Accelerometers– Prelab Quiz

Answer these questions after reading the "Accelerometers" assignment. Submit your answers via Blackboard as either a MS Word (.docx) or MS Excel spreadsheet file (.xlsx). Be sure to show all of your work so that partial credit can be given.

2 points: Your phone (likely) has built-in accelerometers that measure accelerations in 3 different axes. Open the Physics Toolbox Sensor Suite on your smartphone. Take some accelerometer (g-Force) data. While taking data, wiggle the phone in various directions to determine the orientation of the different accelerometer axes. Based on your observations, create a sketch that clearly shows the orientation and direction of the positive x, y, and z accelerometer axes used by your phone.

If you don't have access to a smart phone capable of running the Physics Toolbox Sensor Suite app, make up a 3-dimensional coordinate system, for a hypothetical device, that makes the most sense to you.

2 points: Suppose that you were to take accelerometer (g-Force) data with your phone falling from a short height. What will the acceleration curve of the phone look like? Draw a hypothetical sketch of what you think the acceleration, as a function of time, will look like starting from 1 second before the phone is dropped until 1 second after the phone lands (on a soft surface so that the phone is not damaged). Explain the key features of the acceleration curve that you draw.

2 points: Suppose that you were to take accelerometer (g-Force) data with your phone while riding an elevator. Draw a hypothetical sketch of what you think the acceleration, as a function of time, will look like when riding between the ground floor and the second floor. Explain the key features of the acceleration curve that you draw.

2 points: Based on your acceleration curve for the elevator ride described above, sketch the velocity as a function of time. Explain and justify your drawing.

2 points: Based on your acceleration curve for the elevator ride described above, sketch the position as a function of time. Again, explain and justify your drawing.

Revised: Thursday 4th October, 2018 17:03