MID-TERM EXAMINATION
(B.Tech (CSE-AI/AI & ML)
1st semester(January, 2023)
OFF-LINE mode

Subject Code: BAS-107	Subject: Applied Physics - I

Time: 1 ½Hours

Maximum Marks: 30

Q1 Attempt All Parts (2.5*4)

(a) How many lines per cm are there in a grating which gives a deflection of $30°$ to the first order spectra for the light of wavelength $6×10^{-5}$ cm?

(b) Differentiate between the interference due to division of amplitude and division of wave front, with example?

(c) The electric field component of an electromagnetic field is defined as (in SI units) $E_x = 100 \sin (\pi(6 \times 10^{14}t - 3 \times 10^6 z))$ V/m, determine its (i) Amplitude, (ii) Frequency, (iii) direction of propagation of EM wave, (iv) velocity, and (v) direction of variation of magnetic field vector?

(d) State Poynting theorem and briefly describe its constituents?

Q2 (Attempt any Two Parts) UNIT-1 (5,5)

(a) Derive an expression for the interference due to an oblique incidence of light in reflection mode? Also discuss the conditions of maxima and minima?

(b) Mention at least five differences between Fresnel and Fraunhofer diffraction?

(c) A narrow slit illuminated by sodium light of wavelength 5890 Å. It is located at a distance of **10 cm** from a straight edge. If the measurements are done at a distance of **50 cm** from the straight edge. Find the distance between first and second diffraction minima?

Q3 (Attempt any Two Parts)UNIT-2 (5,5)

(a) What is the skin depth of a conductor of conductivity 5 $(ohm.m)^{-1}$ when an incident radiation of **20 MHz** falls on this?

(b) Write maxwell's equations of electromagnetism and their interpretation? What was the correction introduced by Maxwell and how it removed the discrepancy in the propagation of electromagnetic waves?

(c) Derive an expression for the propagation of EM waves in free space and Prove that Electromagnetic waves travel with the velocity of light in vacuum?