Question Number	Scheme	Marks
2.(a)(i)	In the first pass of a bubble sort we compare the first value with the second and swap if the first is larger than the second. We then compare the value that is second with the third value and swap if the second is larger than the third. Continue like this until the end of the list.	M1 A1
(a)(ii)	Bubble sort stops when we either have a list of length 1 to sort or we have a pass in which no swaps were made.	B1 B1 **(4)**
(b)	Maximum number of passes is 3 as only the three largest values are in the correct position.	B1 B1dep **(2)**
(c)	0.9 1.2 1.5 0.5 1.4 1.1 0.7 **1.7** **2.2** **3.2** 0.9 1.2 0.5 1.4 1.1 0.7 **1.5** **1.7** **2.2** **3.2** 0.9 0.5 1.2 1.1 0.7 **1.4** **1.5** **1.7** **2.2** **3.2** 0.5 0.9 1.1 0.7 **1.2** **1.4** **1.5** **1.7** **2.2** **3.2** 0.5 0.9 0.7 **1.1** **1.2** **1.4** **1.5** **1.7** **2.2** **3.2** 0.5 0.7 **0.9** **1.1** **1.2** **1.4** **1.5** **1.7** **2.2** **3.2** 0.5 **0.7** **0.9** **1.1** **1.2** **1.4** **1.5** **1.7** **2.2** **3.2**	M1 A1 A1ft A1cso **(4)**
(d)	Bin 1: 3.2 0.7 Bin 2: 2.2 1.7 Bin 3: 1.5 1.4 1.1 Bin 4: 1.2 0.9 0.5	M1 A1 A1**(3)**
		13 marks

Notes for Question 2

ai1M1: Compare first value with second value (allow 'compare first and second') and swap if first is larger (oe) - allow 'wrong order' for M1 only – must be clear that the first value is being compared with the second value

ai1A1: Compare second with third (not just 'next two') and so on until the end of the list (oe e.g. 'all', 'last two', 'last') – must be clear that **all** the list of numbers has been considered

aii1B1: CAO – one of 'until only one item left' (oe e.g. 'stops after $n-1$ passes' but not just a statement along the lines of 'until all the required passes have been done') or 'until no swaps' (oe e.g. 'one pass gives the same result as the next pass') – no marks though if they only say 'when the list is in order' (oe)

aii2B1: CAO – both reasons stated correctly

b1B1: CAO (3)

b2B1dep: Correct reasoning – dependent on previous B mark – must mention that the three largest numbers are in the correct position (and not just that 1.7, 2.2 and 3.2 are in the correct position)

c1M1: Bubble sort. Consistent direction throughout sort, and first pass correct – do check these carefully as some candidates show the result of each comparison and swap in their first pass. No marks for quick sort or descending order

c1A1: Second and third passes correct – so end six numbers in place after third pass

c2A1ft: Their fourth and fifth passes correct following through from the candidate's third pass – so end eight numbers in place after fifth pass

c3A1: CSO (correct solution only) – with sixth pass showing no swaps (not just a statement that the list is in order after a fifth pass)

d1M1: First four items placed correctly (the boxed values). Condone cumulative totals for M1 only

d1A1: First eight items placed correctly (the boxed and underlined values) – any additional/repeated values scores M1 only

d2A1: CSO