Civil Engineering Licensure Exam – Mock Exam (Day 30: Truss Analysis – Method of Joints and Sections)

February 24, 2025

Instructions

- Time Limit: 60 Minutes
- Coverage: Truss Analysis – Method of Joints and Sections
- 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 truss is a structural system composed of:

   (a) Rigidly connected members
   (b) Slender members connected at joints
   (c) Solid beams without joints
   (d) Concrete slabs and beams

2. The method of joints is based on:

   (a) Summation of forces at each joint
   (b) Summation of moments at each joint
   (c) The deflection of members

(d) The bending stress in the structure

3. In the analysis of trusses, a zero-force member is a member that:

    (a) Always carries a compressive force
    (b) Always carries a tensile force
    (c) Carries no force under specific loading conditions
    (d) Is always the longest member

4. The method of sections is particularly useful when:

    (a) Solving for all the forces in a truss
    (b) Finding forces in specific members without solving the entire truss
    (c) Determining support reactions
    (d) Calculating the moment of inertia of a truss

5. If a simple truss has m members and j joints, it is statically determinate if:

    (a) $m = 2j - 3$
    (b) $m = j - 2$
    (c) $m = j + 3$
    (d) $m = 2j - 2$

Section B: Problem-Solving

1. A simple truss consists of 6 joints and 11 members. Determine whether the truss is statically determinate or indeterminate.

2. In a truss structure, a force of 200 N is applied vertically at joint C. Using the method of joints, determine the force in members AC and BC if the truss is supported at points A and B.

3. A Pratt truss has a span of 8 m and a height of 3 m. Using the method of sections, determine the force in the middle diagonal member when subjected to a uniform load of 10 kN.

4. Identify the zero-force members in a truss structure where two non-collinear members meet at a joint with no external load or support.

5. A Warren truss has an external load of 5 kN applied at its center. Using the method of sections, determine the force in one of the diagonal members.