

2 In a Young's double slit experiment, 16 fringes are observed in a certain segment of the screen when light of wavelength 700 nm is used. If the wavelength of light is changed to 400 nm, the number of fringes observed in the same segment of the screen would be :

ans

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(a) 24 (b) 30 (c) 18 (d) 28

(d) Let n_1 fringes are visible with light of wavelength λ_1 and n_2 with light of wavelength λ_2 . Then

$$\beta = \frac{n_1 D \lambda_1}{d} = \frac{n_2 D \lambda_2}{d} \quad \left(\because \beta = \frac{n \lambda D}{d} \right)$$

$$\Rightarrow \frac{n_2}{n_1} = \frac{\lambda_1}{\lambda_2} \Rightarrow n_2 = \frac{700}{400} \times 16 = 28$$