

1. 如图(a)所示,一方形断面之懸臂樑,自由端由一鋼索(steel cable)拉住。樑断面為  $50\text{ cm} \times 50\text{ cm}$  (20%) 鋼索断面為  $5\text{ cm}^2$ 。設兩者均為 elastic-perfectly plastic 材料,降伏應力 (yield stress) 均為  $200\text{ MPa}$  (tension and compression)。試求在樑與索均無塑性變形情形下,此結構系統所能承受之最大外力  $P$ 。

2. 一矩形樑,断面為  $b \times h$ , 如图(b)所示。若外力  $P$  作用於  $xy$  平面上  $A, B$  兩點。試求此樑之 (20%) (a) 剪力圖, 彎矩圖  
(b) 最大正向應力  $(\sigma_x)_{\max}$  及其位置  
(c) 最大剪應力  $(\tau_{xy})_{\max}$  及其位置。

3(a) By solving the differential equation of the deflection curve, obtain the critical load  $P_{cr}$  (20%) for the column of Figure (c).

(b) By solving the differential equation of the deflection curve, obtain the buckling equation for the column of Figure (d).

4. Two rigid bars  $AC$  and  $BC$  are supported by the ball and socket at  $A$  and  $B$  and by a (20%) string  $CD$ . If the point  $C$  is pin connection, determine (see Figure (e))

- (a) the tension in string  $CD$   
(b) the forces in  $AC$  and  $BC$ .

5. A light bar  $AD$  is supported by a string  $BE$  and loaded by a force  $20\text{ kN}$  at  $C$ . (20%) If both ends,  $A$  and  $D$ , of the bar are in contact with frictionless walls, determine

- (a) the tension in string  $BE$ ,  
(b) the reactions at  $A$  and  $D$ .

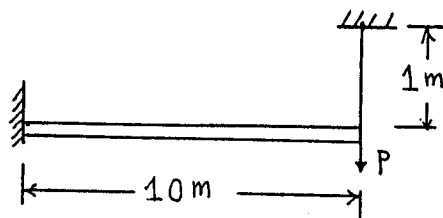


圖 (a)

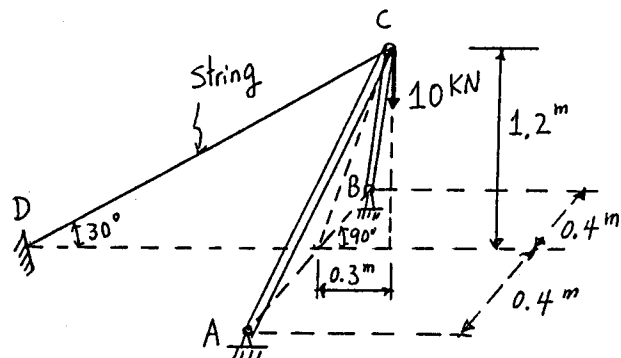


圖 (e)

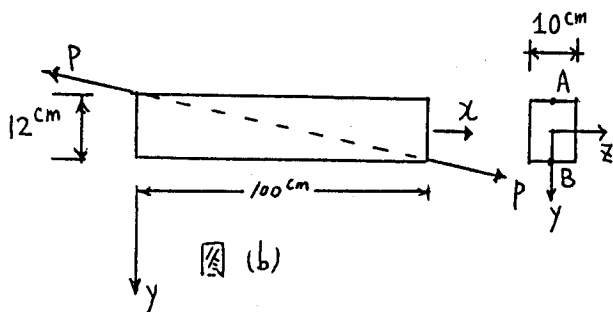


圖 (b)

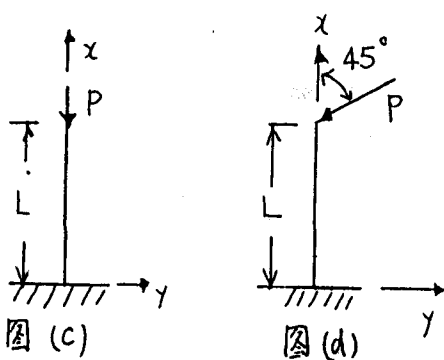


圖 (c)

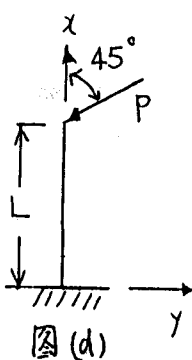


圖 (d)

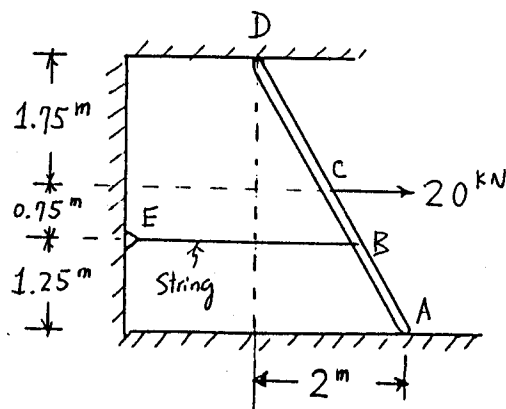


圖 (f)