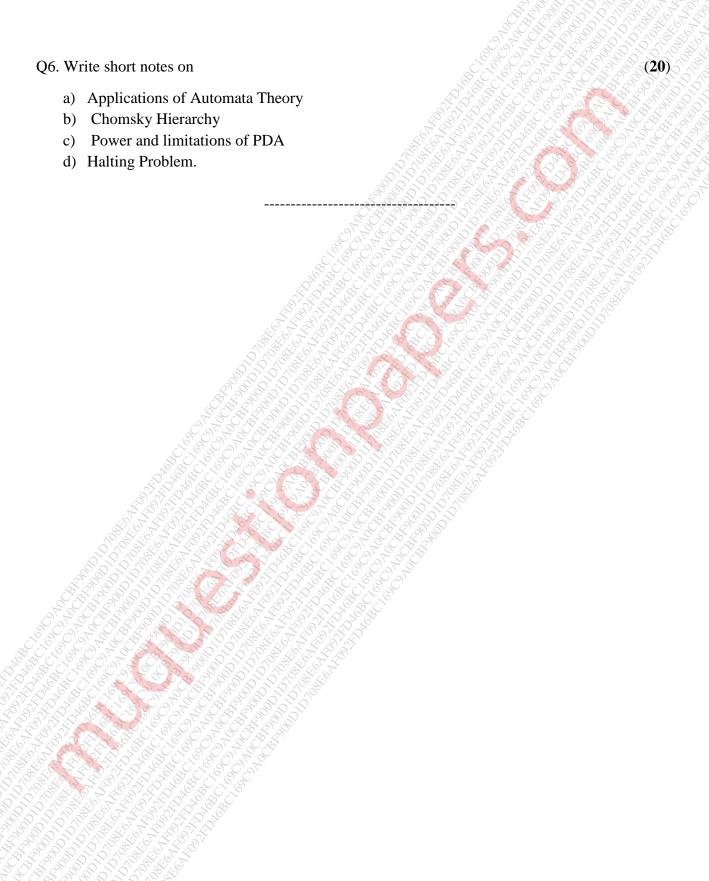
Paper / Subject Code: 41005 / Automata Theory

17-Dec-2019 1T01224 - S.E.(Information Technology Engineering)(SEM-IV)(Choice Based) / 41005 - Automata Theory 79203

(3 Hours) Marks:80 **Note:** Question **No. 1** is **Compulsory** Attempt any three out of the remaining five questions Assumptions made should be clearly stated Q.1 Attempt any four sub-questions. a) Construct the Finite Automata for binary umber divisible by 2 (05)b) Design FA for decimal number divisible by 5 (05)c) Give formal definition of Turing Machine (05)d) State and explain closure properties of regular languages (05)e) Construct DFA accepting all the strings corresponding to the Regular expression 1*01(0+11)*(05)Q2. a) Construct the following grammar to CNF (10) $S \rightarrow Ba / aB$ $A \rightarrow bAA/aS/a$ $B \rightarrow aBB/bS/b$ b) Design Moore machine for binary adder. (10)Q3.a) Design a DFA corresponding to the regular expression (a+b)* aba (a+b)* **(10)** b) Define CFG, obtain CGF for the following grammar (10)(110+11)*(10)*Q4.a) Design a PDA for CFL that checks the well formedness of parenthesis i.e. the language L of all balanced string of two types of parenthesis "()" and "[]". Trace the sequence of moves made corresponding to input string [()(())]. (10)b) Construct a TM for 2's complement of a binary number. Simulate it for 1 0 1 0 (10)Q5. a) Let G be the grammar. Find the leftmost derivation, rightmost derivation and parse (10)tree for the string 001222. G: $S \rightarrow 0S \mid 1A \mid 2B \mid \epsilon$ $A \rightarrow 1A \mid 2B \mid \epsilon$ $B \rightarrow 2B \mid \epsilon$

b) Consider the CFG S \rightarrow aSb | bSa | SS | ε , consider the string *babbabaaaababb* .prove that given grammar is ambiguous by generating more than one parse tree for a given string (10)

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