University of Engineering and Management, Kolkata
1st Term Examination, September, 2023
Programme Name: B.Tech in CSE / CSE (AIML) / CSE (IOT, CYS, BCT)
Semester: 5th
Course Name: Formal Language & Automata Theory
Course Code: PCCCSE502

Full Marks: 30 Date: 14th September, 2023 Time: 1.30 PM – 2.30 PM

Part - A
Attempt 5 questions
Each question carries 2 Marks (2 X 5)

1.A. Define the mathematical definition of a ε-NFA.

Or

1.B. Define the mathematical definition of a NFA.

2.A. Quote the Myhill Nerode theorem.

Or

2.B. Define the Arden's theorem.

3.A. Describe the mathematical definition of a Mealy Machine.

Or

3.B. Describe the mathematical definition of a Moore Machine.

4.A. Identify the differences between Unreachable State and Dead State.

Or

4.B. Show the pumping lemma of regular languages.

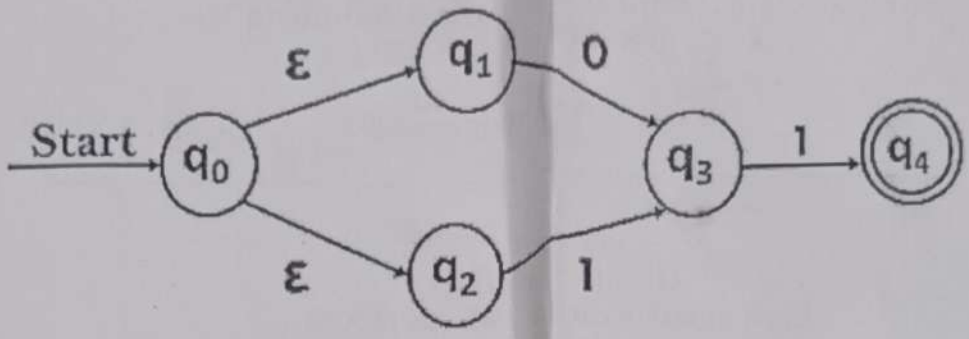
5.A. Contrast and compare the DFA and MDFA.

Or

5.B. Discuss the identities of regular languages.

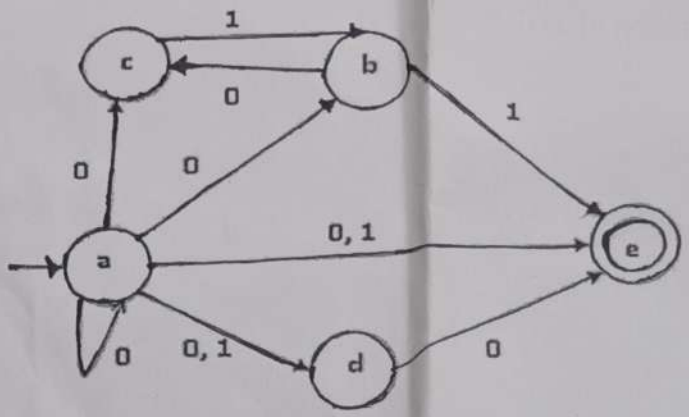
Part - B
Attempt 2 questions
Each question carries 5 Marks (5 X 2)

6.A. Construct the following ε-Non-Deterministic Finite Automata to a Non-Deterministic Finite Automata:



Or

6.B. Construct the following Non-Deterministic Finite Automata to Deterministic Finite Automata:



7.A. Deduce an algorithm to check whether two finite automata are equivalent or not.

Or

7.B. Check whether a given language is regular or not: $L=\{a^n b^n | n>=0\}$

Part - C
Attempt 1 question
Each question carries 10 Marks (10 X 1)

8.A. Evaluate this expression (1+00*1)+(1+00*1)(0+10*1)*(0+10*1)=0*1(0+10*1)* to check regular or not.

Or

8.B. Evaluate a minimal Deterministic Finite Automata for the given language: $L=\{a^n b^m c^l | n,m,l \geq 0\}$

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