

Question 1 (33%)

- (a) (3%) Explain with the aid of simple diagrams the use of identity and logic dummies in an Activity on Arrow Network.
- (b) (5%) Discuss briefly the relative strengths and weaknesses of bar charts and networks in project management.
- (c) (15%) Table 1 gives details of the dependency and duration times of activities of a project.
 - i. Draw a "Precedence" Network for this project.
 - ii. What is the total project time?
 - iii. Determine the critical path, free float, and total float (slack) for the project.

Table 1

Activity	Predecessors	Duration	Shortest Possible Completion Time	Normal Completion Time Cost	Crash Completion Time Cost
A	---	6	4	70	90
B	---	12	8	150	210
C	---	16	11	200	250
D	A	5	4	60	80
E	B	3	1	40	60
F	C	10	9	120	140
G	B,D	9	6	100	130
H	C,E	4	2	50	70
I	F	5	3	70	90
J	F	3	2	60	80
K	E,G,I	10	7	120	150
L	H,J	6	3	70	100

- (d) (10%) Determine the project crash time and all-crash cost based on Table 1. Also, suggest a combination of activity durations which will lead to a project completion time equal to three days longer than the project crash time but would result in the maximum savings

Question 2 (22%)

- (a) (10%) Gives five potential sources of risk or uncertainty associated with **human factors** in a construction project.
- (b) (6%) Both client and contractor are risk takers in a project. Briefly discuss how some of the risks they face are shared and others are separate. What technical approaches are available to both in their response to risk?
- (c) (6%) What are the three most critical factors to be considered when managing a construction project?

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Question 3 (24%)

- (a) (8%) What Information is Included in a BIM Project Execution Plan?
- (b) (8%) What are the benefits of using building information modeling in construction management?
- (c) (8%) Give two examples of how automation technology is changing construction industry.

Question 4 (9%)

According to the latest standards & guideline publication of Project Management Institute (PMI), what are the 9 knowledge areas (functions) of project management?

Question 5 (12%)

- (a) (6%) What is the difference between a lump sum and a unit price contract?
- (b) (6%) Discuss at least three disadvantages of PERT that, in your opinion, have contributed to its limited use.

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