

國立成功大學

112學年度碩士班招生考試試題

編 號：97

系 所：土木工程學系

科 目：結構學

日 期：0206

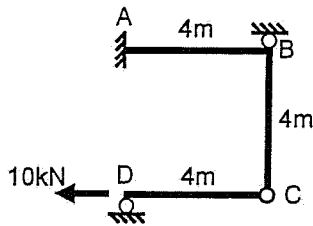
節 次：第 2 節

備 註：可使用計算機

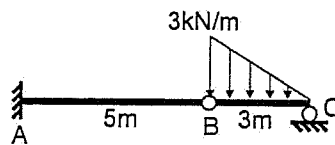
※ 考生請注意：本試題可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

1. Draw the bending moment diagrams for the following structures. Draw the bending moment on the compression side, and mark the values and locations when peak bending moment occurs. (10% each)

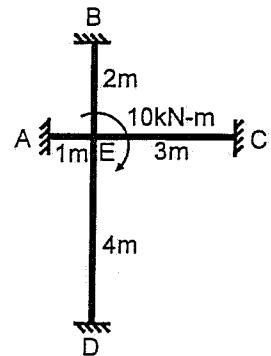
(a)



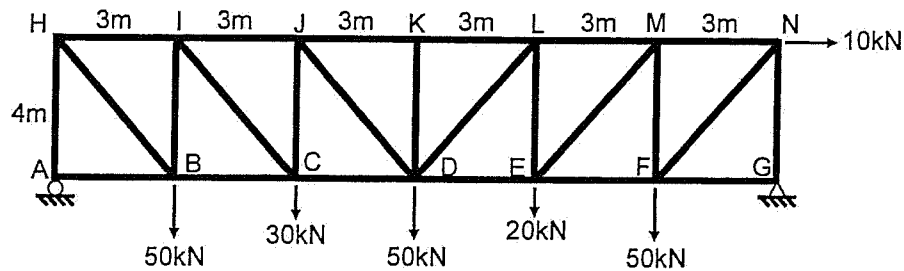
(b)



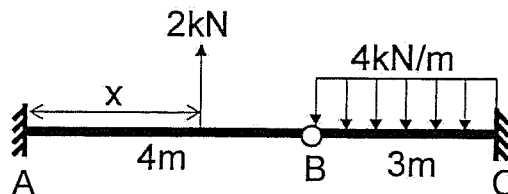
(c)



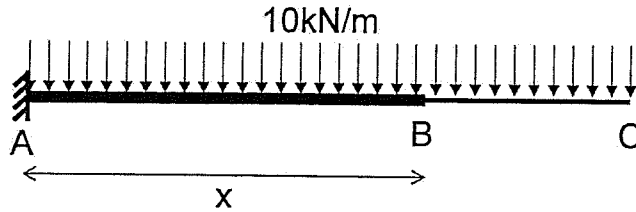
2. For the TRUSS structure shown below, compute the vertical displacement of Point D considering the elements BH, IC, JD are 10mm too short due to fabrication error. All elements have the same E (Young's modulus), A (element cross-sectional area), and I (moment of inertia), use E , A , and I to express your answer. (15%)



3. Determine the value of x so that the amounts of rotations at the left and right sides of Point B are the same. The cross-sectional properties of segments AB and BC are the same. (15%)



4. Consider the cantilever beam AC with a span equal to 5m shown below, determine the minimum value of x so that the deflection at Point C is smaller than 5mm. The flexural stiffness of AB and BC segments are $5EI$ and EI , respectively. $E=200$ GPa, $I=400 \times 10^6 \text{mm}^4$ (20%)



5. Consider the TRUSS structure shown below, compute horizontal and vertical displacements of Point B and the displacement of Point A in the direction parallel to the roller support surface. Construct the stiffness matrices of elements 1, 2, and 3 first, then form the system stiffness matrix. All elements have the same Young's modulus of E , cross-sectional area of A , and moment of inertia of I . Use E , A , and I to express your answer. (20%)

