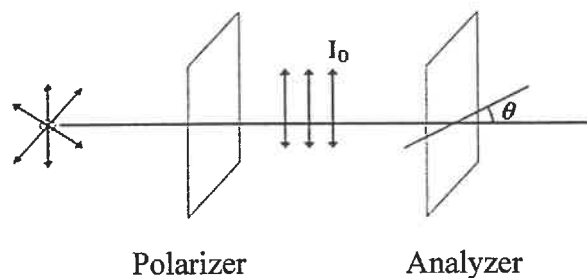
   (b) Draw a graph showing the variation of intensity (I) of polarized light transmitted by an analyzer with angle (θ) between polarizer and analyzer. (θ at $\frac{\pi}{2}$,Π, $\frac{3\pi}{2}$, 2Π) (10%)
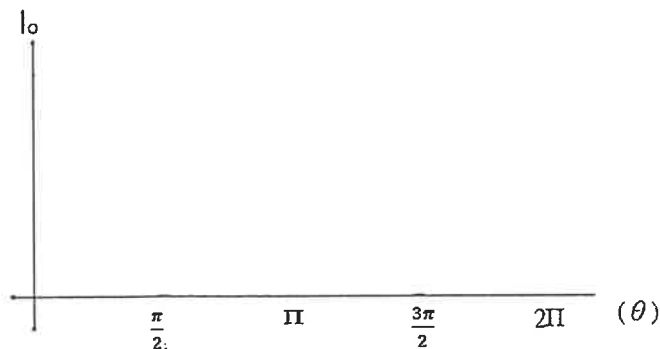
   (c) What is the value of refractive index of a medium of polarizing angle 60^0? (by Brewster's angle)

     (1) 1.732 (2) 1.632 (3) 1.532 (4) 1.432 (10%)