Irondale Physics S2 Review

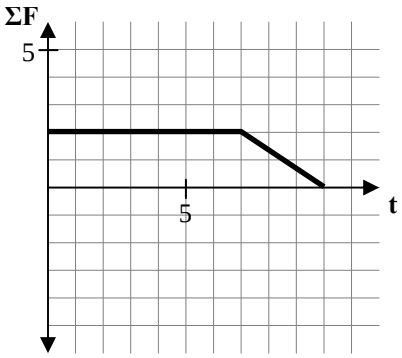
Name _____ Date _____ Pd ____

Newton's Laws of Motion

1.)
2.)
3.)

Impulse-Momentum

momentum
impulse
$p = m \bullet v$
$\Sigma F \bullet \Delta t = m \bullet \Delta v$
if $\Sigma F = 0$, then $\Delta v = 0$, so $\Delta p = 0$: $p_f = p_i$

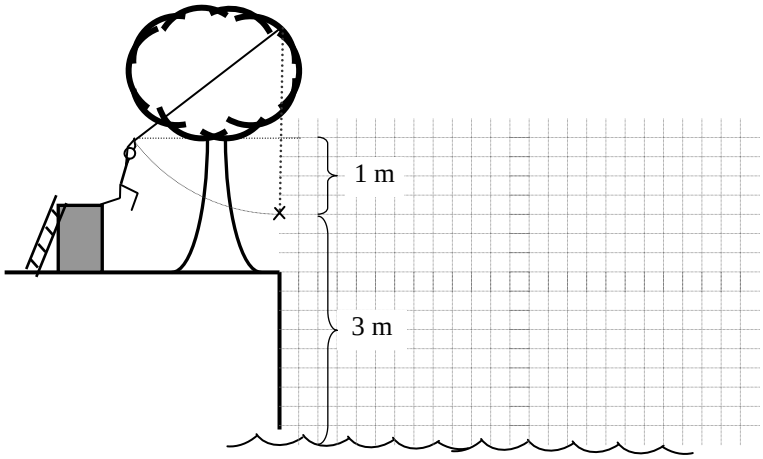


Sample Problem 1: Based upon the graph at right, if an object starts from rest and has a mass of 5 kg, what will be its final velocity?

Sample Problem 2: If you (65 kg) jump at -2 m/s off a raft (120 kg) that is flowing at +1 m/s, what will be the raft's final velocity?

Energy

spring constant
equilibrium
Hooke's law
elastic
gravitational
thermal
kinetic
E_{el} graph
E_g graph
E_{therm} graph
E_k = graph

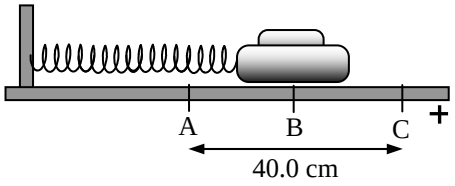


Sample Problem 1: If you (65 kg) swing from the rope from rest, what will be your velocity at the "x"?

Sample Problem 2: A spring dart gun is loaded with a 50 g dart. The spring, is compressed by 10 cm as the dart is loaded and this requires 10 N of force. How much energy is stored elastically? How fast will the dart be moving when it leaves the gun? How high will the dart go (if it's launched straight up)?

Oscillating Particle | Wave Fundamentals

amplitude
period
frequency
T vs. A
T vs. m
T vs. k



Sample Problems: What is the hovercraft's amplitude of oscillation? If the period of oscillation is 1 second, and the spring constant is quadrupled, what will be the new period? …what if the mass had been quadrupled?

Waves

transverse pulse
longitudinal pulse
tension
linear density
pulse behavior at:
- · fixed end
- · free end
- · density boundary (lower → higher)
- · density boundary (higher → lower)

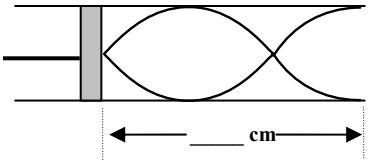
superposition principle
constructive interference
destructive interference
wavelength, frequency, velocity
standing wave
node
antidnode
mode of vibration / harmonic / overtone

Sample Problems: How many nodes are in the standing wave pattern? How many antinodes? How much of a wave is present? If the end-to-end distance is 6 meters, then what is the wavelength? If the resonant frequency for this situation was doubled, what would be the new wavelength? If a standing wave pattern with a wavelength of 3 meters was produced by a resonant frequency of 4 Hz, what is the speed of the waves through the string?

Sound Waves

standing wave patterns in tube closed at one end
standing wave patterns in tube open at both ends
beat frequency
FFT analysis
doppler effect

Sample Problem 1: What mode is represented in this tube? If the wavelength is 92.0 cm and the resonant frequency is 388 Hz, what is the speed of sound in this tube? What is the end-to-end length of the tube?



Sample Problem 2: Two trains carry identical whistles that emit a sound with a frequency of 500.Hz when measured at rest. The trains approach an observer standing between two sets of tracks (see sketch) at velocities V_A = 40 m/s and V_B = 20 m/s. What are the frequencies that the observer will hear? What will be the beat frequency? Train A then passes the observer and is moving away while Train B is still approaching. What will be the beat frequency heard by the observer?

Light | Electromagnetic Spectrum

electromagnetic spectrum
Law of Reflection
Refraction—Snell's Law
wave & particle nature of light