

JK LAKSHMIPAT UNIVERSITY, JAIPUR

INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination (Backlog), November-December 2015

B. Tech. in Civil Engineering, Semester VI

Roll No.....

CE606 : Construction Project Management

Time: 3 hours

Max. Marks: 100

Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.

Q.1A State whether following statements are true or false. (10 questions @ 1 mark) 10

- i. Forward pass calculations yield the earliest start & finish times of various activities.
- ii. A contract is the term used for when the parties have reached agreement.
- iii. When project time duration is reduced the project direct cost increases.
- iv. Critical path is the maximum time required for project completion.
- v. For critical activity, earliest and latest finish times are same.
- vi. The amount of time by which an activity can be delayed from its early start without delaying the early start of the succeeding activity is called total float.
- vii. Nodes should be numbered in such a way that, for every activity, the initial node bears a higher number while final node bears a lower number.
- viii. Optimum duration is project duration at which total project cost is lowest.
- ix. The resources are allotted to the activity which has maximum float,
- x. A project network may have none, one or more critical paths.

Q.2 Short answer type questions (4 questions @ 2.5 marks)

- i. Explain the necessity of a tender? 2.5
- ii. Write short notes on:
 - a. Value engineering. 2.5
 - b. Direct and indirect cost of project 2.5
 - c. Work break down structure. 2.5

Q.3A Explain Internal Rate of Return. 05

Q.3B Explain the necessity of Work Breakdown Structure. 05

Q.4A Explain the payback period of a project. 05

Q.4B Differentiate between CPM & PERT. 05

Q.5A What is contract? Why contract is required? 05

Q.5B Write the advantages and disadvantages of lump sum contract. 05

Q.6A A publisher has a contract with an author to publish a textbook. The simplified (activities) associated with the production of the textbook are given below. The author is required to submit to the publisher a hard copy and a computer file of the manuscript. Develop the associated network for the project. Determine the critical path and find the total project duration.

05

Activity	Predecessor(s)	Duration (weeks)
A: Manuscript proofreading by editor	—	3
B: Sample pages preparation	—	2
C: Book cover design	—	4
D: Artwork preparation	—	3
E: Author's approval of edited manuscript and sample pages	A, B	2
F: Book formatting	E	4
G: Author's review of formatted pages	F	2
H: Author's review of artwork	D	1
I: Production of printing plates	G, H	2
J: Book production and binding	C, I	4

Q.6B Using the above data, calculate latest start and finish time of all the activities.

05

OR

Q.6B Using the above data, calculate earliest start and finish time of all the activities.

05

Q.7 A small project is composed of seven activities, whose time estimates are listed below. Activities are identified by their beginning (i) and (j) node number.

10

Activity (i-j)	Estimated durations (in days)		
	Optimistic	Most Likely	Pessimistic
1-2	2	2	14
1-3	2	8	14
1-4	4	4	16
2-5	2	2	2
3-5	4	10	28
4-6	4	10	16
5-6	6	12	30

Required :

- Draw the project network.
- Find the expected duration and variance of each activity.
- Determine the critical path and the expected project duration.
- What is the probability that the project will be completed at least 8 days earlier than expected?
- If the project due date is 38 days, what is the probability of not meeting the due date?

Given : $Z_{0.50}=0.3085$, $Z_{0.67}=0.2514$, $Z_{1.00}=0.1587$, $Z_{1.33}=0.0918$, $Z_{2.00}=0.0228$

Q.8A A small project consists of jobs as given in the table below. Each job is listed with its normal time and a minimum or crash time (in days). The cost (in Rs. per day) for each job is also given: (2+3)

Job (i-j)	Normal Duration (in days)	Minimum (crash) Duration (in days)	Cost of Crashing (Rs. per day)
1-2	9	6	20
1-3	8	5	25
1-4	15	10	30
2-4	5	3	10
3-4	10	6	15
4-5	2	1	40

Indirect cost of the project is Rs: 300 per day.

- Draw network of the project.
- What is normal duration and normal cost of the project.

Q.8A Find the optimum duration and minimum project cost. In the above question. 05

OR

Q.8B Find the minimum duration of project and project cost after crashing. 05

Q.9A The Madras Construction Company is bidding on a contract to install a line of microwave towers. It has identified the following activities, along with their expected time, predecessor restrictions, and worker requirements: 10

Activity	Duration, Weeks	Predecessor	Crew size, workers
A	4	None	4
B	7	None	2
C	3	A	2
D	3	A	4
E	2	B	3
F	2	B	3
G	2	D, E	3
H	3	F, G	4

Find the critical path. Also calculate the free float and total float for each activity.

Q.9B What is the peak requirement of Manpower? On which day(s) will this occur? 10
Also plot a graph of man power required per day

OR

Q.9B If the maximum no. of resources available during the project is 5, find out project duration for completion of project. Also mention the critical path, if any. 10