Answer Key: Civil Engineering Licensure Exam – Mock Exam (Day 24: Construction Project Scheduling (PERT/CPM))

February 24, 2025

Answer Key

Section A: Multiple Choice Solutions

1. Purpose of CPM: **(a) Determine the longest path in a project schedule**
2. PERT expected duration formula: **(a)** $T_E = \frac{O+4M+P}{6}$
3. Float (Slack) in a project schedule: **(a) The total time an activity can be delayed without delaying the project**
4. Crashing in CPM: **(a) Shortening the project duration by adding resources**
5. Project is considered on time when: **(c) The total float is zero**

Section B: Problem-Solving Solutions

1. Expected duration for each activity:

$$T_E = \frac{O + 4M + P}{6}$$

$$T_E(A) = \frac{3 + 4(6) + 9}{6} = 6$$

$$T_E(B) = \frac{2 + 4(4) + 6}{6} = 4$$

$$T_E(C) = \frac{5 + 4(8) + 11}{6} = 8$$

$$T_E(D) = \frac{4 + 4(5) + 6}{6} = 5$$

2. Critical Path Calculation:

$$\text{Path 1: A} \to \text{B} \to \text{D } (5 + 7 + 8 = 20)$$

$$\text{Path 2: A} \to \text{C} \to \text{D } (5 + 6 + 8 = 19)$$

$$\text{Critical Path: A} \to \text{B} \to \text{D (20 days)}$$

3. Total float:

$$\text{Float} = \text{Latest Start} - \text{Earliest Start}$$

$$= 18 - 12 = 6 \text{ days}$$

4. Cost per day of crashing:

$$\text{Crash Cost} - \text{Normal Cost} = 7,000 - 4,000 = 3,000$$

$$\text{Crash Time Reduction} = 8 - 5 = 3 \text{ days}$$

$$\text{Cost per day} = \frac{3,000}{3} = 1,000 \text{ per day}$$

5. Probability of completion within one standard deviation:

$$\approx 68.27\%$$

(Standard deviation in normal distribution covers 68.27% of values within one standard deviation)