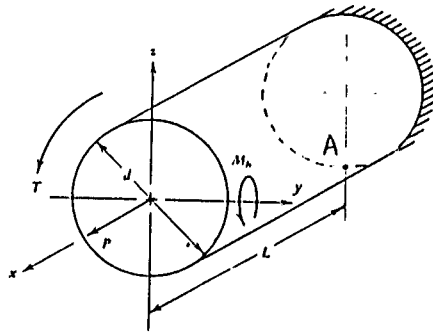


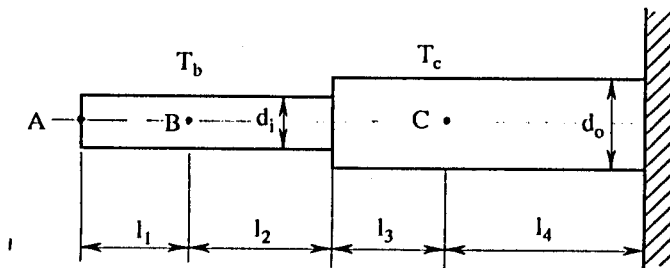
1. (20%)

The solid cylindrical cantilever bar as shown in the figure is subjected to pure torsional moment T about x -axis, pure bending moment M_b about the y -axis, and pure axial force P along the x -axis, all at the same time. Determine the state of stress at point A.



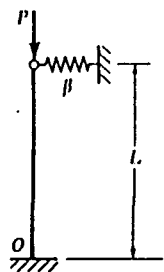
2. (20%)

Pure torsional moments T_b and T_c are applied at the points B and C as shown in the figure respectively. Please determine the angle of twist at point A. (shear modulus G)



3. (20%)

Obtain the buckling equation for a column that is fixed at the base and supported at the top by a linearly elastic spring of stiffness β (see figure).



4. (20%)

A propped cantilever beam AB is acted upon by a uniformly distributed moment (bending moment, not torque) of intensity m per unit distance along the axis of the beam (see figure).

- (i) Determine the reactions at A and B.
- (ii) Find the equation of the deflection curve.



5. (20%)

Locate the shear center O of a channel section of uniform thickness (see figure).

