Civil Engineering Licensure Exam – Mock Quiz (Day 35: Structural Analysis)

February 24, 2025

Instructions

- Time Limit: 60 Minutes
- Coverage: Structural Analysis
- Total Questions: 10 (Multiple Choice & Problem-Solving)
- Show complete solutions for problem-solving questions.

Section A: Multiple Choice Questions (MCQs)

Choose the best answer.

1. A statically determinate structure is one in which:
   (a) The number of reactions equals the number of equilibrium equations.
   (b) The structure has more unknowns than equilibrium equations.
   (c) The structure deforms significantly under load.
   (d) The internal forces are always zero.
2. The moment distribution method is primarily used to analyze:
   (a) Trusses
   (b) Statically determinate beams
   (c) Indeterminate beams and frames

(d) Simple cantilever beams

3. The influence line for a bending moment at a specific point in a beam represents:

   (a) The variation of bending moment at that point due to a moving load

   (b) The variation of shear force at that point due to a moving load

   (c) The deflection curve of the beam

   (d) The reactions at the supports

4. The slope-deflection method is based on:

   (a) Equilibrium equations and force methods

   (b) Compatibility conditions and moment equilibrium

   (c) Shear force and axial force relationships

   (d) The bending stress distribution across the section

5. In the stiffness method of structural analysis, the primary unknowns are:

   (a) Displacements

   (b) Forces

   (c) Moments

   (d) Reactions

Section B: Problem-Solving

1. A simply supported beam of length 8 m carries a point load of 20 kN at 3 m from the left support. Determine the reactions at the supports and draw the shear force and bending moment diagrams.

2. A propped cantilever beam of length 6 m is subjected to a uniform distributed load of 4 kN/m. Determine the reactions at the supports using the force method.

3. Using the moment distribution method, determine the bending moment at the midpoint of a continuous beam of two spans (5 m each) subjected to a uniform load of 3 kN/m.

4. A three-hinged arch with a span of 12 m carries a concentrated load of 15 kN at midspan. Determine the horizontal reaction at the supports.

5. For a frame subjected to lateral forces, use the slope-deflection method to determine the moment at the fixed support if the column is subjected to a horizontal displacement of 10 mm.