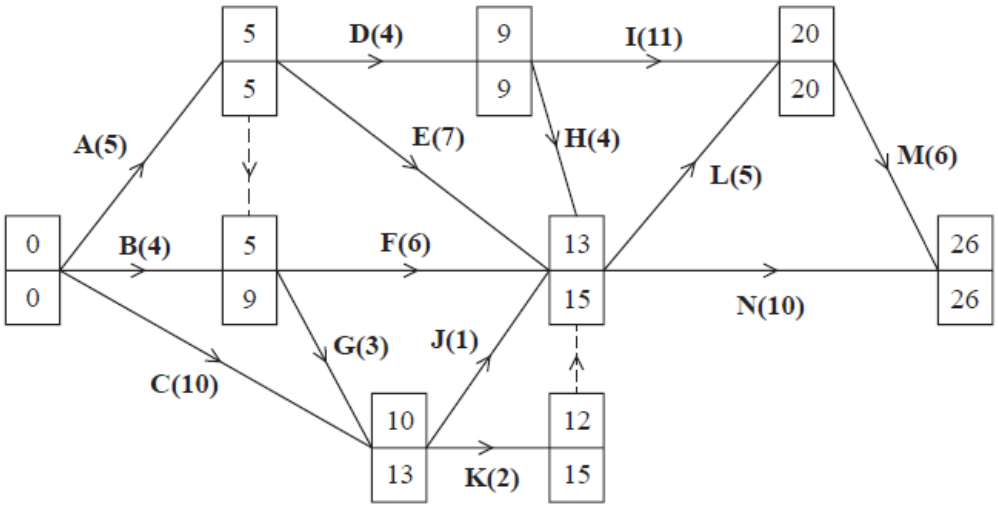
Question Number	Scheme	Marks
4.(a)(i)	The dummy from event 2 to event 3 is required because activity F (or G) relies on activity A and B but activity D (or E) relies on activity A only	B1
(ii)	The dummy from event 6 to event 7 is required as otherwise activities J and K (which both begin at event 4) would end at the same event	B1 **(2)**
(b)		M1 A1 M1 A1 **(4)**
(c)	Minimum completion time: 26 (hours) Critical activities: A, D, I and M	B1 B1 **(2)**
(d)	The early event time at event 7 is (the larger of) 12 or 9 + x The late event time at event 7 would then be either 15 or 9 + x	M1 A1 A1 **(3)**
(e)	$x = 10$	B1 **(1)**
		12 marks

Notes for Question 4

In (a) any use of the terms 'activity' and 'event' must be correct

ai1B1: CAO dependency - all relevant activities must be referred to - activities A and B and one of D or E and one of F or G (so four activities) must be mentioned
aii1B1: CAO uniqueness – please note that, for example, 'so that activities can be defined uniquely' is not sufficient to earn this mark. There must be some mention of describing activities in terms of the event at each end. However, give bod on statements that imply that an activity begins and ends at the same event (for this mark candidates do not need to explicitly mention activities J and K)

b1M1: All top boxes complete, values in the top boxes generally increasing in the direction of the arrows ('left to right'), condone one 'rogue' value (if values do not increase in the direction of the arrows then if one value is ignored and then the values do increase in the direction of the arrows then this is considered to be only one rogue value)
b1A1: CAO for the top boxes
b2M1: All bottom boxes complete, values generally decreasing in the opposite direction of the arrows ('right to left'), condone one rogue. Condone missing 0 and/or their 26 (at the end event) for the M only
b2A1: CAO for the bottom boxes

c1B1: CAO (26)
c2B1: CAO (A, D, I and M only)

Question Number	Scheme	Marks

di1M1: One of 12 or $9 + x$ as the early event time for event 7
di1A1: Both correct answers 12, $9 + x$ (A0 if 'linked' in some way e.g. $12 > 9 + x$ but bod for the M mark)
dii2A1: Both correct answers of 15, $9 + x$ for the late event time for event 7

e1B1: CAO (10)