AP Physics 1

3.1 – Analysis of Circular Motion

Conceptual Assessment

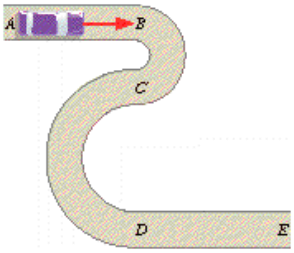
"Don't go around in circles trying to answer these!"

Name: _____ Period: _____

1) A car moves in a constant speed along a straight line as it approaches a circular turn. In which of the following parts of the motion is the car in equilibrium. Justify your answer.
   a. As it moves along in a straight line toward the circular turn.
   b. As it is going around the turn.
   c. As it moves away from the turn in a straight line.

2) Consider two people, on standing on Earth at the equator and the other standing at the North Pole. Which has the larger centripetal acceleration and why?

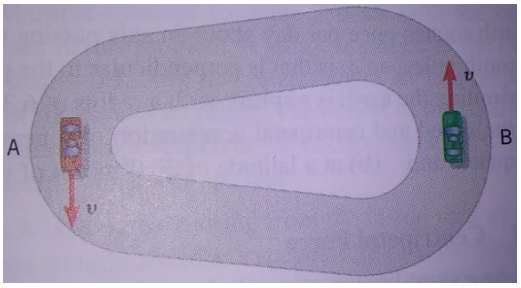
3) A car is traveling at a constant speed along the road ABCDE as shown. Sections AB and DE are straight. Rank the accelerations in each of the four sections according to magnitude, listing the smallest first.



4) In a circus, a man hangs upside down from a trapeze, legs bent over the bar and arms downward, holding his partner. Is it harder for the man to hold his partner when the partner hangs straight down and is stationary or when the partner is swinging down through the straight-down position?

5) Two cars are traveling at the same constant speed v. Car A is moving along a straight section of the road, While B is rounding a circular turn. Which of the statements is true about the acceleration of the cars? Explain why each option is right or wrong.
   a. The acceleration of both cars is zero, since they are traveling at constant speed.
   b. Car A is accelerating, but car B is not accelerating.
   c. Car A is not accelerating, but car B is accelerating.
   d. Both cars are accelerating.

6) Two cars are driving at the same constant speed v around a racetrack. However, they are traveling through turns that have different radii, as shown. Analyze each statement below and indicate whether it is true or false and why.



   a. The magnitude of the centripetal acceleration for each car is the same, since the cars are moving at the same speed.
   b. The magnitude of the centripetal acceleration of the car at A is greater than that of the car at B, since the radius of the circular track is smaller at A.
   c. The magnitude of the centripetal acceleration of the car at A is greater than that of the car at B, since the radius of the circular track is greater at A.
   d. The magnitude of the centripetal acceleration of the car at A is less than that of the car at B, since the radius of the circular track is smaller at A.

7) The drawing below shows two identical stones attached to cords that are being whirled on a tabletop at the same speed. The radius of the larger circle is twice that of the smaller circle. How is the Tension T_1 in the longer cord related to the Tension T_2 in the shorter cord (your answer should be a quantitative ratio)?