

Quiz No. 05 (2014 Summer)

PHYS 203A: College Physics

Date: 2014 Jul 2

(Name)

(Signature)

1. **(20 points.)** A particle of mass $m = 2\text{ kg}$ is moving in a circular orbit of radius $r = 1\text{ m}$ with constant speed $v = 2\text{ m/s}$.
 - (a) What is the direction of acceleration of the particle?
 - (b) What is the magnitude of acceleration of the particle?
 - (c) What is the direction of the force acting on the particle?
 - (d) What is the magnitude of the force acting on the particle?
2. **(20 points.)** At an amusement park there is a ride in which cylindrically shaped chambers spin around a central axis. People sit in seats facing the axis, their backs against the outer wall. At one instant the outer wall moves at a speed of 3.0 m/s , and an 83 kg person feels a 470 N force pressing against his back. What is the radius of a chamber?
3. **(20 points.)** A satellite is in a circular orbit about the Earth ($M_E = 5.98 \times 10^{24}\text{ kg}$). The satellite is on a geosynchronous orbit, that is, the time period of the satellite is exactly one day. What is the radius of a geosynchronous orbit?
4. **(20 points.)** A car is safely negotiating an unbanked circular turn at a speed of 28 m/s . The road is dry, and the maximum static frictional force acts on the tires. The coefficient of static friction between the tires and road is 0.92 , and the coefficient of kinetic friction between the tires and road is 0.45 . What is the radius of the circular turn?
5. **(20 points.)** A motorcycle is traveling up one side of a hill and down the other side. The crest of the hill is a circular arc with a radius of 55.0 m . Determine the maximum speed that the cycle can have while moving over the crest without losing contact with the road.