Problem Session 8

A non-rotating, stepped, round shaft (Figure A-15-9, pg. 748) is subjected to a bending moment that varies from zero to a maximum value of M. The large diameter of the shaft is 15 mm, the small diameter is 10 mm and the fillet radius is 1.0 mm. The material is steel with an ultimate tensile strength of 1400 M Pa and the surface is machined. The section modulus for the shaft is 98.175 mm3. Using the Goodman criterion, determine the value of M consistent with a factor of safety of 2 for infinite life.