

**MID-TERM EXAMINATION**  
(B.Tech CSE -AI, AI-ML) (Semester 1st)  
(October, 2023) OFF LINE mode

05601192023

Subject Code: BAS 107	Subject: Applied Physics
Time : 1 ½ Hours	Maximum Marks : 30
Note: Q. 1 is compulsory.	

<b>Q1</b>		<b>(2.5*4)</b>
(a)	When sunlight falls on the surface of water at an incidence of 60 degree, the reflected light is found to be completely plane-polarized. Find the angle of refraction and the refractive index of water	
(b)	What is Malus law ? Write its mathematical relation.	
(c)	In a free space $E = 30\cos(\omega t - 60x)\hat{j}$ V/m. Find (a) $J_d$ (displacement current density) (b) $\omega$ ( angular frequency)	
(d)	What is equation of continuity? Also write its expression.	

<b>Q2</b>	<b>(Attempt any Two Parts ) UNIT-1</b>	<b>(5,5)</b>
(a)	For the uniform thickness film, which is illuminated by light, deduce the conditions for constructive and destructive interference for reflected light by the thin film.	
(b)	Derive an expression of intensity distribution for Fraunhofer Diffraction due to single slit. Also, plot the intensity curve.	
(c)	What is double refraction? Describe the construction and working principal of Nicol Prism.	

<b>Q3</b>	<b>(Attempt any Two Parts ) UNIT-2</b>	<b>(5,5)</b>
(a)	Derive Maxwell's 3 <sup>rd</sup> equation in differential form and discuss its physical significance.	
(b)	Discuss the propagation of plane electromagnetic waves in free space and find the equation of electric and magnetic field vector. Show that the electromagnetic waves propagate with the speed of light in free space.	
(c)	What do you mean by skin depth ? Determine the penetration depth by which an electromagnetic wave enters into copper sheet if $\rho_{cu} = 2 \times 10^{-6}$ ohm-m, relative permeability $\sim 1$ and frequency = $10^6$ MHz.	