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DMI-ST. EUGENE UNIVERSITY
DEGREE EXAMINATION – DECEMBER – 2022

SEM:VI

055CS62 THEORY OF COMPUTATION

Time: 3 Hours

Max. Marks: 100

Answer any Five questions (5 x 20 = 100 Marks)

1. a) Define a regular language (5 Marks)
b) What is a deterministic finite automata (DFA)? (8 Marks)
c) Highlight the practical use of Finite Automata (7 Marks)
2. a) Design a FA from given regular expression $10 + (0 + 11)0^* 1$. (10 Marks)
b) Write the regular expression for the language accepting all the string which are starting with 1 and ending with 0, over $\Sigma = \{0, 1\}$. (5 Marks)
c) How can one convert a deterministic Finite Automata to a Regular expression? (5 Marks)
3. a) Describe a context free grammar. (10 Marks)
b) Construct a CFG for the regular expression $(0+1)^*$. (10 Marks)
4. a) Define a Turing machine. (5 Marks)
b) What languages are accepted by Turing Machine? (7 Marks)
c) Explain the time and space complexity for a Turing Machine. (8 Marks)
5. a) Explain the basic structure of Push Down Automaton. (10 Marks)
b) Formally define a pushdown automaton. (10 Marks)
6. a) Compare Deterministic Finite Automata and Non-deterministic Finite Automata. (10 Marks)
b) What are the conditions for a string to be accepted by a Finite Automata? (10 Marks)
7. a) What is a regular expression and what are its operands? (7 Marks)
b) Write the regular expression for the language accepting all the string containing any number of a's and b's. (5 Marks)
c) Define a finite Automata with a null move. (8 Marks)