**College of Engineering, Pune**

**Dept of Computer Engineering & Information Technology**

**Second Year B.Tech Computer Engineering**

**Theory of Computation - Test 1**

03/06/2022Time- 4pm to 5pm Max Marks - 20

Answer all Questions  
Marks for each question is given along with

A. Which of the following statement regarding the Finite automaton is true? (1 mark)

1. Finite automaton can have more than one start states
2. Finite automaton can have more than one final states
3. Finite automaton cannot have zero final states
4. All the above statements are true

B. Which of the following language is regular? (1 mark)

1. {0n1n |n > 0}
2. {w | w contains equal number of 01 and 10 substrings}
3. {1p2| p > 0}
4. None of the above

C. When an NFA with n states is converted to DFA, the resulting DFA can have at most (1 mark)

1. n2 states
2. 2n-1 states
3. 2n states
4. 2n – 1 states

D. A language L is regular if (1 mark)

1. There is a DFA but no NFA to recognize L
2. There is a NFA but no DFA to recognize L
3. There is a NFA as well as DFA to recognize L
4. All the above statements are true

E. The class of regular languages is not closed under (1 mark)

1. Union operation
2. Intersection operation
3. Concatenation operation
4. Complement operation
5. None of the above

2. Give a DFA for the language L = {w | w is any string except 11 and 111}. The alphabet is {0,1}. (5 marks)

3. Give a DFA for each of the following languages. The alphabet is {0,1}. (5 marks)

1. {w | w starts with 0 and has odd length, or starts with 1 and has even length}
2. {w | w has length at least 3, the second symbol of w is 0 or the third symbol is 1}

4. Convert the following NFA to DFA. (5 marks)

a

Diagram

Description automatically generated