PRACTICE PROBLEMS:
UNIFORM ACCELERATION

Instructions:

1. Use a sheet of size 1 paper to answer the following problems.
2. Use ISEE as a problem solving strategy. A properly labeled diagram for each problem will be helpful but not required.
3. Express your final answers to two decimal places.

Problem 01

A jet fighter pilot wishes to accelerate from rest at a constant acceleration of 5*g to reach Mach 3 (three* times the speed of sound) as quickly as possible. Experimental tests reveal that he will black out if this acceleration lasts for more than 5.0 s. Use 331 m/s for the speed of sound.

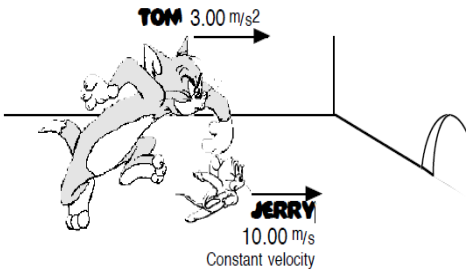
a. Will the period of acceleration last long enough to cause him to black out?
b. What is the greatest speed he can reach with an acceleration of 5*g* before blacking out?

Problem 02

The driver of a car going 90.0 km/h suddenly sees the lights of a barrier 40.0 m ahead. It takes the driver 0.75 s to apply the brakes and the average acceleration during the braking is -10 m/s^2. Determine whether the car hits the barrier.

Problem 03

Tom, the cat, is chasing Jerry, the mouse. Jerry runs past Tom at 10.00m/s. At the instant Jerry passes Tom, Tom starts from rest and accelerates at 3.00 m/s2.



a. How much time does it take for the Tom to catch up to Jerry?
b. What is the velocity of the Tom when he catches up to the Jerry?
c. The mouse hole is 2.1 meters away from Jerry when Tom began to chase Jerry. Will Jerry make it to the hole without being caught? (Support your answer with numbers.)

Sources:

Zitzewitz, Paul W., et.al. **Physics Principles and Problems**, Glencoe/Mc-Graw Hill Companies, USA, 2002.
Young, Hugh D. and Roger A. Freedman. **University Physics.** 9th ed. Massachusetts: Addison-Wesley Publishing Company, Inc., 2012