Recitation Exam 9

Problem 1: (10 points)
A uniform solid spherical marble of mass $M$ and radius $R$ is placed on a flat plane inclined at an angle $\theta$ from the horizontal. The marble rolls without slipping. The moment of inertia of the marble about an axis through its center is $I = \frac{2}{5}MR^2$.

(a) (5 points) Calculate the magnitude of the (linear) acceleration of the marble.

(b) (5 points) The coefficient of static friction between the marble and the plane is $\mu_s$ and the coefficient of kinetic friction is $\mu_k$. Calculate the maximum angle $\theta$ such that the marble does not slip as it rolls down the incline.