Question number	Scheme	Marks
3.(a)	Bin 1: **1.8 1.4 1.6** Bin 2: **2.6** 0.9 0.8 0.6 Bin 3: 2.8 1.2 Bin 4: 3.1 Bin 5: 2.4	**M1** A1 A1 **(3)**
(b)(i)	1.8 2.6 1.6 2.8 1.4 3.1 0.9 1.2 2.4 0.8 0.6	B1
(ii)	Comparisons: 10 Swaps: 6	B1 B1 **(3)**
(c)	e.g. using middle right 2.6 1.8 2.8 1.6 3.1 [1.4] 1.2 2.4 0.9 0.8 0.6 pivot 1.4 2.6 1.8 2.8 [1.6] 3.1 2.4 1.4 1.2 0.9 [0.8] 0.6 pivots 1.6 0.8 2.6 1.8 [2.8] 3.1 2.4 1.6 1.4 1.2 [0.9] 0.8 0.6 pivots 2.8 0.9 (0.6) 3.1 2.8 2.6 [1.8] 2.4 1.6 1.4 1.2 0.9 0.8 0.6 pivot(s) (3.1) 1.8 (1.2) 3.1 2.8 2.6 [2.4] 1.8 1.6 1.4 1.2 0.9 0.8 0.6 pivot 2.4 3.1 2.8 2.6 2.4 1.8 1.6 1.4 1.2 0.9 0.8 0.6 (sort complete) e.g. using middle left 2.6 1.8 2.8 1.6 3.1 [1.4] 1.2 2.4 0.9 0.8 0.6 pivot 1.4 2.6 1.8 [2.8] 1.6 3.1 2.4 1.4 1.2 [0.9] 0.8 0.6 pivots 2.8 0.9 3.1 2.8 2.6 [1.8] 1.6 2.4 1.4 1.2 0.9 [0.8] 0.6 pivots (3.1) 1.8 (1.2) 0.8 3.1 2.8 [2.6] 2.4 1.8 1.6 1.4 1.2 0.9 0.8 0.6 pivot(s) 2.6 (1.6) (0.6) 3.1 2.8 2.6 2.4 1.8 1.6 1.4 1.2 0.9 0.8 0.6 (sort complete)	M1 A1 A1ft A1
(d)	Bin 1: **3.1 1.8** Bin 2: **2.8** 1.6 0.6 Bin 3: **2.6 2.4** Bin 4: 1.4 1.2 0.9 0.8	**M1** A1 A1 **(3)**
		(13 marks)

Notes for Question 3

PLEASE NOTE NO MISREADS IN THIS QUESTION – MARK ACCORDING TO THE SCHEME AND THE SPECIAL CASE IN PART (c) AND THE GUIDANCE FOR THE M MARK IN (d)

a1M1: The **correct** first four items placed correctly (the bold values) and at least eight values placed in bins (allow repeated values). Condone cumulative totals for M1 only
a1A1: First eight values placed correctly (the bold **and** underlined values) with all eleven correct values only placed in bins. This mark cannot be awarded if **any** repeated values or incorrect values are seen (even if the first eight values have been placed correctly)
a2A1: CSO – no additional or repeated values (dependent on both previous marks)

bi1B1: CAO – isw after one complete pass. Please check these carefully as some candidates show all the swaps and comparisons in the first pass and some show more than one complete pass. As a guide consider the placement of the 0.8 (when this is the second value from the right-hand side this will indicate the completion of the first pass)

bii1B1: Comparisons correct (10)
bii2B1: Swaps correct (6)
If the comparisons and swaps are not labelled then assume that the first number seen is the comparisons and the second number is the swaps (so seeing after the 1st pass of bubble sort the numbers 10, 6 then award both the second and third B marks in this part). If all they state is 6 then 10 then give **SC B1 B0** for the final two marks in this part

c1M1: Quick sort, pivot, p, chosen (must be choosing middle left or right – choosing first/last item as the pivot is M0). After the first pass the list must read (values greater than the pivot), pivot, (values less than the pivot). **If only choosing one pivot per iteration then M1 only**
c1A1: First pass correct and choosing consistent pivots for the second pass for this mark
c2A1ft: Second and third pass correct following through from their first pass and choice of pivots for the second pass these pivots for the second pass must be consistent (either both middle left or both middle right)
c3A1: CSO (correct solution only – all previous marks in this part **must** have been awarded) including a fifth pass shown (not just saying 'sort complete' after the fourth pass) for 'middle right' or a fourth pass shown for 'middle left'

SC for (c): If using the original list or an incorrect list from the start of (c), or after the first pass, with only one error (an error is either one missing number, one extra number, two numbers transposed or one incorrect number) then they can score at most M1A0A1ftA0. If the candidate sorts into ascending order they can score M1 as per the main scheme (but with the values either side of the pivot reversed), A1 for a fully correct sort then A0 A0 even if the list is reversed at the end (so 2 marks max.).

d1M1: Their five largest items placed correctly and at least eight values placed in bins (if correct this will be the bold items but must check **their** packing if any of **their** five largest values are incorrect – note that the maximum weight of a bin is 5). Condone cumulative totals for M1 only. First-fit increasing scores no marks in this part. If no sort seen in (c) then mark (d) assuming the correct ordered list is being used
d1A1: First eight values placed correctly (the bold **and** underlined values) with all eleven correct values only placed in bins. This mark cannot be awarded if **any** repeated values or incorrect values are seen (even if the first eight values have been placed correctly)
d2A1: CSO – no additional or repeated values (dependent on both previous marks)