- 1. What type of loading does pure bending involve?
- a) Torsional loading
- b) Axial loading
- c) Shear loading
- d) Bending loading

Answer: d) Bending loading

Explanation: Pure bending involves the application of bending moments to a structural member without any axial or torsional loads. It leads to deformation characterized by curvature along the axis of the member.

- 2. In symmetric members under pure bending, where is the neutral axis located?
- a) At the centroid of the section
- b) At the top surface of the section
- c) At the bottom surface of the section
- d) At the extreme fibers of the section

Answer: a) At the centroid of the section

Explanation: In symmetric members under pure bending, the neutral axis is located at the centroid of the cross-sectional area. It's the axis where the stress is zero during bending.

- 3. What is the primary cause of deformation in a beam under bending?
- a) Shear stress
- b) Axial stress
- c) Tensile stress
- d) Bending stress

Answer: d) Bending stress

Explanation: Bending stress is the primary cause of deformation in a beam under bending. It results from the moment applied to the beam, causing it to bend and inducing stress throughout its cross-section.

- 4. When a composite section is subjected to bending, what property governs the distribution of stresses?
- a) Material density
- b) Modulus of elasticity
- c) Cross-sectional area
- d) Poisson's ratio

Answer: b) Modulus of elasticity

Explanation: The modulus of elasticity of the constituent materials governs the distribution of stresses in a composite section subjected to bending. Materials with different moduli of elasticity will experience different levels of stress.

- 5. In eccentric axial loading, the applied load does not pass through the centroid of the section, resulting in what kind of stress?
- a) Bending stress
- b) Shear stress
- c) Torsional stress
- d) Axial stress

Answer: a) Bending stress

Explanation: In eccentric axial loading, the applied load does not pass through the centroid of the section, leading to bending moments and hence bending stress in addition to axial stress.

- 6. What is the graphical representation of shear force along the length of a beam called?
- a) Stress diagram
- b) Moment diagram
- c) Shear force diagram
- d) Bending moment diagram

Answer: c) Shear force diagram

Explanation: A shear force diagram illustrates the variation of shear force along the length of a beam. It shows the magnitude and direction of the internal shear forces at different points along the beam.

- 7. According to the relationship between load, shear, and bending moment, what is the derivative of shear force with respect to the x-coordinate?
- a) Load
- b) Bending moment
- c) Shear stress
- d) Slope of the beam

Answer: a) Load

Explanation: The derivative of shear force with respect to the x-coordinate gives the rate of change of load along the beam's length. This relationship is fundamental in analyzing beam behavior.

- 8. What type of stress arises in beams due to the internal shear forces?
- a) Tensile stress
- b) Compressive stress
- c) Bending stress

d) Shear stress

Answer: d) Shear stress

Explanation: Internal shear forces in beams lead to shear stress, which acts parallel to the cross-section and contributes to the beam's deformation and failure.

- 9. What type of energy is stored in a beam subjected to bending?
- a) Kinetic energy
- b) Potential energy
- c) Strain energy
- d) Thermal energy

Answer: c) Strain energy

Explanation: Strain energy is stored in a beam subjected to bending due to the deformation caused by bending stresses. It represents the energy absorbed by the material when it deforms elastically.

- 10. Which method is used to determine the deflection of beams by integrating the equation of the elastic curve?
- a) Macaulay's method
- b) Area moment method
- c) Finite element method
- d) Method of joints

Answer: a) Macaulay's method

Explanation: Macaulay's method is a mathematical technique used to determine the deflection of beams by integrating the equation of the elastic curve. It's particularly useful for

solving complex loading and support conditions.

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