IN-CLASS DESIGN PROBLEM 1

Assigned: September 8, 2008

For this exercise, you are to design a vehicle by selecting dimensions, engine size, etc. You will need to make a number of assumptions, and typical road tests are provided to help you in this regard. Based on your knowledge of vehicle design, select reasonable values for the following vehicle attributes:

- Vehicle weight (lb)
- Engine power and torque (estimate based on road tests provided)
- Front or rear wheel drive
- Wheelbase
- Location of center of gravity
- Total frontal area
- Passenger capacity
- Driver’s eye height
- Overall gear reduction ratio (estimate based on road tests provided)
- Approximate 0 – 60 mi/h time

Based on the values selected above, compute the following:

1) Optimal brake-force proportioning (front and rear) on good, wet pavement at 70 mi/h.
2) Maximum acceleration from rest on good, dry pavement.
3) Theoretical stopping distance (exclude perception/reaction time) without antilock brakes from 70 mi/h on good, dry pavement (assume a brake efficiency of 80 percent and ignore aerodynamic resistance).
4) Theoretical stopping distance with antilock brakes (ABS) from 70 mi/h on good, dry pavement (assume appropriate brake efficiency for ABS and ignore aerodynamic resistance).
5) Include a sketch of your vehicle.