

COURSE CODE (CREDITS): 25B11PH111 (4)

MAX. MARKS: 15

COURSE NAME: Physics - I

COURSE INSTRUCTOR: PBB, SKK, VSA, SKT, HAZ, SBD, HSR

MAX. TIME: 1 Hour

**Note:** (a) All questions are compulsory. (b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems (c) Use of calculator is allowed

| Q.No | Question                                                                                                                                                                                                                                                                                                                                | CO | Marks |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|-------|
| Q1   | Find the diameter of the $n^{\text{th}}$ order dark ring for reflected light in Newton's ring setup.                                                                                                                                                                                                                                    | 1  | 2     |
| Q2   | Schematically show the path of beam contributing to formation of fringes in wedge shaped thin film for reflected interference.                                                                                                                                                                                                          | 2  | 2     |
| Q3   | Derive an expression for the calculation of distance between two virtual sources using refracting angle ( $\alpha$ ) of the biprism and its refractive index ( $\mu$ ).                                                                                                                                                                 | 2  | 2     |
| Q4   | Calculate the separation between two consecutive dark and bright fringes in division of wavefront interference method.                                                                                                                                                                                                                  | 1  | 3     |
| Q5   | The ratio of intensity of the maxima and minima of interference fringes is 25 : 9. Determine the ratio between the amplitude and intensities of the two interference beams.                                                                                                                                                             | 4  | 2     |
| Q6   | A soap film of refractive index $4/3$ and thickness $1.5 \times 10^{-4}$ cm is illuminated by white light incident at an angle of $45^\circ$ . The light refracted by it is examined by a spectroscope in which a dark band corresponding to a wavelength of $5 \times 10^{-5}$ cm is found. Calculate the order of interference band.  | 3  | 2     |
| Q7   | On introducing a thin sheet of mica of thickness $1.2 \times 10^{-4}$ cm in the path of one of the interfering beam in a biprism experiment, the central fringe is shifted through a distance equal to the spacing between successive bright fringes. Calculate the refractive index of the mica (Given $\lambda = 6 \times 10^{-7}$ m) | 3  | 2     |