Pankaj

COURSE CODE: 18B11PH112   MAX. MARKS: 35

COURSE NAME: BASIC ENGINEERING PHYSICS - I

COURSE CREDITS: 4   MAX. TIME: 2 Hrs.

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means. Scientific calculator is allowed.

Q1 a) What is dual nature of matter? Obtain an expression for de Broglie wavelength associated with material article. **[3] (CO-1)**

b) Give the schematic diagram of Michelson's interferometer and explain the operation of Michelson's interferometer. **[2] (CO-4)**

Q2 a) Derive an expression for the width of central maximum in Fraunhoffer diffraction due to a circular aperture. **[2] (CO-1)**

b) A parallel beam of light ($\lambda = 589$ nm) is incident perpendicularly on a slit of width 0.1 mm. Calculate angular width and linear width of central maximum formed on screen 100 cm away. **[3] (CO-2)**

Q3 a) For flint glass material, the polarizing angle is $62°24'$. Calculate the refractive index of material. **[2] (CO-2)**

b) 80g of impure sugar when dissolved in a litre of water gives an optical rotation of $9.9°$. The length of polarimeter tube is 20 cm. If the specific rotation of sugar is $66°$, calculate the percentage impurity of sugar sample. **[3] (CO-2)**

Q4 What are plane polarized, circularly polarized and elliptically polarized light? Explain how these can be produced and analyzed. **[5] (CO-3)**

Q5 What are dynamic and kinematic viscosities? Discuss the flow of a liquid using Poiseuille's law. Discuss the factors on which the coefficient of viscosity depends. **[5] (CO-4)**

Q6 What is angle of contact of a liquid? Obtain an expression for excess pressure inside a liquid drop. **[5] (CO-1)**

Q7 Explain the terms i) surface to volume ratio, ii) quantum confinement. **[5] (CO-3)**