For the double-slits-finite-width setup: “$d$” is slit-distance, “$a$” slit-width. Incident light has a wavelength $\lambda$. Denote $\phi = k \Delta = k a \theta$ and 

$\beta = k a \theta$. The intensity is given by: 

$$I(\phi, \beta) = \frac{I(0, 0)}{2} \left( \frac{\sin \beta}{\beta} \right)^2.$$ 

Here the “double-slit $\phi$-pattern” oscillates within the “single-slit $\beta$-pattern”, while the latter serves as an envelope (dotted distribution above).

If the $d = 6 \, a$, number of zeros within the dotted central peak is:

A) $6$  
B) $8$  
C) $10$  
D) $12$

First minimum of single-slit is at $\beta = 2 \pi$, or $\theta_1^s = \frac{2 \pi \lambda}{k a} = \frac{\lambda}{a}$, that of double-slit is at $\phi = \pi$, or $\theta_1^d = \frac{\pi \lambda}{k d} = \frac{\lambda}{2d}$. For $d = 6 \, a$, $\theta_1^d = \frac{1}{12} \frac{\lambda}{a} = \frac{\theta_1^s}{12}$. For double slits, zeros are at: $\phi = [1, 3, \ldots, 11] \pi$, or $\theta = \pm[\frac{1}{12}, \ldots, \frac{11}{12}] \theta_1^s$. There are $12 (= 2 \times 6)$ zeros within central peak.

Answer D.

38.04-03′Double'Slits'Finite'Width'Pattern 2006-9-14