

USE THIS SHEET AS THE FIRST PAGE OF YOUR HOMEWORK SUBMISSION

1) Determine minimum face width for a spur gear pair based on static yield tooth bending failure. Assume tip loading. The input pinion is driven by a 1 HP electric motor at 750 rpm with moderate shock loads on the output. Use “gear_AGMA.xlsx” from the class web page to check for interference. Attach hardcopy of the spreadsheet with your values.

$N_{FS} = 2$ $p_d = 16$ $\phi = 20^\circ$ $N_P = 21$ $N_G = 55$ $Q_V = 6$ 1045 cold-rolled steel

F _____ interference ? YES NO

2) Repeat problem 1) for static yield tooth bending failure with everything the same except 25 degree pressure angle. You do not need to attach hardcopy of the spreadsheet for this case.

F _____ interference ? YES NO

3) Repeat problem 1) with $\phi = 20^\circ$ for fatigue with 99% reliability over 10^7 mesh contacts using hardness HB from Table A-9 and Grade 2 unmodified fatigue strength from Figure 12-25.

F _____

4) A spur gear in an old milling machine must be replaced but there is no documentation available. The old gear was scanned on an office copier at 400 dpi and the image provided at https://www.me.psu.edu/sommer/me360/h13_gear_scan.jpg

Determine number of teeth, diametral pitch, pressure angle, bore size and key size. Be certain to specify standard sizes and correct units. **Show your work.**

N_G _____ p_d _____ ϕ _____ bore _____ key _____



NOT TO SCALE !!! use https://www.me.psu.edu/sommer/me360/h13_gear_scan.jpg