(1) Determine the axial forces in all members for the loaded truss shown in Fig.1. (25%)
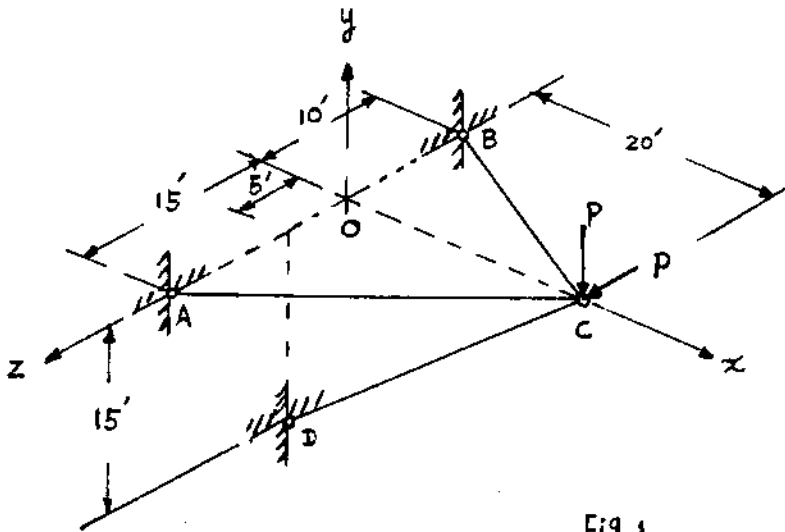

Fig. 1

(2) (a) What kind of the method is used to develop the three-moment equation? (5%)

(b) Determine the internal moments in the beam at the supports using the three-moment equations (see Fig.2). Assume EI=constant. (10%)

(c) Draw the shear force and moment diagrams. (10%)

The general form of the three-moment equation is given as

$$\frac{M_L L_L}{I_L} + 2M_C\left(\frac{L_L}{I_L} + \frac{L_R}{I_R}\right) + \frac{M_R L_R}{I_R} = -\sum\frac{6A_L \bar{x}_L}{I_L L_L} - \sum\frac{6A_R \bar{x}_R}{I_R L_R}$$

where the subscripts L, C and R denote the left, center and right supports of a two-span section, respectively.
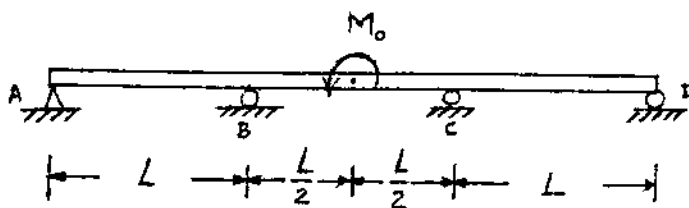

Fig. 2

(背面仍有題目,請繼續作答)

(3) Determine the spring forces in the simply-supported beam, shown in Fig. 3, using the method of consistent deformations. Let the spring forces be the redundant forces. (25%)
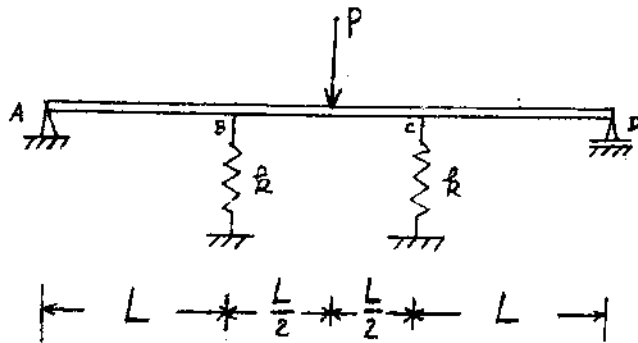
Assume EI=constant.

Fig. 3

(4) Determine the displacement Δ in the direction of the applied load for the structure shown in Fig. 4. Assume the bending rigidity EI and torsion regidity GJ are constants. (25%)
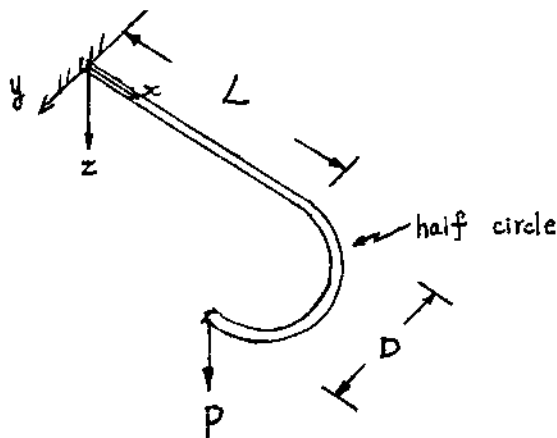

Fig.4