Code: 9A05407

R09

B.Tech II Year II Semester (R09) Supplementary Examinations December/January 2014/2015

**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 Design a finite automation that reads strings made up of letters in the word CHARIOT and recognize those strings that contain the word 'CAT' as a substring.

2 Find the minimal DFA's for the language L = $\{a^n b^m, n \geq 2, m \geq 1\}$.

3 (a) What is the closure property of regular sets?
(b) What is the relationship between finite automata and regular expression?
(c) Give the R.E for the language such that every string will have at least one 'a' followed by at least one 'b'.

4 Discuss and explain the following:
(a) A regular language can be generated by two or more different grammars.
(b) Finite state machine (FSM) can recognize only regular grammar.

5 (a) Decide whether L = {xcx / x Є {a, b}* } is CFL or not.
(b) Prove that the grammar with following productions is ambiguous.
S → aB / ab A → aAB / a B → ABb / b

6 (a) Construct a PDA for recognizing L = { $a^{n+1}b^n$ / n >= 0}. Show the moves of the PDA for the string aaaabbb.
(b) Distinguish between finite automata and push down automata.

7 Write short notes on:
(a) Recursively enumerable and recursive languages.
(b) FAs and TMs.
(c) Church's hypothesis.

8 (a) What is decidability of a problem? Give any two examples of undecidable problems. Prove their undecidability.
(b) Write short notes on LR(0) grammars.

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