1. At a point a structure is subjected to plane stress as shown in Fig. 1. Determine the principle stresses and maximum shear stress at the point.

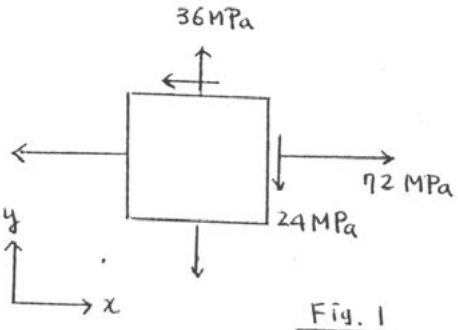

Fig. 1

2. At a point on the surface of an alloy ($E = 210$ GPa and $\nu = 0.30$) structural member subjected to a biaxial state of stress, the measured strains were $\epsilon_x = 1394\ \mu m/m$, $\epsilon_y = -660\ \mu m/m$, and $\gamma_{xy} = 2050\ \mu rad$. Determine the stress components σ_x, σ_y and τ_{xy} at the point.

3. A beam is loaded and supported as shown in Fig. 2. It is also known that the cross section of the beam has dimensions $b \times h$, and the Young's modulus and Poisson's ratio of the beam are E and ν, respectively. Determine the maximum bending stress and shear stress at cross section M-M.

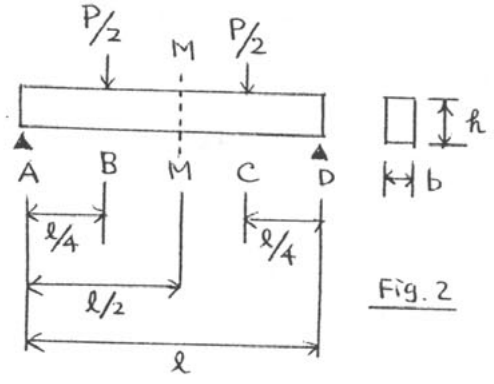

Fig. 2

4. An 8-ft long [$E = 1.9(10^6)$ psi] timber column with a 2 × 4 in. rectangular cross section is loaded by P as shown in Fig. 3. Determine the Euler buckling load (P_{cr}).

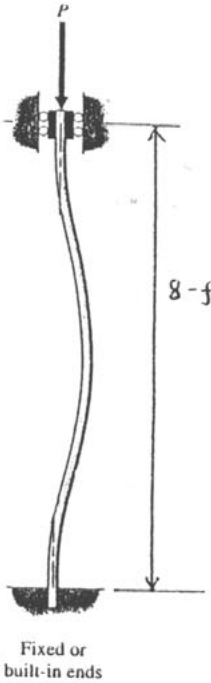

Fig. 3

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