※ 考生請注意：本試題不可使用計算機。　請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

1. The massless rigid bar ace is suspended by three identical bars with same cross-sectional area A and same modulus E. A force P acts at point c as shown. (a) Determine the forces in the three bars. (15%)　(b) Now, let the temperature of the bar cd be uniformly increased (or decreased) by an amount ΔT. No temperatures are increased for bars ab and ef.　Determine the amount of ΔT so that there is no axial force for the bar cd. (10%) (The coefficient of thermal expansion of the bar cd is α)
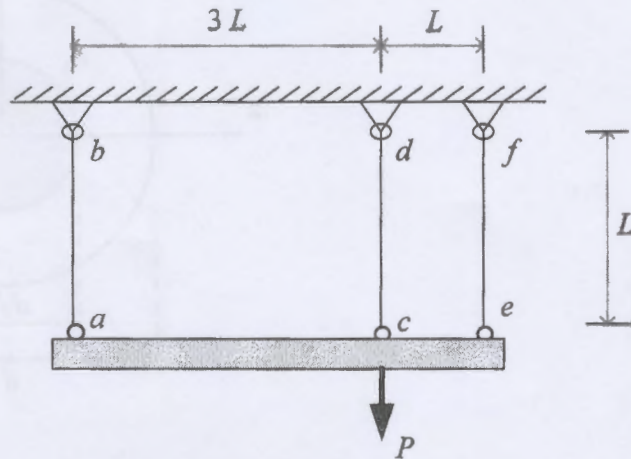
2.　A short bar with square cross section is subjected to an eccentric axial force P and a lateral force $4P/3$ at the free end. The other end of the bar is fixed at the base (see figure). Determine (a) the principle stresses at point A, (15%) and (b) the maximum shear stress at point A (10%).
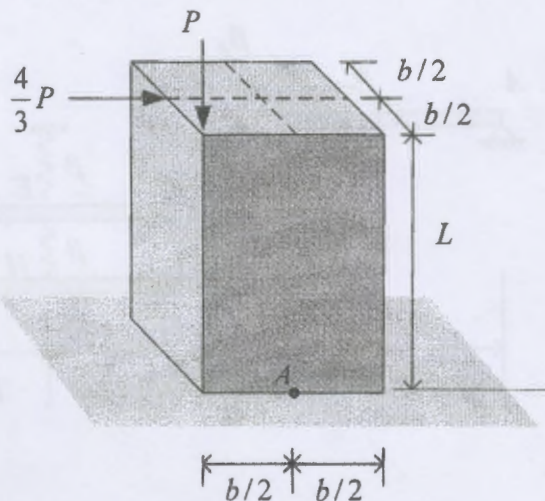
3. A composite beam with circular cross section is composed by two materials with elastic moduli E_1 and E_2, respectively, as shown. The beam is subjected to pure bending moment M. Knowing that $E_2 / E_1 = 17$, determine (a) the curvature of the beam (15%), and (b) the normal stress σ_A at point A. (10%) (Express your answers in terms of M, d and E_1)
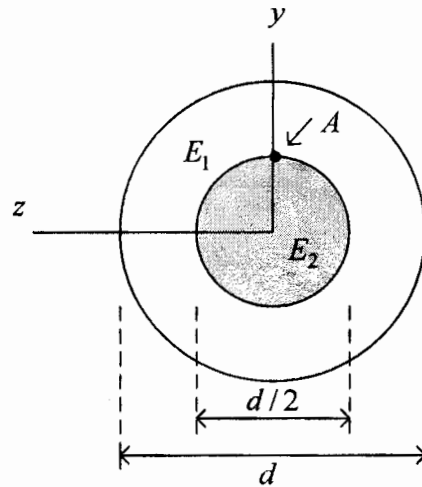
4. The figure shows an idealized structure consisting of rigid bars ABC, DEF and GHI. They are joined by linearly spring with spring constant β at points C, D, E and H (see Figure). The structure is also supported by rotational elastic support at B and translational elastic spring at E. Determine the critical load P_{cr} for the structure. (25%)