ME 360 – H05 Name _____

USE THIS SHEET AS THE FIRST PAGE OF YOUR HOMEWORK SUBMISSION

1) Determine unmodified fatigue strength (units = MPa) of hot-rolled 1030 steel shaft in axial loading for a design life of 10,000 cycles. **Do not apply any fatigue correction factors.**

S_N _____ MPa no CFAC $N = 10^4$ interpolate

2) Determine unmodified fatigue strength (units = ksi) for a normalized 4130 steel shaft in bending for a design life of 10^7 cycles. **Do not apply any fatigue correction factors.**

S_N _____ ksi no CFAC $N = 10^7$ no interp

3) Determine unmodified fatigue strength (units = MPa) for cold-rolled 3003 aluminum rod in torsion for a design life of 10^8 cycles. **Do not apply any fatigue correction factors.**

S_N _____ MPa no CFAC $N = 10^8$ interp

4) Determine fatigue correction factors for the 0.43 inch DIA shaft from H04 using 4340 steel (quenched and tempered at 800° F). The surface of the shaft was machined but was not ground. The shaft is in bending and torsion, operates in normal environmental temperatures and should have 99.9% reliability.

C_{load} _____ C_{size} _____ C_{surf} _____ C_{temp} _____ C_{reliab} _____

5) Determine modified fatigue strength (units = ksi) of for the steel shaft from H04 and problem 4) above for a design life of 10^9 cycles.

S_N _____ ksi no interp