

大葉大學 95 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	4 月 23 日	第 三 節	不可使用 計算機

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

二. 吳乙真

本試卷共四題，每題配分 25 分；請詳列計算步驟，否則不予計分

- A rigid beam AB rests on two short posts shown in Fig. P1. AC is made of aluminum and has a diameter of 50 mm, and BD is made of steel and has a diameter of 25 mm. Determine the displacement of point F on AB if a vertical load of 120 kN is applied over this point. Take $E_{steel} = 200 \text{ GPa}$, $E_{aluminum} = 70 \text{ GPa}$.
- A flag pole of solid circular cross section is subjected to a horizontal force of 2 kN. The length of the pole is 3 m and the allowable stress is 500 MPa in bending and 200 MPa in shear. Determine the minimum required diameter of the pole based on:
 - the allowable bending stress and,
 - the allowable shear stress.

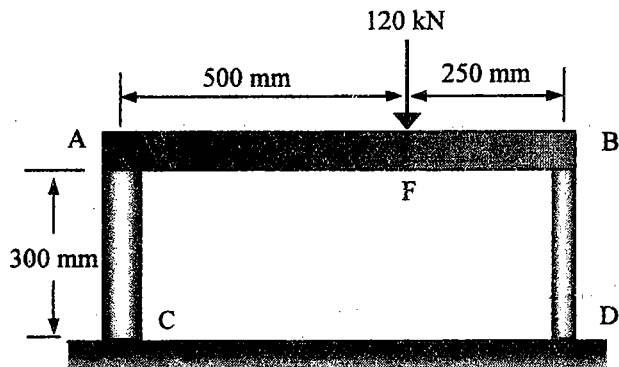


Fig. P1

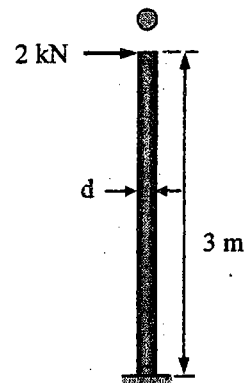


Fig. P2

- An axial force of 1000 N and a torque of 5 N-m are applied to the shaft as shown in Fig. P3. If the shaft has a diameter of 50 mm, determine
 - the principal stresses at point P,
 - the maximum shear stress at point P.
 P is a point on the shaft surface.
- A simply supported beam AB is subjected to a concentrated force P at its mid-span C, as shown in Fig. P4. Determine the angle of rotation θ_A at end A using *energy method*.

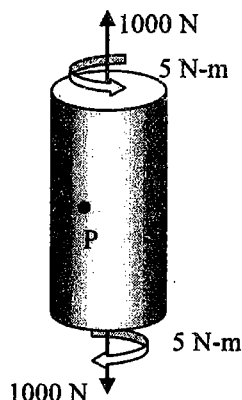


Fig. P3

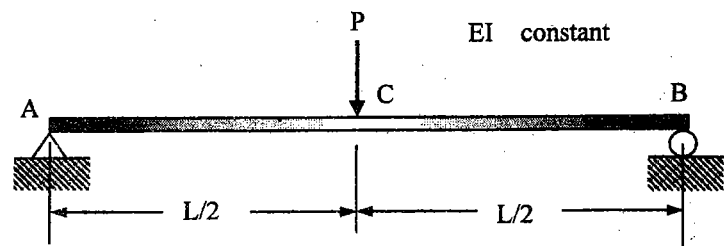


Fig. P4