

**Answer on Question #38004 – Physics - Other**

**Question:** when light of wavelength  $5000 \text{ \AA}$  is used in the single slit diffraction experiment, the first diffraction minimum is formed at the position  $\theta$ . If the width of the slit is  $10^{-4} \text{ cm}$ , the magnitude of  $\theta$  is: a)30; b)45; c)60; d)15.

**Solution:** in the single slit diffraction experiment the condition for the minimum points is

$$a \cdot \sin \theta = n \cdot \lambda, n = \pm 1, \pm 2, \dots$$

For the first diffraction minimum we obtain  $a \cdot \sin \theta = \lambda \rightarrow \sin \theta = \frac{\lambda}{a}$ .

$$\sin \theta = \frac{\lambda}{a} = \frac{5000 \cdot 10^{-10}}{10^{-6}} = 0,5.$$

The solution of the equation  $\sin \theta = 0,5$  is  $\theta = 30^\circ$ .

**Answer:** a)30°.