Tutorial # 3

1- A steel spur pinion has 15 teeth cut on the 20° full-depth system with a module of 5 mm and a face width of 60 mm. The pinion rotates at 200 rev/min and transmits 5 kW to the mating gear. Determine the resulting bending stress assuming accurate mounting and uniform power source.

2- A 20° spur pinion with 20 teeth and a module of 2.5 mm transmits 120 W to a 36 tooth gear. The pinion speed is 100 rev/min, and the gears are grade 1, 18 mm face width, through-hardened steel at 200 Brinell, uncrowned, manufactured to a No.6 quality standard, and considered to be of open gearing quality installation (low accuracy).
Find the AGMA bending and contact stresses and the corresponding factors of safety for a pinion life of 10^8 cycles and a reliability of 0.95.