Problem 4 (Four bar linkage in Simscape)

(a) A four-bar linkage is a single degree-of-freedom mechanism. Therefore, no more than one joint angle (state target) can be specified so that the initial configuration is valid. Simscape checks for this and returns an error if more than one state target is specified.
However, you can suppress this error in the Simscape settings (Simulation->Model configuration Parameters->Simscape Multibody->Diagnostics). If you do this and run the model with all joint state targets set to 0, Simscape will find a configuration `close' to the desired one and return a warning that not all state targets have been met.

(b) See provided Simscape solution file. The position target of the first joint is set to *acos(0.15/0.2)*. Note that while the specified initial configuration is theoretically balanced, the mechanism loses balance after a few seconds due to numerical errors and starts an oscillatory motion.

(c) Because the length of each link is *0.2*, the two end points cannot be more than 0.6 m apart. The specified *Rigid Transform* corresponds to an impossible linkage, regardless of the specified joint state targets. Hence, Simscape cannot approximate such configuration by `tuning' the state target values and returns an error.