國立嘉義大學九十七學年度

土木與水資源工程學系碩士班(甲組)招生考試試題

科目：工程力學

說明：1. 如有條件不足之情形，請自行假設。
　　2. 僅可使用試務單位提供之計算機。

1. The support assembly shown is bolted in place at B, C, and D and supports a downward force **P** at A, as Fig-1. Knowing that the forces in members AB, AC, and AD are directed along the respective members and that **P** = 200 N, determine the forces in the members. (20%)

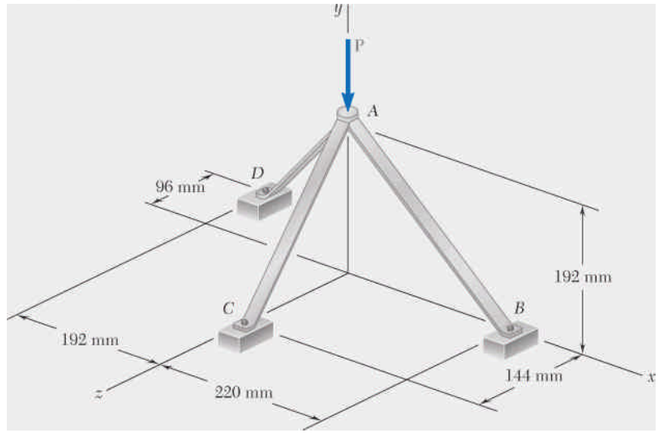

Fig- 1

2. From the beam system as Fig-2 shown,

①derive relationship form $\frac{dV}{dX} = -\omega$ between distribution load ω and shear force **V**, (10%)

②derive relationship form $\frac{dM}{dX} = V$ between shear force V and moment M. (10%)

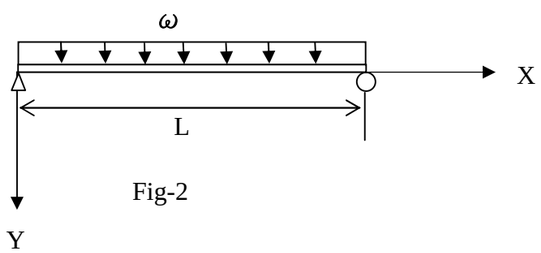

Fig-2

3. Draw the shear and bending-moment diagrams for the beam AB as Fig-3 shown, and determine the maximum absolute values of the shear and bending moment. (20%)

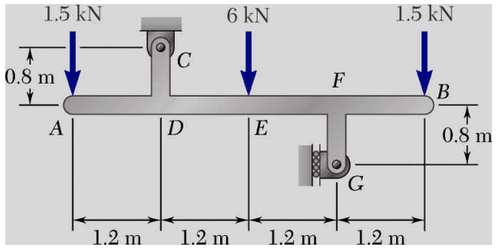

Fig-3

4. Rectangular plate OABC (40cm × 60cm) deforms to OA'B'C' as Fig-4 shown.

①Determine the components of **strains** ε_{xx}, ε_{yy}, γ_{xy}. (10%)

②Determine the principal strain and the direction of principal strain. (10%)

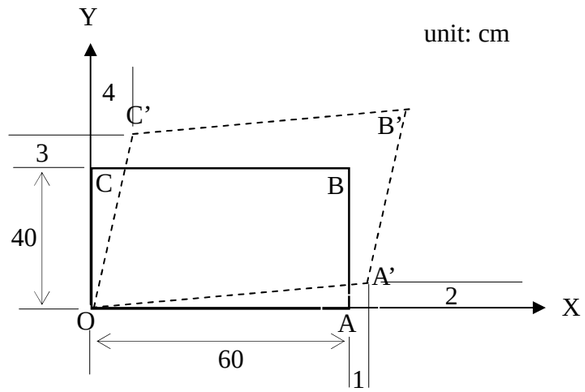

Fig-4

5. A laminated wood beam on simple supports is built up by gluing together tree 2-in × 4-in boards to form a solid beam in cross section as Fig-5 shown. The allowable shear stress in the glued joints is 65 psi and the allowable bending stress in the wood is 1800 psi. If the beam is 6- ft long, what is the allowable load P acting at the midpoint of the beam? (Disregard the weight of the beam) (20%)

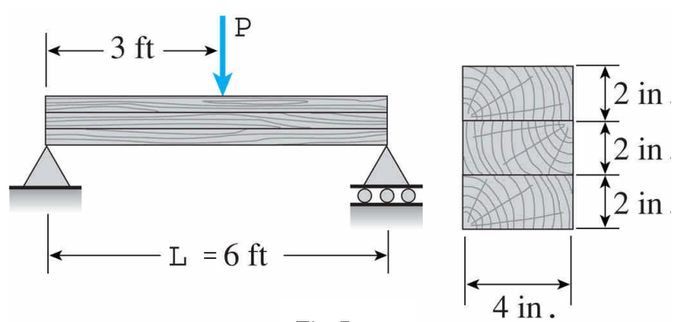

Fig-5