**CE353 PRINCIPLES OF TRANSPORTATION AND TRAFFIC ENGINEERING**

**RECITATION 1**

**1.)** A truck going uphill on a one lane road with 10% grade has left brake marks of 10.49 m on the pavement to avoid colliding with a car traveling down the road at 100 km/h. Assuming that the vehicles applied breaks at the same time. What minimum distance should be visible to drivers of the vehicles to avoid collision? (**take μ= 0.70 and break efficiency $\eta_b$=0.70 for both vehicles, mass factor = 1.04, $t_r$=2.5 seconds)**

a.) use practical breaking distance
b.) use theoretical brake distance

**2.)** A test car furnished with antilock braking system stops at 88 m distance when brakes are applied at 100 km/h speed while travelling down a 3% grade on a test track with poor, wet pavement. During one of the tests at the same speed, the test car impacted an object at 100 m distance from the point of brake application on the same test track. The investigators found out that the antilock brake system failed 60 m after the brakes had been applied.

What speed was the car travelling at just before it impacted the object?

**Notes:**

i. Assume theoretical braking distance
ii. coefficient of road adhesion (maximum) = 0.60,
iii. coefficient of road adhesion (sliding) = 0.30,
iv. coefficient of rolling resistance = 0.015,
v. mass factor = 1.04

**3.)** A car having a braking efficiency of 80% is traveling at 130 km/h. The brakes are applied to miss an object that is 50 m from the point of break application. If the coefficient of road adhesion is 0.80, assuming theoretical minimum braking distance calculate the speed of the car when it strikes the object if (a) the surface is level (b) the surface is on a 5% downgrade.

**Note:** take mass factor= 1.04 and gravitational acceleration = 9.81 $m/s^2$