## Review for Exam 1:

Topics to concentrate on:

The impact of different **processes** on material properties (hardenability, ductility, strength, toughness)

- quenching
- tempering
- annealing
- cold working
- carbeurizing

**Optimization**

- How to handle multivariable problems - no constraints
- How to handle multivariable problems with constraints
- How to hand single variable problems (with or without constraints)

**Transmission angles**

- How to determine analytically for a 4-bar and graphically for other linkages and cams

**Calculation of stresses**

- bending stresses
- shear stresses
  - torsion
  - shear due to bending
- bearing stresses
- principal stresses
- maximum shear stress

**How to compute geometric properties**

- $2^{nd}$ moment of area - I, $1^{st}$ moment of area - Q
- neutral axis, $y_c$

How to compute deflections (using singularity or superposition)

Be able to recite the **design process**

### Resources you will need

A text that gives you the strength of common metals (steel, aluminum, etc)
A text that gives you $1^{st}$ and $2^{nd}$ moments of area for common geometries (rectangles, squares, circles, hollow circles, I beams)
A text that summarizes deflections, moments, slopes for beams (for superposition).
A calculator and spare paper