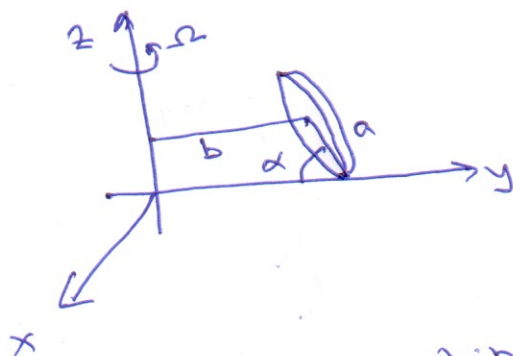# PROBLEM SHEET 3 (Part 2)

Consider a thin circular disc rolling on a horizontal plane at an angle α w.r.t the plane. The radius of the disc is a and the distance of the CM to the axis is b, as shown.

The disc rolls without slipping.

1) What is the no slip condition. Indicate how this might change if a were to vary.

2) Calculate the force at the point of contact and hence calculate the torque about the CM.

3) Calculate the angular momentum about CM. (denoted $\vec{L}^A$). Hence calculate $\dfrac{d\vec{L}^A}{dt}$.

4) From ② & ③ evaluate Ω in terms of α, a and b. Comment on the case $\alpha \to 0$.

5) Check that you get the same result by directly using the relevant Euler equation.