**ME 581 – H05** Name ________________________

1) Determine the mobility of the CRSP closed loop mechanism shown below.

mobility = ____________________________________________________________

2) Use generalized coordinates $\{q\} = \{ \{r_2\}^T \{p_2\}^T \{r_3\}^T \{p_3\}^T \{r_4\}^T \{p_4\}^T \}^T$ and attach local coordinate frames to the links shown on the following page. Clearly label all auxiliary points and vectors needed to form joint constraints. The ball joint moves in the X-Z plane parallel to X.

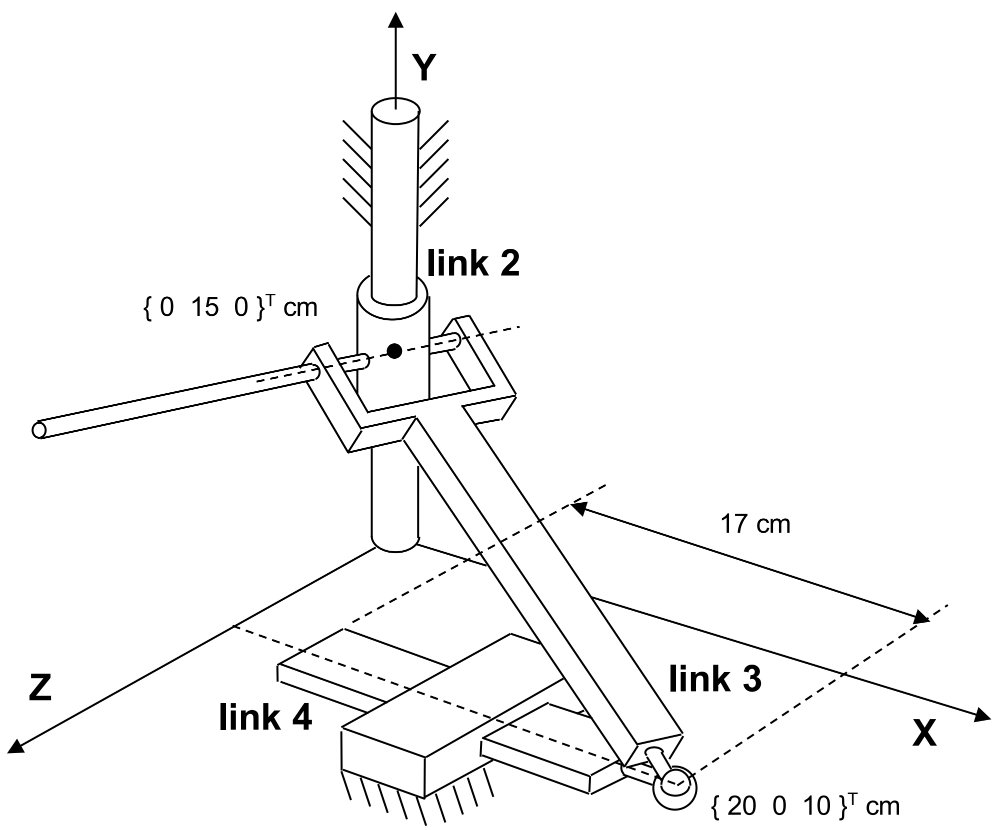
3) Global locations for the ball joint and for the center of the yoke are provided below as well as length of link 4. Provide local locations $\{s_i\}'^{P}$ for all points on your links.

4) Provide initial estimates for $\{q\}$.

5) Symbolically write a constraint vector $\{\Phi\}$ for this mechanism using your local coordinate frames.

6) How many rows and columns will the Jacobian $[\Phi_q]$ contain for your constraint vector? (You do not need to write the Jacobian.)

rows = _______________ columns = __________



**ME 581 – H05** Name ______________________