

Decision Mathematics 1 Unit Test 5: Critical path analysis

1 The precedence table for activities in a small project is shown below.

Activity	Preceding activities
<i>A</i>	-
<i>B</i>	-
<i>C</i>	-
<i>D</i>	<i>A</i>
<i>E</i>	<i>A,B</i>
<i>F</i>	<i>C</i>
<i>G</i>	<i>E,F</i>
<i>H</i>	<i>C</i>
<i>I</i>	<i>H</i>
<i>J</i>	<i>H</i>

- a** Draw an activity network, using the minimum amount of dummies, to model this project.
- b** Explain why each of the dummy activities is needed.

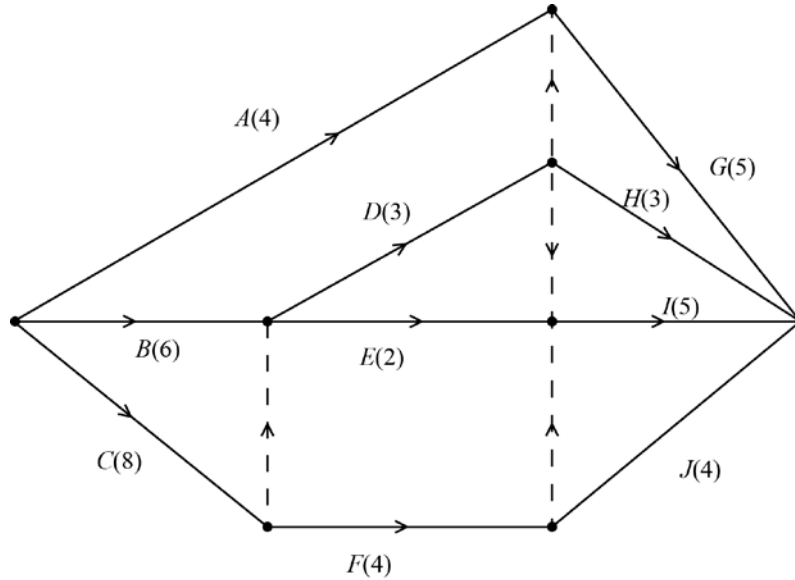
(3 marks)

(2 marks)

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2 This diagram shows an activity network for a project.

The figures in brackets show the durations of the activities in days.



Complete the table below to show the precedences for these activities.

(3 marks)

Activity	Preceding activities
A	
B	
C	
D	
E	
F	
G	
H	
I	
J	

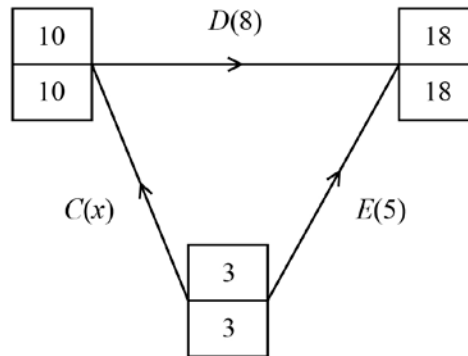
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- 3 This diagram shows part of an activity network, including the early and late event times, given in days.

Activities *C* and *D* are critical.

Key:

Early Time
Late Time



Find the value of x . Explain why activity E is not critical even though it connects two critical events.

(2 marks)

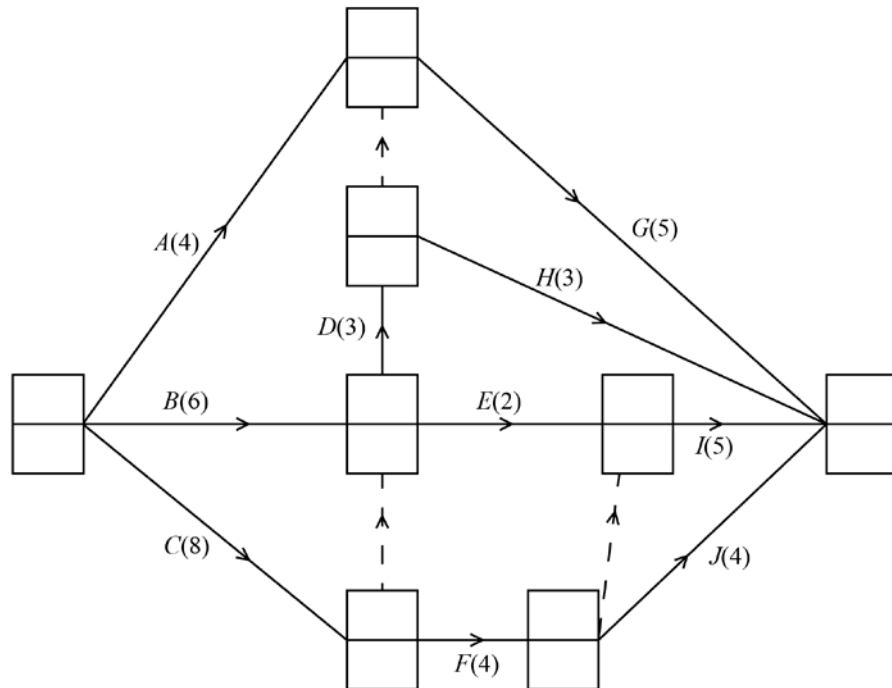
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4 This diagram shows an activity network for a project.

The numbers in brackets show the durations of the activities in days.

Key:

Early Time
Late Time



- Use the boxes on the diagram to carry out a forward pass and a backward pass. **(4 marks)**
- Find the project duration and list the critical activities. **(2 marks)**
- Calculate the lower bound for the number of workers required to complete the project. **(2 marks)**

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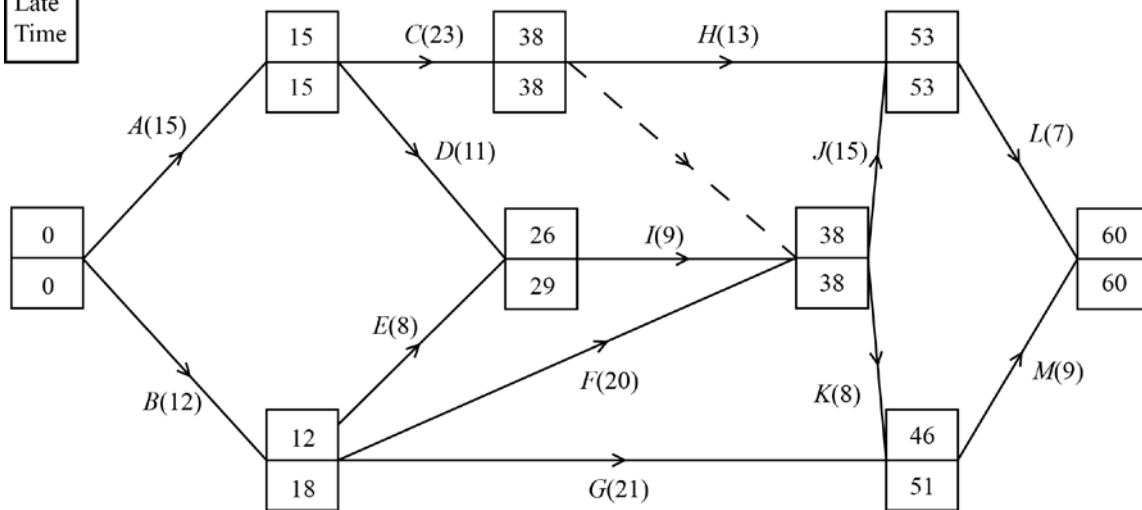
5 A construction project is modelled by the activity network shown below.

The activities are represented by the arcs.

The numbers in brackets on each arc gives the times, in days, to complete the activity.

Key:

Early Time
Late Time



a Calculate the total floats for activities *D* and *H*.

You must make the numbers you use in your calculations clear.

(3 marks)

b Using the grid on the next page, draw a cascade (Gantt) chart for this project.

(3 marks)

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- c** Which activities must be taking place on day 22? **(1 mark)**
- d** Activity *I* is delayed by one day.
Explain how this affects the project. **(2 marks)**