DAMPED AND FORCED OSCILLATIONS

In an ideal simple harmonic motion the displacement follows a sinusoidal curve. The amplitude of oscillation remains constant for an infinite time. This is because there is no loss of energy and thus total energy remains constant. Such oscillation are called "Free oscillations" However, in actual practice, the simple harmonic motion always experiences frictional or resistive force due to which energy of free oscillator is continuously lost and consequently the amplitude of vibration decreases gradually and ultimately the body comes to rest. Hence decay of amplitude with time is called "damping" Such oscillations are called damped harmonic oscillations.

In order to maintain the amplitude constant, an external periodic force is applied. These forced vibrations initially gains the frequency equal to its natural frequency and then after short time, the oscillator

acquires the frequency of the impressed periodic force. In this chapter, we will discuss amplitude resonance, quality factor and energy considerations of forced harmonic oscillator.

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