

## Superposition Document

### Principle of superposition:

When two or more waves meet at a point, the resultant displacement at that point is equal to the vector sum of the displacements due to the individual waves at that point.

### Stationary waves:

A stationary wave is a wave in which vibrational energy is stored.

- Nodes have zero displacement; antinodes have maximum amplitude.
- All particles in the same segment are vibrating in phase; all particles in adjacent segments are vibrating in antiphase.

### Young's Double Slit experiment:

$$x = \frac{\lambda D}{a}$$

$x$  represents the distance between two adjacent dark fringes.

### Single/Multiple slit diffraction:

$$\sin\theta = \frac{n\lambda}{a}$$

$\theta$  is the angle between the central axis and the  $n$ -th order minimum for single slit, maximum for multiple slit.

In the two equations above,  $a$  represents the width (between two slits/of a slit).