

SE (INFT) sem IV 'C' scheme Summa 2015 Exam

Date 21/5/25

Duration: 3 Hrs

Max. Marks: 80

NB:

1. Question No. 1 is compulsory and solve any THREE questions from remaining questions
2. Assume suitable data if necessary
3. Draw clean and neat diagrams

- | Q1. | Answer the following questions  | Marks |
|-----|---|-------|
| a.  | Explain any 5 closure properties of Regular Languages   | 5     |
| b.  | Convert the given grammar Right Linear Grammar to Left Linear Grammar<br>$S \rightarrow bB, B \rightarrow bC \mid aB \mid b, C \rightarrow a$   | 5     |
| c.  | Construct Right linear grammar for RegEx- $00^*(01+0)^*$  | 5     |
| d.  | Write RegEx and draw FA for all strings over $\{0, 1\}$ containing the sequence 011   | 5     |
| Q2. | a. Construct NFA for accepting the input string that contains either the keyword 000/010 and convert this to equivalent DFA.  | 10    |
|     | b. Design a Moore machine that will read the sequence made up of letters $\Sigma = \{a, e, i, o, u\}$ it will give same sequence except in those sequence where 'i' is directly follow 'e', it will give output 'u', hint $[a e i e \rightarrow a e i u]$ | 10    |
| Q3. | a. Construct NFA with $\epsilon$ moves for "zero or more number of 0's followed by zero or more number of 1's followed by zero or more number of 2's". Convert this DFA.  | 10    |
|     | b. Convert the following CFG to CNF<br>G: $S \rightarrow ABA, A \rightarrow aA \mid bA \mid \lambda, B \rightarrow bB \mid aA \mid \lambda$   | 10    |
| Q4. | a. What is Ambiguous Grammar, Explain with example.   | 10    |
|     | b. Let G be the grammar. Find the leftmost derivation, rightmost derivation and parse tree for the string 001222,<br>$S \rightarrow 0S \mid 1A \mid 2B \mid \epsilon$<br>$A \rightarrow 1A \mid 2B \mid \epsilon$<br>$B \rightarrow 2B \mid \epsilon$     | 10    |
| Q5. | a. Design PDA for odd length palindrome, let $\Sigma = \{0,1\}, L = \{W X W^R\}$  | 10    |
|     | b. Design Turing Machine for $L = \{0^n 1^n \text{ where } n \geq 1\}$  | 10    |
| Q6. | Write short notes on (any Four)   | 20    |
|     | a) Applications of Automata Theory  |       |
|     | b) Chomsky Hierarchy  |       |
|     | c) Power and limitations of PDA   |       |
|     | d) Halting Problem.   |       |
|     | e) Variations of Turing machine   |       |

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