National Exams May 2017

07-Str-B2, 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.

    1.   20 marks
    2.   20 marks
    3.   20 marks
    4.   20 marks
    5.   20 marks
    6.   20 marks

1. Scheduling:

The duration and direct-cost data for an activity-on-arrow network is given in the following table and figure.

(a) Using normal durations, perform CPM calculations and determine the critical path.
(b) Determine the optimum project crashing strategy (i.e., project duration with least total cost). Any activity duration between the normal and the crash values is possible. Indirect costs are equal to ($500 / day).
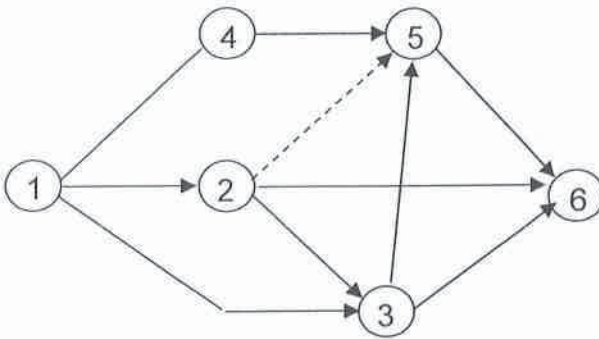
Activity	Normal		Crash	
	Dur.(d)	Cost ($x100)	Dur. (d)	Cost ($x100)
A (1-2)	8	20	5	33
B (2-3)	4	16	2	32
C (2-6)	5	10	5	10
D (1-3)	4	40	4	40
E (3-6)	8	16	3	36
F (3-5)	2	2	1	5
G (1-4)	4	15	4	15
H (4-5)	3	16	3	21
I (5-6)	4	16.5	2	30.5

2. Litigation:

Discuss the main reasons for delay-related claims on construction projects and the contractual modifications that can reduce such claims. Also, discuss the various approaches by which a claim can be settled and the types of delay analyses that need to be performed to validate and judge such claims.

3. Productivity:

Discuss the factors that can impact workers' productivity on construction sites; how a construction site can be arrange to improve productivity; and possible ways to improve morale and motivate workers to improve productivity.

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	$70,000	$50,000
Yearly operating cost	$2,500	$1,000
Major Maintenance (every 5 years)	$5,000	$3,000
Yearly revenue	$13,500	$16,000
Life	15 years	10 years

5. Cash Flow:

(a) Sketch and briefly explain the general trend of a typical S-Curve.

(b) The cash flow diagram for a small project is shown. Estimate the amount of interest charged on borrowed money using an interest rate of 1% per month. Also, Estimate the highest amount of cash needed. Briefly discuss how a down payment can reduce interest charges.
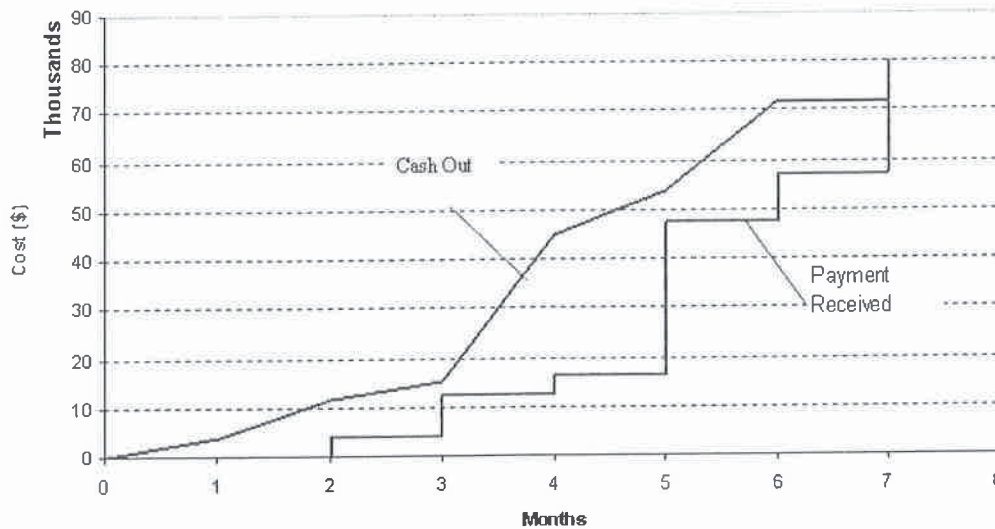
6. Safety Practices and Regulations:

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 highway rehabilitation work zones, particularly during night construction, to assure an accident-free environment.