Reminders 07-30-09:

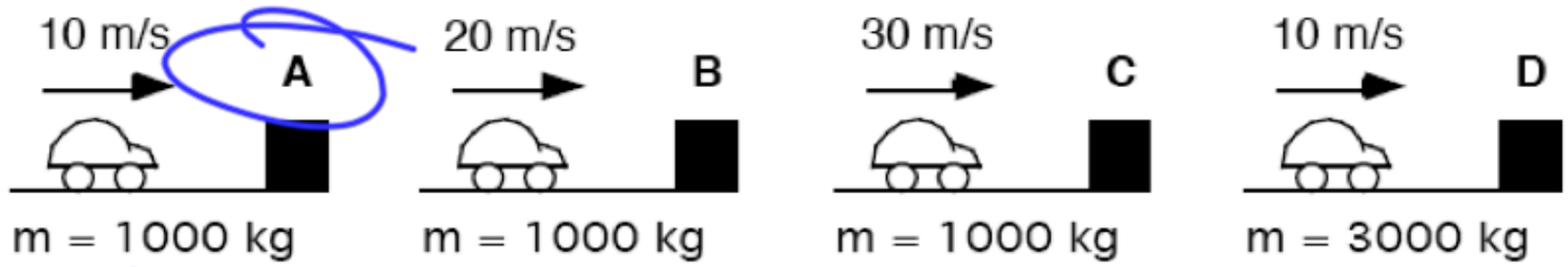
- 8th Webassign due Mon. 11:59PM
- Exam 4 Chapters 9-11 Thursday

Objectives:

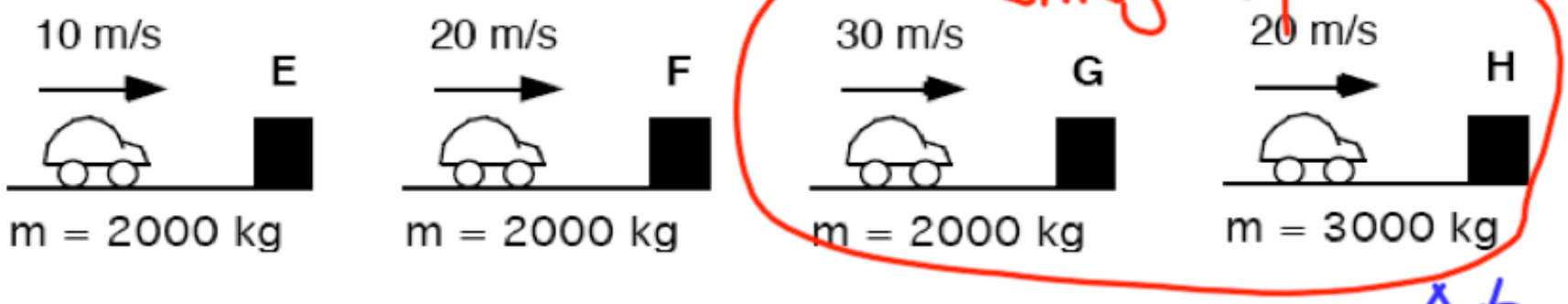
- Momentum
- Conservation of Momentum
- Exam 3

Shown below are eight cars that are moving along horizontal roads at specified speeds. Also given are th masses of the cars. All of the cars are the same size and shape, but they are carrying loads with differen masses. All of these cars are going to be stopped by plowing into identical barriers. All of the cars ar going to be stopped by the same constant force by the barrier.

Rank these situations from greatest to least on the basis of the stopping time that will be needed to sto he cars with the same force. That is, put first the car that requires the longest time and put last the ca hat requires the shortest time to stop the car with the same force.



SMALLEST



LARGEST

$\Delta t = \frac{m\Delta v}{f}$

Longest 1 ____ 2 ____ 3 ____ 4 ____ 5 ____ 6 ____ 7 ____ 8 ____ Shortest

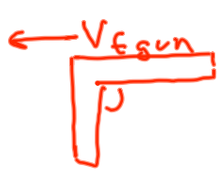
Or, all cars require the same time._____

Please carefully explain your reasoning.

- A 2.0 kg gun fires a 5.0 g bullet. The bullet has a velocity of 6.0×10^2 m/s. Find the recoil velocity of the gun. Note that the momentum of the bullet is equal to the momentum of the gun. Why does the bullet cause more damage than the gun?

before $V_{i\,gun} = 0$

$V_{i\,bullet} = 0$



$\rightarrow$
D
6.0×10^2 m/s

$\Sigma \vec{P}_i = \Sigma \vec{P}_f$

$0 = m_{gun} V_{gun} + m_{bullet} V_{bullet}$

$-m_{gun} V_{gun} = m_{bullet} V_{bullet}$

$V_{gun} = \frac{-m_{bullet} V_{bullet}}{m_{gun}} = \frac{-(.005 kg)(6.0 \times 10^2 \frac{m}{s})}{2.0 kg}$

$= -1.5$ m/s

Change in momentum of Each object Equal but opposite.