淡江大學九十二學年度碩士班招生考試試題

系別：土木工程學系   科目：材 料 力 學

本試題共 2 頁 P.1

本試題雙面印製

1. The stress-strain (σ–ε) diagram of the elastic fibers is shown in Fig.1.
   Determine (a) the modulus of elasticity of the fibers, (b) the modulus of resilience,
   and (c) the modulus of toughness. (15%)
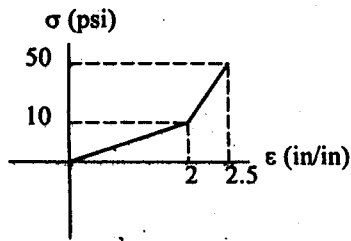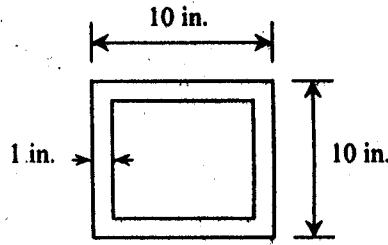

Fig. 1   Fig. 2

2. A box cross section with a uniform thickness is shown in Fig. 2. The cross section
   is made of steel with yield stress $\sigma_y = 40$ ksi. Calculate
   (a) the shape factor of the cross section and
   (b) the torsion constant of the cross section. (20%).

3. A beam composed of a doubly symmetric cross section is loaded as shown in Fig.
   3. Determine the locations and the magnitudes of (a) the largest tensile bending
   stress and (b) the maximum transverse shear stress. (25%)
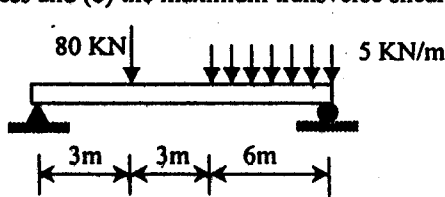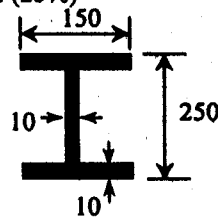

Fig. 3   dimensions of the cross section (unit: mm)

4. The 60° strain rosette is mounted on the surface of an aluminum plate. The
   following readings are obtained from each gauge: $\varepsilon_a = 950(10^{-6})$, $\varepsilon_b = 380(10^{-6})$,
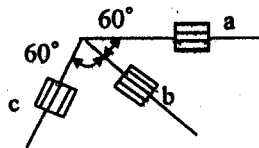 $\varepsilon_c = -220(10^{-6})$. Determine the in-plane principal strains and their orientation.
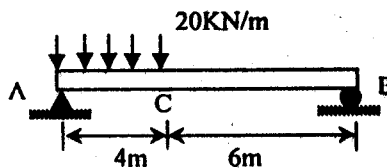   (20%)

Fig. 4   Fig. 5

◀ 注意背面尚有試題 ▶

淡江大學九十二學年度碩士班招生考試試題

系別：土木工程學系　　　　科目：材　料　力　學

准帶項目請打「○」否則打「×」
簡單型計算機　　○

5. A simple beam AB supports a uniform load as shown in Fig. 5. (a) Find the angle of rotation at support A. (b) Find the vertical deflection at point C. (20%)
   ($E= 200$ Gpa, $I =1.2 \times 10^9$ mm^4)

系別：土木工程學系