JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATIONS-2022

B.Tech-I Semester (CS/IT/ECE/Civil)

COURSE CODE (CREDITS): 18B11PH111 (4)   MAX. MARKS: 15

COURSE NAME: ENGINEERING PHYSICS-1

COURSE INSTRUCTORS: PBB, SKK, VSA, RRS, SKT, HAZ, SBD

MAX. TIME: 1 Hour

Note: All questions are compulsory. Marks are indicated against each question in square brackets.

Q1. By how much distance the central fringe shifts when a film of thickness 't' and refractive index 'μ' is inserted in path of one of the interfering beams in a double slit experiment.

[3-marks] [CO-1]

Q2. Two coherent sources of intensity ratio 'α' interfere. Prove that in the resulting interference pattern

$$\frac{I_{max} - I_{min}}{I_{max} + I_{min}} = \frac{2\sqrt{\alpha}}{(1+\alpha)}$$ **[2-marks] [CO-2]**

Q3. For a combination of two convex lenses in place of lens-glass plate assembly in Newton's ring setup, obtain the conditions for bright and dark rings in reflected light. **[3-marks] [CO-1]**

Q4. Light containing two wavelengths λ_1 and λ_2 falls normally on a plano-convex lens of radius of curvature R resting on a glass plate. If the nth dark ring due to λ_1 coincides with the (n+1)th

dark ring due to λ_2, prove that the radius of the nth dark ring of λ_1 is $\sqrt{\frac{\lambda_1\lambda_2 R}{(\lambda_1 - \lambda_2)}}$.

[2-marks] [CO-2]

Q5. Draw the intensity distribution of single slit Fraunhofer diffraction. Using intensity relation calculate the ratio of central maximum with first order secondary maxima.

[3-marks] [CO-1]

Q6. A Fresnel's biprism arrangement is set with sodium light (λ=5893Å) and in the field of view of the eyepiece 62 fringes are observed. How many fringes shall we get in same field view if we replace the source by mercury lamp using green filter (λ=5461Å). **[2-marks] [CO-2]**