BACHELOR OF TECHNOLOGY (CBCS) (2020 COURSE)

Information Technology

B.Tech.Sem - IV :SUMMER : 2023

SUBJECT : FORMAL LANGUAGES & COMPUTATION THEORY

Day : Tuesday | Time : 10:00 AM-01:00 PM

Date : 23-05-2023 | S-24719-2023 | Max. Marks : 60

N.B.

1) All questions are **COMPULSORY.**
2) Figures to the right indicate **FULL** marks.
3) Use of non-programmable calculator is allowed.
4) Assume suitable data if necessary.

Q.1 Design a finite automata for set of all strings over {a,b}ending in either 'ab' or 'ba'. **(10)**

OR

Q.1 Distinguish between Moore and Mealy machine. Comment on powers of finite automat and Turing machine. **(10)**

Q.2 Construct an NFA with ε moves for the regular expression (b a*b+ab*a)*. Convert this NFA to DFA. **(10)**

OR

Q.2 Give definition of regular expression. State and explain pumping lemma. **(10)**

Q.3 Find equivalent CNF for following: **(10)**

S→bA | aB

A→bAA |aS | a

B→aBB | bS | b

OR

Q.3 What are the rules for left linear grammar and right linear grammar. Convert following LL grammar to RL grammar. **(10)**

S→0A | 1B, A→0C | 1A | 0,

B→1B | 1A | 1, C→ 0 | 0A

Q.4 Design a PDA for accepting binary strings of type $0^n 1^n$. Construct transition graph and transition table. **(10)**

OR

Q.4 Construct PDA for accepting b's as twice the number of a's over ∑={a, b} i.e. $a^n b^{2n}$.

Q.5 Describe universal Turing machine. Construct TM for binary string starting with 0 and ending with 1. **(10)**

OR

Q.5 Describe Church – Turing hypothesis. Construct Turing machine for strings over ∑={a, b}. Such that it contains even number of a's and b's . **(10)**

Q.6 Write the applications of regular expression. Comment on language acceptability of FA, PDA and TM. **(10)**

OR

Q.6 Briefly explain undecidability and halting problem. **(10)**

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