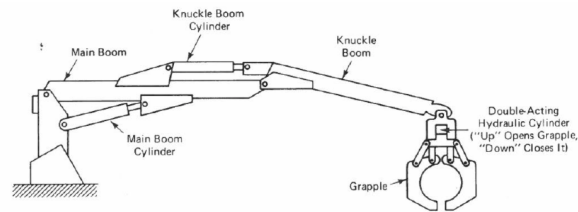


ME 380
Kinematics and Machine Dynamics
Homework I

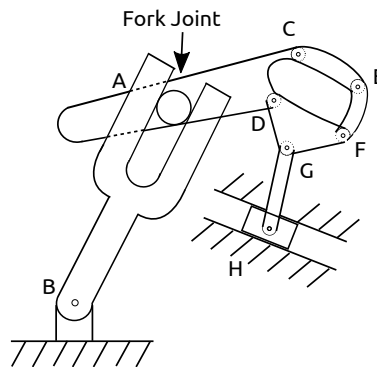
1. [15 points] Determine the number of degrees of freedom of the following mechanisms using Gruebler's equation.

(a) [5 points]

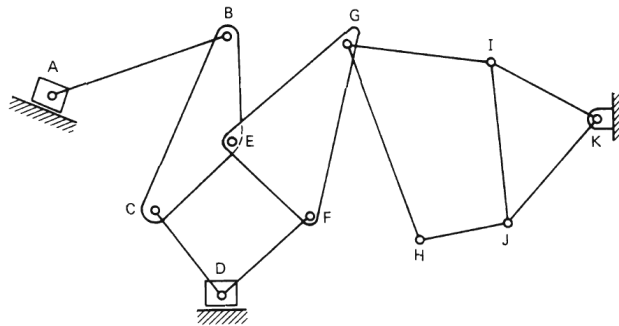
A double-boom crane/excavation device:



(b) [5 points]

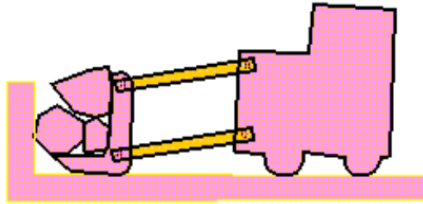


(c) [5 points]

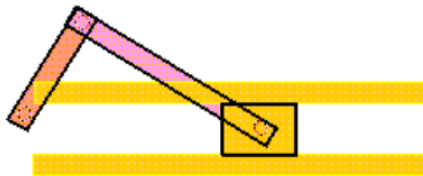


2. [20 points] Identify the type of linkages (four-bar, slider-crank, etc.) for the following mechanisms.

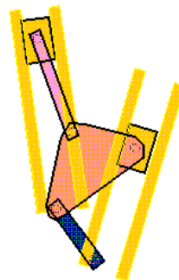
(a) [5 points]



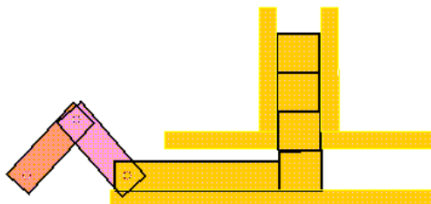
(b) [5 points]



(c) [5 points]

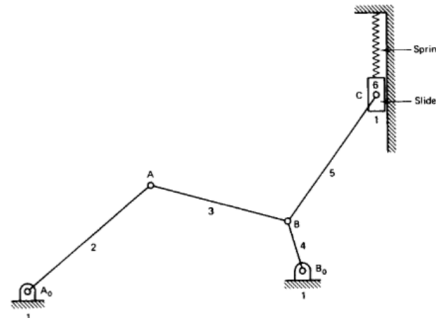


(d) [5 points]

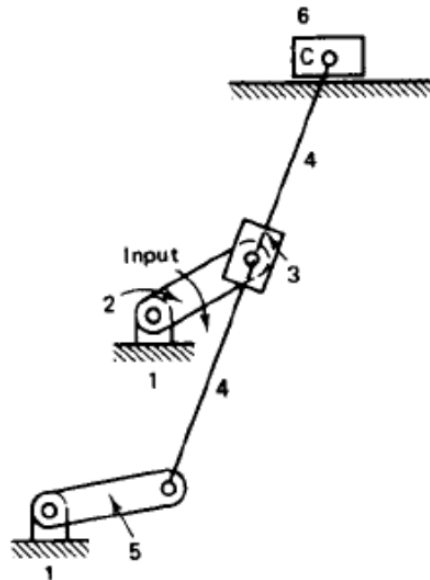


3. [15 points] Determine the transmission angles for the following mechanisms.

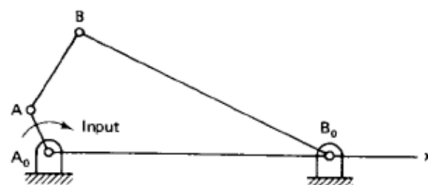
(a) [5 points] 6-bar mechanisms where link 6 is the input and link 2 is the output.



(b) [5 points] The two quick-return shaper mechanisms where link 2 is the input and link 6 is the output.

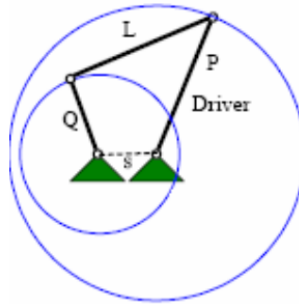


(c) [5 points] Determine the maximum and minimum transmission angles for the following four-bar linkage with dimensions: $A_0B_0 = 6\text{cm}$, $A_0A = 1\text{cm}$, $AB = 2\text{cm}$, $BB_0 = 6\text{cm}$.

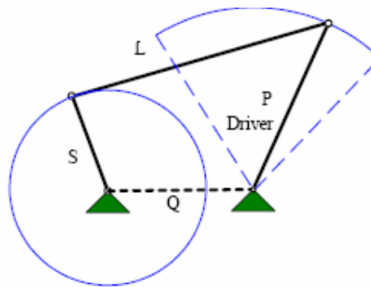


4. [20 points] Classify the following four-bar linkages according to Grashof criterion.

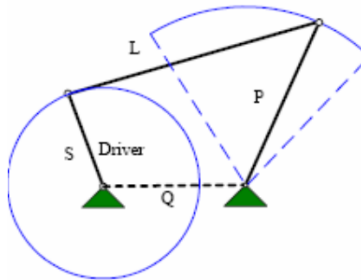
(a) [5 points]



(b) [5 points]



(c) [5 points]



(d) [5 points]

