Code No: 114AG

**R13**

**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 $\{0^n1^n /n>=1\}$. | [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]

**OR**

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 $L=\{a^nb^n|n>=1\}$ 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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