Code: 9A05407

R09

B.Tech II Year II Semester (R09) Supplementary Examinations December/January 2015/2016

FORMAL LANGUAGES & AUTOMATA THEORY

(Computer Science & Engineering)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 (a) Define string and Alphabet. Discuss the operations on string.

(b) Define language. Discuss its operations.

2 The Moore machine to determine residue mod 3 for binary number is given below convert into equivalent Mealy machine.

Σ / Q	0	1	Output (λ)
q_o	q_0	q_1	0
q_1	q_2	q_0	1
q_2	q_1	q_2	2

3 Use closure operations to show that the following language is not regular: L = {x∈{a,b,c}*| the middle symbol of x is b; and x is of odd-length}.

4 Construct regular grammar for following languages:

(a) $\{a^{2n} | n \geq 1\}$.

(b) $\{(ab)^n | n \geq 1\}$.

(c) The set of all strings over {a,b} ending in a.

5 (a) Show that CFL's are closed under Kleene closure operation.

(b) Check whether the following grammar is ambiguous or not. Provide at least two examples to support your answer.

S → AB / aaB A → a / Aa B → b

6 (a) Define PDA. Design a PDA for L = $\{xcx^r / x \in \{a,b\}^*\}$. Process the string abbacabba.
Note: x^r stands for reverse of the string x.

(b) What do you mean by an instantaneous description of a PDA? Explain with example

7 Design a TM for recognizing L = { xx / x Є {a, b}* }. Show the moves of the TM for the strings abaaba and abaabb.

8 (a) Explain in detail about PCP and MPCP.

(b) Write about Universal Turing Machine.

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