

Baba Haruraj Das -National Institute of Technology & Management, Lucknow
B. Tech Second Year/Third Semester, 2022-23
Department of Civil Engineering

Mechanics of Solids (SME-202)
Assignment 1 (Unit 1)

NOTE-ATTEMPT ALL PARTS

1. Briefly explain about types of stresses?
 2. A bar of length 20 cm tapers uniformly from 40 mm dia. to 30mm dia. calculate the change in its length due to an axial pull of 100kN, if $E = 200GPa$. Derive the formula used in the calculations.
 3. A steel rod 100 mm² in cross section stretches by 0.4 mm over a gauge length of 30 mm under an axial load of 30 kN. What is the strain – energy stored in it? If the load at the elastic limit is 45 kN, find the elongation at elastic – limit and the proof resilience?
 4. An I – section beam 200mm x 200mm has a web thickness of 12mm and flange thickness of 20mm. It carries a shear force of 120kN. Sketch the shear stress distribution across the section.
 5. Define section modulus. Obtain section modulus for rectangular and circular sections. Write the expression for stresses in terms of section modulus and B.M.
 6. Derive S.F.D & B.M.D for a cantilever carrying a load whose intensity varies uniformly from zero at the fixed end to 90 per unit run at the free end.
 7. A steel plate is bent into a circular arc of radius 30 metres. If the plate section be 120mm wide and 20 mm thick, find the maximum stress induced and the bending moment which can produce this stress. Take $E = 2 \times 10^5 Mpa$.
 8. Explain about Elasticity.
 9. Define:
 - i) Bending Moment,
 - ii) Shear force,
 - iii) Point of contra flexure
 10. Define Resilience.
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