Civil Engineering Licensure Exam – Mock Exam (Day 49: Review of Past PRC Exam Questions)

February 24, 2025

Instructions

- Time Limit: 60 Minutes
- Coverage: Review of Past PRC Exam Questions
- 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. In structural engineering, the ultimate load design method considers:
   (a) The maximum load a structure can withstand before failure
   (b) The elastic limit of the material
   (c) The load before deflection starts
   (d) The factor of safety in the serviceability state
2. The modulus of elasticity of concrete depends on:
   (a) The strength of concrete
   (b) The type of reinforcement
   (c) The temperature during curing

(d) The size of the aggregate

3. In fluid mechanics, Bernoulli's equation is based on the principle of:

   (a) Conservation of energy
   (b) Conservation of mass
   (c) Conservation of momentum
   (d) Conservation of angular momentum

4. In soil mechanics, the term "plasticity index" refers to:

   (a) The difference between the liquid limit and plastic limit
   (b) The amount of organic material in the soil
   (c) The maximum dry density of soil
   (d) The shear strength of soil

5. The load combination in Load and Resistance Factor Design (LRFD) includes:

   (a) Dead and live loads with load factors
   (b) Only dead loads
   (c) Wind loads only
   (d) Earthquake loads only

Section B: Problem-Solving

1. A reinforced concrete beam has a width of 300 mm and an effective depth of 500 mm. If the factored bending moment is 150 kN·m, determine the required area of tensile reinforcement assuming $f'_c = 25$ MPa and $f_y = 415$ MPa.

2. A rectangular open channel is 3 m wide and carries a flow of 12 m^3/s at a depth of 1.5 m. Determine the Froude number.

3. A steel column has an effective length of 4 m and a radius of gyration of 150 mm. Determine the slenderness ratio.

4. A soil sample has a liquid limit of 50

5. A simply supported beam has a span of 5 m and carries a uniformly distributed load of 25 kN/m. Determine the maximum bending moment.