# Question

A prism of refractive index $\mu$ and angle A is placed in the minimum deviation position. If the angle of minimum deviation is A, then the value of A in terms of $\mu$ is:

A    $\sin^{-1}\left(\frac{\mu}{2}\right)$

B    $\sin^{-1}\sqrt{\frac{\mu-1}{2}}$

C    $2\cos^{-1}\left(\frac{\mu}{2}\right)$

D    $2\cos^{-1}\left(\frac{\mu}{8}\right)$

## Solution

Correct option is C)

We can use the formula: $\mu = \frac{\sin(\frac{A+D}{2})}{\sin(\frac{A}{2})}$

where D is angle of minimum deviation and A is angle of prism.

According to given condition A = D

$$\therefore \mu = \frac{\sin(\frac{A+A}{2})}{\sin(\frac{A}{2})}$$

$$\mu = \frac{\sin(A)}{\sin(\frac{A}{2})}$$

$$\mu = \frac{2\sin(\frac{A}{2})\cos(\frac{A}{2})}{\sin(\frac{A}{2})}$$

$$\mu = 2\cos(\frac{A}{2})$$

$\therefore A = 2\cos^{-1}(\frac{\mu}{2})$ which is the required solution.