

國立中正大學九十學年度碩士班招生考試試題

系所別：機電光整合工程研究所

科目：材料力學

1. The rod shown in figure 1 has cross-sectional area of 40 m^2 . It is attached to the fixed wall at A, and before it is loaded there is a gap between the wall at B and the rod 0.001 m .
 - (a) Determine the reactions at A and B if the rod is subjected to an axial force of $P = 70 \text{ kN}$ at C as shown, the elastic modulus of the rod is $E = 100 \text{ kpa}$.
 - (b) Determine the maximum force of P so that the rod did not contact with wall at B.

(25 %)

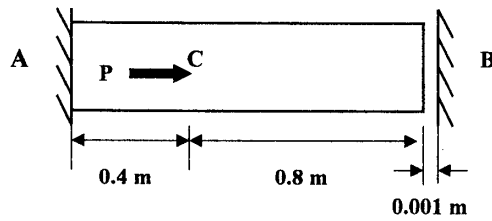


Figure 1.

2. The beam is made of a material having an allowable bending stress of $(\sigma_{\text{allow}})_c = 5 \text{ kpa}$ in compression and $(\sigma_{\text{allow}})_t = 15 \text{ kpa}$ in tension. The cross section of the beam is a T type with the moment of inertia $I = 2/3 \text{ m}^4$ and the centroid of cross section C shown in figure 2.
 - (a) Determine the magnitude of the maximum loads P that can be applied to the beam.
 - (b) Calculate the maximum tensile stress and the maximum compressive stress on the cross section, also plot the bending stress distribution on this cross section.

(25 %)

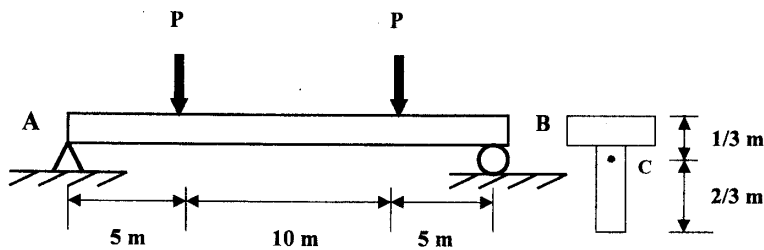


Figure 2

艾子貞 p1

國立中正大學九十學年度碩士班招生考試試題

系所別：機電光整合工程研究所

科目：材料力學

3. The state of stress in a point of material is shown in Fig.3. Determine the direction and magnitudes of the principal stresses. (25%)

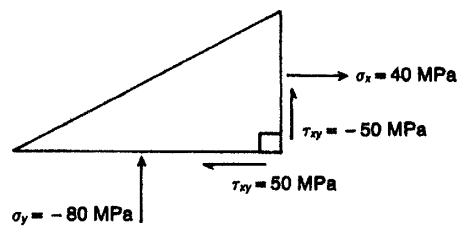


Fig.3 Stress acting at a point

4. The beam shown in Fig.4 is fixed at one end and loaded at the other end with a transverse load P and a torque T . Neglecting the inaccuracies in the stress formulations at the support end, determine the state of stress at point A , B , C , and D . [$I_z = \pi d^4/64$] (25%)

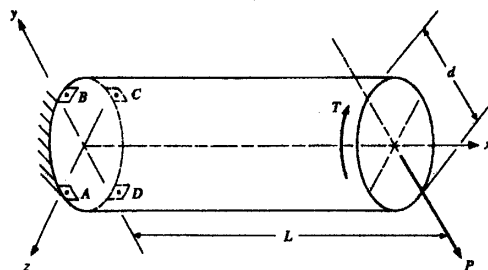


Fig.4