Code No: 134BD

R16

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year II Semester Examinations, December - 2019
FORMAL LANGUAGES AND AUTOMATA THEORY
(Common to CSE, IT)

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 as sub questions.

PART – A

(25 Marks)

1.a)	Define Non-deterministic Finite Automata.	[2]
b)	What is the mathematical model of finite automata?	[3]
c)	What are the Applications of the Pumping Lemma?	[2]
d)	What are the Decision Properties of Regular Languages?	[3]
e)	Define context free grammar.	[2]
f)	Define Pushdown Automaton.	[3]
g)	Define Chomsky Normal Form.	[2]
h)	What is Restricted Turing Machines?	[3]
i)	Define NP-complete problem.	[2]
j)	Give examples for undecidable problems.	[3]

PART – B

(50 Marks)

2. Design a DFA which accepts set of all strings which are divisible by 5 for binary alphabet. [10]

OR

3. Illustrate an example to explain the process used to convert a non-deterministic automata to deterministic automata? [10]

4. Convert regular expression (01^*+1) to finite automata. [10]

OR

5.a) Prove that regular set $L=\{1^p/p \text{ is a prime}\}$ is not regular.
b) Explain about Pumping Lemma. [5+5]

6. Construct a PDA that accepts the language $L = \{ WCW^R \mid W \in (a+b)^* \}$ [10]

OR

7.a) Explain about Ambiguity in Grammars and Languages with example.
b) Discuss in detail about leftmost and right most derivation tree with example. [10]

8. Design a Turing machine over $\Sigma=\{a,b\}$ to accept the language $L=\{WW^R|W\in(a,b)^+\}$. [10]

OR

9.a) Construct PDA from the following CFG

$S \rightarrow aAA$

$A \rightarrow aS|bS|a$

b) Explain Closure Properties of Context-Free Languages. [10]

10.a) Explain Decision Properties of Context-Free Languages.

b) Explain the concepts of Undecidable Problems about Turing Machines. [4+6]

OR

11.a) Discuss in detail about P and NP problems.

b) Explain about Post's Correspondence Problem with an example. [4+6]

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