Quiz 2

SABIC Physics, Winter 2016

Name:

Problem 1.(12 points.) Short answer–no more than one sentence each.

1. A rock is thrown horizontally by a monkey jumping down a cliff of hight 5m. When the monkey is 1m off the ground, how high is the rock??

2. A package falls out of a plane flighting at a constant speed and altitude. Sketch the path of the package from the point of view of (a) the pilot, and (b) an observer on the ground.

3. Centrifuges rapidly rotate vials of a substance and are used to seperate heavy and light particles. State which particles (heavy or light) end up closer to the center of rotation. Why?

Problem 2.(10 points.) Circular Motion: The Earth has a radius of 6000km. What is the radial acceleration of an object on the earth's equator? For what speed of rotation is the acceleration greater than g? If such a planet existed, what would happen to objects on the equator?

Problem 3.(18 points.) Projectile Motion: You play the 6 role for F.C. Barcelona, and you see Lionel Messi seperate from a defender a distance 1m directly in front of you, and 15m to the right of the opposition goal. Messi, running at his top speed of 10m/s, has cut at an angle of 30 leftwards from the opposition goal. At what velocity, and angle, should you pass the ball to land your cross on a leaping Messi's head (heigh 2m) when Messi is directly in front of the opposition goal?