1. Which type of pier is typically used in locations where the foundation is set deep into the ground?

a) Solid pier
b) Hollow pier
c) Stub pier
d) Caisson pier

Answer: d) Caisson pier
Caisson piers are often used in locations where the foundation needs to be set deep into the ground, such as in water bodies or areas with weak soil. They are cylindrical structures sunk into the ground and filled with concrete.

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2. What stability analysis method involves assessing the resistance of piers against overturning and sliding?

a) Shear analysis
b) Lateral analysis
c) Stability analysis
d) Axial analysis

Answer: c) Stability analysis
Stability analysis involves evaluating the resistance of piers against overturning and sliding, ensuring they can withstand external forces and remain structurally sound.

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3. Which type of abutment is characterized by its wing walls extending parallel to the bridge deck?

a) Cantilever abutment
b) Counterfort abutment
c) U-type abutment
d) Return-wall abutment

Answer: d) Return-wall abutment
Return-wall abutments are designed with wing walls extending parallel to the bridge deck, providing additional stability and support.

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4. What are the primary forces acting on piers of a bridge structure?

a) Compression and torsion
b) Shear and tension
c) Bending and flexion
d) Compression and bending

Answer: a) Compression and torsion
The primary forces acting on piers of a bridge structure are compression (from vertical loads) and torsion (from horizontal or twisting loads), which must be carefully considered in their

design.

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5. Which bridge code provision primarily addresses the design of abutments and wing walls?

a) AASHTO
b) Eurocode
c) BS 5400
d) ACI 318

Answer: a) AASHTO
The American Association of State Highway and Transportation Officials (AASHTO) provides guidelines and standards for the design of bridges, including provisions for abutments and wing walls.

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6. In stability analysis, what does the term “overturning” refer to?

a) Horizontal movement of piers
b) Vertical movement of piers
c) Lateral movement of piers
d) Rotation of piers

Answer: d) Rotation of piers

“Overturning” in stability analysis refers to the rotation of piers around their base due to horizontal or lateral forces, which can lead to instability if not adequately resisted.

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7. Which type of pier is characterized by its hollow interior?

a) Solid pier
b) Caisson pier
c) Stub pier
d) Hammerhead pier

Answer: b) Caisson pier
Caisson piers have a hollow interior, allowing them to be sunk into the ground and filled with concrete to provide stability and support.

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8. What type of abutment is designed to resist lateral earth pressure through the use of counterforts?

a) Cantilever abutment
b) Counterfort abutment
c) U-type abutment
d) Return-wall abutment

Answer: b) Counterfort abutment
Counterfort abutments are designed with counterforts to resist lateral earth pressure, providing additional support and stability to the bridge structure.

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9. Which force primarily causes bending in piers of a bridge structure?

a) Vertical loads
b) Horizontal loads
c) Torsional loads
d) Lateral loads

Answer: a) Vertical loads
Vertical loads, such as the weight of the bridge deck and traffic, primarily cause bending in piers of a bridge structure.

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10. What purpose do wing walls serve in the design of abutments?

a) To resist vertical loads
b) To prevent overturning
c) To provide aesthetic appeal
d) To guide lateral earth pressure

Answer: d) To guide lateral earth pressure

Wing walls in the design of abutments serve to guide and distribute lateral earth pressure, enhancing the stability of the bridge structure.