

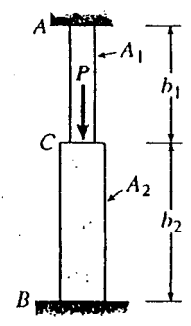
# 淡江大學九十四學年度碩士班招生考試試題 76-1

系別：機械與機電工程學系      科目：材 料 力 學

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| 准帶項目請打「V」 |        |
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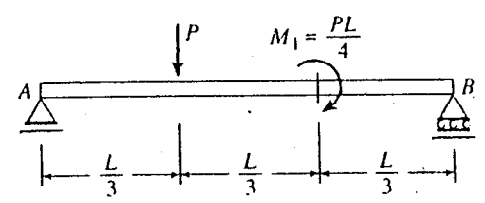
1. (25%)

A bar  $ACB$  having two different cross-sectional areas  $A_1$  and  $A_2$  is held between rigid supports at  $A$  and  $B$  (see figure). A load  $P$  acts at point  $C$ , which is distance  $b_1$  from end  $A$  and distance  $b_2$  from end  $B$ . (a) Obtain formulas for the reactions  $R_A$  and  $R_B$  at supports  $A$  and  $B$ , respectively, due to the load  $P$ . (b) Obtain a formula for the downward displacement  $\delta_C$  of point  $C$ .



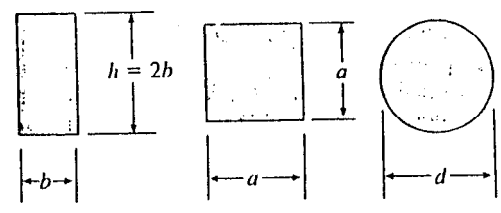
2. (25%)

The simple beam  $AB$  shown in the figure is subjected to a concentrated load  $P$  and a couple  $M_1 = PL/4$  acting at the positions indicated. Draw the shear-force and bending moment diagrams for this beam.



3. (25%)

Determine the ratios of the weights of three beams that have the same length, are made of the same material, are subjected to the same maximum bending moment, and have the same maximum bending stress if their cross sections are: (1) a rectangle with height equal to twice the width, (2) a square, and (3) a circle (see figures).



4. (25%)

A cantilever beam  $AB$  is subjected to a concentrated load  $P$  and a couple  $M_0$  acting at the free end (see figure). Obtain formulas for the angle of rotation  $\theta_B$  and the deflection  $\delta_B$  at end  $B$ .

