MODULE :03

ACOUSTICS

By: Mr. Birajit Basumatary
Assistant Professor (C)
Department Of Physics
BBEC, Kokrajhar

Outlines:

- Weber –Fechner Law

Weber-Fechner Law

Def: It states that the degree of sensation of sound is proportional to the logarithm of the stimulus producing the sound.

Or, The loudness of sound sensed by the ear is directly proportional to the logarithm value of intensity.

If L is the degree of loudness due to intensity I. Then

L= k logI k is proportionality constant.

Because of the logarithm nature, loudness is not doubled when intensity is doubled. However, we can show that loudness increases by the same amount each time when the intensity is doubled.

Let I1 be the initial intensity, which produces loudness L1.Then,

$L1 = k \log I1$

Now, if the intensity is doubled, I1 becomes 2I1 and the loudness due to doubled intensity will be

$L2 = k \log 2I1 = k \log 2 + k \log I1$

$L2 = k \log 2 + L1$

$L2 - L1 = k \log 2$

As klog2 is constant, it follows that the loudness increases by the same amount whenever the intensity is doubled, irrespective to the initial intensity.

Thanks