

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. Recall the Domabot Wall-Docking lab Concept 1 Open-Loop Wall Docking which used `us0_1a1.nxc`. Set your Domabot at 80-cm from the wall. Let the desired distance from the Domabot's ultrasonic sensor and wall at 20-cm. Complete the following table. Then, briefly describe the Domabot's response (i.e. overshoot, undershoot and time) when the `motorSpeed` is different. (15%)

<code>motorSpeed</code>	Measured final distance from wall (with ruler)	Time (with stop watch)	YouTube URL
30			
50			
90			

5. Recall the Domabot Wall-Docking lab Concept 2 Closed-Loop Wall Docking which used `us0_1d.nxc`. Set your Domabot at 80-cm from the wall. Let the desired distance from the Domabot's ultrasonic sensor and wall at 20-cm. Complete the following table. Then, briefly describe the Domabot's response (i.e. overshoot, undershoot and time) when `kP` is different. (15%)

<code>kP</code>	Measured final distance from wall (with ruler)	Time (with stop watch)	YouTube URL
0.5			
1.5			
2.0			



