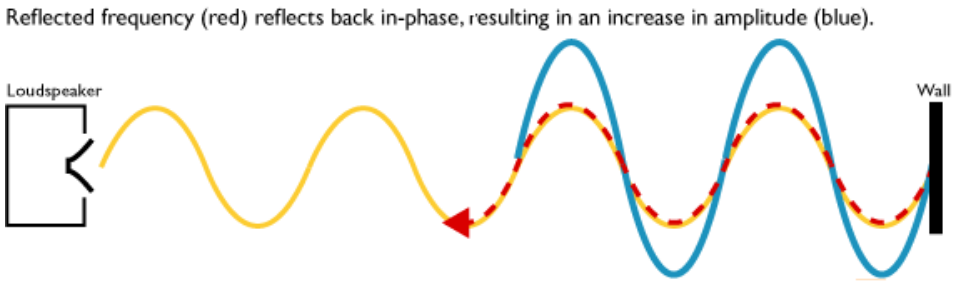
Answer on Question #42022, Physics, Mechanics | Kinematics | Dynamics

SOUND WAVES OF F = 660Hz FALL NORMALLY ON A PERFECTLY REFLECTING WALL. THE SHORTEST DISTANCE AT WHICH ALL PARTICLES WILL HAVE MAX. AMPLITUDE OF VIBRATION IS :

1. 7/8m
2. 3/8m
3. 1/8m
4. 1/4m

Solution:



The shortest distance at which all particles will have maximum amplitude is on distance of λ/4 form the wall:

$$l_1 = \frac{\lambda}{4}$$

The wavelength is

$$\lambda = \frac{v}{f}$$

where v = 330 m/s is velocity of the sound wave, and f is frequency.

Thus,

$$\lambda = \frac{330}{660} = \frac{1}{2}\ \text{m}$$

$$l_1 = \frac{1}{8}\ \text{m}$$

Answer. 3. 1/8m