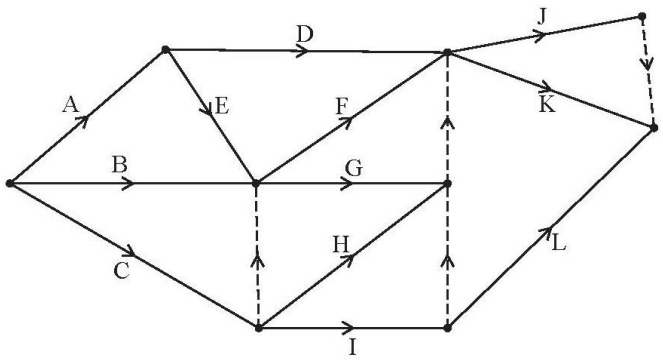
Question Number	Scheme	Marks
5. (a)	e.g.  	M1 A1 A1 A1 A1 **(5)**
(b)	Duration of activity K is 33 – 10 – 7 – 8 = 8 **or** the path AEFJ has a duration of < 33	M1
	Therefore the duration of J is less than 8 hours or 0 < dur(J) < 8	A1 **(2)**
		7 marks

Notes for Question 5

Condone lack of, or incorrect, numbered events throughout. 'Dealt with correctly' means that the activity starts from the correct event but need not necessarily finish at the correct event and **appears only once in the network**, e.g. 'G dealt with correctly' requires the correct precedences for this activity, i.e. B, C and E labelled correctly and leading into the same node and G starting from that node but do not consider the end event for G **so use the table below for checking as there a number of acceptable answers. Activity on node is M0**

If an arc is not labelled, for example, if the arc for activity E is not labelled (but the arc is present) then this will lose the first A mark and the final (CSO) A mark – they can still earn the second A mark on the bod. If two or more arcs are not labelled then mark according to the scheme. Assume that a solid line is an activity which has not been labelled rather than a dummy (even if in the correct place for where a dummy should be)

Ignore incorrect or lack of arrows on the activities for the first four marks only (but assume that they are in the 'correct' direction for checking purposes)

a1M1: At least seven activities (labelled on arc), one start and at least two dummies placed
a1A1: Activities A, B, C, D and E dealt with correctly
a2A1: Activities F, G, H and I dealt with correctly (so a dummy is required at the end of C + correct arrow)
a3A1: Activities J, K and L dealt with correctly (so **at least** two further dummies required + correct arrows)
a4A1: CSO – all arrows correctly placed for each activity with one finish and at most four dummies.
Please check all arcs carefully for arrows – if there are no arrows on any dummies then M1 only.
Note that additional (but unnecessary) 'correct' dummies that still maintain precedence for the network should only be penalised with the final A mark if earned

Extremely useful for checking (a)

Activity	A	B	C	D	E	F	G	H	I	J	K	L
IPA	-	-	-	A	A	B, C, E	B, C, E	C	C	D, F, G, H, I	D, F, G, H, I	I

b1M1: Either the correct method for calculating the duration of activity K seen (e.g. 33 – 10 – 7 – 8 or an answer of 8 can imply this mark) **or** stating the path AEFJ will have a duration < 33 or $\leqslant 33$

b1A1: Correct indication that the duration of K being 8 implies that J's duration is < 8 (allow $\leqslant 8$ but **A0** for $\leqslant 7$). As a minimum for both marks candidates must either say that the duration of K is 8 (e.g. K = 8) **or** that the path AEFJ has a duration < 33 or $\leqslant 33$, **together** with the duration of J being either < 8 or $\leqslant 8$. A lower limit is not required but if stated then it must be either > 0 or $\geqslant 0$ **only**