# GATE PATHSHALA
# Strength Of Materials
# (Assignment-01: Questions)

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## Question - 01

A rod 250 cm long and of diameter 4.0 cm is subjected to an axial pull of 35 kN. If the Young's modulus of the material of the rod is $2.5 \times 10^5$ N/mm$^2$, determine:

1. Stress
2. Strain
3. Elongation of the rod

## Question - 02

Find the Young's modulus of a rod of diameter 30 mm and of length 300 mm which is subjected to a tensile load of 60 kN and the extension of the rod is equal to 0.4 mm.

## Question - 03

A rectangular element in a linearly elastic isotropic material is subjected to tensile stresses of 83 N/mm$^2$ and 65 N/mm$^2$ on mutually perpendicular planes. Determine the strain in the direction of each stress and in the direction perpendicular to both stresses.

$$Take, E = 200000\,\text{N/mm}^2, \quad v = 0.3$$

## Question - 04

From the information given in Question-03. Determine the Principal Strains and Maximum Shear Strain

## Question - 05

A structural member supports loads which produce, at a particular point, a direct tensile stress of 80 $N/mm^2$ and a shear stress of 45 $N/mm^2$ on the same plane. Calculate the values of the principal stresses at the point and also the maximum shear stress, stating on which planes this will act.

## Question - 06

A circular rod 0.2 m long tapers from 20 mm diameter at one end to 10 mm diameter at the other. On applying an axial pull of 6 kN, it was found to extend by 0.068 mm. Find the Young's modulus of the material of the rod.