

淡江大學八十七學年度日間部轉學生入學考試試題

系別：航太工程學系三年級

科目：工程力學 (含靜力學、材料力學)

本試題共 1 頁

1. Find the longitudinal strain on the upper surface of the cantilever beam at point *A* as shown in *Figure 1*. Use $9.0 \times 10^6 \text{ lb/in}^2$ for the modulus of elasticity. (20%)
2. The solid steel shaft *AB* is to be used as a torsion bar. Bar *BC* is a rigid horizontal member. Specifications require that a 2500 pound force *P* at *C* is to cause no more than a 0.9 inch vertical deflection of point *C* as shown in *Figure 2-1*. Find the minimum required diameter of the bar *AB*. Bearing will ensure that the bar *AB* will be in pure torsion. Use $12 \times 10^6 \text{ lb/in}^2$ for the modulus of rigidity. Hint: As shown in *Figure 2-2*, what is ϕ ? (20%)

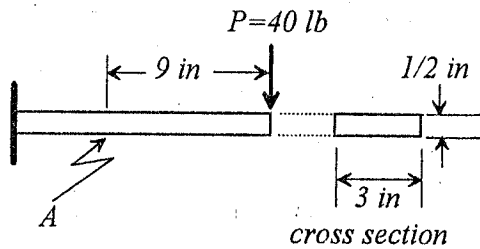


Figure 1.

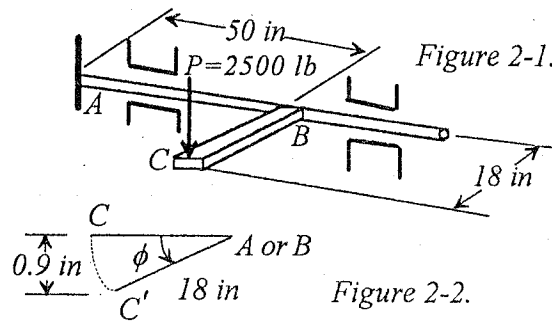


Figure 2-2.

3. Find the centroid of the semicircle (arc) as shown in *Figure 3*. (20%)

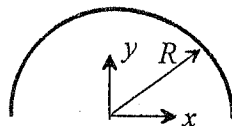


Figure 3.

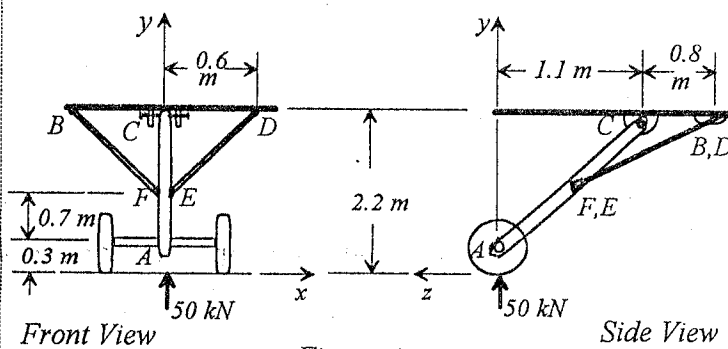


Figure 4.

4. The struts *BF* and *ED* in *Figure 4* are connected to the continuous member *AC* by ball-and-socket joints. The resultant force on the two wheels is $50 \uparrow \text{ kN}$. Find the force **magnitude** in either strut, (their magnitudes being equal by symmetry) (20%)
5. Explain the difference between a **truss** and a **frame**. (20%)