particular separation (length), the string begins to vibrate with maximum amplitude (resonance is observed). This is the condition of resonance at which the frequency of vibrating tuning fork equals to the frequency of vibration of string between the bridges.

(***At resonance, the frequency of vibration of the string is equal to the frequency of vibrating tuning fork***).

Resonance:

Resonance is the tendency of a system to oscillate with greater amplitude at some frequencies than at others.

It is a phenomenon when the frequency of an externally applied periodic force on a body is equal to its natural frequency, the body readily begins to vibrate with an increased amplitude.

Let,

$f = frequency\ of\ tuning\ fork$

$l = resonating\ length\ (length\ of\ string\ between\ bridges\ at\ resonance)$

$v = velocity\ of\ wave\ through\ string$

$T = Tension\ on\ string$

$\mu = mass\ per\ unit\ length\ of\ string$

Then, fundamental frequency of vibration through string:

$$f = \frac{1}{2l}\sqrt{\frac{T}{\mu}} \quad \ldots\ldots\ldots (1)$$

Also on squaring both sides and on solving, we get

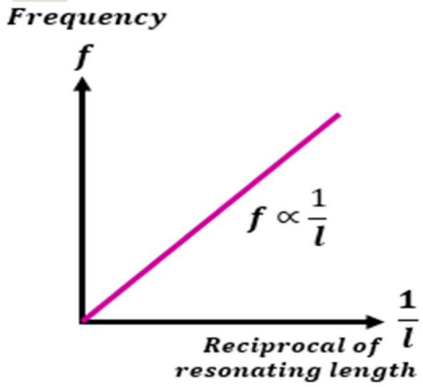
$$T = 4l^2 f^2 \mu \quad \ldots\ldots\ldots\ldots (2)$$

Working formula:

- **For the verification of law of length:**
  For constant value of T and μ,

$$f \propto \frac{1}{l}$$

or, $f \times l = constant$



- **For the verification of law of tension:**
  For constant value of f and μ,

$$T \propto l^2$$

or, $\frac{T}{l^2} = constant$