Course Name: Engineering Physics

Course Outcomes

CO1- Understand phenomenon of interference, diffraction of light waves and variation of intensities in these phenomenon.
CO2- Discuss polarization of light wave, double refraction and specific rotation.
CO3- Explain solids, superconductors and conductivity variation with temperature for intrinsic semiconductors.
CO4- Explain special theory of relativity in fields of physics and engineering.
CO5- Understand fundamentals of quantum mechanics, Schrödinger's wave equations to deal with physics problem.

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Mid Term Examination, Odd Semester 2022-23
Program: B. Tech., Year: I, Semester: I
Subject Code: BPHS0002, Subject: Engineering Physics

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

Section – A

Attempt All Questions 3 × 5 = 15 Marks

No.	Detail of Question	Marks	CO	BL	KL
1	Show that the phenomenon of interference follows the law of conservation of energy.	3	1	A	P
2	Two coherent waves of intensity ratio 9:1 interfere. Prove that in the interference, $\frac{I_{max}-I_{min}}{I_{max}+I_{min}}=\frac{3}{5}$.	3	1	A	P
3	Distinguish between interference and diffraction.	3	1	U	C
4	Define specific rotation. A sugar solution in a tube of length 20 cm produces an optical rotation of 13.9^0. The solution is then diluted to one third of its previous concentration. Find the optical rotation produced by 30 cm tube containing the dilute solution.	3	2	A	P
5	A biprism of obtuse angle 176^0 is made of glass of refractive index 1.5. A slit illuminated with monochromatic light is placed 20 cm behind the biprism and width of interference fringes formed on a screen 80 cm in front of biprism is found to be 8.25×10^{-3} cm. Calculate the wavelength of light used.	3	1	A	P

Section – B

Attempt All Questions 5 × 3 = 15 Marks

No.	Detail of Question	Marks	CO	BL	KL
6	(i) Deduce the temperature independent expression for conductivity of semiconductors in terms of concentration and mobilities of electrons and holes existing in them. (ii) Explain the following terms: (a) Superconductivity (b) Transition temperature	5	3	A	P
7	Light rays from two coherent sources superpose with each other on a screen placed at some distance from these sources. Derive the expression for the fringe width. Or Deduce the expression for the diameter of nth order dark ring forming in the Newton's ring experiment. Diameter of 4^{th} and 12^{th} dark rings in Newton's ring experiment are 0.400 cm and 0.700 cm respectively. Compute the diameter of 20^{th} dark ring.	5	1	A	P
8	Explain the Fraunhofer diffraction due to a single slit and obtain the expression for resultant intensity at a point in the diffraction pattern. Also find the intensity at central maximum and positions of minima forming in the diffraction pattern.	5	1	A	P