國立彰化師範大學 100 學年度碩士班招生考試試題

1. What is axial rigidity? Define a problem by yourself to show the influence produced by the axial rigidity if a structural member, i.e. a rod of length L with Young's modulus E and uniform cross-sectional area A, is subjected to an axial force, say P. Assume that the force acts on the centroid of the cross section at the free end; the rod has fixed-free boundary conditions. (25%)

2. What is flexural rigidity? Define a problem by yourself to show the influence produced by the flexural rigidity if a structural member, i.e. a beam of length L with Young's modulus E and uniform square cross-section of width b, is subjected to a transverse force, say P. Assume that the force acts at the mid-span; the beam is simple-supported at both ends. (25%)

3. What is torsional rigidity? Define a problem by yourself to show the influence produced by the torsional rigidity if an isotropic structural member, i.e. a shaft of length L with Young's modulus E, Poisson's ratio v and uniform solid circular cross-section of diameter d, is subjected to a torque, say T. Assume that the torque acts at the free end; the shaft has fixed-free boundary conditions. (25%)

4. Considering an isotropic material, if a point of the material is subjected to plane stresses and the working plane is the x-y plane, find all the strains by employing linear Hook's law. Assume that E, G, and v are, respectively, the Young's modulus, the shear modulus, and the Poisson's ratio. (25%)