

## Solution to Quiz 4c

Distance b/w slits,  $d = \frac{1}{1000} \text{ mm} = 10^{-3} \text{ mm} = 10^{-6} \text{ m}$ .

The angle at which the spot occurs is given by  
 $\lambda = d \sin \theta$

$$\Rightarrow \lambda = 400 \text{ nm}, \sin \theta = \frac{400 \times 10^{-9}}{10^{-6}} = 0.4$$

$$\Rightarrow \theta = 23.6^\circ$$

$$\text{ly, } \lambda = 700 \text{ nm}, \theta = 44.4^\circ$$

The screen is at distance  $L$ . The position  $y$  on screen  
corresponding to angle  $\theta$  is

$$y = L \tan \theta$$

$$\Rightarrow y_{400 \text{ nm}} = 10 \text{ m} \times \tan 23.6^\circ = 4.36 \text{ m}$$

$$y_{700 \text{ nm}} = 10 \text{ m} \times \tan 44.4^\circ = 9.80 \text{ m}$$

$$\Rightarrow \text{width on screen} = \Delta y = 9.80 - 4.36 \\ = 5.44 \text{ m}$$