(50%) 1. Explain the following technical terms
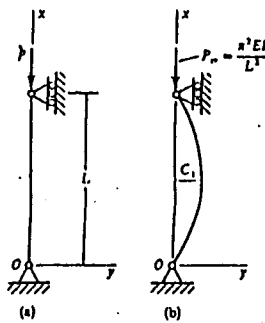
    1) Homogeneity   6) Viscoelasticity

    2) Isotropic   7) Permanent deformation

    3) Dimensionless   8) Stiffness

    4) Elasticity   9) Strain energy

    5) Plasticity   10) Hystersis

(35%) 2. Derive the following equations

    1) Flexure formula $\quad \sigma_x = \dfrac{My}{I}, I = \int y^2 dA$

    2) Shear formula $\quad \tau = \dfrac{VQ}{Ib}, Q = \int y dA$

    3) Critical loads $\quad P_{cr} = \dfrac{\pi^2 EI}{L^2}$

    Where σ_x : normal stress, τ : shear stress, M : applied bending moment

    I : moment of inertia, V : shear force, Q : the first moment, E : Young's modulus

(15%) 3. Determine the vertical deformation δ_v and horizontal deformation δ_h of joint B of the truss in the figure if both members have axial rigidity EA and $\beta = 30°$.