FAQs

1.Explain the concept of bending stress?

The bending moment at a section tends to bend or deflect the beam and the internal stresses resist its bending. The process of bending stops, when every cross section sets up full resistance to the bending moment. The resistance offered by the internal stresses to the bending is called bending stress.

2.What are the assumptions made in bending stress analysis?

- The material of the beam is perfectly homogeneous.
- The beam material is stressed within its elastic limit.
- The transverse sections which were plane before bending remains plane after bending also.
- Each layer of the beam is free to expand (or) contract independently of the layer above or below it.
- The value of E is same in tension and compression.
- The beam is in equilibrium.

3.Write the bending equation?

$$\frac{M}{I} = \frac{f}{y} = \frac{E}{R}$$

Where,

- M – Bending moment or moment of resistance
- I – Moment of inertia
- f – Bending stress
- y – Extreme fibre distance
- E – Young's Modulus
- R – Radius of curvature

4.How to find the centre of gravity of an I section?

$$\overline{y} = \frac{A_1 y_1 + A_2 y_2 + A_3 y_3}{A_1 + A_2 + A_3}$$

Where,

- A_1 = Area of top flange
- y_1 = distance of c.g of top flange from top
- A_2 = Area of web
- y_2 = distance of c.g of web from top
- A_3 = Area of bottom flange

- y_3 = distance of c.g of bottom flange from top

5.A simply supported beam of span 5m has a crossection 150mm x 250mm.If the permissible stress is 10Mpa. Find maximum intensity of udl it can carry?

$I=bd^3/12$

$y_{max}=d/2$

$Z=bd^2/6 = (150x250^2)/6=1562500mm^3$

Moment carrying capacity (M)=Σz=10x1562500Nmm

=15625000 Nmm

If w is the udl acting, max. BM is given by

$wL^2/8=(wx25x1000)/8$Nmm

Equating max. BM to Moment carrying capacity

$(wx25x1000)/8=15625000$

w=5000N/m

=5KN/m