- Among the electromagnetic radiations, Radio waves have a longer wavelength. They can therefore easily be diffracted round the corners of buildings, doors, windows so that they can be easily obtained by the receiver.
- Diffraction pattern is due to superposition of light coming from different points (parts) of same wave front.
- Diffraction can take place without interference. However, interference cannot take place without diffraction.
  [An interference surely contains diffraction but a diffraction does not contain interference.]
- Points of minima (minimum intensity) are not perfectly dark.

Fraunhofer's diffraction [Single slit experiment]

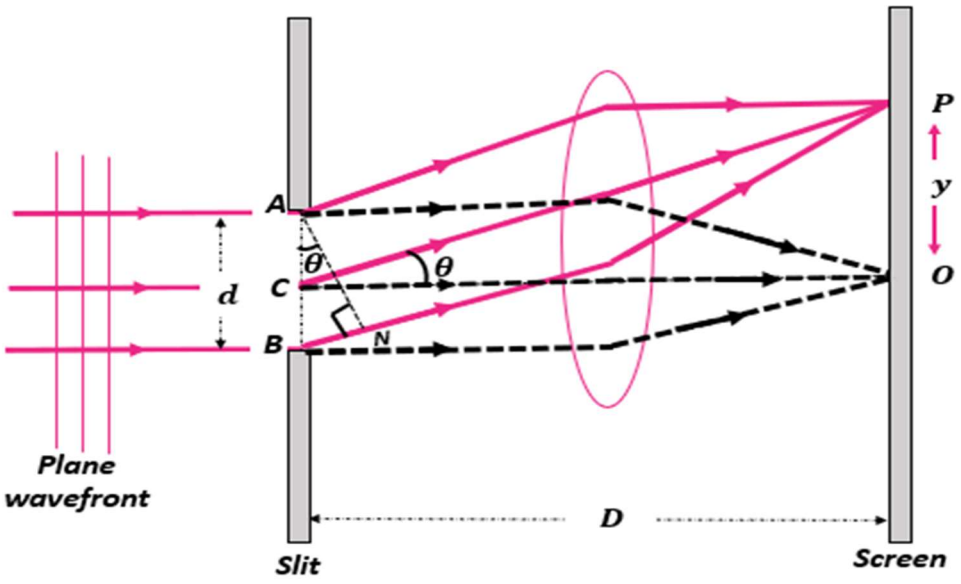

Fig: Fraunhofer's Diffraction at single slit

Suppose a plane wave front is incident on a slit AB (of width d). According to Huygens's theory, each and every part of the plane wave front (i.e., every part of the slit) acts as a source of secondary wavelets spreading in all directions. The diffraction is obtained on a screen placed at a large distance D, as shown in figure.

To explain the diffraction phenomenon, a plane wavefront is divided into half period zones. i.e., the slit width AB is considered to be integral multiple of $\frac{\lambda}{2}$. [$\frac{\lambda}{2}$ ***is called as half period zone***].

1. Condition and Position of Central Maximum [Primary maxima]:

   Any point on the screen will be a point of central maxima if all the light from slit AB reaches the point in same phase or if the path difference is zero.

   Point O, on the screen, is equidistant from each corresponding points in the slit. Hence, the path difference between each corresponding waves reaching to point O will be zero.

   Therefore, point O is the point of central maximum (central bright fringe).

2. Condition and Position of secondary maxima and secondary minima:

   In figure, point P is at distance y from the central maxima on the screen. The path difference between the rays reaching at point P is:

Contd ...