

Homework – Cranks, Cams, Linkages

1. Fill in the blanks for the following (20%)
 - A. A _____ is something that modifies force
 - B. A _____ is when force comes from an outside source
 - C. The mechanical action of the machine produces _____
 - D. All machines (almost) always employ at least one _____
 - E. Mechanical _____ is the ratio of load versus effort
 - F. Leverage is the ratio distances of the _____ and load to the fulcrum
 - G. A lever of the second order is also known as a force _____
 - H. A lever of the third order is also known as a force _____
 - I. Part with the hole that supports the shaft is called the _____
 - J. A _____ converts rotation to reciprocation

2. Read ME 425/625 lecture notes on Levers, Shafts, and Cranks and answer the following. Note: Sketch your own drawings; don't cut-and-paste from my notes) - (10%)
 - A. List, sketch and give examples of the 5 simple machines
 - B. Name, sketch and give examples of the 3 levers

3. Read ME 425/625 lecture notes on Levers, Shafts, and Cranks to define (in a few bullets) and sketch the following. There's no need to refer to sources outside of the lecture notes. Also sketch your own drawings (i.e. don't cut-and-paste from my notes) – (10%)
 - A. Shafts and Bearings
 - B. Cams

4. In the Domabot Line Following lab, bang-bang control was demonstrated. Change the code (e.g. `1fbb1_0a.nxc`) and use the line-following mat provided to you. Complete the following table. Then, briefly describe your observations comparing the three cases (30%)

speedBase	Qualitative Description of performance e.g. lots of CW-CCW yawing	Time (with stop watch)	YouTube URL
30			
50			
90			

5. Studio exercise. Pick 3 reciprocating mechanisms. For each: (1) in Studio create the step-by-step build plan and BOM; (2) physically build the mechanism and provide a YouTube video (URL) demonstrating it working; (3) a photo and/or YouTube URL of a similar mechanism in the real-world, Total (30%)

Reciprocating Mechanisms



