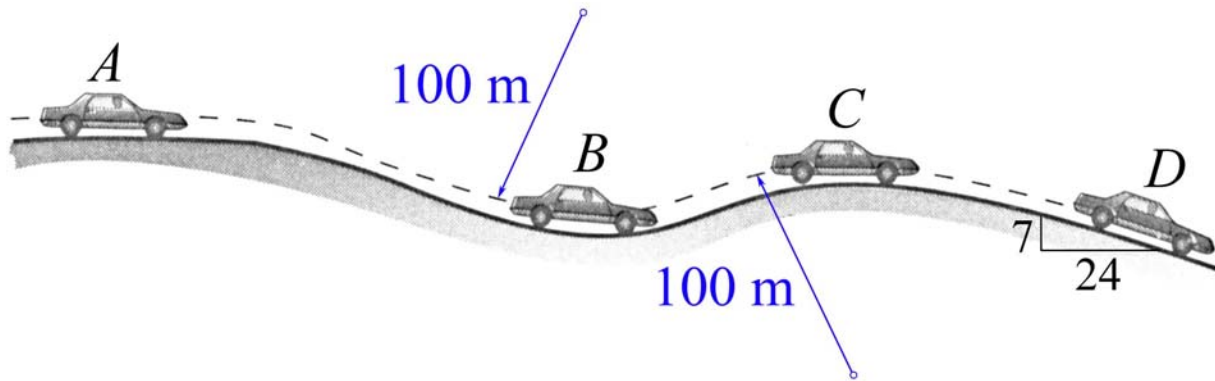


MEEG 2013 Quiz #2.m06.072

Four cars are all traveling at a constant speed of 72 km/h along a road as shown. If $\mu_k = 0.5$ between all tires and the road and the brakes of each car are suddenly applied and skidding occurs at the respective positions shown, determine the magnitude of the tangential deceleration of (a) car B, (b) car D.



$$72 \text{ km/h} = 20 \text{ m/s}$$

(a) Car B

FBD of car B = EFD of car B ②

$$N_B - m(9.81) = m \left[\frac{(20)^2}{100} \right] \quad 0.5 N_B = m a_t \quad ②$$

$$N_B = 13.81m \quad a_t = 6.905 \quad a_t = 6.90 \text{ m/s}^2 \quad ①$$

(b) Car D

FBD of car C = EFD of car C ②

$$N_D - \frac{24}{25}m(9.81) = 0 \quad 0.5 N_D - \frac{7}{25}m(9.81) = m a_t \quad ②$$

$$N_D = 9.4176m \quad a_t = 1.962 \quad a_t = 1.962 \text{ m/s}^2 \quad ①$$