Code: 9A05407

R09

B.Tech II Year II Semester (R09) Supplementary Examinations May/June 2017

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) What is the finite state machine? Define finite automata and discuss the representation of finite automata.

(b) Discuss the applications of finite automata.

2 (a) Discuss about the “equivalence of Moore and Mealy machine”.

(b) Discuss the method for converting the Moore machine to Mealy machine.

3 (a) Show that if L is a regular language and F is a finite language, the LUF, L∩F, and L-F are regular?

(b) Show that if L is a non-regular language and F is a finite language then F is non-regular.

4 (a) Write the procedure for elimination of ε-productions from the grammar with an example.

(b) Eliminate unit productions from the following grammar:

S→A|bb.

A→B|a.

B→S|a.

5 Define Griebach Normal Form for a CFG. Find GNF for the following grammar.

E → E+T / T T → T*F / F F → (E) / a

6 (a) When do you say that a language is a DCFL? Design a DPDA for the language of strings over the alphabet {a, b} containing more number of a’s than number of b’s. Process the string ‘ababbaa’.

(b) Explain the abstract model of a PDA with a neat sketch.

7 Write short notes on:

(a) Multitape TMs.

(b) Universal TM.

(c) Counter Machine.

8 (a) Show that it is undecidable whether an arbitrary CFG is ambiguous. (Assume that PCP is undecidable).

(b) Write short notes on NP Hard and NP complete complexities of problems.

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