1. What is the primary purpose of conducting a plate bearing test for evaluating the subgrade of rigid pavements?

a) To determine the modulus of elasticity of the subgrade
b) To assess the load-carrying capacity of the subgrade
c) To measure the temperature stresses in the pavement
d) To calculate the warping stresses within the pavement

Answer: b) To assess the load-carrying capacity of the subgrade

Explanation: A plate bearing test is used to evaluate the load-carrying capacity of the subgrade by applying a known load to a rigid plate placed on the surface. This test helps in determining the strength and stability of the subgrade, which is crucial for designing rigid pavements.

2. What does the Modulus-K represent in the context of plate bearing tests for rigid pavements?

a) Modulus of elasticity of the rigid pavement
b) Load-transfer efficiency between pavement layers
c) Resilient modulus of the subgrade
d) Frictional coefficient between the plate and the pavement

Answer: c) Resilient modulus of the subgrade

Explanation: The Modulus-K is a measure of the resilient modulus of the subgrade material determined from plate bearing tests. It indicates the stiffness or load-carrying capacity of the subgrade, which is essential for pavement design.

3. According to Westergaard’s stress theory, what type of stresses are considered in rigid pavements?

a) Shear stresses only
b) Compressive stresses only
c) Bending stresses only
d) Combination of bending, shear, and compressive stresses

Answer: d) Combination of bending, shear, and compressive stresses

Explanation: Westergaard’s stress theory considers the combination of bending, shear, and compressive stresses in rigid pavements. This theory forms the basis for analyzing stresses in rigid pavements under various loading conditions.

4. What type of stresses in rigid pavements are primarily induced by temperature fluctuations?

a) Bending stresses
b) Shear stresses
c) Compressive stresses
d) Thermal stresses

Answer: d) Thermal stresses

Explanation: Temperature fluctuations induce thermal stresses in rigid pavements due to differential expansion and contraction of pavement layers. These stresses can lead to cracking and other pavement distresses if not properly addressed in pavement design.

5. Which type of stresses in rigid pavements result from differential settlement or movement at joints?

a) Bending stresses
b) Shear stresses
c) Compressive stresses
d) Warping stresses

Answer: d) Warping stresses

Explanation: Warping stresses in rigid pavements occur due to differential settlement or movement at joints, leading to twisting or warping of the pavement slab. These stresses can cause cracking and other distresses if not managed effectively.

6. Frictional stresses in rigid pavements primarily arise from:

a) Vehicle loads
b) Temperature differentials
c) Subgrade movement
d) Traffic congestion

Answer: a) Vehicle loads

Explanation: Frictional stresses in rigid pavements primarily arise from the movement of vehicles over the pavement surface. These stresses occur due to the frictional resistance between the tires and the pavement surface, contributing to pavement deterioration over time.

7. What represents the critical combination of stresses that rigid pavement design should account for?

a) Bending and frictional stresses
b) Shear and temperature stresses
c) Compressive and warping stresses
d) Thermal and traffic stresses

Answer: c) Compressive and warping stresses

Explanation: The critical combination of stresses in rigid pavement design typically involves compressive and warping stresses. These stresses are crucial considerations to ensure the structural integrity and longevity of the pavement under various loading and environmental conditions.

8. In rigid pavements, where are critical loading positions often located?

a) At the center of the pavement slab
b) Near the pavement edges
c) At expansion joints
d) Over the subgrade

Answer: b) Near the pavement edges

Explanation: Critical loading positions in rigid pavements are often located near the pavement edges, where stresses tend to be higher due to wheel loads and boundary conditions. Proper design and reinforcement are necessary to mitigate potential distresses at these locations.

9. Which factor influences the magnitude of frictional stresses in rigid pavements?

a) Pavement thickness
b) Subgrade strength
c) Traffic volume
d) Surface roughness

Answer: d) Surface roughness

Explanation: Surface roughness influences the magnitude of frictional stresses in rigid pavements by affecting the contact between the tires and the pavement surface. Smoother surfaces typically result in lower frictional stresses, while rougher surfaces may increase frictional resistance.

10. What is the critical aspect considered during the evaluation of subgrade for rigid pavements?

a) Permeability
b) Porosity
c) Strength
d) Texture

Answer: c) Strength

Explanation: The strength of the subgrade is a critical aspect considered during its evaluation for rigid pavements. It determines the load-bearing capacity and stability of the pavement system, influencing its overall performance and longevity.