Code: 9A05407

R09

B. Tech II Year II Semester (R09) Supplementary Examinations, November/December 2012

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 An NFA with states 1-5 and input alphabet [a, b] has the following transition table:

q	δ (q,a)	δ(q,b)
1	{1,2}	{1}
2	{3}	{3}
3	{4}	{4}
4	{5}	{ϕ}
5	{ϕ}	{5}

(a) Draw a transition diagram.
(b) Calculate δ*(1, ab).
(c) Calculate δ*(1, abaab).

2 (a) Explain about finite automata with output.
(b) Discuss in detail the two types of FA with output with example for each.

3 Give a DFA for accepting L = {$a^n b^m$|abs (n-m) mod 3$\leq$1} and show that L is non regular.

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 the following grammar is ambiguous and also eliminate the ambiguity using the if else rules in C language.

S → **if** (c) S / **if** (c) S **else** S **/** S.

(b) What are unit productions? Write the disadvantages of unit productions. Write the procedure for eliminating unit productions from a given CFG. Eliminate unit productions from the following grammar.

E → E+T / T T → T*F / F F → (E) / **id**

6 (a) Write short notes on:
(a) DPDA and NPDA. (b) Equivalence of CFG and PDA's.

7 (a) Write short notes on Church's hypothesis.
(b) Discuss in detail about various modifications that can be done to the basic model of a Turing machine.

8 (a) Show that PCP is undecidable over one symbol alphabet.
(b) Explain about Chomsky hierarchy of languages.

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