As part of the assessment for Unit F248 – Strategic Decision-Making – the examination may contain questions concerning critical path analysis. Candidates are likely to be asked one or more of the following:

1. To complete a network diagram from data given in a gantt chart or table
2. To complete a network diagram by filling-in the EST and LFT entries for the remaining nodes
3. To calculate the float time for a given activity
4. To determine the shortest time in which a project can be completed
5. To identify a critical path
6. To analyse a network diagram
7. To evaluate the usefulness of critical path as a decision-making tool.

All questions require the candidate to have a sound understanding of the mechanics of critical path analysis in order to access the available marks.

In the examination the network diagram will be presented according to common convention: Nodes will be labelled by number and tasks by letter. Nodes will be shown as circles and elapsed time by arrows. The EST (earliest start time for an activity) is to be positioned in the top right quadrant of the node and the LFT (latest finish time) in the bottom right quadrant.

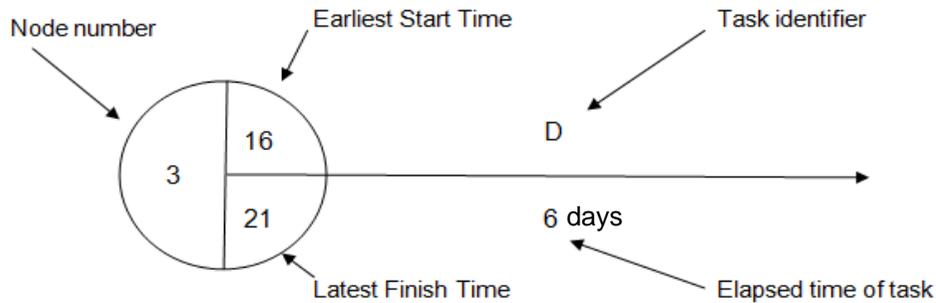In the notation diagram which follows (units in days):

The node number is 3.
The earliest start time for the following tasks is day 16.
The latest finish time for the preceding tasks is day 21.
The task which follows node 3 is labelled task D and will take 6 days.

Notation diagram:

In the examination the network diagram itself will vary in composition depending on the number, dependence and concurrency of tasks in the project being illustrated. In all cases, however, candidates should be taught to begin by inserting the EST for each task into the appropriate node working in order from **left to right**. Only when the final node is reached should candidates insert the LFT entries, this time working in order from **right to left**.

The shortest length of time that a project can be completed by is shown in the final node (farthest right).

The critical path can be identified by following the path where the EST and LFTs are the same.
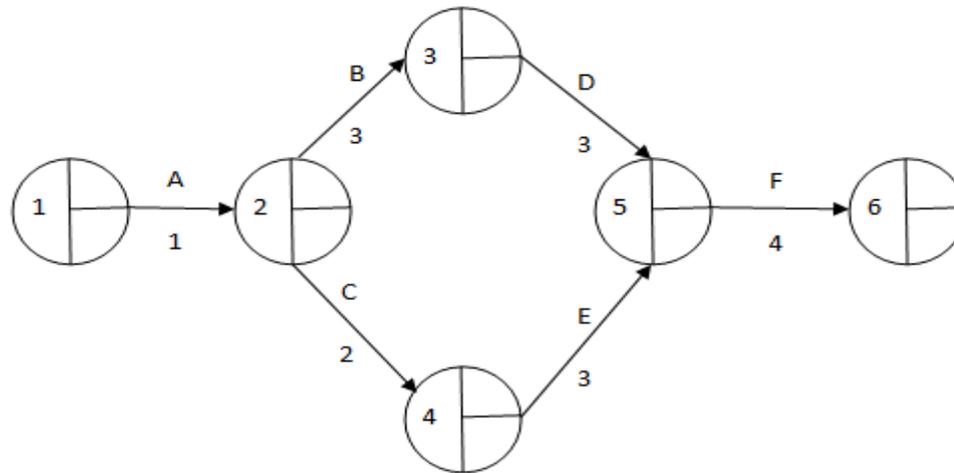
The formula for calculating the total float for a task is: LFT at end of task – duration of task – EST at start of task.

Worked example:

Racoons Restaurant has decided to carry out some market research to find out existing customers' and local residents' attitudes to the proposed extension of its opening hours. The tasks involved are shown in the table below.

| Task	Description	Order/Logic	Duration
A	Plan primary research	To be completed first	1 week
B	Prepare postal questionnaire	Start when A is complete	3 weeks
C	Prepare email survey	Start when A is complete	2 weeks
D	Post questionnaires and wait for replies	Start when B is complete	3 weeks
E	Send email surveys and wait for replies	Start when C is complete	3 weeks
F	Analyse results	Start when D and E are complete	4 weeks

Network diagram:

Required:

(a) Complete the network diagram by inserting the EST (earliest start time) and LFT (latest finish time) for each node on the diagram.

(b) Calculate the total float for task C.

(c) Identify the critical path.

(d) Identify the shortest length of time it can take to complete this market research.

Method:

(a) (i) First enter the ESTs for all nodes from **left to right** beginning with **node 1**.

B 3 4
D

3   3

0 A 1   7 F 11
1   2   5   6
1   4

C
E

2

3 3
4
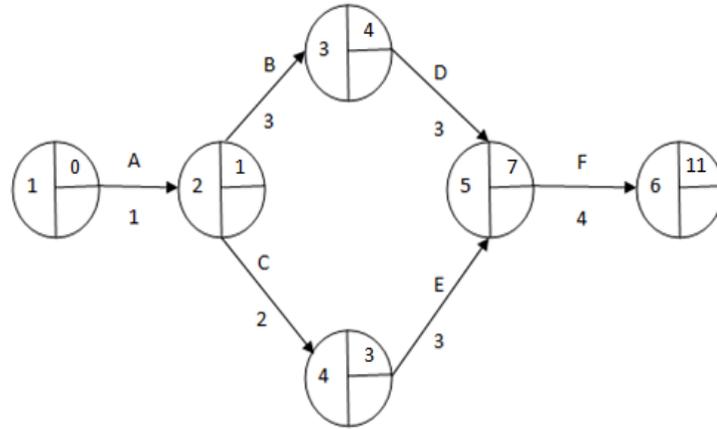
(ii) Then enter the LFTs for all nodes from **right to left** beginning with **node 6**.

B 3 4 4
D

3   3

0 A 1   7 F 11
1   2   5   6
0 1   7   4   11

C
E

2

3 3
4 4
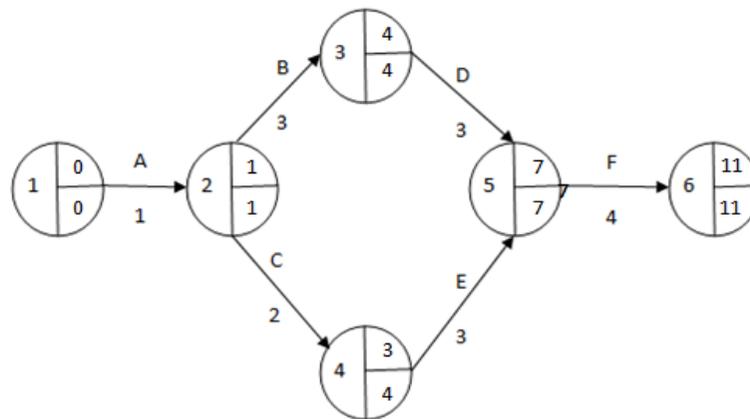
(b) Formula for total float for activity C is **LFT at end of task C – duration of task C – EST at start of task C**.

EST at start of task C

Duration of task C

LFT at end of task C
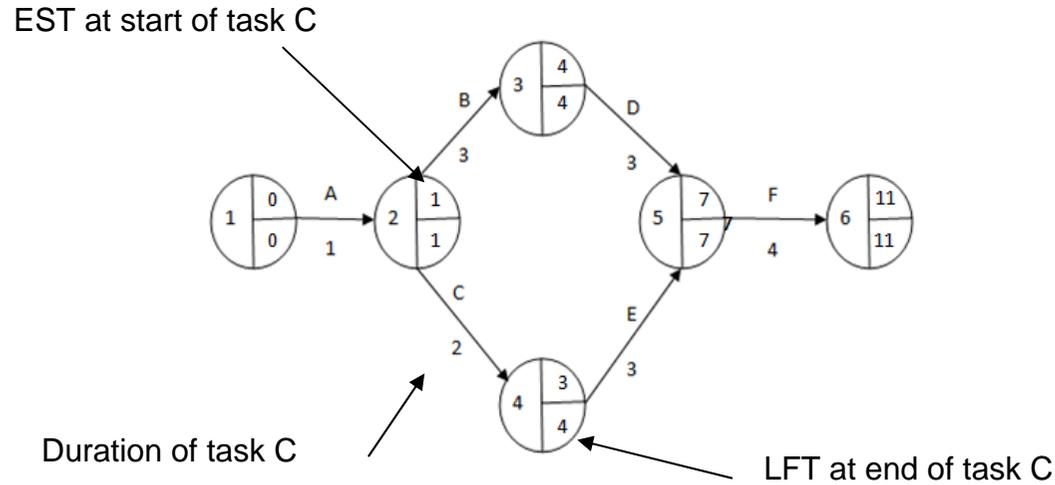
Total float for activity C is, therefore: 4 – 2 – 1 = 1 week

(c) The network diagram shows that all nodes have equal EST and LFTs apart from node 4.

The critical path is, therefore, A – B – D – F

(d) The shortest length of time it can take to complete the market research is shown in the final node, node 6.

Shortest time to completion = 11 weeks