Question Number	Scheme	Marks
3(i) (a)	Start by adding the required arc and then continue (with Kruskal's algorithm until tree is completed)	B1 **(1)**
(b)	BJ add BC add FG add DJ add CD reject {AB add} either order {EF add} HJ add AH reject GH add (DE FJ reject)	M1 A1 A1 **(3)**
(c)	207 (metres)	B1 **(1)**
(ii)(a)	Consider all pairings of B, D, F and H	M1
	BD + FH 43 + 49 = 92 BF + DH 77 + 48 = 125 BH + DF 51 + 55 = 106	A1 A1
	Length of route = 323 + 92 = 415 (metres)	A1
	Repeat BC CD FG GH	A1 **(5)**
(b)	Must now consider B, D, H and J BJ + DH 42 + 48 = 90 BD + HJ 26 + 43 = 69 BH + DJ 51 + 22 = 73	M1 A1
	Difference in length = 92 – 69 = 23 (metres)	A1 **(3)**
		13 Marks
	Notes for Question 3	
(i)aB1	CAO. We need **both** elements to be mentioned i.e. selecting the (specific) arc first AND continuing to select arcs (by Kruskal's)	
bM1	First 4 arcs (BJ to DJ) added in the correct order and at least one rejection seen	
b1A1	Next 4 arcs (CD to HJ) dealt with correctly in the correct order	
b2A1	CSO all arcs added/rejected in the correct order (DE and FJ do not need to be seen)	
cB1	CAO	
(ii)aM1	The correct three pairings of the correct four nodes (B, D, F and H)	
a1A1	Two rows correct including pairings **and** totals	
a2A1	All three rows correct including pairings **and** totals	
a3A1	CAO but must have three pairings of the correct nodes	
a4A1	CAO must be arcs so BCD and FGH is A0	
(ii)bM1	The correct three pairings of the correct four nodes (B, D, H and J)	
b1A1	All three rows correct including pairings **and** totals	
b2A1	CAO	