ME 360 – H14 Name _____

USE THIS SHEET AS THE FIRST PAGE OF YOUR HOMEWORK SUBMISSION

1) A single cylinder air compressor delivers 300 psi and uses six M8 coarse bolts (Class 5.8) to retain the head on the block. The cylinder has 70 mm bore. Determine -

a) total force required to hold the head on the cylinder block based on gas pressure,
b) total force with application factor of safety N_{AFS} = 4 to prevent gasket leakage,
c) initial preload required for each bolt assuming all bolts share load equally,
d) factor of safety for proof strength of the bolts,
e) and torque required to provide this preload for lubricated threads.

F_{TOT} _____ N F_{AFS} _____ N F_i _____ N N_P _____ T_i _____ N.m

2) Determine factor of safety for ultimate tensile failure of a ¼-20 UNC Grade 8 bolt with load F = 3500 lbf.

N_{FS} _____

3) Determine factor of safety for stripping threads from a ¼-20 UNC Grade 8 bolt with load F = 3500 lbf assuming at least three threads are engaged.

N_{FS} _____

4) Determine factor of safety for stripping threads from a ¼-20 UNC Grade 8 nut with load F = 3500 lbf assuming at least three threads are engaged.

N_{FS} _____

5) Determine factor of safety for stripping ¼-20 UNC threads from an engine block made of annealed ductile iron 60-40-18 with load F = 3500 lbf assuming at least three threads are engaged.

N_{FS} _____

6) Determine factor of safety for stripping ¼-28 UNF threads from the engine block in problem 5) with load F = 3500 lbf assuming at least three threads are engaged.

N_{FS} _____