題號： 306
科目： 材料力學(D)
節次： 2

國立臺灣大學 111 學年度碩士班招生考試試題

題號：306

共 1 頁之第 1 頁

1. (20 Points) The spherical pressure vessel has an inner diameter of 2 m and a thickness of 10 mm. A strain gage having a length of 20 mm is attached to it, and it is observed to increase in length by 0.012 mm when the vessel is pressurized. Determine the pressure causing this deformation, and find the maximum in-plane shear stress, and the absolute maximum shear stress at a point on the outer surface of the vessel. The material is steel with Young's modulus of 200 GPa and Poisson's ratio of 0.3.

2. (20 Points) The rubber block is confined in the U-shape smooth rigid block. If the rubber has a modulus of elasticity E and Poisson's ratio v, determine the effective modulus of elasticity of the rubber under the confined condition.

3. (20 Points) The bearing pin supports the load of 3.5 kN. Determine the stress state in the support member at point B. The support is 12 mm thick.

4. (20 Points) Determine the displacement at pully B. The steel shaft with Young's modulus of 200 GPa has a diameter of 30 mm.

5. (20 Points) The T-beam is nailed together as shown. If the nails can each support a shear force of 4.5 N, determine the maximum shear force V that the beam can support and the corresponding maximum nail spacing s to the nearest multiples of 5 mm. The allowable shear stress for the wood is 3 MPa.
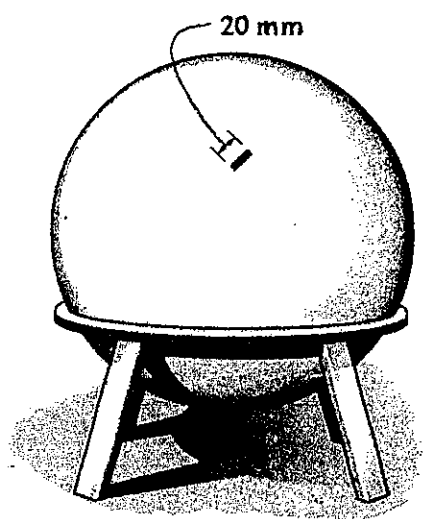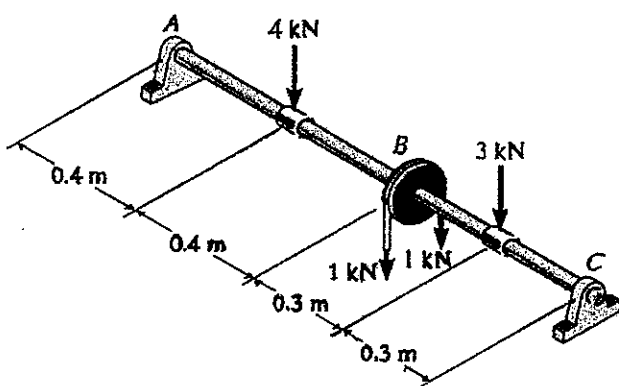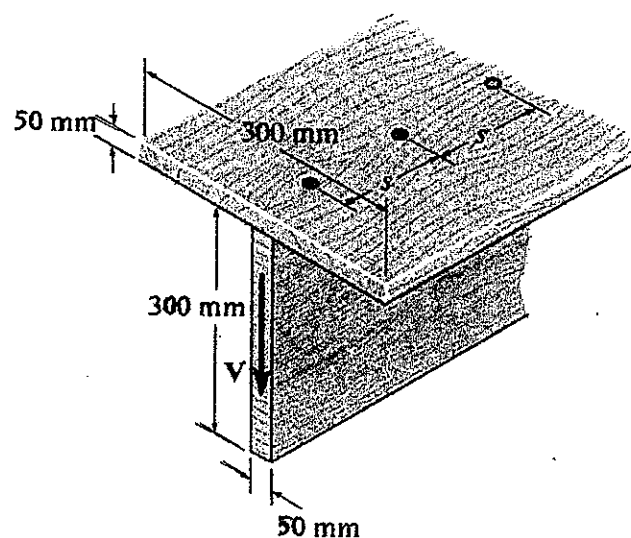

Problem 1
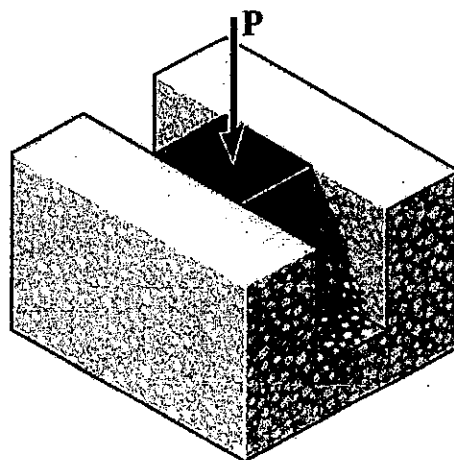
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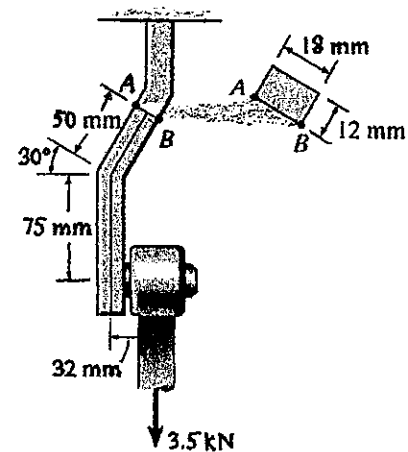
Problem 3

Problem 4

Problem 5

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