Civil Engineering Licensure Exam – Mock Exam (Day 11: Triangulation and Trilateration Principles)

February 24, 2025

Instructions

- Time Limit: 60 Minutes

- Coverage: Principles of Triangulation and Trilateration

- 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 advantage of triangulation over direct distance measurement is:

   (a) Higher accuracy in rough terrain

   (b) Faster data collection

   (c) Less need for specialized equipment

   (d) Eliminating errors in angle measurement

2. The sum of the three angles in a triangulation network must be:

   (a) $90°$

   (b) $120°$

(c) 180°

(d) 360°

3. In trilateration, what is primarily measured?

(a) Angles only

(b) Distances only

(c) Both angles and distances

(d) Elevation differences

4. Which instrument is commonly used for measuring angles in triangulation?

(a) Theodolite

(b) Total Station

(c) Plane Table

(d) GPS Receiver

5. A control network using triangulation should ideally form:

(a) Squares

(b) Circles

(c) Equilateral triangles

(d) Quadrilaterals

Section B: Problem-Solving

1. A triangulation network consists of a triangle with angles $40°, 65°$, and an unknown angle. Determine the missing angle.

2. A surveyor measures the sides of a triangle as 200 m, 250 m, and 300 m. Compute the area of the triangle using Heron's formula.

3. In a trilateration survey, the distances between three points form a triangle with sides 50 m, 60 m, and 80 m. Compute the smallest angle using the cosine rule.

4. A survey station has a known baseline length of 150 m. If the angle between two adjacent lines is $60°$, determine the third side using the Law of Cosines.

5. If the baseline of a triangulation network is measured as 250 m and two angles are given as $45°$ and $75°$, determine the remaining side using the Law of Sines.