National Exams May 2015

98-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.

Marking Scheme

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

1. Schedulin :

The table shows the activities' names, durations and predecessors of a small project. Draw an Activity-On-Arrow network, identify the critical path, and calculate the activities' total floats.

ACT	DUR	PREDECESSORS
A	1	
B	8	A
C	4	A
P	7	A
L	2	B
M	4	C
Q	4	P,C
N	9	P
Y	5	L,Q
F	10	M
J	2	Q
S	2	N
V	5	Y,F,J
QI	1	V,S

2. Contract Administration:

Discuss the project environment that best suits the following contractual approaches: Design-Bid-Build, Turnkey, Lane Rental. Also, discuss the level of risk carried by both the owner and the contractor organizations in each of the three contractual approaches.

3. Estimating and Bidding:

Estimate the total cost and cost per linear foot for excavating a trench 30in. wide with an average depth of 7ft. The trench is 2,940ft long in common earth. A ladder-type trenching machine will be used (data on the side table). Assume an efficiency of 45 min per hour. The cost of the Trenching machine is $87/hr, machine operator is $25/hr, and the laborer and foreman will cost $20/hr each.

Depth of trench, ft	Width of trench, in.	Digging speed, ft/hr
4–6	16, 20, 22	100–300
	24, 26, 28	75–200
	30, 32, 36	40–125
6–8	16, 20, 22	40–125
	24, 26, 28	30–60
	30, 32, 36	25–50
8–12	18, 24, 30	30–75
	32, 24, 36	14–40

4. Engineerin 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	$62,000	$80,000
Yearly operating cost	$1,500	$1,000
Major Maintenance (every 3 years)	$15,000	$13,000
Yearly revenue	$11,500	$16,000
Life	9 years	9 years

5. Safety Practices and Re ulations:

Briefly discuss each of the following safety measures and if it suitable for a highway versus building projects, or both:

1 Scaffolding	6 First aid and fire safety
2 Fall protection	7 Confined spaces
3 Ladder safety	8 Record keeping
4 Respiratory safety	9 Welding safety
5 Personal protective equipment (PPE)	10 Training

6. Productivity:

Discuss the factors that can impact workers productivity on construction sites. Discuss briefly how productivity can be measured and ways to improve it.