ASSIGNMENT-1

Year: III **Semester: V** **Session: 2022-23**

Subject Code & Name: BCSC-0011 (Theory of Automata & Formal Language)

NOTE: Handwritten assignment with name on each page is required to be submitted on portal on or before 25-09-22.

Over the alphabet ∑={a,b} design DFA for the following

1. Set of all strings with exactly one a.
2. Set of all strings with atleast one a.
3. Set of all strings with atmost one a.
4. L={w1abw2| w1,w2 ϵ (a,b)*} OR containing substring ab.
5. Set of all strings starting with ab.
6. Set of all strings ending with ab.
7. Set of all strings containing exactly 2 a's.
8. Set of all strings with exactly 2 a's and exactly 2 b's.
9. Set of all strings with exactly 1 a and atleast 2 b's.
10. Set of all strings with atleast 1 a and atleast 2 b's.
11. Set of all strings with exactly 2 a's and atmost 2 b's.
12. L={w| |w| mod 3=0}
13. L={w| |w| mod 3>0}
14. L={w| |w| mod 3!=0}
15. L={w| |w| mod 5>0}
16. L={w| ηa(w) mod 3>1}
17. L={w| |w|>=4}
18. Set of all strings w such that ηa(w) is divisible by 3.
19. Set of all strings w such that ηa(w)=3.
20. L={$(ab)^i$ $(b)^{2j}$ | i>=1, j>=1}
21. Odd number of a's.
22. Even number of a's.
23. Starting with a and ending with b.
24. Even no. of a's and even no. of b's.
25. Even no. of a's and odd no. of b's.
26. Even no. of a's and no. of b's is divisible by 3.
27. Not containing aa as substring.
28. L={w| 2^{nd} last symbol must be 'a'}
29. L={w| 3^{rd} last symbol must be 'a'}
30. Set of all strings that begin and end with the same letter.
31. L={w| 2^{nd} last symbol should be different from first symbol} |w|>=3.

For ∑={0,1} design DFA for the following:-

32. Set of all binary numbers whose decimal equivalent is divisible by 3.
33. Set of all binary numbers whose decimal equivalent is divisible by 4.
34. For ∑={0,1,2} design a DFA that will accept all ternary numbers divisible by 2.
35. For ∑={0,1,2} design a DFA that will accept all ternary numbers divisible by 4.

36. ∑={0,1} design a DFA for accepting all those strings in which number of 0's is divisible by 2 and number of 1's is divisible by 3.
37. ∑={0,1}, DFA for all strings not containing 00.
38. ∑={0,1}, design a DFA that will accept all those binary numbers whose decimal equivalent is divisible by 2 but not divisible by 3.
39. ∑={0,1} Design a DFA to accept all those strings not containing 101 as substring.
40. ∑={0,1} , Design a DFA to accept all those binary numbers whose decimal equivalent is divisible by 2 or divisible by 3.