MCS11 — FORMAL LANGUAGES AND AUTOMATA THEORY

Time : Three hours Maximum : 75 marks

SECTION A — (5 × 6 = 30 marks)

Answer ALL questions.

1. (a) How will you represent a Finite State Machine? Explain.

Or

   (b) What are the ways describing a set? Explain with examples.

2. (a) Prove that "a language L is accepted by a DFA if and only if it is accepted by an NFA".

Or

   (b) Briefly explain the Sequential circuit design methodology.

3. (a) Write the properties of Regular Languages.

Or

   (b) Briefly explain Closure Properties of Regular Languages.

4. (a) Construct a Pushdown Automata for $\{a^n b^n : n \geq 0\}$.

Or

(b) Construct a PDA that accepts $L = \{ww^R | w = (a+b)^*\}$.

5. (a) What are Languages of Twing Machines? Explain.

Or

(b) Write a short note on Turing Machines for Adding Two Unary Numbers.

SECTION B — (3 × 15 = 45 marks)

Answer any THREE questions.

6. What are steps in Method of proof by Induction? Explain.

7. Differentiate between NFA and DFA.

8. Describe in detail Chomsky Normal Form for Context Free Grammar.

9. Explain the Algorithm to find PDA corresponding to a given CFG.

10. Design a Turing machine that accepts the language of marked palindromes (sms^{-1} with s a sequence of 0s and 1s, and s^{-1} its reverse).

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