

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

- 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 $L \cup F$, $L \cap F$, 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:
 $S \rightarrow A|bb.$
 $A \rightarrow B|a.$
 $B \rightarrow S|a.$
- 5 Define Griebach Normal Form for a CFG. Find GNF for the following grammar.
 $E \rightarrow E+T / T$ $T \rightarrow T * F / F$ $F \rightarrow (E) / a$
- 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.
