Write your answers in the D1 answer book for this paper.

1.

17 9 15 8 20 13 28 4 12 5

The numbers in the list shown above are the weights, in kilograms, of ten boxes.
The boxes are to be transported in containers that will each hold a maximum weight of 40 kilograms.

(a) Calculate a lower bound for the number of containers that will be needed to transport the boxes. You must show your working.

(2)

(b) Use the first-fit bin packing algorithm to allocate the boxes to the containers.

(3)

(c) Using the list provided, carry out a quick sort to produce a list of the weights in **ascending** order. You must make your pivots clear.

(3)

(d) Use the binary search algorithm to try to locate the weight of 9 in the sorted list. Clearly indicate how you choose your pivots and which part of the list is being rejected at each stage.

(3)

(Total 11 marks)