

## PSII FIRST OPTIONAL CHALLENGE EXAM

**Please use separate sheet(s) of paper to record your analysis and answers. Put your name, section and date on all such separate pages that you use for this purpose.**

From the three *rational relations* (i.e. *common sense relations*) for average velocity and average acceleration of an object (*that we discussed extensively*), for motion of that object in a single dimension, develop/derive at least two of the additional three (*classic*) equations of motion for that object in a single dimension, discussed at length in class. These three equations are to provide the relationships for:

- The final velocity of the object with constant acceleration in terms of its initial velocity, acceleration and time interval,

$$\boxed{V_f = V_i + (\mathbf{a})(\Delta t)} \Rightarrow \textit{Given}$$

- The final velocity of the object after any displacement in terms of its initial velocity, acceleration and that displacement

*and*

- The displacement of the object with constant acceleration in terms of its initial velocity, time interval and acceleration.

As you complete this assignment be sure to provide an explanation for all symbols/terms utilized and additionally provide clear indication as to how you manipulated the three *rational relations* for average velocity and acceleration to achieve the selected two of the three “classic” equations described above.