淡江大學九十二學年度碩士班招生考試試題

系別：機械與機電工程學系　　　科目：材　料　力　學

准帶項目請打「○」否則打「×」
簡單型計算機
○

1. (25%)

A bar AB having length L and axial rigidity EA is fixed at end A (see figure 1). At the other end a small gap of dimension s exists between the end of the bar and a rigid surface. A load P acts on the bar at point C, which is two-thirds of the length from the fixed end.

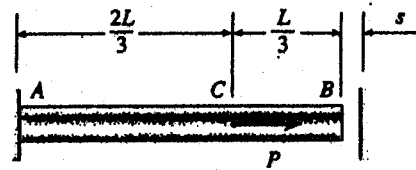If the support reactions produced by the load P are to be equal, what should be the size s of the gap?

Fig. 1

2. (25%)

A solid circular bar ABCD with fixed supports is acted upon by torques T_0 and $2T_0$ at the locations shown in the figure.(see figure 2). Obtain a formula for the maximum angle of twist Φ_{max} of the bar.
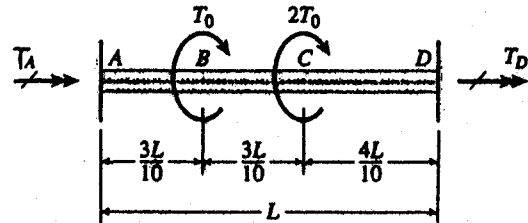

Fig. 2

3. (25%)

A simple beam AB of span length L=22ft (see figure 3a) supports a uniform load of intensity q=1.5k/ft and a concentrated load P=12k. The uniform load includes an allowance for the weight of the beam. The concentrated load acts at a point 9.0 ft from the left-hand end of the beam. The beam is constructed of glued laminated wood and has a cross section of width b=8.75 in. and height h=27 in (see figure 3b). Determine the maximum tensile and compressive stresses in the beam due to bending.
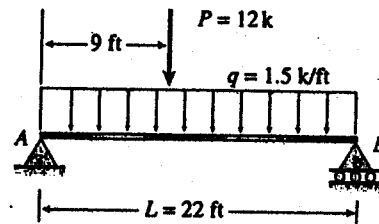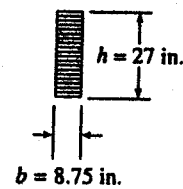
Fig. 3

4. (25%)

Determine the slope and deflection at the free end B of the cantilevered beam subjected to the concentrated load P located as shown in Figure 4 (Note: The beam has length L and constant flexural rigidity EI. Disregard the weight of the beam itself)
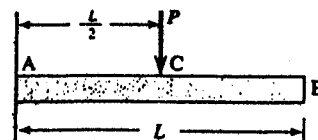

Fig. 4