



*Tenth lecture*

*The principle of superposition*

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**What can happen when waves superposition?**

There are two possibilities. When the peak of one wave is superimposed on the peak of other waves, constructive interference occurs, and when the peak of one wave is superimposed on the trough of other waves, destructive interference occurs.

**What is meant by superposition of waves?**

When two or more waves simultaneously pass through a point, the disturbance at the point is given by the sum of the disturbances each wave would produce in absence of the other waves.

**How does superposition work?**

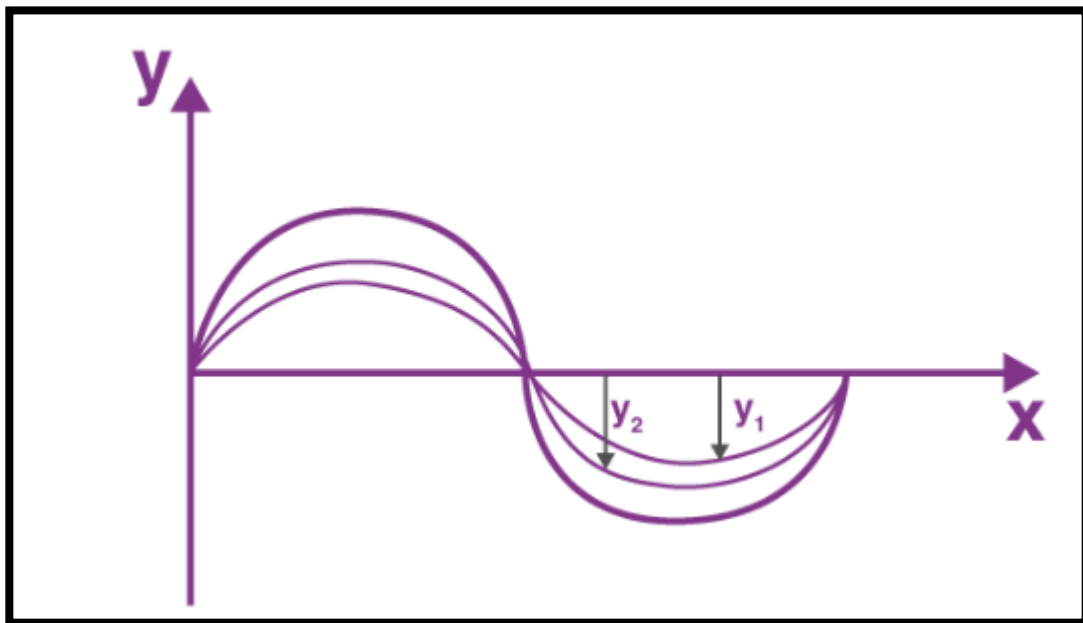
Superposition adds up all effects of individual stimuli and produces the resultant response. These stimuli can be anything like displacements, amplitudes, frequency, currents, voltages, and so on.

**What is the principle of a superposition?**

For all linear systems, the principle of superposition states that the net response caused by two or more stimuli is the sum of the responses that would have been caused by each stimulus individually.

## What Is the Superposition of Waves

According to the principle of superposition, the resultant displacement of a number of waves in a medium at a particular point is the vector sum of the individual displacements produced by each of the waves at that point.



## Principle of Superposition of Waves

Consider two waves travelling simultaneously along the same stretched string in opposite directions, as shown in the figure above. We can see images of [waveforms](#) in the string at each instant of time. It is observed that the net displacement of any element of the string at a given time is the algebraic sum of the displacements due to each wave.