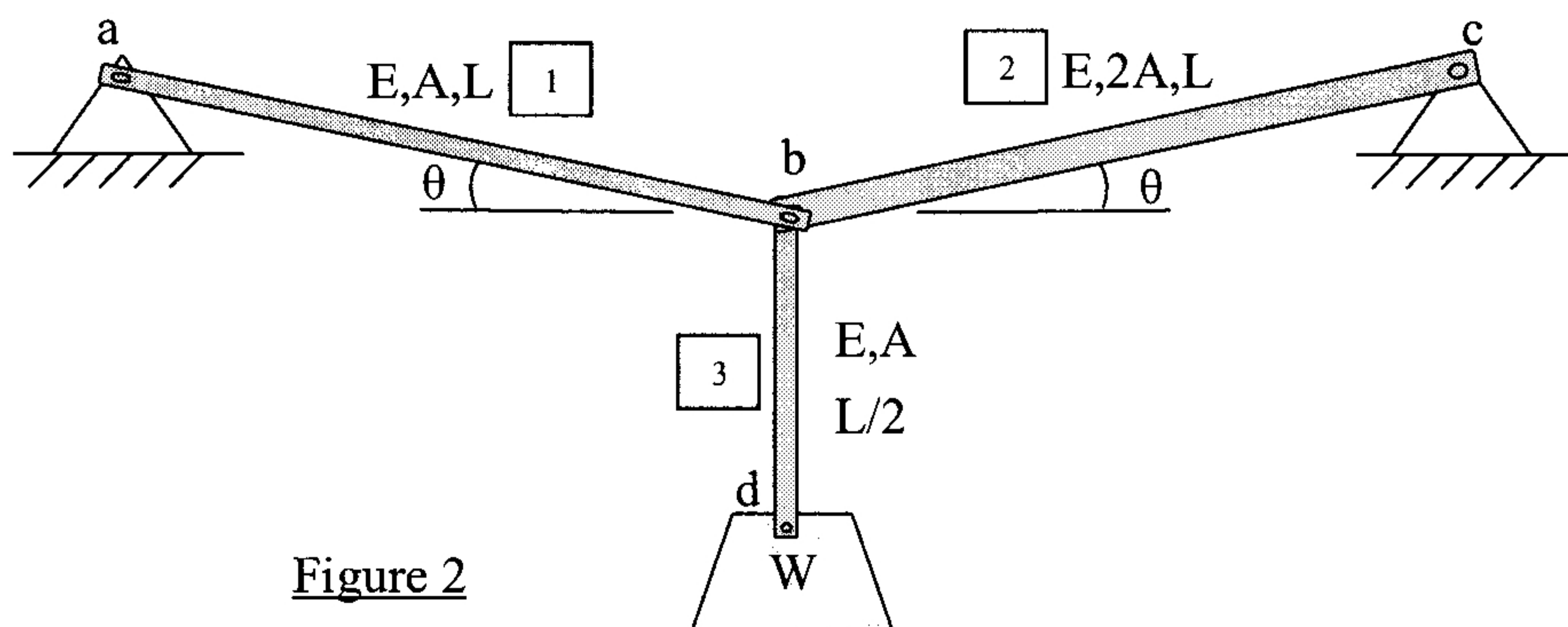
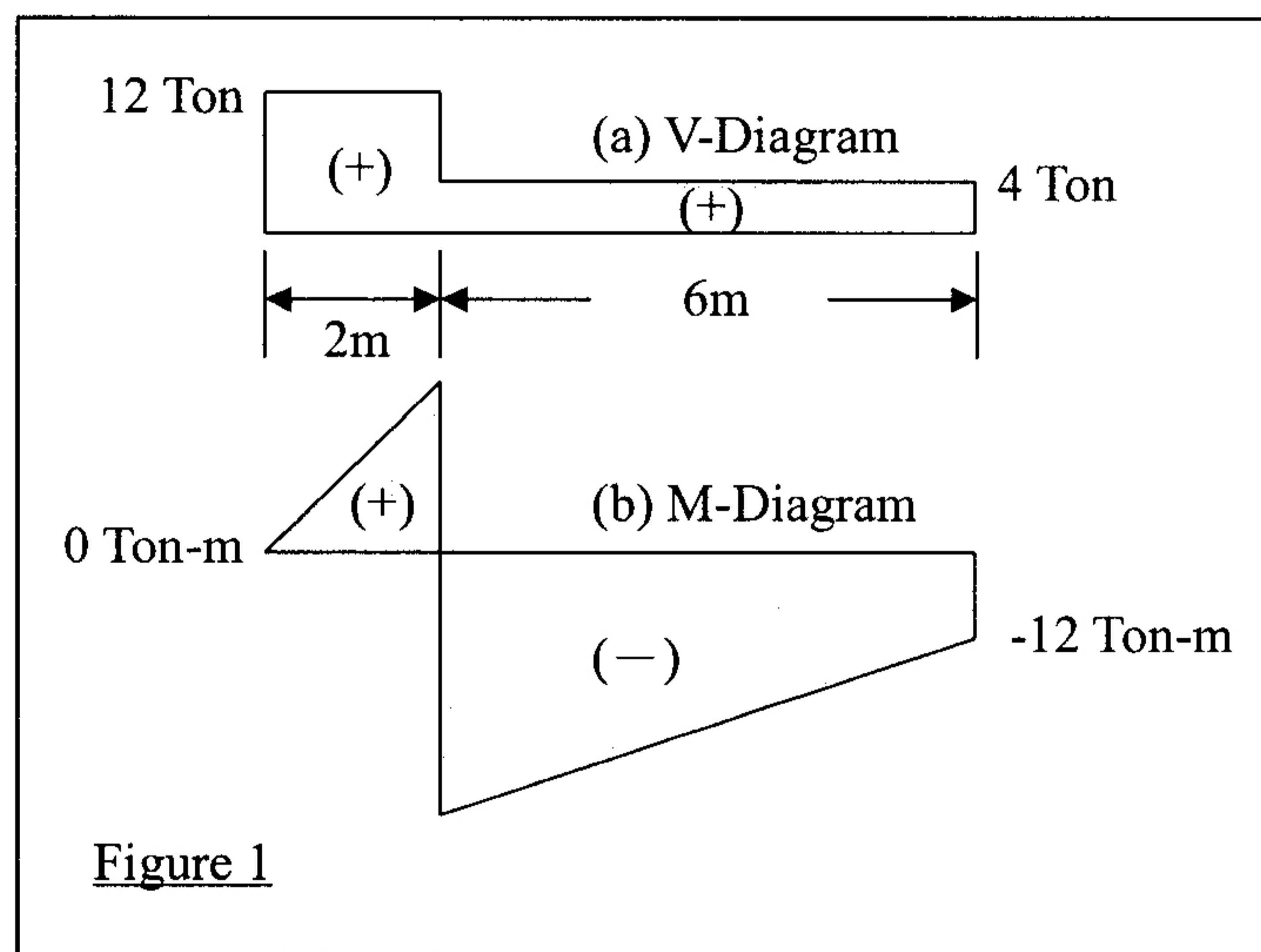


國立高雄大學九十七學年度研究所碩士班招生考試試題

科目：材料力學
 考試時間：100 分鐘
 系所：土木與環境工程學系碩士班土木工程組
 是否使用計算機：是
 本科原始成績：100 分

1. The shear force and bending moment diagrams of a beam are shown in Figure 1. Please determine the external loads (including forces and bending moments) that result in such diagrams (20%). Please define your own appropriate positive sign convention.
2. Members 1 and 2 supported by two hinges a and c, respectively are identical and rest at an angle θ with the horizontal line before loaded at the joint b (Figure 2). Member 3 is vertical with the upper end pinned at the joint b. A block of W in weight is hooked up at the free end of member 3 and released slowly so that the weight is fully supported by member 3 while a gravitational force is pulling the block downward. All three members are deformable with the same cross sectional area A and material property E except that member 2 has a double size cross section area, 2A. The self weights of the members are negligible. What is the vertical deflection at joint b after the weight is hooked up (10%)? What is the horizontal deflection of the block (10%)? What are the internal forces of these three members (10%)?



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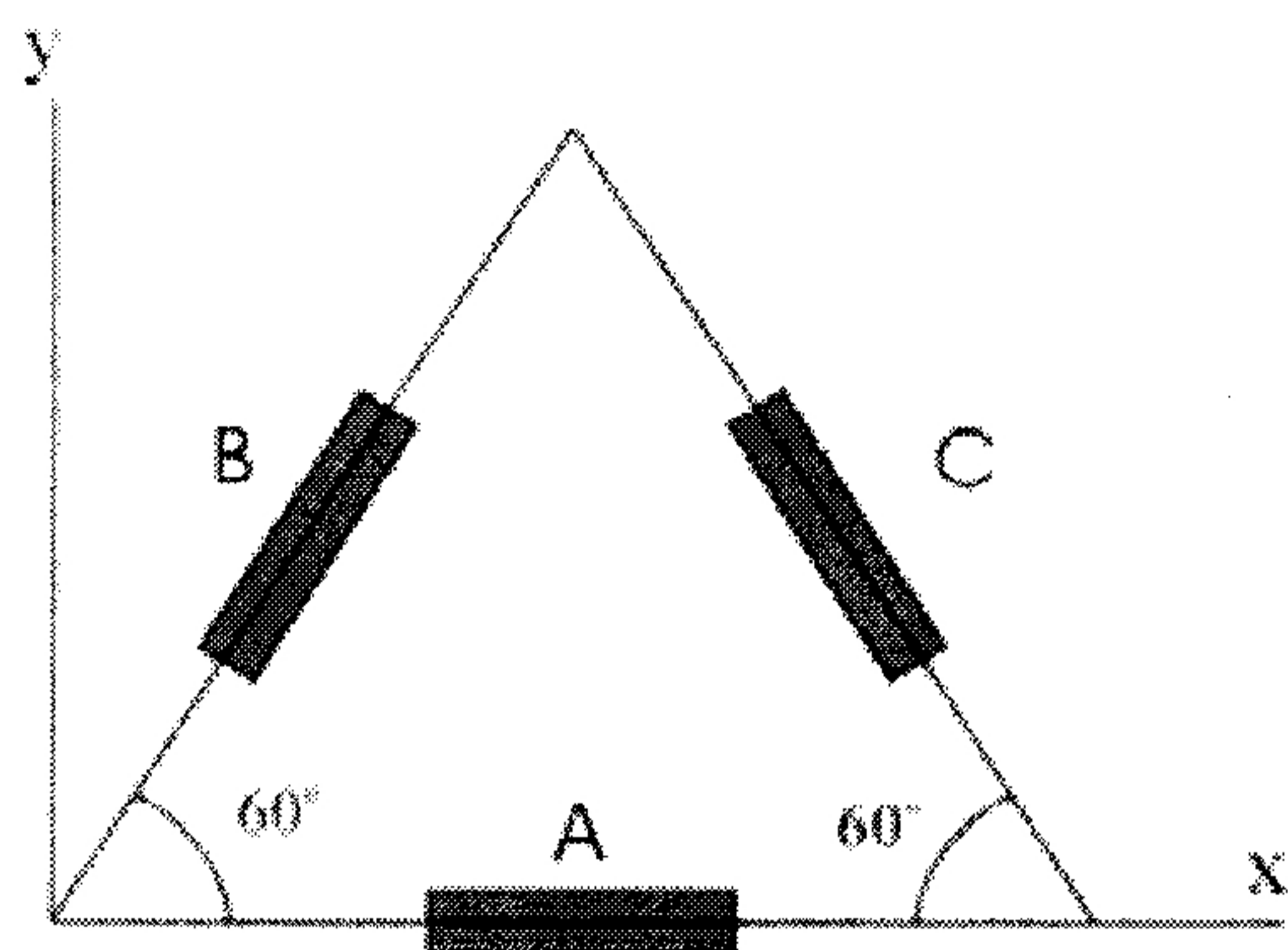
土木與環境工程學系碩士班土木工程組

是否使用計算機：是

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3. 一組應變計貼於元件表面，量得應變分別為 $\epsilon_A = 200 \times 10^{-6}$ ， $\epsilon_B = 500 \times 10^{-6}$ ， $\epsilon_C = 800 \times 10^{-6}$ 。

- (1) 試求此元件之應變 ϵ_x 、 ϵ_y 及 γ_{xy} 。(10%)
- (2) 試求此元件之主應變大小及其方向。(10%)



4. 一金屬塊放置於二道平行牆之間，如下圖所示。金屬在 z 方向不受束制可自由延伸(平面應力狀況)。一均佈壓力 5 MPa 作用於上下兩端。金屬塊之彈性模數 $E = 195 \text{ GPa}$ ，柏松比 $\nu = 0.25$ ，試求：

- (1) 中心點 c 所受之正應力 σ_x (10%)
- (2) 中心點 c 之正應變 ϵ_y (10%)
- (3) 金屬塊之體積應變 ϵ_v (10%)

