國立嘉義大學九十三學年度
土木與水資源工程學系碩士班招生考試試題

科目：工程力學

注意：1.本試題不可使用計算機
2.本試題如條件不足，請自行假設

1. The pin-connected truss shown in the Fig.1 has a span L = 6.0m and height H = 1.5m. The truss is constructed of steel bars, each having cross-sectional area A = 3000 mm^2 and modulus of elasticity E = 200 Gpa. A load P acts vertically at midpoint D.
   (a) If P = 120 KN, what is the horizontal displacement of joint C ? (10%)
   (b) What is the maximum permissible load P_{max} if the displacement of joint C is limited to 2.0 mm? (10%)

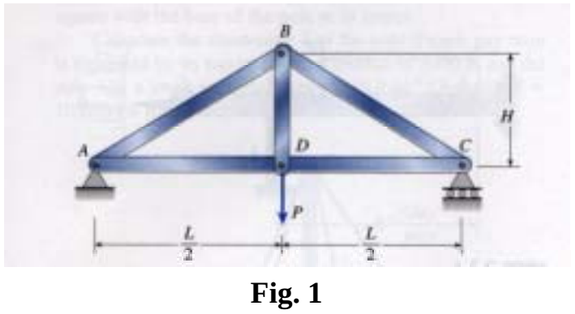

Fig. 1

2. The cantilever beam AB shown in the Fig.2 is subjected to a concentrated load P at the midpoint and a counterclockwise couple of moment M_1 = PL/4 at the free end. Draw the shear-force and bending-moment diagrams for this beam. (15%)

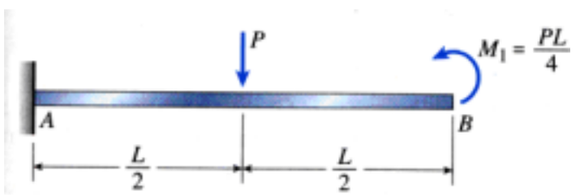

Fig. 2

3. A vertical solid post 2.5 m high must support a lateral load P = 12 kN at its upper end, shown as Fig. 3. What is the minimum required diameter d_1 of the wood post if the allowable bending stress in the wood is 20 Mpa ? (15%)

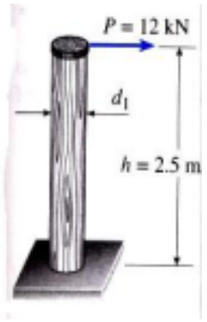

Fig. 3

4. For the channel section of Fig.4 determine
   (a) The distribution of the shearing stress caused by an 800 N vertical shear V exerted at the shear center O, knowing that b=100mm, h=150mm, and t=3mm.(10%)
   (b) The location of the shear center O. (10%)

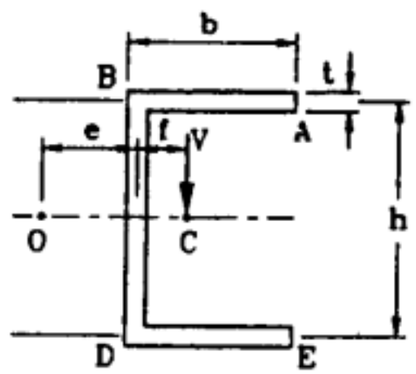

Fig. 4

背面尚有試題

5. For the straight beam shown in Fig. 5, determine

(a) The location of the maximum deflection, and, (8%)

(b) The magnitude of the maximum deflection. (7%)

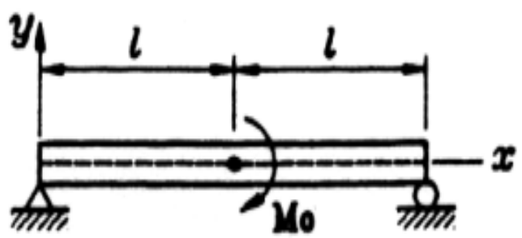

Fig. 5

6. A rectangular aluminum plate is loaded as shown in Fig.6.
If σ_x=10,000 psi, σ_y=20,000 psi, E=10×10^6 psi, and ν = 0.3, determine the change in length of the diagonal BD. (15%)

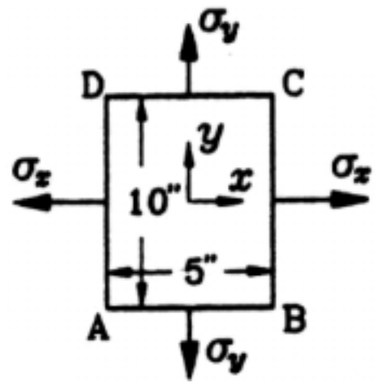

Fig. 6