

6. (a) Using pseudo-code, describe the sorting algorithm *mergesort*. Illustrate your description by showing the intermediate lists produced while applying mergesort to the following values:

3 8 1 0 5 2 4 9

[7 marks]

- (b) What is the *worst-case* running time for mergesort? Justify your answer. [4 marks]
- (c) Using pseudo-code, describe the sorting algorithm *quicksort*. Illustrate your description by showing the intermediate lists produced while applying quicksort to the same values as in (a). [7 marks]
- (d) What is the *worst-case* running time for quicksort? Justify your answer. [4 marks]
- (e) How might you improve the running time for quicksort? [2 marks]