

07-Bld-A3 Construction Engineering

National Exams December 2011

3 hours duration

NOTES:

1. If doubt exists as to the interpretation of any questions, the candidate is required to submit with the answer paper, a clear statement of any assumptions made;
2. This is a CLOSED BOOK EXAM. Only Casio or Sharp Calculator approved calculator is permitted;
3. This paper has SEVEN questions. Answer any FIVE questions, which constitute the paper.
4. All questions carry equal marks;
5. For essay questions, clarity and organization of the answers are important.

1. Read the following case and then answer the questions related to it.

Andrew Smith has recently been appointed project manager of a new project for his company. The goal of the project is to produce a complete renovation from a factory to a school. Renovating schools are extremely price-sensitive and all project managers are under a great deal of pressure to submit realistic budgets so that go/no go project decisions can be made quickly.

The Company recently fired a project manager for overestimating project costs at the feasibility stage of a similar renovating project. As a consequence, the project was cancelled at an early stage of its development only to find that a competitor did win that project a few months later that proved to be very successful.

Andrew's dilemma is how to construct a budget that accurately reflects the cost of the proposed renovating. Although he is an experienced project manager who feels comfortable with his estimating ability, the recent firing of his colleague has made him rather nervous. He has found that only one of the stages of the traditional four-stage renovating process needs to be completely changed. This will cause some minor changes to the other three stages, but it will represent almost 50% of the total renovating cost.

Under these circumstances, what budgeting approaches should Andrew adopt and why? (20 marks)

2. A) Crashing a critical or non-critical activity will not influence project duration? Select the correct answer and briefly explain your reasoning. (10 marks)

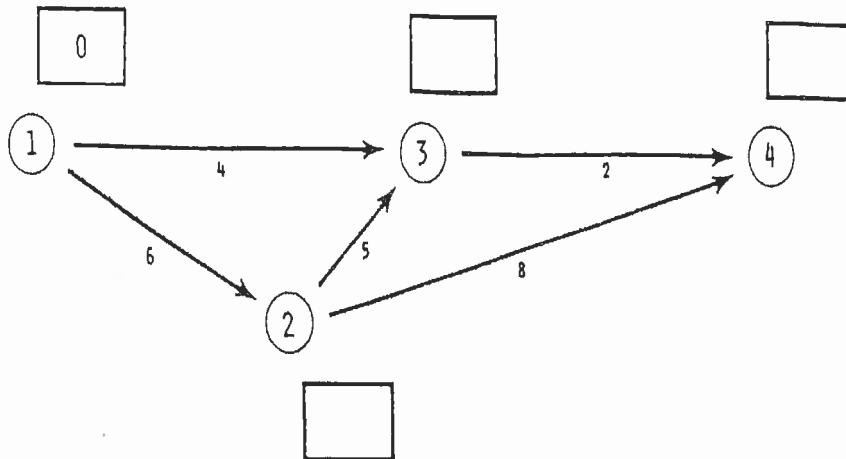
- a) True
- b) False

B) Float is the difference between time available and time required to complete an activity. Describe how this can affect the total float (total slack) in the overall scheme of a project and the critical path. (10 marks)

3. A) Explain the main difference between planning and scheduling and give one example of each? (10 marks)

B) The planning process involves three steps of plan, schedule and control. Describe the requirements for each step and list the scope, work breakdown schedule, milestone placement, and monitoring of actual versus planned budget accordingly within each process? (10 marks)

4. A) Complete the diagram below by inputting the number of days in each square (activities 1 to 4) and identify the critical path. The numbers below the arrows represent number of days. (10 marks)



- B) Construct the precedence for the above diagram including duration, early start/early finish, late start/late finish and float (slack) for each activity. (10 marks)

5. A) The required labour time for 2 technologists to complete a job is 8 hours total at a rate of \$19.50/hour. Assuming project overhead charges are 75% and allowance for personal time is 10%, calculate the total cost? (8 marks)

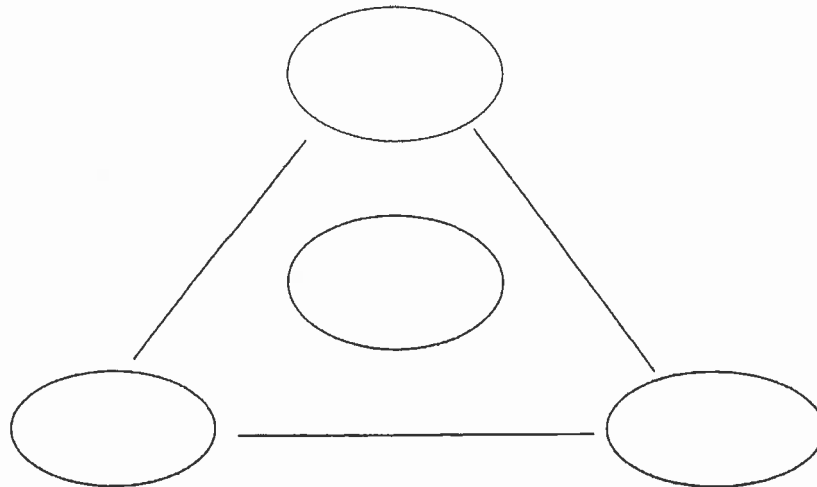
- B) Assuming that another project requires duration of 24 hours to complete, and the project is finished in 20 hours, identify the number of workers with the time spent by each on the project? Show your method and calculation by using the given formula of: $Work = Duration \times Units$. (7 marks)

- C) Suppose you want to crash the activity and need to complete the project in one working day. Using the same formula from above, show how this could be done without requiring overtime hours. (5 marks)

6. A) One technique for resolving project conflict is negotiation. There are three techniques commonly used for negotiation and it includes partnering, chartering,

and scope change. Briefly describe one of the techniques and give a situation where it can be applied. (10 marks)

B) Identify the relationship between project scope and cost, time and quality by labeling each in the diagram below? Briefly explain the trade-off relationship? (10 marks)



7. A contractor that specialize high-rise condominium in Ontario has been awarded a contract to construction a 20-story condominium with three lower level retails in a well built up area in Toronto. The contract is for two years with a fixed date for completion after which a \$100,000 per day penalty will apply. This is considered to be a major undertaking, is of strategic importance, and will require a matrix organization. The company has selected you as the Project Manager and a team to follow the project through to completion. You decide to employ a scheduling technique that should fulfill the following criteria: simple to follow; able to show the duration and sequence of events; able to indicate planned and actual flow; and able to show which items may proceed together and how far they are from completion. The Assistant Project Manager favors use of a Gantt chart, whereas the financial controller prefers PERT, and the Technology Department would like to use CPN.

Evaluate the techniques stated above (and any others that may be appropriate) and provide a persuasive argument for your choice of what should be used. (20 marks)