Problem 1 (5 points)

The beam is supported by a pin at A and a short link BC. Determine the maximum magnitude of $P$ of the loads the beam will support if the average shear stress in each pin is not to exceed 80 MPa. All pins are in double shear and each has a diameter of 18mm.
Problem 2 (5 points)

The bar is pinned at A and supported by two aluminum rods, each having a diameter of 25 mm and a modulus of elasticity $E_{al} = 70$ GPa. If the bar is assumed to be rigid and initially vertical, determine the force in each rod when the 10 KN is applied.
Problem 3 (5 points)

The turbine develops 150 KW of power, which is transmitted to the gears such that C receives 70% and D receives 30%. If the rotation of the 100 mm diameter steel shaft is 800 rev/min, the shear modulus $G=75$ GPa. Determine the absolute maximum shear stress in the shaft and the angle of twist of end E of the shaft relative to B. The journal bearing at E allows the shaft to run freely about its axis.