

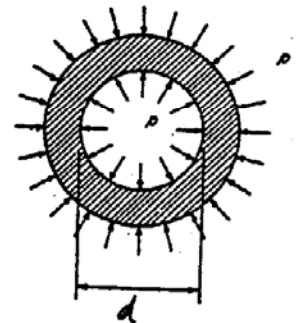
國立臺灣科技大學  
八十八學年度碩士班招生考試試題

系所別：機械工程系研究所

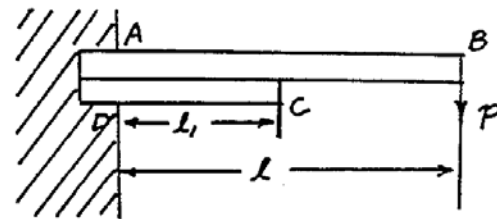
組別：甲、乙組

科目：材料力學

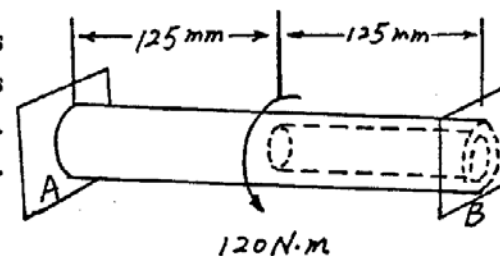
1. A steel spherical shell with Young's modulus  $E$  and Poisson's ratio  $\nu$  is subjected to a uniform inner and outer pressure  $p$ . Find the reduction  $\delta$  of the inner diameter. (25%)



2. A cantilever  $AB$ , loaded at the end  $B$ , is supported by a shorter cantilever  $CD$  of the same cross section as cantilever  $AB$ . Determine the pressure  $X$  between the two beams at  $C$ . (25%)



3. A circular shaft  $AB$  consists of a 250 mm long, 20 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 120 N·m torque is applied at its midsection. Determine the torque exerted on the shaft by each of the supports. (25%)



4. A rectangular frame of uniform cross section is submitted to a uniformly distributed load of intensity  $p$ . Determine the bending moments  $M$  at the corners. (25%)

