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

Total No. of Questions : 18

B.Tech. (CSE) (Sem.–5)

FORMAL LANGUAGE & AUTOMATA THEORY

Subject Code : BTCS-502-18

M.Code : 78321

Time : 3 Hrs. Max. Marks : 60

INSTRUCTION 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 has to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students has to attempt any TWO questions.**

SECTION-A

Answer briefly :

1) If A={a, b} and B={a, c}, Find A* U B*.

2) State Kleene's Theorem.

3) Find Regular Expression over {a,b} having set of all string containing exactly two a's.

4) Differentiate between type1 and type2 grammar.

5) State Arden's Theorem.

6) Describe PDA.

7) Differentiate between Injective and Surjective functions in a set.

8) Write the steps needed for proving that a given set is not regular.

9) Define Derivation Tree.

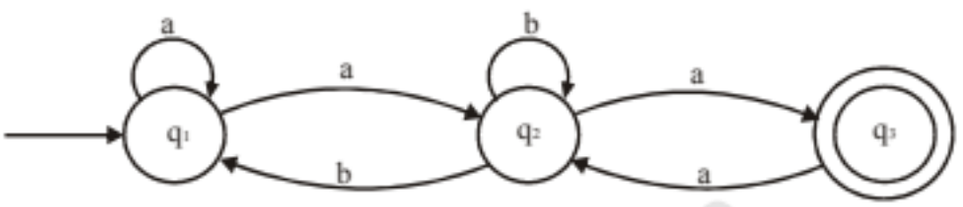
10) State Ambiguous grammar with example.

SECTION-B

11) Describe pumping lemma for regular set with the help of an example.

12) Prove that string represented by following transition system is

$(a + a(b + aa)^*b)^* a(b + aa)^*a$.



13) Find a reduced grammar equivalent to the given grammar.

$S \rightarrow AB$ $A \rightarrow a$ $B \rightarrow b$ $B \rightarrow C$ $E \rightarrow c$

14) What are the different types of Grammars and Languages associated with it.

15) Discuss the Universality of Cellular Automata.

SECTION-C

16) Find a grammar in GNF equivalent to the grammar.

$E \rightarrow E + T \mid T$ $T \rightarrow T * F \mid F$ $F \rightarrow (E) \mid a$

17) Discuss the various representations of Turing Machine.

18) Design PDA for $\{wcw^T \mid w = \{a,b\}^*\}$.

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.