

CS 3240 : Languages and Computation Practice Test I

1. **Write regular expressions for the following languages.**
 - a. All strings made from alphabet [a-z] which contain all five vowels in that order, a, e, i, o, u.
 - b. All strings made from [a-z] in which letters are in ascending lexicographic order.
 - c. All even numbers and all odd numbers made from [0-9]
 - d. All the numbers made from [0-9] that are multiples of 4

2. **Describe the language recognized by the following regular expressions**
 - a. $0(0|1)^*1$
 - b. $(0|1)^*0(0|1)(0|1)$
 - c. $0^*10^*10^*10^*$
 - d. $(j)[a-z][a-z][a-z]^*$

3. **Convert the following into NFAs and then into DFAs and then minimize them.**
 - a. $(ab|ba)^*$
 - b. $(a^*|b^*)^*$
 - c. a^*b^*
 - d. $b+a^*$

4. **Prove or disprove whether the following languages are regular**
 - a. Number of a's are multiples of 4 and strings end on a b
 - b. $\{xwx^R \mid x \text{ and } w \text{ are non-empty strings made from alphabet } (0, 1)\}$
 - c. $\{0^i 1^m 0^j, m = j + 4\}$
 - d. Strings of [a-z] that have odd number of vowels