Code No: 134BD

R16

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year II Semester Examinations, April - 2018
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, c as sub questions.

PART- A
(25 Marks)

1.a) Define DFA. [2]
b) Write about the applications of Finite Automata? [3]
c) If a Regular grammar G is given by $S \rightarrow aS/a$ Find DFA (M) accepting L(G)? [2]
d) Construct a regular grammar for $L= \{0^n 11/n >= 1\}$. [3]
e) For the Grammar $\{S \rightarrow AS/a, A \rightarrow SbA/SS/ba\}$ construct Left most derivation for the string aabbaaa? [2]
f) Define Push Down Automata. [3]
g) What is the purpose of studying Turing Machine? [2]
h) Write a Context free grammar for the language $\{0^n 1^n/n >= 1\}$. [3]
i) Give an example of un decidable problem. [2]
j) Define Post correspondence Problem. [3]

PART-B
(50 Marks)

2.a) Construct Minimum state Automata for the following DFA?
* denotes final state

δ	0	1
→Q1	q2	q6
q2	q1	q3
*q3	q2	q4
q4	q4	q2
q5	q4	q5
*q6	q5	q4

b) Differentiate between NFA and DFA. [6+4]

OR

3.a) Design DFA for the following over {a,b}.
i) All strings containing not more than three a's.
ii) All strings that has at least two occurrences of b between any two occurrences of a.
b) Construct a DFA accepting the set of all strings ending with 00? [5+5]

4.a) Define Regular Expression? Explain about the Properties of Regular Expressions.
  b) Construct a DFA for the Regular Language consisting of any number of a's and b's.
                                                                    [5+5]

OR

5.a) Construct a DFA for the Regular expression $(0+1)^* (00+11) (0+1)^*$.
  b) Explain about the identity rules of Regular Expressions.   [5+5]

6.a) Define Ambiguous Grammar. Check whether the grammar.
     S→aAB, A→bC/cd, C→cd, B→c/d Is Ambiguous or not?
  b) Construct a PDA for the following grammar S→AA/a, A→SA/b.   [5+5]

OR

7.a) Show that for every PDA there exists a CFG such that L(G)=N(P).
  b) Convert the grammar S→0AA, A →0S/1S/0 to a PDA that Accepts the same Language
     by Empty Stack.   [5+5]

8.a) Construct a Turing Machine that will accept the Language consists of all palindromes of
     0's and 1's?
  b) Explain about types of Turing Machine.   [5+5]

OR

9.a) Obtain GNF for S→AB, A→BS/b , B→SA/a.
  b) Design a Turing Machine for L={$0^n1^m0^n1^m$/m,n>=1}.   [5+5]

10.a) Discuss in brief about NP Hard problems.
  b) Explain about the Decidability and Undecidability Problems.   [5+5]

OR

11.a) Give an overview of recursively enumerable language.
  b) Give the correspondence between P, NP and NP-complete problems.   [5+5]

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