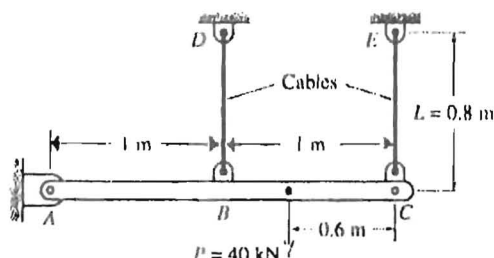※ 考生請注意：本試題 ☑可　□不可 使用計算機

1. As shown in **Fig. 1**, a rigid horizontal bar is supported by a hinge at A and by two steel cables BD and CE, which are of equal length , L=0.8m, and cross-sectional area, A=140mm^2.　Find: The stress in each cable due to a vertical force of P=40kN, Applied as shown in the figure. (25%)
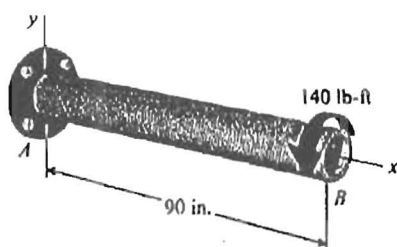
Fig. 1

2. A hollow circular steel shaft (**Fig. 2**) with an outside diameter of 1.5 in. and a wall thickness of 0.125in. is subjected to a pure torque of 140 lb-ft. The shaft is 90 in. long.　The shear modulus of the steel is G=12,000 ksi. Determine:
(a) the maximum shear stress in the shaft. (15%)
(b) the magnitude of the angle of twist in the shaft. (15%)

Fig. 2

3. The beam shown in **Fig. 3** is simply supported at A and B.　The loading consists of a concentrated load P=20kN at the middle of span AB and a uniform load of intensity w=4kN/m.　Find: Construct shear-force and bending-moment diagrams for the beam, using the graphical method. (25%)

Fig. 3
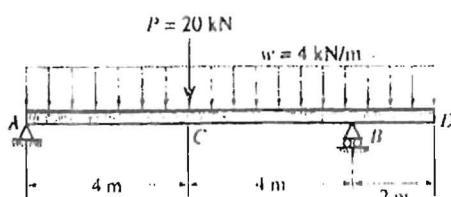
(背面仍有題目,請繼續作答)

※ 考生請注意：本試題 ☑可 □不可 使用計算機

4. Consider a point in a structural member that is subjected to plane stress. Normal and shear stresses acting on horizontal and vertical planes at the point are shown (**Fig. 4**).

(a) Determine the principal stress and the maximum in plane shear stress acting the point. (10%)

(b) Show these stresses on an appropriate sketch. (10%)

Fig. 4