Tahsili Physics (Waves and Sound) Cheat Sheet

by TheGoldenClover via cheatography.com/201551/cs/42880/

Periodic Motion

Periodic Motion	motion in which the restoring force is directly proportional to the displacement (springs and pendulum)
Hook's Law	states that the force required to compress a spring by a distance is proprtional to the distance
Hook's Law Equation	F = -kd (k is the spring constant)
PE of a spring	PE = 1/2 x k x d^2
application of a simple pendulum	to determine the gravitational acceleration
Periodic Time	T = 2(pi)√(L/g)

Mechanical Waves

Transversal Waves	waves that oscillate perpendicularly to their direction of motion
Longitudinal Waves	waves that oscillate in the same direction as their motion
Surface Waves	waves that move perpendicularly and parallel to the direction of motion
One dimesional wave	ex: Rope
Two dimensional Wave	ex: water waves
Three dimens-ional waves	ex: sound and EM waves

Doppler Effect

Doppler Effect	the change in frequency produced by a moving source with respect to an observer
Doppler Effect Formula	fo = fs(v±vo / v±vs)
vo is positive if the observer moves towards the source	vs is positive if the source moves away from the observer

Waves

Mechanical Wave	a wave that requires a medium to translate in
Electromagnetic Wave	a wave that does not require a medium

Waves (cont)

Amplitude	the maximum displacement from the equilibrium position
Periodic Time	the time needed to complete one full cycle
Frequency	the number of cycles completed in one second
Frequency Formula	f = 1/T
Wavelength (λ)	The distance between two crests or troughs
Wavelength Formula	λ = v / f (v is the wave speed)

The energy carried by a wave is directly proportional to the **amplitude squared**

Standing Waves

standing waves	a combination of two waves moving in opposite direct-ions, while having the same amplitude and frequency
Nodes	positions on a standing wave where the wave stays in a fixed position due to the destructive interference
Antinodes	positions on a standing wave with the highest amplitude

the number of nodes are always greater than the number of antinodes

Sound Waves

Sound wave	a longitudinal wave composed of compressions and rarefactions, and whose speed is directly proportional to temperature
Loudness	depends on amplitude
Pitch	depends on frequency
Sound Intensity	the relative sound intensity compared to a specific standard intensity expressed in decibels

humans can hear noises between 20 Hz and 20,000 Hz

Standing Waves in Air Columns

Formula for two open ends (antinodes are greater)	λ = 2L / n (n is the harmonic level)
Formula for a closed column (nodes = antinodes)	λ = 4L / n (n is the harmonic level)

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