

ADVANCED STRENGTH OF MATERIALS (BENDING STRESS)

1. A steel wire of 5 mm diameter is bent into a circular shape of 5 m radius. Determine the maximum stress induced in the wire. Take $E = 200 \text{ GPa}$. (100 MPa)
2. A steel wire of 3 mm diameter is to be wound around a circular component. If the bending stress in the wire is limited to 80 MPa, find the radius of the component. Take $E = 200 \text{ GPa}$. (3.75 m)
3. A cantilever beam is rectangular section having 80 mm width and 120 mm depth. If the beam is subjected to a point load of 6 kN at its free end, and bending stress is not exceed 40 MPa. Find the span of the beam. (1.2 m)
4. A rectangular beam 200 deep is simply supported over a beam of span 2 m. Find the U.D.L. the beam can carry if the bending stress is not exceed 30 MPa. Take M.O.I. of the beam $8 \times 10^6 \text{ mm}^4$. (4.8 N/mm)
5. A cantilever beam is circular section of diameter 60 mm carrying U.D.L 5 kN/m over entire length. If the maximum bending stress is not exceed 65 MPa, find out the suitable length of beam. (742.5 mm)
6. A simple supported beam 6 m long carrying a point load at the mead span. The section of the beam is rectangular in which depth-width ratio is 2:1. The maximum allowable bending stress is 50 MPa. Design the suitable section of beam. Take point load is 50 kN. (131 mm & 262 mm)
7. A simple supported beam is to have a inverted T section of dimension --
 Flange – 150 mm * 50 mm
 Web – 250 mm * 30 mm
 Find the neutral axis, the allowable tensile stress 32 N/mm^2 & compressive stress 41 N/mm^2 . Find the maximum bending moment that the beam can carry. (25.42 kN-m)
8. A cantilever beam carrying U.D.L 6 kN/m over entire length. The cross section of the beam is angle section of Flange 150 mm * 50 mm and Web 200 mm * 30 mm. If the maximum allowable bending stress 100 MPa, find out suitable length of the beam. (3.78 m)
9. A C.P. pipe of 50 cm internal diameter & 2 cm thick is simply supported at its end. Find the maximum length of the pipe, when the pipe is running full of water. The bending stress is not exceed 15 MPa, take the specific weight of C.I. 72 kN/m^3 & water is 10 kN/m^3 . (10.26 m)
10. Three beam have the same length, same allowable stress and the same bending moment. Find the ratio of weights of circle and the rectangular beams with respect to the square beams. (1 : 0.79, 1 : 1.12)

