

**Department of Computer Science and Engineering
Class Test-III (W-2018)**

Course code: CSU 502

Course name: Theory of Computation

Marks: 10

Time: 30 Min.

Solve any two

Q1. Prove that complement of recursive language is recursive

5M

Q2. What is post's correspondence problem? Explain with example

5M

Q3. Explain Chomsky hierarchy

5M

Department of Computer Science & Engineering
Class Test: 3

Sub: Theory of Computation (CSU 502)

Time: 1 hour

Class: Fifth Semester
Marks: 25

Q1.) Find whether the following instance of PCP is decidable

	List A	List B
i	wi	xi
1	100	1
2	1	00
3	0	100

Solve any two from following

Q2) The complement of recursive language is recursive.

Q3) The union of recursive language is recursive.

Q3) Convert the following Turing machine into Universal turing machine for string 1011. turing machine defined

$$M = (\{q_1, q_2, q_3, q_4\}, \{0, 1\}, \{0, 1, B\}, q_1, \delta, \{q_4\})$$

Delta is defined as

$$\delta(q_1, 0) = (q_3, 1, L)$$

$$\delta(q_1, 1) = (q_4, 0, R)$$

$$\delta(q_2, 0) = (q_2, 0, L)$$

$$\delta(q_2, 1) = (q_3, 1, L)$$

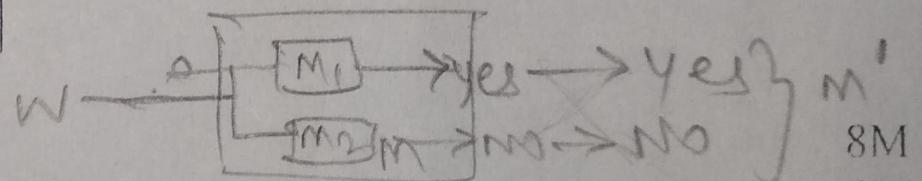
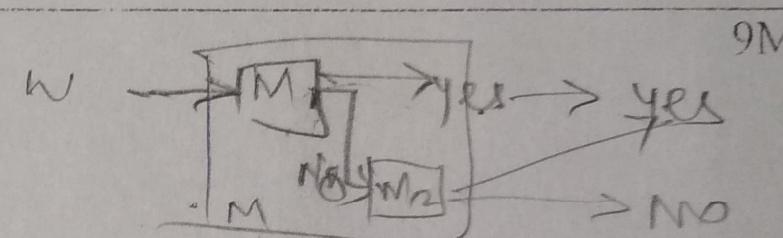
8M

$$\delta(q_3, 0) = (q_3, B, L)$$

$$\delta(q_3, 1) = (q_3, 1, R)$$

$$\delta(q_3, B) = (q_3, B, R)$$

8M



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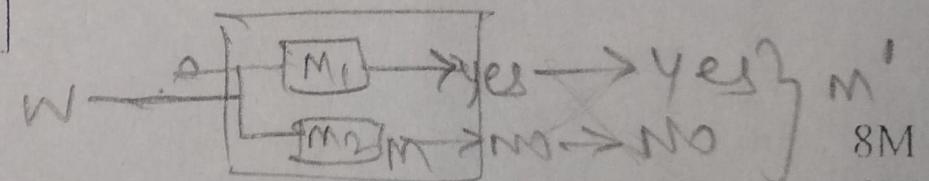
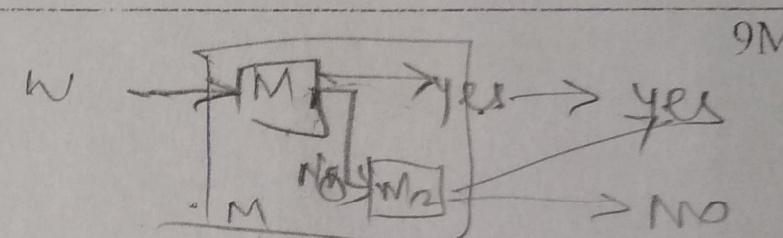
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8M



Department of Computer Science and Engineering
Class Test-2 (W-2018)

Course code: CSU 502

Course name: Theory of Computation

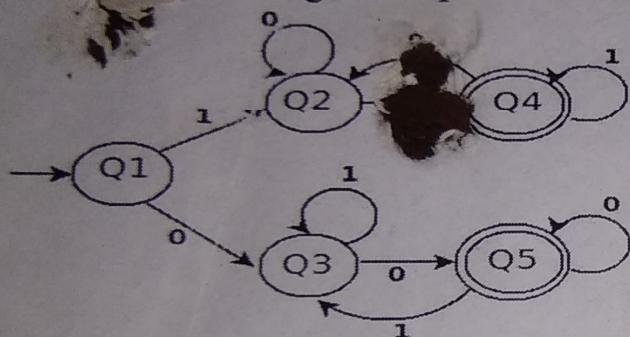
Marks: 15

Time: 1 hour

Solve any three

Q1. Construct regular expression for DFA given below

5M



Q2. Construct finite automata for regular grammar $G = (\{S, A, B\}, \{0, 1\}, P, S)$ where P consist of

5M

$$S \rightarrow 1S|0A$$

$$A \rightarrow 1S|0B|0$$

$$B \rightarrow 1S|0B|0$$

Q3) Let G be the grammar $G = (\{S, A, B\}, \{a, b\}, P, S)$ where P consist of

5M

$$S \rightarrow aB|bA$$

$$A \rightarrow a|aS|bAA$$

$$B \rightarrow b|bS|aBB$$

For the string aaabbabbba find Leftmost derivation, Rightmost derivation and parse tree

5M

Q4) Consider the grammar $G = (\{A_1, A_2, A_3\}, \{a, b\}, P, A_1)$ where P consist of

$$A_1 \rightarrow A_2A_3$$

$$A_2 \rightarrow A_3A_1|b$$

$$A_3 \rightarrow A_1A_2|a$$

Find Greibach Normal Form Grammar equivalent to the above grammar