

國立嘉義大學九十四學年度 土木與水資源工程學系碩士班招生考試試題

科目：工程力學

(如有條件不足之情形，請自行假設。僅可使用學校提供之計算機)

1. A box beam supports the loads shown in Fig.-1. Compute the maximum value of P that will not exceed a flexural stress $\sigma = 1000$ psi or a shearing stress $\tau = 100$ psi. (20%)

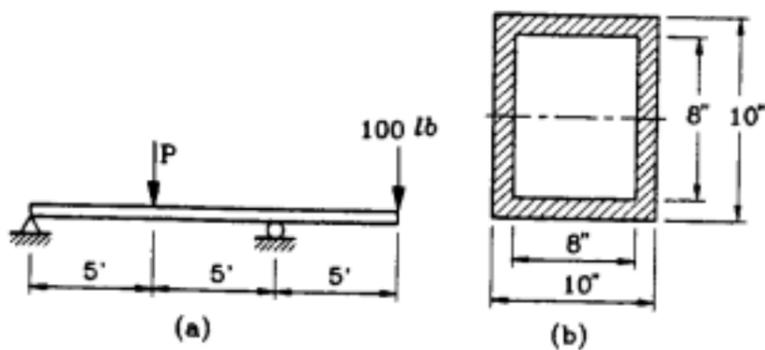


Fig.-1

2. For the block ($10\text{cm} \times 8\text{cm} \times 5\text{cm}$), as shown in Fig.-2, determine the strain-energy density and the strain energy. Use $E = 200 \times 10^3$ Mpa and $\nu = 0.3$. (20%)

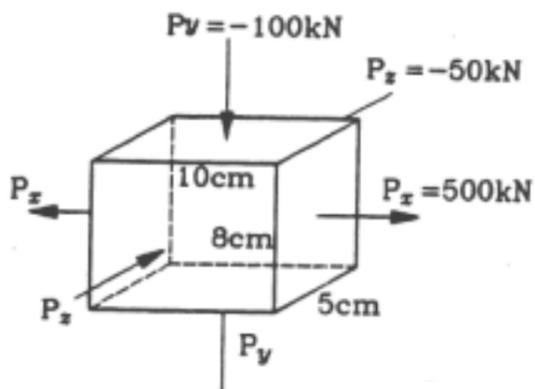


Fig.-2

3. A square pillar is subjected to a compressive force $P = 3500$ kN and a bending moment $M = 85$ kN-m (see Fig.-3). What is the required dimension b of the pillar if the allowable stresses are 18 Mpa compression and 6 Mpa tension? (Disregard the weight of the pillar itself.) (20%)

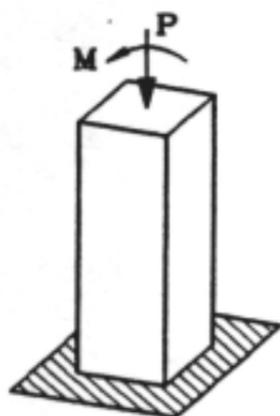


Fig.-3

4. A simple beam AB supports a uniform load of intensity $q = 2.0$ KN/m over a portion of the span as shown in Fig.-4. Draw the shear-force and bending-moment diagrams for this beam. (20%)

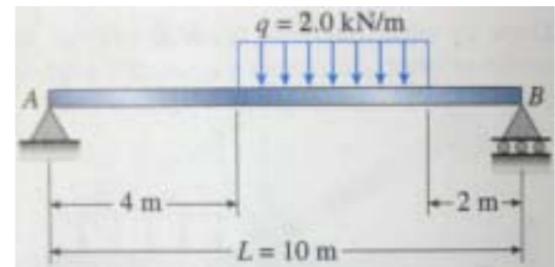


Fig.-4

5. Derive the equation of the deflection curve for a simple beam AB loaded by a couple M_0 at the left-hand support as shown in Fig.-5. (15%) Also, determine the maximum deflection δ_{\max} . (5%)

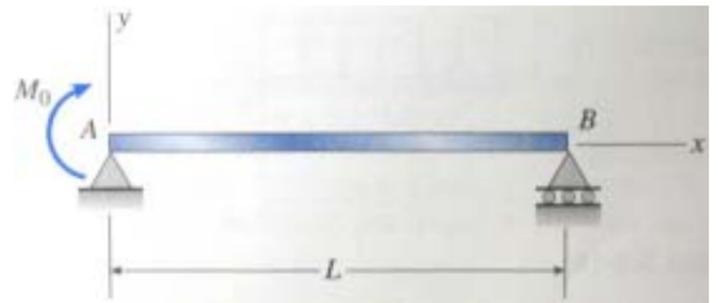


Fig.-5