



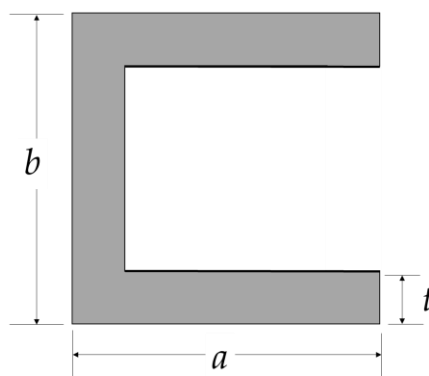
Advanced Strength of Materials

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Chapter 7 – Torsion of Prismatic Bars

Question 1. Show that the stress function $\phi = k(r^2 - a^2)$ is applicable to the solution of a solid circular section bar of radius a . Determine the stress distribution in the bar in terms of the applied torque, the rate of twist, and the warping of the cross-section. Is it possible to use this stress function in the solution for a circular bar of hollow section?

Question 2. Determine the maximum shear stress and the rate of twist in terms of the applied torque T for the section made up of narrow rectangular strips shown in Figure.



Question 3. A steel bar ($G = 200$ GPa) of cross section as shown in Figure is subjected to a torque of 500 N·m. Determine the maximum shearing stress and the angle of twist per unit length. The dimensions are $b_1 = 100$ mm, $b_2 = 125$ mm, $t_1 = 10$ mm, and $t_2 = 4$ mm.

