

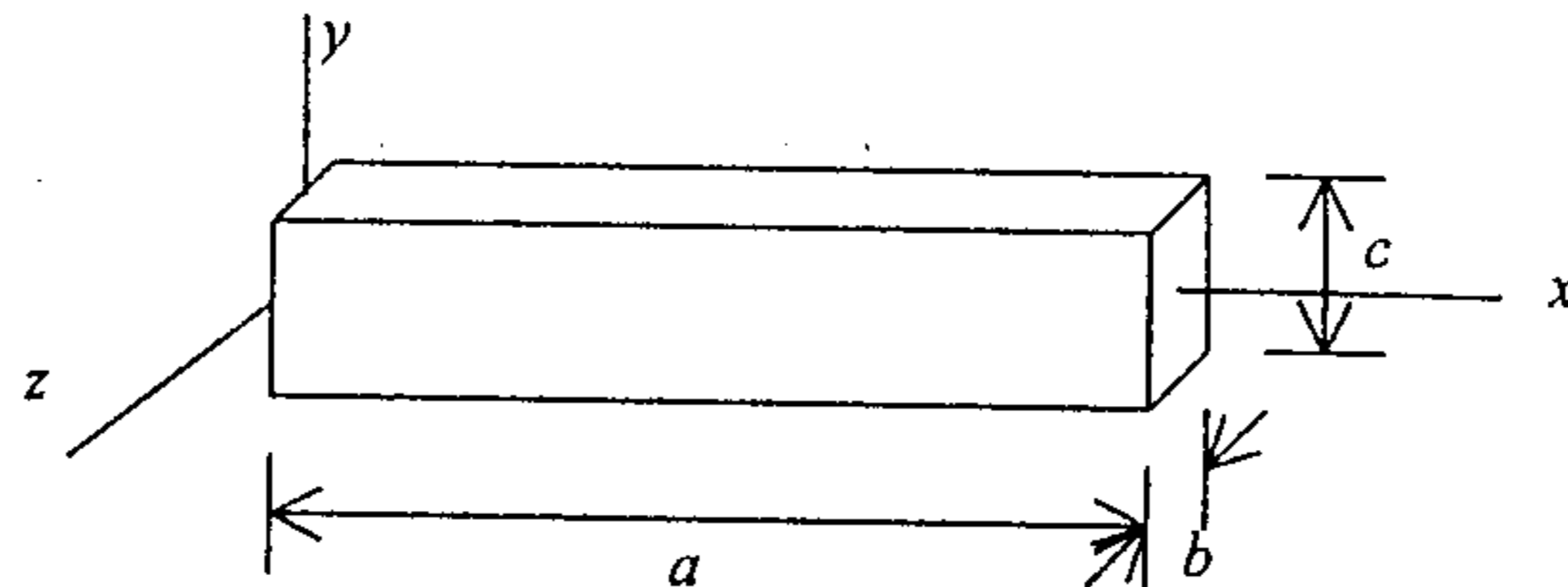
# 淡江大學八十九學年度日間部轉學生招生考試試題 42

系別：土木工程學系三年級

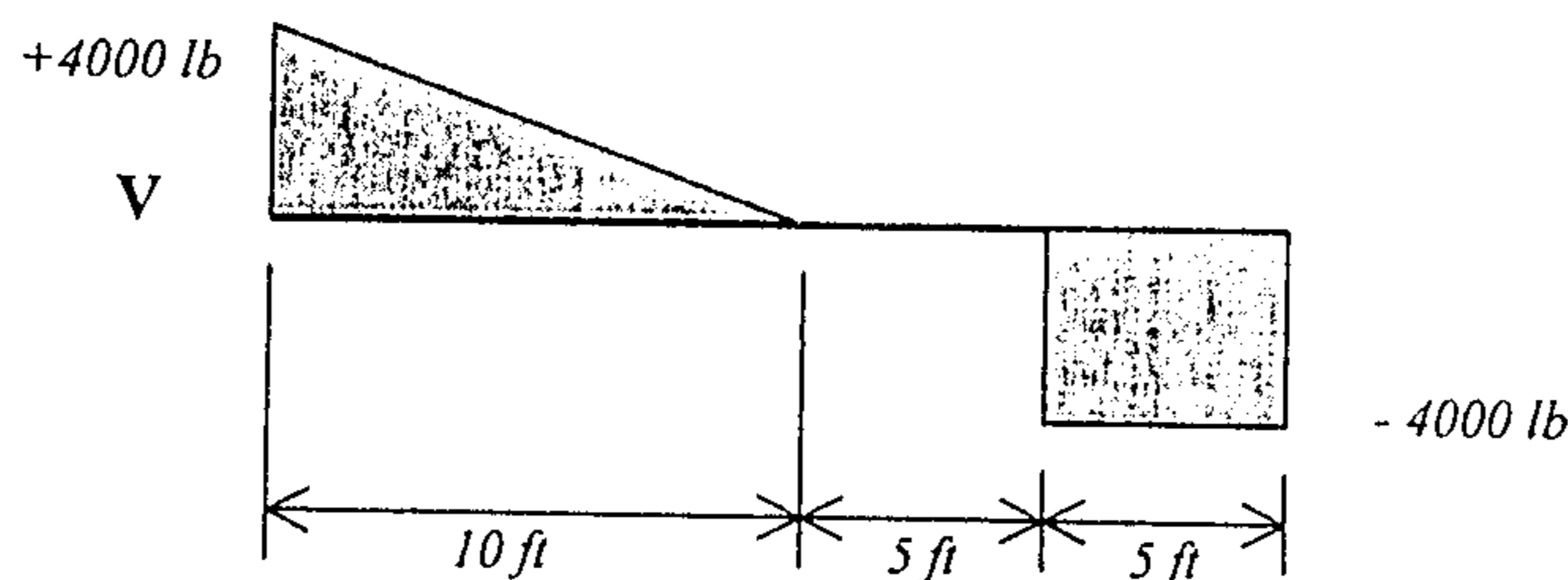
科目：工程力學

本試題共 / 頁

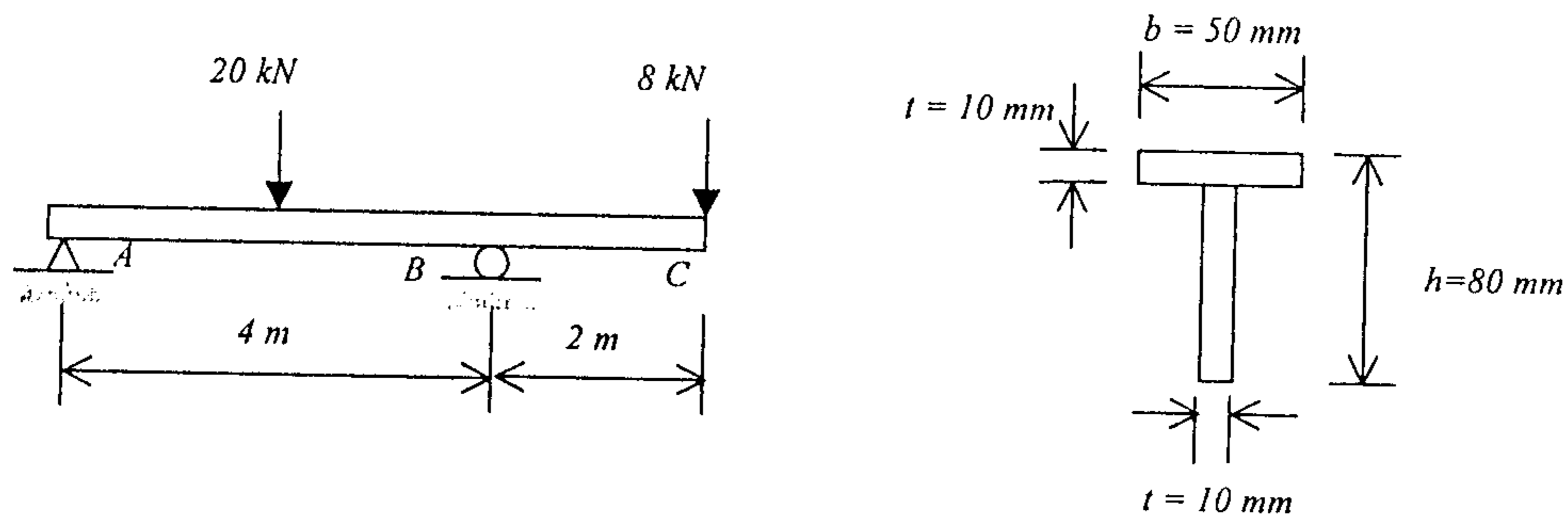
1. For the homogeneous rectangular prism with density  $\rho$  and mass  $m$ , determine the mass moment of inertia with respect to the  $z$  axis. Note: Derivation is necessary, no credit for writing answer only. (25%)



2. The shear-force diagram for a simple beam is shown in the figure. Determine the loading on the beam and draw the bending-moment diagram, assuming that no couples act as loads on the beam. (25%)



3. The beam of T-section is supported and loaded as shown in the figure. The cross section has width  $b = 50 \text{ mm}$ , height  $h = 80 \text{ mm}$ , and thickness  $t = 10 \text{ mm}$ . Determine the maximum tensile and compressive stresses in the beam. (25%)



4. An element in plane stress is subjected to stresses shown in the figure. It is known that one of the principal stresses equals 26.1 MPa in tension. (a) Determine the stress  $\sigma_y$ . (b) Determine the other principal stress and the orientation of the principal planes; then show the principal stresses on a sketch of a properly oriented element. (25%)

