

National Exams May 2019

16-Civ-B8, Management of Construction

3 hours duration

Notes:

1. If doubt exists as to the interpretation of any question, the candidate is urged to submit with the answer paper, a clear statement of any assumptions made;
2. This is a "Closed Book" exam. Candidates may use one of two calculators, the Casio or the Sharp approved models;
3. Any five questions constitute a complete paper. Only the first five questions as they appear in your answer book will be marked.
4. All questions are of equal value (20 marks).

1. Scheduling:

The activities of a small project and their optional estimates are given below.

- a) If all activities use their cheapest options, calculate project duration, cost, and required number of workers. Draw the network and show the critical path; and
- b) If you need to complete the project in only 8 days using only four workers/ day, determine the best combination of the given options. Calculate the associated project cost and draw a bar chart.

Activity	Depends on	Estimate 1- Slow Machine			Estimate 2 – Fast Machine		
		Cost (\$)	Duration (days)	Workers / day	Cost (\$)	Duration (days)	Workers / day
Site Preparation	---	\$5,000	4.0	3.0	---	---	---
Trench 1 Excavation	1	\$5,000	4.0	3.0	\$10,000	2.0	2.0
Trench 2 Excavation	1	\$5,000	4.0	2.0	\$7,000	2.0	2.0
Lay Pipe 1 & Backfill	2	\$5,000	4.0	3.0	\$7,000	1.0	2.0
Lay Pipe 2 & Backfill	3	\$5,000	4.0	3.0	\$9,000	2.0	2.0

2. Litigation:

- (a) Discuss the main reasons for delay-related claims on construction projects, the contractual modifications that can reduce such claims, and the types of analyses that need to be performed to validate and judge such claims.
- (b) Briefly discuss the following: excusable versus non-excusable delays; compensable versus non-compensable delays; and concurrent versus non-concurrent delays.

3. Contract Administration:

Discuss the advantages and disadvantages of: Design-Bid-Build versus Construction Management at Risk delivery approaches. Also, discuss the criteria used by public agencies to filter out unbalanced bids and select a responsible winner.

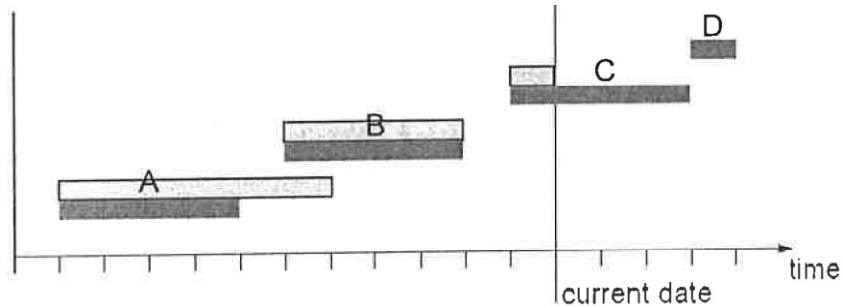
4. Engineering Economics:

An appraisal of two alternative projects is being carried out. Given the following cash flow, calculate the most economical plan using present value profit. Use discount rate of 10% per year.

	Project A	Project B
Initial Investment	\$170,000	\$150,000
Yearly operating cost	\$12,500	\$11,000
Major Maintenance (every 5 years)	\$15,000	\$13,000
Yearly revenue	\$23,500	\$26,000
Life	15 years	10 years

5. Project Control:

In the bar chart below, the lighter bars indicate the actually time spent on each activity and the darker bars show planned durations. Activity C is still not finished. Assume that one day of work costs \$1,000 per activity. Use the earned value method and the 20/80 rule to compute the Cost Performance Index (CPI) for the activities and for the project.



6. Safety Practices and Regulations:

Construction sites can be considered as being one of the most hazardous types of working environments. Discuss some of the important practices that need to be adopted on a construction site that involves several activities, including demolition as well as removal of hazardous materials to an offsite location.