You will find these much easier if you can use some software. Please be sure to comment your solutions sufficiently for me to understand what you are doing!

Consider the mechanism shown in the figure. The frame (black) is rigid. It attaches to the wheels by frictionless bearings. The wheels are constrained to be upright. The left hand pair of wheels (green) can rotate about the vertical as well as their axles; the right hand wheels (red) can only rotate about their axles. The frame is two units long and the axles are 1.5 units long. The wheel radius is 0.25.

1. Write the holonomic constraints and identify the simple and nonsimple ones.
2. Write the nonholonomic constraints.
3. Apply all the holonomic constraints, define a set of generalized coordinates and find the constraint matrix and the null space matrix. Write the rates of change of $q$.
4. Apply the just simple holonomic constraints, define a set of generalized coordinates and find the constraint matrix and the null space matrix. Write the rates of change of $q$.
5. How many reduced Hamilton’s equations are there for each formulation?

I am not asking for numerical results!