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TEST-2 EXAMINATION- OCTOBER, 2019

M. Tech I Semester

COURSE CODE: 15M1WCI331   MAX. MARKS: 25

COURSE NAME: Advanced Theory of Computation

COURSE CREDITS: 3   MAX. TIME: One and Half Hour

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

1. Let $G = (\{S, A_1, A_2\}, \{a, b\}, P, S)$, where P consists of

   $S \rightarrow aA_1A_2a$, $A_1 \rightarrow baA_1A_2b$, $A_2 \rightarrow A_1ab$, $aA_1 \rightarrow baa$, $bA_2b \rightarrow abab$

   Test whether $w = baabbabaaabbaba$

   is in $L(G)$.   [4 marks]

2. Construct a grammar G such that

   $L(G) = \{w \in \{a, b\} \mid w$ has an equal number of a's and b's$\}$.   [4 marks]

3. Construct a grammar G accepting the set L of all strings over $\{a, b\}$ having more a's than b's.

                                                                            [4 marks]

4. Construct a grammar G accepting all strings over $\{a, b\}$ containing an unequal number of a's and b's.

                                                                            [4 marks]

5. Prove $(1 + 00^*1) + (1 + 00^*1)(0 + 10^*1)^* (0 + 10^*1) = 0^*1(0 + 10^*1)^*$.

                                                                            [4 marks]

6. Consider the transition system given in Fig. 5.13. Prove that the strings recognized are $(a + a(b + aa)^*b)^*$ $a(b + aa)^*$ a.

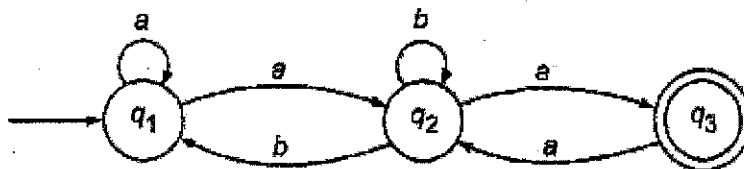Fig. 5.13 Transition system of Example 5.8.

                                                                            [5 marks]