## Principle of Superposition.

The displacement at any time due to any number of waves meeting simultaneously at a point in a medium is the vector sum of the individual displacements due each one of the waves at that point at the same time.

If  $\vec{y}_1, \vec{y}_2, \vec{y}_3$  ...... are the displacements at a particular time at a particular position, due to individual waves, then the resultant displacement.  $\vec{y} = \vec{y}_1 + \vec{y}_2 + \vec{y}_3 + \dots + \dots$ 

## Examples

(i) Radio waves from different stations having different frequencies cross the antenna. But our T.V/Radio set can pick up any desired frequency.

(ii) When two pulses of equal amplitude on a string approach each other [fig. (A)], then on meeting, they superimpose to produce a resultant pulse of zero amplitude [fig (B)]. After crossing, the two pulses travel independently as shown in [fig (C)] as if nothing had happened.



Important applications of superposition principle:

(a) Interference of waves

(b) Stationary waves

(c) Beats.