1. In Young's double slit arrangement, slits are separated by a gap of 0.5 mm, and the screen is placed at a distance of 0.5 m from them. The distance between the first and the third bright fringe formed when the slits are illuminated by a monochromatic light of 5890 Å is: [March 18, 2021 (I)]

(a) 1178×10^{-9} m

(b) 1178×10^{-6} m

(c) 1178×10^{-12} m

(d) 5890×10^{-7} m

ans

(b) Given :

$d = 0.5$ mm $= 0.5 \times 10^{-3}$ m and $D = 0.5$ m

Fringe width $\beta = \dfrac{\lambda D}{d}$

$= \dfrac{5890 \times 10^{-10} \times 0.5}{0.5 \times 10^{-3}} = 589 \times 10^{-6}$ m

Hence, distance between the first and third bright fringe

$= 2\beta$

$= 2 \times 589 \times 10^{-6}$ m

$= 1178 \times 10^{-6}$ m