

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2025

B.Tech-I Semester (CSE/IT/ECE/CE)

COURSE CODE (CREDITS): 25B11PH111 (4)

MAX. MARKS: 25

COURSE NAME: PHYSICS-1

COURSE INSTRUCTORS: PBB, SKK, VSA, SKT, SBA, HSR, HAZ MAX. TIME: 1 Hour 30 minutes

Note: (a) All questions are compulsory.

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems; Scientific calculators are allowed; Sharing of calculators not allowed;

Q.No	Question	CO	Marks
Q1	(a) A square piece of cellophane film index of refraction 1.5 has a wedge shaped section so that its thickness at two opposite sides is t_1 and t_2 . If with a light of $\lambda=6000\text{\AA}$, the number of fringes appearing on the film is 10, calculate the difference (t_2-t_1) .	3	3
	(b) Find the thickness of a soap film ($\mu=1.33$) for normal incidence, which gives constructive second order interference of reflected red light of $\lambda = 600\text{ nm}$.	3	2
Q2	A plane polarized light is incident on a plate of quartz cut with faces parallel to optic axis. Calculate the thickness for which the phase difference between the two rays is 60° . The difference of refractive indices of e- and o-rays is 0.0141 and wavelength of light used is 500 nm.	4	2
Q3	(a) A length of 25 cm of solution containing 50 g of solute per litre causes a rotation of plane of polarization of light by 5° . Find the rotation of the plane of polarization by a length of 75 cm of a solution containing 100 g of the solute per litre.	2	2
	(b) Using diagram show how to detect and differentiate the unpolarized and circularly polarized light.	2	3
Q4	Show that the superposition of two plane waves with perpendicular planes of vibration travelling in the same direction having phase difference δ is an elliptically polarized light.	1	3
Q5	(a) A diffraction grating having 4000 lines/cm is illuminated normally by light of wavelength 5000 $\text{\AA}$. Calculate its dispersive power in third order spectrum.	3	2
	(b) Derive the expression for an angular width of the first principal maxima in a diffraction grating of N number of lines per unit length.	1	2
Q6	(a) In a diffraction grating, 'a' being the width of transparent slit and 'b' being the width of opaque space between two slits, derive the expression for missing order spectra.	4	2
	(b) A grating has 620 rulings/mm and is 0.5 mm wide. What is the smallest wavelength interval that can be resolved in the third order at $\lambda=480\text{ nm}$.	3	2
Q7	Fraunhofer double slit diffraction pattern is observed in the focal plane of a lens of focal length 0.5 m. The wavelength of incident light is 500 nm. The distance between two maxima adjacent to the maximum of zero order is 5 mm and the fourth order maximum is missing. Find the width of each slit and the distance between their centers.	4	2