1. Which theory describes the distribution of stresses in a beam under bending loads?

a) Theory of elasticity
b) Theory of simple bending
c) Theory of relativity
d) Theory of plasticity

Answer: b) Theory of simple bending

Explanation: The theory of simple bending is commonly used to analyze the distribution of stresses in beams under bending loads. It provides a simplified model for calculating bending stresses and deformation in beams.

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2. What is the concept associated with a beam experiencing equal bending moments along its length?

a) Shear bending
b) Pure bending
c) Compound bending
d) Elastic bending

Answer: b) Pure bending

Explanation: Pure bending occurs when a beam is subjected to equal bending moments along its length, resulting in a uniform distribution of bending stress across the section.

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3. Which parameter determines the resistance of a beam to bending?

a) Shear modulus
b) Section modulus
c) Elastic modulus
d) Moment of inertia

Answer: b) Section modulus

Explanation: The section modulus is a geometric property of the cross-section of a beam that determines its resistance to bending. It is directly proportional to the bending strength of the beam.

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4. What does the neutral axis represent in a beam under bending?

a) Axis of maximum bending stress
b) Axis of zero bending stress
c) Axis of maximum shear stress
d) Axis of zero shear stress

Answer: b) Axis of zero bending stress

Explanation: The neutral axis is the axis within a beam where there is no bending stress. It divides the beam into equal compression and tension regions when subjected to bending loads.

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5. Which equation is used to calculate bending stress in a beam?

a) Hooke’s Law
b) Euler’s Equation
c) Navier-Stokes Equation
d) Flexure Formula

Answer: d) Flexure Formula

Explanation: The flexure formula, also known as the bending equation, is used to calculate the bending stress in a beam subjected to bending loads. It relates the bending moment, section modulus, and distance from the neutral axis to the bending stress.

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6. In a simply supported beam, where is the bending stress maximum?

a) At the supports
b) At the midpoint
c) At the neutral axis

d) Uniformly distributed

Answer: a) At the supports

Explanation: In a simply supported beam, the bending stress is maximum at the supports where the bending moment is highest. This is due to the concentrated load or reaction at those points.

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7. What type of beam has one end fixed and the other end free?

a) Simply supported beam
b) Cantilever beam
c) Overhanging beam
d) Continuous beam

Answer: b) Cantilever beam

Explanation: A cantilever beam is a beam that is fixed at one end and free at the other end. It is commonly used in structures where one end needs to be anchored or supported while the other end is free to deflect.

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8. Which beam type extends beyond its supports?

a) Simply supported beam
b) Cantilever beam
c) Overhanging beam
d) Fixed beam

Answer: c) Overhanging beam

Explanation: An overhanging beam is a beam that extends beyond its supports on one or both ends. This design allows for additional loads or attachments to be placed on the extended portion of the beam.

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9. What does the shear stress distribution across a beam section depend on?

a) Bending moment
b) Shear modulus
c) Section modulus
d) Moment of inertia

Answer: a) Bending moment

Explanation: The shear stress distribution across a beam section depends on the bending moment. It varies linearly with distance from the neutral axis and is maximum at the top and bottom surfaces of the beam.

10. Which type of stress is responsible for resisting forces parallel to the cross-section of a beam?

a) Bending stress
b) Torsional stress
c) Shear stress
d) Axial stress

Answer: c) Shear stress

Explanation: Shear stress is the type of stress that occurs in a beam when forces are applied parallel to its cross-section. It is responsible for resisting shear forces and preventing the sliding of adjacent layers of the beam.