Civil Engineering Licensure Exam – Mock Exam (Day 20: Drainage, Stormwater Management, and Irrigation Systems)

February 24, 2025

Instructions

- Time Limit: 60 Minutes
- Coverage: Drainage, Stormwater Management, and Irrigation Systems
- 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. The primary objective of a stormwater drainage system is to:
   (a) Increase groundwater recharge
   (b) Reduce flooding by directing runoff efficiently
   (c) Control wastewater flow to treatment plants
   (d) Improve soil fertility
2. The Rational Method is used in stormwater management to:
   (a) Estimate peak runoff discharge
   (b) Calculate groundwater infiltration rates
   (c) Determine soil moisture levels

(d) Design water treatment systems

3. A detention basin is designed to:

   (a) Store stormwater temporarily and release it slowly
   (b) Provide a permanent water storage facility
   (c) Increase rainfall intensity
   (d) Accelerate stormwater flow to prevent ponding

4. In an irrigation system, the term "duty of water" refers to:

   (a) The amount of water required per unit crop area
   (b) The depth of water infiltrated into the soil
   (c) The flow velocity in an irrigation channel
   (d) The duration of water supply to a farm

5. The Manning's equation is used in drainage design to compute:

   (a) The peak discharge of a storm
   (b) The velocity of water flow in an open channel
   (c) The rate of evapotranspiration
   (d) The soil permeability coefficient

Section B: Problem-Solving

1. A 10-hectare urban area experiences a storm with an intensity of 50 mm/hr. Using a runoff coefficient of 0.7, compute the peak runoff using the Rational Method.

2. A rectangular stormwater channel is designed to have a width of 2 m and a depth of 1.2 m. If the flow velocity is 1.8 m/s, determine the discharge.

3. A detention basin is designed to capture runoff from a 5-hectare area with a rainfall depth of 80 mm. Determine the total volume of stormwater that needs to be managed.

4. A farmer applies irrigation water at a rate of 25 mm/day over a 2-hectare farm. Compute the total daily irrigation volume required.

5. An open drainage channel has a hydraulic radius of 0.5 m, a slope of 0.001, and a Manning's roughness coefficient of 0.015. Compute the flow velocity using Manning's equation.