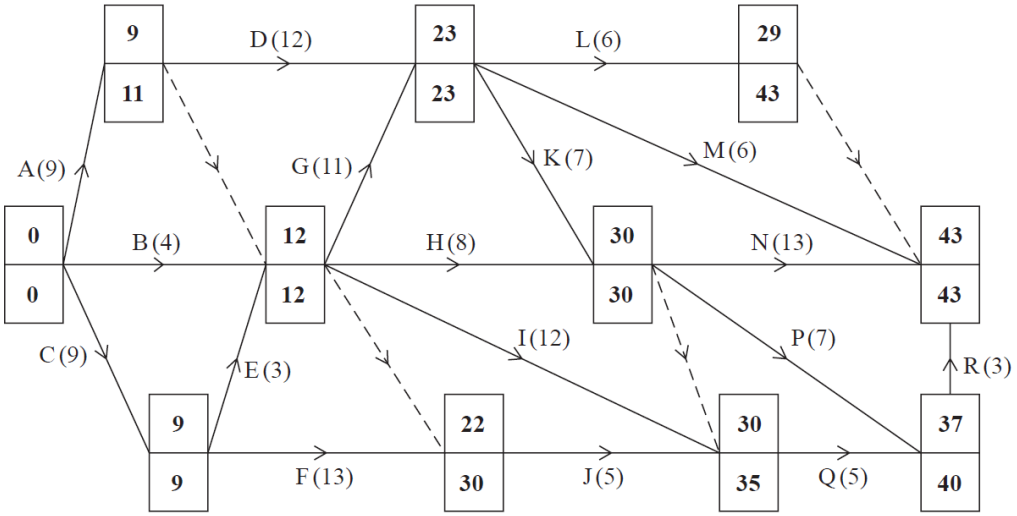
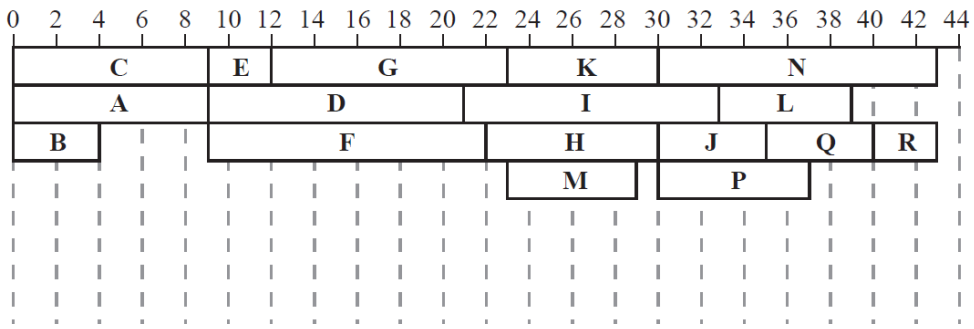
<table>
<tr><th>Question number</th><th>Scheme</th><th>Marks</th></tr>
<tr><td>4.(a)</td><td>
<table>
<tr><th>Activity</th><th>Immediately preceded by</th><th>Activity</th><th>Immediately preceded by</th><th>Activity</th><th>Immediately preceded by</th></tr>
<tr><td>A</td><td>-</td><td>G</td><td>A, B, E</td><td>M</td><td>D, G</td></tr>
<tr><td>B</td><td>-</td><td>H</td><td>A, B, E</td><td>N</td><td>H, K</td></tr>
<tr><td>C</td><td>-</td><td>I</td><td>A, B, E</td><td>P</td><td>H, K</td></tr>
<tr><td>D</td><td>A</td><td>J</td><td>A, B, E, F</td><td>Q</td><td>H, I, J, K</td></tr>
<tr><td>E</td><td>C</td><td>K</td><td>D, G</td><td>R</td><td>P, Q</td></tr>
<tr><td>F</td><td>C</td><td>L</td><td>D, G</td><td></td><td></td></tr>
</table>
</td><td>B2, 1, 0 (2)</td></tr>
<tr><td>(b)</td><td>
</td><td>M1
A1
M1
A1 (4)</td></tr>
<tr><td>(c)</td><td>Critical activities: C, E, G, K and N</td><td>B1 (1)</td></tr>
<tr><td>(d)</td><td>Float on J = 35 – 22 – 5 = 8</td><td>B1ft (1)</td></tr>
<tr><td>(e)</td><td>Lower bound is $\frac{133}{43} = 3.0930... = 4$</td><td>B1 (1)</td></tr>
<tr><td>(f)</td><td>e.g.

</td><td>M1
A1
A1
A1 (4)</td></tr>
<tr><td></td><td></td><td>(13 marks)</td></tr>
</table>

Notes for Question 4

a1B1: Any four (of the eight blank) rows correct
a2B1: All eight rows correct

b1M1: All top boxes complete, values generally increasing in the direction of the arrows (so generally going from 'left to right' across the network), condone one 'rogue' value (if values do not increase in the

direction of the arrows then if one value is ignored and the remaining values do increase in the direction of the arrows then this is considered to be a single rogue value). Note that all values in the top boxes could be incorrect but it can still score the M mark if the values are **increasing** in the way stated above
b1A1: CAO – **all** values correct in the top boxes
b2M1: All bottom boxes complete (but condone a blank box for the late event time at the end event node for the M mark only). Values generally decreasing in the opposite direction of the arrows (so generally going from 'right to left' across the network), condone one 'rogue' (as described above in **b1M1**)
b2A1: CAO – **all** values correct in the bottom boxes

c1B1: CAO (C, E, G, K and N only)

d1B1ft: correct calculation seen for their J (provided total float is non-negative). Correct answer or the correct answer following through the event times for J with no working seen scores B0 – must see all three numbers in their calculation

e1B1: CSO – 4 together with **either** a **correct** calculation seen **or** an awrt 3.1. An answer of 4 with no working scores B0. If working seen then it must be correct

f1M1: Not a cascade (Gantt) chart. 5 'workers' used at most and at least 8 new (11 in total) activities placed
f1A1: 4 workers. All 14 new (17 in total) activities present (just once). Condone at most **three** errors. An activity can give rise to at most three errors; one on duration, one on time interval and only one on IPA
f2A1: 4 workers. All 14 new (17 in total) activities present (just once). Condone **one** error **either** precedence **or** time interval **or** activity length; An activity can give rise to at most three errors; one on duration, one on time interval and only one on IPA
f3A1: 4 workers. All 14 new (17 in total) activities present (just once). No errors**.**

The table below is helpful in checking an activities duration, time interval and IPA

Activity	Duration	Time interval	IPA
D	12	9 – 23	A
E	3	9 – 12	C
F	13	9 – 30	C
G	11	12 – 23	A, B, E
H	8	12 – 30	A, B, E
I	12	12 – 35	A, B, E
J	5	22 – 35	A, B, E, F
K	7	23 – 30	D, G
L	6	23 – 43	D, G
M	6	23 – 43	D, G
N	13	30 – 43	H, K
P	7	30 – 40	H, K
Q	5	30 – 40	H, I, J, K
R	3	37 – 43	P, Q