University of Engineering & Management, Kolkata

Even Semester Term - I Examination, March, 2021

Course: B-Tech(CS)   **Semester: 4th**

Paper Name: Formal Languages and Automata Theory

Paper Code: PCCCS401

Full Marks: 70   **Time: 2 hours**

(Answer all the questions and each question is of 10 marks)

1. A) Proof that if there exists a DFA and there exists a string Wx of length n there will be n+2 states in the DFA.
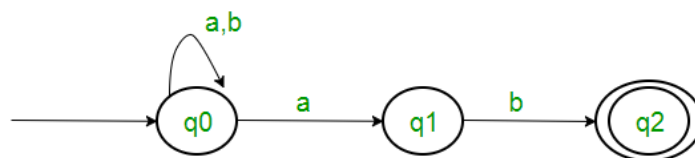
OR

B) Design a DFA over $\Sigma = \{a,b\}$ such that every string is accepted by the DFA must starts and ends with ω, where $|\omega| => 3$
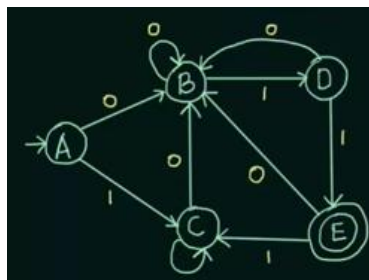
2. A) Design a NFA over $\Sigma = \{a,b\}$ such that every string is accepted by the NFA must ends with ω, where $\omega =$ 'bb'.

OR

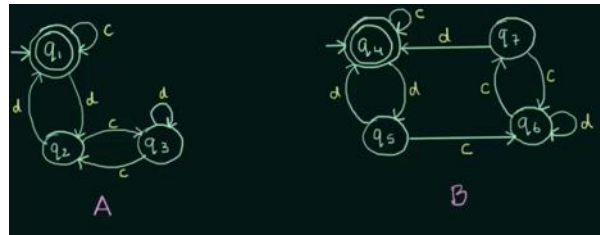B) Convert the following NFA into a DFA:

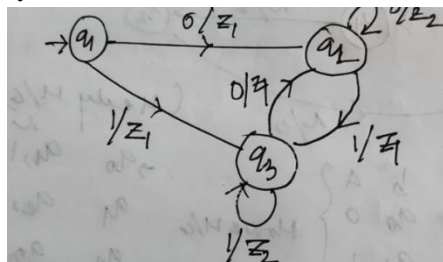3. A) Convert the DFA into a MDFA:

OR

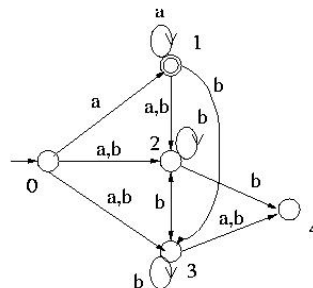B) Check whether two following DFAs are equal or not:

A   B

4. A) Construct a Moore machine that takes set of all strings over $\Sigma = \{a, b\}$ as input and prints '1' as output for every occurrence of 'ab' as a substring.

OR

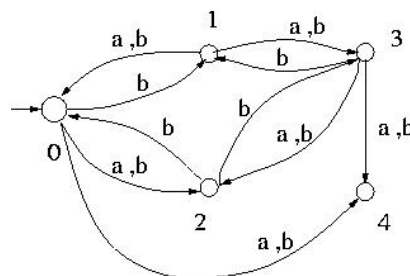B) Convert the following Mealy machine into Moore Machine:
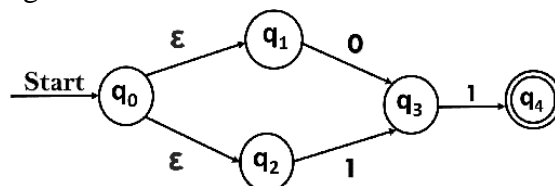

5. A) Convert the following NFA to DFA:
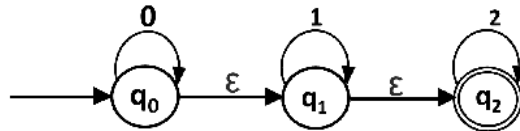

OR

B) Convert the following NFA to DFA:

6. A) Convert the following $\in$-NFA to NFA:

<center>OR</center>

B) Convert the following Є-NFA to NFA:

7. A) Construct a mealy machine that takes binary no as input and produces 1's complement of that no as output. Assume the string is read LSB to MSB and end carry is discarded.

<center>OR</center>

B) Convert the DFA into a MDFA: