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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE) (Sem.-5)

FORMAL LANGUAGE AND AUTOMATA THEORY

Subject Code : BTCS-502-18

M.Code : 78321

Date of Examination : 05-12-2024

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. Define Grammar.
- b. What is the meaning of acceptability of string by FA?
- c. $\Sigma = \{0,1\}$, write RE for the alphabet whose 9th symbol from the L.H.S is 1.
- d. Define Derivation Tree and yield of tree.
- e. List closure properties of CFL.
- f. Define Universal Turing Machine.
- g. What is NP hard problem?
- h. State Rice' Theorem.
- i. Define Decidability.
- j. What is halting problem?

SECTION-B

2. Explain the Chomsky hierarchy of grammars with the help of writing rules for each type of grammars.
3. Write short note on Applications of Regular Expressions.
4. What are non-reachable symbols? Eliminate non-reachable symbols from $S \rightarrow aS \mid A$, $A \rightarrow a$, $B \rightarrow aa$.
5. Construct the DPDA for "Accepting the language of balanced parentheses".
6. What do you understand by Tractable and Intractable problems with reference to Turing Machines.

SECTION-C

7. Explain the concept of Turing Machine. Construct a TM for $L = \{0^n 1^n 2^n \mid n \geq 1\}$.
8. What is a Context Free Grammar? Prove that If L_1 and If L_2 are two context free languages, their union $L_1 \cup L_2$ will also be context free.
9. **Write a short note on :**
 - a. FA vs PDA
 - b. Context Sensitive Languages.

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.