

AMEV02 MECHANICS OF SOLID

UNIT-1 STRESS AND STRAIN

- 1.1 Stress and strain at a point- Tension, Compression,
- 1.2 Shear Stress- Hooke's Law
- 1.3 Relationship among elastic constants- Stress Strain Diagram for Mild Steel,
- 1.4 TOR steel, Concrete
- 1.5 Ultimate Stress- Yield Stress
- 1.6 Factor of Safety- Thermal Stresses- Thin Cylinders and Shells
- 1.7 Strain Energy due to Axial Force- Resilience- Stresses due to impact and Suddenly Applied Load- Compound Bars.

UNIT-2 SHEAR AND BENDING IN BEAMS

- 2.1 Beams and Bending- Types of loads,
- 2.2 Supports- Shear Force and Bending Moment Diagrams for statically determinate beam with concentrated load,
- 2.3 UDL, uniformly varying load.
- 2.4 Theory of Simple Bending- Analysis of Beams for Stresses- Stress Distribution at a cross Section due to bending moment and shear force for Cantilever,
- 2.5 Simply supported and overhanging beams with different loading conditions- Fitched Beams.

UNIT-3 DEFLECTION

- 3.1 Double integration method Macaulay's methods
- 3.2 Area moment method
- 3.3 Conjugate beam method for computation of slopes and deflections of determinant beams.

UNIT-4 TORSION

- 4.1 Torsion of Circular and Hollow Shafts
- 4.2 Elastic Theory of Torsion- Stresses and Deflection in Circular Solid and Hollow Shafts
- 4.3 Combined bending moment and torsion of shafts- strain energy due to torsion
- 4.4 Modulus of Rupture- Power transmitted to shaft- Shaft in series and parallel
- 4.5 Closed and Open Coiled helical springs
- 4.6 Leaf Springs- Springs in series and parallel- Design of buffer springs.

UNIT-5 COMPLEX STRESSES AND PLANE TRUSSES

- 5.1 2 D State of Stress
- 5.2 2 D Normal and Shear Stresses on any plane
- 5.3 Principal Stresses and Principal Planes
- 5.4 Mohr's circle
- 5.5 Plane trusses: Analysis of plane trusses
- 5.6 Method of joints- method of sections.

References Books

- 1 Gambhir. M.L., "Fundamentals of Solid Mechanics", PHI Learning Private Limited., New Delhi, 200-
- 2 Timoshenko.S.B. and Gere.J.M, "Mechanics of Materials", Van Nos Reinbhold, New Delhi 1--5.

