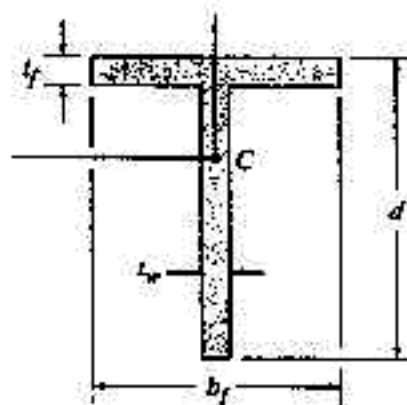
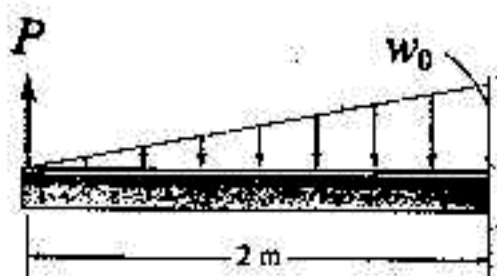


1. Explain the following terminology in detail : (20%)
 - (a) Strain energy
 - (b) Offset yield stress
 - (c) Octahedral shearing stress
 - (d) Bleich correction factor

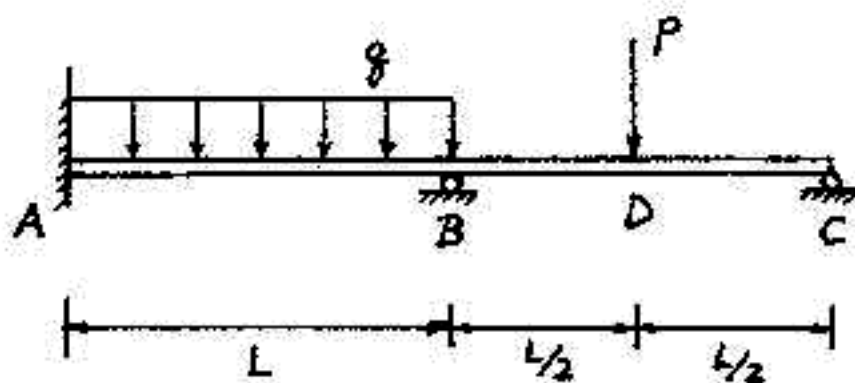
2. A tee section is used as a cantilever beam to support a triangularly distributed load of maximum intensity $w_0 = 1 \text{ kN/m}$ and a concentrated load $P = 250 \text{ N}$. (a) Sketch shear force and bending moment diagrams for the beam, and (b) determine the maximum tensile flexural stress and maximum compressive flexural stress in the beam. The relevant dimensions of the cross section are $t_f = t_w = 5 \text{ mm}$, $b_f = 55 \text{ mm}$ and $d = 60 \text{ mm}$. (20%)



3. A circular rod with diameter D is subjected to axial load P and torque T . Determine the principal stresses at point A on the surface of the rod. (20%)



4. The beam ABC with a fixed support at A and roller supports at B and C . The beam is subjected to a uniform load of intensity q on AB and a concentrated load P at D . For $P = qL$, determine (a) the reactions at A , B and C , (b) the maximum positive and negative moments on the beam, (c) the slopes at B and C (θ_B and θ_C), and (d) the deflection at D (δ_D). Denote EI the flexural rigidity of the beam. (20%)



八十八學年度 動力機械 系(所) 丙 組碩士班研究生招生考試

目 材料力學 科號 1401 共 3 頁第 3 頁 *請在試卷【答案卷】內作答

5. A column AB of length L with flexural rigidity EI are pinned at both ends. At the top of the column, a rotational spring of stiffness β is mounted to restrain rotation. (a) Derive the buckling equation for the column, and (b) calculate the critical load P_{cr} if $\beta = 3EI/L$. (20%)

