國立屏東科技大學 九十六 學年度碩士班暨碩士在職專班招生考試

材料力學

Problem #1 A stress-strain curve obtained from the tensile test is shown in Figure 1. (20%)

(a) Explain the physical meaning of each curve section through the points O, A, C, D and E.

(b) Do you think this is ductile material or brittle material, explain why ?

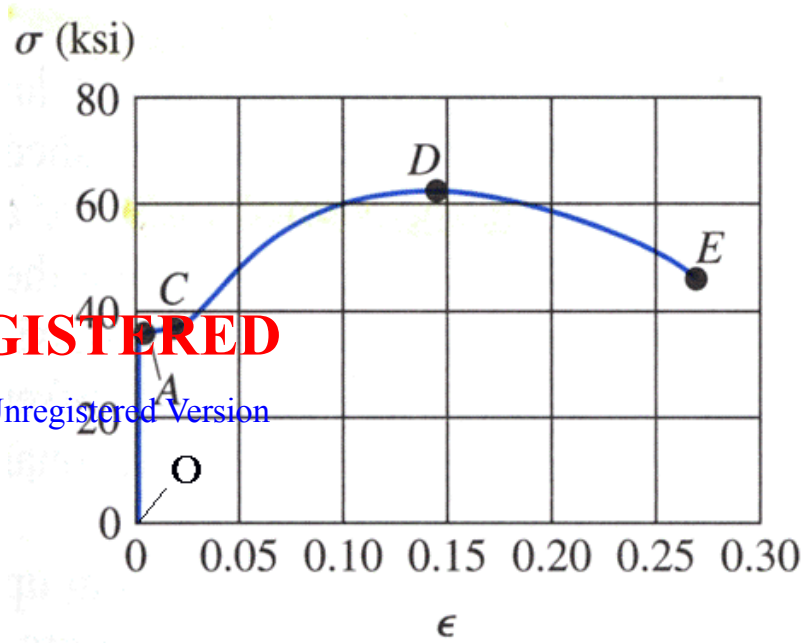

Figure 1

Problem #2 A taper bar of solid circular cross section is support at end B and subjected to a tensile load P at free end A as shown in Figure 2. Determine the elongation of the bar due to load P. [E = 70 GPa, L = 10 m, d_A = 0.1m, d_B = 0.2 m, P = 100 kN] (20%)

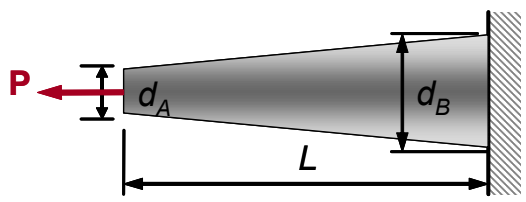

Figure 2

Problem #3 A shaft is supported by two bearings A and B, and driven by a belt and pulley with tensile forces in each side 540 lb_f and 180 lb_f as shown in Figure 3. (30%)

(a) Draw the shear force and bending moment diagrams of the shaft.

(b) If the maximum shear stress in shaft is not allowed to greater than 6000 psi, determine the diameter of the shaft.

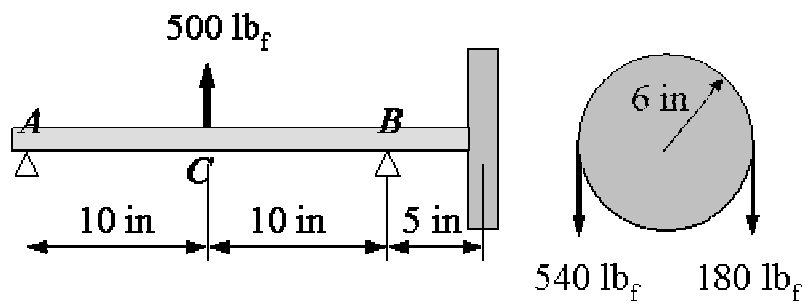

Figure 3

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Problem #4 A segment of the crack-shaft in a vehicle is represented as shown in Figure 4. If the diameter of the upper shaft is d = 20 mm, draw the stress states at points A and B, and determine the maximum tensile, compressive and shear stresses at points A and B. (30 %)

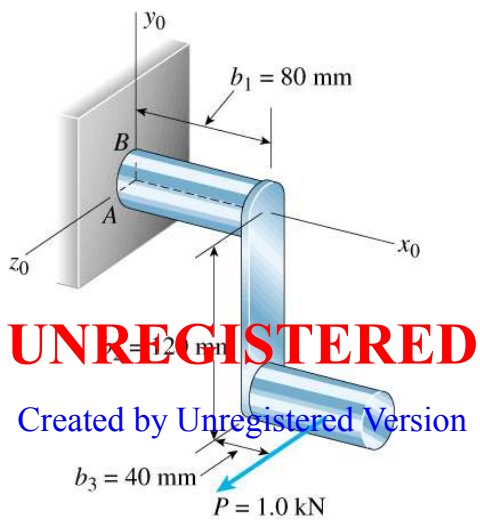

Figure 4