JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2023

B.Tech.-I Semester (BT/BI)

COURSE CODE(CREDITS):18B11PH112 (04) MAX. MARKS: 25

COURSE NAME: Basic Engineering Physics-I

COURSE INSTRUCTORS: Dr. Ragini Raj Singh MAX. TIME: 1 Hour 30 Minutes

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Note: (a)All questions are compulsory.
(b)Marks are indicated against each question in square brackets.
(c) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

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Q.1. Short answer questions

(i) Why only electric field component is considered in polarization and not a magnetic field vector [CO:2; Marks:1]

(ii) Name the various optical phenomenon to produce the polarized light [CO:3; Marks:1]

(iii) Polarization by selective absorption [CO:4; Marks:1]

Q.2. How to fabricate Polaroid sheets? Derive the equation which explains the effect of polarizer on natural light? Also discuss the Malu's law. [CO:3; Marks:4]

Q.3. Discuss special cases where depending upon $\delta=0, \pi$, and $\pi/2$ the nature of polarized light changes. [CO:4; Marks:3]

Q.4. How to produce and analyze linearly and circularly polarized light, for explanation draw the suitable diagrams only with proper labeling. [CO:4; Marks:3]

Q.5. A lens of focal length 90 cm forms Fraunhoffer diffraction pattern of a single slit of width 0.04 cm in its focal plane. The incident light contains two wavelengths $\lambda1$ and $\lambda2$. It is found that the fourth minimum corresponding to $\lambda1$ and the fifth minimum corresponding to $\lambda2$ occur at the same point 0.5 cm from the central maxima. Find the values of $\lambda1$ and $\lambda2$. [CO:1; Marks:2]

Q.6. How many orders will be observed by a grating having 5000 lines/cm if it is illuminated by a visible light of wavelength in the range 4500- 7500 Å. [CO:1; Marks:2]

Q.7. A diffraction grating used at normal incidence gives a yellow line (λ=6000 Å) in a certain spectral order superimposed on a blue line (λ= 4800 Å) of next higher order. If the angle of diffraction is $\sin^{-1}$ (3/4), calculate the grating element. [CO:2; Marks:2]

Q.8. A diffraction grating having 4000 lines per cm is used at normal incidence. Calculate dispersive power of the grating in the second order spectrum in the 6000 Å wavelength region. [CO:2; Marks:2]

Q.9. A grating has 6000 lines per cm drawn on it. If its width is 10 cm, calculate (i) the resolving power in the third order in 5500 Å wavelength region. [CO:3; Marks:2]

Q.10. A sugar solution in a tube of length 25 cm produces optical rotation of 15 degree. The solution is diluted to half of its previous concentration. Find optical rotation produced by 40 cm long tube containing the diluted solution. [CO:4; Marks:2]