(1) Determine the deflection function (i.e., $w(x)$) of a loaded beam, shown in Fig. 1, using

　　(a) the conjugate beam method,　　　　　　　　　　　　　　(15%)

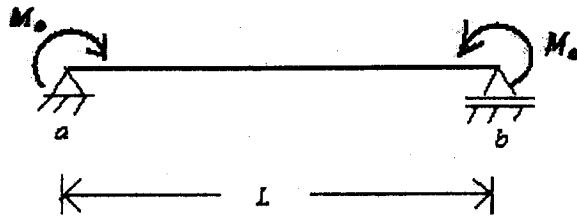　　(b) the method of virtual work (i.e., the method of unit load).　　(15%)

Figure 1

(2) Consider a statically determinate frame as shown in Fig. 2. Determine and draw the influence lines for

　　(a) the internal shear force at point C,　　　　　　　　　(10%)

　　(b) the fixed moment at point E,　　　　　　　　　　　　(10%)

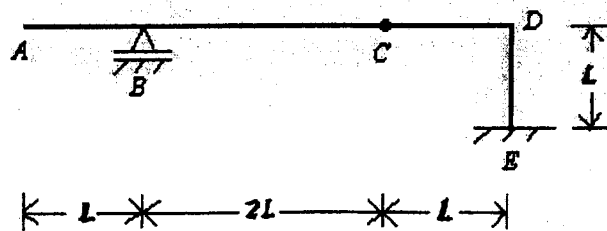　　using the force and moment equilibrium equations for each free body diagram.

Figure 2

（背面仍有題目,請繼續作答）

(3) Consider a loaded beam as shown in Fig. 3 where the flexural rigidity of the beam is EI and the spring constant is k_s (Let $k_s = 24EI/L^3$). Determine the deflection and rotation at point B, the spring force and all the end moments using

    (a) the slope-deflection method, (15%)
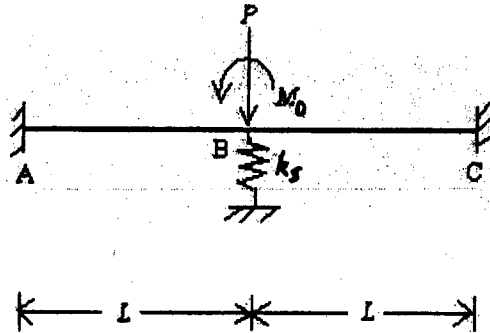
    (b) the moment distribution method. (15%)

Figure 3

(4) Consider the same loaded beam in problem 3 (see Fig. 4). Determine the deflection and rotation at point B using the matrix displacement method. (20%)
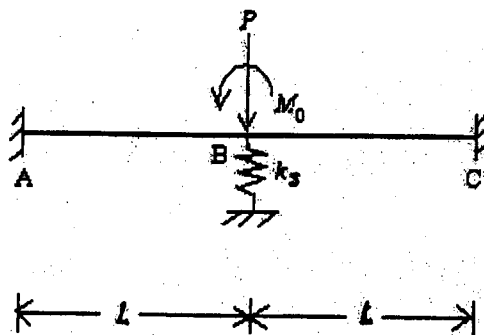

Figure 4