Q. A Lloyd's mirror of length 5 cm is illuminated by light of wavelength, λ = 600 nm from a narrow slit 0.1 cm above the plane of mirror. Calculate the fringe width on a screen 120 cm from slit.

$\beta = \frac{D}{d}\lambda$

Here given, $\lambda = 600$ nm $= 600 \times 10^{-7}$ cm

$D = 120$ cm

$d = (0.1 + 0.1)$

$= 0.2$ cm

$= \frac{120}{0.2} \times 600 \times 10^{-7}$

$= \frac{120}{2 \times 10^{-1}} \times 600 \times 10^{-7}$

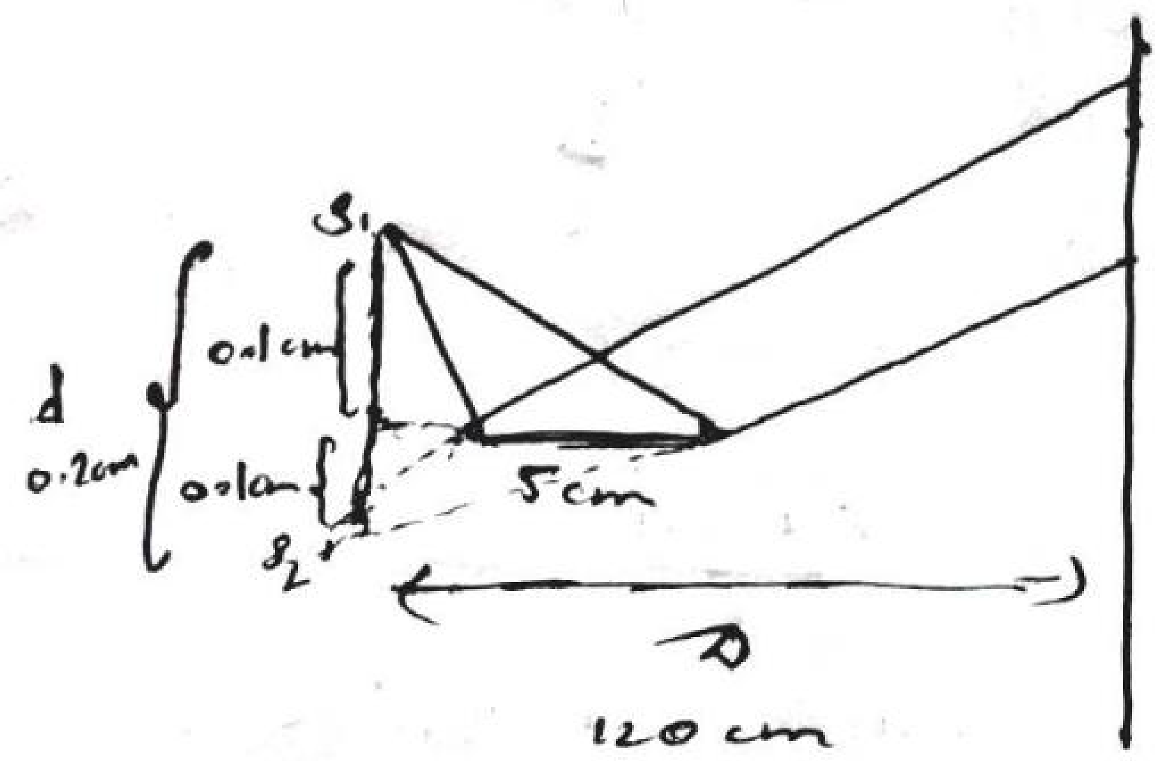
$= 60 \times 600 \times 10^{-6}$

$= 36000 \times 10^{-6}$

$= 36 \times 10^{-3}$ cm

$= 3.6 \times 10^{-2}$ cm

$= 3.6 \times 10^{-5}$ m



Q. Two narrow and parallel slits 0.1 cm apart are illuminated with a monochromatic light of wavelength 589.3 nm. The interference pattern is observed at a distance of 25 cm from the slits. Calculate the fringe width.

$\lambda = 589.3$ nm $= 589.3 \times 10^{-9}$ m

$D = 25$ cm $= 25 \times 10^{-2}$ m

$d = 0.1$ cm $= 0.1 \times 10^{-2}$ m

$\beta = \frac{D}{d}\lambda$

$= \frac{25 \times 10^{-2}}{0.1 \times 10^{-2}} \times 589.3 \times 10^{-9}$

$= 147325 \times 10^{-9}$ m $= 0.147 \times 10^{-3}$ m

$= 0.147$ mm.