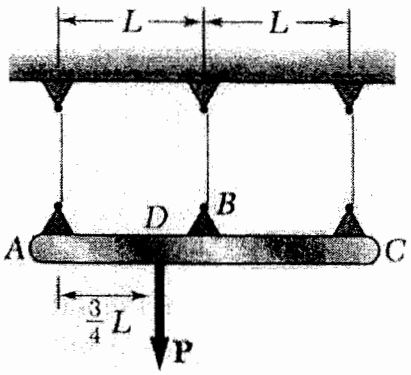
系所組別：工程科學系在職專班乙組

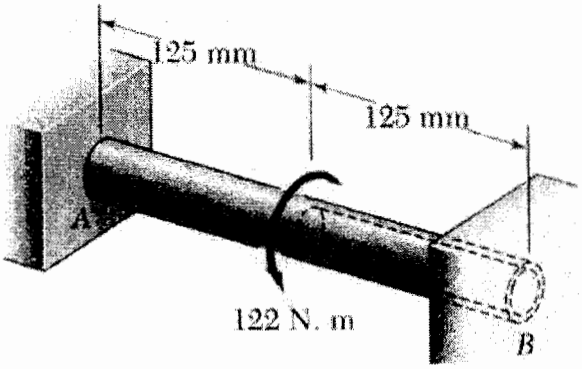
考試科目：材料力學(專班)　　考試日期：0222，節次：3

※ 考生請注意：本試題不可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

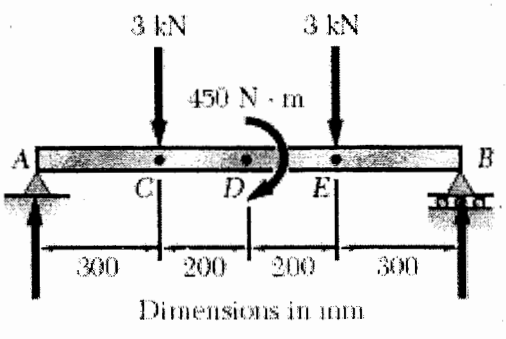
1. (20pts) The rigid rod ABC is suspended from three wires of the same material. The cross-sectional area of the wire at B is equal to half of the cross-sectional area of the wires at A and C. Determine the tension in each wire caused by the load **P**.




2. (20pts) A circular shaft AB consists of a 250 mm long, 22 mm diameter steel cylinder, in which a 125 mm long, 16 mm diameter cavity has been drilled from end B. The shaft is attached to fixed supports at both ends, and a 122 N·m torque is applied at its midsection. Determine the torque exerted on the shaft by each of the supports.




3. (20pts) Draw the shear and bending-moment diagrams for the beam and loading shown, and determine the maximum absolute value (a) of the shear, (b) of the bending moment.




**(背面仍有題目,請繼續作答)**

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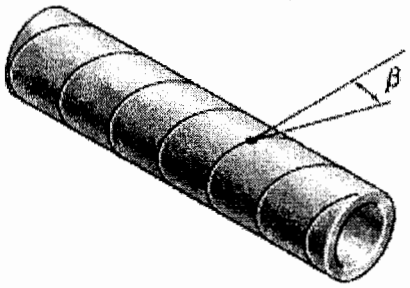
4. (20pts) The pipe shown has an outer diameter of 600 mm and was fabricated by welding strips of 10-mm-thick plate along a helix forming an angle $\beta = 25°$ with a transverse plane. Knowing that the ultimate normal stress perpendicular to the weld is 450 MPa and that a factor of safety of 6.0 is desired, determine the largest allowable gage pressure that can be used. ($\sin 50° = 0.766$, $\cos 50° = 0.643$)




5. (20pts) Determine the reaction at the roller support for the beam and loading shown.