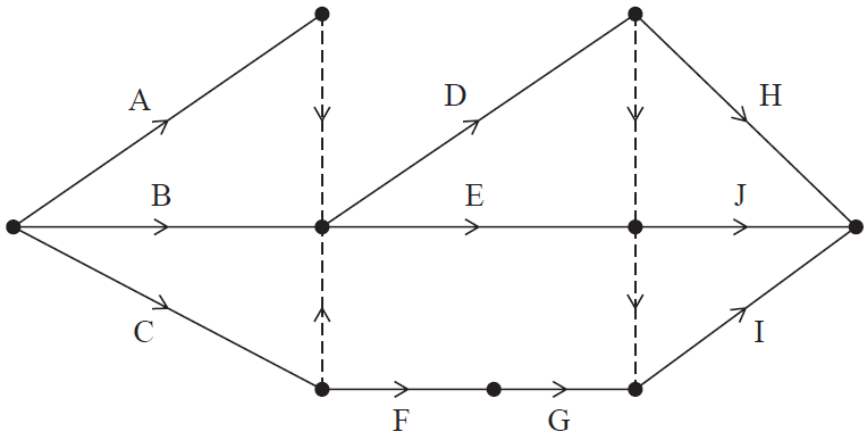
Question Number	Scheme	Marks
	 **Note that this solution is not unique e.g. A and B could be interchanged**	A1 A1 A1 **(5)**
		5 marks

Notes for Question 3

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, e.g. 'D dealt with correctly' requires the correct immediate precedences for this activity, i.e. A, B and C labelled correctly and leading into the same node and D starting from that node but do not consider the end event for D. **Activity on node is M0**

If one arc is not labelled, for example if the arc for activity F 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 strictly according to the scheme below and therefore no bod as mentioned above. 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)

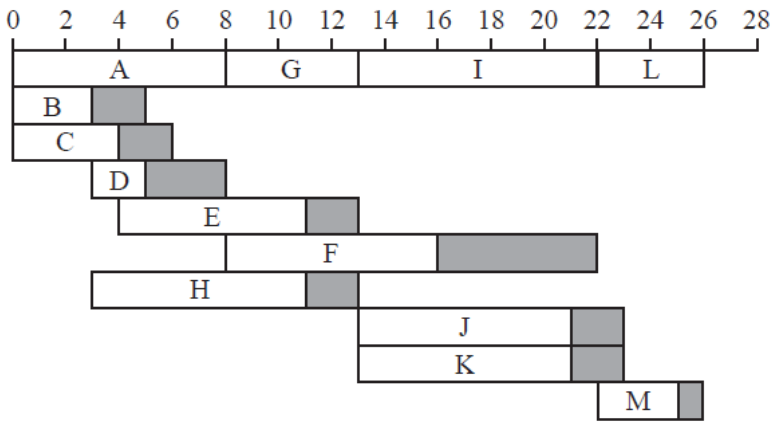
Ignore lack of arrows on the activities for the first four marks only

a1M1: Seven activities (labelled on arc), one start and at least two dummies placed
a1A1: Activities A, B, C, 1st two dummies (including correct arrows on these two dummies) and F dealt with correctly. The first two dummies are those at the end of activities A (or possibly B if A and B are interchanged in their network) and C
a2A1: D, E, G and H dealt with correctly – this mark can be scored on the bod if the arrows are missing off the first two dummies provided the dummies are in the correct place
a3A1: I and J dealt with correctly – so this requires the third and fourth dummies (including correct arrows)
a4A1: cso – all arrows correctly placed for each activity with one finish and at most four dummies (so must have scored the first four marks)
Please check all arcs carefully for arrows – if no dummy has an arrow 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

For reference in checking immediately preceding activities (for 'dealt with correctly')

A	B	C	D	E	F	G	H	I	J
-	-	-	A, B, C	A, B, C	C	F	D	D, E, G	D, E

4. (a)	Float on F is twice float on D $\Rightarrow 22-8-y=2(8-3-x)$ (oe)	B1
	BFDM is 10 less than critical path	B1

Question Number	Scheme	Marks
	$\Rightarrow 3+x+y+3=26-10$ (oe)	
	$x+y=10$ $-2x+y=4$ and solve simultaneously to find both x and y	M1
	$x=2, y=8$	A1 **(4)**
(b)		M1 A1 A1 A1 **(4)**
(c)	Lower bound is 4 workers e.g. activities F, I, J and K together with $15 < \text{time} < 16$	M1 A1 **(2)**
		10 marks

Notes for Question 4

a1B1: cao (any equivalent form) – allow $14-y=2(5-x)$ or $14-y=10-2x$

a2B1: cao (any equivalent form) – allow $x+y+6=16$

a1M1: Setting up two equations both including x and y (dependent on one correct equation) and an attempt to solve for both x and y leading to a value for x and a value for y – this mark can be implied if the candidate has two equations, both in x and y (with at least one correct), followed by values for x and y

a1A1: cao ($x = 2, y = 8$) – if both correct values are stated without any working/justification please send to review

b1M1: At least nine activities labelled including at least five floats. A scheduling diagram scores M0

b1A1: The critical activities dealt with correctly and appearing just once (A, G, I and L) and three non-critical activities dealt with correctly

b2A1: Any six non-critical activities correct (this mark is not dependent on the previous A mark)

b3A1: Completely correct Gantt chart (exactly thirteen activities appearing just once)

c1M1: Either a statement with the correct number of workers (4) and the correct activities (F, I, J and K) with **any** numerical time (or time interval) stated **or** the correct number of workers (4) and a time in the interval $15 \leqslant t \leqslant 16$ – mark the numerical value only not their use of day/time. In either case they must state the correct number of workers . M0 for 'F, J, K and the critical activity' (they must explicitly state activity I in this case) unless a time in the interval stated above is given too

c1A1: A completely correct statement with details of both time and activities. Candidates must give a time within the correct interval of $15 < t < 16$. Please note the strict inequalities for the time interval (e.g. implying a time of 15 is incorrect). Answers given as an interval of time are acceptable provided the time interval stated is correct for all its possible values (e.g. time 15 – 16 is A0). Note that 'on day 16' is correct but 'on day 15' is not correct. A completely correct statement with an additional incorrect statement scores A0 (so no isw)