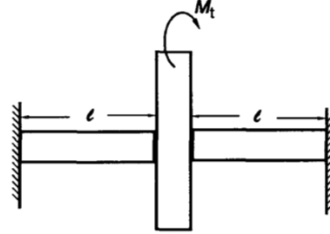
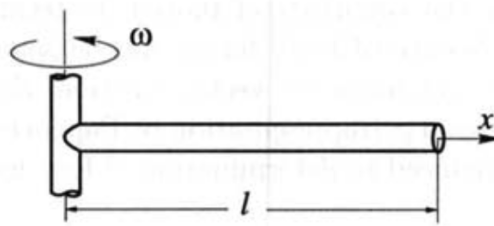


One of the problems will be handed in and marked.

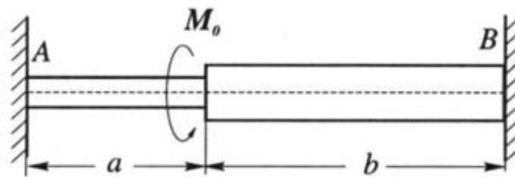
Problem 1 In the figure below, a twisting torque M_t is applied to the rigid disc in the middle. Find the twisting moments transmitted to the circular shafts on either side of the disc.



Problem 2 Find the expression for the elongation δ of a cylindrical rod of an initial length L , one of the ends of which is fixed to a shaft rotating with a constant angular speed ω around a vertical axis (see figure below). Calculate this elongation for a copper rod of length $L = 1$ m if $\omega = 30$ s⁻¹. The density of copper is 8.87 g/cm³, Young's modulus $E = 121$ GPa. Neglect the weight of the rod.



Problem 3 A solid shaft of circular cross section consists of two parts with lengths a and b and radii R_a and R_b , respectively (see figure below). The shaft is fixed at the ends and loaded by a torque M_0 at the interface section. Find the moments of reactions M_A and M_B arising at the sections of fixation. Find the rotation angle φ of the section at which the torque acts.



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