大葉大學九十學年度研究所碩士班招生考試試題紙			
系 所 組 別	考 試 科 目 （中 文 名 稱）	考 試 日 期	備 註
機械所甲、丙組	材料力學	4 月 22 日 第 2 節	共 1 頁 攜帶計算機

註：考生可否攜帶計算機或其他資料作答，請在備註欄註明（如未註明，一律不准攜帶）

1. A simply supported beam ABC is loaded at the ends of a vertical arm and of the overhang, as shown in Fig. 1. Draw the shear-force and bending-moment diagrams for beam ABC. (25%)
2. A cylindrical pressure vessel having radius r = 12 in. and wall thickness t = 0.6 in. is subjected to internal press p = 360 psi. In addition, a torque T = 90 k-ft acts at each end of the cylinder, as shown in Fig. 2. Determine the maximum tensile stress σ_{max} and the maximum in-plane shear stress τ_{max} in the wall of the cylinder. (25%)
3. The truss ABC shown in Fig. 3 supports a vertical load P at point B. Both bars have cross-sectional area A and Young's modulus E. Determine the vertical deflection δ_B at point B using Castigliano's theorem. (*Hints*: express the vertical deflection δ_B in terms of P, A, L, θ and E) (25%)
4. A horizontal beam AB is pin-supported at end A and carries a load Q at end B, as shown in Fig. 4. The beam is supported at C and D by two identical pinned-end columns of length L. Each column has flexural rigidity EI. What is the critical load Q_{cr} at which the system collapses because of Euler buckling of the columns? (25%)

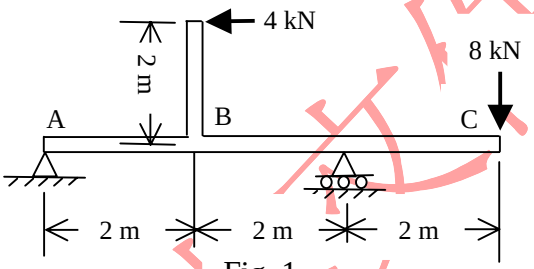

Fig. 1

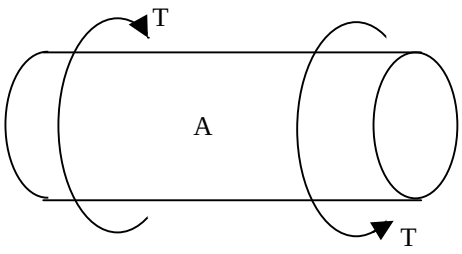

Fig. 2

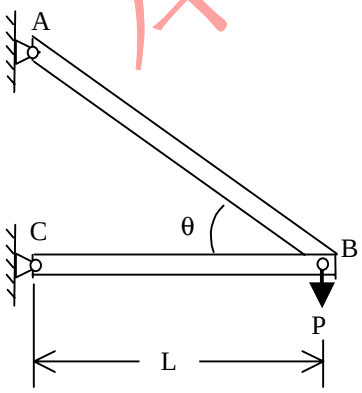

Fig. 3

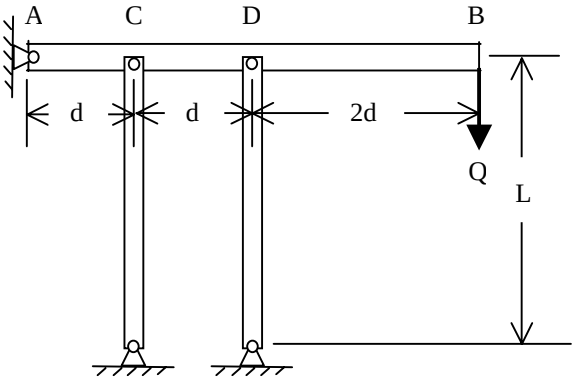

Fig. 4