# FAQ's

**1. Explain direct stress with its expression?**

The load passing through the axis of a member is called axial load. If a member is subjected to axial loading, the stress caused will be direct stress.

Direct stress is given by

$\sigma_d = P/A$

where,

P= axial load

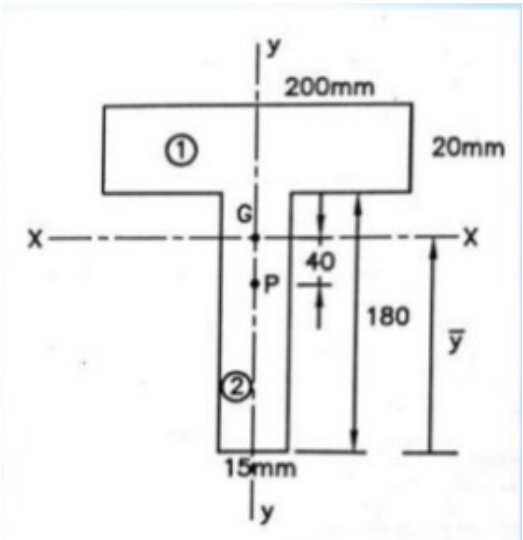
A= area of cross section

**2. What is core/ kern of a section?**

The area of section within which tensile stress is zero. If the line of action of the load is within the middle third, then there will be no tensile stress. If the load acts within the core or kern of a section, no tension will develop.

Core in case of circular section will be e< d/8 and in case of rectangular section will be e< d/6.

**3. A column of T-section shown in figure is subjected to a load of 100kN at a point on the centroidal axis, 40mm below the centroidal x-x axis. Calculate the maximum stresses induced in the section.**




P=100KN;e=40mm

Section 1:

$a_1=200x20=4000mm^2$

$y_1=180+10=190mm$

Section 2:

$a_2=180x15=2700mm^2$

$y_2=90mm$

$y = (a_1y_1+a_2y_2)/ (a_1+a_2)=((4000x190)+(2700x90))/(4000+2700)$

$= 149.70mm$

$I_{xx}=(200x20^3/12)+(4000x(190-149.70)^2)$

$+(15x180^3/12)+(2700(149.70-90)^2)$

$I_{xx}=23.539x10^6mm^4$

$Z_{xx}= (I_{xx}/y_{max})=(23.539x10^6/149.70)= 157241.15\ mm^3$

$\sigma_{max}=(P/A)+(M/Z)$

$=(100x10^3/6700)+(100x10^3x40/157241.15)$

$=14.92+25.43$

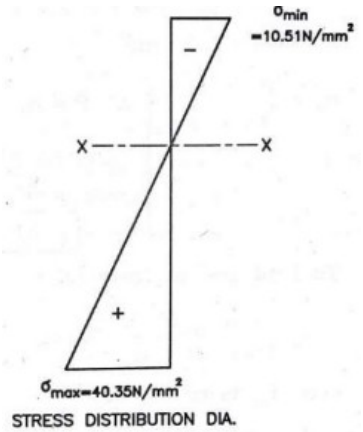
$=40.35\ N/mm^2$(compressive)

$\sigma_{min}=(P/A)-(M/Z)$

$=(100x10^3/6700)-(100x10^3x40/157241.15)$

$=10.51N/mm^2$(tensile)

Stress distribution is given below,




STRESS DISTRIBUTION DIA.

**4. A rectangular column is 100 mm wide and 60 mm thick. It carries a load of 100KN at an eccentricity of 10mm in a plane bisecting the thickness. Find the maximum and minimum intensities of stress in the section.**

P= 100kN; e=10mm

A= 100mm x 60mm

B= 100mm

$\sigma_{max}$=(P/A)(1+(6e/b))

= (100x1000/100x60)(1+(6x10/100))

= 26.67 MPa

$\sigma_{max}$=(P/A)(1-(6e/b))

= (100x1000/100x60)(1-(6x10/100))

= 6.67 MPa