Forces in Circular Motion

Three Levels of Difficulty

Apprentice Level: Questions 1-4Master Level: Questions 1-8Wizard Level: Questions: 5 - 12

Question 1

Lisa Honda is turning in a circle while traveling along a level road. Identify the free-body diagram that shows the type and direction of the forces acting on her car.

Question 2

Question 3

Darrel Deval is on a <l>looping</l> roller coaster ride. He is upside down at the top of the loop and traveling at high speed. Identify the free-body diagram that shows the type and direction of the forces acting on Darrel at the top of the loop.

Question 4

Darrel Deval is on a <l>looping</l> roller coaster ride. He is right-side up at the bottom of the loop and traveling at high speed. Identify the free-body diagram that shows the type and direction of the forces acting on Darrel at the bottom of the loop.

Question 5

A rope is tied to a bucket that is half-filled with peas. After discussing the importance of whirled peas, a Physics teacher holds the rope and whirls the bucket of peas in a vertical circle. Identify the free-body diagram that shows the type and direction of the forces acting on the bucket of peas when it is at the bottom of the circular loop.

Question 6

A rope is tied to a bucket that is half-filled with peas. After discussing the importance of whirled peas, a Physics teacher holds the rope and whirls the bucket of peas in a

vertical circle. Identify the free-body diagram that shows the type and direction of the forces acting on the bucket of peas when it is $\langle B \rangle$ at the top $\langle B \rangle$ of the circular loop.

Question 7

A light rope is tied to a glass vase. Rex Things holds the free end of the rope and whirls the vase in a horizontal circle. Identify the free-body diagram that shows the type and direction of the forces acting on the vase as it spins in the horizontal circle.

Question 8

Phil Engees is nearing the end of a roller coaster ride and moving at high speed over a series of sharply-curved vertical hills. At the bottom of one hill, Phil experiences a large number of G's as the car abruptly pulls out of the vertical descent. Identify the free-body diagram that shows the type and direction of the forces acting on Phil at the bottom of this hill.

Question 9

Phil Engees is nearing the end of a roller coaster ride and moving at high speed over a series of sharply- curved vertical hills. At the top of one hill, Phil is lifted off his seat and held in the car only by the lap bar that crosses his lap. Identify the free-body diagram that shows the type and direction of the forces acting on Phil at the top of this hill.

Question 10

Lisa Honda is driving her car at high speed through a horizontal turn on a sharply banked roadway. Identify the free-body diagram that shows the type and direction of the forces acting on Lisa's car.

Question 11

A rope is tied to a bucket that is half-filled with peas. After discussing the importance of whirled peas, a Physics teacher holds the rope and whirls the bucket of peas in a horizontal circle. Identify the free-body diagram that shows the type and direction of the forces acting on the bucket of peas.

Question 12

Meghan Golse is the school's best soccer player. During one game, Meghan makes a sharp 180-degree turn on the horizontal turf. Meghan leans at an angle to the vertical as she makes the turn. Identify the free-body diagram that shows the type and direction of the forces acting on Meghan during this turn.

There are six answer options for every question. The diagrams below are the source of the answer options.









