**UNIT-1**

**Worksheet-3**

**Construction of DFA, NFA, ε-NFA and equivalence of NFA and DFA**

1. What is the minimum number of states to recognise the language L={w/w ϵ (0+1+2)+}?
2. 1 b) 2 c) 3 d) 4
3. What is the minimum number of states required by the DFA that accepts the language? L={a | a is a number divisible by n} ?
4. n b) n+1 c) n-1 d) 2n
5. \_\_\_\_\_\_\_ is the maximum number of states that an ε-NFA can have on ε moves.

a) n

b) 0

c) Infinite

d) 1

4. The FSA to recognize the words “infrared” and “infrastructure” has \_\_\_\_\_ number of states.

a) 20

b) 22

c) 15

d) 17

5. NFA with ϵ transitions \_\_\_\_\_\_\_

a) Increases computations

b) Decreases computations

c) Decreases number of states

d) Increases uncertainty

6. What are the maximum number of output states for any input state (n) in a NFA?

a) n

b) n+1

c) 2n

d) n-1

7. I: DFA’s can be constructed for all the languages

II: The strings accepted by DFA will be accepted by NFA

What can be said about these two statements?

a) Only II is false

b) Only I is false

c) I is false and II is true

d) II is true and I is false

8. What can be told about the recognising capability of NFA, ε-NFA and DFA?

a) All three are equally powerful

b) ε-NFA is more powerful and flexible

c) ε-NFA is less powerful and flexible

d) DFA is more powerful

9. What is the minimum number of states for NFA that accepts the language {01n 01 | n >=0}?

a) 5

b) 4

c) 6

d) 16

10. Which of the given languages are accepted by Non Deterministic PDA but not by Deterministic PDA?

a) Language generating strings that contain at least one symbol repeated at least twice

b) Even Palindromes

c) Strings ending with a particular symbol

d) Strings starting with particular symbol

**PART-B**

1. Construct a DFA that can recognise the six-symbol password over the input Σ={a, b, c} with the following conditions:
2. Password should start with ‘ab’
3. Password should not end with ‘bb’.
4. Construct a DFA that accepts the numbers that are multiples of five in its binary form.
5. Construct a DFA and NFA that accepts strings that starts with ‘abb’ and ends with any number of ‘a’.
6. Ramesh has to create an FSA that accepts string over {a, b, c} in such a way that the fourth symbol from the right is always ‘c’. Can he construct both NFA and DFA? Justify your answer.
7. Is it possible to create an NFA and ε-NFA over {0,1} that accepts L={0n 1m 2o| n, m, o >=0}? If so, give the construct.
8. Is it possible to create an NFA and ε-NFA over {0,1} that accepts L={0n 1m 2o| n, m, o >0}? If so, give the construct.
9. Design a NFA that recognises the strings ‘abc’, ‘abd’, ‘aacd’ over the input Σ={a, b, c, d}.
10. Convert the following NFA to DFA:

| δ | 0 | 1 |
| --- | --- | --- |
| ->Q0 | {Q1, Q2} | {Q0} |
| Q1 | {Q1, Q2} | Φ |
| \*Q2 | Q1 | {Q1, Q2} |