1. In Young's double-slit experiment, the slits are separated by 0.28 mm and the screen is placed 1.4 m away. The distance between the central bright fringe and fourth bright fringe is measured to be 1.2 cm. Determine the wavelength of light used in the experiment.

Sol. Given, d = 0.28 mm = 0.28×10^{-3} m, D = 1.4 m, y = 1.2 cm = 1.2×10^{-2} m, n = 4, λ = ?

For constructive interference, distance between two fringes, $y = \frac{nD\lambda}{d}$

Thus, wavelength $\lambda = \frac{yd}{nD} = \frac{1.2\times10^{-2}\times0.28\times10^{-3}}{4\times1.4} = 6 \times 10^{-7}$ m

or λ = 600 nm