

Dr Manendra Singh

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29/11/2023 (E)

End Semester Theory Examination, December 2023

Department of Civil Engineering- NIT Hamirpur

CE-433 CPT and PERT

Marks 50

Time: 3h

Course coordinator: Dr. Manendra Singh, DoCE

Instructions: Read the instructions carefully.

- Write to the point only. Do not write anything which is not related to the question.
- Do all parts of a question in sequence order otherwise other parts may not be evaluated.
- There is no step marking therefore whatever you attempt try to do correctly.
- Assume missing data, if any.

Q. 1 Explain the following type of contracts:

- a) Lump sum and schedule contract
- b) Joint venture contract

5 marks

Q. 2 a) Explain the line and staff organisation. Also discuss the suitability merits and demerits of line and staff organisation

5 marks

b) Define histogram or resource uses profile. Also differentiate between resources smoothing and resources levelling.

5 marks

c) What is Work Breakdown Structures. Also explain the various functions of construction management.

5 marks

Q. 3 A father notes that his teenage daughter uses the telephone. She takes no less than 5 minutes for a call and sometimes as much as an hour. Fifteen minutes calls are more frequent than any calls of any other duration. If daughter's call were an activity in PERT project:

- a) What would be the phone calls expected duration?
- b) What estimate would you give for its variance?
- c) In scheduling the project, how much time would you allocate for phone call?

5 marks

Q. 4 The figure 1 shows the network for a construction project, with the three times estimates of each activity marked.

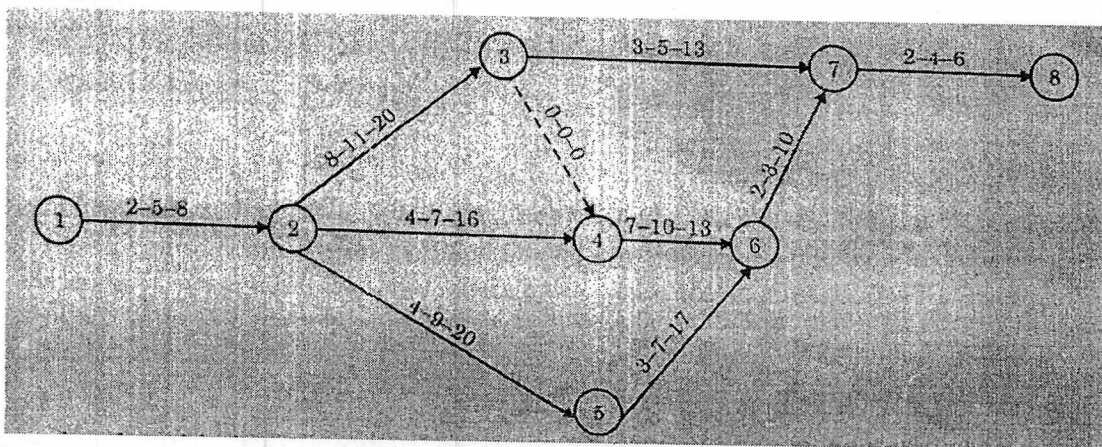


Fig. 1

Determine the critical path based on concepts of slack and its standard deviation. Also compute the time duration that will provide 95% probability of its completion in time.

Give the calculations in tabular form.

Z	1.0	1.1	1.2	1.3	1.4	1.5
Probability (%)	84.13	86.43	88.49	90.32	91.92	93.32

5 marks

Q. 5 The following information is available about the various activities of network:

Activity	t_n (Days)	t_c (Days)	C_n (Rs.)	C_c (Rs.)
A	8	4	6000	12000
B	4	2	2000	14000
C	10	4	4000	8000
D	6	4	4000	8000

Project overhead cost is 1000/week. A and B are starting activities; C follows B; D follows A and C; D is the finishing activity. Draw network diagram and find optimum cost and optimum duration of the project.

10 marks

Q. 6 a) The data for planning a project by network technique is given below:

Activity	Duration (weeks)	Activity immediately	
		Preceding	Following
A	4	-	B, C
B	4	A	D, E
C	6	A	E, G
D	3	B	E, G
E	6	C, D	H, I
F	6	B	I
G	5	C, D	I
H	7	E	-
I	4	E, F, G	-

i) Draw the Network diagram, ii) Calculate Activity times and Total float of each activity in tabular (activity order must be in same order as mentioned in above table iii) Find critical path and project duration.

b) The network in part (a) is to be updated after 10 days of its execution. The following conditions exist at the time of updating:

- Activities A, B, C were completed as originally planned.
- Other activities have not been commenced and their original predicted durations will hold good except for activity E which will require only 3 days instead of 6 days originally planned.

Update the network and determine the critical path and duration of the updated network.

10 marks