Roll No. | | | | | | | | | | | | **Total No. of Pages : 02**

Total No. of Questions : 09

B.Tech (CSE (Data Science)) (Sem.–6)

FORMAL LANGUAGE & AUTOMATA THEORY

Subject Code : BTCS-502-18

M.Code : 92319

Date of Examination : 11-01-2023

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. DFA

b. Left Derivate

c. Right context

d. Acceptability of a string

e. Transition Diagram

f. Yield of a tree

g. Type-3 grammar

h. NULL and UNIT productions

i. Language

j. Chain Rule.

SECTION-B

2. Differentiate between Mealy and Moore. Explain with example how Mealy is converted into Moore machine.

3. Construct a finite automata equivalent to the regular expression:

   $(0 + 1)^* (00 + 11) (0 + 1)^*$

4. Explain in detail the Chomsky classification of languages.

5. Discuss the Universality of Cellular Automata.

6. Define PDA. Explain its variants. How CFG is converted into PDA?

SECTION-C

7. Describe Church-Turing thesis and NP Complete problems.

8. Design PDA for $\{a^n b^m \mid n, m>1\}$

9. Find a grammar in GNF equivalent to the grammar

   $S \rightarrow XB \mid AA$

   $A \rightarrow a \mid SB$

   $B \rightarrow b$

   $X \rightarrow a$

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