

## National Exams Dec 2018

### 16-Civ-B8, Management of Construction

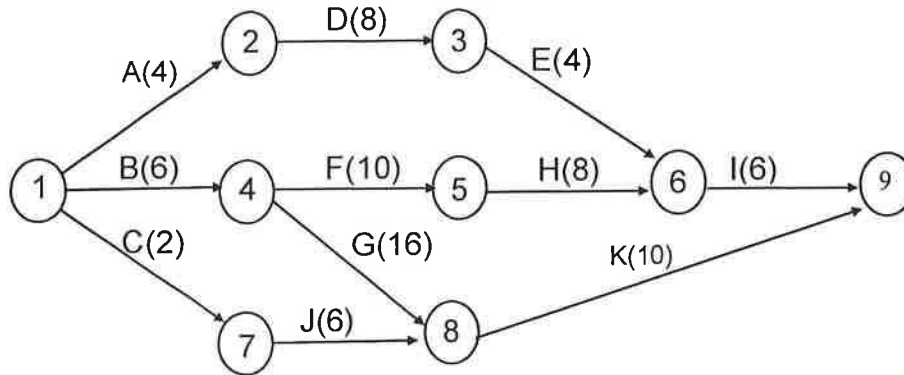
3 hours duration

#### 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.

**1. Scheduling:**

For the project network below: (a) Calculate total floats and identify the critical path; (b) What is the effect of delaying activity F by 3 days on project duration?; and (c) draw the equivalent AON network.



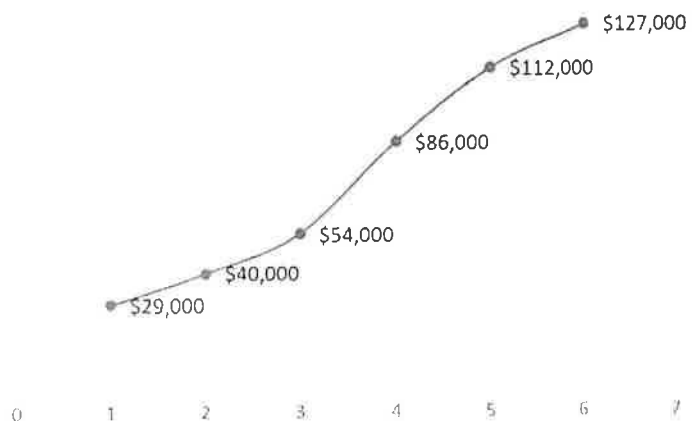
**2. Contract Administration:**

Discuss and compare the following types of contracts/delivery approaches: Lump Sum, Unit Price, Turn- Key, Cost-Plus, in terms of: Suitability to specific projects; relative degree of risk carried by the owner and the contractor; and relative cost/time of delivery.

**3. Project Control:**

The **budget** S-curve for a small project is shown:

- (a) Calculate and draw the S-curve of expenses against the expected owner payments;
- (b) Estimate the amount of interest chargeable on borrowed money and the overdraft limit needed. Markup is 10%; Owner retention is 5% (payable with last payment); Owner payment delay is 1 month; Interest rate is 12% per annum.



**4. Engineering Economics:**

Annual maintenance costs for a particular section of highway pavement are \$7,000. The placement of a new surface would reduce the annual maintenance cost to \$2,500 per year for the first 5 years and to \$4,000 per year for the next five years. The annual maintenance after 10 years would again be \$7,000. If maintenance costs are the only saving, calculate the maximum investment that can be justified for the new surface, with interest at 10%.

**5. Insurance:**

Discuss the differences between bid bonds and performance bonds. Also, discuss the purpose and mechanics liens in construction.

**6. Estimating:**

A masonry work involves laying 6,000 sqf of economy size brick veneer. Complete the following R.S. Means tables, assuming that labor overhead and profit (O&P) is 60%. If you use 5 bricklayers and 3 helpers, estimate the total cost and duration of this job.

Unit Masonry Assemblies	Crew	Daily Output	Labor Hrs/unit	Unit	Bare Costs / unit				Total \$/Unit
					Mat	Labor	Equip	Total	Incl O & P
Economy, 4" x 4" x 8" (4.50/S.F.)	D 8		0.129	sqf	\$3.54				

Related Crew

Crew D-8		Bare Costs		Incl. O&P		Cost Per Labor-hour	
		Hr.	Daily	Hr.	Daily	Bare costs	Incl. O&P
3	Bricklayer	\$35.25	\$40				
2	Bricklayer Helper	\$26.90	\$30				
40	Total Hours						