

# 淡江大學 105 學年度碩士班招生考試試題

22-1

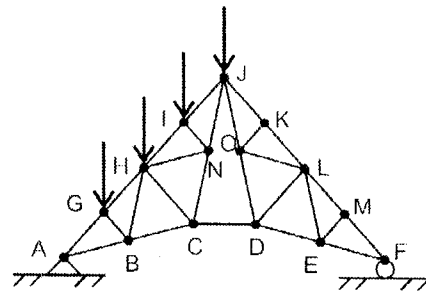
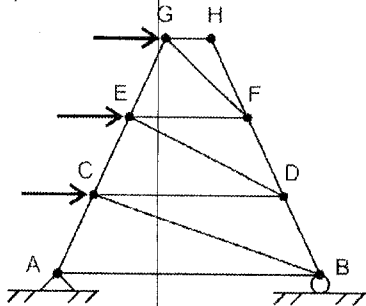
系別：土木工程學系 A 組

科目：結構學 (含工程力學)

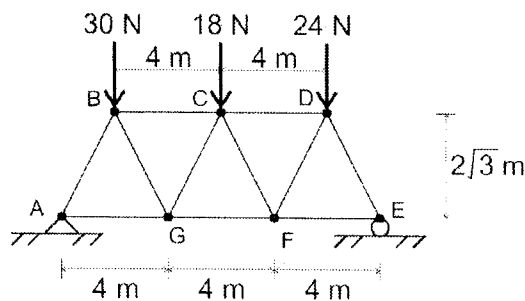
考試日期：3月5日(星期六) 第2節

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1. Please identify zero-force members in the two truss systems show in figure (a) and figure (b).  
 (a) (10%) (b) (15%)

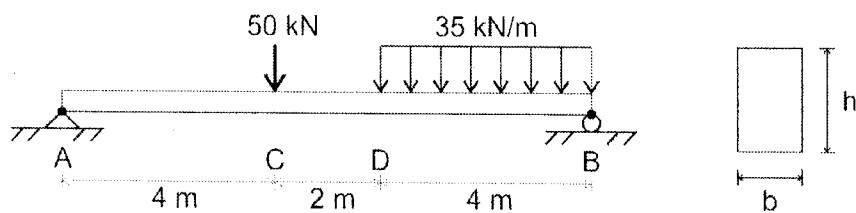


2. (25%) Please use the principle of virtual work to determine the vertical displacement at the joint G of the truss shown below. The Young's modulus and the cross-section are 210 GPa and 750 mm<sup>2</sup> respectively.



3. A beam is loaded and supported as shown in the figure. The cross section of the beam is rectangular with width  $b = 0.30$  m and height  $h = 0.45$  m presented in the figure below as well. The beam is adequately supported against sideways buckling.

- (1) (10%) Please draw shear and bending moment diagrams of the beam and provide the complete information of the shear force and bending moment values in these two diagrams.  
 (2) (15%) Please find the maximum tensile and compressive stresses in the beam.



4. (25%) Please apply the slope-deflection method to draw the moment diagram of the frame with the support at A, which has the rotation angle  $\theta_A$  of 0.0016 rad clockwise shown in the following figure. The multiplication of Young's modulus  $E$  and the area moment of inertia  $I$  is 10000 kips-ft<sup>2</sup>. The area moments of inertia of member AB and member BC are  $I$  and  $2I$  respectively.

