

Code No: 114AG

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD

B.Tech II Year II Semester Examinations, May - 2016

FORMAL LANGUAGES AND AUTOMATA THEORY

(Computer Science and Engineering)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART - A**(25 Marks)**

- 1.a) Define a non-deterministic model with example. [2]
- b) State and explain Moors Machine. [3]
- c) Give an example to explain the concept of regular set. [2]
- d) Discuss about right linear and left linear grammars. [3]
- e) Give an example for context free language. [2]
- f) Write a context free grammar for the language $\{0^n 1^n / n \geq 1\}$. [3]
- g) When do you say that the Turing machine accepts a string. [2]
- h) What are the components of a Turing machine? [3]
- i) State and explain universal Turing machine. [2]
- j) Give an example to explain NP hard and NP Complete problems. [3]

PART - B**(50 Marks)**

2. Define DFA and Regular expression. DFA accepts all strings corresponding to the expression $1^*01(0+11)^*$. Also explain how to convert a regular expression to DFA. [10]
 3. Convert the following regular expressions to NFA with epsilon transitions
a) 0^*+1101 b) $(0+1)^*$ [5+5]
 4. Show that if L is regular grammar the L is a regular set. [10]
- OR**
5. Explain various components of context free grammar and derivation tree in detail. [10]
 6. When do you say a language L is unambiguous? Show that the language $L = \{a^n b^n / n \geq 1\}$ is unambiguous. [10]
- OR**
7. Show that the L is context free language, then there exists a Push down automata M such that $L = N(M)$. [10]

8. Show that any non-trivial property of the recursively enumerable language is undecidable? [10]

OR

9. Design a Turing machine to accept the set of all palindrome over $\{0,1\}^*$. Draw a transition diagram for the Turing machine of the above. [10]

10. State and explain in detail about P and NP problems. [10]

OR

11. Explain what undecidable problem is and post correspondence problem? [10]

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