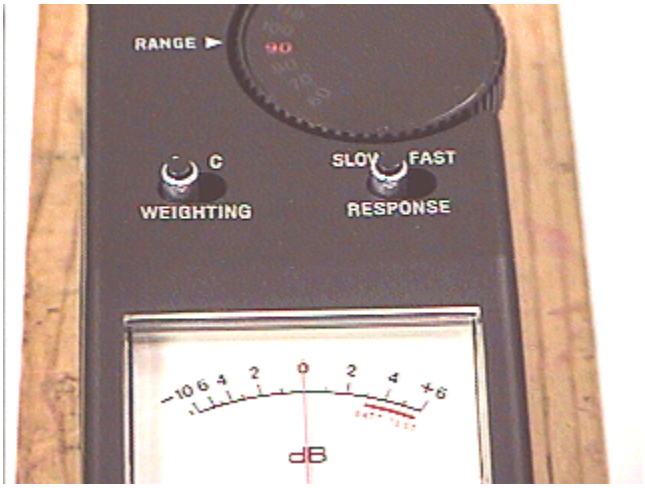
Answer #150

The answer is (a): the meter reading will remain at 90 dB - or extremely close to it, as seen in an mpeg video by clicking your mouse on the photograph below.



the 70 dB signal is 1/100th of the amplitude of the original 90 dB signal, so the decibel increase will be

$$10 \log_{10} 1.01 = 90.04 \text{ dB},$$

which is not observable on this type of meter.

This was an interesting problem for me; I was once asked to be an expert witness against a Maryland Occupational Safety and Health officer. He claimed that in the presence of 90 dB of road noise he heard a truck backup siren that registered 60dB on his meter. This is clearly impossible: he either heard it and it was around 90 dB or more, or he did not hear it, if it was actually 60 dB. In addition, a 60 dB sound would not show in the presence of 90 dB of background noise, as this experiment demonstrates. This was important in the lawsuit because the two men who were killed should have heard the backup alarm, as I did when I measured it at 100 dB. The MOSH officer *misread the meter and did not understand the nature of the decibel intensity level scale*, although he claimed to have been trained thoroughly.

So here is another question about decibels. If you connect the same noise generator to both loudspeakers and set both individually at 90 dB, what will the meter read when they are both turned on:

- (a) <90 dB.
- (b) 90 dB.
- (c) 93 dB.
- (d) 96 dB.
- (e) 100 dB.
- (f) >100 dB.

When, and only when, you have arrived at your answer, click here

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For questions and comments regarding the *Question of the Week* contact Dr. Richard E. Berg by e-mail or using phone number or regular mail address given on the Lecture-Demonstration Home Page.