

Mechanics of Material (ARA-205)

- Q1 → Define principal planes and principal stresses.
- Q2 → Differentiate between homogeneity and isotropy?
- Q3 → what do you understand by engineering stress-strain curve?
- Q4 → what do you mean by pure bending?
- Q5 → what is the difference between UDL & point load.
- Q6 → State and Explain Hook's Law.
- Q7 → write the relation between rate of loading, shear force & bending moment.
- Q8 → Explain stress-strain diagram for
 - a) Ductile Material
 - b) Brittle Material
- Q9 → Define yield stress?
- Q10 → Explain the significance of modulus of rigidity.
- Q11 → Explain factor of safety & its significance
- Q12 → Distinguish between longitudinal and lateral strain.
- Q13 → what do you mean by two dimensional stress system?
- Q14 → write short note on Mohr's circle of stress and its applications.
- Q15 → what is the necessity of theory of failure.

Q16 → Explain the following terms in the context of stress-strain curve for mild steel:-

- elastic limit
- upper & lower yield point.
- ultimate point & breaking point.

Q17 → Write down the different relations between constants like E , C , K , μ where E = elastic constant, C = shear modulus, K = Bulk modulus & μ = poisson ratio.

Q18 → Explain Rankine theory of failure.

Q19 → what do you mean by stress tensor.

Q20 → Explain generalized Hooke's law.

Q21 → Define young's modulus of elasticity and modulus of rigidity.

Q22 → Define stiffness, strain energy & resilience.

Q23 → Derive the relationship between Young's modulus (E), Modulus of rigidity (C) and Bulk modulus (K).

Q24 → what is the difference between stiffness and toughness?

Q25 → Draw the stress-strain diagram under tensile test for mild steel and name salient points.

Q26 → Define "poisson's ratio". Also state its range in normal condition.

- Q27 → Write the relation between shear force and bending moment.
- Q28 → An aluminium rod of 20mm diameter is elongated by 3.5mm along its longitudinal direction by a load of 25kN. Determine the original length of the bar. Take $E = 70000 \text{ N/mm}^2$.
- Q29 → Find the principal stresses with the help of Mohr's circle for two perpendicular linear stresses 100 N/mm^2 (tensile) and 50 N/mm^2 (compressive).
- Q30 → Explain how the stress due to sudden load is two times the stress when the same load is gradually applied.
- Q31 → Explain why the stresses developed in a rope due to its self weight are negligible.
- Q32 → What is failure theory? Discuss its importance.
- Q33 → State the assumptions made in mechanics of material.
- Q34 → Explain shear force & Bending moment for a plane beam.
- Q35 → Define —
a) Stress at a point
b) von-mises theory of failure.