

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 ½ Hours

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 \AA . 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 $5 (\text{ohm.m})^{-1}$ 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?