

1. What type of stress is primarily responsible for causing torsion in shafts?

- a) Compressive stress
- b) Tensile stress
- c) Shear stress
- d) Bending stress

Answer: c) Shear stress

Explanation: Torsion in shafts occurs due to the application of twisting forces, resulting in shear stress along the cross-section of the shaft.

2. Which property of a material is crucial in determining its resistance to torsional deformation?

- a) Tensile strength
- b) Modulus of elasticity
- c) Ductility
- d) Hardness

Answer: b) Modulus of elasticity

Explanation: Modulus of elasticity (also known as Young's modulus) represents a material's stiffness and its resistance to deformation under applied load, including torsional forces.

3. What is the deformation pattern in a circular shaft subjected to torsion?

- a) Linear deformation
- b) Radial deformation
- c) Axial deformation
- d) Angular deformation

Answer: d) Angular deformation

Explanation: Torsion in a circular shaft causes angular deformation or twist along its length due to the applied torque.

4. The angle of twist in a shaft is directly proportional to which of the following factors?

- a) Length of the shaft
- b) Diameter of the shaft
- c) Applied torque
- d) Modulus of elasticity

Answer: c) Applied torque

Explanation: The angle of twist in a shaft is directly proportional to the applied torque and the shaft's length, as per the torsion formula.

5. In a stepped transmission shaft, what purpose does the change in diameter serve?

- a) Increase torsional strength
- b) Reduce weight
- c) Improve aesthetics
- d) Enhance heat dissipation

Answer: a) Increase torsional strength

Explanation: A stepped transmission shaft increases torsional strength by distributing stresses more evenly along its length, preventing stress concentration at a single point.

6. What advantage does a hollow transmission shaft offer over a solid one?

- a) Greater torsional stiffness
- b) Lower manufacturing cost

- c) Reduced weight
- d) Increased durability

Answer: c) Reduced weight

Explanation: A hollow transmission shaft reduces weight while maintaining sufficient torsional strength, making it advantageous for applications where weight is a critical factor.

7. What effect does increasing the shaft diameter have on its torsional resistance?

- a) Decreases torsional resistance
- b) Increases torsional resistance
- c) No effect on torsional resistance
- d) Reduces the angle of twist

Answer: b) Increases torsional resistance

Explanation: Increasing the shaft diameter increases its cross-sectional area, thereby increasing its resistance to torsional forces.

8. Which type of stress is predominant in a transmission shaft subjected to torsion?

- a) Tensile stress
- b) Compressive stress
- c) Shear stress
- d) Bending stress

Answer: c) Shear stress

Explanation: Shear stress is predominant in a transmission shaft subjected to torsion, as torsional forces create shear stresses along the shaft's cross-section.

9. What is the primary function of transmission shafts in mechanical systems?

- a) Transfer linear motion
- b) Transmit rotational motion and torque
- c) Provide structural support
- d) Act as a heat sink

Answer: b) Transmit rotational motion and torque

Explanation: Transmission shafts are primarily designed to transmit rotational motion and torque from one component to another within mechanical systems.

10. Which material property is crucial for selecting a suitable material for transmission shafts?

- a) Electrical conductivity
- b) Thermal expansion coefficient
- c) Yield strength
- d) Refractive index

Answer: c) Yield strength

Explanation: Yield strength is essential for selecting a material with adequate mechanical strength to withstand the torsional stresses experienced by transmission shafts in operation.

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