JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2024

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) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems.
(c)Use of scientific calculators is permitted.

Q.No	Question	CO	Marks
Q1	**(a)** What is the basic condition to have diffraction? On the basis of distance between source, slit and screen, how to classify diffraction? **(b)** What are the differences between single slit and double slit diffraction? Deduce the relations for interference maxima and minima in double slit diffraction.	1	**2+ 2=4**
Q2	**(a)** Derive the equation to find width of central maxima in diffraction pattern generated by plane transmission grating. **(b)** Deduce the relation for dispersive power of a plane transmission grating? Also establish the relation between dx and $d\lambda$.	2	**2.5+2.5 =5**
Q3	**(a)**List the methods to obtain polarized light. Discuss the method of selective absorption in detail with necessary diagram. **(b)**Derive the general equation of ellipse for the superposition of two linearly polarized light waves? Also discuss the condition when the circularly polarized light will be obtained.	3	**2+4=6**
Q4	A lens whose focal length is 60 cm forms a Fraunhoffer diffraction pattern of a single slit of 0.4 mm width. Calculate the distance of the first dark band and the next bright band on either side of the central maxima. The wavelength of light used is 5000 Å.	3	**2**
Q5	In a double slit Fraunhoffer diffraction pattern, the screen is placed 150 cm away from the slits. The width of the slits is 0.05 mm and they are 0.5 mm apart. **(a)** Calculate the wavelength of light in the fringe width is 0.025 cm. **(b)** Also find the missing orders.	4	**2+2=4**
Q6	**(a)** A ray of light is incident on the surface of the glass plate of refractive index 1.55. Calculate the angle of incidence for which the reflected light is completely plane polarized. What is the plane of vibration of light? What is the corresponding angle of refraction?	4	**1+1+1 +1=4**

	(b) Two Nicols have parallel polarizing directions so that the intensity of transmitted light is maximum. Through what angle must either Nicol be turned if intensity is drop by 1/2 of its maximum value. **(c)** Find the thickness of the quarter wave plate when the wavelength of light is equal to 6500Å, μ_o=1.65, and μ_E is 1.55. **(d)** A tube of sugar solution 20 cm long is placed between crossed Nicols and illuminated with light of wavelength 6000Å. If the optical rotation produced is 15 degree and the specific rotation is 65 degree dm/g/cm^3, determine the strength of the solution.		