Question Number	Scheme	Marks
1.(a)	Bin 1: **26 19 10** Bin 2: **31 14** 3 5 Bin 3: <u>30</u> <u>18</u> Bin 4: <u>33</u> Bin 5: 28	**M1** <u>A1</u> A1**(3)**
(b)	middle right 26 19 31 10 14 **30** 33 18 3 28 5 Pivot 30 31 **33** <u>30</u> 26 19 10 14 **18** 3 28 5 33, 18 <u>33</u> 31 <u>30</u> 26 **19** 28 <u>18</u> 10 14 **3** 5 (31) 19, 3 <u>33</u> <u>31</u> <u>30</u> 26 **28** <u>19</u> <u>18</u> 10 **14** 5 <u>3</u> 28, 14 <u>33</u> <u>31</u> <u>30</u> <u>28</u> 26 <u>19</u> <u>18</u> <u>14</u> 10 **5** <u>3</u> (26) 5 <u>33</u> <u>31</u> <u>30</u> <u>28</u> <u>26</u> <u>19</u> <u>18</u> <u>14</u> 10 <u>5</u> <u>3</u> (10)	M1 A1 A1ft A1 **(4)**
	middle left 26 19 31 10 14 **30** 33 18 3 28 5 Pivot 30 **31** 33 <u>30</u> 26 19 10 **14** 18 3 28 5 31, 14 33 <u>31</u> <u>30</u> 26 **19** 18 28 <u>14</u> 10 **3** 5 (33), 19, 3 <u>33</u> <u>31</u> <u>30</u> **26** 28 <u>19</u> 18 <u>14</u> **10** 5 <u>3</u> 26, (18) 10 <u>33</u> <u>31</u> <u>30</u> 28 <u>26</u> <u>19</u> <u>18</u> <u>14</u> <u>10</u> 5 <u>3</u> (28), (5)	
(c)	Bin 1: **33 19** 3 Bin 2: **31 18** 5 Bin 3: **30** 14 10 Bin 4: **28 26**	**M1** A1**(2)**
		9 marks
	Notes for Question 1	
a1M1	The **correct** first five items placed correctly (the bold values) and at least eight values placed in bins (allow repeated values). Condone cumulative totals or calculation of the remaining space 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)	

b1M1	Quick sort using all 11 numbers (condone one item error or omission), pivot, p, chosen (must be choosing middle item – 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. Bubble sort is M0.**	
b1A1	First and second passes correct but not choice of pivots for 3rd pass	
b2A1ft	Third and fourth passes correct following through from their second pass and choice of pivots for the third pass. The pivots for the third and fourth pass must be consistent with their second pass (MR or ML) If they choose one MR and one ML pivot for the second pass, they can score this mark if they then consistently choose either MR or ML pivots for the rest of their sort.	
b3A1	CSO (correct solution only – all previous marks in this part **must** have been awarded) including a fifth pass for middle right and choosing either 5 (MR) or 10 (ML) as pivots	
	Special Case for (b) 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.). See below	
c1M1	**Their** seven largest items placed correctly and at least nine values placed in bins (if correct this will be the bold items but must check **their** packing if any of **their** seven largest values are incorrect – note that the maximum weight of a bin is 55). Condone cumulative totals or calculation of remaining space for M1 only. First-fit increasing scores no marks in this part. If no sort seen in (b) then mark (c) assuming the correct ordered list is being used	
c1A1	CAO	
	Ascending Sort Middle right 26 19 31 10 14 **30** 33 18 3 28 5 Pivot 30 26 19 10 14 **18** 3 28 5 30 31 **33** 18, 33 10 14 **3** 5 18 26 **19** 28 30 31 33 3, 19, (31) 3 10 **14** 5 18 19 26 **28** 30 31 33 14, 28 3 10 **5** 14 18 19 26 28 30 31 33 5 (26) 3 5 10 14 18 19 26 28 30 31 33 (10)	

	Middle left 26 19 31 10 14 **30** 33 18 3 28 5 Pivot 30 26 19 10 **14** 18 3 28 5 30 **31** 33 14, 31 10 **3** 5 14 26 **19** 18 28 30 31 33 3, 19, (31) 3 **10** 5 14 18 19 **26** 28 30 31 33 10, (18) 26 3 5 10 14 18 19 26 28 30 31 33 (28), (5)	