（1）一樑結構承受荷載，如圖所示，已知C點為內鉸；試繪出其剪力圖及彎矩圖，並求出此樑最大正彎矩及其位置。

（2）A homogeneous cantilever beam has a rectangular cross-section of 10 cm × 20 cm. If the beam is subjected to an impact force due to an object $W$ dropping from a height $H = 20$ cm above the free end, what will be the stresses at the point $A$ and point $B$ of the c-c section of the fixed end when the maximum deflection is reached, as shown (圖二).

Note that the modulus of elasticity $E = 30$ GPa and the use of stress unit MPa is required.
如圖三所示之立方體花崗岩，彈性模數 $E = 60$ GPa，泊松比 $\nu = 0.25$，其尺寸為 $a = 75$ mm，
進行三軸應力試驗，花崗岩各側均貼有應變計，量得的應變為 $\varepsilon_x = -720 \times 10^{-6}$ mm/mm，
$\varepsilon_y = \varepsilon_z = -270 \times 10^{-6}$ mm/mm，計算下列量值：
(a) 作用在花崗岩 $x$，$y$，與 $z$ 面上之垂直應力 $\sigma_x$，$\sigma_y$，與 $\sigma_z$
(b) 材料中的最大剪應力 $\tau_{\text{max}}$
(c) 花崗岩的體積改變量 $\Delta V$，與
(d) 花崗岩中儲存的總應變能 $U$

A post having a hollow circular cross section supports a horizontal load $P = 360$ lb acting at the end of an arm that is 4 ft long (圖四)。The height of the post is 25 ft, and its section modulus is $S = 10$ in.$^3$.

(a) Calculate the maximum tensile stress $\sigma_{\text{max}}$ and maximum in-plane shear stress $\tau_{\text{max}}$ at point $A$ due to the load $P$
(point $A$ is located on the “front” of the post, that is, at the point where the tensile stress due to bending alone is a maximum).

(b) If the maximum tensile stress $\sigma_{\text{max}}$ and maximum in-plane shear stress $\tau_{\text{max}}$ at point $A$ are limited to 16,000 psi and 6,000 psi, respectively, what is the largest permissible value of the load $P$?