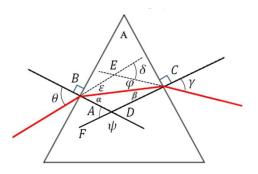**Question.** Determine the angle of deviation of a ray by a glass prism with a prism angle of $3°$ if the angle of incidence of the ray on the front face of the prism is zero. The refractive index of the glass material is 1.5.

Solution.

For prism

The total deviation of the ray is given by

$$\delta = \theta + \gamma - A,$$

Where

$$\sin \gamma = n \cdot \sin \left(A - \arcsin \left(\frac{\sin \theta}{n} \right) \right).$$

In our case

$$\theta = 0° \quad and \quad A = 3° \quad and \quad n = 1.5.$$

$$\sin \gamma = n \cdot \sin \left(A - \arcsin \left(\frac{\sin \theta}{n} \right) \right) = 1.5 \cdot \sin \left(3° - \arcsin \left(\frac{\sin 0°}{n} \right) \right) = 1.5 \cdot \sin(3° - 0°) =$$

$$= 0.0785039 \quad \rightarrow \quad \gamma = 4.5°.$$

So,

$$\delta = 0° + 4.5° - 3° = 1.5°.$$

Answer. $\delta = 1.5°$.