INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

Q.1(a) Define Deterministic FA, Non- Deterministic FA and ε- NFA. List some applications of FAs.   [5]
Q.1(b) Construct a minimised DFA for all *binary numbers* divisible by 5 over Σ={0,1}.   [5]

Q.2(a) Construct Mealy machine which outputs 2's complement of given binary number.   [5]
Q.2(b) Check whether the L = { a^p | *p* is a prime number} is regular or not. State the method used for proving   [5]
        or disproving

Q.3(a) Design a Pushdown Automata for   L = { ww^R | w ∈ {a,b}*}. Is the designed PDA a DPDA or NPDA?   [5]
Q.3(b) State and Elaborate Pumping Lemma for Context Free Languages with an example.   [5]

Q.4(a) Present the transition function of TM. Construct a TM for L = { ww | w ∈ {a,b}*}.   [5]
Q.4(b) Explain Recursive Languages and Recursive Enumerable Languages.   [5]

Q.5(a) Explain Rice Theorem with example.   [5]
Q.5(b) Discuss the computational complexities about P, NP, NPC and NP Hard Problems.   [5]

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