Physics 2305
Quiz 4—Form A

4 February, 2000

Fiona skis down a hill with a slope of 25° from the horizontal.

1. If we assume the slope is frictionless, what is her acceleration down the slope?

    A) 4.1 m/s²
    B) 4.6 m/s²
    C) 8.9 m/s²
    D) 9.8 m/s²

2. What is her acceleration if μ_k=0.10?

    A) 1.0 m/s²
    B) 3.3 m/s²
    C) 3.7 m/s²
    D) 8.0 m/s²

Useful constants and equations:

$$\Sigma \mathbf{F} = m\,\mathbf{a}$$

$$F_g = m\,g$$

$$f = \mu\,N$$

$$g = 9.8 \text{ m/s}^2$$

$$a_r = v^2/r$$

Leo accelerates his hot new car at 4.0 m/s^2 on level ground.

1.   What would the coefficient of friction between Leo's coffee cup and the dashboard have to be to keep the cup from sliding backwards?

   A) 0.18
   B) 0.41
   C) 1.00
   D) 2.45

2.   Leo's fuzzy dice will lean back, so that the string tied to the rear-view mirror makes an angle from the vertical. What is this angle?

   A) 22°
   B) 24°
   C) 66°
   D) 68°

Useful constants and equations:

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

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Quiz 4—Form C

Becky swings a yo-yo of mass 0.10 kg in a vertical circle of radius 0.65 m.

1.   If the yo-yo is moving with a velocity of 3.3 m/s at the bottom of the swing, what is the tension in the string?

    A) 0.7 N
    B) 1.5 N
    C) 1.7 N
    D) 2.7 N

2.   What is the minimum velocity at the top of the swing needed to keep the string from going slack?

    A) 0 m/s
    B) 2.5 m/s
    C) 3.9 m/s
    D) 6.4 m/s

Useful constants and equations:

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