Physics 2305 7 February, 2000
Quiz 5—Form A

1. The Amazing Amos drives his motorcycle through a looped track of radius 8.5 m. How fast does Amos have to go to maintain contact with the track at the top of the loop?

A) 9.1 m/s
B) 18 m/s
C) 83 m/s
D) You must know his mass.

2. If the coefficient of friction between your tires and the icy road is only 0.15, how fast can you execute a turn with radius of curvature = 20 m?

A) 3.8 m/s (9 mi/h)
B) 5.4 m/s (12 mi/h)
C) 14 m/s (31 mi/h)
D) 29 m/s (66 mi/h)

Useful constants and equations:

$\Sigma \mathbf{F} = m\,\mathbf{a}$ $F_g = m\,g$
$T = 2\,\pi\,r\,/\,v$ $f = \mu\,N$
$g = 9.8$ m/s^2 $a_r = v^2/r$

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Quiz 5—Form B

Granny Smith rounds the corner at 22 miles per hour (10 m/s). The radius of curvature is 15 m.

1. What is the minimum coefficient of friction between her dashboard and her box of tissues needed to keep the tissues from sliding?

A) 0.07
B) 0.52
C) 0.68
D) 0.87

2. What angle does her little tree-shaped air freshener hanging from the rear-view mirror make with respect to the vertical?

A) 4°
B) 27°
C) 34°
D) 41°

Useful constants and equations:

$\Sigma \mathbf{F} = m\,\mathbf{a}$ $\quad F_g = m\,g$

$T = 2\,\pi\,r\,/\,v$ $\quad f = \mu\,N$

$g = 9.8\ \mathrm{m/s^2}$ $\quad a_r = v^2/r$

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Quiz 5—Form C

1. You are pushing a 10.0 kg box against the wall, and the coefficient of static friction between the two is 0.75. What's the minimum force you must apply to keep the box from slipping downward?

A) 74 N
B) 98 N
C) 130 N
D) 200 N

2. A penny spins on a turntable at a distance of 0.12 m from the hub. If the coefficient of static friction between the penny and the turntable is 0.60, how fast can the penny move without slipping?

A) 0.71 m/s
B) 0.84 m/s
C) 1.1 m/s
D) 1.4 m/s

Useful constants and equations:

$\Sigma \mathbf{F} = m\,\mathbf{a}$ $\quad F_g = m\,g$

$T = 2\,\pi\,r\,/\,v$ $\quad f = \mu\,N$

$g = 9.8\ \text{m/s}^2$ $\quad a_r = v^2/r$