

CRITICAL PATH ANALYSIS

Question 1

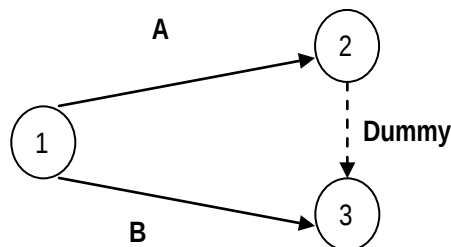
Explain the following in the context of a network:

- (i) Critical path
- (ii) Dummy activity.

(4 Marks)(June, 2009)

Answer

- (i) **Critical Path:** Critical Path is a chain of activities that begin with the starting event and ends with ending event of a particular project. It is that path that runs through a network with the maximum length of time or it indicates the maximum possible time required for completion of a project. Critical path indicates the minimum time that will be required to complete a project. It is determined after identifying critical events. Critical path goes through critical events.
- (ii) **Dummy Activities:** Dummy Activity is that activity which does not consume time or resources. It is used when two or more activities have same initial and terminal events. As a result of using dummy activities, other activities can be identified by unique end events. These are usually shown by arrows with dashed lines.



Question 2

List the 5 steps involved in the methodology of critical path analysis.

(4 Marks)(Nov., 2010)

Answer

Working Methodology of PERT:

The working methodology of PERT which includes both CPM and PERT, consists of following five steps:

1. Analyze and break down the project in terms of specific activities and/or events.
2. Determine the interdependence and sequence of specific activities and prepare a network.
3. Assign estimates of time, cost or both to all the activities of the network.
4. Identify the longest or critical path through the network.
5. Monitor, evaluate and control the progress of the project by re-planning, rescheduling and reassignment of resources.

Question 3

A small project is composed of seven activities, whose time estimates are listed below. Activities are identified by their beginning (i) and ending (j) note numbers:

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

- (a) Draw the project network.
- (b) Find the expected duration and variance for each activity. What is the expected project length?

Given :	Z	0.50	0.67	1.00	1.33	2.00
	P	0.3085	0.2514	0.1587	0.0918	0.0228

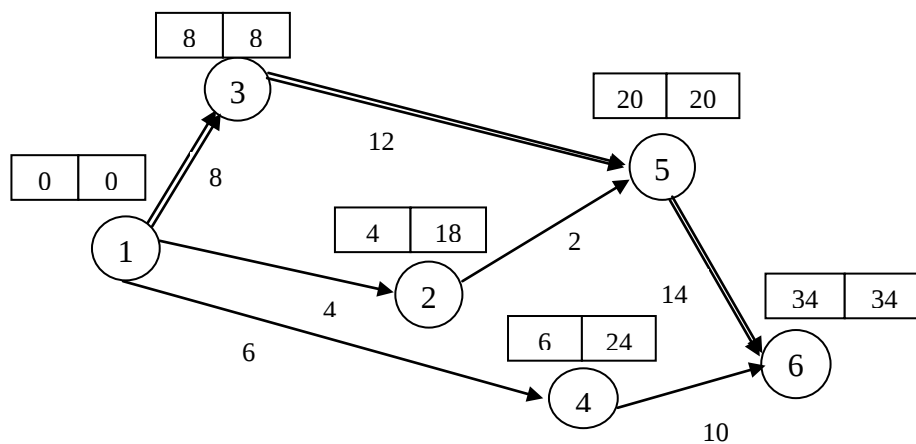
(4 Marks)

Answer

Activity Estimated Durations :

Activity estimated durations (days) $t_e = \frac{(a + 4m + b)}{6}$ Duration

Activity	a	m	b	t_e	$s = [(b - a)/6]^2$
1-2	2	2	14	4	4
1-3	2	8	14	8	4
1-4	4	4	16	6	4
2-5	2	2	2	2	0
3-5	4	10	28	12	16
4-6	4	10	16	10	4
5-6	6	12	30	14	16



Critical path is 1-3-5-6.

The expected project duration = 8+12+14 = 34 days