CO5- Understand fundamentals of quantum mechanics, Schrodinger's wave equations to deal with physics problem.

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Mid Term Examination, Even Semester 2022-23
Program: B. Tech., Year: I, Semester: II
Subject Code: BPHS 0002, Subject: Engineering Physics-I

Time: 2 Hours **Maximum Marks: 30**

Section – A

Attempt All Questions 3 × 5 = 15 Marks

No.	Detail of Question	Marks	CO	BL	KL
1	Two waves of amplitudes a_1 and a_2 having phase difference δ are superposing with each other. Deduce the expression for resultant intensity due to superposition of these waves.	3	1	A	P
2	In an interference pattern the ratio between maximum and minimum intensities is 36:1. Find the ratio between amplitude and intensities of the two interfering waves.	3	1	A	P
3	Distinguish between Fraunhofer and Fresnel class of diffraction.	3	1	U	C
4	Define the following terms: (i) Plane polarized light (ii) Polarisation (iii) Plane of vibration	3	2	R	F
5	Explain transition temperature. Transition temperature of Pb is 7.2 K. The critical magnet field of Pb at 5 K is 3.3×10^4 A/m. Estimate its critical magnetic field at 0 K.	3	3	A	P

Section – B

Attempt All Questions 5 × 3 = 15 Marks

No.	Detail of Question	Marks	CO	BL	KL
6	Explain Hall effect. Deduce the expression for Hall coefficient in terms of Hall voltage, thickness of the solid, current flowing in it and magnetic field applied. Hall coefficient of a conductor is 8.0×10^{-9} m^2/Coulomb. Calculate the concentration of electrons in it (Charge of electron(e) $=1.6\times10^{-19}$ Coulomb).	5	3	A	P
7	Obtain the expression for resultant intensity at a point in the diffraction pattern formed due to single a slit. Also find the direction of central maximum. Light rays of wavelength 5.5×10^{-5} cm are falling on a slit of width 22×10^{-5} cm. Compute the angular positions of first minima in the diffraction pattern lying on either side of central maximum. Or (i) Deduce the expression for the diameter of nth order bright ring forming in the Newton's ring experiment in reflected light. (ii) Light containing two wavelengths λ_1 and λ_2 fall normally on a Plano convex lens of radius of curvature R resting on a plane glass plate. If the n^{th} dark ring due to λ_1 coincides with $(n+1)^{th}$ dark ring due to λ_2, then prove that the radius of nth dark ring of wavelength λ_1 is $\sqrt{\frac{\lambda_1\lambda_2 R}{(\lambda_1-\lambda_2)}}$	5	1	A	P
8	Two perpendicular vibrations after emerging from a calcite crystal are superposing with each other. Find the equation of the locus of the resultant light vector forming due to superposition of these vibrations. Using it show that plane and circularly polarized lights are the special case of elliptically polarized light.	5	2	A	P