

Roll No.

Total No. of Pages : 02

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B.Tech. (CSE) (Sem.-5)
FORMAL LANGUAGE & AUTOMATA THEORY

Subject Code : BTCS 502/18

M.Code : 78321

Date of Examination : 18-06-2024

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

- a. What are production rules?
- b. L^* is a subset of closure of alphabet (T/F).
- c. What is the meaning of statement '*acceptability of string by FA*'?
- d. Give an example of a regular expression that matches any sequence of 'a's followed by any sequence of 'b's.
- e. Every Type2 grammar is a Type 3 grammar (T/F). Justify your answer.
- f. What is meaning of halting problem in TM?
- g. Define Linear Bounded Automation.
- h. List variants of Turing Machines.
- i. What are Undecidable Problems.
- j. What is Hamilton cycle in a graph?

SECTION-B

2. Explain Chomsky hierarchy of languages.
3. Describe the concept of minimization of states in a DFA. Why is it important?
4. Explain the significance of Turing machines in the study of computability and complexity.
5. Give an example of a context-free grammar and show how it can be transformed into Chomsky Normal Form?
6. How does the Cook-Levin Theorem demonstrate that the Boolean satisfiability problem (SAT) is NP-complete?

SECTION-C

7. Discuss the concept of ambiguity in context-free grammars. How does ambiguity affect the parsing process and what are the methods to resolve or identify ambiguity in CFGs?
8. What is PDA and how it is different from FA? Discuss Push down Automation in detail. Design PDA for $\{wcw^T w = \{a,b\}^*\}$
9. **Write a Short note on :**
 - a. P vs NP problems
 - b. Pumping Lemma for CFGs.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.