Huffman trees

We want to compress a string, consisting of 5 distinct symbols a,b,c,d og e. The relative frequencies are given by the following frequency table:

a	b	c	d	e
2	1	12	1	4

(a) What is the longest code-length for a symbol in the corresponding huffman tree?

(b) How many bits does the code for the symbol e contain?

(c) How many bits are used to code the string aaabbcdee?

Now, we will not consider any concrete huffman tree for a given frequency-table, but rather consider huffman trees in general.

(d) If a frequency table consists of 8 distinct symbols, how many nodes are there in the corresponding huffman tree?

(e) In a huffman tree with 8 leaf-nodes, what is the longest possible code-length for a symbol?