

大葉大學 九十三年 學年度 研究所碩士班 招生考試試題紙

系所別	組別	考試科目 (中文名稱)	考試日期	節次	備註
機械工程研究所碩士班	甲	材料力學	3月28日	第三節	1. 可使用不可攜式計算機 2. 共2頁

註：考生可否攜帶計算機或其他資料作答，請在備註欄註明（如未註明，一律不准攜帶） 13:30 ~ 15:00

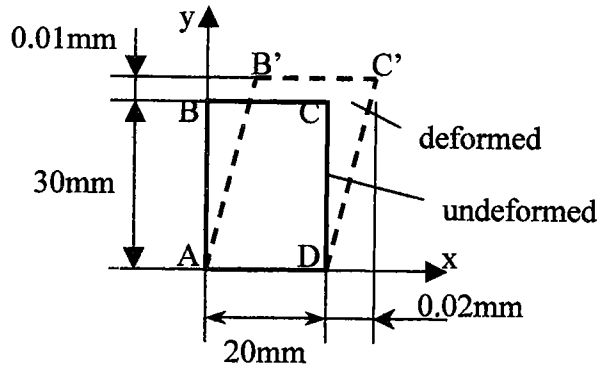
「詳列計算步驟否則一概不計分」，每大題配分25%。

一、A rectangular piece of material ABCD is deformed into the dashed configuration AB'C'D.

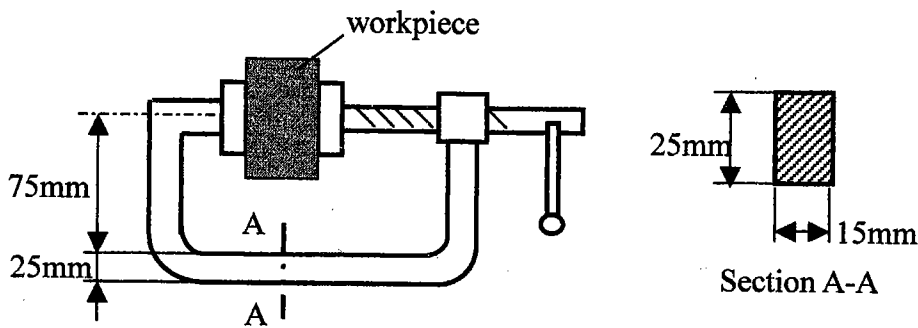
Determine

- the normal strain  $\epsilon_x$  at A;
- the normal strain  $\epsilon_y$  at B
- the shear strain  $\gamma_{xy}$  at C
- the shear stress applied to AB'C'D if

$$E=200GPa, \nu=0.3$$



二、



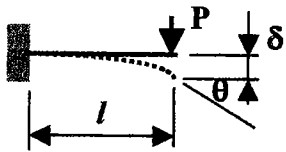
The C-clamp is exerting a gripping force of 1000N upon the workpiece. The horizontal portion of the clamp has a rectangular cross-section of dimensions 25mm x 15mm as shown.

- Determine the maximum normal stress on the horizontal portion (Section A-A) of the clamp.
- Draw the Mohr's circle of (a) and calculate the maximum shear stress.

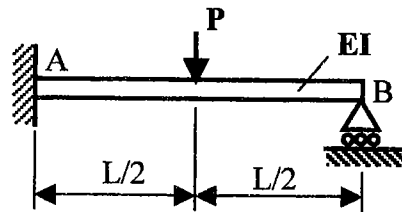
三、The statically indeterminate beam is subjected to a central loading P.

- Find the reactions at A and B;
- Plot the shear diagram and bending diagram of the beam AB.

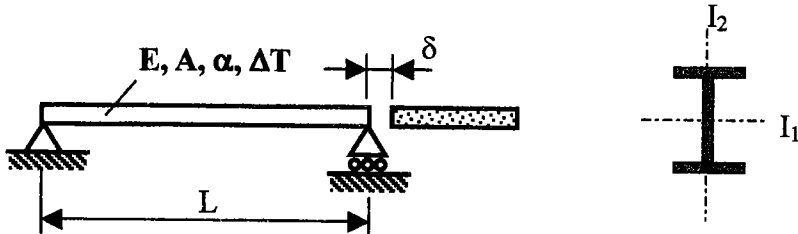
Hint:



$$\delta = \frac{Pl^3}{3EI}, \quad \theta = \frac{Pl^2}{2EI}$$



四、



The I-beam of the railway is supposed to be in simply supported boundary condition. During the summer season, the temperature of the I-beam can subject to a temperature rise of  $\Delta T$ . Find the required clearance  $\delta$  in order to avoid buckling of the beam due to  $\Delta T$ . (Note:  $I_1 > I_2$ )