Question Number	Scheme	Marks
3. (a)	e.g. add CD and remove AD, BA and BC gives 516 (km) e.g. add EF and remove EB, BA and AF gives 509 (km)	M1 A1 **(2)**
(b)	NNA: A – B – E – F – D – C – A	B1
	57 66 69 78 71 76 = 417 (km)	B1 **(2)**
(c)	Length of RMST = 248	B1
	248 + 66 + 69 = 383 (km)	M1 A1 **(3)**
		7 marks

Notes for Question 3

a1M1: Must clearly start with 2(length of given MST) and add and subtract at least one arc (to give a network of weight < 628) – graph must be connected and Eulerian

a1A1: CAO – shortcut(s) and length must be consistent (with length stated < 520). The shortcuts must be clearly stated (that is the arcs added and subtracted) and network must be connected and Eulerian

b1B1: CAO (must return to A) – must be stated in terms of either the nodes or arcs (e.g. AB, BE, EF,…) but not just the weights of the arcs

b2B1: CAO (417)

c1B1: Correct length of RMST (248) – maybe implied by later working

c1M1: Adding the two correct least weighted arcs (66 and 69) to their RMST length ($231 \leqslant$ length $\leqslant 265$)

– give bod but their RMST must only contain 4 arcs – this mark can be implied by the correct value for the lower bound

c1A1: CAO (383) – if correct answer with no working then award B0M1A1