

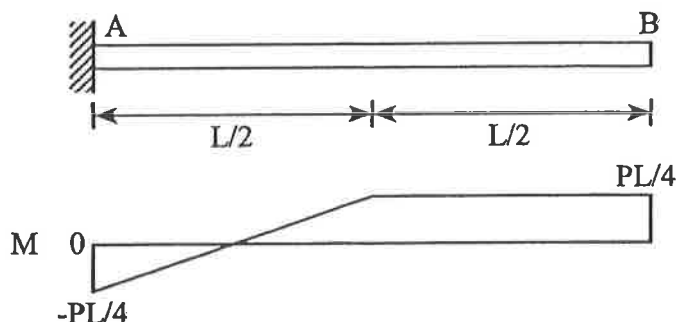
臺灣綜合大學系統 106 學年度學士班轉學生聯合招生考試試題

科目名稱	材料力學	類組代碼	D09
		科目碼	D0993

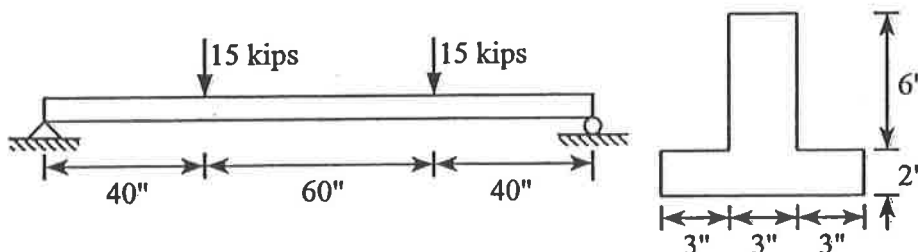
※本項考試依簡章規定各考科均「不可以」使用計算機

本科試題共計 2 頁

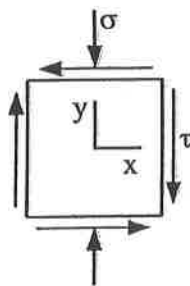
1. A cantilever beam has a moment diagram shown below. Draw the shear-force and load diagrams for the beam. (20%)



2. Two vertical forces are applied to a beam of the cross section shown. Determine the maximum tensile and compressive stresses in the beam. (20%)



3. (a) A linearly isotropic element (modulus of elasticity E , Poisson's ratio ν) is subjected to triaxial stresses $\sigma_x = \sigma_y = \sigma_z = \sigma_0$. Let the bulk modulus of elasticity of the element be $K = \sigma_0 / e$, where e is the unit volume change of the element. For small strain condition, find the expression for K in terms of E and ν . (b) If an element is subjected to plane stresses shown below, find the unit volume change e of the element using small strains assumption. (20%)



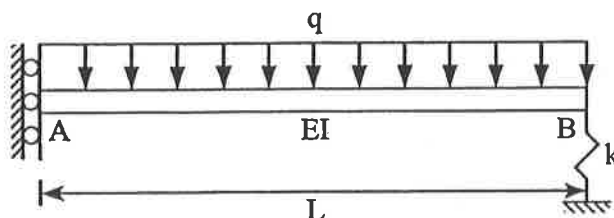
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4. A beam with a uniform load has a sliding support at end A and a spring support (stiffness $k = 48EI/L^3$) at end B. (i) Use the shear-force differential equation $Elv'''(x) = V(x)$ to obtain the equation of the deflection curve. (ii) Determine the angle of rotation at support B. (20%)



5. What are the critical buckling loads P_{cr} for the following columns. Assume all columns have the same EI. (20%) (You are not supposed to carry out a lot of calculations)

