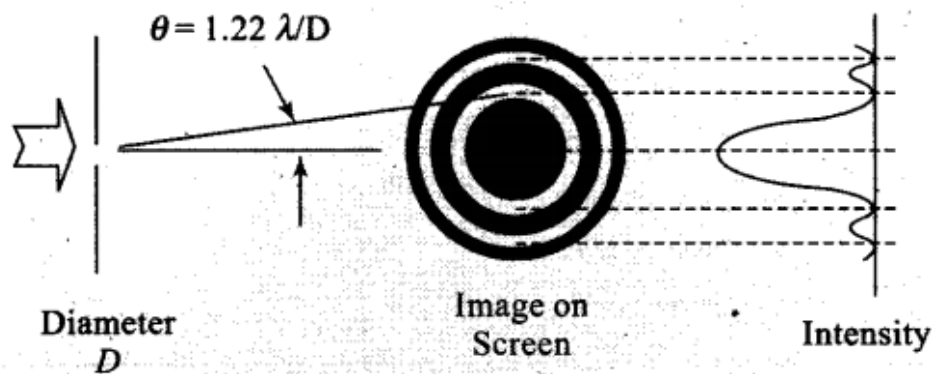# Exemplar Problems

Question 8. Consider the diffraction pattern for a small pinhole. As the size of the hole is increased
(a) the size decreases (b) the intensity increases
(c) the size increases (d) the intensity decreases
Solution: (a,b)

Key concept: The "shadow" of hole of diameter d is spread out over an angle $\Delta\theta = 1.22\dfrac{\lambda}{D} \Rightarrow \Delta\theta \propto \dfrac{1}{D}$

The central bright disc is known as Airy's disc.
As the size of the hole is increased, AO will decrease and size of Airy's disc will decrease.

As the size of the hole is increased, the width of the central maximum of the diffraction pattern of hole decreases. Since the same amount of light is now distributed over a small area, as intensity ∞ 1/area, the area is decreasing so area intensity increases.