

**National Exams May 2007**

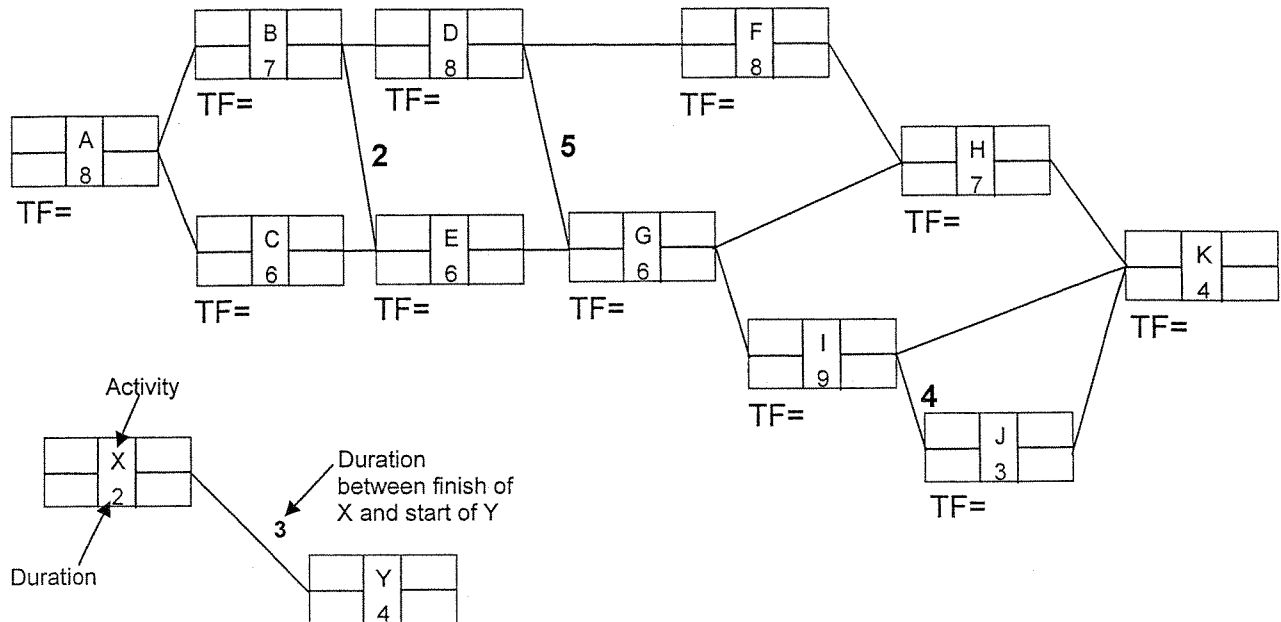
**98-Civ-B8, Management of Construction**

**3 hours duration**

**Notes:**

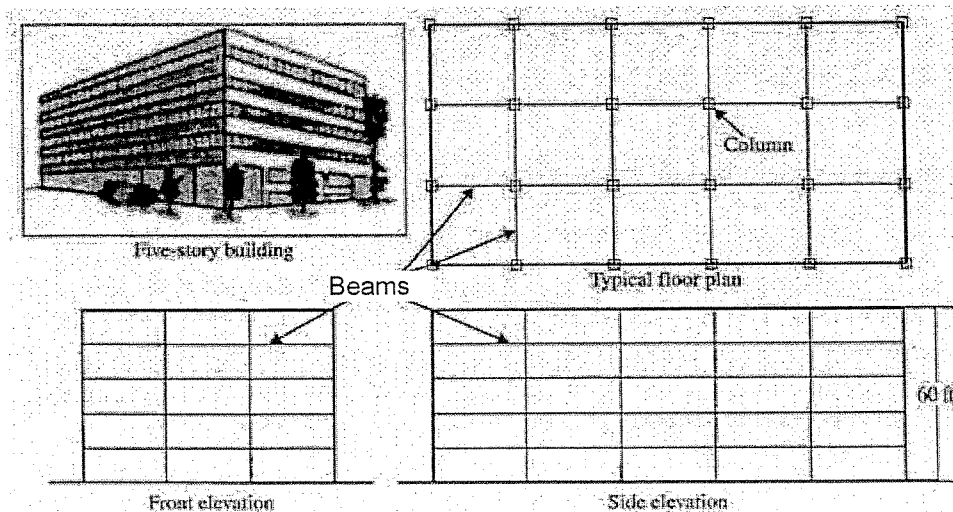
1. If doubt exists as to the interpretation of any question, the candidate is urged to submit with the answer paper, a clear statement of any assumptions made;
2. This is a "Closed Book" exam. Candidates may use one of two calculators, the Casio or the Sharp approved models;
3. Any five questions constitute 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.

**1. Scheduling:** Perform schedule calculations for the following network and define the critical path.



**2. Estimating:**

The plan and elevation of a five-story structural steel building is shown in the following drawing. Column erection requires a crew of 4 ironworkers, 1 crane operator, and 1 foreman, in addition to one crane equipment. All beams have 20-ft span lengths and will be erected by the same crew and equipment. The crew-hours per 1,000 linear feet of columns and beams are 9.5 and 11.5, respectively. Estimate the duration to erect the beams and the columns.



**3. Contract Administration:**

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

**4. Project Control:**

- (a) Briefly discuss the project's S-Curve and explain its shape;
- (b) Sketch a typical project S-Curve and show the expenses versus expected payment profiles; and
- (c) Explain how the S-curve can be used for project control.

**5. Engineering Economics:**

Annual maintenance costs for a particular section of highway pavement are \$2,000. The placement of a new surface would reduce the annual maintenance cost to \$500 per year for the first 5 years and to \$1,000 per year for the next five years. The annual maintenance after 10 years would again be \$2,000. If maintenance costs are the only saving, calculate the maximum investment that can be justified for the new surface, with interest at 7%.

**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 the construction site of a high-rise building project to assure an accident-free environment.