

Question #1 (15 points).

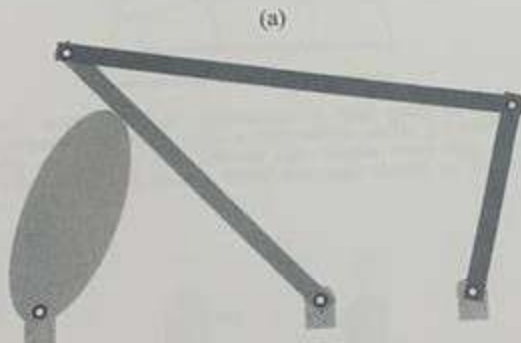
Part A. Circle the correct answer.

The 4-bar mechanism shown below is:

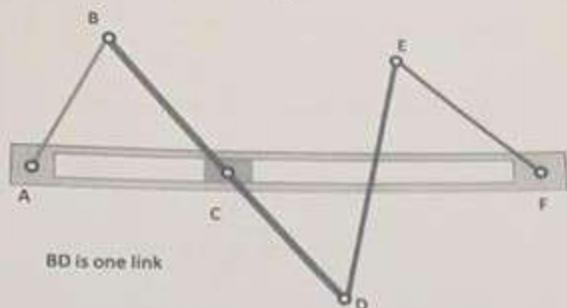
1. A double-rocker Grashof mechanism
2. A double-rocker non-Grashof mechanism
3. A double-crank Grashof mechanism
4. A crank-rocker Grashof mechanism



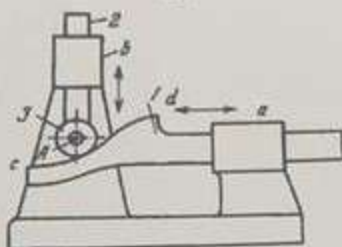
Part B. For each mechanism, give the number of links, the number of lower kinematic pairs, the number of higher kinematic pairs and mobility.



(b)

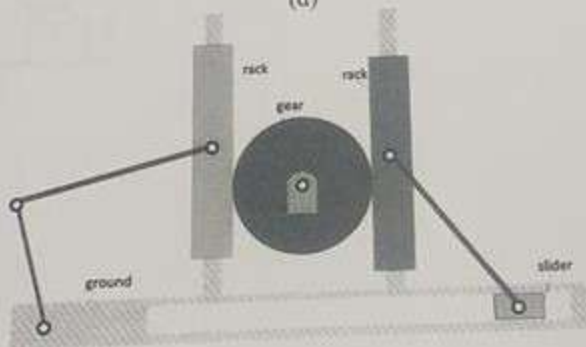


(c)



Cam 1 with profile *cd* reciprocates in fixed guide *a*. Follower 2 reciprocates in fixed guide *b* and carries roller 3 which rotates freely about axis *A*. Follower rise occurs when cam 1 moves to the left, and return when the cam moves to the right.

(d)



Question #2- (20 points)

- Construct two loops by drawing the vectors on the figure.
- Number the vectors and show their angles.
- Write the loop-closure equations.
- AD is crank, the crank angle is input, define the variables of the problem.
- Derive the velocity equations and write them in matrix form.

