



**ANURAG GROUP OF INSTITUTIONS
(AUTONOMOUS)**

**II B. Tech – I Semester Assignment Paper – II (2018 – 19)
Subject: MECHANICS OF SOLIDS**

DEPARTMENT OF MECHANICAL ENGINEERING

1. a) What do you mean by shear stresses in beams? (Level – 2) (CO -3)
b) A simply supported wooden beam of span 1.3 m having a cross section 150 mm wide by 250 mm deep carries a point load W at the centre. The permissible stresses are 7 N/mm^2 in bending and 1 N/mm^2 in shearing. Calculate the safe load W . (Level – 3) (CO -3)
2. a) A wooden beam 100 mm wide and 150 mm deep is simply supported over a span of 4 m. If shear force at a section of the beam is 4500 N, find the shear stress at a distance of 25 mm above the N.A. (Level – 3) (CO - 3)
b) An I – section beam 350 mm x 150 mm has a web thickness of 10 mm and a flange thickness of 20 mm. If the shear force acting on the section is 40 kN, find the maximum shear stress developed in the I –section. (Level – 3) (CO - 3)
3. a) Find the slope and deflection of a simply supported beam carrying a point load at the centre of the beam by Mohr's theorems. (Level – 3) (CO - 4)
b) Find the slope and deflection of a simply supported beam carrying U.D.L. throughout the length of the beam by Mohr's theorems. (Level – 3) (CO - 4)
4. A beam of length 6 m is simply supported at its ends and carries two point loads of 48 kN and 40 kN at a distance of 1 m and 3 m respectively from the left support. Find:
 - i) Deflection under each load,
 - ii) Maximum deflection, and
 - iii) The point at which maximum deflection occurs.Take $E = 2 \times 10^5 \text{ N/mm}^2$, $I = 85 \times 10^6 \text{ mm}^4$. (Level – 3) (CO - 4)
5. Derive an expression for slope and deflection of a cantilever of length L , carrying a point load W at the free end by double integration method. (Level – 3) (CO - 4)
6. A cantilever of length 3 m is carrying a point of 50 kN at a distance of 2m from the fixed end. If $I = 10^8 \text{ mm}^4$ and $E = 2 \times 10^5 \text{ N/mm}^2$. Find:
 - i) Slope at free end and
 - ii) Deflection at free end. (Level – 3) (CO - 4)