淡江大學九十四學年度碩士班招生考試試題 61-1

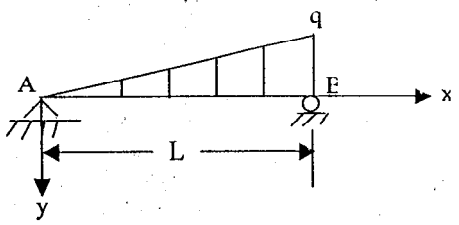
系別：土木工程學系　　科目：材 料 力 學

准帶項目請打「V」	
V	簡單型計算機

本試題共 壹 頁

[1]. Derive the equation of the deflection curve for a simple beam carrying the loads as shown in the figure. Solve the problem with the four-order differential equation. Denoting the distance from end A of the beam to the point of maximum deflection by Xd, find the value of Xd. (25%)

EI=const.



[2]. In plane stress problem, an element is submitted to the stress

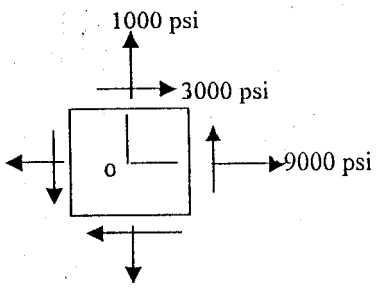
σx= 9000 psi

σy= 1000 psi

τxy = 3000 psi as shown in figure

(a). Determine the principal stress and show them on a sketch of a properly oriented element.

(b). Determine the maximum shear stress and show them on a sketch of a properly oriented element. (25%)



[3]. Part A

Normal stresses in beams (linearly elastic materials), derive the formula:

$\Sigma x = \sigma x = -E\kappa y$

Given: $\kappa = 1/\rho = d\theta/dx$

Part B

Shear stress formula in a rectangular beam, derive the formula:

$\tau = (VQ)/(I\,b)$

You may solve the problem by choosing either Part A or Part B.

(25%)

[4]. Explain briefly the following terminologies:

(a). shear center (6%)

(b).strain energy (7%)

(c). shape factor (6%)

(d). plastic moment Mp (6%)