

科目：材料力學 適用：土木系(結構與應力組)

編號：452

考生注意：

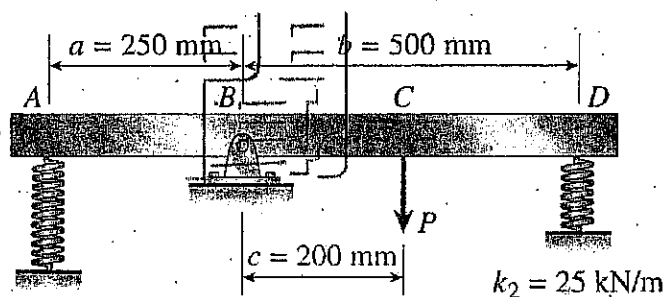
1. 依次序作答，只要標明題號，不必抄題。
2. 答案必須寫在答案卷上，否則不予計分。
3. 限用藍、黑色筆作答；試題須隨卷繳回。

本試題

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- (1) A rigid bar  $ABCD$  is pinned at point  $B$  and supported by springs at  $A$  and  $D$  (see Figure 1). The springs at  $A$  and  $D$  have stiffnesses  $k_1 = 10 \text{ kN/m}$  and  $k_2 = 25 \text{ kN/m}$ , respectively, and the dimensions  $a$ ,  $b$ , and  $c$  are 250 mm, 500 mm, and 200 mm, respectively. A load  $P$  acts at point  $C$ . If the angle of rotation of the bar due to the action of the load  $P$  is limited to  $3^\circ$ , what is the maximum permissible load

 $P_{\max}$ . (25%)Figure 1  $k_1 = 10 \text{ kN/m}$ 

- (2) For a triangle shown in Figure 2, determine (a) the moment of inertia  $I_x$  (12%), and (b) the moment of inertia  $I_y$  (13%).

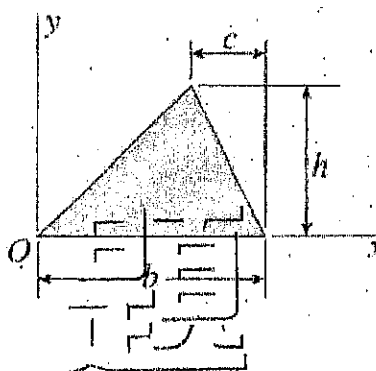


Figure 2

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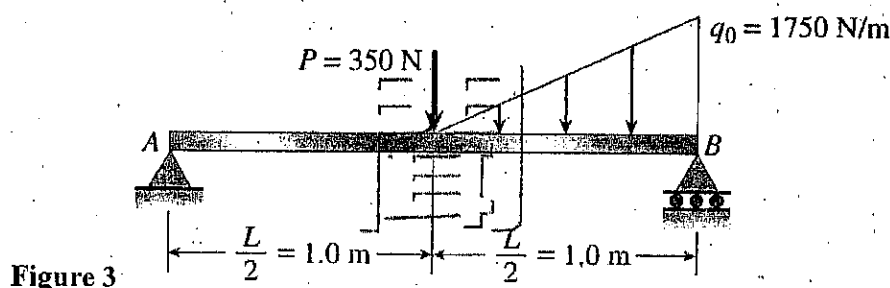
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- (3) The simple beam  $AB$  supports a triangular load of maximum intensity  $q_0 = 1750 \text{ N/m}$  acting over one-half of the span and a concentrated load  $P = 350 \text{ N}$  acting at midspan (see Figure 3). Draw (a) the shear force diagram (12%), and (b) the bending moment diagram for this beam (13%).



- (4) The fixed-end beam  $AB$  of length  $L$  is subjected to a uniform load of intensity  $q$  acting over the middle region of the beam (see Figure 4). Determine (a) the reaction  $M_A$  (10%), and (b) obtain the equation of the deflection curve (15%).  $EI$  is constant.

